

# **1988 PROCEEDINGS**



**American Peanut Research  
and  
Education Society, Inc.**

**Volume 20**

**Volume 20**

**1988  
PROCEEDINGS**

**of**

**THE AMERICAN PEANUT RESEARCH  
AND EDUCATION SOCIETY, INC.**

**Meeting  
Tulsa, Oklahoma  
July 12-15, 1988**

**Publication Date  
November 1988**

**Editor: J. Ronald Sholar  
Production Editor: Brenda Louderback**

BOARD OF DIRECTORS  
1988-89

President----- Hassan A. Melouk (1989)  
Past President----- Daniel W. Gorbet (1989)  
President-elect----- Johnny C. Wynne (1989)  
State Employee Representative----- Charles Simpson (1990)  
USDA Representative----- Floyd J. Adamsen (1990)  
Industry Representatives:  
    Production----- Benny Rogerson (1990)  
    Shelling, Marketing, Storage----- T.H. Birdsong, III (1989)  
    Manufactured Products----- Gerry Zekert (1989)  
National Peanut Council President----- C. Edward Ashdown (1989)  
Executive Officer----- J. Ron Sholar (1989)

MEETING SITES

|                                  |                                  |
|----------------------------------|----------------------------------|
| 1969 - Atlanta, Georgia          | 1979 - Tulsa, Oklahoma           |
| 1970 - San Antonio, Texas        | 1980 - Richmond, Virginia        |
| 1971 - Raleigh, North Carolina   | 1981 - Savannah, Georgia         |
| 1972 - Albany, Georgia           | 1982 - Albuquerque, New Mexico   |
| 1973 - Oklahoma City, Oklahoma   | 1983 - Charlotte, North Carolina |
| 1974 - Williamsburg, Virginia    | 1984 - Mobile, Alabama           |
| 1975 - Dothan, Alabama           | 1985 - San Antonio, Texas        |
| 1976 - Dallas, Texas             | 1986 - Virginia Beach, Virginia  |
| 1977 - Asheville, North Carolina | 1987 - Orlando, Florida          |
| 1978 - Gainesville, Florida      | 1988 - Tulsa, Oklahoma           |

1969-1978: American Peanut Research and Education Association (APREA)  
1979-Present: American Peanut Research And Education Society, Inc. (APRES)

APRES COMMITTEES  
1988-89

PROGRAM COMMITTEE

J. C. Wynne (1989)

PUBLIC RELATIONS COMMITTEE

D. A. Knauft, Chair (1989)  
E. J. Long (1989)  
J. P. Beasley (1990)  
E. Colburn (1990)  
L. J. Littlefield (1991)  
D. Colvin (1991)  
D. T. Gooden (1991)

FINANCE COMMITTEE

W. Mozingo, Chair (1991)  
C. E. Simpson (1989)  
B. J. Brecke (1990)  
D. Dougherty (1991)  
F. W. Nutter, Jr. (1991)

NOMINATING COMMITTEE

D. W. Gorbett, Chair (1989)  
M. Beute (1989)  
M. Schubert (1989)

PUBLICATIONS & EDITORIAL COMMITTEE

D. Smith, Chair (1990)  
R. J. Henning (1989)  
A. B. Rogerson (1989)  
J. M. Bennett (1990)  
T. J. Whitaker (1991)  
D. L. Ketring (1991)  
C. S. Kvien, Ex-Officio  
C.C. Holbrook, Ex-Officio  
H. E. Pattee, Ex-Officio  
E. M. Ahmed, Ex-Officio

PEANUT QUALITY COMMITTEE

D. L. Hartzog, Chair (1990)  
J. H. West (1989)  
M. R. Cobb (1989)  
T. J. Whitaker (1990)  
P. Blankenship (1991)  
J. Grichar (1991)  
J. Kirby (1991)  
M. Grice (1991)

BAILEY AWARD COMMITTEE

F. S. Wright, Chair (1989)  
H. W. Spurr, Jr. (1989)  
F. M. Shokes (1990)  
C. S. Kvien (1990)  
J. Starr (1991)  
T. Brennenman (1991)

FELLOWS COMMITTEE

O. D. Smith, Chair (1989)  
C. T. Young (1989)  
J. W. Dickens (1990)  
A. H. Allison (1990)  
F. McGill (1991)  
D. H. Smith (1991)

NAT'L. PEANUT COUNCIL RES. & ED AWARD

G. Buchanan, Chair (1989)  
A. H. Allison (1989)  
J. F. McGill (1990)  
R. Cole (1990)  
R. Howell (1991)  
P. Phipps (1991)

SITE SELECTION COMMITTEE

G. Sullivan, Chair (1989)  
N. L. Sugg (1989)  
A. S. Csinos (1990)  
R. E. Lynch (1990)  
T. A. Lee (1991)  
C. E. Simpson (1991)  
F. S. Wright (1992)  
B. Birdsong (1992)

LIAISON MEMBERS

G. A. Buchanan, Southern Agric. Experiment  
Station Directors (1989)

W. D. Branch, American Society of  
Agronomy (1989)

J. R. Sholar, CAST (1991)

# PAST PRESIDENTS, APRES

|                  |        |                  |        |
|------------------|--------|------------------|--------|
| Daniel W. Gorbet | (1987) | Astor Perry      | (1977) |
| D. Morris Porter | (1986) | Leland Tripp     | (1976) |
| Donald H. Smith  | (1985) | J. Frank McGill  | (1975) |
| Gale A. Buchanan | (1984) | Kenneth Garren   | (1974) |
| Fred C. Cox      | (1983) | Edwin L. Sexton  | (1973) |
| David C. H. Hsi  | (1982) | Olin D. Smith    | (1972) |
| James L. Butler  | (1981) | William T. Mills | (1971) |
| Allen H. Allison | (1980) | J. W. Dickens    | (1970) |
| James S. Kirby   | (1979) | David L. Moake   | (1969) |
| Allen J. Norden  | (1978) | Norman D. Davis  | (1968) |

## FELLOWS OF APRES

|                      |        |                         |        |
|----------------------|--------|-------------------------|--------|
| Mr. J. Frank McGill  | (1988) | Mr. J. W. Dickens       | (1985) |
| Dr. Donald H. Smith  | (1988) | Dr. Thurman Boswell     | (1985) |
| Mr. Joe S. Sugg      | (1988) | Dr. Allen J. Norden     | (1984) |
| Dr. Donald J. Banks  | (1988) | Dr. William V. Campbell | (1984) |
| Dr. James L. Steele  | (1988) | Dr. Harold Pattee       | (1983) |
| Dr. Daniel Hallock   | (1986) | Dr. Leland Tripp        | (1983) |
| Dr. Clyde T. Young   | (1986) | Dr. Kenneth H. Garren   | (1982) |
| Dr. Olin D. Smith    | (1986) | Dr. Ray O. Hammons      | (1982) |
| Mr. Allen H. Allison | (1985) | Mr. Astor Perry         | (1982) |

## BAILEY AWARD WINNERS

|      |                                                           |
|------|-----------------------------------------------------------|
| 1988 | A.K. Culbreath and M.K. Beute                             |
| 1987 | J.H. Young and L.J. Rainey                                |
| 1986 | T. B. Breneman, P.M. Phipps, R.J. Stipes                  |
| 1985 | K.V. Pixley, K.J. Boote, F.M. Shokes, and D.W. Gorbet     |
| 1984 | C.S. Kvien, R.J. Henning, J.E. Pallas, and W.D. Branch    |
| 1983 | C.S. Kvien, J.E. Pallas, D.W. Maxey, and J. Evans         |
| 1982 | E. Jay Williams and J. Stanley Drexler                    |
| 1981 | N.A. deRivero and S. L. Poe                               |
| 1980 | J. Stanley Drexler and E. Jay Williams                    |
| 1979 | David A. Nickle and David W. Hagstrum                     |
| 1978 | John M. Troeger and James L. Butler                       |
| 1977 | Johnny C. Wynne                                           |
| 1976 | J. W. Dickens and Thomas B. Whitaker                      |
| 1975 | Robert E. Pettit, Frederick M. Shokes, and Ruth Ann Taber |

## GOLDEN PEANUT RESEARCH AND EDUCATION AWARD WINNERS

|      |                                                                  |      |                             |
|------|------------------------------------------------------------------|------|-----------------------------|
| 1988 | R.J. Henning                                                     | 1975 | R.O. Hammons                |
| 1987 | L.M. Redlinger                                                   | 1974 | K.H. Garren                 |
| 1986 | A.H. Allison                                                     | 1973 | A.J. Norden                 |
| 1985 | E.J. Williams and J.S. Drexler                                   | 1972 | U.L. Diener and N.D. Davis  |
| 1984 | Leland Tripp                                                     | 1971 | A.E. Waliking               |
| 1983 | Richard Cole, Timothy Sanders, Robert Hill, and Paul Blankenship | 1970 | A.L. Harrison               |
| 1982 | J. Frank McGill                                                  | 1969 | H.C. Harris                 |
| 1981 | G.A. Buchanan and E.W. Hauser                                    | 1968 | C.R. Jackson                |
| 1980 | T.B. Whitaker                                                    | 1967 | R.S. Matlock and M.E. Mason |
| 1979 | J.L. Butler                                                      | 1966 | L.I. Miller                 |
| 1978 | R.S. Hutchinson                                                  | 1965 | B.C. Langley                |
| 1977 | H.E. Pattee                                                      | 1964 | A.M. Altschul               |
| 1976 | D.A. Emery                                                       | 1963 | W.A. Carver                 |
| 1975 | R.O. Hammons                                                     | 1962 | J.W. Dickens                |
| 1974 | K.H. Garren                                                      | 1961 | W.C. Gregory                |

1989 Changed to National Peanut Council Research and Education Award  
 1961-1988 Golden Peanut Research and Education Award

# TABLE OF CONTENTS

PAGE

## ABSTRACTS

### BREEDING AND GENETICS

|                                                                                                                                          |    |
|------------------------------------------------------------------------------------------------------------------------------------------|----|
| Variability in Growth Characteristics of Peanut Lines-----                                                                               | 12 |
| D. A. Knauff* and D. W. Gorbet                                                                                                           |    |
| Use of Reproductive:Vegetative Ratios and Efficiency Factors as Potential<br>Criteria for Single Plant Selection in Peanut Breeding----- | 12 |
| Donald J. Banks                                                                                                                          |    |
| The Parental Potential of Six Diverse Peanut Cultivars-----                                                                              | 13 |
| C. C. Holbrook* and W. D. Branch                                                                                                         |    |
| Cyclic versus Pedigree Selection Method in Peanut-----                                                                                   | 13 |
| W. D. Branch*, J. S. Kirby, J. C. Wynne, C. C. Holbrook and<br>W. F. Anderson                                                            |    |
| Breeding For CER Resistance in Peanut-----                                                                                               | 14 |
| T. A. Coffelt* and P. M. Phipps                                                                                                          |    |
| Inheritance of Earliness in Crosses among Five Early-Maturing Spanish<br>Peanut Varieties-----                                           | 14 |
| O. N'Doye*, O. D. Smith and G. B. Parker                                                                                                 |    |
| The Inheritance of a High Oleic Acid Oil in Peanut-----                                                                                  | 15 |
| K. M. Moore* and D. A. Knauff                                                                                                            |    |
| Techniques for Maintaining Precious <u>Arachis</u> Germplasm-----                                                                        | 15 |
| C. E. Simpson                                                                                                                            |    |

### ENTOMOLOGY

|                                                                                                                         |    |
|-------------------------------------------------------------------------------------------------------------------------|----|
| Thrips Control Regimes Targeted to Reduce Tomato Spotted Wilt<br>Virus on Peanut-----                                   | 16 |
| J. R. Weeks*, T. P. Mack, J. C. French and A. K. Hagan                                                                  |    |
| Monitoring the Adult Southern Corn Rootworm with Pheromone-Baited<br>and Unbaited Sticky Traps-----                     | 16 |
| W. V. Campbell                                                                                                          |    |
| Effect of Groundnut Harvest Data and Termite-resistant Varieties on<br>Termite Damage in Burkina Faso, West Africa----- | 17 |
| R. E. Lynch*, A. P. Ouedraogo and S. A. Some                                                                            |    |

### EXTENSION

|                                                                                |    |
|--------------------------------------------------------------------------------|----|
| Optimal Peanut Production Plans for Southeast Farmers-----                     | 18 |
| T. D. Hewitt*, S. A. Ford and H. E. Jowers                                     |    |
| Producing Quality Peanuts: Getting the Message Across-----                     | 18 |
| J. P. Beasley, Jr.                                                             |    |
| Extension Implementation of the Hull-Scrape Method-----                        | 19 |
| J. A. Baldwin                                                                  |    |
| Use of a Spreadsheet for Expediting the Use of a Peanut Disease Threshold----- | 19 |
| J. E. Bailey                                                                   |    |
| Evaluation and Implications of "Profitable" Peanut Contracts-----              | 20 |
| F. D. Mills, Jr.                                                               |    |

## HARVESTING AND HANDLING

Page

|                                                                                                                                    |    |
|------------------------------------------------------------------------------------------------------------------------------------|----|
| Effect of Stacked Windrow on Peanut Curing Environment-----                                                                        | 21 |
| J. L. Butler*, E. J. Williams, J. R. Vercellotti and K. L. Crippen                                                                 |    |
| Interrelationships Between Volatile Concentrations, Seed Size<br>Categories, and Flavor in Large-Seeded Virginia Type Peanuts----- | 21 |
| H. E. Pattee*, E. W. Rogister, J. W. Dickens and G. A. Sullivan                                                                    |    |
| Variability in Sampling and Grading Florunner Farmers Stock Peanuts-----                                                           | 22 |
| J. I. Davidson, Jr.*, Y. J. Tsai, R. J. Cole, J. W. Dorner<br>and F. E. Dowell                                                     |    |
| Effects of Belt Screening Peanuts Before Drying-----                                                                               | 22 |
| P. D. Blankenship*, T. H. Sanders, J. R. Vercellotti and K. L. Crippen                                                             |    |
| Effect of Screening on the Quota Loan Value of Farmers Stock Peanuts-----                                                          | 23 |
| J. W. Dickens* and A. B. Slate                                                                                                     |    |
| Moisture Content and Storage System Affects on Peanut Quality and<br>Milling Parameters-----                                       | 23 |
| J. S. Smith, Jr.* and T. H. Sanders                                                                                                |    |

## MYCOTOXINS

|                                                                                                                                                                     |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Pattern of Preharvest Aflatoxin Contamination of Peanuts Based on<br>Single Kernel Analysis-----                                                                    | 24 |
| J. W. Dorner*, R. J. Cole, P. D. Blankenship and T. H. Sanders                                                                                                      |    |
| Effects of Gypsum and Irrigation on <u>Aspergillus flavus</u> Group Colonization<br>of Peanuts-----                                                                 | 24 |
| D. M. Wilson* and M. E. Walker                                                                                                                                      |    |
| Aflatoxin Content of Peanuts Cleaned On a Peanut Belt Screen Before Drying-----                                                                                     | 25 |
| T. H. Sanders*, P. D. Blankenship and R. J. Cole                                                                                                                    |    |
| Detection of Aflatoxin in Various Components of Farmers Stock Peanuts-----                                                                                          | 25 |
| F. E. Dowell*, J. W. Dorner, J. I. Davidson, R. J. Cole and<br>W. G. Ferguson                                                                                       |    |
| Simulating the Testing of Peanut Lots in the Export Market for Aflatoxin-----                                                                                       | 26 |
| T. B. Whitaker* and J. W. Dickens                                                                                                                                   |    |
| Electrophoretic Comparison of Cotyledonary Proteins from Kernels of<br>Fourteen Peanut Cultivars Colonized by <u>Aspergillus</u> spp. for<br>Different Periods----- | 26 |
| J. B. Szerszen* and R. E. Pettit                                                                                                                                    |    |
| Isolation and Characterization of Phenolic Acids in Mature Peanut Seed<br>Coats from Twenty-three peanut Genotypes-----                                             | 27 |
| H. A. Azaizah, R. D. Waniska and R. E. Pettit*                                                                                                                      |    |

## PATHOLOGY

|                                                                                                                  |    |
|------------------------------------------------------------------------------------------------------------------|----|
| The Effect of Planting Date on Severity of Leafspot and Sclerotinia<br>Blight of Peanuts-----                    | 28 |
| D. M. Porter*, R. W. Mozingo and K. P. Burnham                                                                   |    |
| Effect of Supplemental Irrigation and Rovral on Sclerotinia Blight<br>of Peanut-----                             | 28 |
| K. E. Jackson*, H. A. Melouk and C. N. Akem                                                                      |    |
| Agar Plate, Soil Plate and Field Evaluation of Fungicides for Activity<br>Against <u>Sclerotinia minor</u> ----- | 29 |
| F. D. Smith*, P. M. Phipps and R. J. Stipes                                                                      |    |

|                                                                                                                                                                                |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Comparison of Three New methods of Copper Resinate Application for<br>Control of Certain Soil-borne Pathogens in Peanuts-----                                                  | 29 |
| W. W. Osborne* and J. D. Taylor                                                                                                                                                |    |
| Effect of <u>Penicillium citrinum</u> Filtrate on Germination and Growth of<br>Sclerotia of <u>Sclerotinia minor</u> -----                                                     | 30 |
| C. N. Akem* and H. A. Melouk                                                                                                                                                   |    |
| Growth Stimulation of Peanut in Response to Mycorrhizal Colonization-----                                                                                                      | 30 |
| J. S. Neck* and R. A. Taber                                                                                                                                                    |    |
| Simulation Model of the Progression of Leafspot Diseases Affecting Peanut-----                                                                                                 | 31 |
| G. Bourgeois*, K. J. Boote and R. D. Berger                                                                                                                                    |    |
| Management of Late Leafspot on a Partially Resistant Cultivar-----                                                                                                             | 31 |
| F. M. Shokes* and D. W. Gorbet                                                                                                                                                 |    |
| Field Performance of Computerized Advisories for Fungicide Application<br>to Control Early Leafspot of Peanut-----                                                             | 32 |
| R. M. Cu*, P. M. Phipps, J. L. Steele and R. J. Stipes                                                                                                                         |    |
| In-Vitro Fungicide Sensitivity of <u>Cercosporidium personatum</u> -----                                                                                                       | 32 |
| T. B. Brenneman* and E. L. Jewell                                                                                                                                              |    |
| Comparative Effects of a Protectant vs. a Sterol Inhibiting Fungicide<br>on Disease Components of Late Leafspot of Peanut-----                                                 | 33 |
| F. W. Nutter, Jr.* and J. L. Labrinos                                                                                                                                          |    |
| Relationships Between Plot Yield and Spectral Reflectance Patterns<br>of Peanuts Developing Under Stress-----                                                                  | 33 |
| V. J. Elliott* and H. W. Spurr, Jr.                                                                                                                                            |    |
| Resistance of the Peanut Variety 'Southern Runner' to White Mold,<br><u>Sclerotium rolfsii</u> -----                                                                           | 34 |
| J. E. Arnold, R. K. Sprentel*, D. W. Gorbet and J. King                                                                                                                        |    |
| Deposition of Sprays on the Soil for Soil-borne Targets of Peanut-----                                                                                                         | 34 |
| A. S. Csinos* and C. S. Kvien                                                                                                                                                  |    |
| Comparison of Chlorpyrifos, Ethoprop, and Fonofos with PCNB for<br>Southern Stem Rot Suppression on Peanut-----                                                                | 35 |
| A. K. Hagan* and J. R. Weeks                                                                                                                                                   |    |
| Control of <u>Cylindrocladium</u> Black Rot (CER) of Peanut with Soil Fumigants<br>having Methyl Isothiocyanate as the Active Ingredient for Soilborne<br>Disease Control----- | 35 |
| P. M. Phipps                                                                                                                                                                   |    |
| Effect of Resistant and Susceptible Peanut Genotypes on Time of Onset<br>and Rate of <u>Cylindrocladium</u> Black Rot Epidemics-----                                           | 36 |
| A. K. Culbreath* and M. K. Beute                                                                                                                                               |    |
| Effect of Fungicides on Infection of Peanut Hypocotyl With<br><u>Aspergillus niger</u> -----                                                                                   | 36 |
| S. S. Aboshosha, H. A. Melouk and D. H. Smith                                                                                                                                  |    |
| Control of Rhizoctonia Limb Rot with Diniconazole (Spotless 25WP)-----                                                                                                         | 37 |
| J. S. Barnes* and A. S. Csinos                                                                                                                                                 |    |
| Comparison of Seven Peanut Genotypes for Pod rot Susceptibility and<br>Influence on <u>Pythium</u> Inoculum Densities in Soil-----                                             | 37 |
| P. I. Lewis* and A. B. Filonow                                                                                                                                                 |    |

|                                                                                                                 | <u>Page</u> |
|-----------------------------------------------------------------------------------------------------------------|-------------|
| Colorimetric Assessment of Pod Rot Disease Severity in Peanuts—<br>G. B. Parker, O. D. Smith* and W. J. Grichar | 38          |
| Effects of Ethoprop and Metalaxyl-PCNB on Nematodes and Peanut Pod Rot—<br>H. H. Fagbenle and K. E. Jackson     | 38          |
| Nematode Diseases of Groundnut in India—<br>S. B. Sharma                                                        | 39          |
| Resistance to Root-knot Nematode in Exotic Peanut Germplasm—<br>S. C. Nelson*, C. E. Simpson and J. L. Starr    | 39          |
| Distribution of Spotted Wilt Disease in South Texas Peanut Fields—<br>M. C. Black* and D. H. Smith              | 40          |

#### PHYSIOLOGY AND SEED TECHNOLOGY

|                                                                                                                                                                                               |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Relation of Peanut Phenology with Thermal Time—<br>D. L. Ketrting* and T. G. Wheless                                                                                                          | 41 |
| Pod Characteristics Influencing Calcium Concentrations in the<br>Seed and Hull of Peanut ( <i>Arachis hypogaea</i> L.)—<br>C. S. Kvien*, W. D. Branch, M. E. Sumner, A. S. Csinos and H. Smal | 41 |
| Soil Temperature Effects on Free Carbohydrate Concentrations in Peanut<br>( <i>Arachis hypogaea</i> L.) Seed—<br>J. L. McMeans*, T. H. Sanders, B. W. Wood and P. D. Blankenship              | 42 |
| Shoot-tip Culture of Peanut—<br>W. Q. Chen*, B. Johnson and J. L. Sherwood                                                                                                                    | 42 |
| Effects of Substrate Calcium Concentrations on Nodulation and the<br>Incidence of Mycorrhizal Association of Peanut Roots—<br>J. S. Calahan, Jr.                                              | 43 |
| Deposition Pattern of Arachin During Peanut ( <i>Arachis hypogaea</i> L.)<br>Seed Maturation—<br>S. M. Basha                                                                                  | 43 |
| The Effect of Spotless on Vegetative and Reproductive Growth of Peanuts—<br>G. A. Sullivan                                                                                                    | 44 |
| Effects of Plant Density and Planting Pattern on Peanut—<br>T. Misungayi* and F. P. Gardner                                                                                                   | 44 |

#### PROCESSING AND UTILIZATION

|                                                                                                                                                 |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Variation of Color of Oil Cooked Virginia-Type Peanuts—<br>J. E. Erickson*, M. D. Keziah, L. A. Nelson, C. T. Young and<br>R. W. Mozingo        | 45 |
| Microwave Roasting of Peanut Seeds—<br>E. M. Ahmed                                                                                              | 45 |
| Effect of the Degree of Roasting on the Production of Pyrazines<br>in Florunner Peanuts—<br>J. A. Lansden*, T. H. Sanders and J. R. Vercellotti | 46 |
| Sensory Evaluation of a High Oleic Acid Peanut Line—<br>Clyde T. Young* and A. J. Norden                                                        | 46 |

|                                                                                                                      |    |
|----------------------------------------------------------------------------------------------------------------------|----|
| Investigation of the Relationship between Flavor Profiles and Peanut Volatile Profiles Using Multivariate Analysis   | 47 |
| K. L. Crippen*, G. Shaffer, and N. V. Lovegren, P. D. Blankenship, G. V. Civile, T. H. Sanders and J. R. Vercellotti |    |

|                                                                                                                            |    |
|----------------------------------------------------------------------------------------------------------------------------|----|
| Effect of Peanut Kernel Moisture Content on Lipoxigenase Activity in Raw Peanuts as Evidenced by Volatiles Profile Changes | 47 |
| N. V. Lovegren*, J. R. Vercellotti and T. H. Sanders                                                                       |    |

|                                                                           |    |
|---------------------------------------------------------------------------|----|
| Significance, Identification, and Detection of Allergenic Peanut Proteins | 48 |
| S. L. Taylor*, J. A. Nordlee, S. Meier-Davis and R. K. Bush               |    |

#### PRODUCTION TECHNOLOGY

|                                                                               |    |
|-------------------------------------------------------------------------------|----|
| Effect of Rhizobium Inoculation and Nitrogen Fertilizer on Peanut in Oklahoma | 49 |
| J. R. Sholar* and G. Turpin                                                   |    |

|                                                                                                 |    |
|-------------------------------------------------------------------------------------------------|----|
| Yield, Value, and Disease Response of Peanuts to Conservation Methods of Production in Virginia | 49 |
| F. S. Wright* and D. M. Porter                                                                  |    |

|                                                                   |    |
|-------------------------------------------------------------------|----|
| Irrigation of Peanut Using a Subsurface Trickle Irrigation System | 50 |
| N. L. Powell* and F. S. Wright                                    |    |

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| Effect of Harvesting Date on Yield, Grade and Seed Quality of Southern Runner Peanut | 50 |
| R. R. Pedelini* and E. B. Whitty                                                     |    |

|                                                                      |    |
|----------------------------------------------------------------------|----|
| Mineral Distribution in Peanuts as Detected by SEM-ED X-Ray Analysis | 51 |
| R. K. Howell*, W. P. Wergin and N. Chaney                            |    |

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| Impact of Peanut Production Costs on the Quota Support Formula of the Peanut Program | 51 |
| R. H. Miller                                                                         |    |

|                                                                                                           |    |
|-----------------------------------------------------------------------------------------------------------|----|
| Assessment of Shell Damage and Fungal Infection Rates of Seed in Samples of Five Diverse Peanut Cultivars | 52 |
| J. L. Steele*, D. M. Porter and T. A. Coffelt                                                             |    |

#### WEED SCIENCE

|                                                                          |    |
|--------------------------------------------------------------------------|----|
| Phytotoxicity of Paraquat as Affected by Formulation and Peanut Cultivar | 53 |
| D. L. Colvin* and B. J. Brecke                                           |    |

|                                                                       |    |
|-----------------------------------------------------------------------|----|
| Efficacy of Various Herbicides for Yellow Nutsedge Control in Peanuts | 53 |
| W. J. Grichar                                                         |    |

|                                                          |    |
|----------------------------------------------------------|----|
| Economics of Peanut Weed Control Systems without Dinoseb | 54 |
| J. W. Wilcut*, G. R. Wentje, T. V. Hicks and T. A. Cole  |    |

|                                                              |    |
|--------------------------------------------------------------|----|
| Label Update for the Use of Lactofen on Peanuts              | 54 |
| H. B. Hagwood*, M. R. Bates, T. D. Bishop and C. A. Trammell |    |

|                                                         |    |
|---------------------------------------------------------|----|
| Basagran-Gramoxone Interactions in Early Season Peanuts | 55 |
| J. C. Turner* and J. R. Evans                           |    |

|                                                            |    |
|------------------------------------------------------------|----|
| Benchmark <sup>TM</sup> Herbicide: Weed Control in Peanuts | 55 |
| J. C. Hulbert*, D. D. Rogers and R. L. Brooks              |    |

|                                                          |    |
|----------------------------------------------------------|----|
| Recent Advances in Chlorothalonil Formulation Technology | 56 |
| W. C. Odle                                               |    |

|                                                                     | <u>Page</u> |
|---------------------------------------------------------------------|-------------|
| Use of 'Norflurazon' on Peanuts for Florida Beggarweed Control----- | 56          |
| H. S. McLean                                                        |             |

## SYMPOSIA

### PEANUT SYSTEMS RESEARCH

|                                                                                                                         |    |
|-------------------------------------------------------------------------------------------------------------------------|----|
| Research and Management Applications of the FNUITGRO Crop Growth Model-----                                             | 57 |
| K. J. Boote*, J. W. Jones and G. Hoogenboom                                                                             |    |
| Use of "PEANUT" by Research, Extension and Farm Managers-----                                                           | 57 |
| J. H. Young                                                                                                             |    |
| Use of a Peanut Leafspot Model in Virginia-----                                                                         | 58 |
| J. L. Steele*, P. M. Phipps and D. M. Porter                                                                            |    |
| Use of a Weather-Based Forecasting Model for Late Leafspot: Integration<br>with Fungicides and Resistant Varieties----- | 58 |
| F. W. Nutter, Jr.                                                                                                       |    |
| A Peanut Harvest Scheduling Model for Use by Research, Extension, and<br>Farm Managers-----                             | 59 |
| E. J. Williams                                                                                                          |    |
| Use of Expert Systems by Research, Extension, and Farm Managers-----                                                    | 59 |
| R. W. McClendon                                                                                                         |    |
| An Expert System for Management of the Lesser Cornstalk Borer-----                                                      | 60 |
| Y. Wang and T. P. Mack*                                                                                                 |    |
| Development of an Expert Systems Model for Managing Irrigation and Pests<br>in Peanuts-----                             | 60 |
| J. I. Davidson, Jr.*, S. Parker and A. Jones                                                                            |    |
| The Coastal Plain Experiment Station's Computerized Peanut Literature<br>Database-----                                  | 61 |
| C. S. Kvien*, C. C. Holbrook and G. A. Buchanan                                                                         |    |
| Software, Networking and Contacts for Obtaining Access to Peanut<br>Systems Information-----                            | 61 |
| C. L. Butts                                                                                                             |    |

### DEVELOPMENT AND UTILIZATION OF NEW PEANUT PRODUCTS

|                                                                                        |    |
|----------------------------------------------------------------------------------------|----|
| Overview of Present Day Industrial Uses of Peanuts-----                                | 62 |
| J. R. Baxley                                                                           |    |
| Competitive Inroads Made by Other Edible Nuts in the Food Industry-----                | 62 |
| Melanie L. Miller                                                                      |    |
| Peanut Products Utilization in Japan and Asia-----                                     | 63 |
| A. Matsunobu                                                                           |    |
| Developing Creative Peanut Butter Recipes for Home and Institutional Uses-----         | 63 |
| S. B. Huffman                                                                          |    |
| New Peanut Product Development in Thailand and Other Southeast<br>Asian Countries----- | 64 |
| C. Oupadissakoon*, V. Haruthaithanasan and P. Chompreeda                               |    |
| Peanuts and Candy - The Incredible Combination-----                                    | 64 |
| J. S. L. How                                                                           |    |

|                                                                              |    |
|------------------------------------------------------------------------------|----|
| Designing the "Perfect" Peanut Variety for Maximizing Industrial Utilization | 65 |
| R. W. Mozingo                                                                |    |

#### SCLEROTINIA CONFERENCE

|                                                                                       |    |
|---------------------------------------------------------------------------------------|----|
| Sclerotinia Blight of Peanuts                                                         | 66 |
| D. M. Porter                                                                          |    |
| Status of Sclerotinia Blight of Peanut in Oklahoma                                    | 66 |
| H. A. Melouk* and L. J. Littlefield                                                   |    |
| Strategies for Control of Sclerotinia Blight of Peanut in Virginia and North Carolina | 67 |
| P. M. Phipps* and J. E. Bailey                                                        |    |
| Status of Sclerotinia Blight in Texas                                                 | 67 |
| T. A. Lee, Jr.* and K. E. Woodard                                                     |    |

#### SOCIETY BUSINESS

|                                                           |     |
|-----------------------------------------------------------|-----|
| President's Report                                        | 68  |
| Minutes of Board of Directors Meeting                     | 70  |
| Minutes of Regular Business Meeting                       | 71  |
| Finance Committee Report                                  | 72  |
| Peanut Science Budget                                     | 73  |
| APRES Budget                                              | 74  |
| Financial Statements                                      | 75  |
| Nominating Committee Report                               | 78  |
| Public Relations Committee Report                         | 78  |
| Publications and Editorial Committee Report               | 79  |
| Peanut Quality Committee Report                           | 80  |
| Program Committee Report                                  | 81  |
| 1988 Program                                              | 82  |
| Bailey Award Committee Report                             | 93  |
| Fellows Committee Report                                  | 95  |
| CAST Report                                               | 98  |
| Site Selection Committee Report                           | 98  |
| ASA Liaison Report                                        | 98  |
| NPC Research and Education Award Report                   | 99  |
| Southern Agricultural Experiment Station Directors Report | 99  |
| By-Laws                                                   | 100 |
| Membership Roster                                         | 106 |
| Author Index                                              | 145 |

# BREEDING AND GENETICS

Variability in Growth Characteristics of Peanut Lines. D. A. KNAUFT\* and D. W. GORBET. Dept of Agronomy, University of Florida, Gainesville, 32611 and Marianna, 32446

Sixteen peanut genotypes were evaluated without the use of fungicides for leafspot control. Data were gathered to provide information for the development of selection criteria to incorporate earliness with high yield in leafspot resistant lines. Vegetative and pod yields, as well as disease resistance parameters, were measured at 10 day intervals throughout the growing season for two years. The high yielding, leafspot susceptible cultivars had earlier pod production, greater pod yield early in the growing season, produced their maximum recoverable pod yield earlier, had higher partitioning, and lower total vegetative growth than the resistant lines in this study. The leafspot resistant lines were all later in maturity than the cultivars. Compared to other resistant lines, the several lines with relatively high yields had higher partitioning rates and had lower vegetative yields. Selection for disease resistance in peanut has identified large numbers of lines with low yield and late maturity. Choosing among leafspot resistant lines for early initiation of pod growth along with lower vegetative production may be a useful method for combining high yield, earlier maturity, and disease resistance.

Use of Reproductive:Vegetative Ratios and Efficiency Factors as Potential Criteria for Single Plant Selection in Peanut Breeding. DONALD J. BANKS. USDA, ARS,

Plant Science Research Laboratory, P.O. Box 1029, Stillwater, OK 74076. Partitioning of photosynthate to fruit production is an extremely important physiological factor in peanut yield determination. However, comparisons of reproductive:vegetative ratios ( $R:V$  = dry pod weight/above-ground dry plant weight) have not been fully utilized by peanut breeders during the selection process. My studies have shown that there is considerable variation in pod yield, vegetative plant weight, and  $R:V$  ratios among selected peanut genotypes. Generally, there has been a positive correlation between plant weight and pod yield.  $R:V$  ratios have ranged from  $<0.1$  to  $>1.0$ , with the highest ratios being noted in breeding lines derived from crosses between OK-FH 13 and VA 81B, two highly productive peanut genotypes. Direct comparisons of pod yield and  $R:V$  ratios for assisting in the plant selection process can be made by comparing their efficiency factors ( $EF$  = pod yield  $\times R:V$  ratio). Consequently, selection of genotypes with a balance between plant size and reproductive potential may be achieved more easily. Proper utilization of the above two factors should assist the peanut breeder in making single plant selections in segregating populations.

The Parental Potential of Six Diverse Peanut Cultivars. C. C. HOLBROOK\* and W. D. BRANCH, USDA-ARS and Univ. of Georgia, Coastal Plain Exp. Stn., Tifton, GA 31793.

The objective of this study was to determine the combining ability for yield, yield components and grade of six genetically diverse peanut cultivars. The cultivars, Dixie Spanish, Spangcross, Southeastern Runner 56-15, Tifrun, Virginia Runner G26 and Georgia 119-20 were intermated using a half-diallel mating design. Parents were field evaluated along with progeny each year at Tifton, GA.  $F_1$ ,  $F_2$  and  $F_3$  generations were tested in 1984, 1986 and 1987, respectively. SCA was still a significant source of variation in the  $F_3$  generation. However, SCA accounted for a relatively small proportion of the total variation. Tifrun had the greatest GCA effects for all yield components and total yield. Progeny from Tifrun X Virginia Runner G26 had significantly higher yield than all other combinations.

Cyclic versus Pedigree Selection Method in Peanut. W. D. BRANCH\*, J. S. KIRBY, J. C. WYNNE, C. C. HOLBROOK and W. F. ANDERSON. Dept. of Agronomy, Univ. of Georgia, Coastal Plain Expt. Station, Tifton, GA 31793; Dept. of Agronomy, Okla. State Univ., Stillwater, OK 74078; Dept. of Crop Science, N. C. State Univ., Raleigh, NC 27695; USDA-ARS, Dept. of Agronomy, Coastal Plain Expt. Station, Tifton, GA; and Dept. of Crop Sci., N. C. State Univ., Raleigh, NC, respectively.

Cyclic selection is a proposed breeding methodology to potentially minimize genotype x environment interactions. The procedure basically involves cycling selections through different environments. To illustrate the method, a peanut leafspot resistance study was cooperatively conducted in Georgia, North Carolina, and Oklahoma. Pedigree versus cyclic selection and single seed descent were simultaneously practiced at each location during the  $F_2$ ,  $F_3$ , and  $F_4$  generations within the same diverse cross population. Advanced  $F_{6-8}$  selections by methods and locations were then all compared over a three-year period, 1985-87, in each state. The results from these comparisons suggests the utilization of the cyclic selection method.

Breeding For CBR Resistance In Peanut. T. A. COFFELT\* and P. M. PHIPPS. USDA-ARS and VPI & SU, Tidewater Agricultural Experiment Station, Suffolk, VA 23437

It has been proposed that *Cylindrocladium* Black Rot (CBR) resistant peanut (*Arachis hypogaea* L.) cultivars can be developed either by selecting for resistance in early segregating generations or later generations after other characteristics have been selected. The objective of this study was to compare the performance of three lines (TRC 02057-1, TRC 05097-3, and TRC 05117-1) selected for resistance in early generations and four lines (VA 781621, VA 830116, VA 830117, and VP 3204) selected for resistance in later generations with the susceptible cultivar Florigiant and the resistant cultivar NC8C. Tests were conducted in 1984 and 1985 at the Tidewater Agricultural Experiment Station Research Farm in Suffolk, Virginia, on a Kenansville loamy sand naturally infested with *Cylindrocladium crotalariae* (Loos) Bell & Sobers, the causal organism of CBR. Entries were evaluated for disease incidence, pod and root rot, yield, value, and resistance to peanut leafspot, caused by *Cercospora arachidicola* Hori and *Cercosporidium personatum* (Berk. & Curt.) Deighton in 1984 and 1985. CBR and leafspot were more severe in 1984 than 1985. Yield and value were higher in 1985 than in 1984. Results indicated that CBR resistant lines can be developed using either selection method. Lines selected for yield first then CBR resistance tended to have less variation for yield than those selected on the basis of CBR resistance. Those selected for CBR resistance in early generations resulted in less variation for CBR and leafspot resistance than those selected for other traits. Thus, either method of selection can be used to obtain CBR resistant varieties depending upon the capabilities, methods, and goals of the breeding project. The best procedure may be a combination of both methods.

Inheritance of Earliness in Crosses among Five Early-Maturing Spanish Peanut Varieties. O. N'DOYE\*, O.D. SMITH, and G.B. PARKER. Dept. of Soil & Crop Sci., Texas A&M University, College Station, TX 77843-2474.

Short growth duration is of vital importance to peanut culture in regions of the Sahel. Tx851856, Chico, Sn55-437, TxAG-1, and TxAG-2 which are early maturing spanish peanut germplasm lines were crossed in complete diallel. Progenies were studied with regard to the inheritance of earliness and to ascertain if segregates earlier than the parents would result from recombination. Parent, F<sub>1</sub>, and F<sub>2</sub> generations of each cross and its reciprocal were grown in four replications over time near Bryan, TX in 1987. Dates were recorded on a plant basis for emergence and occurrence of the first, fifth, tenth, fifteenth, twentieth, and twenty-fifth flower. Total number of pods, number of full-size pods, and number of mature pods based on internal pericarp color were counted after digging. Rains and other environmental factors during planting affected seedling emergence and development. Reciprocal differences were not apparent. Progenies of varied parental combinations differed in number of days to specified flower numbers, number of full-size pods, and percent mature pods. Coefficients of correlation between number of mature pods and days from planting to the twenty-fifth flower ranged from 0.38 to 0.75 among replications. The correlation coefficients between days from emergence to the specified flower numbers, and between days to the first flower and subsequent flower numbers were lower than between days from planting and days to the flower numbers identified. Selection for earliness on the basis of flower number would not have been effective in this study. Dual selection among plants on the basis of number of full-size or mature pods, followed by selection for high percentage of mature pods within the group of plants with acceptable pod numbers might be considered in breeding for earliness. Heritability and combining ability estimates will be discussed.

The Inheritance of a High Oleic Acid Oil in Peanut. K. M. MOORE\*  
and D. A. KNAUFT. Dept. of Agronomy, University of Florida,  
Gainesville, FL 32611.

The quality of oil from oil seed crops is directly related to the fatty acid profile of the oil. Oils high in monounsaturates, i.e. oleic acid, are most desirable for both stability and health considerations. Oleic acid levels in oil of cultivated peanut (*Arachis hypogaea*) have been reported as 36% to 66% of the total fatty acid composition. In 1987, A. J. Norden reported a peanut line at the University of Florida that contained as high as 80% oleic acid. This peanut line was crossed with four other peanut lines that had oleic acid contents ranging from 45% to 65%. Fatty acid profiles were determined on individual seeds of the F1, F2, F3, and backcross generations. When crossed with an advanced breeding line, UF78114, the F2 segregating ratio was 15:1, with high oleic acid controlled by two recessive genes. When crossed with Sunrunner, the F2 segregating ratio was 3:1, with high oleic acid controlled by a single recessive gene.

Techniques for Maintaining precious Arachis Germplasm. C. E. SIMPSON.

Texas Agricultural Experiment Station, Texas A&M University,  
Stephenville, Texas 76401.

Peanut breeders and their students often have "one of a kind" hybrids and/or other germplasm lines which are essential to the successful completion of a specific study. It is not uncommon to lose such plants to disease or other factors which cause plant death. Following are four techniques which have been used in our laboratory/greenhouses to assure survival or to rescue such germplasm materials. 1. Cuttings of peanuts have been reported several times in the literature, and are the most common technique. However, we often encounter situations where cuttings are not practical or adequate. 2. A vigorous plant which suddenly loses its root system to disease(s) can be rescued by grafting the tip of a lateral branch from a healthy plant (still attached) onto the mainstem or lateral branch of the diseased plant. Such a graft will allow both plants to live on the root system of the healthy plant. 3. Or, the branches of a diseased plant can simply be grafted in place of the laterals of a healthy plant. 4. Pegs from natural pollination or from hybridization efforts can be grafted onto branches or leaves (as cuttings or in place) of other plants. Grafts of hypocotyls, branches, leaves, and pegs have been successfully made among and between numerous species of *Arachis*. To date no particular barrier has been identified in cross-species grafting. The percentage of successful grafts and/or cuttings accomplished is enhanced by placing the plants in a humidity chamber for approximately ten days.

# ENTOMOLOGY

## Thrips Control Regimes Targeted to Reduce Tomato Spotted Wilt Virus on Peanut.

J. R. WEEKS\*, T. P. MACK, J. C. FRENCH and A. K. HAGAN. Depts. of Entomology and Plant Pathology, Auburn University, AL 36849.

In-furrow and foliar applications of insecticides were applied to peanuts cv. Florunner at 4 locations in Alabama during 1987. Thrips populations were sampled weekly from emergence until harvest. Terminals and blooms were 'washed' in 70% alcohol to remove adults and larval thrips. In-furrow granules of aldicarb reduced populations up to 90% for 3 weeks. An additional application of granules banded over the row 30 days after cracking had no significant effect on thrips. Bi-weekly foliar sprays of acephate combined with the in-furrow granules provided greatest reduction of thrips through the season. Although tomato spotted wilt virus incidence was extremely low in Alabama in 1987 (less than 1%), one location had higher levels of TSWV in untreated areas than in insecticide treated peanuts.

## Monitoring the Adult Southern Corn Rootworm with Pheromone-Baited and Unbaited Sticky Traps. W. V. CAMPBELL. Dept. of Entomology, North Carolina State University, Box 7613, Raleigh, N.C. 27695-7613.

Traps coated with Stickem® were used to monitor seasonal populations of the adult southern corn rootworm (SCR). Forty, one-sq. ft. traps were dispersed in the field at four compass directions and at two heights. Adult SCR were counted and removed weekly. This method of monitoring seasonal populations of SCR has been used since 1966. Data from year to year and in multiple locations in the state were relatively consistent for the time of occurrence of seasonal population peaks. Trap catches are highest between July 25 and August 10. The lowest populations occur generally during the first two weeks in July. In fields where the SCR is not controlled with an insecticide adults emerging in September may exceed the number of ovipositing adults captured in early August. For the past three years a pheromone-baited trap has been used that is highly efficient in attracting male SCR. While 40 unbaited sticky traps may collect a peak number of 50-200 adults in one week, one pheromone-baited trap may capture 200-600 adult male SCR during the same period. Seasonal populations of SCR collected from pheromone-baited traps coincide with long term data collected from unbaited traps. One exception is that immature males are not attracted to pheromone-baited traps. For this reason trap catches of SCR are always low in the pheromone-baited traps in September. Pheromone traps show a small but consistent early season population peak the third week in June that is not always evident with unbaited sticky traps. This early season population may provide the key for an action threshold based on adult SCR.

Effect of Groundnut Harvest Date and Termite-resistant Varieties on Termite Damage in Burkina Faso, West Africa. R. E. LYNCH\*, A. P. OUEDRAOGO, and S. A. SOME. USDA-ARS, Insect Biology and Population Management Research Laboratory, P. O. Box 748, Tifton, GA 31793-0748; ISN-IDR, University of Ouagadougou, B.P. 7020, Burkina Faso, West Africa.

The effect of groundnut harvest date and cultivars with resistance to termites was evaluated in Burkina Faso, West Africa. Groundnut pod damage by termites increased substantially between 90 and 110 days, but was even greater between 110 and 125 days. Delayed harvest to 125 days not only increased termite damage to pods, but also significantly increased aflatoxin in the seed. Groundnut cultivars RNP40, NCAC 2240, NCAC 343, and Bonga (local variety) showed the least termite damage to plants and pods while maintaining respectable yields, even with delayed harvest. NCAC 343, in particular, showed tremendous promise, since it was previously identified as moderately resistant to thrips, leafhoppers, Heliothis defoliation, and southern corn rootworm damage to pods.

## EXTENSION

Optimal Peanut Production Plans for Southeast Farmers. T. D. HEWITT\*, S. A. FORD and H. E. JOWERS. Food and Resource Economics Department, Institute of Food and Agricultural Sciences, University of Florida, AREC - Marianna, FL 32446 and Gainesville, FL 32611, and Jackson County Cooperative Extension Service, Marianna, FL 32446.

The agricultural economy of the Southeast has been adversely affected by low commodity prices in recent years. Government farm programs have helped to support the low farm income and to reduce price risk. Acreages planted in many of the traditional row crops has been decreasing while peanut acreage has increased significantly since the early 1980's. Much of the increase in acreage is due to the change in the peanut program that established a two-tier price system and allowed the unlimited planting of additional peanuts. This change combined with low commodity prices for other agronomic crops has resulted in large acreages of peanuts. Concern has been expressed by some segments of the industry that peanut plantings will exceed demand and result in an over-supply situation in the near future. The purposes of this study are to examine the profit potential of agronomic crops in the Southeast under current economic conditions, illustrate the effect of government price support programs on profits, calculate the profit maximizing crop mix for a "typical" Southeast farm, and to determine the maximum number of additional peanuts that might be planted in the Southeast. The information developed from this research will help to explain why Southeast peanut producers plant current levels of additional peanuts. A farm model was developed to estimate the optimal crop mix. This mathematical programming method searches over all possible crop and acreage combinations to find the crop mix that minimizes the historic deviations from the expected returns of that crop mix. A representative farm was modeled to determine the effects of the peanut price support program on the optimal crop mix under risk. A minimum price level for additional peanuts that will allow growers to profitably produce peanuts was also determined. Potential acreages for the Southeast were estimated under different levels of risk.

Producing Quality Peanuts: Getting the Message Across. J.P. BEASLEY, JR., Dept. of Extension Agronomy, University of Georgia College of Agriculture, Tifton, Ga. 31793.

The peanut industry today is facing many challenges in relation to improving peanut quality. Proposition 65 in California, impending legislation in many other states, stricter standards on aflatoxin in the European community and consumer pressure has made it imperative that peanut producers improve the quality standards of peanuts produced on their farms. Of immediate importance is reducing the levels of aflatoxin, foreign material and chemical residues. Peanut producers rely upon Extension for information relating to industry concerns as well as research and production data. The Extension peanut specialists (Agronomists, Pathologists, Entomologists, Economists, etc.) must react to industry demands and provide producers with critical and timely information. The agronomists' role is working with county agents and growers to emphasize and put into practice those production and cultural schemes that improve peanut quality. Methods of technology transfer and production practices to improve quality will be discussed.

Extension Implementation of the Hull-Scrape Method. J. A. BALDWIN. Extension Agronomy Department, The University of Georgia, Tifton, Ga. 31793.

Interpretation and dissemination of research results is an important part of the extension specialist's role. The demonstration of new technologies and management techniques to producers is the role of the county extension agent. Since the "Hull-Scrape Method" was developed in 1983, a series of extension developed demonstration methods and educational programs have been initiated in Georgia. This technology provides producers useful information for determining optimum maturity for harvesting runner type peanuts. Unlike some other methods, the hull-scrape method has been more fully utilized and gained in popularity as an important management tool for Georgia peanut producers. County agent training, field days, demonstrations, grower meetings, and hull scrape clinics have been conducted to educate and inform Georgia peanut producers to the advantages of using this valuable harvest aid. Researchers, industry personnel, and extension workers have worked together to provide methodology, support materials, and educational programs to producers for them to have the opportunity to more fully understand and evaluate this valuable research information.

Use of a Spreadsheet for Expediting the Use of a Peanut Disease Threshold.

J.E. BAILEY, Extension Plant Pathologist, North Carolina State University, Box 7616, Raleigh, North Carolina, 27695-7616

A threshold model was developed to analyze field histories to determine the economics of growing resistant variety with or without prior fumigation as compared to a susceptible variety. Variables in the threshold equation are; past yield, past percent disease, and estimated price per pound of peanuts. Use of information from this model required a computer program that was easy to use, update and generate reports in various formats. Lotus 1-2-3, a spreadsheet/graphics program, was well suited for this purpose. Information from replicated pesticide screening trials, where dose/response curves are generated, can be converted to a usable threshold format quickly and easily using a spreadsheet.

Evaluation and Implications of "Profitable" Peanut Contracts. F. D. MILLS, JR.  
Extension Agricultural Economics Department, The University of Georgia, Rural  
Development Center, Tifton, GA 31793.

The two-price poundage quota system implemented under the 1977 Farm Act effectively created two distinct markets for peanuts. Categorization of U.S. peanuts as quota and non-quota (additional) began in 1978 with quota supported at a price level higher than additional. The two support levels created a different amount of risk exposure for quota and additional peanut producers. Peanut contracts began being offered as a risk management tool. This allowed quota and non-quota producers to price their peanuts prior to harvest to reduce exposure to price risk. However, no consensus on whether peanut contracts were (are) an effective pricing and risk management tool has been formed. Crop enterprise budgets for South Georgia dryland and irrigated peanuts were used at yield levels of 3400 and 4000 pounds per acre, respectively. Contract prices and ratios for the 1988-crop year were incorporated into "Peanut", a contract analysis program. It was determined that additional peanuts grown and sold in combination with quota peanuts actually diluted the price received for quota peanuts. Returns per dollar of investment on quota production were consistently higher than any combination of quota/additional contract prices and ratios offered. This occurred even when contract prices for quota peanuts were higher than the government support price. Additionally, each contract increased production risk by various degrees due to more acres having to be planted to fulfill contracts. However, producers growing only additional could have used contracts as a means to reduce exposure to price risk and increase their likelihood of positive returns per dollar invested.

# HARVESTING AND HANDLING

Effect of Stacked Windrow on Peanut Curing Environment. J. L. BUTLER\*, E. J. WILLIAMS, J. R. VERCELLOTTI, and K. L. CRIPPEN. USDA-ARS-SAA-CSRU, Coastal Plain Experiment Station, Tifton, Georgia 31793, USDA-ARS-SRRC, New Orleans, LA 70179.

Two experiments were conducted to determine whether the curing environment of windrowed peanuts could be improved. Florunner peanuts grown with irrigation on a sandy soil were dug based on the optimum maturity profile. The digging was done with a conventional digger-inverter. Immediately following digging, treatments were made by taking part of the windrow and placing it on the inverted portion so that the peanut pods at these plants were down. This arrangement left the pods off the ground (from the inverting operation) and shaded by the plants placed on top. During the first 48 hours, the shaded peanuts were generally below or at ambient temperature whereas the inverted peanuts ranged up to 10°C higher. As exposure time increased, shading was reduced by the withered leaves and the lower moisture content of the shaded peanuts allowed the temperature of the shaded peanuts to equal or slightly exceed the ambient temperature. The inverted peanuts continued to range above ambient. Nighttime temperatures of the inverted peanuts were lower through out the tests. Following combining, the peanuts were put in mesh bags and randomly placed in a peanut drying wagon with loose peanuts, and dried to 10% mc with a maximum of 8°C temperature rise and recommended airflow. The dried peanuts were shelled and sized with the No. 1's, medium and jumbo being used in tests to determine the effect of treatment on quality.

Interrelationships Between Volatile Concentrations, Seed-Size Categories, and Flavor in Large-Seeded Virginia Type Peanuts. H. E. PATTEE\*, E. W. REGISTER, J. W. DICKENS, and G. A. SULLIVAN. USDA-ARS, Dept. of Botany, N. C. State University, Raleigh, NC 27695-7625; Northampton County Extension Office, Jackson, NC 27845; USDA-ARS, Dept. of Biological and Agricultural Engineering, N. C. State University, and Crop Science Extension, N. C. State University, Raleigh, NC 27695.

Recent development of an organic volatile meter (OVM) has made available a rapid, inexpensive quantitative method to test for the possible presence of off-flavors in peanuts. Previous studies have shown that a relationship exists between the concentration of organic volatiles in the headspace of ground peanut samples and the intensity of off-flavors. During the 1987 crop year a quality survey using the OVM was conducted at six peanut buying stations located throughout Northampton County, NC. Three different frequency distribution patterns were observed for sample organic volatile concentration (OVC) levels. Locations A and B had about 66% of the samples analyzed with an OVC of 8.8 mg/kg air or less. This OVC level is considered to represent a marginally acceptable sample. Locations C, D, and F had about 58% of the samples with an OVC of 8.8 mg/kg air or less while Location E was near 45%. At an OVC level of 24.8 mg/kg air the percentages were approximately 88, 87, and 69%, respectively. Most of the difference in frequency distribution patterns is thought to result from environmental factors which influence the average maturity of the crop at harvest. Professionally trained taste panel profiling of a roasted peanut paste made from selected screen sized seed fractions and OVC levels indicated that the fruity character note was most characteristic of high-temperature-exposure off-flavor. Low intensity levels were characterized as sweet fruity and higher levels of intensity as an alcohol-fermented fruity character. Further flavor evaluation of roasted peanut paste from selected screen-sized seed fractions and OVC levels showed all fractions with an OVC of 7.6 mg/kg air or above were an unacceptable product while fractions with OVC levels between 5.3 and 3.1 mg/kg air were marginally acceptable products. Fractions with OVC levels at 2 mg/kg air or less made acceptable products.

Variability in Sampling and Grading Florunner Farmers Stock Peanuts.

J. I. DAVIDSON, JR.<sup>\*1</sup>, Y. J. TSAI<sup>2</sup>, R. J. COLE<sup>1</sup>, J. W. DORNER<sup>1</sup> and F. E. DOWELL<sup>1</sup>. <sup>1</sup>USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; <sup>2</sup>University of Georgia, Tifton, GA 31793

Sampling, grading, and pilot plant shelling studies were conducted on 14 loads of Florunner farmers stock peanuts to determine the accuracy and variability of grade factors and to provide data for improving the current farmers stock grading system. All grade outturn factors (FM, LSK, SMK, OK, and TK), except sound splits (SS), overestimated the actual outturns. Sound splits, as determined by the grade, underestimated the actual outturn of sound split kernels because the official grade sheller split considerably fewer kernels than obtained with the commercial-type sheller. LSK estimates were about two times higher than the actual LSK because the pneumatic sampler produced additional LSK. Identification of Segregation 3 loads by the visible *A. flavus* method was in error for 5 of 13 loads. Regression equations were developed to provide a more accurate estimate of the peanut quality for the various grade factors. Variability of the grade factor within each load was quite large when using the current 0.5 and 1.8 kg grade samples. The average coefficient of variation ranged from 0.6% for TK to 110.4% for *A. flavus* kernels. Based upon the variability, calculations were made to determine the number of samples needed to provide a high degree of confidence in detecting specified differences in each grade factor.

Effects of Belt Screening Peanuts Before Drying. P. D. BLANKENSHIP<sup>\*1</sup>, T. H.

SANDERS<sup>1</sup>, J. R. VERCELLOTTI<sup>2</sup> and K. L. CRIPPEN<sup>2</sup>. <sup>1</sup>USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; <sup>2</sup>USDA, ARS, Southern Regional Research Center, New Orleans, LA 70179.

Screening peanuts before initial marketing is currently receiving major attention of all segments of the peanut industry. Tests were conducted to evaluate the effects of screening florunner peanuts with a belt screen before artificial drying on drying energy consumption and peanut quality improvement. Belts were spaced 10.3 mm apart on the screen. Seven replications of 4 drying trailer lots of peanuts were dried with two lots of each screened and two not screened before drying. Screening removed an average of 11.22% of weight. Drying energy costs averaged 0.536 dollars/tonne higher for unscreened lots dried at 8.3 C above ambient; 0.194 lower at 16.7 C higher than ambient. Screening increased official grade SMK+SS an average of 1.99%; reduced OK by 1.14%, foreign material by 3.5%, and LSK by 1.43%. Average shelling outturns of screened lots had 0.8% more Jumbo kernels, 1.3% more Mediums, 0.6% less Other Edible, and 1.6% less Oil Stock.

Effect of Screening on the Quota Loan Value of Farmers Stock Peanuts.  
J. W. DICKENS\* and A. B. SLATE. USDA-ARS, N. C. State University,  
Raleigh, NC 27695-7625.

In order to improve the quality of shelled peanuts, the National Peanut Council Task Force Implementation Committee has proposed that all farmers stock peanuts be screened to remove shelled kernels (LSK) and foreign material (FM) prior to storage. LSK generally contain higher concentrations of aflatoxin and higher percentages of broken, dirty and damaged kernels than do unshelled kernels in the lot. Removal of FM favors aeration and cooling which reduce aflatoxin production, insect damage and other quality deterioration during storage. Also, screening before storage reduces the amount of FM in shelled peanuts. With present quota price support levels, the grower can increase his income per pound of quota allotment by screening his peanuts to remove LSK, small pods and FM; accepting quota loan value for the better-grading portion that passes over the screen; and accepting additional loan value for the portion that passes through the screen. He would have to produce more peanuts to meet his quota allotment, and his net return would depend upon the cost of screening and the cost of producing the extra peanuts. If all growers screened their peanuts and if there were no change in the present 5-year averaging procedure for computing price support schedules, the economic advantage of screening would be amortized over a 5-year period. Thereafter, the growers would suffer a loss; because they would receive the same quota support price per pound for the portion that passes over the screen that they otherwise would have received for unscreened peanuts.

Moisture Content and Storage System Affects on Peanut Quality and Milling Parameters. J. S. SMITH, JR.\* and T. H. SANDERS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

The affects of initial moisture content and type of storage system on final peanut quality and milling parameters were investigated. Farmers stock peanuts from the same field, artificially dried to 8 and 10% moisture contents, were stored for 6 months in mechanically and naturally ventilated miniature warehouses. Temperatures and relative humidities within the peanut masses at various levels as well as ambient conditions were recorded at 2-hour intervals throughout storage. Results from these studies will provide needed information to design and construct better storages to maintain peanut quality and improve milling in stored farmers stock peanuts.

# MYCOTOXINS

Pattern of Preharvest Aflatoxin Contamination of Peanuts Based on Single Kernel Analysis. J. W. DORNER\*, R. J. COLE, P. D. BLANKENSHIP and T. H. SANDERS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Florunner peanuts were grown in an environmental control plot at the National Peanut Research Laboratory. Plants were subjected to late-season drought stress under conditions favoring preharvest aflatoxin contamination. Individual plants were harvested during the drought period, and single-kernel analyses were performed for aflatoxin contamination. An association between aflatoxin-contaminated kernels and certain individual plants was observed. Of the 1340 kernels analyzed from 44 plants, only 3.5% had  $\geq 10$  ppb aflatoxin, but 87.2% of those kernels came from 9.1% of the plants. Over half of the contaminated kernels ( $\geq 10$  ppb) came from one plant. Of the kernels that contained  $\geq 10$  ppb aflatoxin, 42.6% were from yellow 2 hull-scraps maturity stage pods, and 78.8% were confined to the immature yellow 1, yellow 2, and orange A stages combined. Only 17% were from the mature brown and black maturity stages. There was not a strong relationship between aflatoxin contamination and the location of the kernel in the pod. Both kernels were contaminated in 45.5% of the pods containing kernels with  $\geq 10$  ppb aflatoxin. In 21.1% only the apical kernel was contaminated and in 15.2% contamination was confined to the basal kernel. One-kernel pods accounted for 18.2% of the contaminated kernels.

Effects of Gypsum and Irrigation on *Aspergillus flavus* Group Colonization of Peanuts. D. M. WILSON\* and M. E. WALKER. UGA Coastal Plain Experiment Station, Tifton, GA 31793.

Applications of gypsum at early bloom have lowered aflatoxin contamination of peanuts in years with widespread aflatoxin contamination, but in years with little contamination the importance of gypsum is difficult to measure. Field experiments were conducted in 1984, 1985, 1986 and 1987 on a calcium deficient Lakeland sand. Florunner was planted in 1984 and 1987 while NC-7 was planted in 1985 and 1986. Irrigation and non-irrigation were the whole plots, split plots were rates of gypsum corresponding to 0, 112, 224 and 336 kg ha<sup>-1</sup> of added calcium. Split-split plots were inoculated or not by sprinkling a spore suspension of *Aspergillus parasiticus* NRRL-2999 over the plants at early bloom. Soil populations of the *A. flavus* group were monitored four times each year. Harvested hulls and kernels were plated to assess *A. flavus* incidence. Aflatoxin contents of kernels were determined using HPLC. Gypsum applications increased yield, value,  $\Sigma$  SMK and reduced damage in all years. *A. parasiticus* inoculation decreased yield of Florunner but not NC-7. Inoculation increased the *A. flavus* group soil populations that persisted in some years. However, neither irrigation or gypsum affected *A. flavus* soil populations. Irrigation and gypsum both decreased hull and kernel colonization by *A. flavus*. Aflatoxin contamination was infrequently seen and occurred in a random manner. Gypsum and irrigation consistently decreased *A. flavus* group invasion and colonization and both have previously decreased aflatoxin amounts in years when conditions were favorable for excessive aflatoxin contamination.

Aflatoxin Content of Peanuts Cleaned On a Peanut Belt Screen Before Drying.

T. H. SANDERS\*, P. D. BLANKENSHIP, and R. J. COLE. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Removal of aflatoxin contaminated peanuts from the edible market is of high priority in the peanut industry. A recently developed belt screen was utilized to evaluate quality improvements in moisture, foreign material, and aflatoxin content when farmers' stock peanuts were cleaned before drying. Four drying wagon loads from each of seven farm fields were evaluated. Two loads were screened over a belt screen which had a 10.3 mm gap between belts and two loads were left unscreened. Fall-through weight of the screened loads ranged from ca. 2-26% (wt) of the loads. One screened and one unscreened load were artificially dried at an 8.3°C rise above ambient and the other loads were dried at a 16.7°C rise above ambient. Approximately 100 pounds from each wagon were shelled and the seed were sized. Peanuts from three of the seven locations contained detectable levels of aflatoxin. All size categories of peanuts from the three locations contained aflatoxin regardless of whether or not they had been screened and regardless of whether pods rode or fell through the screen. Jumbo, medium, and No. 1 size peanuts from pods riding the screen were hand-picked to remove damaged seed and, with one exception, aflatoxin levels were less than 2.5 ppb in subsequent analyses.

Detection of Aflatoxin in Various Components of Farmers Stock Peanuts. F. E.

DOWELL\*, J. W. DORNER, J. I. DAVIDSON, R. J. COLE and W. G. FERGUSON. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

Ten 50 lb pneumatic samples from 17 loads of farmers stock peanuts were collected during the 1987 harvest season in Georgia. Grade samples were removed and the remaining peanuts were run over a 24/64 belt screen. Loose-shelled kernels (LSK) and small pods that fell through the belt screen were separated, pods were shelled, and the kernels were screened over a 16/64 and 14/64 slotted screen. Pods that rode the 24/64 belt screen were similarly shelled and screened, and in addition, the damaged kernels were removed. The resulting components were analyzed separately for aflatoxin by high performance liquid chromatography (HPLC). From the grade samples, the LSK, other kernels (OK), and damaged kernels were combined and the sound mature kernels (SMK) and sound splits (SS) were combined. These two grade components were analyzed separately for aflatoxin by HPLC. Results showed the distribution of aflatoxin within each component and provided variance data to determine sample sizes needed to detect specified levels of aflatoxin in each respective component. Results also provided additional information needed for finalizing the design of a pilot study to determine the performance of the belt screen separator in removing foreign material and poor quality peanuts prior to marketing of farmers stock peanuts.

Simulating the Testing of Peanut Lots in the Export Market for Aflatoxin. T. B. WHITAKER\* and J. W. DICKENS, USDA-ARS, Department of Biological and Agricultural Engineering, N. C. State University, Raleigh, NC 27695-7625.

The present aflatoxin testing plan used in the United States (US) for shelled peanuts was designed with a final accept level of 25 parts per billion (ppb) total aflatoxin. Some of the importers of US peanuts use aflatoxin testing plans with accept levels lower than the 25 ppb used in the US. For example, the accept level of a testing plan used in the Netherlands is 5 ppb B1 or 10 ppb total aflatoxin. Computer models were developed to simulate the testing of peanut lots with the US and the Netherlands testing plans. The model was used to determine the effects of decreasing the final accept level of the US testing program on the number of lots accepted and rejected in the US and the number of exported lots accepted and rejected when using the Netherlands testing plan. Decreasing the final accept level of the US testing program from 25 to 5 ppb increased the number of lots rejected in the US by 371% while reducing the number of exported lots rejected by 51%. For every additional 8.3 lots rejected in the US, one less export lot will be rejected.

Electrophoretic Comparison of Cotyledonary Proteins from Kernels of Fourteen Peanut Cultivars Colonized by *Aspergillus* spp. for Different Periods. J.B. SZERSZEN\* and R. E. PETTIT. Dept. of Plant Pathology and Microbiology. Texas A&M University, College Station, TX 77843-2132.

Testa-free peanut kernels of Florunner, PI 337394, PI 337409, PI 341885, PI 343419, Pronto, SN 55-437, SN 73-30, SN 73-33, Starr, Tannut, Toalson, TX Ag 3, and TX 798736 were separately inoculated with *Aspergillus flavus* and *A. parasiticus* and placed into 95% RH moist chambers at 28°C for 12 days. The kernels were removed after 0, 3, 6, 9, and 12 days of incubation and the embryonic axes removed. Cotyledonary protein samples were prepared and subjected to discontinuous sodium dodecyl polyacrylamide gel electrophoresis (SDS-PAGE) and isoelectrofocusing (IEF). Very highly-sensitive silver staining of both kinds of electrophoretic gels revealed 34 proteins for SDS-PAGE (MW 12, 100-218, 700 daltons) and 40 proteins for IEF (pI 3.5-7.9). Kernel colonization by both aspergilli resulted in decomposition of high molecular weight proteins (arachin, conarachin fractions) to smaller molecular weight components and to quantitative depletion of high molecular weight proteins. Most changes recorded on SDS gels occurred within 0-6 days of incubation and continued at a reduced rate until the twelfth day of incubation. High molecular weight proteins in cotyledons colonized by *A. flavus* were decomposed more rapidly cotyledons colonized by *A. parasiticus*. Colonization of cotyledons by either fungus caused depletion of proteins from the acidic region of IEF gels which increased with incubation time. There were noted differences within protein patterns of *Aspergillus* spp.-colonized cotyledons among peanut cultivars. Using SDS-PAGE, most differences were recorded for Florunner, Starr, TX Ag 3, and Toalson; using IEF, for Florunner, STarr, PI 337409, and TX 798736.

Isolation and Characterization of Phenolic Acids in Mature Peanut Seed Coats from Twenty-three Peanut Genotypes. H.A. AZAIZEH, R.D. WANISKA, and R.E. PETTIT\*. Dept. of Plant Pathology and Microbiology and Dept. of Soil and Crop Sciences. Texas Agricultural Experiment Station, Texas A&M University, College Station, TX 77843-2132.

Phenolic acids were extracted from seed coats (testae) of twenty-three peanut genotypes (following grinding) with an acetone-water solution. The acetone was evaporated and the extract partitioned in ethyl acetate. This phase was roto-evaporated to dryness at 35-40°C, redissolved in methanol, filtered, and injected into a C 18 column with a 10 um particle size. Phenolic acids were detected at a wavelength of 254 nm. Twelve different compounds were separated. Comparisons with known compounds revealed a preliminary identification of protoatechuic acid, genetinic acid, catechin, methyl catechin, epi catechin, and p-coumaric acid. Correlation analysis of the ability of the initial testae extracts to inhibit Aspergillus flavus and A. parasiticus growth and aflatoxin production in liquid culture media revealed  $R^2$  values which ranged from 0.36 to 0.89. Testae extracts from seed of genotypes which contained relatively high levels of phenolic acids caused the least inhibition of fungal growth and aflatoxin production. Dark testae color was negatively correlated with kernel resistance and aflatoxin production. The concentration of specific phenolic acids was variable among genotypes and was related to testae color, market type, and selections within a genotype. Some positive correlations were obtained with specific phenolic acids and inhibition of fungal growth and aflatoxin formation in extracts from peanut genotypes classified in the Virginia market type.

# PLANT PATHOLOGY

The Effect of Planting Date on Severity of Leafspot and Sclerotinia Blight of Peanuts. D. M. PORTER\*, R. W. MOZINGO, and K. P. BURNHAM, USDA-ARS, and VPI & SU, Tidewater Agricultural Experiment Station, Suffolk, VA 23437

The relationship of planting date on the severity of leafspot (*Cercospora arachidicola*) and Sclerotinia blight (*Sclerotinia minor*) was determined in a two-year field study (1986-1987) at the Tidewater Agricultural Experiment Station in Suffolk, Virginia. A split-block design with three replications was used with fungicide treatment (treated and/or untreated) as whole plots as one factor and the 16 combinations of four varieties and four planting dates as the second factor. Treated plots were sprayed with recommended fungicides on a preventative schedule for leafspot control. Leafspot severity measurements consisting of leaflet defoliation and infection percentages and lesion number per plant were made at two-week intervals (August 11, 26 and September 9) on six lateral branches collected at random from each plot. Leafspot severity indices of subjective field ratings were made one month prior to harvest and at harvest. Sclerotinia blight "hits" per plot were recorded at harvest. At intervals throughout the growing season, older plants (as determined by planting dates of April 24, May 3, 13, and 23) exhibited a higher disease index to leafspot, higher defoliation and plant infection percentages, and a higher number of leafspot lesions per plant than younger plants. Differences were more dramatic in plants not treated with leafspot fungicides. Peanuts planted May 13 and May 23 exhibited a higher disease index for leafspot, higher defoliation and plant infection percentages, and more lesions per plant than peanuts planted April 24 and May 3 when all were harvested at the same age of 151 days after planting (DAP). However, Sclerotinia blight "hits" at harvest or 151 DAP were more severe in late planted peanuts (May 3, 13 and 23) than in early planted peanuts (April 24).

Effect of Supplemental Irrigation and Rovral on Sclerotinia Blight of Peanut. K. E. JACKSON\*, H. A. MELOUK, AND C. N. AKEM. Dept. of Plant Pathology, USDA-ARS, Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078-0285.

Peanut seeds of cv. 'Spanco' were planted June 9, 1987 at Perkins, Oklahoma. Plots were designed so that main plots were fungicide treatment and sub-plots were amount of supplemental irrigation. Plots were 3.65 X 9.1 m with row spacing of 0.91 m, and were replicated 4 times in a split plot design. A stationary sprinkle irrigation line was positioned north and south parallel to rows. Plots were perpendicular to irrigation lines to obtain a gradual decrease in amount of supplemental water which was collected and measured for each plot. Fraction of Sclerotinia blight was determined by dividing the number of infection loci by the number of potential infection loci. An infection locus is defined as an area of disease symptoms equal to or less than 6 inches long in a standard row. Rate of disease progress (r) was calculated for simple interest diseases as follows:  $1/(t_2 - t_1) \times \ln(1 - X_1)/(1 - X_2)$ , where  $t$  = time in days and  $X$  = fraction of disease. Pod yields increased with increased supplemental water except for the plot that received the most supplemental water in which pod yields decreased. Sclerotinia blight incidence increased as the amount of supplemental water increased. Rovral (iprodione) treated plots had a significant lower disease incidence, a lower rate of disease progress, and higher pod yields than untreated plots. The results indicated that excessive supplemental water can be detrimental when Sclerotinia blight is present in the field.

Agar Plate, Soil Plate and Field Evaluation of Fungicides for Activity Against Sclerotinia minor. F. D. SMITH\*, P. M. PHIPPS and R. J. STIPES. Tidewater Agr. Exp. Sta., VPI&SU, Suffolk, VA 23437.

The sensitivity of *Sclerotinia minor* to iprodione (Rovral) and four experimental fungicides was tested on fungicide-amended, glucose-yeast extract agar (GYEA). ED<sub>50</sub> values for growth inhibition of a dicarboximide-sensitive field isolate (S-1A) were 0.004, 0.025, 0.08, 0.18 and 0.25 µg/ml for RH 3486, MON 13108, vinclozolin, iprodione and chlozolate, respectively. A dicarboximide-resistant field isolate (B-83-T2) showed enhanced growth on GYEA containing iprodione or vinclozolin at 1.0 µg/ml or chlozolate at 5.0 µg/ml. RH 3486 and MON 13108 were both inhibitory to growth of B-83-T2, and exhibited ED<sub>50</sub> values of 0.10 and ca. 1.0 µg/ml, respectively. Mycelial growth by *S. minor* on a soil-cornmeal medium (5% cornmeal, w/w) in 9-cm Petri plates was measured 5 days after overspraying plates with fungicides in aqueous suspension. Mycelial growth of S-1A was inhibited 80-83% by chlozolate, iprodione, RH 3486 and vinclozolin; MON 13108 was only 23% inhibitory. Mycelial growth of B-83-T2 was inhibited 24, 19, 15, 12 and 8% by RH 3486, vinclozolin, chlozolate, MON 13108 and iprodione, respectively. Counts of sclerotia formed by S-1A and B-83-T2 in the medium after 14 days indicated that the dicarboximide fungicides (chlozolate, vinclozolin and iprodione) were most active in suppressing growth below the treated surface. Sclerotinia blight of peanut in the field trial was negligible until frequent rainfall in September 1987. Although all treatments suppressed disease and increased yield, only RH 3486, MON 13108 and vinclozolin gave a significant (P = 0.05) response. RH 3486 at 2.24 kg/ha applied at pegging suppressed disease incidence by 74% and increased yield 921 kg/ha. MON 13108 at 1.12 and 2.24 kg/ha on demand (Jul 31) and twice at 4 wk intervals suppressed disease incidence by 51 and 45%, and increased yield 648 and 809 kg/ha, respectively. Vinclozolin at 0.84 kg/ha in three applications suppressed disease incidence 46%, and increased yield 485 kg/ha. Three applications of iprodione at 1.12 kg/ha or chlozolate at 0.56 to 1.12 kg/ha failed to provide both significant disease suppression and yield increase.

Comparison of Three New Methods of Copper Resinate Application for Control of Certain Soil-borne Pathogens in Peanuts. W. W. OSBORNE\*, J. D. TAYLOR. IAI, INC. South Boston, VA 24592; J & S Plant Consultants, Inc., Skippers, VA 23879.

Laboratory studies show that copper resinate (TENN-COP 5E) is superior to iprodione (ROVRAL) and tribasic copper sulfate (TRI-BASIC) in curtailing mycelia growth and sclerotia production by *Sclerotinia* spp. Also, *Sclerotium rolfsii* Sacc. mycelia growth was less in the optimum copper resinate treatment. Studies in fields infested with *Sclerotinia minor* Jagger; *Sclerotinia sclerotiorum* (Lib.) deBary; and *Sclerotium rolfsii*, employed three methods of chemical application to determine the optimum dosage for early peanut (cv. Florunner) treatment to suppress the three fungi listed. The superior treatment was TENN-COP 5E applied at peanut emergence, tea cup size, and at early pegging. Subsequent applications of TENN-COP 5E are needed to suppress *Sclerotinia* spp. invasion of senescent peanut blooms.

Effect of Penicillium Citrinum Filtrate on Germination and Growth of Sclerotia of Sclerotinia Minor. C. N. AKEM\*, and H. A. MELOUK. Dept. of Plant Pathology, USDA-ARS, Oklahoma State University, Stillwater, OK 74078-0285.

Penicillium citrinum was isolated from sclerotia of Sclerotinia minor recovered from a field soil planted in peanuts. P. citrinum was grown in a broth of Czapek Dox for 4-8 wks at 25±2 C. Filtrate of P. citrinum was incorporated into potato dextrose agar (PDA) or Czapek Dox agar (CDA) at concentrations of 0, 10, 15, 20, 30, 40 and 50% (v/v). Sclerotia of S. minor were produced by growing the fungus on autoclaved oat seed moistened with water. The P. citrinum filtrate amended media were tested for their activity in inhibiting the germination of sclerotia and growth of S. minor. Sclerotia of S. minor germinated at concentrations up to 15% on the PDA amended media. Sclerotia did not germinate on PDA medium amended with 20% P. citrinum filtrate. The average germination of sclerotia on PDA was 97%. Sclerotial germination on CDA was only 20%, and no germination occurred on any of the CDA amended media.

Growth Stimulation of Peanut in Response to Mycorrhizal Colonization. J. S. NECK\* and R. A. TABER. Department of Plant Pathology and Microbiology, Texas A&M University, Texas Agricultural Experiment Station, College Station, Tx. 77843.

Influence of mycorrhizal colonization on the growth and yield of greenhouse grown peanut cv. "Tamnut-74" was examined in a complete randomized block (4 replicate) design. A pasteurized soil:sand (1:1) mix was infested with spores and infected sudan grass root pieces of either Glomus etunicatum Becker and Gerdemann or Glomus deserticola Trappe, Bloss and Menge. All treatments were inoculated with a commercial Bradyrhizobium inoculant. At flowering, leaf tissue phosphorus levels were higher in mycorrhizal plants, while calcium levels were higher in the non-mycorrhizal controls. At harvest, dry top weights of mycorrhizal plants were 200 + % greater than the controls. Pod weight and pod number exhibited similar increases from plants in both of the mycorrhizae treatments. Dry seed weights of colonized plants were 300 + % greater than controls. Mean root colonization levels at harvest for G. etunicatum and G. deserticola were 16.8% and 6.8%, respectively. Values represent data from two experiments.

Simulation Model of the Progression of Leafspot Diseases affecting Peanut.

G. BOURGEOIS\*, K.J. BOOTE, and R.D. BERGER. Departments of Agronomy and Plant Pathology, Univ. of Florida, Gainesville, FL 32611.

Early and late leafspots are major foliar diseases affecting peanut. These diseases cause necrotic lesions on leaflets, reduce their photosynthetic rate, and induce early senescence. At the canopy level, defoliation is the major factor causing reductions in canopy carbon exchange rate which result in lower peanut pod and seed yields. A model of the progression of leafspot diseases has been developed and coupled to PNUIGRO, a peanut growth and development simulator, in order to predict disease-induced reductions in dry matter production. The leafspot diseases model was made as biologically realistic as possible from information available in the literature. Infection and colonization by the pathogen are driven as functions of temperature and relative humidity of the air. Relative humidity at each hour is estimated from hourly temperatures which are computed in PNUIGRO from daily minimum and maximum temperatures. The leaf area is divided in five states associated with the development of the pathogen: 1) Healthy state in which the pathogen has not penetrated the leaf, 2) Latently infected state in which the pathogen has penetrated but the symptoms are not visible, 3) Pre-infectious state in which symptoms are visible but necrotic lesions are not sporulating, 4) Infectious state in which necrotic lesions are sporulating, and 5) Post-infectious state. Sensitivity analyses were made on parameters related to pathogen infection and colonization processes. Variations in all parameters related to the infection process, such as conidial infection efficiency and the conidia production per unit sporulating leaf area, did not cause differences in selected model output variables (leaf area index and disease severity). On the other hand, variations in most parameters related to pathogen colonization, such as the infected leaf area expansion factor, the incubation period, and the latent period, caused differences in these output variables. This information will be used for model calibration against data sets obtained from field experiments at the University of Florida.

Management of Late Leafspot on a Partially Resistant Cultivar. F. M. SHOKES\* and D. W. GORBEY. North Florida Research and Education Center, Quincy, FL 32351. Agricultural Research and Education Center, Marianna, Florida 32446.

'Southern Runner', a peanut cultivar with partial resistance to late leafspot [*Cercosporidium Personatum*] (Berk. & Curt.) Deighton was tested under various management regimes from 1984-1987. Yield losses varied from 18-40% without fungicide for the three years tested. In 1984 and 1985 when the susceptible cultivar Sunrunner was tested for comparison, yield losses of 79% and 74%, respectively, were measured. Under heavy disease pressure full season applications of captafol, cupric hydroxide, triphenyltin hydroxide plus sulfur, and mancozeb plus sulfur allowed considerable build-up of leafspot on southern Runner (mean defoliation 81%) compared to 51% for chlorothalonil. Chlorothalonil applied on a 21 day schedule beginning 60 days after planting (4 sprays) allowed defoliation to reach 71% (mean) but sustained yields of 3739 lb/A compared to 3496 lb/A for seven sprays of the less efficacious fungicides. Four to seven applications of either the protectant chlorothalonil or the systemic diniconazole were effective in sustaining high yields on Southern Runner when applied on various schedules in 1987. Yields were significantly ( $P < 0.05$ ) higher with diniconazole than with chlorothalonil. Yield increases with diniconazole could not be accounted for by leafspot control alone. Four applications of an effective protectant or systemic fungicide will usually be sufficient to sustain high yields with Southern Runner.

Field Performance of Computerized Advisories for Fungicide Application to Control Early Leafspot of Peanut. R. M. CU\*, P. M. PHIPPS, J. L. STEELE, and R. J. STIPES. Tidewater Agr. Exp. Sta., VPI&SU and USDA ARS, Suffolk, VA 23437.

Spray programs using chlorothalonil at 1.26 kg/ha (Bravo 720 1.5 pt/A) and diniconazole-M at 0.09 kg/ha (Spotless 25W 5.1 oz/A) were evaluated for efficacy in control of early leafspot (*Cercospora arachidicola*) of Florigiant peanut in 1987. Sprays (140 L/ha) were applied at 345 kPa with a CO<sub>2</sub> pressurized sprayer having three, D<sub>2</sub>13 (disk-core) nozzles per row. Plots consisted of four 12.2-m rows, spaced 0.9-m apart. Treatments were replicated in four randomized complete blocks. Reference standard treatments included fungicides applied seven times on a 14-day schedule, five times according to the current leafspot advisory model (P. M. Phipps and N. L. Powell, 1984. *Phytopathology* 74:1189-1193), and an untreated check. New advisory models included the current advisory modified to use average temperature instead of minimum temperature, and a new model that attempts to estimate pre-symptom phases in the disease cycle. This model assigned "time duration values" (TDV) of 48, 72, 96 and 120 to spore germination, stomatal penetration, infection, and colonization, respectively. A TDV of one was assigned to each hour of weather conditions having RH>95% and ambient temperature >16 C and <30 C. Weather parameters for input into the models were measured at 10 min. Intervals by a computerized weather station 3.2 km from the field site. Plots treated with chlorothalonil and diniconazole-M on a 14-day schedule exhibited 1.8 and 5% leafspot (% leaflets symptomatic) at harvest, respectively, compared to 96% leafspot in untreated plots. Spray dates using the current advisory with inputs of either minimum or average temperature during periods of RH>95% were identical and disease incidence at harvest averaged 26 and 28% with chlorothalonil and diniconazole-M, respectively. Five sprays of fungicides were made according to the model having an action threshold of TDV=48, whereas other TDV threshold models required three sprays. Chlorothalonil applications using TDV=48 showed only 2.8% leafspot at harvest, which was significantly better than diniconazole-M using TDV=48 as well as all other advisory programs with both fungicides. Yields with all fungicide spray programs were significantly above the untreated (4263 kg/ha), and overall averaged 4963 and 5082 kg/ha for chlorothalonil and diniconazole-M, respectively.

In Vitro Fungicide Sensitivity of *Cercosporidium personatum*. T. B. BRENNEMAN\*, and E. L. JEWELL. Dept. of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793.

Thirteen isolates of *Cercosporidium personatum* were collected from 10 counties in Georgia during 1987. Isolates represented a composite sample of lesions at each location and were grown on a modified peanut oatmeal agar. Conidia produced were used to flood-inoculate plates of 1.5% water agar (WA) amended with four concentrations of chlorothalonil, diniconazole, or benomyl. After 7 days incubation at 26 C with a 12-hour photoperiod, spores were rated for germination, mycelial growth, and sporulation. Eighty percent of conidia on WA with no fungicide formed sporulating colonies and only 1.3% did not germinate. Germination of conidia was inhibited 66, 37, and 14% by 0.1 µg/ml chlorothalonil, benomyl, and diniconazole, respectively. Chlorothalonil was not evaluated at higher concentrations, but inhibition of germination by benomyl and diniconazole at 1.0 µg/ml was the same as at 0.1 µg/ml. Ten µg/ml of benomyl or diniconazole prevented germination by 53 and 17% of the conidia, respectively. Subsequent sporulation of colonies that did form was found to be essentially eliminated by all three fungicides at 0.1 µg/ml. The one exception was an isolate from Tift county which produced sporulating colonies on media amended with up to 10 µg/ml benomyl. This study verifies the continued sensitivity of *C. personatum* to chlorothalonil in spite of many years of extensive use. It also verifies the potential competitiveness of benomyl-resistant isolates, even in the absence of selection pressure. Most importantly, this work helps establish a base-line sensitivity of this fungus to the sterol-inhibiting fungicides (SI's). Preliminary studies indicated a similar degree of fungitoxicity between diniconazole and ethyltrianol, another SI tested extensively on peanut. Registrations are currently being sought for the use of these SI's, and evaluating their activity in the future will require data concerning the pre-exposure sensitivity of *C. personatum*.

Comparative Effects of a Protectant vs a Sterol Inhibiting Fungicide on Disease Components of Late Leafspot of Peanut. F. W. NUTTER, JR.\* and J. L. LABRINOS. Dept. of Plant Pathology, Univ. of Georgia, Athens, GA 30602.

The objective of this study was to quantify and compare the effects of two classes of fungicides on individual components of the disease cycle of Cercosporidium personatum. The fungicides used in this study were chlorothalonil (protectant) and ethyltrialol (sterol inhibitor). The epidemiological effects of these two fungicides were determined for the following disease components: (i) infection frequency (number of successful infections per unit leaf area), (ii) incubation period (time from inoculation to the time 50 percent of the lesions are visible), (iii) lesion size (diameter), and (iv) sporulation (number of spores per unit lesion area). The presence of ethyltrialol or chlorothalonil on peanut leaf surfaces, even at low a.i. concentrations, reduced infection frequency to near zero. The presence of ethyltrialol systemically within the plant did not reduce spore germination or germ tube entrance into host stomates, however, infection frequency decreased with increasing a.i. concentrations indicating a fungicidal effect on the early stages of colonization. Chlorothalonil, a protectant fungicide, was not present systemically within peanut leaves and therefore did not reduce infection frequency once the host was penetrated. The systemic action of ethyltrialol was found to completely reduce infection frequency up to 6 days after inoculation and by more than 50% up to 12 days after inoculation. Ethyltrialol also reduced the size of C. personatum lesions up to 16 days after inoculation whereas chlorothalonil had no effect on lesion size. A regression equation relating the appearance of C. personatum lesions to the number of days after inoculation showed that the time for 50% of the lesions to appear increased as ethyltrialol a.i. concentrations increased. Both fungicides had a significant negative effect on sporulation of C. personatum in the field. Chlorothalonil reduced sporulation by 50% while ethyltrialol reduced sporulation by more than 95%. This study has provided quantitative information about the specific disease components that are affected by chlorothalonil versus ethyltrialol. This information, coupled with quantitative data on how resistant varieties and weather also affect leafspot disease components, will lead to more efficient integrated leafspot control programs.

Relationships Between Plot Yield and Spectral Reflectance Patterns of Peanuts Developing Under Stress. V. J. ELLIOTT\* and H. W. SPURR JR. USDA-ARS Tobacco Research Lab, Oxford, NC and Department of Plant Pathology, North Carolina State University

The spectral reflectance of peanut canopies was measured from the middle to late growing season using a multispectral radiometer recording eight discrete bands between 500nm and 850nm. Two locations were studied with plots in one location being subjected to varying levels of early to mid season stress (primarily drought). Plots at the second location were subjected to varying levels of mid to late season stress (primarily early leafspot). Plot yields were recorded at the end of the season. Statistical models were developed to relate the spectral reflectance at various times in the season to final plot yield. Although wavelengths of 750nm and greater generally accounted for a large part of the explainable variation in yield, consideration of shorter wavelengths accounted for additional variation. Models derived through principal component analysis or multiple regression analysis explained up to 90% of the observed variation in yield as early as 65 days before harvest in the first location where crop stress was present early in the season. At the second location, where crop stress gradually increased in the later season, models based on spectral reflectance accounted for up to 60% of the observed variation in plot yields as early as 26 days before harvest.

Resistance of the Peanut Variety 'Southern Runner' to White Mold, Sclerotium rolfsii. J.E. ARNOLD, R.K. SPRENKEL\*, D.W. GORBET and J. KING. Total Farm Services, Marianna, FL 32446; North Florida Research and Education Center, University of Florida, Quincy, FL 32351-9529; Marianna Research and Education Center, University of Florida, Marianna, FL 32446-9803 and Rt. 1 Box 38, Greenwood, FL 32443.

In 1987, a 70 acre commercial peanut (*A. hypogaea* L.) field in Florida had 8 rows of 'Southern Runner' peanuts and the remainder planted in 'Florunner'. Near the end of the growing season, differences in the amount of white mold (*S. rolfsii*) between the two varieties were evident. Subsequently, randomized 100' lengths of adjacent rows of the two varieties were rated for white mold. Data were collected twice: once, just before the Florunners were dug, and 3 1/2 weeks later when only the Southern Runner remained in the field. The second evaluation was made to determine if the white mold infections were related to physiological age rather than actual age of the varieties, since Southern Runner matures 10+ days later than Florunner. Statistical analysis indicated significantly fewer white mold infections in the Southern Runner variety. Under the 1987 growing conditions in Florida, the Southern Runner variety was clearly more resistance to white mold than Florunner.

Deposition of Sprays on the Soil for Soil-borne Targets of Peanut. A. S. CSINOS\* and C. S. KVIEN, Dept. of Plant Pathology and Agronomy, Coastal Plain Experiment Station, Tifton, GA 31774.

The application of fungicides for control of soil-borne diseases *Sclerotium rolfsii* Sacc., the incitant of Southern stem rot, and *Rhizoctonia solani*, the incitant of *Rhizoctonia* limb rot, on peanut *Arachis hypogaea* have been as a granular formulation. The dogma is that the fungicide must be a granular in order to filter through the foliage and deposit on the soil surface where the fungi are active. However, experimentation with ergosterol synthesis inhibitor (EBI) fungicides has demonstrated that the application of foliar sprays of these materials have very effectively controlled *S. rolfsii* and to a lesser extent *R. solani*. Although control of soil-borne diseases with EBI's has been well documented the former dogma of targeting soil-borne diseases with granular fungicides has not been addressed. To learn more completely how foliar spray applied materials are deposited on the soil surface and thus understand how they act in controlling diseases, studies were initiated with the dye, methyl-blue. Methyl-blue in 15 gal spray/acre was sprayed on the foliage at various band widths, allowed to dry on the foliage and irrigated with approximately 0.25 inches of water. The architecture of peanut plants is important to the soil deposition of spray materials applied to leaf surfaces. Specific deposition patterns would be related to growth habits of peanut cultivars. The patterns of the dye on the soil surface was noted and the results are used to speculate on formulations of fungicides for control of soil-borne diseases of peanut. These data also suggest explanations for specific ecological pathogen niches in peanut canopies.

Comparison of Chlorpyrifos, Ethoprop, and Fonofos with PCNB for Southern Stem Rot Suppression on Peanut. A. K. HAGAN\* AND J. R. WEEKS. Department of Plant Pathology and Department of Entomology, respectively, Alabama Cooperative Extension Service and Alabama Agricultural Experiment Station, Auburn University, AL 36849.

From 1985 to 1987, chlorpyrifos 15G (2.2 kg ai/ha), ethoprop 15G (3.3 kg ai/ha), and fonofos 10G (2.2 kg ai/ha) were compared with the fungicide PCNB 10G (11.2 kg ai/ha) and PCNB 10G + insecticide combinations for southern stem rot suppression caused by *Sclerotium rolfsii* on peanut. Trials were located each year in 2 or 3 farm fields with a history of stem rot damage. A split-plot design with locations as whole plots and treatments as sub-plots was used. Treatments were applied 80 to 90 days (GS R5-R6) after planting. Disease loci counts were made after the plots were inverted. Plots were harvested 5 to 7 days later. Compared to the non-treated control, significant reductions in stem rot incidence were obtained each year with chlorpyrifos and two of three years with ethoprop and fonofos. Few differences in stem rot loci counts were noted among the insecticide treatments. Disease suppression with chlorpyrifos, fonofos, and ethoprop was similar to that provided by PCNB but did not always result in a significant yield increase. Only in 1986 did the insecticide-treated plots significantly outyield the non-treated control while PCNB use increased yield each year. Yield response to PCNB was consistently higher each year than ethoprop and fonofos but not chlorpyrifos. Disease suppression and yield response with the PCNB + insecticide combinations was similar to PCNB alone but superior to the insecticides alone. Insecticides are a less costly alternative to PCNB on dryland peanuts where there is a risk from late season damage caused by other soil pests coupled with light to moderate stem rot pressure.

Control of Cylindrocladium Black Rot (CBR) of Peanut with Soil Fumigants having Methyl Isothiocyanate as the Active Ingredient for Soilborne Disease Control. P. M. PHIPPS, Tidewater Agr. Exp. Sta., VPI&SU, Suffolk, VA 23437.

Metham-sodium at 36 and 72 kg/ha (Vapam 10 and 20 gal/A) and 1,3-dichloropropene (1,3-D) at 15.4 kg/ha plus methyl isothiocyanate (MIT) at 7.7 kg/ha (Vorlex 4 gal/A) were evaluated for control of CBR of peanut in naturally infested fields. Treatments were replicated in a minimum of four randomized complete blocks. Plots consisted of two 12.2-m rows, spaced 0.9-m apart. Chemical treatments were applied 14 to 21 days pre-plant with a gravity flow applicator and chisel shanks mounted at the front of a two-row, Ferguson Tillage. Applicator shanks were either centered in rows (one/row) or placed 15 cm to the left and right (two/row) of each row center. As chemical was deposited ca. 15-cm deep in soil, the Tillage was operated at a 5- to 7.5-cm depth to produce smooth beds (10-cm high and 61-cm wide), which helped seal the materials in soil and mark the treated rows. In seven tests (1981 to 1987), metham-sodium at 36 and 72 kg/ha suppressed disease incidence in Florigiant peanut (CBR-susceptible) by 56 and 85%, and increased yields by 805 and 826 kg/ha, respectively. Metham-sodium at 36 and 72 kg/ha, and the single rate of 1,3-D plus MIT were compared in 4 tests (1984-87) and found to suppress disease incidence in Florigiant by 77, 85, and 55%, and in NC 8C (CBR-resistant) by 62, 88, and 51%, respectively. The above treatments increased yields of Florigiant by 1009, 1037, and 845 kg/ha, and NC 8C by 558, 584, and 582 kg/ha, respectively. Yields of Florigiant and NC 8C without chemical treatment averaged 3510 and 4088 kg/ha, respectively. Microsclerotia (ms) populations of *Cylindrocladium crotalariae* prior to soil treatment in tests (1981-1986) ranged from 0.3 to 6.3 ms/g soil. Ms populations at harvest of Florigiant peanut averaged 10.5, 6.9, and 4.7 times higher than pre-treat counts in untreated soil, and soil treated with metham-sodium at 36 and 72 kg/ha, respectively. Ms populations at harvest of three tests (1984-86) were 11.0, 5.6, 3.6, and 6.7 times greater than pre-treat levels following Florigiant, and 8.1, 1.3, 1.1, and 1.9 times greater than pre-treat levels following NC 8C in untreated soil, and soil treated with either metham-sodium at 36 or 72 kg/ha, or the single rate of 1,3-D plus MIT, respectively. Application of chemicals with either one or two chisels per row did not affect disease control significantly.

Effect of Resistant and Susceptible Peanut Genotypes on Time of Onset and Rate of *Cylindrocladium* Black Rot Epidemics. A. K. CULBREATH\* and M. K. BEUTE. Dept. of Plant Pathology, North Carolina State University, Raleigh, NC 27695-7616.

*Cylindrocladium* black rot (CBR) disease progress was monitored in seven peanut (*Arachis hypogaea*) genotypes in field tests in Martin Co. NC in 1986 and 1987. CBR susceptible cultivar, Florigiant; moderately resistant cultivar, NC 8C; three new genotypes selected for CBR resistance and large pod and seed size, NC 18414, NC 18416, and NC 10C (18417); and highly resistant breeder lines, NC 18016 and NC 3033 were planted in 36 plots each, representing a range of inoculum density of the pathogen *Cylindrocladium crotalariae*. Of three disease progress models, i.e. monomolecular, Gompertz, and logistic, disease progress was best described by the logistic model for most genotypes. Rates of disease progress, determined by regression of the logit transformation of disease incidence on time, were slower in moderately resistant genotypes, NC 8C, NC 10C and NC 18416 than in Florigiant. Rates were slowest for highly resistant genotypes, NC 18016 and NC 3033. CBR epidemics began approximately 1.5 weeks later in NC 8C, NC 10C and NC 18416 than in Florigiant, and were delayed further in NC 18016 and NC 3033. Later onset of CBR epidemics in resistant genotypes suggests that these three moderately resistant genotypes, used in combination with other practices that retard CBR development (i.e. late planting dates or metam-sodium fumigation, etc.) might delay CBR epidemics enough to avoid peak levels of disease before harvest.

Effect of Fungicides on Infection of Peanut Hypocotyl With *Aspergillus Niger*.

S. S. ABOSHOSHA, H. A. MELOUK, and D. H. SMITH. Dept. of Plant Pathology, College of Agriculture, Alexandria, Egypt; USDA-ARS, Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078-0285; and Texas Agricultural Experiment Station, Yoakum, Texas 77993, respectively.

*Aspergillus niger*, the causal agent of crown rot of peanut, was isolated from infected peanut cv. Florunner grown in a field in Atascosa County, Texas. The fungus was pathogenic on hypocotyls of peanut cvs. Florunner, Tannut 74 and Pronto. The pathogenicity test was performed in the following manner: hypocotyls of peanut were inoculated by placing a 4mm plug, taken from a 2-day-old culture of *A. niger* grown on potato dextrose agar, on an incision (2mm long made with a needle). Hypocotyls were then placed on moist filter paper in petri dishes (9cm), and incubated at 28± 1C in darkness. Five fungicides, Benlate, Botec, Bravo, Captan, and Grannox, were tested for their inhibitory effects of *A. niger* on Czapek-Dox agar by the micro-assay disc technique. At 5µg/ml, Bravo produced the largest zone (675mm<sup>2</sup>) of inhibition, and Botec had the least inhibition zone (75mm<sup>2</sup>). Inhibition zones produced by Botec, Captan, Grannox, and Benlate were not significantly different. Pronto seeds were germinated for 96hr at 28± 1C in petri dishes (9cm) on Whatman #1 filter paper saturated with aqueous preparations of the tested fungicides at 0, 5, 10, 15, and 20 µg/ml. Hypocotyls were inoculated with *A. niger* as described earlier, and the lengths of lesions in the various treatments were measured six days after inoculation. At 5µg/ml, Bravo exhibited the largest reduction (67%) in lengths of lesions compared to the water control treatment. Also, at 5µg/ml, Bravo significantly reduced the sporulation of *A. niger* on infected hypocotyl by 88% compared to the water control treatment.

Control of Rhizoctonia Limb Rot with Diniconazole (Spotless 25WP). J.S. BARNES\* and A.S. CSINOS. Dept. of Plant Pathology, University of Georgia, Athens, GA 30602; Dept. of Plant Pathology, Coastal Plain Experiment Station, University of Georgia, Tifton, GA 31793.

Diniconazole (Spotless 25WP) was compared to PCNB-Mocap 10-3G in a field test in Tifton, Georgia, and to cyproconazole, chlorothalonil and PCNB in a laboratory test for control or inhibition of Rhizoctonia solani AG4, causal agent of Rhizoctonia limb rot. Spotless 25WP plus 1% Agridex was applied at .08 or .125 lb ai/A on 14 day intervals and without Agridex at .25 lb ai/A at 70 or 70 and 100 DAP. PCNB-Mocap 10-3G was applied at 100 lb formulated/A at 100 DAP. Weekly severity ratings of Rhizoctonia limb rot were made four weeks before harvest by randomly collecting five lower lateral branches per plot and recording lesion numbers. Number of disease loci from Sclerotium rolfsii were recorded after peanuts were dug and inverted. All Spotless applications significantly reduced limb rot severity as compared to the standard (PCNB). Overall, the 14 day interval applications provided superior limb rot and white mold control. Yields from all chemical treated plots were greater than the untreated plots. Yields from Spotless treated plots were not significantly different from PCNB-Mocap treated plots. Isolations were made from typical limb rot lesions from an untreated, experimental plot at the Gibbs Farm, Coastal Plain Experiment Station, Tifton, Georgia. Rhizoctonia solani and Rhizoctonia-like fungi recovered from these isolations were tested in-vitro for sensitivity to four fungicides: Spotless 25WP, SAN 619 .4G (cyproconazole), Terraclor 75WP (PCNB), and Bravo 720 (chlorothalonil). Fresh potato dextrose agar (PDA) was amended with specific concentrations of each formulated fungicide to obtain a range of inhibition levels. Plates were inoculated with a 5 mm mycelial plug of the fungus, incubated at 25°C for 42 hours, and EC<sub>50</sub> values were calculated based on inhibition of radial growth. Average EC<sub>50</sub> values for diniconazole, cyproconazole, PCNB and chlorothalonil were .028, .056, 4.06 and 4.85 ppm, respectively. Among the 28 isolates, a 14 fold range in sensitivity to diniconazole was observed.

Comparison of Seven Peanut Genotypes for Pod Rot Susceptibility and Influence on Pythium Inoculum Densities in Soil. P.I. LEWIS\* and A.B. FILONOW. Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

Seven peanut genotypes (Pronto, Spanco, Okrun, Langley, Florunner, Florigiant and GK-7) were evaluated for pod rot susceptibility and their effect on Pythium inoculum densities in replicated fields plots at Ft. Cobb and Madill, Oklahoma. Soil inoculum densities were determined at planting (mid May) and every four weeks up to harvest. Pod rot severity was rated on a scale of 1-5 where 1=no visible lesions, 5=>75% pod rot. Florigiant had the greatest amount of pod rot and was found to be significantly different (p=0.05) than Pronto, Spanco, and Okrun genotypes in the Ft. Cobb test. In the Madill test no significant differences in pod rot among genotypes were found. Differences in inoculum densities of soils from genotypes were seen in individual sampling periods, and some of these were significant. Averaged over the whole season, soil inoculum densities of Pythium spp. planted to the seven genotypes at both tests were not significantly different. Inoculum density showed a significant increase in July for both locations. At Ft. Cobb the mean inoculum density for soils from all genotypes was 7 propagules per gram (p/g) of soil at planting, rose to 740 p/g in July and dropped to 67 p/g at harvest. A similar phenomenon was seen at Madill, OK. Soil temperature or soil moisture did not have any apparent relationship with this peak in Pythium spp. No genotype appeared to consistently maintain a greater population of Pythium spp. in roots based on isolations.

Colorimetric Assessment of Pod Rot Disease Severity in Peanuts. G. B. PARKER, O. D. SMITH\*, and W. J. GRICHAR. Dept. of Soil & Crop Sci., Texas A&M University, College Station, TX 77843-2474, and Texas A&M University Plant Disease Research Station, Yoakum, TX 77993.

Rapid and accurate quantification of pod disease among segregates is critical to progress in a breeding program for pod rot resistance. Soil adhering to pods often precludes field evaluations. Dependable visual rating in the laboratory requires proper facilities and consumes scientists' time. An alternate method using a Gardner XL865 tri-stimulus colorimeter to assess discoloration was investigated. Precision (repeatability), correlation between color measures and visual assessment values, and efficacy of use in selection of pod rot resistant phenotypes were investigated. Data from fifteen pod rot resistance selection studies conducted over four years (1982-4, 1986) in Lavaca and Wilson Counties, Tx were used in the analysis. Analysis of the regression of five determinations of color measures on percent infection gradient from 0% to 100% showed regression coefficients to be homogeneous and highly significant ( $p=.01$ ), indicating the colorimetric method yielded repeatable results. Correlation between color measures and visual ratings were much lower than among multiple visual ratings, prompting comparison of the two evaluation methods for selection of pod rot resistant phenotypes. Entries appearing in the most resistant statistical group of colorimeter-based values were evaluated for co-occurrence with entries in the most resistant statistical group of visual rating-based values. Where significant differences among entry means were detected, over 50% of entries in the most resistant group using color measures were also in the most resistant group based on visual ratings; in eight of the fifteen experiments this value was 100%. A lower percent of entries appeared in the top statistical group when color measures were the dependent variable than when visual ratings were used, indicating the former measures enabled better discrimination among entry means. Results demonstrated the efficacy of using a single visual rating and colorimeter-determined measures of lightness and yellowness to evaluate pod rot resistance in a selection program.

Effects of Ethoprop and Metalaxyl-PCNB on Nematodes and Peanut Pod Rot.

H. H. FAGBENLE and K. E. JACKSON. Dept. of Plant Pathology, Oklahoma State University, Stillwater, OK 74078.

Field tests at Caddo County, OK were conducted in 1986 to determine the most effective combination of ethoprop (Mocap) and metalaxyl-PCNB (Ridomil-PC) on northern root-knot nematodes and ring nematodes, on peanut pod rot, and on yield of peanut cv. 'Florunner'. Each plot was 12.2 m long and consisted of 4 rows spaced at 0.91 m. Plots were replicated 4 times in a randomized complete block design. Treatments consisted of 1) one application of ethoprop at plant at 2.2 kg ai/ha; 2) ethoprop at plant at 2.2 kg ai/ha and 7 wks after planting at 3.4 kg ai/ha; 3) metalaxyl-PCNB applied at 1.2 kg ai/ha at plant, 4.9 kg ai/ha 11 weeks after planting, and 6.2 kg ai/ha 16 wks after planting; 4) a combination of treatments 1 and 3; 5) a combination of treatments 2 and 3; and 6) no ethoprop or metalaxyl-PCNB. Soil populations of nematodes were determined at plant and at approximately 6 wk intervals throughout the growing season. Nematodes were extracted from roots and populations determined 11 and 20 wks after planting. Pod yields and percentage pod rot were determined at harvest (162 days after planting). Nematode populations ranged from 2 to 688 root-knot juveniles/g root, from 1 to 594 root-knot nematode juveniles/100 cm<sup>3</sup> soil, and from 0 to 122 ring nematodes/100 cm<sup>3</sup> soil. All treated plots had higher (not significant) pod yields than non-treated plots. Populations of ring nematodes treated with metalaxyl-PCNB alone were significantly higher than the control ( $P = 0.05$ ). Numbers of root-knot nematode juveniles recovered from treatments 1 and 4 were significantly lower than the control 11 wks after planting. Plots treated with either nematicide or fungicide-nematicide significantly reduced pod rot when compared with non-treated plots ( $P = 0.05$ ).

Nematode Diseases of Groundnut in India. S.B. SHARMA, Nematology Unit, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Andhra Pradesh 502 324, India.

More than 27 species of plant parasitic nematodes have been reported associated with groundnut in India and of these the root-knot disease caused by Meloidogyne arenaria, and the pod-lesion diseases caused by Pratylenchus spp. and Tylenchorhynchus spp. appear to be serious. Limited surveys have indicated that the root-knot disease is very severe in the western states of Gujarat and Maharashtra, particularly in the Saurashtra region of Gujarat where yield losses are suspected to range from 20 to 90 percent. Pathogenicity tests in pots at different locations have shown that an initial population of 1 to 3 larvae g<sup>-1</sup> soil adversely affects plant growth. Farmers do not apply nematicides, but the practice of summer ploughing is thought to reduce root-knot disease levels. A few sources of resistance have recently been identified. Pod-lesion diseases occur in localized areas in the southern states of Andhra Pradesh and Tamil Nadu. Groundnut genotypes have been identified that are resistant to the pod disease caused by Tylenchorhynchus brevilineatus.

Resistance to Root-knot Nematode in Exotic Peanut Germplasm. S. C. NELSON\*, C. E. SIMPSON, and J. L. STARR. Dept. of Plant Pathology and Microbiology, Texas A&M Univ., College Station, TX 77843; Tex. Agric. Exp. Stn., Stephenville, TX 76401; Dept. of Plant Pathology and Microbiology, Texas A&M Univ., College Station, TX 77843.

Field and greenhouse evaluations of exotic wild species germplasm demonstrated high levels of resistance to Meloidogyne arenaria, the peanut root-knot nematode, within the genus Arachis. The reproductive index, or relative rate of nematode reproduction on an eggs/gm of root basis, was the criterion upon which assessments of resistance and susceptibility were based. Ten seeds were germinated for each of 67 wild species germplasm lines in greenhouse tests, with the susceptible check A. hypogaea 'Tamnut 74' included. Plants were inoculated with 5,000 eggs ten days after germination, grown for eight weeks, and harvested for quantification of egg production. A total of 26 genotypes exhibited a high level of resistance (less than 2.5% of Tamnut 74, eggs/gm of root). In section Arachis, highly resistant species included A. chacoensis (GKP-10602), A. cardenasii (GKP-10017), A. batizocoi (K-9484), A. villosa, A. stenosperma (HLK-410), A. duranensis (GKPBSSC-30078), and several other undescribed Arachis species. Repeated tests of selected entries provided consistent results. Significant inhibition of Meloidogyne reproduction was observed in every other section of the genus. Within-species variability also was observed, with A. duranensis placing entries into all four resistance categories. Susceptibility equivalent to Tamnut 74 was found only in section Arachis. Two concurrent field tests were designed to determine the effect of genotypes examined in the greenhouse tests upon the reproduction of a field population M. arenaria. The CRB designs accommodated 52 entries in adjacent tests. Composite soil samples (500 cm<sup>3</sup>) were removed from each plot replication prior to planting (Pi), at midseason (Pm), and just prior to harvest (Pf) for quantification of the juvenile and egg fractions. A significant species effect upon detectable numbers of eggs and juveniles was demonstrated, and means separation (LSD = .05) of the transformed data, log(Pf + 1), revealed significantly suppressed nematode reproduction in 13 entries. A high degree of correlation existed between greenhouse and field tests.

Distributions of Spotted Wilt Disease in South Texas Peanut Fields.

M. C. BLACK\* and D. H. SMITH, Department of Plant Pathology and Microbiology, Texas A&M University, Uvalde, TX 78802-1849 and Yoakum, TX 77995-0755.

Seven commercial peanut fields ranging in size from 26 to 61 ha were evaluated over time for spotted wilt disease, caused by tomato spotted wilt virus (TSWV). Six fields were marked with a 61 by 61 m grid and one field was marked with a 61 by 122 m grid. The number of 30 cm divisions of the row with symptoms of TSWV infection were estimated for 15 m at each point of the grids. Six fields were Florunner variety and two were Southern Runner variety. Symptoms were easily detected early in the season, but this became increasingly difficult after midseason and with water stress. Ringspots, mottling of new leaves and stunting were the predominant early seasons symptoms. Yellowing, wilting and plant death were often the symptoms produced by late season infections. Average disease incidence at the last evaluation ranged from 1.1 to 23.4 percent. Generally, disease was greatest in the southern portions of the fields. This was especially evident in a field of Florunner variety located adjacent to and north of earlier planted spanish type peanuts. The spanish peanuts developed a high incidence of spotted wilt and were maturing while the Florunner peanuts were in the late pegging and pod fill stages. There was also a trend for greater disease incidence wherever slope changes were greatest, e.g. near ridge tops and along the sides of water drains. Prevailing winds in this area are usually from the southeast during much of the growing season, but wind effects on the thrips vectors of TSWV are not well understood. More control measures should perhaps be used in the areas of the field where disease risk is highest.

# PHYSIOLOGY AND SEED TECHNOLOGY

Relation of Peanut Phenology with Thermal Time. D. L. KETRING\* and T. G. WHELESS.  
USDA-ARS, Southern Plains Area and Dept. of Agronomy, Oklahoma State  
University, Stillwater, OK 74076.

Temperature is a major environmental variable that determines the rate of plant and crop development. One of the methods that has been used to evaluate the effect of temperature on plant development is the summation of daily mean temperature above a base temperature, currently referred to as thermal time measured in day-degrees ( $^{\circ}\text{Cd}$ ). This method was used to determine phenological development of peanut under field conditions. An early maturing cultivar and late maturing breeding line, 'Pronto' and OK-FH15, respectively, were grown in 1985, 1986, and 1987. Different water amounts, irrigation plus rainfall (IRR), ranging from a maximum of 84 cm in 1985 to a minimum of 40 cm in 1987 were received by the crop. At 12 days after planting (DAP) when >80% emergence (VE) had occurred,  $135.8 \pm 17.5^{\circ}\text{Cd}$  had accumulated. Pronto produced more mainstem nodes (Vegetative stage, V) than did OK-FH15. V development was highly correlated ( $r^2$  values >0.97 for the quadratic function) with  $^{\circ}\text{Cd}$ . However, as less water was received, growth was slower and slopes of the function changed accordingly. Incipient flowering (R1) began at 313 and 316  $^{\circ}\text{Cd}$  in 1985 and 1986, respectively. At 50% R1 in 1987, 410 and 498  $^{\circ}\text{Cd}$  had accumulated for Pronto and OK-FH15, respectively. Regression analysis indicated high correlation between reproductive stages (R) and  $^{\circ}\text{Cd}$  accumulated. Linear and quadratic function  $r^2$  values were nearly the same (mostly >0.95) for all years and water amounts. However as for V stage, R stage development was slower with less water, particularly for the virginia-runner genotype OK-FH15. Although attainment of a high R value (7-9) does not indicate a high yield per se, it does indicate the degree of crop maturity. Seasonal accumulation of  $^{\circ}\text{Cd}$  in 1985, 1986, and 1987 were 1456, 1672, and 1473, respectively. Crop yields for the Full-Irrigation treatments were 312.2, 324.7, and 288.1 gm pods/ $\text{m}^2$  for Pronto and 357.8, 405.3, and 308.3 gm pods/ $\text{m}^2$  for OK-FH15 in 1985, 1986, and 1987, respectively.

Pod Characteristics Influencing Calcium Concentrations in the Seed and Hull of Peanut (*Arachis hypogaea* L.). C. S. KVIEN<sup>1</sup>, W. D. BRANCH<sup>1</sup>, M. E. SUMNER<sup>2</sup>, A. S. CSINOS<sup>1</sup>, and H. SMAL<sup>2</sup>. <sup>1</sup>Univ. of Georgia, Coastal Plain Exp. Sta., Tifton, Georgia 31793, and <sup>2</sup>Univ. of Georgia, Athens, Georgia 30602.

Calcium is often a limiting factor in peanut production. Since the peanut fruit develops underground it will not transpire root-absorbed water. Therefore, the developing fruit must absorb phloem immobile ions such as Ca directly from the soil solution. This experiment's objective was to determine the influence of several pod characteristics on Ca accumulation and Ca concentration in peanut fruit. Eight genotypes with diverse fruit characteristics were grown for two seasons, under five water stress treatments [drought 20 to 50 days after planting (DAP), 50 to 80 DAP, 80 to 110 DAP, 110 to 140 DAP, and a well-watered control]. The 80 to 110 DAP drought period had the greatest negative impact on seed Ca concentrations. Total Ca accumulation in the pod (hull + seed) was positively correlated (0.97) to pod surface area. However, five pod characteristics (days required to mature a pod, specific hull weight, pod surface area, hull thickness, and pod volume) significantly influenced seed and hull Ca concentrations. These characteristics were under genetic control, but their absolute value was modified by water stress. Supply of Ca to the seed may be analogous to a filter system. Thin, light hulls and long pod maturity periods promote high Ca concentrations in the seed. Thick, dense, hulls, short maturity periods and small pod volumes promote high Ca concentrations in the hull.

Soil Temperature Effects on Free Carbohydrate Concentrations in Peanut (*Arachis hypogaea* L.) Seed. J. L. MCMEANS<sup>1\*</sup>, T. H. SANDERS<sup>1</sup>, B. W. WOOD<sup>2</sup> and P. D. BLANKENSHIP<sup>1</sup>.

<sup>1</sup>USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; <sup>2</sup>USDA, ARS, Southeastern Fruit & Tree Nut Research Laboratory, Byron, GA 31008.

Research has indicated that variation in mean soil temperature of only a few degrees results in quality differences of peanut seed. The importance of the carbohydrate-amino acid interaction in the development of roasted peanut flavor and color is well documented. The objective of this study was to determine the influence of controlled field soil temperatures on free carbohydrates in commercially sized peanut seed. Florunner peanuts were grown in 5.48 x 12.19 m plots. Soil temperatures were modified from 28 days after planting to produce mean temperatures warmer (28.9 C) and cooler (21.8 C) than ambient (24.6 C) at the 5.08 cm depth in 1982 and 27.9, 22.5, and 25.8 C, respectively, in 1983. Carbohydrates were determined by gas chromatography. Sucrose concentrations decreased significantly as accumulated heat units and seed size increased. In general, fructose, glucose, and raffinose concentrations followed the same trends. The carbohydrate differences found in sized seed were similar to those found among maturity stages from each soil temperature treatment. The data indicate that soil temperature influences seed carbohydrate concentrations and, thus, are involved in the determination of quality characteristics.

Shoot-tip Culture of Peanut. W. Q. CHEN\*, B. JOHNSON, and J. L. SHERWOOD.

Dept. of Plant Pathology; Dept. of Botany; Dept. of Plant Pathology; Oklahoma State University, Stillwater, OK 74078-0285.

Shoot-tips of the peanut cultivars Florunner and Pronto, grown in the greenhouse, were used to develop an appropriate medium for tip culture. The terminal and lateral buds were excised from the plants, and surface sterilized with 0.525% sodium hypochlorite for 1-2 minutes followed by 70% ethanol for 5 minutes. Shoot-tips of approximately 0.5-1.0 mm long were excised from the buds, transferred to a modified Murashige-Skoog (MS) (Physiol. Plant. 15:474) agar medium, and maintained at 26 C with a 16-h photoperiod. The modified MS medium contained MS mineral salts, B5 vitamins, and the hormones naphthaleneacetic acid (NAA) and 6-benzyladenine (BA). Different concentrations of NAA and BA have been used for tip culture of peanut. The concentrations of NAA and BA that resulted in the best growth were NAA at 5.0 uM and BA at 5.0 uM. After 1 month or more, the plantlets that were produced in the medium were transferred to the soil and continued to grow. The use of this system for the elimination of plant viruses from peanut germplasm is being investigated.

Effects of Substrate Calcium Concentrations on Nodulation and the Incidence of Mycorrhizal Association of Peanut Roots. J. S. Calahan, Jr. Texas Agricultural Experiment Station, Department of Biological Sciences, Tarleton State University, Stephenville, TX 76402.

Peanuts cv. Florunner were grown in 20 liter pots of sandy soil collected from an area peanut field and irrigated with water containing calcium chloride (1, 10 or 20 meq./l.) and sodium chloride (0 or 10 meq./l.). Both nodule number and incidence of mycorrhizal infections were found to be inhibited with increasing treatment levels of calcium. Nodule numbers were decreased by the 10 and 20 meq./l. calcium treatments by 28 and 42%, respectively, and nodule weights decreased by 23 and 31%, respectively, as compared to the 1 meq./l. treatment. Similar treatment effects were observed for the incidence of vesicular-arbuscular mycorrhiza. It is postulated that both these effects are caused by a decreased "leakage" of root cellular contents. For example, rhizosphere reducing sugar content was decreased by 84% from an average of 45 micrograms per plant at 0 and 1 meq./l. substrate calcium to 7 micrograms per plant at 10 and 20 meq./l. substrate calcium.

Deposition Pattern of Arachin During Peanut (*Arachis hypogaea* L.) seed maturation.  
S. M. BASHA, Div. of Agricultural Sciences, Florida A&M University, Tallahassee, FL 32307.

Arachin is a major storage protein of peanut seed. During seed maturation non-arachin proteins are accumulated initially, where as arachin accumulation becomes predominant in the later period of maturation. Arachin has been shown to be polymeric and consist of numerous polypeptide components. In order to determine accumulation pattern of these components, arachin was isolated from seeds of different maturities and characterized by gel filtration, HPLC and electrophoresis. The gel filtration data indicated that the amount of protein in arachin polymer decreased while the amount of monomer increased with increasing seed maturity. Two-dimensional gel electrophoresis also showed quantitative and qualitative differences in the polypeptide components of arachin obtained from seeds of different maturities. In addition to protein, variations were also found in the amino acid composition of the arachin molecule during seed maturation.

The Effect of Spotless on Vegetative and Reproductive Growth of Peanuts.

Gene A. SULLIVAN. Dept. of Crop Science, College of Agriculture and Life Sciences, North Carolina State University, Raleigh, North Carolina 27695-7620.

Tests were conducted at nine locations in 1987 to compare the effects of Spotless fungicide and plant growth regulator with the plant growth regulator Kylar. Plant measurements include main stem length, cotyledonary lateral length, nodes per stem, leaf area and pegs or pods per reproductive node. Spotless and Kylar reduced main stem and cotyledonary lateral length and increased leaf area. The number of pegs on pods per reproductive node were increased slightly, but not statistically significantly. Yields and grades were not statistically different but the percent fancy pods was lower for both plant growth regulators. Yields were not decreased by Spotless when applied to stressed plants.

Effects of plant density and planting pattern on peanut. T. MUSUNGAJI\* and F. P. GARDNER, Dept. of Agronomy, University of Florida, Gainesville, Florida 32611.

Population plant density (PPD) and planting pattern affect peanut (*Arachis hypogaea* L.) growth and kernel yield. These studies were designed to assess the effects of PPD, planting pattern and their interaction on growth and kernel yield and quality of peanut cultivars diverse in growth habit, using greenhouse and field experiments at Gainesville, FL during 1986 and 1987. In greenhouse at constant plant density (138 plant per m<sup>2</sup>), the grid or square (SR) plant arrangement, compared to hedge rows (HR) produced the greatest leaf area index (LAI), crop growth rate (CGR), and total dry matter (TDM). Discrete points of transition in rate from exponential to linear in growth curve were not detected. In the first field experiment at constant plant density (33.3 plant per m<sup>2</sup>), the SR pattern produced greater (2x) LAI, CGR and TDM yield compared to HR, but the discrete point of transition in rate from exponential rate to linear was not detectable. In the second field experiment, using a log-log design, which produced 12-squareness values of patterns and 10 PPD the following was observed: 1) at low PPD (3 to 4), SR had little effect; 2) at high PPD (12 to 62), increasing SR values (up to 1.0, i.e., equidistant spacing = intra-/inter-row distance = 1) increased pod and kernel yield; 3) yield response to PPD was parabolic, increasing up to but declined after 44 PPD, 4) high PPD tended to decrease shelling percentage, whereas planting pattern had no significant effect. We conclude that peanut growth and kernel yield at moderate to high PPD can be increased without affecting kernel quality by planting patterns that have a squareness approximating 1.0.

# PROCESSING AND UTILIZATION

## Variation of Color of Oil Cooked Virginia Type Peanuts.

J. E. ERICKSON\*, M. D. KEZIAH, L. A. NELSON, C. T. YOUNG  
AND R. W. MOZINGO. Depts. of Food Science and  
Statistics, North Carolina State University, Raleigh, NC  
27695-7624, and Tidewater Agricultural Experiment  
Station, Suffolk, VA 23437.

Virginia type peanuts (Florigiant variety and two advance breeding lines - NC 18411 and NC 18423) were grown in research plots in Martin County, NC and Suffolk, VA in 1987. Recommended production, harvesting and curing practices were used. The peanuts were shelled and graded into commercial grades. Extra large kernels (ELK) and medium grades were blanched by Seabrook Blanching Corp., and oil cooked by Aster Nut Products, Inc. Color on the outer and inner surfaces of 50 peanut cotyledons was measured using a Minolta Chroma Meter II. Chromaticity was expressed numerically as  $L^* a^* b^*$ . Statistical analysis using analysis of variance showed significant effects on the degree of lightness ( $L^*$ ) on the inner surface for variety, location, grade, variety x location, variety x grade and variety x location x grade and on the outer surface for variety, location, grade, variety x grade and variety x location x grade. The correlation coefficient between the outer and inner surface was 0.739. Graphs are presented to show the color distribution in each sample. Significant effects on degree of redness ( $+a^*$ ) and degree of yellowness ( $+b^*$ ) on the outer and inner surfaces are discussed.

## Microwave Roasting of Peanut Seeds. E. M. AHMED. Food Science and Human Nutrition Department, University of Florida, Gainesville, FL 32611.

A roaster for peanut seeds was constructed and attached to a medium intensity microwave generator model 6SF. Peanut seeds were placed on a glass plate positioned at 7.5 microwave wavelengths (91.8 cm) from waveguide output. The glass plate was also positioned to be 1/4 wavelength above the bottom of the roaster to permit the reflection of microwave rays back to the peanut seeds. Peanut seeds were treated in 4-kg batches. At an intensity of 5.0 kw, a 20-min exposure resulted in an acceptable roasted color. The uniformity of roasting for the 4-kg samples were within  $\pm 8\%$  as indicated by total color " $\Delta E$ " values. The effects of microwave intensity at different exposure time combinations on the destruction of aflatoxins in contaminated peanut seeds will be reported.

Effect of the Degree of Roasting on the Production of Pyrazines in Florunner  
Peanuts. J. A. LANDSEN<sup>1</sup>, T. H. SANDERS<sup>1</sup> and J. R. VERCELLOTTI<sup>2</sup>. <sup>1</sup>USDA, ARS,  
National Peanut Research Laboratory, Dawson, GA 31742; <sup>2</sup>USDA, ARS, Southern  
Regional Research Center, New Orleans, LA 70179.

The effect of the degree of roast on the relative concentrations of pyrazines in peanut butter has been investigated using the external inlet gas chromatographic system. Commercial Florunner peanuts were sized to obtain the fractions riding 16/64, 19/64, and 22/64 slotted screens. Each screen size fraction was subdivided into small samples, roasted for various times and ground into peanut butter. Hunter L values were obtained for each roasted sample as a measure of the degree of roast. Small aliquots of each roasted sample were submitted to dynamic headspace gas chromatography. The resulting chromatograms were analyzed for total area counts of the substituted pyrazines by molecular weight classes. The total area count for each molecular weight class and the aggregate total area count within a screen size were well correlated with the degree of roast.

Sensory Evaluation of a High Oleic Acid Peanut Line. Clyde T. YOUNG\* and A. J. NORDEN. Department of Food Science, North Carolina State University, Raleigh, NC 27695-7624 and Department of Agronomy, University of Florida, FL 32611. An experimental line (UF 435-2--2) containing 79.0% oleic acid and the control line (cv. Florunner) containing 54.4% oleic acid were grown in 1986 at the Gainesville Florida location. Samples of each line were roasted and oil cooked for sensory evaluation using the flavor and texture profile methods. Aroma, flavor by mouth, aftertaste, and texture notes (a total of 40 notes) were measured. Generally, the desirable notes (roasted peanut, sweet, hardness, crunchiness, and chewiness) and overall impression were higher in the Florunner cultivar. A similar trend was observed for both the roasted and oil cooked peanut samples.

### Investigation of the Relationship between Flavor Profiles and Peanut

#### Volatile Profiles using Multivariate Analysis

K.L. CRIPPEN\*, G. SHAFFER, AND N.V. LOVEGREN, P.D. BLANKENSHIP, G.V. CIVILLE, T.H. SANDERS and J.R. VERCELLOTTI. USDA-ARS/SRRC, New Orleans, LA 70179; Dept. of Statistics, Louisiana State University, Baton Rouge, LA 70803; USDA-ARS/SRRC, New Orleans, LA 70179; USDA-ARS-SAA, NPRL, Dawson, GA 31742; Sensory Spectrum, Inc., East Hanover, NJ 07936; USDA-ARS-SAA/NPRL, Dawson, GA 31742; USDA-ARS/SRRC, New Orleans, LA 70179

The descriptive flavor analysis data and the G.C. volatile data were collected on peanuts from a study concerning the effects of maturity (based on Pod Maturity Profile) and drying temperature on peanut flavor. The FACTOR procedure (SAS, 1982) was used to divide the G.C. volatiles in such a way that each factor can be interpreted as essentially uncorrelated. The FACTOR procedure was then used to cluster the G.C. volatiles with the sensory flavor characteristics. Compounds associated with the first cluster were ethanol, methylpropanal, an unidentified peak which is probably butanone, methylbutanal, methylbutanol, hexanal, hexanol and methyl acetate. These peaks have high positive correlations with the flavor characteristics sour and fruity/fermented and did not load high on factors containing other flavor characteristics. The second cluster of compounds consists of methylpyrazine, dimethylpyrazine, methylethylpyrazine and an unidentified peak (after vinyl phenol). These compounds have negative correlations with raw/beany and positive correlations with dark roasted. This indicates the pyrazines are involved in the dark roasted flavor and low concentrations of pyrazines occur in under-roasted peanuts as reflected in high negative correlations with raw/beany.

### Effect of Peanut Kernel Moisture Content on Lipoxigenase Activity in Raw Peanuts as Evidenced by Volatiles Profile Changes

N.V. LOVEGREN\* and J.R. VERCELLOTTI, USDA-ARS, Southern Regional Research Center, New Orleans, LA 70179; T.H. SANDERS, National Peanut Research Laboratory, USDA-ARS, Dawson, GA 31742

The lipid oxidation enzyme system(s) in the fresh raw peanut immediately after digging (moisture content about 28%) produced pentane and hexanal rapidly and lesser amounts of other lipid oxidation products (pentanal, hexanol, 2-pentyl furan, nonanal, nonanol, t-c-decadienal, t-t-decadienal) in cut or mashed raw peanut. This effect was retained as long as the moisture content in the sample was over 11%. Volatiles were determined by the direct SRRC volatile profile procedure in the gas chromatograph (inlet at 127°C). After the peanut sample had been dried to 6 to 8 % moisture, practically no pentane or hexanal was produced, implying that the catalytic effect of the enzymes was no longer operating at the lower moisture content. Under identical conditions, a single whole fresh raw peanut (moisture content 28%) did not produce pentane or hexanal as long as the sample was not cut or bruised, indicating that cell damage allowed lipoxigenase to contact its substrate. Storage of mashed wet raw peanuts for one day (in a glass vial at room temperature) increased the volatiles (pentane, hexanal, and total volatiles as above) several fold over a sample evaluated immediately after preparation. The volatile profile of good dried raw peanuts (5% moisture for 2 months) indicated little pentane or hexanal. When water was added to this ground sample and the volatile profile immediately determined, large pentane and hexanal peaks were found indicating the lipoxigenase was immediately reactivated by adding water to the ground sample equivalent to that in the original undried peanut.

Significance, Identification, and Detection of Allergenic Peanut Proteins.

S. L. TAYLOR\*, J. A. NORDLEE, S. MEIER-DAVIS, AND R. K. BUSH. Department of Food Science and Technology, University of Nebraska, Lincoln, NE 68583-0919 and Department of Medicine, University of Wisconsin Medical School, Madison, WI 53792.

Peanut allergy is one of the most common food allergies. Unlike some food allergies that are outgrown, peanut allergy tends to persist into adulthood. The symptoms of an allergic reaction to peanuts may range from mild to deadly and include nausea, vomiting, diarrhea, oral and laryngeal edema, urticaria, rhinitis, and anaphylactic shock. Fatal food-induced anaphylaxis is rarely reported, but in a period of 19 months four deaths were reported that incriminated peanuts. It is important for most peanut allergic individuals to avoid peanuts and as the use of peanuts and their products is becoming more widespread and less traditional, this task is becoming more difficult. The existence of multiple peanut allergens has been demonstrated by radioallergosorbent test inhibition (RAST-inhibition), crossed-radioimmuno-electrophoresis, and immunoblotting. Immunoblotting detects allergenic proteins by employing serum of peanut allergic individuals. RAST-inhibition can be used to determine the allergenicity of proposed non-allergenic peanut products. An ELISA (enzyme linked immunosorbent assay) has been developed to detect peanut proteins in other foods. This technique detects 10 ppm peanut in some products. Work is currently being undertaken to make ELISA applicable to peanut detection in a broader group of foods.

# PRODUCTION AND TECHNOLOGY

Effect of Rhizobium Inoculation and Nitrogen Fertilizer on Peanut In Oklahoma. J. R. SHOLAR\* and G. TURPIN. Dept. of Agronomy, Oklahoma State University, Stillwater, OK 74078.

Previous studies on peanut (*Arachis hypogaea* L.) pod yield and grade response to inoculation with Rhizobium bacteria and nitrogen fertilizer application have produced inconsistent results. A 3 year (1985-1987) study was conducted on old peanut land to determine the response of peanut cv. Spanco to inoculation by Rhizobium bacteria and nitrogen fertilizer application in Oklahoma. Treatments were (1) uninoculated control; (2) granular inoculant applied in-furrow at rates from 4.6 to 8.8 lb per acre; and (3)  $\text{NH}_4\text{NO}_3$  at 100 lb N per acre applied in July. Plant growth and color were unaffected by all treatments. Statistically significant ( $P<0.05$ ) pod yield increases for inoculated peanuts were obtained in 1987 only; however, inoculated plots outyielded uninoculated plots in all years. Pod yield increases from nitrogen application were obtained in two of the three years; however, the increase was significant ( $P<0.05$ ) in 1985 only. Pod yield increases from nitrogen fertilizer were less than increases from inoculant use. Granular inoculant and nitrogen application resulted in higher market grade than the control in 1987 only.

Yield, Value, and Disease Response of Peanuts to Conservation Methods of Production in Virginia. F. S. WRIGHT\* and D. M. PORTER. USDA-ARS, Tidewater Agricultural Experiment Station, Suffolk, VA 23437

The yield, value, and disease development of peanuts (*Arachis hypogaea* L.) produced in a wheat cover crop were compared to peanuts grown conventionally. The studies were conducted for three years with three digging dates for one variety and four years for three varieties in both production systems. The wheat cover was killed about three weeks prior to planting with Glyphosate (Roundup). Peanuts were planted conventionally (CT), and in wheat cover with a rotary tiller in a 10-inch tilled band (BT) or with a modified in-row till conservation tillage implement (NT). Yield was influenced (6-15%) by digging 10 days before and after the normal digging date (first week in October). The yield and value means between varieties were not significantly different. Yield and value of NT peanuts were about 80% of the yield and value of CT peanuts. The response of BT peanuts was about equal to or slightly higher than the response of NT peanuts. Peanut leafspot (*Cercospora arachidicola*) severity (% defoliation, % plant infected, # lesion/leaflet) was (29%, 20% and 50%, respectively) less for NT as compared to CT peanuts. Also, leafspot was more severe in Florigiant and VA 81B than in NC 6. Pod rot (*Pythium myricetum*) severity was 25% greater in NT as compared to CT. The total pods/plant was 10% less for NT as compared to CT peanuts. Other studies have indicated a delay in flowering of NT peanuts. This may explain the lower yield under conservation methods of production.

Irrigation of Peanut Using a Subsurface Trickle Irrigation System. N. L. POWELL\* and F. S. WRIGHT. Tidewater Agricultural Experiment Station, P. O. Box 7099, Suffolk, Virginia 23437.

In a previous overhead sprinkler irrigation study, peanut yields were decreased three out of four years in irrigated plots when compared to non-irrigated plots. Yield decreases in the irrigated plots were attributed to an increase in severity of several diseases including leafspot, pod rot, and Sclerotinia blight enhanced by increased wetness of the plant canopy and soil surface. A subsurface trickle irrigation system installed 14-16 inches below the soil surface was used to irrigate peanut during the growing seasons, 1986 and 1987. In 1987, peanuts (cv. Florigiant) were irrigated on a daily basis starting at pegging time using three irrigation levels, no irrigation and irrigation with a total of 6 and 9 inches of water. Without the application of irrigation water the peanut yield was 4122 lbs/acre. With the application of 6 and 9 inches of irrigation water the crop yield was 4680 and 4742 lbs/acre, respectively, using a tube spacing of 3 feet (under each row). Using a tube spacing of 6 feet (between every other row) the yield was 4802 and 4661 lbs/acre for 6 and 9 inches of applied irrigation water, respectively. With a tube spacing of 9 feet (under every third row), the yield was 4462 and 4563 lbs/acre for 6 and 9 inches of applied irrigation water, respectively. During 1986 when irrigating on a week to ten day interval, crop yield increases attributed to irrigation were less when compared to 1987.

Effect of Harvesting Date on Yield, Grade and Seed Quality of Southern Runner Peanut. R. R. PEDELINI\* and E. B. Whitty. Department of Agronomy, University of Florida, Gainesville, FL 32611.

Field trials were conducted at three locations in Florida during 1987 to assess the effects of variation in harvesting date on yield, grade and seed quality of the Southern Runner peanut variety. Improved yield and grade were obtained by delaying harvesting from 135 days to 180 days after planting (DAP) with an early planting date, and from 110 to 153 DAP with a late planting date. The yield and grade decreased with a harvest date of 192 DAP at one location and was due mainly to pod rot. Germination percentage followed the same trend as yield and grade as it increased after the first harvest and remained at the same level during the subsequent harvests. Data from this research suggests that the Southern Runner variety will improve and maintain yield and quality as harvest is delayed and may be due to the long filling period and disease resistance of the variety. Although harvests at 160 DAP or later resulted in greater pod loss in the soil, the rate of pod filling to pod loss was still favorable to yield. Flexibility in the harvest period could allow farmers to use equipment more efficiently.

Mineral Distribution in Peanuts as Detected by SEM-ED X-Ray Analysis.

R. K. HOWELL\*, W. P. WERGIN, and N. CHANEY. ARS, USDA, Beltsville, MD 20705.

How are selected minerals distributed in peanut tissues? Leaves, exterior and interior pod surfaces, seed coats, cotyledons, and plumules were removed from field or greenhouse grown plants and examined by scanning electron microscopy and energy dispersive X-ray analysis for Mg, P, S, K, Ca, Fe, Al, and Si. Soils were amended with 300 kg/ha of 0-15-30. Soil pH was 6. At early bloom 800 kg/ha of gypsum was applied over plants. Mg, P, S, K, Fe, Al, Si were evenly distributed within sections of tissues. Ca was evenly distributed in all tissues examined but leaves. On both leaf surfaces prismatic particles morphologically resembling calcium oxalate were present. When the particles were probed, Ca was detected at the sites of the particles. On upper leaf surfaces these calcinated particles were always on the outer epidermal surfaces but were under the cuticle. They appear only in small crevices where two cells abut; therefore, when probed for Ca these particles appear as branched chains over the upper leaf surfaces. On lower leaf surfaces similar particles occurred but appeared to have a less designed pattern of deposition. SEM in addition to ED X-ray analysis should be useful to detect locations of minerals in plant tissues and to provide new information about possible functions and depositions of mineral elements.

Impact of Peanut Production Costs on the Quota Support Formula of the Peanut Program. R.H. MILLER, USDA, ASCS, Commodity Analysis Division, Room 3741-S, Washington, D.C. 20250.

Beginning with the 1978 peanut crop, Federal law has provided for a minimum level of support for quota peanuts with annual changes to reflect changes in the cost of production, excluding the cost of land. However, for the 1979-81 crops, USDA was also required to consider eight additional economic factors. The support has increased 46 percent since 1978, from \$420 to \$615 per short ton in 1988. Most of the increase was required by the 1981 and 1985 farm legislation. Since 1978, the peanut quota support has increased more rapidly than the indexes of prices paid by farmers and wholesale food prices, but less rapidly than retail food prices. Component changes in the Department of Agriculture's estimates of peanut production costs are summarized. From 1977 to 1987 total cash expenses per acre increased from \$287 per acre to \$388, while other economic costs declined from \$177 per acre to \$166. Interest cost rose but there was reduced land rent. However, residual returns to management and risk generally increased over the 10-year period.

Assessment of Shell Damage and Fungal Infection Rates of Seed in Samples of Five Diverse Peanut Cultivars. J.L. STEELE\*, D.M. PORTER AND T. A. COFFELT. USDA-ARS, U.S. Grain Marketing Research Laboratory, Manhattan, KS 66502 and USDA-ARS, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.

In-shell samples of conventionally harvested peanuts were subjected immediately after harvest to aeration at constant and favorable mold growth conditions for selected periods of time. The in-shell samples were removed, dried and then stored in a constant and safe storage environment. The samples remained in storage for moisture equilibration so that shell damage and mold assays could be simultaneously determined on the treated lot. The cultivars were Florigiant, NC 6, NC 7, Early Bunch and Va. 81B. Duplicate samples of each cultivar were exposed to the favorable mold growth environment for periods of 0, 2, 4, 6, 8, 10, 12, 14 and 16 days. Each sample was evaluated for shell damage using fast green dye techniques for classification of the seed at shelling. Seed from sound, invisible and visible damage categories were then plated for mold growth assessment. Twenty-five seeds of each damage category were incubated and seed counts for prevalent fungi were recorded. Additionally, bulk lots of the conventionally harvested peanuts were artificially dried from harvest moisture to less than 10% moisture. The treatments and measurements described above were then repeated for assessment at a lower moisture content. The procedures, treatments and measurements also were repeated for each of three consecutive growing seasons. Variations in shell damage percentage among cultivars and production seasons were determined. Percent of seed infected by prevalent fungi as a function of exposure time was used to determine relative fungal infection rates for each cultivar, damage category and production season. Visible pod damage for all cultivars was consistently high and ranged from 69-76%. Visible pod damage for one cultivar, VA 81B, averaged about 8% less than that of the other cultivars. Sound pods ranged from 8-15% and was highest for the cultivar NC 7. Percentage of seed infected with A. Flavus was significantly different across years, moisture contents, cultivars and exposure times. Percentages of seed infected with A. Flavus increased with pod damage severity for all cultivars and was lowest for the cultivar NC 6.

# WEED SCIENCE

## Phytotoxicity of Paraquat as Affected by Formulation and Peanut Cultivar.

D. L. COLVIN and B. J. BRECKE. Agronomy Department, University of Florida, Gainesville, FL 32611; Agricultural Research and Education Center, University of Florida, Jay, FL 32565.

'Florunner' and 'Southern Runner' peanuts (*Arachis hypogaea* L.) were planted in paired plots in a randomized complete block to investigate the effects of applications of paraquat (1,1'-dimethyl-4,4'-bipyridinium ion) and paraquat + alachlor (2-chloro-N-(2,6-diethylphenyl)-N-(methoxymethyl)acetamide) tank mixes on peanut phytotoxicity and yield. Peanuts were planted in late May of both 1987 and 1988 at Gainesville and Jay, FL on a Blanton fine sand and a Red Bay sandy loam, respectively. Benefin (N-butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl)benzenamine) was applied pre-plant incorporated at 1.68 kg/ai/ha to control weedy grasses and small seeded broadleaves. Paraquat and paraquat + alachlor treatments utilizing both the "old" (2 lb/ai/gal) and the "new" (1.5 lb/ai/gal) formulation of Gramoxone and Gramoxone Super were applied true ground-cracking and early postemergence (14 days after emergence). Florunner plots were dug 136 days after planting while Southern runner plots were dug 159 days after planting. Data taken include both early and late season crop injury ratings as well as peanut yields. Data indicate that few differences with respect to peanut injury, yield or grade could be attributed to Gramoxone formulation. Early postemergence applications showed higher crop injury ratings than ground cracking treatments at the early rating. However, by the late season rating peanuts in all treatments had overcome visual injury. Final yield data in 1987 indicated no significant treatment differences within a particular cultivar. Within individual herbicide treatments Florunner yielded more than Southern Runner. The same yield trend was noted in the check plot which received no herbicide treatment, thereby making these differences in yield difficult to attribute to differential herbicide damage.

## Efficacy of Various Herbicides for Yellow Nutsedge Control in Peanuts. W. J. GRICHAR. Texas Agricultural Experiment Station, Yoakum, TX 77995.

Three separate tests were conducted in 1986 and 1987 in the South Texas peanut growing area to evaluate several herbicides for control of yellow nutsedge (*Cyperus esculentus*). RE 40885 at 0.56 to 1.12 kg/ha provided excellent control for 60-90 days after either preemergence or preplant incorporated applications. SC 0051 applied preemergence at 1.12 to 2.24 kg/ha provided excellent control but caused severe peanut injury in two of the three tests. Fomesafen at 0.35 and 0.43 kg/ha applied preemergence provided greater than 90% nutsedge control for 30 days after application but control dropped off considerably after the 30 day time period. Severe peanut injury was noted at one location with the 0.43 kg/ha rate of fomesafen applied preemergence while no injury was noted with early postemergence applications. Pyridate at 1.01 to 2.1 kg/ha provided excellent nutsedge control (>90%) with 2 to 3 applications under heavy nutsedge populations. The 0.67 kg/ha rate only provided 60-70% nutsedge control. No difference in the activity of pyridate was noted with or without the use of the crop oil Agridex at 0.28 kg/ha. Metolachlor at 1.68 kg/ha applied preplant incorporated or preemergence plus postemergence treatments of pyridate at 0.67 to 1.01 kg/ha provided nutsedge control of 80-90% throughout the growing season. SC 0051 resulted in significantly reduced yield due to peanut injury in 1986. Vernolate, metolachlor alone, fomesafen, and metolachlor plus pyridate at 0.67 kg/ha applied early postemergence provided significantly higher yields than the untreated check in 1987.

Economics of Peanut Weed Control Systems without Dinoseb. J. W. WILCUT\*, G. R. WEHTJE, T. V. HICKS, AND T. A. COLE. Tidewater Agric. Exp. Stn., Virginia Polytechnic Inst. & State Univ., 6321 Holland Road, Suffolk, VA 23437, and Auburn University, AL 36849.

Postemergence treatments utilizing combinations of fluazifop-P, paraquat, and 2,4-DB were compared to a traditional system containing a preplant incorporated application (PPI) of benefin followed by a ground-cracking application of alachlor and dinoseb plus naptalam and a postemergence (POE) application of 2,4-DB for weed control, peanut yield, and net economic return. The greatest peanut yields (3-year average of 4500 kg/ha) and net returns (3-year average of \$433/ha) were provided by a postemergence system that utilized two POE applications of paraquat (0.14 kg ai/ha/application) and one POE application of fluazifop-P (0.11 kg ai/ha) and 2,4-DB (0.28 kg ai/ha). This system provided complete control of Texas panicum (*Panicum texanum*), sicklepod (*Cassia obtusifolia*), pitted morningglory (*Ipomoea lacunosa*), and 99% control of Florida beggarweed (*Desmodium tortuosum*). Seven other postemergence systems provided equivalent or greater yield and net returns than the PPI and dinoseb system. The addition of one POE application of paraquat to the PPI and dinoseb system improved the 3-year average peanut yield and net returns by 510 kg/ha and \$144/ha, respectively, compared to the same system without paraquat.

Label Update for the Use of Lactofen on Peanuts, H. B. HAGWOOD\*, Oxford, NC 27565, M. R. BATES, Cabot, AR 72023, T. D. BISHOP, Lawrenceville, GA 30245, C. A. TRAMMELL, Madison, MS 39110, Valent USA Corporation.

Lactofen is a selective, broadleaf herbicide for use in peanuts (*Arachis hypogaea* L.). When Lactofen herbicide is applied during true ground cracking at 0.28 Kg/ha or postemergence at a rate of 0.22 Kg/ha it provides excellent wide-spectrum control of many problem broadleaf weeds in peanuts. When using true ground crack applications, Lactofen may be tank mixed with alachlor, metolachlor, or chloramben at labeled rates, for extended preemergence broadleaf control and added grass control. In addition, Lactofen may also be tank mixed with 2, 4-DB amine according to manufacturer's recommendation for enhanced postemergence control of morning glories (*Ipomoea* spp.) up to 12 inches long and sicklepod (*Cassia obtusifolia* L.). Research results show that both a true ground cracking and an early postemergence treatment is required for consistent broadleaf weed control in the states of Alabama, Florida, Georgia, North Carolina, South Carolina, and Virginia. In all other peanut producing states, excellent weed control has been observed using single applications of Lactofen at true ground cracking or as early postemergence treatments. Peanuts are tolerant to Lactofen herbicide. Peanuts may exhibit a temporary contact response to postemergence applications. This response is limited to all peanut foliage exposed at the time of application. New growth is not affected. The temporary response does not affect peanut yields. For best results, Lactofen herbicide should be applied using conventional ground sprayers equipped with flat fan or hollow cone nozzles. Tips larger than 8006 do not deliver a fine particled spray pattern, afford poor spray coverage of the target weeds and reduce weed control effectiveness.

Basagran-Gramoxone Interactions in Early Season Peanuts. J.C. TURNER and J.R. EVANS. BASF Corporation

In the Spring of 1987, ICI Americas was granted a Section 18 registration for the use of Gramoxone in early season peanuts. In the Spring of 1988, ICI was then granted a Section 3 Full registration for the use of Gramoxone in early season peanuts. Shortly thereafter, both BASF Corporation and ICI Americas received supplemental labelling for the tank mix of Basagran plus Gramoxone for the same purpose. Data were presented from 1987 and 1988 BASF field and greenhouse trials conducted in south Georgia and at the Agricultural Research Center near Raleigh, NC, respectively. Data presented showed generally excellent weed control achieved by the tank mix of Basagran (0.5 lb a.i./acre) plus Gramoxone (0.125 lb a.i./acre). Increases in control of Gramoxone tolerant weeds such as smallflower morningglory (*Jacquemontia tamnifolia*), prickly sida (*Sida spinosa*), and bristly starbur (*Acanthospermum hispidum*) were achieved due to the susceptibility of these weeds to Basagran. Another interesting phenomenon was observed with the tank mix as compared to Gramoxone alone. Consistent reductions in peanut phytotoxicity were reported for the Basagran tank mix relative to Gramoxone applications. Peanut phytotoxicity was observed to be higher with higher use rates of Gramoxone, but substantially reduced with increasing rates of Basagran when tank mixed. Peanut phytotoxicity was also slower to manifest itself when Basagran was added to Gramoxone applications. The supplemental labelling of the Basagran-Gramoxone tank mix now has given peanut producers an alternative approach to early season weed control. The tank mix has proven to be effective, economical, and safe to the crop.

BENCHMARK<sup>TM</sup> Herbicide: Weed Control in Peanuts,\*J. C. HULBERT, D. D. ROGERS, R. L. BROOKS, Chevron Chemical Company, Tucker, Georgia 30084.

BENCHMARK<sup>TM</sup>[5-(methylamino)-2-phenyl-4-(3-trifluoromethylphenyl)-3(2H)furanone] is a broad spectrum herbicide invented by Chevron Chemical Company, Agricultural Chemicals Division. Crops showing acceptable tolerance to BENCHMARK include cotton, peanuts, sorghum, sunflowers, certain small grains and vegetables. Activity has been demonstrated on over twenty broadleaf weed species including sicklepod, Florida beggarweed, annual morningglory species, prickly sida, velvetleaf, pigweed, common lambsquarter and spurred anoda. Annual grass species controlled or suppressed include barnyardgrass, foxtail species, large and smooth crabgrass, seedling Johnsongrass and Texas panicum. Bleaching-type injury symptoms indicate BENCHMARK activity is due primarily to inhibition of carotenoid synthesis. BENCHMARK is effective when applied preplant incorporated, preemergence, at-cracking, and postemergence over-the-top of peanuts at volumes of 20 to 40 gallons of water per acre. Use rates are dependent on soil type and organic matter. Herbicide activity in coarse and medium soils of two percent organic matter or less has been observed at rates from 0.4 to 0.75 pounds active ingredient per acre through either preplant incorporated or preemergence applications. Moisture at or around preemergence applications enhances activity. Split applications (preplant incorporated plus preemergence) have provided excellent broadleaf and improved annual grass weed control. At-cracking and postemergence rates range from 0.25 to 0.75 pounds active per acre, depending on weed size and species. Postemergence activity is enhanced with a non-ionic surfactant such as X-77 spreader at concentrations of 0.5 to 1.0 percent volume per volume. BENCHMARK appears to be compatible with postemergence grass herbicides such as SELECT<sup>TM</sup>. Planting of crops normally susceptible to BENCHMARK back into a BENCHMARK treated field appears to be possible within 50 days of application.

Recent Advances in Chlorothalonil Formulation Technology. W.C. ODLE. Fermenta Plant Protection Company.

The Fermenta Plant Protection Company recently introduced Bravo 720 to the marketplace following extensive laboratory, greenhouse and field evaluations. Although Bravo 500 was one of the most effective and successful foliar fungicides on the market, Fermenta initiated a development program to further optimize the benefits and performance of chlorothalonil. One characteristic which was targeted for evaluation was weathering, or rain tenacity, of chlorothalonil on leaf surfaces. Since this chemical has a low volatility and exhibits a low degree of hydrolysis and photodegradation, weathering has been identified as the primary factor involved in loss of chlorothalonil from leaf surfaces. Advanced flowable formulation technology was utilized to develop a Bravo 720 that exhibits improved rain tenacity on plant surfaces. Physical characteristics and mixing qualities of Bravo 720 and Bravo 500 are comparable. In peanut field trials, the formulations have also exhibited comparable leafspot control, however, Bravo 720 has consistently provided higher yields than Bravo 500. In the future, Fermenta will continue to optimize the manufacturing and biological properties of chlorothalonil. Development activities will also include evaluation of Bravo in combination with other fungicides in an effort to provide more effective, broad spectrum disease control. Chlorothalonil is a strategically important component in management of fungal resistance. Fermenta intends to remain on the leading edge of resistance. Fermenta intends to remain on the leading edge of chlorothalonil formulation development in order to provide growers with the best product that technology and economics will permit.

Use of 'Norflurazon' on Peanuts for Florida Beggarweed Control. H.S. MCLEAN.

Sandoz Crop Protection Corporation, Rt. 1 Box 535 Cordele, GA 31015. Norflurazon has been evaluated as a preemergence herbicide for peanuts in the southeastern United States since 1983. These investigations have included efficacy trials since 1984 and Experimental Use Permit (EUP) trials since 1986. Results indicate that norflurazon, as part of a total weed control program, will provide superior preemergence Florida beggarweed control compared to the currently labeled products. Norflurazon also provides increased control of sicklepod, coffee senna, teaweed, and annual grasses (except Texas panicum). The optimum use pattern appears to be a dinitroaniline preplant incorporated followed by norflurazon (1.25 lbs ai/acre) plus either alachlor (3.0 lbs ai/a) or metolachlor (2.5 lbs ai/a) preemergence (at-planting). Additional cleanup postemergence herbicide applications enhance overall activity by controlling weeds that may have emerged prior to activation by rainfall. Norflurazon treatment often results in temporary chlorosis (bleaching) of peanuts upon emergence but this bleaching will dissipate 4-6 weeks following applications. Bleaching does not appear to cause stunting and yield reductions have not been encountered as a result of norflurazon applications. However, norflurazon can not be applied to peanuts that have been treated with vernolate as increased crop injury will result. Based on preliminary data, bleaching caused by norflurazon does not appear to increase crop injury caused by postemergence herbicides. Our investigations indicate that norflurazon may also prove to be helpful in the control of other weeds such as burgherkin, redweed, and morningglory. The use of norflurazon in peanuts will be limited by rotational crop restrictions; and probably to Southeastern U.S. peanuts.

# SYMPOSIA

## PEANUT SYSTEMS RESEARCH

Research and Management Applications of the PNUIGRO Crop Growth Model. K. J. BOOTE\*, J. W. JONES, and G. HOOGENBOOM. Departments of Agronomy and Agricultural Engineering, Univ. of Florida, Gainesville, FL 32611.

PNUIGRO V1.01 is a peanut crop growth simulation model which was developed to simulate the growth and yield of Florunner peanut in response to environment, genotype, and management conditions. The model has been tested against four or more seasons of growth analysis on Florunner peanut, but additional experience is needed with other soils, cultivars, and drought situations. Research applications of PNUIGRO include doing "what if" hypothetical simulations of genetic traits to determine their impact on yield under various environments. Simulated effects of maturity traits, partitioning, and pod growth traits will be shown. Research applications include the coupling of pest effects (leafspot damage or insect damage) to crop growth processes in order to understand the system and to predict yield reductions. Present possible management applications for researchers, extension, and growers include the prediction of growth and yield response to planting date, row spacing, and irrigation. Simulations versus long term weather records show that optimum planting date in Florida is between April 15 to June 1 and is reduced for later plantings. Examples will be shown on the use of PNUIGRO to simulate the yield advantage from irrigation, using long term weather information and different soil types. PNUIGRO can also be used to predict current stage of vegetative and reproductive development, and aid management decisions on gypsum, irrigation, and fungicide applications, as well as harvest date. With early planting, the model predicts slower development and more calendar days to harvest. It will also predict delayed maturity resulting from early season droughts which delay pod formation. Many other management and research applications are possible, including the use of PNUIGRO placed inside expert systems shells to allow interaction with information from extension specialists.

Use of "PEANUT" by Research, Extension and Farm Managers. J. H. YOUNG. Biological and Agricultural Engineering Department, North Carolina State University, Box 7625, Raleigh, NC 27695-7625.

The peanut growth model "PEANUT" has been adapted to run on an IBM-PC or compatible microcomputer. Additionally it has been combined with an expert system program which allows users to choose planting dates, soil types, and harvest dates. It further allows the user to simulate the effects of management decisions such as irrigation date and amount using either average weather conditions or actual data up to the date of simulation followed by historical average data for the remainder of the season. The expert system allows the user to easily create a data set of weather parameters for the current year in the format needed by "PEANUT" and merges that data set with an existing set of average conditions. It allows the user to consider "what if" questions concerning the economic feasibility of various levels of irrigation on a particular date.

Use of a Peanut Leafspot Model in Virginia. J.L. STEELE\*, P. M. PHIPPS AND D. M. PORTER. USDA-ARS, U. S. Grain Marketing Research Laboratory, Manhattan, KS 66502; Tidewater Agr. Exp. Sta., VPI&SU, Suffolk, VA 23437 and USDA-ARS, Suffolk, VA 23437.

Yield reductions and/or fungicide costs for control of peanut leafspot in Virginia were very significant in the mid 70's. Without control, potential yield reductions ranged from 30 to 60%. Typical fungicide application costs for control often exceed 10% of the crop value. Implementation and verification of an existing peanut leafspot model for Virginia began in 1975 with the development and operation of an automated system for real-time acquisition of environmental data. The model was implemented for verification tests using 10-minute interval relative humidity and temperature data. In verification tests, the model produced dramatic reductions in the number of fungicide applications with no significant yield reductions when compared to conventional 14-day fungicide application procedures. As a result, the daily delivery of the leafspot advisory to growers began 1981. The success of the leafspot advisory program in Virginia was attributed to the frequency and precision of the environmental data, the model logic, effective advisory delivery, availability of effective fungicides, and correct guidelines for grower utilization. Historical utilization data, comparisons with conventional procedures and annual production cost savings were presented. Utilization of the leafspot model in other geographic areas and software sources for implementation of the model discussed.

Use of a Weather-Based Forecasting Model for Late Leafspot: Integration with Fungicides and Resistant Varieties. F. W. NUTTER, JR. Department of Plant Pathology, University of Georgia, Athens, GA 30602.

A model to forecast early leafspot (caused by *Cercospora arachidicola*, was developed in Georgia more than 20 years ago by Jensen and Boyle at a time when early leafspot was the predominant foliar pathogen. This model is currently used successfully in Virginia and in North Carolina where early leafspot is severe but this model is not currently recommended or used in Georgia. One possible reason for its lack of use in Georgia may be that since 1971, late leafspot, caused by *Cercosporidium personatum*, has gradually become the most important foliar pathogen in Georgia. Our research over the past 2 years has shown that the early leafspot model does not accurately predict the occurrence of late leafspot and therefore a different model is needed to identify weather periods favorable (or unfavorable) for the development of late leafspot. A preliminary late leafspot model (developed by Nutter, Breneman, and Alderman) was tested in 1987 at three locations in Georgia. Applying chlorothalonil or ethyltrianol according to the late leafspot model resulted in a reduction in the number of fungicide applications applied in 2 out of the 3 locations without reducing yield or quality. Although the number of sprays was not reduced in one location, the better timing of fungicide applications to coincide with weather periods favorable for late leafspot resulted in higher pod yields with either fungicide. The late leafspot forecasting model, combined with leafspot resistant varieties and sterol-inhibiting fungicides, offers an alternative disease control program that reduces fungicide inputs without risking a loss in yield or quality.

A Peanut Harvest Scheduling Model for Use by Research, Extension, and Farm Managers. E. J. WILLIAMS. Crop Systems Research Unit, USDA-ARS, Georgia Coastal Plain Experiment Station, Tifton, Georgia 31794.

A risk-management model was developed to determine the optimum harvest interval for runner peanuts (*Arachis hypogaea* L.). Based on the pod maturity profile, the model is designed to simulate total production, net yield, and the risk of pod loss in half week intervals from the time of initial sampling. Primary inputs to the model include the pod maturity profile, determined by field sampling, and the crop age. The model also provides a skeletal structure for future additions of environmental and other moderating influences. The background and use of the model is illustrated in three production situations, each having a different pod maturity profile. Software also provides a data base and graphics utility for viewing pod maturity profiles. The model runs on IBM-PC and compatible computers.

Use of Expert Systems by Research, Extension, and Farm Managers. R. W. MCCLENDON. Driftmier Engineering Center, Athens, GA 30602.

An expert system is a computer program that responds to questions the way a human expert might. It is composed of three parts: knowledge base, inference engine, and user interface. The knowledge base contains the rules obtained from the expert. For example, the effects of a pest on a crop or a recommended control regime. The inference engine contains algorithms to logically consider all applicable rules. A strictly rule-based expert system could be developed using extension guidelines. An expert system could also incorporate intuitive rules from experts which would be difficult to place in a bulletin. Expert systems can include other programs such as crop models to increase their usefulness. Expert systems provide a unique opportunity for close cooperation among researchers, extension agents, and growers. It is unrealistic for a researcher to attempt the development of an expert system for agricultural production without the collaboration of extension. Furthermore, these expert systems should be reviewed by growers. Expert systems hold promise as aids to management in every phase of agricultural production.

An Expert System for Management of the Lesser Cornstalk Borer. Y. WANG and T.P. MACK\*. Department of Entomology, Alabama Agricultural Experiment Station, Auburn University, AL 36849-5413.

An expert systems model for the lesser cornstalk borer, Elasmopalpus lignosellus (Zeller) (Insecta: Lepidoptera: Pyralidae) has been developed for conventionally tilled and planted runner peanuts in Alabama. The prototype expert systems model consists of an inference engine, a knowledge base, and a user interface. The model uses information a field location, previous history of lesser cornstalk borer damage, soil type, environmental events, and a lesser cornstalk borer population dynamics model to determine if a population outbreak will occur. It is written in Microsoft Quickbasic and runs on IBM PC and 100% compatible machines.

Development of an Expert Systems Model for Managing Irrigation and Pests in Peanuts.

J. I. DAVIDSON, JR.<sup>1\*</sup>, SARAH PARKER<sup>2</sup> and ALLAN JONES<sup>2</sup>. <sup>1</sup>USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742; <sup>2</sup>USDA, ARS, Grassland Soil and Water Research Laboratory, Temple, TX 76503-6112.

With partial support from the Georgia Agricultural Commodity Commission for Peanuts and in cooperation with several scientists, Extension specialists, and farmers, an expert systems has been developed to manage irrigation and pest in Florunner peanuts. This model is based upon new concepts and an extensive data base. The model has been placed on personal computer (PC) diskettes so that anyone having an IBM-compatible PC can operate the model. By simply placing the appropriate diskette into the PC and typing in the name of the model, the PC will then lead the user through a planned strategy of irrigation and pest control. Prior to asking for input data, the model offers an option for explaining the simple procedure for running the model. The PC then asks the user simple questions relative to soil type, crop rotation, irrigation capacity, planting date, decision date, plant and soil condition, fruit initiation date, vine coverage, rainfall plus irrigation, maximum and minimum soil temperature, and weather. The model then uses the answers to the question to provide recommendation for irrigation and pest management. Options are then provided to (1) display reasons for recommendations, (2) change answers to questions and rerun, (3) store answers for decisions at a later date, or (4) terminate. Cooperators make recommendations for improvement and receive the latest research findings relative to a specific knowledge base and management strategy and new and updated diskettes. Success of this effort has been largely due to the cooperation and support by the Georgia Peanut Commission which has provided (1) a personal computer to run and evaluate the models, (2) help in collecting critical data needed to evaluate the new concepts and to develop knowledge bases for developing other expert systems management models, and (3) materials for developing new production management tools. Scientists who have made major contributions to the knowledge base are Paul Blankenship, Richard Cole, and Tim Sanders, NPRL; R. J. Henning, Farmers Fertilizer and Feed Company (formerly with the University of Georgia Extension Service); and Frank McGill and Sam Thompson, University of Georgia Extension Service.

The Coastal Plain Experiment Station's Computerized Peanut Literature Database.

C. S. KVIEN\*, C. C. HOLBROOK, and G. A. BUCHANAN. University of Georgia, USDA, ARS, and University of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793.

Knowing the results of past research is important in the design and interpretation of today's projects. Computerized literature databases have improved our ability to retrieve published information, but most databases do not go back further than 1970. To improve our ability to understand and conduct research the Coastal Plain Experiment Station (CPES) has gathered and computerized a peanut literature database of over 18,000 references, 12,000 reprints and 600 theses. The CPES literature database spans the period from 1525 to present, and covers nearly all topics concerning peanut. Standard computerized literature search statements are used to find the desired references. The database is separated into three subunits based on publication date: 1525 to 1950 (2,500 references), 1950 to 1970 (7,000 references), and 1970 to present (9,000 references). The database can be put on-line. Reprints are on-hand for most of the references in the database.

Software, Networking and Contacts for Obtaining Access to Peanut Systems Information.

C. L. BUTTS. USDA, ARS, National Peanut Research Laboratory, Dawson, GA 31742.

A variety of computer software is available to the producer, extension agent, and researcher interested in peanut production. The software ranges in form from spreadsheet templates to detailed process models. Most states in which peanuts are grown have software available to the farmer and extension agent to analyze production costs, contracting options, insect scouting report data bases as well as irrigation and disease management strategies. These programs are usually available through the state's Cooperative Extension Service. In some states, such as Florida and Georgia, the software can be obtained through a central "clearing house" associated with the Extension Service. As software becomes available for general distribution, it is suggested that one of the electronic mail networks be used for notification. Researchers at the NPRL plan to use the ARS Systems Research Resource (ASRR) located in Beltsville, MD, as the mode of communication and distribution. ASRR is a facility set up by ARS at the USDA, ARS Agricultural Systems Research Institute, Model and Database Coordination Laboratory for the purpose of exchanging databases, models, and expert systems. It is also intended to use BITNET as another communication tool among cooperators. BITNET is an international electronic network used for sending messages, manuscripts, programs, and data among mainframe computers. BITNET can be accessed through a logon on a participating mainframe computer (node). Most major universities have at least one node on BITNET. A list of available software, description, author, distribution point, and information regarding access to ASRR are available.

# DEVELOPMENT AND UTILIZATION OF NEW PEANUT PRODUCTS

Overview of Present Day Industrial Uses of Peanuts. J. R. BAXLEY, Pert Laboratories, Edenton, NC 27932.

The peanut industry actually began when peanuts originated in South America. The Incas evidently held peanuts in high esteem, for they often buried them with their dead, presumably to provide food in the afterlife. The cultivation of peanuts spread to Mexico, to Asia, Africa and Spain, and returned to North America with African slaves. In the United States, demand grew slowly, increasing with the development of peanut butter, with the mechanization of growing, harvesting, picking, cleaning and shelling, and with a growing appreciation of the peanuts flavor, aroma, texture, and nutritional quality. Research and technology have provided us with many products from the peanut. In this country peanut butter is the most important, accounting for approximately one half of the usage of edible peanuts. Other popular products include salted cocktail type peanuts, seasoned dry roasted peanuts, honey roasted peanuts, roasted-in-shell and salted-in-shell peanuts. The availability in recent years of partially defatted peanuts has led to the development of an entirely new category of peanut products and peanut based ingredients for the food industry. Reduced calorie snack peanuts, high stability peanuts, low cost tree nut replacements or extenders, partially defatted peanut flours, cold pressed peanut oil and roasted peanut extract are examples. There are other peanut products waiting in the wings for their opportunity. The technology is available to make completely defatted peanut flour, spray dried partially defatted and full fat peanut flours, peanut protein concentrates and isolates, hydrolized peanut protein and textured peanut protein. Finished consumer products based on these have also been developed, such as snack peanut chips, meat replacers or extenders, peanut milk, and fermented or cultured products such as peanut cheese, yogurt and tofu. The uses and potential uses of peanuts seem almost endless. Ingenuity is the only limit.

Competitive inroads made by other edible nuts in the food industry. MELANIE L. MILLER, Director of Industry Services, National Peanut Council, 1500 King Street, Suite 301, Alexandria, Va 22314.

The other edible nut market consists mainly of pecans, pistachios, walnuts, almonds, filberts (hazelnuts), and to some extent cashews. Because cashews are imported, there is very little data on their markets, however, information is available on their use in various products. The edible nut market has made significant inroads into the food industry in the past several years. As the convenience food/fast food area has grown, so has the use of edible nuts in many convenience foods, particularly snack foods. The cereal and granola bar area have been the fastest growing, along with confections, and since many granola bars are now sold in the candy section, there is a great deal of overlap. Efforts have been made by a number of other nuts to duplicate peanut butter, but with little success. One area that has been successful, at least for the almond industry, is flavored nuts. Honey roasting has also been very popular and successful, with companies now mixing honeyroasted nuts to include peanuts and cashews. Baking is still an important area for uses of edible nuts, including peanuts almonds and cashews, however, pecans and walnuts are still the most popular. Even though the edible nut market has made a major contribution to the food industry, they still have not been able to come close to the market that the peanut industry holds in the food industry, mainly because of price.

Peanut Products Utilization in Japan and Asia. A. MATSUNOBU, Director, Toyo Nut Co., Ltd., 30, Fukae-hamamachi, Higashinadaku, Kobe, 658 Japan.

It is said that peanuts (*Arachis Hypogaea* L.) first appeared in Japan across the from China around 1704. However, this did not bring about the development of the culture of peanuts in Japan. In 1874, peanuts were first grown in Japan by using peanut seeds imported from the U.S.A. by the Japanese government. The average quantity of peanut consumption in Japan was approximately 120,000 metric tons (kernel) in the past few years. However, the market does not show any tendency to increase. Peanuts, as food, traditionally have been used in Japan and Asian countries in several ways such as confectioneries, snacks, beverages, an ingredient in various dishes, delicacies, fermented foods and seasonings. These products and their processes will be shown in a slide demonstration.

"Developing Creative Peanut Butter Recipes for Home and Institutional Uses."

S.B. HUFFMAN, Best Foods/CPC International, International Plaza, P.O. Box 8000, Englewood Cliffs, New Jersey 07632.

Peanut butter has a myriad of recipe uses far beyond the tried-and-true peanut butter cookie. Creative yet practical ways to use peanut butter in recipes were discussed. This versatile product lends itself not only to desserts such as cookies, mousses, cakes and pies, but also to a wide range of main dish items. Indonesian-influenced peanut butter sauces and cachet to pasta are also quite tasty. A peanut butter marinade can transform plain grilled chicken from the mundane to marvelous. Introduction of new products containing peanut butter in the past five years - peanut butter with honey; flavored peanut butters such as Banana Crunch, Chocolate, Amber Maple, Apples 'n Spice, Rocky Road; salt and sugar-free peanut butter - were also covered.

**New Peanut Product Development in Thailand and Other Southeast Asian Countries.**

**C. OUPADISSAKOON\*, V. HARUTHAITHANASAN and P. CHOMPREEEDA,  
Department of Product Development, Kasetsart University, Faculty of  
Agro-Industry, Bangkok, 10900, Thailand.**

New peanut products developed at the department of Product Development involved oil-roasted peanuts to prolong shelf-life of the products, peanut butter bar and peanut spread to use the peanut butter base for Thai consumer, fried peanuts in batter to develop the good keeping quality for the old, traditional Thai peanut product, the supplemented peanut flour in Thai sausage, infant foods, chocolate beverage, chicken burger, cookies, to utilize peanut flour excess of peanut. Peanut-soy beverage and curd, snack foods, soups, and sauces are the interested new products developed at the University of the Philippines at Los Banos. Commercial peanut products in Thailand and other Asian countries are similar in the form of fresh and dry boiled peanuts, shelled and unshelled dry roasted peanuts, ground peanuts, peanut brittle, old-fashioned peanut nougat, and peanut sauce. Peanut butter is successfully commercialized in the Philippines while other countries such as China and Thailand are trying to incorporate peanut butter into candy, ice cream and snack products. Most countries in Asia are suffering from the aflatoxin contamination after harvesting of peanuts, especially of the wet season crop which limit the utilization of the peanuts into the products at the industry level. More research is needed to fully summarize the utilization of peanuts in Asian Countries.

**Peanuts and Candy - The Incredible Combination.** J.S.L. How, Hershey Foods Corporation, Hershey, PA 17033-0805.

About 20% of all edible peanuts in the U.S. are used in candy and confectionery products. Peanuts tend to complement confections with their roasted flavor, crunchy texture, good nutrition, availability and low cost. Many of the top selling candy bars contain peanuts. The stability and shelf-life of confectionery are affected by the quality of peanuts used, processing and manufacturing. Factors such as variety, chemical composition, maturity, postharvest handling, storage, roasting and ingredient are important in optimizing peanut utilization in confectionery products. Some limitations include rancidity, texture deterioration and oil migration. Appropriate technology could be applied to minimize such problems by the selective use of compatible confectionery systems, physical, or chemical barriers, antioxidants, packaging materials and storage conditions. Innovative use of peanut and peanut products continue to present challenging opportunities for the development of new and/or better confectionery products.

Designing the "Perfect" Peanut Variety for Maximizing Industrial Utilization. R.

W. MOZINGO. Tidewater Agricultural Experiment Station, Suffolk, VA 23437. Designing the "perfect" peanut variety for all segments of the peanut industry is an undertaking with tremendous challenge. The desires and needs of each segment from seedsman to grower to sheller to manufacturer to consumer are varied and complex. While the development of a "perfect" peanut variety acceptable to some degree by all segments of the industry is possible, it may not be advisable since the uses of the peanut are many and varied. Seedsmen want varieties which have a large percentage of seed shellout but small percentages of splits and skin slippage, good germination, the potential to readily absorb calcium, and the ability to withstand numerous handlings and shipments. Grower concerns are high yield and dollar value, early maturity, and resistance to pests, drought, and aflatoxin. Shellers need a large mill outturn with minimal splits and uniform size and shape within grades. Manufacturers' desires vary depending upon the product manufactured. In-shell processors want clean large-sized pods with uniform shape as well as uniformity of roast and long shelf life. Peanut butter processors want seed with good blanchability, an oil content of 48-52%, no aflatoxin and uniform roast. Confectioners want seed with good blanchability that will retain an applied coating, that are aflatoxin free, uniform in size and shape, and have a shelf-life of at least six months. Oil cookers prefer seed with good blanchability and no splits that are aflatoxin free and uniform in size, shape, and roasting color. Consumers want a peanut product with good taste, flavor, texture, and eye appeal which is nutritionally balanced and free of chemical residues and aflatoxin. Since it appears to be difficult to design and develop the "perfect" peanut variety for all segments of the peanut industry, it is more feasible to develop the "perfect" variety for a particular need and, therefore, "perfect" peanut varieties for all segments of the industry.

# SCLEROTINIA CONFERENCE

Sclerotinia Blight of Peanuts. D. M. PORTER. Tidewater Agricultural Experiment Station, USDA-ARS, Suffolk, VA 23437

Sclerotinia blight of peanut has been reported in the major peanut producing countries of the world. This disease, caused by the soilborne fungus Sclerotinia minor, was first observed in the USA in Virginia in 1971. It has become widespread throughout the peanut producing area of Virginia and has since spread to other states including North Carolina, Oklahoma and Texas. It is currently considered by many to be the most potentially destructive of all peanut diseases. Fungicides and resistant varieties currently provide only partial control. Characteristic signs of Sclerotinia blight include the presence of a white, fluffy mycelium on infected tissues, shredding of infected branch tissues and the abundant production of black, irregularly shaped sclerotia (0.02 - 3.00 mm) on or in diseased plant tissues. Sclerotia, the overwintering propagules of S. minor, can persist in the top 20 cm soil layer for several years in the absence of a host plant. A sclerotium count of 1 per 100 g of soil is sufficient to cause disease. Disease severity is environmental dependent and reaches epidemic proportions only when low temperatures (15 - 25 C), high soil moisture levels and high relative humidities prevail. Disease development is enhanced by overhead irrigation, plant injury (tractor tires, etc.), the use of chlorothalonil for leafspot control, late planting and dense canopy growth. The exact mechanism of spread of S. minor from one field to another is not known. However, field equipment, haulms, hulls, seed from diseased plants, and birds and animals have been implicated in the spread of Sclerotinia blight. Peanut germplasm from China and breeding lines developed in Virginia, North Carolina and Texas have potential in providing genetic bases that might be utilized in the development of high yielding Sclerotinia blight resistant varieties. Biological control may also be possible since mycoparasites have been identified that readily attack and destroy sclerotia of S. minor.

Status of Sclerotinia Blight of Peanut in Oklahoma. H. A. MELOUK\*, and L. J. LITTLEFIELD. USDA-ARS, and Department of Plant Pathology, Oklahoma State University, Stillwater, OK 74078-0285.

Sclerotinia blight of peanut, caused by Sclerotinia minor, has been endemic in several counties of Oklahoma since 1973. Symptoms of this disease, under Oklahoma conditions, are similar to those in other states. The first visible symptom is flagging or wilting of infected branches. White, fluffy mycelium appears on diseased stem tissue near the base, under the plant canopy. This is especially evident during early morning hours of high relative humidity. Infected branches become chlorotic and eventually die. The pathogen produces numerous sclerotia on and in infected plant tissues, including stems, pegs and roots. Sclerotia can also form inside the pods of infected plants between the shell and the seed. An overview of research on S. minor and Sclerotinia blight management in Oklahoma will be presented and discussed. Research thrusts in Oklahoma on S. minor include the following: 1) developing reliable greenhouse procedures to evaluate reaction of peanut to S. minor, 2) screening cultivated and wild peanut germplasm for resistance to Sclerotinia blight 3) studying early stages of infection of peanut stem and seed by S. minor using scanning electron microscopy, 4) evaluating resistance in cultivated peanut genotypes, and definition of the epidemiological parameters of disease reaction, 5) determining distribution of sclerotia in field soils, 6) evaluating antagonists for biological control, 7) studying survival of sclerotia in ruminant animals, and studying other methods of spread, and 8) developing cultural and chemical disease management strategies in the field.

Strategies for Control of Sclerotinia Blight of Peanut in Virginia and North Carolina. P. M. PHIPPS\* and J. E. BAILEY. Tidewater Agr. Exp. Sta., VPI&SU, Suffolk, VA 23437, and Dept. Plant Pathology, NCSU, Raleigh, NC 27650.

Nearly two decades have past since Sclerotinia blight (SB) of peanut was first discovered in Virginia and northeastern North Carolina. Research projects to date have described the causal fungus (*Sclerotinia minor*), explained its method of survival and spread, identified two varieties with partial resistance, screened numerous chemicals and developed use patterns for several fungicides to control SB, and defined management practices to minimize yield loss. VA 81B is an early maturing, bunch-type peanut that has partial resistance to SB, but is highly susceptible to leafspot and *Cylindrocladium* black rot. AD 1 is a patented variety (Ashley Darden, Newsoms, VA) that resembles Florigiant, except for its sparse foliage and branching habit. AD 1 has partial resistance to SB, but is highly susceptible to leafspot. Among the remaining commercial varieties of Virginia-type peanuts, NC 7 has shown the greatest level of susceptibility to SB. From 1976 to 1984, Botran 75W was available to growers (Sec. 18, emergency exemption) for control of SB. Terraclor 10G became available in 1983 for suppression of SB by state approval (24-c, special local need). Also in 1983 and again in 1984, Ronilan 50W was used (Sec. 18, emergency exemption). In 1985, Rovral 50W was registered for control of SB of peanut and is currently the only fungicide labeled for spray application. Several management practices have been shown to have a significant influence on the severity of SB. Failure to utilize a multi-input approach can severely handicap performance of partially-resistant varieties and/or fungicides for SB control. Research has indicated that 1) early planting can suppress late season development of SB, 2) reduced seed rates of susceptible varieties suppresses SB, 3) cultivation or other practices causing vine injury can trigger epidemics of SB, 4) fewer applications of leafspot fungicides as recommended by the Virginia leafspot advisory result in less SB than six or seven sprays on a 14-day schedule, 5) Bravo 720 for leafspot control can increase the severity of SB, except if applied according to leafspot advisories and in no more than three sprays with intervals of at least 21 days, and 6) diseased fields should be dug to minimize yield losses once disease incidence reaches a 40 or 50% threshold.

Status of Sclerotinia Blight in Texas. T.A. LEE, JR.\*, and K.E. WOODARD. Department of Plant Pathology, Extension Plant Pathologist, Texas Agricultural Extension Service; Experiment Station Research Associate in Pathology; Texas A&M University Research and Extension Center, Stephenville, Texas 76401.

Sclerotinia blight (*Sclerotinia minor*) was first identified in Texas peanuts in 1981 on a few acres in one field in Mason County. Since that time, it has steadily spread to at least 6000 acres in at least 9 counties from the Red River on the north to south of San Antonio. Control strategies attempting to stop spread of the disease are addressing physical movement of the fungus on equipment, seed, wildlife and man. Chemical control has not been satisfactory with any chemical even though it is the best thing we presently have. The extended longevity of sclerotia has limited cultural control. New varieties through plant breeding and selection remain a future hope for the long term.

## THE PRESIDENT'S REPORT

D. W. GOREET

**QUALITY.** - This word has received considerable press in the past year or so in the peanut industry. Quality in peanuts means different things to different segments of the industry. Webster's New Collegiate Dictionary gives nine definitions for quality. Many of the words in these definitions can be related to quality as pertains to peanuts—nature, characteristic, attribute, grade, class, kind, virtue, distinctive trait, excellence of character, property, etc.

"Good" or "high" quality has been used to characterize commercial peanuts in the USA. This has been a positive factor in the export marketing of U.S. peanuts. We have also come to realize the need for continued improvement in the quality of the commercial crop.

The membership and leadership of APRES have long recognized the importance of quality, as relates to peanuts. This position of importance is noted by the fact that APRES has a standing committee on quality that has been very active for years. This is further evidenced by an article by Dr. Ralph S. Matlock (former peanut breeder at Oklahoma State University, now deceased), which he published in the Proceedings of the 5th National Peanut Research Conference (1968). The conference was sponsored by the USDA-ARS and the Peanut Improvement Working Group (PIWG, a predecessor of APRES). In his article on peanut quality, Dr. Matlock noted that the first National Peanut Research Conference, which was held in 1957, was devoted entirely to—"the relation of various phases of the industry to quality of raw peanuts for specific end uses—".

In 1986 the National Peanut Council appointed a Quality Task Force to address peanut quality problems in the industry. This task force was co-chaired by Dr. Ron Hemming and Russell Schools,—well known members of APRES. A summary of the results of the efforts of this task force are given in the 1987 Proceedings of APRES (p.79-80). Five major areas of concern were identified—afatoxin, chemical residues, flavor, foreign material, and maturity. Many sub-categories were listed under each of these five major areas. Nearly all members of APRES should be able to identify with one or more of the topics listed.

Considering these five areas of primary concern that were identified by the peanut quality task force, a decision was made early in 1988 to field-test a belt separator-cleaner, which was developed by researchers at the National Peanut Research Laboratory at Dawson, Georgia and the peanut industry. This belt separator is designed to remove ISKs, small immature peanuts, and foreign material. Removal of a significant amount of this material will address four of the five primary areas identified by the task force and should provide a better quality raw peanut for marketing and processing.

Recently the National Peanut Council established a Peanut Foundation that has requested research proposals to address problems in the peanut industry. Of special importance are the quality problems, as outlined by the task force. I would encourage members of APRES to consider submitting proposals in their areas of research expertise that address these or related problems. The entire industry will benefit from positive research effort and results that deal with improving peanut quality.

APRES has published twenty-six methods for quantifying various characteristics of peanut quality and a total of fifty are planned. Extensive research effort has been directed toward identification of quality factors and development of methods to improve raw and processed peanut and its products.

The membership of APRES embodies a major portion of the worldwide expertise on peanut research. Our society will play a major role in the progress that will be made in the future toward improving peanut quality factors. Research will provide fundamental answers to maintaining and improving the "quality" that nature provides in the peanut. A wide range of research effort has and will affect peanut quality. Fundamental improvements can be made in the chemical composition, flavor, and

processing characteristics of the seed through genetics, breeding, and probably biotechnology. All areas of pest control related research can contribute toward quality improvement in the production and handling of peanuts. Almost all research efforts can relate to some phase of quality. It is critical that we all contribute in this effort.

To borrow a statement from Dr. Don Smith, a former president and executive officer of our society, "APRES is an information exchanging professional society." Our efforts as a society and as individual members of APRES will make a significant contribution toward progress in improving all phases of peanut quality for the industry, now and in the distant future.

It has been a pleasure to serve as your president this past year. I want to express my appreciation to you for the support and cooperation that I have received. I am looking forward to participating in our 1988 meetings. Our society's future is exciting and bright.

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY  
Board of Directors Meeting  
Sheraton-Kensington Hotel, Tulsa, Oklahoma  
July 12, 1988

1. Call to order - 7:15 p.m. - President D. W. Gorbet  
Those present were: D. Gorbet, R. Sholar, M. Porter, H. Melouk, J. Wynne, G. Harrison, M. Grise, D. Knauff, E. Ashdown, G. Buchanan, J. Kirby, T. Coffelt, J. Williams, R. Taber, S. Wright, G. Sullivan, C. Simpson, W. Mozingo, F. Adamsen, B. Branch.  
Reading of Minutes by Ron Sholar, Executive Officer
2. Old Business (Reports follow)
  - a. Executive Officer Report-  
CAST Report
  - b. American Society of Agronomy Liaison Report - W. D. Branch
  - c. Southern Agricultural Experiment Station Directors Report - G. A. Buchanan.  
This group is working on the problem with the loss of peanut quota on Experiment Stations but it is not likely that peanut quota will be restored until the new farm bill is written.
  - d. Additional Old Business - none
3. New Business (Reports follow)
  - a. Nominating Committee - Morris Porter  
The Nominating Committee made the following nominations:  
President-Elect - Johnny Wynne  
Industry Representative - Benny Rogerson  
State Employee Representative - Charles Simpson  
Executive Officer - J. Ronald Sholar
  - b. Finance Committee Report - Jim Kirby  
A Finance Report and Audit Report for the past four years were given to the Board of Directors.
  - c. Publications and Editorial Committee - Terry Coffelt  
Craig Kvien and Corley Holbrook are trying to get new sections in Peanut Research. The Society still owes purchasers of QUALITY METHODS twenty-four additional methods. Two hundred and four copies of PEANUT SCIENCE AND TECHNOLOGY were sold in the last year.
  - d. Peanut Quality Committee - Jay Williams
  - e. Public Relations Committee - Dave Knauff  
Three necrology resolutions were passed:  
Dr. W. A. Carver - University of Florida (1935-62)  
Mr. Woodrow Fugate - Williston, Florida  
Mr. Fletcher Thompson - Blakely, Georgia
  - f. Golden Peanut Award - Jay Williams  
There were three nominees for this award with Dr. Ron Henning formerly of the University of Georgia Cooperative Extension Service announced as the winner. This award has been changed to the National Peanut Council Research and Education Award.
  - g. Bailey Award Committee - Ruth Taber and Scott Wright  
Johnny Wynne gave a report on the proposed "Joe Sugg Award" for a Graduate Student Paper contest at the annual meeting of APRES. The North Carolina Peanut Growers Association will provide financial support for the award.  
The incoming President will appoint an implementation committee to establish guidelines for a Graduate Student Paper Contest.  
Nominees for Bailey Award will be published in the Proceedings. It was decided at the 1987 meeting that nominees will receive a Certificate of Merit. This action will be discontinued after the 1988 Proceedings is published.
  - h. Site Selection Committee - Bobby Clary  
The 1989 annual meeting will be held July 11-14, 1989, in Winston-Salem, North Carolina. It will be held at the Winston Plaza Stouffer Hotel. The 1990 meeting will be held July 10-13 in Atlanta, Georgia. The 1991 meeting will be held in the Dallas or San Antonio area of Texas.

i. Program Committee - H. A. Melouk

Dr. Melouk discussed the 1988 program and indicated committee assignments for 1988-89.

The Board of Directors directed the incoming President to appoint an Ad Hoc Committee to study an offer by Valent USA Corporation to establish an award for an "Outstanding Extension Program."

The Board of Directors directed that the incoming President appoint an Ad Hoc Committee to study the establishment of an award in honor of Dr. Coit Wilson. The award would be for the person "giving greatest service to the society in a particular year." It would be open to all APRES members.

The Board of Directors directed that the incoming President appoint an Ad Hoc Committee to study the composition of the Board of Directors of APRES and to make recommendations at the 1989 meeting on any changes. The Board of Directors directed the Executive Officer to provide demographics on APRES to the Ad Hoc Committee.

The Board of Directors directed the incoming President to appoint an Ad Hoc Committee to study By-laws and make recommendations for changes.

j. Fellows Committee - Harold Pattee

MINUTES OF THE REGULAR BUSINESS MEETING OF THE  
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

July 15, 1988

The meeting was called to order by President Dan Gorbet at 8:30 a.m. The following committee reports were made and accepted:

Executive Officer  
Nominating Committee  
Finance Committee  
Program Committee  
Peanut Quality Committee  
Public Relations Committee  
Bailey Award Committee  
Publication and Editorial Committee  
Fellows Committee  
Site Selection Committee

## FINANCE COMMITTEE REPORT

July 12, 1988

The Finance Committee met at 2:00 p.m. on July 12, 1988, at the Sheraton-Kensington Hotel, Tulsa, Oklahoma, with members Kirby, Mozingo, and Howell and incoming members David E. Dougherty and Forrest Nutter present.

Dr. Ron Sholar, Executive Officer, presented the financial statement of activity for the year and provided copies of an audit conducted for the year ending June 30, 1988, as well as copies of an accountant's review of financial records for the three years ending June 30 in 1985, 1986, and 1987. These financial records of the Society were found to be in order.

Dr. Harold Pattee, Peanut Science Editor, presented a report of Peanut Science finances for the year and a proposed budget for 88-89.

With the understanding that the Publications Committee was requesting an additional \$5 of each member's dues go to Peanut Science for their subscription (\$8 + \$5 = \$13 total), and taking into advisement the data presented, the Finance Committee prepared Proposed Budgets for the Society and for Peanut Science for the 1988-89 year. These budgets were later presented to and approved by the Board of Directors.

The cash position of APRES increased by \$4,496.76 for the year, but the book inventory decreased by \$4,775.68, resulting in a \$278.92 decrease in Total Assets. As of June 30, 1988, APRES had Cash Assets of \$71,020.83 and a Book Inventory value of \$34,623.68, giving a Present Net Worth of \$105,644.51.

Respectfully Submitted,

Finance Committee:

J. S. Kirby, Chairman  
R. W. Mozingo  
R. K. Howell  
C. E. Simpson  
B. Brecke

# PEANUT SCIENCE

## 1988-89 BUDGET

### Issues Planned:

Two (July - December, 1988; January - June, 1989)

### Estimates:

Pages - 125  
Cost/Page - \$82.00

|                                          |               |
|------------------------------------------|---------------|
|                                          | 88-89         |
| Income:                                  | <u>Budget</u> |
| Page and Reprint Charges                 | \$11,500      |
| Foreign Mailings                         | 1,900         |
| APRES Members Subscriptions (580 x \$13) | 7,540         |
| Library Subscriptions (95 x \$15)        | <u>1,425</u>  |
| TOTAL                                    | \$22,365      |
| Expenditures:                            |               |
| Printing and Reprint Costs               | \$11,685      |
| Editorial Assistant                      | 5,040         |
| Office Supplies                          | 350           |
| Postage                                  |               |
| Domestic                                 | 650           |
| Foreign                                  | 1,900         |
| Misc. Expenses                           | <u>525</u>    |
| TOTAL                                    | \$20,150      |

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY  
1988-1989 BUDGET

|                                                       | 88-89         |
|-------------------------------------------------------|---------------|
| <u>RECEIPTS</u>                                       | <u>Budget</u> |
| Registration                                          | \$ 8,000      |
| Membership                                            | 17,000        |
| Proceedings and Reprint Sales                         | 150           |
| Special Contributions                                 | 3,000         |
| Peanut Science & Technology                           | 3,000         |
| Peanut Science Page Charges & Reprints                | 11,500        |
| Differential Postage Assessment-International Members | 2,250         |
| Interest                                              | 4,500         |
| APRES Methods Books                                   | <u>200</u>    |
| <br>TOTAL RECEIPTS                                    | <br>\$49,600  |
| <u>EXPENDITURES</u>                                   |               |
| Proceedings - Printing & Reprints                     | \$ 3,500      |
| Annual Meeting                                        | 6,500         |
| Membership - CAST                                     | 750           |
| Secretarial                                           | 9,030         |
| Postage                                               | 2,500         |
| Office Supplies                                       | 1,100         |
| Travel - Officers                                     | 1,000         |
| Miscellaneous                                         | 500           |
| Peanut Science                                        | 20,150        |
| Peanut Science & Technology                           | 250           |
| Bank Charges                                          | 150           |
| Peanut Research                                       | 2,000         |
| Legal Fees                                            | 1,500         |
| Corporation Registration                              | 100           |
| APRES Methods Books                                   | 500           |
| Sales Tax                                             | <u>50</u>     |
| <br>TOTAL EXPENDITURES                                | <br>\$49,580  |
| Excess Receipts over Expenditures                     | \$20          |
| Cash - Beginning of Period                            | \$71,020.83   |
| Cash - End of Period                                  | \$71,040.83   |

AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

BALANCE SHEET FOR FY1987-88

| <u>ASSETS</u>                                             | <u>June 30, 1988</u> | <u>June 30, 1987</u> |
|-----------------------------------------------------------|----------------------|----------------------|
| Petty Cash Fund                                           | \$ 234.83            | \$ —                 |
| Cash in Checking Account                                  | 18,897.64            | 17,946.42            |
| Certificate of Deposit #1                                 | 13,865.11            | 13,027.11            |
| Certificate of Deposit #2                                 | 8,938.14             | 8,375.64             |
| Certificate of Deposit #3                                 | 8,348.62             | 7,571.20             |
| Money Market Account                                      | 19,616.71            | 18,478.60            |
| Savings Account (Wallace Bailey)                          | 1,119.78             | 1,125.10             |
| Inventory of Books<br>(see attached inventory adjustment) | <u>34,623.68</u>     | <u>39,399.36</u>     |
| TOTAL ASSETS                                              | \$105,644.51         | \$105,923.43         |

LIABILITIES

|      |      |      |
|------|------|------|
| None | 0.00 | 0.00 |
|------|------|------|

|                                               |                     |                     |
|-----------------------------------------------|---------------------|---------------------|
| <u>FUND BALANCE</u>                           | <u>\$105,644.51</u> | <u>\$105,923.43</u> |
| <u>TOTAL LIABILITIES AND<br/>FUND BALANCE</u> | <u>\$105,644.51</u> | <u>\$105,923.43</u> |

# AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

## Statement of activity for Year Ending

| RECEIPTS                                 | June 30, 1988               | June 30, 1987       |
|------------------------------------------|-----------------------------|---------------------|
| Registration                             | \$ 8,626.00                 | 10,427.54           |
| Membership                               | 14,365.00                   | 12,327.00           |
| Special Contributions                    | 4,000.00                    | 2,100.00            |
| Differential Postage                     | 2,357.00                    | 2,703.00            |
| Ladies Activities                        | 0.00                        | 0.00                |
| Peanut Science and Technology            | 5,140.08                    | 3,662.93            |
| Quality Methods                          | 230.00                      | 481.25              |
| Proceedings & Rep Sales                  | 195.65                      | 48.00               |
| Peanut Science Page Chg & Rep            | 8,070.00                    | 10,978.90           |
| Checking Account Interest                | 1,137.43                    | 948.35              |
| Savings Account Interest                 | 66.61                       | 62.60               |
| Money Market Account Interest            | 1,138.11                    | 1,008.29            |
| Certificate of Deposit #1 Int            | 838.00                      | 1,000.17            |
| Certificate of Deposit #2 Int            | 562.50                      | 498.59              |
| Certificate of Deposit #3 Int            | 777.42                      | 571.20              |
| <b>TOTAL RECEIPTS</b>                    | <b>\$ 47,503.80</b>         | <b>\$ 46,817.82</b> |
| <b>EXPENDITURES</b>                      |                             |                     |
| Annual Meeting                           | 5,705.99                    | 7,755.69            |
| Membership                               | 61.00                       | 49.00               |
| Office Supplies                          | 1,095.62                    | 1,299.89            |
| Secretarial Services                     | 8,600.00                    | 8,047.00            |
| Postage                                  | 2,349.41                    | 1,442.00            |
| (minus petty cash fund bal)              | (234.83)                    |                     |
| Travel-Officers                          | 791.39                      | 969.57              |
| Corporation Registration                 | 50.00                       | 10.00               |
| Legal Fees                               | 200.00                      | 100.00              |
| Sales Tax                                | 43.25                       | 60.33               |
| Proceedings                              | 2,997.00                    | 4,321.00            |
| Peanut Science                           | 18,000.00                   | 17,000.00           |
| Peanut Science & Technology              | 296.75                      | 106.22              |
| Peanut Research                          | 1,635.58                    | 1,938.01            |
| Quality Methods                          | 371.24                      | 0.00                |
| Bank Charges                             | 145.75                      | 83.98               |
| Money Market Account                     | 0.00                        | 0.00                |
| Certificate(s) of Deposit                | 0.00                        | 0.00                |
| Miscellaneous                            | 826.96                      | 60.00               |
| <b>TOTAL EXPENDITURES</b>                | <b>\$ 42,935.11</b>         | <b>\$ 43,242.69</b> |
| <b>EXCESS RECEIPTS OVER EXPENDITURES</b> | <b>\$ 4,568.69</b>          | <b>\$ 3,575.13</b>  |
| <b>Cash in Checking Account:</b>         |                             |                     |
| July 1, 1986 - \$17,512.14               | June 30, 1987 - \$17,946.42 |                     |
| July 1, 1987 - \$17,946.42               | June 30, 1988 - \$18,897.64 |                     |

PEANUT SCIENCE AND TECHNOLOGY  
SALES REPORT AND INVENTORY ADJUSTMENT

|                                   | 1987-88             |                            |
|-----------------------------------|---------------------|----------------------------|
|                                   | <u># books sold</u> | <u>Remaining inventory</u> |
| Beginning inventory               | —                   | 1716                       |
| 1st Quarter                       | 90                  | 1626                       |
| 2nd Quarter                       | 68                  | 1558                       |
| 3rd Quarter                       | 20                  | 1538                       |
| 4th Quarter                       | 26                  | 1512                       |
|                                   | <hr/>               |                            |
| TOTAL SOLD                        | 204                 |                            |
| <u>INVENTORY ADJUSTMENT</u>       |                     |                            |
| Missing books                     | 3                   |                            |
| Damaged books                     | 1                   |                            |
|                                   | <hr/>               |                            |
| <u>ACTUAL REMAINING INVENTORY</u> |                     | <u>1508</u>                |

204 books sold x \$22.96 = \$4,683.84 decrease in value of book inventory plus 4 books (inventory adjustment) x \$22.96 = \$91.84 further decrease in book inventory value for a total decrease of \$4,775.68.

1508 remaining books x \$22.96 (book value) = \$34,623.68 total value of remaining book inventory.

#### REPORT OF 1988 NOMINATING COMMITTEE

The following individuals all active in the affairs of APRES, have agreed to serve in the following offices if duly elected:

|                                      |                  |
|--------------------------------------|------------------|
| President-Elect                      | Johnny Wynne     |
| Industry Representative (Production) | Benny Rogerson   |
| State Employees Representative       | Charles Simpson  |
| Executive Officer                    | J. Ronald Sholar |

Submitted by:

Olin Smith  
Ron Henning  
Morris Porter, Chairman

#### PUBLIC RELATIONS COMMITTEE REPORT

The Public Relations Committee met on July 12, 1988 at 1:00 p.m. The committee agreed to explore avenues for improving both APRES membership and corporate sponsorship.

#### NECROLOGY RESOLUTIONS

Whereas, Mr. Woodrow Fugate of Williston, Florida devoted his life to agriculture and the production of peanuts, and

Whereas, Mr. Fugate was an active member of APRES who regularly attended meetings and served on APRES committees.

Therefore, the American Peanut Research and Education Society adopts this resolution on this day, July 15, 1988, recognizing and remembering Mr. Woodrow Fugate for his devotion and service to the peanut industry.

Whereas, Dr. W. A. Carver of Gainesville, Florida served as peanut breeder at Florida Agricultural Experiment Station for many years, and

Whereas Dr. Carver was instrumental in the creation of the popular peanut cultivars Dixie Runner, Early Runner, Florispan Runner, and Florigiant.

Therefore, the American Peanut Research and Education Society adopts this resolution this day, July 15, 1988, recognizing and remembering Dr. W. A. Carver for his devotion and service to the peanut industry.

Whereas, Mr. Olan Fletcher Thompson, of Blakely, Georgia was a peanut farmer, businessman, and founder of the Georgia Peanut Producers Association.

Therefore, the American Peanut Research and Education Society adopts this resolution this day, July 15, 1988, recognizing and remembering Mr. Fletcher Thompson for his devotion and service to the peanut industry.

#### RECOGNITION RESOLUTION

Whereas, Dr. Johnny Wynne and Dr. Charles Simpson have served five and three years, respectively, as chairman of the Peanut Crop Advisory Committee, and

Whereas, the leadership of these two individuals has been instrumental in advances made by the Peanut CAC, and

Whereas, their work was conducted with considerable contributions of their time and research budgets.

Therefore, the American Peanut Research and Education Society adopts this resolution this day, July 15, 1988, recognizing the contributions of Drs. Wynne and Simpson.

Respectfully submitted,

David A. Knauff, Chairman  
P.M. Phipps  
H.A. Melouk  
E.J. Long  
J.P. Beasley  
E. Colburn

#### PUBLICATION AND EDITORIAL COMMITTEE

Seven members and two guests were present at the annual meeting, July 12, 1988 at Tulsa, OK. The following reports were read and approved: Peanut Science by Harold Pattee, editor; Peanut Research by Corley Holbrook, co-editor; Proceedings by Terry Coffelt; Quality Methods by Terry Coffelt as received from Sam Ahmed; Sales of Peanut Science and Technology by Terry Coffelt as received from Ron Sholar; Ad-hoc committee on revision of Peanut Science and Technology by Clyde Young.

The committee recommends to the Board of Directors that the proportion of member dues allocated to Peanut Science be changed from \$8.00/member to \$13.00/member in order to balance the budget for Peanut Science.

The committee recommends the following Associate Editors for Peanut Science be appointed: John Sherwood - Plant Pathology; Tim Mack - Entomology; Glenn Wehtje-Weed Science; Tom Stalker -Peanut Breeding; James Howe and John Vercellotti - Food Science.

The committee recommends that the chairman of the Publication and Editorial Committee for 1988-89 appoint someone to investigate the proposal that ICRISAT handle sales of Peanut Science and Technology in Asia at a reduced cost (approximately \$10-\$12 per copy).

The committee recommends that the Ad-hoc committee on revision of Peanut Science and Technology report be changed to read 1990 for reconsideration of a new book rather than 1992.

The committee expresses its appreciation to President Gorbet for writing a thank you to the Dean of Research, IFAS, University of Florida for publishing the 1986 Quality Symposia.

The committee expresses appreciation to our editors, authors, reviewers, and other contributors to our Society publications.

Respectfully submitted:

|                         |                            |
|-------------------------|----------------------------|
| T. A. Coffelt, Chairman |                            |
| D. J. Banks             | C. S. Kvien, Ex-Officio    |
| R. J. Henning           | C. C. Holbrook, Ex-Officio |
| A. B. Rogerson          | H. E. Pattee, Ex-Officio   |
| J. M. Bennett           | E. M. Ahmed, Ex-Officio    |
| D. H. Smith             |                            |

#### PEANUT QUALITY COMMITTEE REPORT

The Peanut Quality Committee meeting was convened at 3:40 p.m., July 12, 1988. The Committee Chairman made comments related to the Quality Committee recommendation last year that a symposium on chemical residues be included as a symposium topic at the 1988 APRES meeting.

Paul Blankenship presented background, development and implementation information on the Peanut Quality Enhancement Project sponsored by the peanut industry through the Peanut Foundation. Tests and potential for overall quality improvement in aflatoxin, foreign material, flavor and maturity were addressed and discussed.

Craig Kvien presented information and an update on the thinking of the Long Range Planning Committee of the NPC Research Committee. Areas of important research continue to be aflatoxin, foreign material and chemical residues.

Bill Dickens presented information on some of the recent changes in the Peanut Administrative Committee regulations. Emphasis on removal of the other edible category from the edible market, reduction of aflatoxin level from 25 ppb to 20 ppb and less and formulation of a Committee on peanut quality to eliminate aflatoxin were central issues.

Comments on chemical residues continued and renewed interest was expressed in a symposium on where we are, what we are doing, and what changes need or can be made in the peanut industry in the area of chemical residues.

Bob Petit made comments and generally led a discussion of industry acceptability of additives to bind aflatoxin in peanut products.

A total of 29 people were in attendance at the Peanut Quality Committee meeting.

Respectfully submitted:

T. H. Sanders, Chairman  
R. E. Pettit  
R. N. Pittman  
K. Warnken  
J. H. West  
M. R. Cobb  
D. L. Hartzog  
T. B. Whitaker

#### PROGRAM COMMITTEE REPORT

Members of the technical program, local arrangement and spouse activities are listed in the program and at the end of this report. These individuals have worked hard and contributed to the success of our meetings. On behalf of the American Peanut Research and Education Society, I want to extend my sincere thanks and appreciation for their efforts.

In the technical program there were 113 presentations that included two symposia, one on Peanut Systems Research and the second on New Peanut Products, and a Sclerotinia Conference. The local arrangements committee provided the logistical support for the meeting. Their efforts have paid extremely well in having no complaints that were reported to the Program Chair. This committee worked closely with the sponsors of the various social functions that included an ice cream reception, a buffet dinner, a barbecue at Dillingham Ranch and the business meeting breakfast. A number of exhibitors and other companies contributed toward the cost of the coffee breaks and the spouse program. The spouse's program committee arranged for coffee breaks and tours to attractions in Tulsa and local shopping.

Oklahoma was pleased to host the 1988 APRES Meeting in Tulsa. We sincerely hope that the meetings were informative and enjoyed by all attending.

#### Program Committee

Hassan A. Melouk, Chairman

#### Local Arrangements

Bobby Clary, Chairman  
Richard Berberet  
Alex Filonow  
Darold Ketring  
Jim Kirby  
Mike Kizer  
Larry Littlefield  
Ron Noyes  
Ron Sholar

#### Technical Program

Richard Berberet, Chair  
Don Banks  
Ron Elliot  
Helen Fagbenle  
Alex Filonow  
Ken Jackson  
Darold Ketring  
Jim Kirby  
Larry Littlefield  
Ron Noyes  
John Sherwood

#### Spouses Program

Afaf Melouk, Co-Chair  
Linda Sholar, Co-Chair  
Barbara Kirby  
Beverly Ketring  
Julie Littlefield  
Brenda Louderback  
Zona Noyes

PROGRAM  
FOR THE  
TWENTIETH ANNUAL MEETING  
of the  
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY

TUESDAY, JULY 12

1:00-8:00      APRES Registration  
1:00-5:00      Spouses Registration  
1:00-5:00      Spouses Hospitality

Committee Meetings

1:00          Public Relations  
              Bailey Award  
              APRES-CAST

2:00          Site Selection  
              Finance  
              Associate Editors (Peanut Science)

3:30          Publications and Editorial  
              Peanut Quality  
              Peanut Crop Advisory

7:00          Board of Directors

8:00          Ice Cream Reception - Sponsored by Rhone-Poulenc

WEDNESDAY, JULY 13

8:00-5:00      APRES Registration  
8:00-10:00     Spouses Registration and Program  
10:00-5:00     Exhibits

GENERAL SESSION  
D. W. Gorbet, Presiding

8:30          Call to order  
              Invocation - J. S. Kirby

8:40          Welcome and comments  
              C. B. Browning, Dean and Director, Oklahoma  
              Agricultural Experiment Station

9:00          Introduction of keynote speaker  
              C. B. Browning  
              Keynote address - "Biotechnology and Its Potential  
              Impact on Agriculture" by John F. Fulkerson, USDA-  
              CSRS, Washington, D.C.

9:30          Presidential Address - D. W. Gorbet

9:45          Presentation of Honorary Awards - D. W. Gorbet

9:55          Announcements  
              Bobby Clary - Local Arrangements  
              Richard Berberet - Technical Program

10:00         Break

### THREE CONCURRENT SESSIONS

#### SESSION A - PLANT PATHOLOGY

#### SESSION B - HARVESTING AND HANDLING

#### SESSION C - WEED SCIENCE

#### SESSION A - PLANT PATHOLOGY

D. M. Porter, Presiding

- 10:30 The Effect of Planting Date on Severity Leafspot and Sclerotinia Blight of Peanuts. D.M. Porter\*, R.W. Mazingo, and K.P. Burnham, USDA-ARS, and VPI & SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.
- 10:45 Effect of Supplemental Irrigation and Rovral on Sclerotinia Blight of Peanuts. K.E. Jackson\*, H.A. Melouk, and C.N. Akem, Dept. of Plant Pathology, and USDA-ARS, Okla. State U., Stillwater, OK 74078
- 11:00 Agar Plate, Soil Plate and Field Evaluation of Fungicides for Activity Against *Sclerotinia minor*. F.D. Smith\*, P.M. Phipps, and R.J. Stipes, VPI&SU, Tidewater Agr. Exp. Sta, Suffolk, VA 23437
- 11:15 Comparison of Three New Methods of Copper Resinate Application for Control of Certain Soil-borne Pathogens in Peanuts. W.W. Osborne\*, IAI, Inc., South Boston, VA 24592 and J.D. Taylor, J&S Plant Consultants, Inc., Skippers, VA 23879
- 11:30 Effect of *Penicillium citrinum* Filtrate on Germination and Growth of Sclerotia of *Sclerotinia minor*. C.N. Akem\* and H.A. Melouk, Dept. of Plant Path. and USDA-ARS, Okla. State U., Stillwater, OK 74078.
- 11:45 Growth Stimulation of Peanut in Response to Mycorrhizal Colonization. J.S. Neck\* and R.A. Taber, Dept. of Plant Path. and Microbiology, Texas A&M U., College Station, TX 77843.
- 12:00 Lunch

#### HARVESTING AND HANDLING

J. L. Butler, Presiding

- 10:30 Effect of Stacked Windrow on Peanut Curing Environment. J.L. Butler\*, and E.J. Williams, USDA-ARS, Coastal Plain Exp. Sta., Tifton, GA 31793 and J.R. Vercellotti, and K.L. Crippen, USDA-ARS, New Orleans, LA 70179.
- 10:45 Interrelationships Between Volatile Concentrations, Seed-Size Categories, and Flavor in Large-Seeded Virginia-type Peanuts. H.E. Pattee\*, USDA-ARS, Dept. of Botany, N.C. State U., Raleigh, NC 27695; E.W. Rogister, Northampton Co. Ext. Off., Jackson, NC 27845; J.W. Dickens, USDA-ARS, Dept. of Biological and Agric. Engineering and G.A. Sullivan, Crop Science Ext., N.C. State U., Raleigh, NC 27695.
- 11:00 Accuracy and Variability in Sampling and Grading 'Florunner' Farmers Stock Peanuts. J.I. Davidson, Jr.\*, Y.J. Tsai, R.J. Cole, and J.W. Dorner, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.
- 11:15 Effects of Belt Screening Peanuts Before Drying. P.D. Blankenship\*, T.H. Sanders, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742 and J.R. Vercellotti, K.L. Crippen, S. Regional Res. Ctr., New Orleans, LA 70179.

- 11:30 Effect of Screening on the Quota Loan Value of Farmers Stock  
Peanuts. J.W. Dickens\* and A.B. Slate, USDA-ARS, N.C. State U.,  
Raleigh, NC 27695.
- 11:45 Moisture Content and Storage System Affects on Peanut Quality and  
Milling Parameters. J.S. Smith, Jr.\* and T.H. Sanders, USDA-ARS,  
Nat. Peanut Res. Lab., Dawson, GA 31742.

12:00 Lunch

WEED SCIENCE  
W.J. Grichar, Presiding

- 10:30 Phytotoxicity of Paraquat as Affected by Formulation and Peanut  
Cultivar. D.L. Colvin\*, Agronomy Dept., U. of Florida, Gainesville,  
FL 32611 and B.J. Brecke, Agr. Res. and Ed. Center, U. of Florida,  
Jay, FL 32565.
- 10:45 Efficacy of Various Herbicides for Yellow Nutsedge Control in  
Peanuts. W.J. Grichar, Texas Agr. Exp. Sta., Yoakum, TX 77995.
- 11:00 Economics of Peanut Weed Control Systems Without Dinoseb. J.W.  
Wilcut\*, G.R. Wehtje, T. V. Hicks, and T.A. Cole, VPI&SU, Tidewater  
Agr. Exp. Sta., Suffolk, VA 23437, and Auburn U., AL 36849.
- 11:15 EUP for 'Tough EC' Postemergent Contact Herbicide for Broadleaf  
Weeds in Peanuts. H. Bodingbauer, Gilmore, Inc., Memphis, TN  
38119.

11:30 Lunch

1:00-3:00 SYMPOSIUM - "Peanut Systems Research and Practical  
Applications"  
J.I. Davidson, Presiding

- 1:00 Research and Management Applications of the PNUIGRO Crop Growth  
Model. K.J. Boote\*, J.W. Jones, and G. Hoogenboom, Dept. of  
Agronomy and Agric. Engineering, U. of Florida, Gainesville, FL  
32611.
- 1:10 Use of "PEANUT" by Research Extension and Farm Managers. J.H.  
Young, Biological and Agricultural Engineering Dept., N.C. State  
U., Raleigh, NC 27695.
- 1:20 Use of a Peanut Leafspot Model in Virginia. J.L. Steele\*, USDA-ARS,  
U.S. Grain Marketing Res. Lab., Manhattan, KS 67502; P.M. Phipps,  
VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437 and D.M.  
Porter, USDA-ARS, Suffolk, VA 23437.
- 1:30 Use of a Weather-Based Forecasting Model for Late Leafspot:  
Integration with Fungicides and Resistant Varieties. F.W. Nutter,  
Jr., Dept. of Plant Pathology, U. of Georgia, Athens, GA 30602.
- 1:40 A Peanut Harvest Scheduling Model for Use by Research, Extension,  
and Farm Managers. E.J. Williams, USDA-ARS, Crop Systems Res.  
Unit, Coastal Plain Exp. Sta., Tifton, GA 31793.
- 1:50 Use of Expert Systems by Research, Extension, and Farm Managers.  
R.W. McClendon, Driftmier Engineering Center, Athens, GA 30602.
- 2:00 An Expert System for Management of the Lesser Cornstalk Borer.  
Y.Wang and T.P. Mack\*, Dept. of Entomology, Auburn U., AL 36849.
- 2:10 Development of an Expert Systems Model for Managing Irrigation and  
Pests in Peanuts. J.I. Davidson, Jr.\*, USDA-ARS, Nat. Peanut Res.  
Lab., Dawson, GA 31742; Sarah Parker and Allan Jones, USDA-ARS,  
Grassland Soil and Water Res. Lab., Temple, TX 76503.

- 2:20 The Coastal Plain Experiment Station's Computerized Peanut Literature Database. C.S. Kvien\*, C.C. Holbrook, and G.A. Buchanan, USDA-ARS, and U. of Georgia, Coastal Plain Exp. Sta., Tifton, GA 31793.
- 2:30 Software, Networking and Contacts for Obtaining Access to Peanut Systems Information. C.L. Butts, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.
- 2:40 Discussion
- 3:00 Break
- 1:00-3:20           INDUSTRY SESSION  
                  J. C. LaPrade, Presiding
- 1:00 'Buctril', a New Potential Herbicide for Postemergence Broadleaf Weed Control in Peanuts. A. Luke, Rhone-Poulenc, Inc.
- 1:10 'Basagran-Gramoxone' Interactions in Early Season Peanuts. J.C. Turner and J.R. Evans, BASF, Inc.
- 1:20 'Benchmark' Herbicide: Weed Control in Peanuts. J.C. Hulbert, Chevron Chemical Co.
- 1:30 Performance of 'Temik' Brand 15G Pesticide for Thrips Control on Peanuts. A.R. Ayers, Rhone-Poulenc, Inc.
- 1:40 Pest Control on Peanuts with 'Mocap' Brand Nematicide - Insecticide. A.R. Ayers, Rhone-Poulenc, Inc.
- 1:50 'Gramoxone Super': 1987 Summary of Results in Peanuts. J.N. Lunsford, ICI Americas.
- 2:00 ICIA 0523 (Hexaconazole) A New Fungicide for Peanuts. J.N. Lunsford, ICI Americas.
- 2:10 'Rovral' Performance Update on Peanuts. H. Baldwin, Rhone-Poulenc, Inc.
- 2:20 Recent Advances in 'Chlorothalonil' Formulation Technology. W.C. Odle, Fermenta Plant Protection.
- 2:30 Sclerotinia and Stem Rot Suppression Update Using 'Tern-Cop SE' Fungicide in a Peanut Spray Program. A.F. Gohlke, Tennessee Chemical Co.
- 2:40 Use of 'Norflurazon' on Peanuts for Florida Beggarweed Control. H. McLean, Sandoz Co.
- 2:50 Current Status of 'Tough' Peanut Herbicide. C.A. Clark, Helena Chemical Co.
- 3:00 'Apron' - 'Terraclor', A New Farmer-Applied Seed Treatment. W.G. Hairston, Gustafson, Inc.
- 3:10 'Amiben': The Superior Florida Beggarweed Control Herbicide For Use on Peanuts in the Southeast. J.C. LaPrade\*, Rhone-Poulenc, Inc.
- 3:20 Break

### THREE CONCURRENT SESSIONS

#### SESSION A - PLANT PATHOLOGY

#### SESSION B - ENTOMOLOGY AND EXTENSION

#### SESSION C - PROCESSING AND UTILIZATION

#### SESSION A - PLANT PATHOLOGY

F. W. Nutter, Jr., Presiding

- 3:30 Simulation Model of the Progression of Leafspot Diseases Affecting Peanut. G. Bourgeois\*, K.J. Boote, and R.D. Berger, Depts. of Agronomy and Plant Path., U. of Florida, Gainesville, FL 32611.
- 3:45 Management of Late Leafspot on a Partially Resistant Cultivar. F.M. Shokes\*, N. Florida Res. and Ed. Center, Quincy, FL 32351; and D.W. Gorbet, Agr. Res. and Ed. Center, Marianna, FL 32446.
- 4:00 Field Performance of Computerized Advisories for Fungicide Application to Control Early Leafspot of Peanut. R.M. Cur\*, P.M. Phipps, J.L. Steele, and R.J. Stipes, USDA-ARS and VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23436.
- 4:15 In Vitro Fungicide Sensitivity of *Cercosporidium personatum*. T.B. Breneman\*, and E.L. Jewell, Dept. of Plant Pathology, Coastal Plain Exp. Sta., Tifton, GA 31793.
- 4:30 Comparative Effects of a Protectant vs. a Sterol Inhibiting Fungicide on Disease Components of Late Leafspot of Peanut. F.W. Nutter, Jr.\* and J.L. Labrinos, Dept. of Plant Pathology, U. of Georgia, Athens, GA 30602.
- 4:45 Relationships Between Plot Yield and Spectral Reflectance Patterns of Peanuts Developing Under Stress. V.J. Elliott\*, USDA-ARS, Tobacco Res. Lab., Oxford, NC and H.W. Spurr, Jr., Dept. of Plant Pathology, NC State U., Raleigh, NC 27695.

#### ENTOMOLOGY AND EXTENSION

R. E. Lynch, Presiding

- 3:30 Thrips Control Regimes Targeted to Reduce Tomato Spotted Wilt Virus on Peanut. J.R. Weeks\*, T.P. Mack, J.C. French, and A.K. Hagan, Depts of Entomology and Plant Pathology, Auburn U., AL 36849.
- 3:45 Monitoring the Adult Southern Corn Rootworm with Pheromone-Baited and Unbaited Sticky Traps. W.V. Campbell, Dept. of Entomology, NC State U., Raleigh, NC 27695.
- 4:00 Effect of Groundnut Harvest Date and Termite-resistant Varieties on Termite Damage in Burkina Faso, West Africa. R.E. Lynch \*, USDA-ARS, Insect Biology and Population Management Re. Lab., Tifton, GA 31793; A.P. Ouedraogo, and S.A. Some, ISN-IDR, U. of Ougadougou, B.P. 7020, Burkina Faso, West Africa.
- 4:15 Optimal Peanut Production Plans for Southeast Farmers. T.D. Hewitt\* and S.A. Ford, Food and Resource Economics Dept., Institute of Food and Agric. Sciences, U. of Florida, Marianna, FL 32446 and Gainesville, FL.
- 4:30 Producing Quality Peanuts: Getting the Message Across. J.P. Beasley, Jr., Extension Agronomy Dept., U. of Georgia, Tifton, GA 31793.
- 4:45 Extension Implementation of the Hull-Scrape Method. J.A. Baldwin, Extension Agronomy Dept., U. of Georgia, Tifton, GA 31793.

- 5:00 Use of a Spreadsheet for Expediting the Use of a Peanut Disease Threshold. J.E. Bailey, Plant Pathology Dept., NC State U., Raleigh, NC 27695.

PROCESSING AND UTILIZATION  
C. T. Young, Presiding

- 3:30 Variation of Color of Oil Cooked Virginia Type Peanuts. J.E. Erickson\*, M.D. Keziah, and C.T. Young, Dept. of Food Science, NC State U., Raleigh, NC 27694 and R.W. Mozingo, VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.
- 3:45 Microwave Roasting of Peanut Seeds. E.M. Ahmed, Food Science and Human Nutrition Dept., U. of Florida, Gainesville, FL 32611.
- 4:00 Effect of the Degree of Roasting on the Production of Pyrazines in 'Florunner' Peanuts. J.A. Landsden\* and T. H. Sanders, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742; and J.R. Vercellotti, USDA-ARS, Southern Regional Res. Center, New Orleans, LA 70179.
- 4:15 Sensory Evaluation of a High Oleic Acid Peanut Line. C.T. Young\*, Dept. of Food Science, NC State U., Raleigh, NC 27695 and A.J. Norden, Dept. of Agronomy, U. of Florida, Gainesville, FL 32611.
- 4:30 Investigation of the Relationship between Peanut Flavor Profiles and Peanut Volatile Profiles Using Cluster Analysis. K.L. Crippen\*, USDA-ARS/SRRC, New Orleans, LA 70179; G. Shaffer, Dept. of Statistics, Louisiana State U., Baton Rouge, LA 70803 and N.V. Lovegren, USDA-ARS/SRRC, New Orleans, LA 70179.
- 4:45 Effect of Peanut Kernel Moisture Content on Lipooxygenase Activity in Raw Peanuts as Evidence by Volatiles Profile Changes. N.V. Lovegren\* and J.R. Vercellotti, USDA-ARS, Southern Regional Res. Center, New Orleans, LA 70179; and T.H. Sanders, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.
- 5:00 Significance, Identification, and Detection of Allergenic Peanut Proteins. S.L. Taylor\*, J.A. Nordlee, S. Meier-Davis, and R.K. Bush, Dept of Food Science and Technology, U. of Nebraska, Lincoln, NE 68583 and Dept. of Medicine, U of Wisconsin Medical School, Madison, WI 53792.
- 7:30 Social sponsored by Fermenta Plant Protection

THURSDAY, JULY 14

- 8:00-12:00 APRES Registration  
Spouses Registration and program

THREE CONCURRENT SESSIONS

- SESSION A - PLANT PATHOLOGY  
SESSION B - PHYSIOLOGY AND SEED TECHNOLOGY  
SESSION C - BREEDING AND GENETICS

SESSION A - PLANT PATHOLOGY  
A.K. Hagan, Presiding

- 8:00 Resistance of the Peanut Variety 'Southern Runner' to White Mold, *Sclerotium rolfsii*. J.E. Arnold, Total Farm Services, Marianna, FL 32446; R.K. Sprentzel\*, Res. and Ed. Center, Quincy, FL 32351; D.W. Gorbet, Marianna Res. and Ed. Center, Marianna, FL 32446 and J. King, Rt. 1, Box 38, Greenwood, FL 32443.

- 8:15 Deposition of Sprays on the Soil for Soil-borne Targets of Peanut. A.S. Csinos\* and C.S. Kvien, Depts of Plant Pathology and Agronomy, Coastal Plain Exp. Sta., Tifton, GA 31773.
- 8:30 Comparison of Chlorpyrifos, Ethoprop, and Fonofos with PCNB for Southern Stem Rot Suppression on Peanut. A.K. Hagan\* and J.R. Weeks, Depts of Plant Pathology and Entomology, Auburn U., AL 36849.
- 8:45 Control of *Cylindrocladium* Black Rot (CBR) of Peanut with Soil Fumigants Having Methyl Isothiocyanate as the Active Ingredient for Soilborne Disease Control. P.M. Phipps, VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.
- 9:00 Effect of Resistant and Susceptible Peanut Genotypes on Time of Onset and Rate of *Cylindrocladium* Black Rot Epidemics. A.K. Culbreath\* and M.K. Beute, Dept. of Plant Pathology, NC State U., Raleigh, NC 27695.
- 9:15 Effect of Fungicides on Infection of Peanut Hypocotyl With *Aspergillus niger*. S.S. Aboshosha\*, Dept. of Plant Pathology, College of Agric., Alexandria, Egypt; H.A. Melouk, USDA-ARS, Dept. of Plant Pathology, Okla. State U., Stillwater, OK 74078, and D.H. Smith, Texas Agr. Exp. Sta., Yoakum, TX 77993.
- 9:30 Control of *Rhizoctonia* Limb Rot With Diniconazole (Spotless 25WP). J.S. Barnes\*, Dept. of Plant Pathology, U. of Georgia, Athens, GA 30602 and A.S. Csinos, Coastal Plain Exp. Sta., Tifton, GA 31793.
- 9:45 Break

PHYSIOLOGY AND SEED TECHNOLOGY  
A.M. Shubert, Presiding

- 8:00 Relation of Peanut Phenology with Thermal Time. D.L. Ketrings\* and T. G. Wheeler, USDA-ARS, Dept. of Agronomy, Okla. State U., Stillwater, Ok 74078.
- 8:15 Pod Characteristics Influencing Calcium Concentrations in the Seed and Hull of Peanut (*Arachis hypogaea* L.). C.S. Kvien\*, W.D. Branch, M.E. Sumner, A.S. Csinos, and H. Smal, Coastal Plain Exp. Sta., Tifton, GA 31793, and U. of Georgia, Athens, Ga 30602.
- 8:30 Soil Temperature Effects on Free Carbohydrate Concentrations in Peanut (*Arachis hypogaea* L.) Seed. J.L. McMeans\*, T.H. Sanders, and P.D. Blankenship, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742 and B.W. Wood, USDA-ARS, SE Fruit & Tree Nut Res. Lab., Byron, GA 31008.
- 8:45 Shoot-tip Culture of Peanut. W.Q. Chen\*, B. Johnson, and J.L. Sherwood, Depts of Plant Pathology and Botany, Okla. State U., Stillwater, Ok 74078.
- 9:00 Effects of Substrate Calcium Concentrations on Nodulation and the Incidence of Mycorrhizal Association of Peanut Roots. J.S. Calahan, Jr., Dept. of Biological Science, Tarleton State U., Stephenville, Tx 76402.
- 9:15 Deposition Pattern of Arachin During Peanut (*Arachis hypogaea* L.) Seed Maturation. S.M. Basha, Div. of Agricultural Sciences, Florida A&M U., Tallahassee, FL 32307.
- 9:30 The Effect of Spotless on Vegetative and Reproductive Growth of Peanuts. G.A. Sullivan, Dept. of Crop Science, NC State U., Raleigh, NC 27695.
- 9:45 Break

BREEDING AND GENETICS  
J. S. Kirby, Presiding

- 8:00 Variability in Growth Characteristics of Peanut Lines. D.A. Knauff\* and D.W. Gorbet, Dept. of Agronomy, U. of Florida, Gainesville, FL 32611 and Marianna, FL 32446.
- 8:15 Use of Reproductive:Vegetative Ratios and Efficiency Factors as Potential Criteria for Single Plant Selection in Peanut Breeding. D.J. Banks, USDA-ARS, Plant Science Res. Lab., Stillwater, OK 74076.
- 8:30 The Parental Potential of Six Diverse Peanut Cultivars. C.C. Holbrook\* and W.D. Branch, USDA-ARS and Dept. of Agronomy, Coastal Plain Exp. Sta., Tifton, GA 31793.
- 8:45 Cyclic versus Pedigree Selection Method in Peanut. W.D. Branch\*, Dept. of Agronomy, Coastal Plain Exp. Sta., Tifton, GA 31793; J.S. Kirby, Dept. of Agronomy, Okla. State U., Stillwater, OK 74078; J.C. Wynne, Dept. of Crop Science, NC State U., Raleigh, NC 27695; C.C. Holbrook, Dept. of Agronomy, Coastal Plain Exp. Sta., Tifton, GA and W.F. Anderson, Dept. of Crop Science, NC State U., Raleigh, NC 27695.
- 9:00 Breeding for CER Resistance in Peanut. T.A. Coffelt\* and P.M. Phipps, USDA-ARS and VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.
- 9:15 Inheritance of Earliness in Crosses Among Five Early-Maturing Spanish Peanut Varieties. O. N'Doye\*, O.D. Smith, and G.B. Parker, Dept. of Soil & Crop Sciences Texas A&M U., College Station, TX 77843.
- 9:30 The Inheritance of High Oleic Acid Oil in Peanut. K.M. Moore\* and D.A. Knauff, Dept. of Agronomy, U. of Florida, Gainesville, FL 32611.
- 9:45 Techniques for Maintaining Precious *Arachis* Germplasm. C.E. Simpson, Texas A&M U., Texas Agr. Exp. Sta., Stephenville, TX 76401.
- 10:00 Break

THREE CONCURRENT SESSIONS

SESSION A - PLANT PATHOLOGY  
SESSION B - MYCOTOXINS  
SESSION C - PRODUCTION TECHNOLOGY

PLANT PATHOLOGY  
A. B. Filnow, Presiding

- 10:15 Comparison of Seven Peanut Genotypes for Pod Rot Susceptibility and Influence on *Pythium* Inoculum Densities in Soil. P.I. Lewis\* and A.B. Filnow, Dept. of Plant Pathology, Okla. State U., Stillwater, OK 74078.
- 10:30 Colorimetric Assessment of Pod Rot Disease Severity in Peanuts. G.B. Parker, and O.D. Smith\*, Dept. of Soil & Crop Sciences, Texas A&M U., College Station, TX 77843 and W.J. Grichar, Texas A&M U. Plant Disease Res. Sta., Yoakum, TX 77993.
- 10:45 Effects of Ethoprop and Metalaxyl-PCNB on Nematodes and Peanut Pod Rot. H.H. Fagbenle\* and K.E. Jackson, Dept. of Plant Pathology, Okla. State U., Stillwater, OK 74078.

- 11:00 Nematode Diseases of Groundnut in India. S.B. Sharma, Nematology Unit, Internat. Crops Res. Inst. for the Semi-Arid Tropics (ICRISAT), Andhra Pradesh 502 324, India.
- 11:15 Resistance to Root-knot Nematode in Exotic Peanut Germplasm. S.C. Nelson\*, and J.L. Starr, Dept. of Plant Pathology and Microbiology, Texas A&M U., College Station, TX 77843 and C.E. Simpson, Texas Agr. Exp. Sta., Stephenville, TX 76401.
- 11:30 Distribution of Spotted Wilt Disease in South Texas Peanut Fields. M.C. Black\* and D.H. Smith, Dept. of Plant Pathology and Microbiology, Texas A&M U., Uvalde, TX 78802 and Yoakum, TX 77995.
- 11:45 Lunch

#### MYCOTOXINS

R. E. Pettit, Presiding

- 10:15 Pattern of Preharvest Aflatoxin Contamination of Peanuts Based on Single Kernel Analysis. J.W. Dornier\*, R.J. Cole, P.D. Blankenship and T.H. Sanders, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.
- 10:30 Effects of Gypsum and Irrigation on Aspergillus flavus Group Colonization of Peanuts. D.M. Wilson\* and M.E. Walker, Coastal Plain Exp. Sta., Tifton, GA 31793.
- 10:45 Aflatoxin Content of Peanuts Cleaned Before Drying on a Peanut Belt Screen. T.H. Sanders\*, P.D. Blankenship and R.J. Cole, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.
- 11:00 Detection of Aflatoxin in Various Components of Farmers Stock Peanuts. F.E. Dowell\*, J.W. Dornier, J.I. Davidson, R.J. Cole, and W.G. Ferguson, USDA-ARS, Nat. Peanut Res. Lab., Dawson, GA 31742.
- 11:15 Simulating the Testing of Shelled Peanut Lots for Aflatoxin in the Export Market. T.B. Whitaker\* and J.W. Dickens, USDA-ARS, Dept. of Biological and Agricultural Engineering, NC State U., Raleigh, NC 27695.
- 11:30 Electrophoretic Comparison of Cotyledonary Proteins from Kernels of Fourteen Peanut Cultivars Colonized by Aspergillus spp. for Different Periods. J.B. Szerszen\* and R.E. Pettit, Dept. of Plant Pathology and Microbiology, Texas A&M U., College Station, TX 77843.
- 11:45 Isolation and Characterization of Tannin-related Compounds in Mature Peanut Testae from Twenty-three Peanut Genotypes. H.A. Azaizah, R.D. Waniska, and R.E. Pettit\*, Dept. of Plant Pathology and Microbiology and Dept. Soil and Crop Sciences, Texas A&M U., College Station, TX 77843.
- 12:00 Lunch

#### PRODUCTION TECHNOLOGY

R. K. Howell, Presiding

- 10:15 Effect of Rhizobium Inoculation and Nitrogen Fertilizer on Peanut in Oklahoma. J.R. Sholar\* and G. Turpin, Dept. of Agronomy, Okla. State U., Stillwater, OK 74078.
- 10:30 Yield, Value, and Disease Response of Peanuts to Conservation Methods of Production in Virginia. F.S. Wright\* and D.M. Porter, USDA-ARS, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.

- 10:45 Irrigation of Peanut Using a Subsurface Trickle Irrigation System. N.L. Powell\* and F.S. Wright, VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.
- 11:00 Effect of Harvesting Date on Yield, Grade and Seed Quality of 'Southern Runner' Peanut. R.R. Pedelini\* and E.B. Whitty, Dept. of Agronomy, U. of Florida, Gainesville, FL 32611.
- 11:15 Mineral Distribution in Peanuts as Detected by SEM-ED X-Ray Analysis. R.K. Howell\*, W.P. Wergin, and N. Chaney, USDA-ARS, Beltsville, MD 20705.
- 11:30 Impact of Peanut Production Costs on the Quota Support Formula of the Peanut Program. R.H. Miller\*, USDA-ASCS, Commodity Economics Division, Washington, DC 20250
- 11:45 Assessment of Shell Damage and Fungal Infection Rates of Seed in Samples of Five Diverse Peanut Cultivars. J.L. Steele\*, USDA-ARS, U.S. Grain Marketing Res. Lab., Manhattan, KS 66502; D.M. Porter and T.A. Coffelt, USDA-ARS, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.
- 12:00 Lunch
- 1:00-3:05 SYMPOSIUM  
"UTILIZATION AND DEVELOPMENT OF NEW PEANUT  
PRODUCTS FOR THE FOOD INDUSTRY"  
J. S. How, Presiding
- 1:00 Introduction - J. S. How, Hershey Foods Corp.
- 1:05 Overview of Current Industrial Uses of Peanuts. J.R. Baxley, Vice-President, PERT Labs/Seabrook Blanching Co.
- 1:22 Competitive Inroads Made by Other Edible Nuts in the Food Industry. M. Miller, Director of Marketing, National Peanut Council.
- 1:39 Peanut Products Utilization in Japan and Asia. A. Matsunobu, Director, Toyo Nuts Co., Japan.
- 1:56 Developing Creative Peanut Butter Recipes for Home and Institutional Uses. S. Huffman, Director, Consumer Affairs, Best Foods/CPC International.
- 2:13 New Peanut Products Development in Thailand and Other Southeast Asian Countries. C. Oupadissakoon, Assistant Professor, Kasetsart University, Thailand.
- 2:30 Peanuts and Candy, the Incredible Combination. J.S. How, Senior Food Technologist, Hershey Foods Corp.
- 2:47 Designing the "Perfect" Peanut Variety for Maximizing Industrial Utilization. W. Mozingo, Associate Professor, VPI&SU, Suffolk, VA.
- 3:05 Break
- 1:00-3:00 SCLEROTINIA CONFERENCE  
O. D. Smith, Presiding
- 1:00 Introduction, O.D. Smith, Texas A&M U., College Station, TX.
- 1:05 Sclerotinia Blight of Peanuts, D.M. Porter, USDA-ARS, Tidewater Agr. Exp. Sta., Suffolk, VA 23437.

- 1:25 Status of Sclerotinia Blight of Peanuts in Oklahoma. H.A. Melouk\* and L.J. Littlefield, USDA-ARS and Dept. of Plant Pathology, Okla. State U., Stillwater, OK 74078.
- 1:45 Strategies for Control of Sclerotinia Blight of Peanut in Virginia and North Carolina. P.M. Phipps\*, VPI&SU, Tidewater Agr. Exp. Sta., Suffolk, VA 234347 and J.E. Bailey, Dept. of Plant Pathology, NC State U., Raleigh, Nc 27650.
- 2:05 Status of Sclerotinia Blight in Texas. T.A. Lee, Jr.\* and K.E. Woodard, Dept. of Plant Pathology, Texas A&M Res. and Ext. Center, Stephenville, TX 76401.
- 2:25 Discussion
- 3:00 Break
- 4:30-9:00 Barbecue at Dillingham Ranch, Okmulgee, Oklahoma  
Sponsored by Uniroyal

FRIDAY, JULY 15

- 7:30 Breakfast  
Awards Ceremony
- 8:30 Final Business Meeting
- 10:00 Adjourn

#### BAILEY AWARD COMMITTEE REPORT

The Bailey Award Committee met at 1:00 p.m. on July 12, 1988 in Tulsa, Oklahoma. In attendance were Scott Wright, Bob Howell, Fred Shokes, D.L. Ketring, Craig Kvien, Charles Swann, Ron Sholar, Richard Berberet, and Ruth Taber.

Guidelines for selecting nominees for the 1988 Bailey Award included:

1. Selecting the best oral presentation from each technical paper session;
2. Requiring the senior author to be a member of APRES;
3. Requiring the senior author to present the paper.

Final selection was based on manuscripts submitted by nominees after the 1987 meeting in Orlando, Florida. Manuscripts were judged for scientific merit, originality, clarity, and contribution to peanut science. Nominees were notified of their selection on January 8, 1988, and asked to return their manuscript by March 15, 1988. Committee members that were nominated for this award were not involved in the manuscript evaluation. There were 16 nominees and 12 manuscripts were submitted. The winners were determined to be A.K. Culbreath and M.K. Beute for their paper "Spatial and Temporal Aspects of Cylindrocladium Black Rot Disease Progress in Peanut." Author/co-authors of the 16 papers totaled 46 nominees. Each author on the nominated will be mailed a certificate of merit. The committee recommended to the Board of Directors that in succeeding years, no certificates should be distributed to nominees for the Bailey Award in view of the numbers of nominees. The names of the authors and titles of their paper should instead be recognized in the APRES Proceedings.

An ad hoc committee appointed to study the possibility of awarding a special graduate student paper award was composed of J.C. Wynne, M.K. Beute, and H.T. Stalker. The Bailey Award committee, based on the ad hoc committee proposal, recommended to the Board of Directors at the 1988 Board of Directors meeting the following:

1. A graduate student award should be given in honor of Joe S. Sugg.
2. The award should consist of first and second place certificates and a check for \$200 for 1st place and a check for \$100 for 2nd place.
3. A special session for graduate student papers should be scheduled each year and preferably not conflict with other technical sessions. Judges should be appointed by the chairman of the Bailey Award Committee. The winners would be announced and recognized at the business meeting the same year.

Respectfully submitted,  
R. A. Taber, Chairman  
M. C. Black  
H. W. Spurr, Jr.  
F. S. Wright  
F. M. Shokes  
C. S. Kvien

# PAPERS NOMINATED FOR THE BAILEY AWARD

1. Use of Inbred Backcross Line Method in Peanut. J.C. Wynne\*, M.K. Beute, C.T. Young, W.V. Campbell, D.M. Porter, and T.A. Coffelt.
2. Storability of farmers' stock peanuts at two moisture levels in mechanically and naturally ventilated miniature warehouses. J.S. Smith, Jr.\* and T.H. Sanders.
3. Chlorpyrifos-methyl as a protectant of farmers' stock peanuts. F.H. Arthur\*, L.M. Redlinger, and R.A. Simonaitis.
4. Grading peanut butter using video image analysis techniques. T.B. Whitaker\*, J.W. Dickens, and A.B. Slate.
5. Influence of chlorothalonil applied in irrigation water on yield and foliage residue. R.H. Littrell.
6. Genetic control of maturity in peanut. C.C. Holbrook\*, C.S. Kvien and W.D. Branch.
7. Spatial and temporal aspects of cylindrocladium black rot disease progress in peanut. A.K. Culbreath\* and M.K. Beute.
8. Response of Florunner peanut to water stress levels induced through irrigation timing by canopy temperature. A.M. Schubert\* and T.H. Sanders.
9. Metolachlor effects on peanut growth and development. J. Cardina\* and C.W. Swann.
10. Spotted wilt and rust reactions in south Texas among selected peanut genotypes. M.C. Black\* and D.H. Smith.
11. Major sulfur compounds in peanut headspace. R.H. Watkins\* and C.T. Young.
12. Tough 3.75EC: A new highly selective postemergent herbicide for peanuts. H.R. Bodingbauer\* and A. Zohner.
13. Interaction and minimum sufficiency levels of K and Mg for peanuts grown on two sandy soils. M.E. Walker\*, T.P. Gaines and M.B. Parker.
14. Growth response of peanut to field inoculation with vesicular-arbuscular endomycorrhizal fungi and bradyrhizobium in Texas. R.A. Taber\*, O.D. Smith, D.H. Smith, R.E. Pettit, J.S. Neck, S.Rajapakse, and W.F. Harman.
15. Intrarow seed spacing effects on five peanut cultivars. R.W. Mazingo\* and J.L. Steele.
16. Differences in competitive ability of single and mixed strain inoculants for peanut. P.J.A. Wijewickrama, T.J. Schneeweis, J.C. Wynne\*, and G. H. Elkan.

#### FELLOWS COMMITTEE REPORT

Using guidelines published in the 1981 APRES Proceedings, pages 146-147, the following individuals were elected Fellows by the Board of Directors:

Donald J. Banks  
J. Frank McGill  
Donald H. Smith  
James L. Steele  
Joe S. Sugg

Respectfully submitted:

H. E. Pattee, Chairman  
A. H. Allison  
T. E. Boswell  
J. W. Dickens  
O. D. Smith  
C. T. Young

DONALD J. BANKS has a research career of more than 20 years in peanut genetics and breeding. He initiated the new USDA-ARS project on peanut breeding at Stillwater, OK, in 1966 and is recognized as an authority on peanut genetics and breeding in the United States and ranks among the top scientists in the world on understanding evolution and speciation of the genus Arachis.

Dr. Banks, starting in 1966 as the sole scientist of this new ARS research project on peanuts at the Stillwater location, and later as Research Leader, developed a major peanut research program involving both Federal and Oklahoma Agricultural Experiment Station resources and personnel. His efforts through the years have been key factors in helping develop facilities and personnel that now comprise one of the major peanut research laboratories in the world.

Dr. Banks has been instrumental in assembling, organizing, increasing, distributing, and enhancing a large collection of wild Arachis germplasm. In addition to Dr. Banks' research with the wild species, he has conducted research in many other areas including:

- helping develop procedures for evaluating peanut  
genotypes for their resistance to the northern  
root knot nematode.
- developing procedures that make hand-crossing to  
achieve peanut hybrids more efficient.
- colchiploidy, embryo rescue, and tissue culture.

Some of Dr. Banks' research has carried through to the development and release of three peanut cultivars that are presently in commercial production.

Dr. Banks has authored or co-authored 23 papers in refereed journals and has presented or been involved in the presentation of 53 papers, many of them at our society meetings.

Dr. Banks has been a continuous member of the organization (and its predecessors, PIWG and APREA) since 1966, and has attended all but three of the annual meetings. He has served on the Board of Directors and on numerous committees of our society.

Dr. Banks has served on the Peanut Crop Advisory Committee (PCAC) since its inception in 1981. Dr. Banks has been heavily involved in the activities of this committee and was elected Chairman of the Peanut CAC in 1987 for a 3-year term.

J. FRANK MCGILL, began his career in 1951 as a Georgia county extension agent. In 1954 he became a Georgia extension peanut specialist, and in 1981 retired from the extension service to become a field peanut consultant for M&M Mars. He has authored or co-authored over 600 extension and research publications, appeared on 175 television programs, countless radio broadcasts, and conducted over 1200 educational programs for Georgia peanut growers. During his 31 year extension

career the average Georgia peanut yield grew from 800 to over 3500 Kg/Ha. A key ingredient to the success of the peanut industry in Georgia was the peanut extension team and their "package approach" program which presented growers with a complete package of technology, rather than single out one part of the technology as being superior.

Besides extension activities, he has served as chairman of the Peanut Improvement Working Group, as president of APRES, and as a technical advisor to the U.S. Senate on Agriculture, the National Peanut Council, the National Peanut Growers Group, and the Georgia Peanut Commission. During the past 25 year he has served as short-term peanut consultant in 21 countries on six continents.

The University of Georgia has honored J. Frank McGill with the D.W. Brooks Distinguished Professor of Agronomy Award, the Distinguished Service Award, Distinguished Alumni Award, and the Arch Award for Public Service. He has also received the Superior Service Award from the USDA, the Golden Peanut Award from the National Peanut Council, the Service to Mankind from the Sertoma Club, and was elected to the Georgia Peanut Commission's Peanut Hall of Fame.

DONALD H. SMITH, Professor, Texas Agricultural Experiment Station, Texas A&M University System Plant Disease Research Station, Yoakum, TX, is an excellent scientist working in the area of peanut diseases. While his particular emphasis is foliar diseases caused by fungi, he is well versed in most peanut diseases. His research activities have ranged from routine testing of fungicidal chemicals to disease forecasting and resistance of pathogens to pesticides. His area of work ranges from one-on-one interaction with South Texas peanut producers to extensive surveys of diseases in West Africa. His interest ranges from very practical applications to basic microbiology. He has been co-editor of one book on peanut diseases and has written chapters in five books. He has authored or co-authored 22 papers in refereed journals, 8 papers in other journals, 53 technical bulletins and reports, at least 10 non-technical papers, and 50 abstracts. Dr. Smith is a senior scientist with broad knowledge of both the biology of peanut diseases and his fellow scientist in this field of study. He is open in sharing knowledge with others. In recent years it has become apparent that, when an unusual peanut disease situation emerges in nearly any of the world's peanut growing areas, Dr. Smith is one of an informal network of international scientists who can pool information and experience to establish strategies for studying the problem effectively.

Dr. Smith has served APRES to a degree that few other members can match. He was Executive Secretary-Treasurer for 10 years. He has also served as president-elect, president, and past-president and held a number of committee assignments. If you compiled a list of people who have had a major role in the success of APRES, Dr. Donald H. Smith would rank near the top of the list.

JAMES L. STEELE, Agricultural Engineer and Research Leader, Engineering Unit, U.S. Grain Marketing Research Laboratory, USDA, ARS, Manhattan, Kansas, has been actively engaged in engineering research on crop drying and storage for over 29 year. He has authored or co-authored over 70 scientific articles, technical bulletins, and abstracts. From July 1967 through December 1987 he served as an Agricultural Engineer, Peanut Production, Disease, and Harvesting Research Unit, USDA, ARS, Tidewater Agricultural Experiment Station, Suffolk, Virginia. During this time he worked to improve the efficiency of peanut drying and curing systems, peanut production, peanut disease management, and peanut kernel quality. He also developed system models and served as part of a national team to improve peanut growth models.

Dr. Steele has served the peanut industry and his profession through activities in the Peanut Improvement Working Group, American Peanut Research and Education Society, and the American Society of Agricultural Engineers (ASAE). He has served as an editor for the Computer News Column of Agricultural Engineering and is currently the Associate Divisional (EPP) Editor for Transactions of ASAE and Applied Engineering in Agriculture.

Dr. Steele's work is highly regarded on a national and international basis. He is consulted by industry, producers, and the scientific community on problems related to artificial crop drying and storage. He has been asked to discuss peanut harvesting and mechanization research with visitors from other countries including Canada, Japan, West Germany, Australia, Venezuela, Argentina, Egypt, Israel, and Peoples Republic of China. His outstanding work in research and education in the peanut industry, along with his leadership abilities have been recognized by the USDA, ARS with the appointment to his present position January 1, 1988.

JOE S. SUGG is the pioneer that realized the need for sharing peanut research at the state and national level. His affiliation with the peanut industry began in 1953 when he became the first Executive Secretary of the newly organized North Carolina Peanut Growers Association. In that capacity he worked tirelessly and effectively to improve the position of peanut growers through pursuing the implementation of the best possible programs for marketing, research, and education. He was instrumental in organizing the Peanut Improvement Working Group and its successor, the American Peanut Research and Education Society. Mr. Sugg served as Chairman of the Publication and Editorial Committee in 1969, and from 1972-1980. In this capacity he handled publication of the Proceedings and was responsible for establishing the Bailey Award and Peanut Science. He also provided outstanding leadership as Chairman and Board Member of the National Peanut Council where he helped establish the Golden Peanut Research and Education Award. He also served as Chairman and Member of the Peanut Administration Committee, the Virginia-Carolina Advisory Committee, and as Co-Editor of the Virginia-Carolina Peanut News. His efforts have had a strong impact on legislation both at the state and national levels.

Mr. Sugg is a N. C. State University agricultural graduate, with employment services in the Agricultural Extension Service, Atlantic Coastline Railroad Agricultural Representative and Executive Secretary of the North Carolina Peanut Growers Association. He served twenty-seven years as a leader in the peanut industry from the legislative halls in Washington, to fighting the battle of aflatoxin. He has been a strong supporter of research and extension programs and funding.

Mr. Sugg's contributions to the peanut industry were recently recognized by the National Peanut Council when he was honored as the first inductee into the Peanut Hall of Fame.

#### CAST REPORT

The CAST Board of Directors met in Washington, D.C. on February 23-25, 1988. The CAST Board is currently exploring methods for increasing membership and generating additional funding for the organization. At the February meeting, the magazine "Science of Food and Agriculture" committee was directed to develop an alternative publication which would be less costly to produce.

CAST currently has Task Force reports being developed in the following areas:

1. Agricultural Production and Food Processing Waste Management and Utilization
2. Risk Benefit Assessment of Antibiotics
3. Assessment of Risks Associated with Pathogenic Microorganisms
4. Pesticides on Imported Foods
5. Ionizing Energy in Food Processing and Pest Control
6. Ecological Impacts of Federal Conservation and Cropland Reduction Programs

Reports on "Effective Use of Water in Irrigated Agriculture" (Report No. 113) and "Long-Term Viability of U.S. Agriculture" (Report No. 114) were published in June.

Submitted by:

J. Ronald Sholar

APRES Representative to CAST

#### SITE SELECTION COMMITTEE

The 1989 annual meeting will be held July 11-14, 1989, in Winston-Salem, North Carolina. It will be held at the Winston Plaza Stouffer Hotel. The 1990 meeting will be held July 10-13 in Atlanta, Georgia. The 1991 meeting will be in the Dallas or San Antonio area of Texas.

Respectfully submitted:

B. L. Clary, Chairman  
R. C. Berberet  
G. A. Sullivan  
N. L. Sugg  
A. J. Csinos  
R. J. Lynch  
T. A. Lee  
C. E. Simpson

#### AMERICAN SOCIETY OF AGRONOMY LIAISON REPRESENTATIVE REPORT

The 79th annual meeting of the American Society of Agronomy, Crop Science Society of America, and the Soil Science Society of America was held November 29-December 4, 1987 in Atlanta, Georgia. About 2,070 papers were presented in approximately 200 divisional sessions. Nearly 45%, or 885 papers were given as posters. Four peanut breeding and genetic papers were included in a joint peanut, cotton, potato session chaired by W.D. Branch. Members of APRES were authors or co-authors on some 14 total presentations involving various aspects of peanut research.

New officers of the Tri-Societies (ASA, CSSA, and SSSA) are as follows: D. A. Holt, president, and E. C. A. Runge, President-elect of ASA; C. J. Nelson, president, and C. O. Qualset, President-elect of CSSA; and D. R. Keeney, president, and J. J. Mortvedt, President-elect of SSSA. Anaheim, California will host the 1988 meetings of these three sister societies from November 27 thru December 2.

Respectfully submitted:

William D. Branch

#### GOLDEN PEANUT AWARD ADVISORY COMMITTEE

The Committee evaluated three nominees for the Golden Peanut Research and Education Award. The evaluation was forwarded to the National Peanut Council (NPC) for final selection. The 1988 recipient, selected by the National Peanut Council, was Ronald J. Henning.

The NPC has changed the name of this award. Future awards will be known as the NPC Research and Education Award.

Respectfully submitted:

E. Jay Williams, Chairman  
A. H. Allison  
Gale A. Buchanan  
Richard Cole  
J. Stanley Drexler  
J. Frank McGill

#### REPORT OF REPRESENTATIVE FROM THE SOUTHERN AGRICULTURAL EXPERIMENT STATION DIRECTORS

The spring meeting of the Southern Agricultural Experiment Station Directors was held in Orlando, Florida, May 22-25, 1988. The Florida Agricultural Experiment Station served as host for the meeting.

The Experiment Station Directors have been very active in addressing the matter of loss of experimental quota for peanuts involved in research. Efforts included discussion, development of a resolution, and personal visits to Federal ASCS personnel and the Secretary of Agriculture. It appears that this matter will not be addressed until a new farm bill is written.

The Southern Agricultural Experiment Station Directors continue to have a special interest in APRES and its role in supporting research in peanuts and enhancing the peanut industry.

Respectfully submitted:

Gale A. Buchanan

BY-LAWS  
of  
AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC.

ARTICLE I. NAME

Section 1. The name of this organization shall be "AMERICAN PEANUT RESEARCH AND EDUCATION SOCIETY, INC."

ARTICLE II. PURPOSE

Section 1. The purpose of the Society shall be to instruct and educate the public on the properties, production, and use of the peanut through the organization and promotion of public discussion groups, forums, lectures, and other programs or presentation to the interested public and to promote scientific research on the properties, production, and use of the peanut by providing forums, treatises, magazines, and other forms of educational material for the publication of scientific information and research papers on the peanut and the dissemination of such information to the interested public.

ARTICLE III. MEMBERSHIP

Section 1. The several classes of membership which shall be recognized are as follows:

a. Individual memberships: Individuals who pay dues at the full rate as fixed by the Board of Directors.

b. Institutional memberships: Libraries of industrial and educational groups or institutions and others that pay dues as fixed by the Board of Directors to receive the publications of the Society. Institutional members are not granted individual member rights.

c. Organizational memberships: Industrial or educational groups that pay dues as fixed by the Board of Directors. Organizational members may designate one representative who shall have individual member rights.

d. Sustaining memberships: Industrial organizations and others that pay dues as fixed by the Board of Directors. Sustaining members are those who wish to support this Society financially to an extent beyond minimum requirements as set forth in Section 1c, Article III. Sustaining members may designate one representative who shall have individual member rights. Also, any organization may hold sustaining memberships for any or all of its division or sections with individual member rights accorded each sustaining membership.

e. Student memberships: Full-time students who pay dues at a special rate as fixed by the Board of Directors. Persons presently enrolled as full-time students at any recognized college, university, or technical school are eligible for student membership. Post-doctoral students, employed persons taking refresher courses or special employee training programs are not eligible for student memberships.

Section 2. Any member, participant, or representative duly serving on the Board of Directors or a Committee of this Society and who is unable to attend any meeting of the Board or such Committee may be temporarily replaced by an alternate selected by the agency or party served by such member, participant, or representative upon appropriate written notice filed with the president or Committee chairman evidencing such designation or selection.

Section 3. All classes of membership may attend all meetings and participate in discussions. Only individual members or those with individual membership rights may vote and hold office. Members of all classes shall receive notification and purposes of meetings, and shall receive minutes of all Proceedings of the American Peanut Research and Education Society.

#### ARTICLE IV. DUES AND FEES

Section 1. The annual dues shall be determined by the Board of Directors with the advice of the Finance Committee subject to approval by the members at the annual meeting. Minimum annual dues for the five classes of membership shall be:

- a. Individual memberships : \$ 25.00
- b. Institutional memberships : \$ 15.00
- c. Organizational memberships: \$ 35.00
- d. Sustaining memberships : \$125.00
- e. Student memberships : \$ 5.00

(Dues were set at 1987 Annual Meeting)

Section 2. Dues are receivable on or before July 1 of the year for which the membership is held. Members in arrears on July 31 for dues for the current year shall be dropped from the rolls of this Society provided prior notification of such delinquency was given. Membership shall be reinstated for the current year upon payment of dues.

Section 3. A registration fee approved by the Board of Directors will be assessed at all regular meetings of the Society. The registration fee for student members shall be one-third that of members.

#### ARTICLE V. MEETINGS

Section 1. Annual meetings of the Society shall be held for the presentation of papers and/or discussion, and for the transaction of business. At least one general business session will be held during regular annual meetings at which reports from the executive officer and all standing committees will be given, and at which attention will be given to such other matters as the Board of Directors may designate. Also, opportunity shall be provided for discussion of these and other matters that members may wish to have brought before the Board of Directors and/or general membership.

Section 2. Additional meetings may be called by the Board of Directors, either on its own motion or upon request of one-fourth of the members. In either event, the time and place shall be fixed by the Board of Directors.

Section 3. Any member may submit only one paper as senior author for consideration by the program chairman of each annual meeting of the Society. Except for certain papers specifically invited by the Society president or program chairman with the approval of the president, at least one author of any paper presented shall be a member of this Society.

Section 4. Special meetings or projects by a portion of the Society membership, either alone or jointly with other groups, must be approved by the Board of Directors. Any request for the Society to underwrite obligations in connection with a proposed special meeting or project shall be submitted to the Board of Directors, who may obligate the Society to the extent they deem desirable.

Section 5. The executive officer shall give all members written notice of all meetings not less than 60 days in advance of annual meetings and 30 days in advance of all other special project meetings.

#### ARTICLE VI. QUORUM

Section 1. Forty voting members shall constitute a quorum for the transaction of business at the business meeting held during the annual meeting.

Section 2. For meetings of the Board of Directors and all committees, a majority of the members duly assigned to such board or committee shall constitute a quorum for the transaction of business.

#### ARTICLE VII. OFFICERS

Section 1. The officers of this Society shall consist of the president, the president-elect, the immediate surviving past-president and the executive officer of the Society, who may be appointed secretary and treasurer and given such other title as may be determined by the Board of Directors.

Section 2. The president and president-elect shall serve from the close of the annual general meeting of this Society to the close of the next annual general meeting. The president-elect shall automatically succeed to the presidency at the close of the annual general meeting. If the president-elect should succeed to the presidency to complete an unexpired term, he shall then also serve as president for the following full term. In the event the president or president-elect, or both, should resign or become unable or unavailable to serve during their terms of office, the Board of Directors shall appoint a president, or both president-elect and president, to complete the unexpired terms until the next annual general meeting when one or both offices, if necessary, will be filled by normal elective procedure. The most recent available past president shall serve as president until the Board of Directors can make such appointment.

Section 3. The officers and directors, with the exception of the executive officer, shall be elected by the members in attendance at the annual general meeting from nominees selected by the Nominating Committee or members nominated for this office from the floor. The president, president-elect, and surviving past-president shall serve without monetary compensation. The executive officer shall be appointed by a two-thirds majority vote of the Board of Directors.

Section 4. The executive officer may serve consecutive yearly terms subject to appointment by the Board of Directors. The tenure of the executive officer may be discontinued by a two-thirds majority vote of the Board of Directors who then shall appoint a temporary executive officer to fill the unexpired term.

Section 5. The president shall arrange and preside at all general meetings of the Board of Directors and with the advice, counsel, and assistance of the president-elect, and executive officer, and subject to consultation with the Board of Directors, shall carry on, transact, and supervise the interim affairs of the Society and provide leadership in the promotion of the objectives of this Society.

Section 6. The president-elect shall be program chairman, responsible for development and coordination of the overall program of the education phase of the annual meetings.

Section 7. (a) The executive officer shall countersign all deeds, leases, and conveyances executed by the Society and affix the seal of the Society thereto and to such other papers as shall be required or directed to be sealed. (b) The executive officer shall keep a record of the deliberations of the Board of Directors, and keep safely and systematically all books, papers, records, and documents belonging to the Society, or in any wise pertaining to the business thereof. (c) The executive officer shall keep account of all monies, credits, debts, and property of any and every nature accrued and/or disbursed by this Society, and shall render such accounts, statements, and inventories of monies, debts, and property, as shall be required by the Board of Directors. (d) The executive officer shall prepare and distribute all notices and reports as directed in these By-Laws, and other information deemed necessary by the Board of Directors, to keep the membership well informed of the Society activities.

#### ARTICLE VIII. BOARD OF DIRECTORS

Section 1. The Board of Directors shall consist of the following:

- a. The president
- b. The most immediate past president able to serve
- c. The president-elect
- d. State employees' representative - this director is one whose employment is state sponsored and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits.
- e. United States Department of Agriculture representative - this director is one whose employment is directly sponsored by the USDA or one of its agencies, and whose relation to peanuts principally concerns research, and/or education, and/or regulatory pursuits.
- f. Three Private Peanut Industry representatives - these directors are those whose employment is privately sponsored and whose principal activity with peanuts concerns: (1) the production of farmers' stock peanuts; (2) the shelling,

marketing, and storage of raw peanuts; (3) the production or preparation of consumer food-stuffs or manufactured products containing whole or parts of peanuts.

g. The President of the National Peanut Council

h. The Executive Officer - non-voting member of the Board of Directors who may be compensated for his services on a part-time or full-time salary stipulated by the Board of Directors in consultation with the Finance Committee.

Section 2. Terms of office for the directors' positions set forth in Section 1, paragraphs d, e, and f, shall be three years with elections to alternate from reference years as follows: e, 1972; d and f (1), 1973; and f(2) and f(3), 1974.

Section 3. The Board of Directors shall determine the time and place of regular and special meetings and may authorize of direct the president to call special meetings whenever the functions, programs, and operations of the Society shall require special attention. All members of the Board of Directors shall be given at least 10 days advance notice of all meetings; except that in emergency cases, three days advance notice shall be sufficient.

Section 4. The Board of Directors will act as the legal representative of the Society when necessary and, as such, shall administer society property and affairs. The Board of Directors shall be the final authority on these affairs in conformity with the By-Laws.

Section 5. The Board of Directors shall make and submit to this Society such recommendations, suggestions, functions, operations, and programs as may appear necessary, advisable, or worthwhile.

Section 6. Contingencies not provided for elsewhere in these By-Laws shall be handled by the Board of Directors in a manner they deem desirable.

Section 7. An Executive Committee comprised of the president, president-elect, immediate surviving past president, and executive officer shall act for the Board of Directors between meetings of the Board, and on matters delegated to it by the Board. Its action shall be subject to ratification by the Board.

#### ARTICLE IX. COMMITTEES

Section 1. Members of the committees of the Society shall be appointed by the president and shall serve three-year terms unless otherwise stipulated. The president shall appoint a chairman of each committee from among the incumbent committeemen. The Board of Directors may, by a two-thirds vote, reject committee appoints. Appointments made to fill unexpected vacancies by incapacity of any committee member shall be only for the unexpired term of the incapacitated committeeman. Unless otherwise specified in these By-Laws, any committee member may be re-appointed to succeed himself, and may serve on two or more committees concurrently but shall not hold concurrent chairmanships. Initially, one-third of the members of each committee will serve one-year terms, and one-third of the members of each committee shall serve two-year terms, as designated by the president. The president shall announce the committees immediately upon assuming the office at the annual business meeting. The new appointments take effect immediately upon announcement.

Section 2. Any or all members of any committee may be removed for cause by a two-thirds approval by the Board of Directors.

a. Finance Committee: This committee shall include at least four members, one each representing State and USDA and two from Private Business segments of the peanut industry. This committee shall be responsible for preparation of the financial budget of the Society and for promoting sound fiscal policies within the Society. They shall direct the audit of all financial records of the Society annually, and make such recommendation as they deem necessary or as requested or directed by the Board of Directors. The term of the Chairman shall close with preparation of the budget for the following year, or with the close of the annual meeting at which a report is given in the work of the Finance Committee under his chairmanship, whichever is later.

b. Nominating Committee: This committee shall consist of at least three members appointed to one-year terms, one each representing State, USDA, and Private Business segments of the peanut industry. This committee shall nominate individual members to fill the positions as described and in the manner set forth in Articles VII and VIII of these By-Laws and shall convey their nominations to the president of this Society on or before the date of the annual meeting. The committee shall, insofar as possible, make nominations for the president-elect that will provide a balance among the various segments of the industry and a rotation among federal, state, and industry members. The willingness of any nominee to accept the responsibility of the position shall be ascertained by the committee (or members making nominations at general meetings) prior to the election. No person may succeed himself as a member of this committee.

c. Publication and Editorial Committee: This committee shall consist of at least three members for three-year terms, one each representing State, USDA, and Private Business segments of the peanut industry. The members will normally serve two consecutive three-year terms, subject to approval by the Board. Initial election shall alternate from reference years as follows: private business, 1983; USDA, 1984 and State, 1985. This committee shall be responsible for the publication of Society-sponsored publications as authorized by the Board of Directors in consultation with the Finance Committee. This committee shall formulate and enforce the editorial policies for all publications of the Society subject to the directives from the Board of Directors.

d. Peanut Quality Committee: This committee shall include at least seven members, one each actively involved in research in peanuts - (1) varietal development, (2) production and marketing practices related to quality, and (3) physical and chemical properties related to quality - and one each representing the Grower, Sheller, Manufacturer, and Services (pesticides and harvesting machinery in particular) segments of the peanut industry. This committee shall actively seek improvement in the quality of raw and processed peanuts and peanut products thorough promotion of mechanisms for the elucidation and solution of major problems and deficiencies.

e. Public Relations Committee: This committee shall include at least seven members, one each representing the State, USDA, Grower, Sheller, Manufacturer, and Services segments of the peanut industry, and a member from the university of the host state who will serve a one-year term to coincide with the term of the president-elect. The primary purpose of this person will be to publicize the meeting and make photographic records of important events at the meeting. This committee shall provide leadership and direction for the Society in the following areas:

(1) Membership: Development and implementation of mechanisms to create interest in the Society and increase its membership. These shall include, but not be limited to, preparing news releases for the home-town media of person recognized at the meeting for significant achievements.

(2) Cooperation: Advise the Board of Directors relative to the extent and type of cooperation and/or affiliation this Society should pursue and/or support with other organizations.

(3) Necrology: Proper recognition of deceased members.

(4) Resolutions: Proper recognition of special services provided by members and friends of the Society.

f. Bailey Award Committee: This committee shall consist of at least six members, with two new appointments each year, serving three-year terms. This committee shall be responsible for judging papers which are selected from each subject matter area. Initial screening for the award will be made by judges, selected in advance and having expertise in that particular area, who will listen to all papers in that subject matter area. This initial selection will be made on the basis of quality of presentation and content. Manuscripts of selected papers will be submitted to the committee by the author(s) and final selection will be made by the committee, based on the technical quality of the paper. The president, president-elect and executive officer shall be notified of the Award recipient at least sixty days prior to the annual meeting following the one at which the paper was presented. The president shall make the award at the annual meeting.

g. Fellows Committee: This committee shall consist of six members, two representing each of the three major geographic areas of peanut production and with balance among state, USDA and private business. Terms of office shall be for three years with initial terms as outlined in Section 1 of this Article. The committee shall select from nominations received, according to procedures adopted by the Society (P148-9 of 1981 Proceedings of APRES), qualified nominees for approval by the Board of Directors.

h. Golden Peanut Research and Education Award Committee: This committee shall consist of six previous Golden Peanut Award recipients, representing each of the three areas of peanut production. Terms of office shall be for three years as outlined in Section 1 of this Article. This committee shall serve as an advisory committee by screening nominations received by the National Peanut Council. The final selection shall be made by the National Peanut Council. For even-numbered year, the award shall be made for research accomplishments and for odd-numbered years, the award will be made for educational accomplishments.

i. Site Selection Committee: This committee shall consist of eight members, each serving four-year terms. New appointments shall come from the state which will host the meeting four years following the meeting at which they are appointed. The chairman of the committee shall be from the state which will host the meeting the next year and the vice-chairman shall be from the state which will host the meeting the second year. The vice-chairman will automatically move up to chairman.

#### ARTICLE X. DIVISIONS

Section 1. A Division within the Society may be created upon recommendation of the Board of Directors, or members may petition the Board of Directors for such status, by two-thirds vote of the general membership. Likewise, in a similar manner, a Division may be dissolved.

Section 2. Divisions may establish or dissolve Subdivision upon the approval of the Board of Directors.

Section 3. Division may make By-Laws for their own government, provided they are consistent with the rules and regulations of the Society, but no dues may be assessed. Divisions and Subdivisions may elect officers (chairman, vice-chairman to succeed to the chairmanship, and a secretary) and appoint committees, provided the efforts thereof do not overlap or conflict with those of the officers and committees of the main body of the Society.

#### ARTICLE XI. AMENDMENTS

Section 1. These By-Laws may be amended consistent with the provision of the Articles of Incorporation by a two-thirds vote of all the eligible voting members present at any regular business meeting, provided such amendments shall be submitted in writing to each member of the Board of Directors at least thirty days before the meeting at which the action is to be taken.

Section 2. A By-Law or amendment to a By-Law shall take effect immediately upon its adoption, except that the Board of Directors may establish a transition schedule when it considers that the change may best be effected over a period of time. The amendment and transition schedule, if any, shall be published in the "Proceedings of APRES".

Amended at the Annual Business  
Meeting of the American Peanut  
Research and Education Society,  
July 17, 1987, Orlando, FL

MEMBERSHIP SUMMARY

|               |           |
|---------------|-----------|
| Individual    | 455       |
| Student       | 35        |
| Organization  | 59        |
| Sustaining    | 27        |
| Institutional | <u>93</u> |
| TOTAL         | 669       |

# INDIVIDUAL MEMBERS

DR. REMEDIOS ABILAY  
INSTITUTE OF PLANT BREEDING  
AGRIC. DEPT.-UNIV. PHILIPPINES  
COLLEGE LAGUNA  
PHILIPPINES

FLOYD J ADAMSEN  
USDA-ARS  
P. O. BOX 7099  
SUFFOLK VA 23437  
USA

A H ALLISON  
TRACEC  
P. O. BOX 7219  
SUFFOLK VA 23437  
USA  
8046576378

JOHN C ANDERSON  
ALABAMA A&M UNIVERSITY  
P.O. BOX 264  
NORMAL AL 35762  
USA  
2058597454

D ANNEROSE  
CIRAD/ISRA/CNRA  
BP 59  
BAMBEY  
SENEGAL

FRANK ARTHUR  
USDA-ARS  
P.O. BOX 22909  
SAVANNAH GA 31403  
USA

AMRAM ASHRI  
FACULTY OF AGRICULTURE  
P.O. BOX 12  
REHOVOT 76100  
ISRAEL

JAMES L AYRES  
GOLD KIST INCORPORATED  
2230 INDUSTRIAL BLVD.  
LITHONIA GA 30058  
USA

H F BABB, JR.  
217 HANGING TREE RD.  
COURTLAND VA 23837  
USA

JULIE G ADAMS  
NATIONAL PEANUT COUNCIL  
101 S. PEYTON STREET  
ALEXANDRIA VA 22315  
USA  
7038389500

ESAM M AHMED  
UNIVERSITY OF FLORIDA  
DEPT FOOD SCI & HUM NUT  
GAINESVILLE FL 32611  
USA  
9043921991

GEORGE D ALSTON  
P. O. BOX 1177  
STEPHENVILLE TX 76401  
USA  
8177682764

N. MURTHI ANISHETTY  
IBPGR - FAO  
VIA DL TERME DI CARACALLA  
ROME 00100  
ITALY

OKON ANSA  
DEPT CROP PROTECTION, IAR  
AHMADU BELLO UNIVERSITY  
PMB 1044, SAMARU-ZARIA  
NIGERIA

V. ARUNACHALAM  
NATIONAL FELLOW-DIV OF GENETICS  
INDIAN AGRIC RESEARCH INSTITUTE  
NEW DELHI 110 012  
INDIA

ALAN R AYERS  
RHONE-POULENC AG CO  
T.W. ALEXANDER DR  
RESEARCH TRIANGLE PK NC 27709  
USA  
9195492748

AMADOU BA  
LABORATOIRE MYCOTOXINES  
ISRA SECTEUR CENTRE SUD  
BP 199 KAOLACK - SENEGAL  
WEST AFRICA

PAUL BACKMAN  
AUBURN UNIVERSITY  
DEPT PLANT PATHOLOGY  
AUBURN AL 36849  
USA  
2058264830

JACK BAILEY  
NCSU-PLANT PATH DEPT  
P. O. BOX 7616  
RALEIGH NC 27695-7616  
USA  
9197372711

JOHN A BALDWIN  
P.O. BOX 1209  
TIFTON GA 31793  
USA

DAVID D BALTENSPERGER  
UNIVERSITY OF FLORIDA  
304 NEWELL HALL-DEPT AGRON  
GAINESVILLE FL 32611  
USA

ZVI BAR  
HEVEL MA'ON  
D.N. NEGEV  
85465  
ISRAEL

A. GREGG BAYARD  
PLANTERS LIFESAVERS-QUALITY ASSUR  
1100 REYNOLDS BLVD.  
WINSTON-SALEM NC 27102  
USA

DANISE T BEADLE  
NOR-AM CHEMICAL  
P.O. BOX 7  
CANTONMENT FL 32533  
USA  
9045872122

BRIAN BECK  
P.O. BOX 727  
WHITE RIVER 1240  
REP. OF SOUTH AFRICA

FRED BELFIELD, JR  
ROOM 102 AG CENTER  
AG CENTER DRIVE  
NASHVILLE NC 27856  
USA  
9194594141

VICHITR BENJASIL  
FIELD CROP RESEARCH INSTITUTE  
DEPT OF AGRICULTURE  
BANGKOK 10900  
THAILAND

DARRELL BAKER  
NM AGRICULTURAL SCIENCE CENTER  
STAR ROUTE, BOX 77  
CLOVIS NM 88101  
USA  
5059852292

CHARLES H BALDWIN, JR.  
RHONE-POULENC AG CO  
2 T.W. ALEXANDER DR  
RESEARCH TRIANGLE PK NC 27709  
USA  
9195492257

DONALD J BANKS  
USDA-ARS, PLANT SCIENCE RES LAB  
P. O. BOX 1029  
STILLWATER OK 74076  
USA  
4056244124

GARLAND G BARR  
RHONE-POULENC, INC.  
DSR 15C  
DANEVANG TX 77432  
USA  
4095431414

ALLEN E BAYLES  
BOX 2007  
AIKEN SC 29801  
USA  
8036496297

JOHN P BEASLEY, JR.  
RURAL DEVELOPMENT CENTER  
P.O. BOX 1209  
TIFTON GA 31793  
USA

PAUL W BECKER  
TEXASGULF, INC.  
104 AKIRY COURT  
CARY NC 27511  
USA  
9194672194

D K BELL  
COASTAL PLAIN EXPERI STATION  
PLANT PATHOLOGY  
TIFTON GA 31793-0748  
USA  
9123863370

JERRY M BENNETT  
UNIVERSITY OF FLORIDA  
BLDG 164-DEPT AGRONOMY  
GAINESVILLE FL 32611  
USA  
9043926180

RICHARD BERBERET  
OKLAHOMA STATE UNIVERSITY  
ENTOMOLOGY DEPT  
STILLWATER OK 74078  
USA  
4057445527

A S BHAGSARI  
314 WAKE FOREST DRIVE  
WARNER ROBINS GA 31093  
USA

MARK C BLACK  
TEXAS A&M UNIVERSITY AREC  
P.O. BOX 1849  
UVALDE TX 78802-1849  
USA

PAX BLAMEY  
DEPARTMENT OF AGRICULTURE  
ST. LUCIA QUEENSLAND 4067  
AUSTRALIA  
073773829

KENNETH J BOOTE  
UNIVERSITY OF FLORIDA  
304 NEWELL HALL-AGRON DEPT  
GAINESVILLE FL 32611  
USA  
9043921811

J P BOSTICK  
P. O. BOX 357  
HEADLAND AL 36345  
USA  
2058217400

JOHN V BOYNE  
RHONE-POULENC  
P.O. BOX 12014  
RESEARCH TRIANGLE PK NC 27709  
USA

RICK L BRANDENBURG  
NCSU-ENTOMOLOGY DEPT  
BOX 7613  
RALEIGH NC 27695-7613  
USA

CHARLES L BRASHER  
261 SHANKLE DR.  
MARIANNA FL 32446  
USA  
9044827170

MARVIN K BEUTE  
NCSU-PLANT PATH DEPT  
BOX 7616  
RALEIGH NC 27695-7616  
USA  
9197372737

W M BIRDSONG, JR  
BIRDSONG PEANUTS  
P. O. BOX 776  
FRANKLIN VA 23851  
USA  
8045623177

HARRIS BLACKWOOD, EDITOR  
SOUTHEASTERN PEANUT FARMER  
P. O. BOX 706  
TIFTON GA 31793  
USA

PAUL D BLANKENSHIP  
NATIONAL PEANUT RESEARCH LAB  
1011 FORRESTER DR., S.E.  
DAWSON GA 31742  
USA  
9129954481

WILLIAM H BORDT  
CPC INTERNATIONAL INC.  
P.O. BOX 1534  
UNION NJ 07083  
USA  
2016839000

BRUCE BOWMAN  
TOM'S FOODS-DIR OF TECHNOLOGY  
P. O. BOX 60  
COLUMBUS GA 31902  
USA  
4043232721

WILLIAM D BRANCH  
AGRONOMY DEPT  
COASTAL PLAIN EXP STN  
TIFTON GA 31793  
USA  
9123863561

JOHN M BRANDT  
PLANTERS LIFESAVERS  
200 JOHNSON AVENUE  
SUFFOLK VA 23434  
USA  
8045392343

L B BRAXTON  
3328 WHIRLAWAY TRAIL  
TALLA FL 32308  
USA

MARK BRAXTON  
P.O. BOX 10  
GREENWOOD FL 32443  
USA

TIMOTHY BRENNEMAN  
COASTAL PLAIN EXP STATION  
DEPT PLANT PATHOLOGY  
TIFTON GA 31794  
USA

GALE A BUCHANAN, RES. DIR.  
GA AGRIC EXPERIMENT STATION  
COASTAL PLAIN EXP STATION  
TIFTON GA 31793  
USA

J. NEAL BUTLER  
FERMENTA PLANT PROTECTION  
1517 JOHNSON FERRY RD, SUITE 275  
MARIETTA GA 30062  
USA

CHRIS BUTTS  
UNIVERSITY OF FLORIDA  
AGRIC ENGINEERING  
GAINESVILLE FL 32611  
USA  
9043921864

ELISEO P CADAPAN  
UNIVERSITY OF THE PHILIPPINES  
AT LOS BANOS COLLEGE  
LAGUNA, 3720  
PHILIPPINES

KEVIN CALHOUN  
FARMERS FERTILIZER & MILLING CO  
P.O. BOX 265  
COLQUITT GA 31737  
USA  
9127583520

IAN S CAMPBELL  
UNIV OF HAWAII @ MANOA, AGRSS  
1910 EAST-WEST RD  
HONOLULU HI 96822  
USA  
8089487530

CHARLES S CANNON  
ROUTE 2 BOX 171  
ABBEVILLE GA 31001  
USA  
9124672042

BARRY J BRECKE  
UNIV OF FL, AGRIC RES CTR  
RT #3, BOX 575  
JAY FL 32565  
USA  
9049945215

P C BRYANT  
COUNTY AGENT, MARTIN COUNTY  
BOX 1148  
WILLIAMSTON NC 27892  
USA  
9197921621

ROGER C BUNCH  
P. O. BOX 248  
TYNER NC 27980  
USA

JAMES L BUTLER  
CROP SYSTEMS RESEARCH UNIT  
COASTAL PLAIN EXP STN  
TIFTON GA 31793  
USA  
9123863585

EVERETT W BYRD  
ROUTE 2, BOX 295  
CLARKTON NC 28433  
USA  
9196454354

JOHN S CALAHAN, JR  
DEPT BIOLOGICAL SCIENCES  
TARLETON STATE UNIV  
STEPHENVILLE TX 76402  
USA  
8179684158

E T CALLAWAY  
2310H LONGMIRE DR  
COLLEGE STATION TX 77840  
USA

W V CAMPBELL  
NCSU-DEPT ENTOMOLOGY  
BOX 7613  
RALEIGH NC 27695-7613  
USA  
9197372833

ROBERT F CAPPELLUTI  
NABISCO BRANDS  
P.O. BOX 303  
PARSIPPANY NJ 07054  
USA  
2018987100

JOHN CARDINA  
USDA-ARS, COASTAL PLAIN EXP STN  
BOX 748  
TIFTON GA 31793  
USA

THOMAS R CARTER  
COOP LEAGUE OF THE USA  
1401 N.Y. AVE,NW, SUITE 1100  
WASHINGTON DC 20005  
USA

JAY W CHAPIN  
EDISTO EXPT STN (CLEMSON U)  
P. O. BOX 247  
BLACKVILLE SC 29817  
USA  
8032843345

SHUI-HO CHENG  
EXECUTIVE YUAN  
37 NANHAI RD  
TAIPEI TAIWAN 10728  
REPUBLIC OF CHINA

J M CHESHIRE, JR  
GEORGIA EXPERIMENT STATION  
UNIVERSITY OF GEORGIA  
EXPERIMENT GA 30212  
USA

Z. ALBERT CHITEKA  
CROP BREEDING INSTITUTE  
BOX 8100, CAUSEWAY-DEPT AGRON  
HARARE  
ZIMBABWE 704531

BOBBY CLARY  
OKLAHOMA STATE UNIVERSITY  
AG ENGINEERING DEPT  
STILLWATER OK 74078  
USA  
4057445426

A. EDWIN COLBURN  
TEXAS AGR EXTENSION SERV  
348 SOIL & CROP SCIENCES  
COLLEGE STATION TX 77843-2474  
USA

RICHARD COLE  
NATIONAL PEANUT RESEARCH LAB  
1011 FORRESTER DRIVE S.E.  
DAWSON GA 31742  
USA  
9129954441

DALE H CARLEY  
GEORGIA EXPERIMENT STATION  
DEPT OF AG ECONOMICS  
EXPERIMENT GA 30212  
USA  
4042287231

SAM R CECIL  
1119 MAPLE DRIVE  
GRIFFIN GA 30223  
USA  
4042288835

DR SHUI-HO CHENG  
COUNCIL OF AGRIC, EXEC. YUAN  
37 NAN-HAI ROAD  
TAIPEI, TAIWAN, 107  
REPUBLIC OF CHINA

JOHN P CHERRY  
ERRC,ARS-USDA  
600 E MERMAID LANE  
PHILADELPHIA PA 19118  
USA

ROBIN Y.-Y. CHIOU  
NATIONAL CHIAIYI INST OF AGRIC.  
DEPT. FOOD PROCESSING  
CHIAIYI TAIWAN  
REPUBLIC OF CHINA

C A CLARK  
HELENA CHEMICAL CO.  
5100 POPLAR AVE., SUITE 3200  
MEMPHIS TN 38137  
USA

TERRY A COFFELT  
USDA-ARS  
P. O. BOX 7099  
SUFFOLK VA 23437  
USA  
8046576744

DESIREE L COLE  
UNIV OF ZIMBABWE, DEPT CROP SCI  
BOX MP 167  
MOUNT PLEASANT, HARARE  
ZIMBABWE

JAMES R COLLINS  
RHONE-POULENC, INC  
P. O. BOX 1515  
STATESBORO GA 30458  
USA  
9127643894

RAYMOND D COLTRAIN  
UPPER COASTAL PLAIN RES STN  
ROUTE 2 BOX 400  
ROCKY MOUNT NC 27801  
USA

ALLEN A CONGER, PRES  
SOUTHERN ROASTED NUTS  
P. O. BOX 508  
FITZGERALD GA 31750  
USA  
9124235616

BRIAN COOPER  
CARDI  
P.O. BOX 766  
ST. JOHN'S ANTIGUA  
WEST INDIES  
8094620661

MARK A CRAWFORD  
AUBURN UNIVERSITY  
DEPT BOT, PLT PATH, MICRO  
AUBURN AL 36849  
USA

HIROYUKI DAIMON  
CHIBA PREF AGRIC EXP STATION  
808 DAIZENNO  
CHIBA 280-02  
JAPAN

JAMES I DAVIDSON, JR  
NATIONAL PEANUT RESEARCH LAB  
1011 FORRESTER DRIVE, SE  
DAWSON GA 31742  
USA  
9129954481

ROBERT DAVIS  
USDA-ARS STORED PROD IR&D LAB  
P.O. BOX 22909  
SAVANNAH GA 31403  
USA

J W DEMSKI  
GEORGIA EXPERIMENT STATION  
DEPT PLANT PATHOLOGY  
GRIFFIN GA 30223  
USA

J W DICKENS  
NCSU-USDA/ARS  
BOX 7625  
RALEIGH NC 27695-7625  
USA  
9197373101

DANIEL L COLVIN  
UNIVERSITY OF FLORIDA  
303 NEWELL HALL  
GAINESVILLE FL 32611  
USA  
9043921818

EDITH J CONKERTON  
SOUTHERN REGIONAL RESEARCH CTR  
P. O. BOX 19687  
NEW ORLEANS LA 70179  
USA  
5045897075

FRED R COX  
NCSU - SOIL SCIENCE DEPT  
BOX 7619  
RALEIGH NC 27695-7619  
USA  
9197372388

ALEX CSINOS  
DEPT OF PLANT PATHOLOGY  
COASTAL PLAIN EXP STN  
TIFFTON GA 31793  
USA  
9123863370

KENTON DASHIELL  
1616 CEDAR STREET  
ELKHART IN 46514  
USA

JAMES C DAVIS  
418 KIMBALL DRIVE  
MARION SC 29571  
USA  
8034233228

IGNACIO JOSE DE GODOY  
RUA LOTARIO NOVAES, 336  
TAQUARAL - CEP 13.075  
CAMPINAS S.P.  
BRASIL

TED DENBOW  
U.S. GYPSUM  
417 BROOKGLEN  
RICHARDSON TX 75080  
USA  
2146904161

DAVID DICKERSON  
ANHEUSER-BUSCH COMPANIES, INC.  
1101 WYOMING ST  
ST. LOUIS MO 63118  
USA

DONALD W DICKSON  
UNIV OF FLA-IFAS  
NEMATOTOLOGY LAB-BLDG 78  
GAINESVILLE FL 32611  
USA  
9043921990

FRANK G DOLLEAR  
ROUTE 3 BOX 460  
PEARL RIVER LA 70452  
USA  
5048637490

DAVID E DOUGHERTY  
BASF CORPORATION  
P.O. BOX 13528  
RESEARCH TRIANGLE PARK NC 27709-3528  
USA

ANTHONY DREW  
CO. EXTENSION AGENT  
P.O. BOX 219  
BRONSON FL 32621  
USA

S L DWIVEDI  
ICRISAT/AGINSPO-IIIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

RAY EDAMURA  
1047 YONGE STREET  
TORONTO, ONTARIO, M4W 2L2  
CANADA  
4169225100

DARYL EISENMENGER  
CPC INTERNATIONAL, INC.  
8500 FRAZIER PIKE, BOX 309  
LITTLE ROCK AR 72203  
USA  
5014901441

MUAWYA HASSAN EL SAWI  
SUDAN OILS SEED  
P.O. BOX 167, PARLIAMENT ST  
KHARTOUM  
SUDAN

VERN J ELLIOTT  
USDA-ARS  
P.O. BOX 1555  
OXFORD NC 27565  
USA  
9196935151

URBAN L DIENER  
750 SHERWOOD DRIVE  
AUBURN AL 36830  
USA

JOE W DORNER  
USDA,ARS, NAT PEANUT RES LAB  
1011 FORRESTER DR. SE  
DAWSON GA 31742  
USA  
9129954441

CLYDE C DOWLER  
USDA-ARS  
COASTAL PLAIN EXP STN  
TIFFTON GA 31793  
USA  
9123863351

C E DRYE  
EDISTO EXPT STN (CLEMSON U)  
BOX 247  
BLACKVILLE SC 29817  
USA

MICHAEL H EAGER  
FERMENTA PLANT PROTECTION  
5966 HEISLEY RD, PO BOX 8000  
MENTOR OH 44061-8000  
USA

GARY EILRICH  
SDS BIOTECH CORP  
P.O. BOX 348  
PAINESVILLE OH 44077  
USA

ABDEL MONEIM B EL AHMADI  
GEZIRA RESEARCH STATION  
P. O. BOX 126  
WAD MEDANI  
SUDAN

GERALD H ELKAN  
N.C. STATE UNIVERSITY  
P.O. BOX 5615  
RALEIGH NC 27695-5615  
USA  
9197372392

DONALD A EMERY  
NCSU-CROP SCIENCE DEPT  
BOX 7620  
RALEIGH NC 27695-7620  
USA  
9197373666

JOHN W EVEREST  
AUBURN UNIVERSITY  
106 EXTENSION HALL  
AUBURN UNIVERSITY AL 36849  
USA  
2058214477

D G FARIS  
ICRISAT/AGINSPO-IIIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

MICHELE M FLETCHER  
NABISCO BRANDS  
P.O. BOX 1942  
EAST HANOVER NJ 07936-1942  
USA

Z R FRANK  
INSTITUTE OF PLANT PROTECTION  
P. O. BOX 6  
BET-DAGAN  
ISRAEL

JOHN R FRENCH  
FERMENTA PLANT PROTECTION  
P.O. BOX 348  
PAINESVILLE OH 44077  
USA  
2163573436

WOODROE FUGATE & SONS, INC.  
P. O. BOX 114  
WILLISTON FL 32696  
USA  
9045285871

T. POWELL GAINES  
COASTAL PLAIN EXP STN, AGRON DEPT  
P. O. BOX 748  
TIFTON GA 31793-0748  
USA  
9123863327

KENNETH H GARREN  
408 KINGSale ROAD  
SUFFOLK VA 23437  
USA  
8046576549

EDGARDO H GIANDANA (ING AGR)  
ESTACION EXPER AGROPECUARIA  
INTA - SECCION MANI  
(5988) MANFREDI CORDOBA  
ARGENTINA, S.A.

HELEN H FAGBENLE  
OKLAHOMA STATE UNIVERSITY  
104 LIFE SCIENCES  
STILLWATER OK 74078  
USA  
4057445643

ALEXANDER B FILONOW  
OKLAHOMA STATE UNIVERSITY  
PLANT PATHOLOGY  
STILLWATER OK 74078  
USA  
4057449947

SIDNEY W FOX  
RT. 4, P.O. BOX 50  
DONALSONVILLE GA 31745  
USA  
9125242724

JOHN C FRENCH  
AUBURN UNIVERSITY  
HEAD, EXTN PEST MGT  
AUBURN UNIVERSITY AL 36849  
USA  
2058264940

DUANE A FUGATE  
P. O. BOX 114  
WILLISTON FL 32696  
USA

JOE E FUNDERBURK  
NFREC, IFAS - UNIV OF FLORIDA  
ROUTE 3 BOX 4370  
QUINCY FL 32351  
USA

FRANKLIN P GARDNER  
306 NW 28TH TERR.  
GAINESVILLE FL 32607  
USA  
9043926187

JOHN GAVIN  
SMITHS CRISPS  
ATHERTON ROAD  
LIVERPOOL L9 7AQ  
ENGLAND  
0515238700

R W GIBBONS  
ICRISAT/AGINSPO-IIIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

PIERRE F GILLIER  
15-17 ALLEE DU CLOS DE TOURVOIE  
94260 FRESNES  
FRANCE

CHARLES GIROUX  
ICRISAT  
CENTRE SAHELIEN-LIBRARY  
B.P. 12404 NIAMEY  
NIGER (VIA PARIS)

ARTHUR F GOHLKE  
TENNESSEE CHEMICAL CO  
3400 PEACHTREE RD NE, SUITE 401  
ATLANTA GA 30326  
USA  
8002411912

DANIEL W GORBET  
AGRICULTURE RESEARCH CENTER  
ROUTE 3, BOX 376  
MARIANNA FL 32446  
USA  
9045943241

JOHN M GREEN  
101 SYCAMORE ST  
LELAND MS 38756  
USA  
6016869784

JAMES GRICHAR  
PLANT DISEASE RES STN  
P. O. BOX 755  
YOAKUM TX 77995  
USA

TERRY GRINSTED  
M&M/MARS-ALBANY  
P. O. BOX 3289  
ALBANY GA 31708  
USA

RICHARD L GUTHRIE  
COLLEGE OF AGRICULTURE  
109 COMER HALL  
AUBURN UNIVERSITY AL 36849  
USA  
2058264100

AUSTIN HAGAN  
AUBURN UNIVERSITY  
107 EXTENSION HALL  
AUBURN AL 36849  
USA  
2058264940

M. ELIZABETH GILREATH  
N FLORIDA RES AND EDUC CTR  
ROUTE 3, BOX 4370  
QUINCY FL 32351  
USA  
9046279236

MIKE GODFREY  
M & M MARS  
P.O. BOX 3289  
ALBANY GA 31708  
USA  
9128834000

DEWITT T GOODEN  
EDISTO RES & ED CTR(CLEMSON U)  
BOX 247  
BLACKVILLE SC 29817  
USA  
8032843343

WILLIAM H GRADIS  
ICI AMERICAS, INC  
498 N. MARIPOSA  
VISALIA CA 93277  
USA

HOWARD GREER  
OKLAHOMA STATE UNIVERSITY  
272 AG HALL  
STILLWATER OK 74078  
USA  
4057446420

BILLY J GRIFFIN  
BERTIE CNTY EXTENSION SERVICE  
P. O. BOX 280  
WINDSOR NC 27983  
USA  
9197943194

H. DOUGLASS GROSS  
NCSU-CROP SCIENCE DEPT  
BOX 7620  
RALEIGH NC 27695-7620  
USA  
9197372704

DON GUY  
GRIFFIN AG PRODUCTS  
P.O. BOX 1847  
VALDOSTA GA 31603-1847  
USA  
9122428635

HENRY B HAGWOOD  
PPG INDUSTRIES, INC  
ROUTE 4 BOX 86  
OXFORD NC 27565  
USA  
9196934455

BILL HAIRSTON  
GUSTAFSON INC  
BOX 660065  
DALLAS TX 75266-0065  
USA

J E HAMM  
P. O. BOX 403  
SYLVESTER GA 31791  
USA  
9127762032

JOHN M HAMMOND  
CIBA-GEIGY  
P. O. BOX 2369  
AUBURN AL 36830  
USA  
2058877362

LUTHER C HAMMOND  
UNIVERSITY OF FLORIDA  
2169 MCCARTY HALL  
GAINESVILLE FL 32611  
USA  
9043921951

R O HAMMONS  
ARACHIS INTERNATIONAL  
1203 LAKE DRIVE  
TIFTON GA 31794  
USA  
9123823157

H. GARY HANCOCK  
ROUTE 2, BOX 1835  
HAMILTON GA 31811-9846  
USA

JOHN HANEY  
WESTRECO INC  
555 S. FOURTH STREET  
FULTON NY 13069  
USA

RICHARD K HANRAHAN  
RHONE-POULENC, INC  
P. O. BOX 125  
MONMOUTH JCT NJ 08852  
USA  
2012970100

SYED Q HAQUE  
CARDI, UNIVERSITY CAMPUS  
ST. AUGUSTINE TRINIDAD  
WEST INDIES  
6451208

JOHN S HARDEN  
BASF  
9402 SPRINGDALE DRIVE  
RALEIGH NC 27612  
USA

MOHAMMED HAROON  
P.O. BOX 1183, STATION H  
MONTREAL QUEBEC H3G 2N2  
CANADA

SHERWOOD L HARRELL  
1996 KINGS HWY  
SUFFOLK VA 23435  
USA  
8046576378

ZACKIE HARRELL  
P.O. BOX 46  
GATESVILLE NC 27938  
USA  
9193571400

HENRY C HARRIS  
3020 SW FIRST AVENUE  
GAINESVILLE FL 32607  
USA  
9043731651

GERALD W HARRISON  
FERMENTA PLANT PROTECTION  
P.O. BOX 70665  
ALBANY GA 31707  
USA

DALLAS L HARTZOG  
AUBURN U - DEPT AGRON & SOILS  
P. O. BOX 217  
HEADLAND AL 36345  
USA  
2056932010

J. ERNEST HARVEY  
AGRATECH SEEDS INC.  
P.O. BOX 644  
ASHBURN GA 31714  
USA  
9125673297

R C HEARFIELD  
KP FOODS  
WINDY RIDGE, ASHBY-DE-LA-ZOUCH  
LEICESTERSHIRE,  
ENGLAND LE6 5UQ

J HEINIS  
NCSU  
BOX 7624  
RALEIGH NC 27695-7624  
USA  
9197332965

STEPHEN C HERLOCKER  
PEANUT BELT RESEARCH STATION  
P.O. BOX 220  
LEWISTON NC 27849  
USA  
9193482213

TIMOTHY D HEWITT  
AG RESEARCH & EDUC CENTER  
ROUTE 3 BOX 376  
MARIANNA FL 32446  
USA

A. BRETT HIGHLAND  
P.O. BOX 785  
PEARSALL TX 78061  
USA  
5123343805

ARTHUR E HILTBOLD  
AUBURN UNIVERSITY  
AGRONOMY & SOILS  
AUBURN AL 36849  
USA

DAVID M HOGG  
P.O. BOX 40111  
RALEIGH NC 27629  
USA  
9198722155

W. CLAYTON HOLTON, JR  
6 CHURCHILL CIRCLE  
LEESBURG GA 31763  
USA

JOE H HOPE  
RHONE-POULENC AG CO  
T.W. ALEXANDER, P.O. BOX 12014  
RESEARCH TRIANGLE PK NC 27709  
USA  
9195492703

MICHAEL W HOTCHKISS  
ROUTE 3 BOX 1080  
FORT VALLEY GA 31030  
USA  
9129565656

EDDIE HOWARD  
ROUTE 4 BOX 123  
DUBLIN TX 76446  
USA

RONALD J HENNING  
HENNING PEANUT TECHNICAL SERV.  
RT. 4, BOX 146A  
COLQUITT GA 31737  
USA  
9127583520

GLEN L HEUBERGER  
TIDEWATER RESEARCH CENTER  
6321 HOLLAND ROAD  
SUFFOLK VA 23437  
USA  
8046576103

STEVE HICKEY  
HICKEYS AGRI-SERVICES LAB  
P.O. BOX 547  
CAMILLA GA 31730  
USA

G L HILDEBRAND  
ICRISAT-CHITEDZE AGRIC RESEARCH STAT  
PRIVATE BAG 63  
LILONGWE  
MALAWI  
767 226

STEVEN C HODGES  
RURAL DEVELOPMENT CENTER  
P.O. BOX 1209  
TIFTON GA 31793  
USA

C. CORLEY HOLBROOK  
USDA-ARS-SAA  
P. O. BOX 748  
TIFTON GA 31793  
USA

GERRIT HOOGENBOOM  
DEPT OF AG ENGINEERING  
UNIVERSITY OF FLORIDA  
GAINESVILLE FL 32611  
USA  
9043921264

JOHN D HOPKINS  
RHONE POULENC AG CO  
114 OLD HICKORY POINT  
GREENVILLE SC 29607  
USA

JAMES S HOW  
KRAFT, INC.  
801 WAUKEGAN ROAD  
GLENVIEW IL 60025  
USA

ROBERT K HOWELL  
BARC-WEST  
BELTSVILLE MD 20705  
USA  
3013443143

DAVID C HSI  
NMSU AG SCIENCE CENTER  
1036 MILLER ST, S.W.  
LOS LUNAS NM 87031  
USA  
5058654684

MING-TEH FRANK HUANG  
KAOHSIUNG DAIS  
1 NUNGSHU LANE, MINGSHEN RD  
PINGTUNG, TAIWAN 90002  
REPUBLIC OF CHINA

JERRY C HULBERT  
CHEVRON CHEMICAL CO  
1728 MONTREAL CIRCLE  
TUCKER GA 30084  
USA  
4049340494

DAVE INMAN-QUAL. CONTROL  
HOODY CORPORATION  
P.O. BOX 100  
BEAVERTON OR 97075  
USA  
5036460555

KOW-CHOY IU  
AG & FISH DEPT - GOVT. OFFICES  
393 CANTON ROAD  
KOWLOON HONG KONG  
REPUBLIC OF CHINA  
368811119

YOSHIHARU IWATA  
118-4 KAMATORICHO CHIBASHI  
CHIBA CITY CHIBAKEN  
JAPAN

J O JACKSON, JR  
303 S.W. 22ND STREET  
SEMINOLE TX 79360  
USA  
9157585128

ANTONY JARVIE  
PIONEER SEED CO  
BOX 19  
GREYTOWN  
SOUTH AFRICA  
335160332

ROLF JESINGER  
BASF CORPORATION  
100 CHERRY HILL ROAD  
PARSIPPANY NJ 07054  
USA

CHIN-SHENG HSU  
TAINAN DIST. AG. IMPROV. STN.  
350 LIN-SEN RD, SEC. 1  
TAINAN, TAIWAN, 700  
REPUBLIC OF CHINA

JIM HUDSON, EDITOR  
SOUTHEAST FARM PRESS  
1306 ANNAPOLIS DR.  
RALEIGH NC 27608  
USA  
9198346938

G. HUTCHISON  
P. O. BOX 592  
HARARE  
ZIMBABWE

YASUYUKI ISHIDA  
SAITMA UNIV. - AGRONOMY LAB.  
FACULTY OF EDUCATION  
URAWA  
JAPAN

HENRY W IVEY II  
AUBURN UNIVERSITY  
ROUTE 2  
HEADLAND AL 36345  
USA  
2056932363

KENNETH E JACKSON  
OKLAHOMA STATE UNIVERSITY  
115 LIFE SCI EAST  
STILLWATER OK 74078  
USA  
4057449959

J R JAMES  
CIBA-GEIGY CORP.  
P.O. BOX 18300  
GREENSBORO NC 27419  
USA  
9192927100

EDWARD G JAY  
USDA  
BOX 22909  
SAVANNAH GA 31403  
USA  
9122337981

BECKY B JOHNSON  
OKLAHOMA STATE UNIVERSITY  
318 LIFE SCIENCES EAST  
STILLWATER OK 74078  
USA  
4057446119

CHARLES S JOHNSON  
SOUTH PIEDMONT AG EXP STA  
P.O. BOX 448  
BLACKSTONE VA 23824  
USA

WILLIAM F JOHNSON  
BIFAD STAFF  
AID-DEPT STATE, R-5316 NEW STATE  
WASHINGTON DC 20523  
USA

ARNET W JONES  
DEVELOPMENT ASSISTANCE CORP  
1415 11TH ST., N.W.  
WASHINGTON DC 20001  
USA  
2022348842

MICHAEL W JORDAN  
GRIFFIN CORPORATION  
P. O. BOX 1847  
VALDOSTA GA 31601  
USA

H E JOWERS  
FL COOP EXT SVC, JACKSON CTY  
620 E. LAFAYETTE, SUITE 3  
MARIANNA FL 32446  
USA

ROBERT KARN  
HOLSUM FOODS  
P.O. BOX 107  
ALBANY GA 31702  
USA  
9124355643

NOBLE S KEARNEY, JR  
P. O. DRAWER 1849  
UVALDE TX 78801  
USA

MANOCHAI KEERATI-KASIKORN  
FACULTY OF AGRICULTURE  
KHON KAEN UNIVERSITY  
KHON KAEN, 40002  
THAILAND

DAN KENSLE  
VALENT U.S.A. CORPORATION  
1851 TALPECO ROAD  
TALLAHASSEE FL 32303  
USA

THOMAS J KERR  
ATHENS TECH-HIWAY 29N  
ATHENS GA 30610  
USA

DAROLD L KETRING  
USDA-ARS  
P.O. BOX 1029  
STILLWATER OK 74076  
USA  
4056244361

LAKHO L KHATRI  
BEATRICE/HUNT-WESSON FOODS  
1645 W. VALENCIA DRIVE  
FULLERTON CA 92633  
USA

PAUL KING  
UNIROYAL CHEMICAL CO INC  
3601 E. CELERY AVE.  
SANFORD FL 32771  
USA  
3053222993

JAMES S KIRBY  
OKLAHOMA STATE UNIVERSITY  
AGRONOMY DEPT  
STILLWATER OK 74078  
USA  
4057446417

THOMAS KIRKLAND  
THOMAS KIRKLAND FARM  
ROUTE 1  
HEADLAND AL 36345  
USA  
2056932552

JERRY W KIRKSEY  
USDA,ARS, NATL PEANUT RES LAB  
1011 FORRESTER DR SE  
DAWSON GA 31742  
USA  
9129954441

ORRIE KLEINHEKSEL  
CPC INTERNATIONAL INC.  
8500 FRAZIER PIKE, BOX 309  
LITTLE ROCK AR 72203  
USA  
5014901441

DAVID A KNAUPT  
UNIVERSITY OF FLORIDA  
304 NEWELL HALL  
GAINESVILLE FL 32611  
USA  
9043921823

GARY KOCHERT  
UNIVERSITY OF GEORGIA  
BOTANY DEPARTMENT  
ATHENS GA 30602  
USA

THOMAS A KUCHARAK  
UNIVERSITY OF FLORIDA  
1421 FIFIELD HALL-PLANT PATH  
GAINESVILLE FL 32611  
USA

JOHN LANSDEN  
NATIONAL PEANUT RESEARCH LAB  
1011 FORRESTER DRIVE, SE  
DAWSON GA 31742  
USA  
9129954441

ALFREDO LAYRISSE  
UCV FACULTAD DE AGRONOMIA  
DEPARTAMENTO DE GENETICA  
MARACAY 2101  
VENEZUELA

THOMAS A LEE, JR  
BOX 1177  
STEPHENVILLE TX 76401  
USA  
8179655071

JOHN LEIDNER  
PROGRESSIVE FARMER  
P. O. BOX 1603  
TIFTON GA 31794  
USA

H. MICHAEL LINKER  
NCSU-CROP SCIENCE DEPT  
BOX 7620  
RALEIGH NC 27695-7620  
USA

ROBERT LITTRELL  
DEPT PLANT PATHOLOGY  
COASTAL PLAIN EXP STN  
TIFTON GA 31793  
USA

NORMAN LOVEGREN  
SOUTHERN REGIONAL RESEARCH CTR  
P.O. BOX 19687  
NEW ORLEANS LA 70179  
USA  
5045897593

PATRICK LUMMUS  
ROUTE 4, BOX 8694  
EDINBURG TX 78539  
USA

ARTHUR E KRISINSKI  
BEST FOODS/CPC INTNT'L, R&E CTR  
P. O. BOX 1534  
UNION NJ 07083  
USA  
2016889000

CRAIG KVIENT  
AGRONOMY DEPT  
COASTAL PLAIN EXP STN-PO BOX 748  
TIFTON GA 31793  
USA

J C LAPRADE  
RHONE POULENC AG COMP  
3409 HUNTINGTON PL  
DOTHAN AL 36303  
USA  
2157936282

GARY L LEE  
UNIV GA COOP EXT SERVICE  
203 N. JACKSON RD  
STATESBORO GA 30458  
USA  
9127646121

STANLEY K LEHMAN  
NOR-AM CHEMICAL CO  
1325 JOHNSON FERRY RD, SUITE 228  
MARIETTA GA 30067  
USA  
4049736393

H. READ LESTER  
ROUTE 6  
SIMCOE, ONTARIO N34 4K5  
CANADA

LARRY LITTLEFIELD  
OKLAHOMA STATE UNIV  
104 LSE-PLANT PATHOLOGY  
STILLWATER OK 74078  
USA  
4057445643

ELBERT J LONG  
SEVERN PEANUT COMPANY, INC  
P. O. BOX 28  
SEVERN NC 27877  
USA  
9195850838

DR HUNG-SHUNG LU  
TAIWAN AGRIC RES INSTITUTE  
189 CHUNG-CHENG ROAD  
WAN-FENG, WU-FENG TAICHUNG, TAIWAN  
REPUBLIC OF CHINA

JAMES N LUNSFORD  
900 CAMELOT COURT  
DOTHAN AL 36303  
USA

EDMUND LUSAS  
TX A&M-FOOD PROT RES & DEV CTR  
FM-183  
COLLEGE STATION TX 77843  
USA

ROBERT E LYNCH  
USDA-ARS - INSECT BIOLOGY LAB  
TIFTON GA 31793  
USA

TIMOTHY P MACK  
DEPT ENTOMOLOGY  
301 FUNCHESS HALL  
AUBURN UNIVERSITY AL 36849  
USA  
2058264850

KAZUMI MAEDA  
FACULTY OF AGRICULTURE  
KOCHI UNIVERSITY  
NANKOKU KOCHI, 783  
JAPAN

W MARTINEZ  
USDA,ARS  
ROOM 224, BLDG. 005, BARC-WEST  
BELTSVILLE MD 20705  
USA  
3013444278

DONALD A MASTROROCCO, JR.  
HERSHEY CHOCOLATE COMPANY  
P. O. BOX 1028  
STUARTS DRAFT VA 24477  
USA  
7033374700

DR. BRUNO MAZZANI  
CENTRO NACIONAL DE INVEST AGROPECU  
CENIAP, AGRONOMIA  
MARACAY 2101  
VENEZUELA

DUNCAN MCDONALD  
ICRISAT/AGINSPO - IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

MARSHALL J MCFARLAND  
DEPT OF AG ENGINEERING  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA

J. FRANK MCGILL  
M & M MARS  
P. O. BOX 81  
TIFTON GA 31794  
USA  
9123826912

FREDDIE P MCINTOSH  
GOLD KIST, INC.  
P. O. BOX 97  
GRACEVILLE FL 32440  
USA

BRUCE MCKEOWN  
CANADA PACKERS INC.  
2211 ST CLAIR AVE WEST  
TORONTO ONTARIO M6N 1K4  
CANADA

HENRY MCLEAN  
SANDOZ CROP PROTECTION  
RT. 2, BOX 535  
CORDELE GA 31015  
USA  
9122733384

AITHEL MCMAHON  
#19 TOWN & COUNTRY CIRCLE  
ARDMORE OK 73401  
USA  
4052233505

DAVID MCNEAL  
USDA/ES - ROOM 3347-S  
WASHINGTON D. C. 20250  
USA

KAY MCWATERS  
GEORGIA EXPERIMENT STATION  
FOOD SCIENCE DEPT  
EXPERIMENT GA 30212  
USA  
4042287284

HASSAN A MELOUK  
OKLAHOMA STATE UNIVERSITY  
DEPT PLANT PATHOLOGY  
STILLWATER OK 74078  
USA  
4057449957

THOMAS E MICHAELS  
DEPT OF CROP SCIENCE  
UNIV OF GUELPH  
GUELPH ONTARIO N1G 1B6  
CANADA

KEITH J MIDDLETON  
Q'LAND DEPT PRIMARY INDUSTRIES  
P. O. BOX 23  
KINGAROY, QUEENSLAND, 4610  
AUSTRALIA  
071621355

WILLIAM T MILLS  
1906 GROVELAND RD.  
ALBANY GA 31707  
USA  
9128835300

RICHARD P MINOR  
P.O. BOX 85  
BYROMVILLE GA 31007  
USA

STEVE MISARI  
DEPT CROP PROTECTION, IAR  
AHMADU BELLO UNIVERSITY  
FMB 1044, SAMARU-ZARIA  
NIGERIA

S C MOHAPATRA  
NCSU - DEPT BIO & AG ENG  
BOX 7625  
RALEIGH NC 27695-7625  
USA

R. HARVEY MORRIS  
NC STATE EXTENSION  
P. O. BOX 248  
ELIZABETHTOWN NC 28337  
USA  
9198624591

J P MOSS  
ICRISAT/AGINSPO - IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

WALTON MOZINGO  
TRACEC  
SUFFOLK VA 23437  
USA  
8046576450

PHILIP H MUNGER  
BASF CORPORATION-CHEM DIV  
BOX 9154  
COLLEGE STATION TX 77842-9154  
USA  
4096960179

ROBERT H MILLER  
ASCS-USDA  
801 CHALFONTE DRIVE  
ALEXANDRIA VA 22305  
USA  
2024478839

FOY MILLS, JR.  
COOPERATIVE EXTENSION SERVICE  
P.O. BOX 1209  
TIFTON GA 31793  
USA

NORMAN A MINTON  
COASTAL PLAIN EXPERIMENT STATION  
TIFTON GA 31793  
USA

FORREST L MITCHELL  
TEXAS AG EXPERIMENT STATION  
P.O. BOX 292  
STEPHENVILLE TX 76401  
USA

LOY W MORGAN  
COASTAL PLAIN EXPERIMENT STATION  
TIFTON GA 31793  
USA  
9123863374

J C MORTREUIL  
ISRA/CNRA  
B.P. 59  
BAMBAY SENEGAL, WEST AFRICA  
VIA PARIS

AMADOU MOUNKAILA  
C/O DR. IDRISSE SOUMANA  
DIRECTOR - INRAN  
B.P. 429--- NIAMEY NIGER  
W. AFRICA- VIA PARIS

LAURENCE C MUDGE  
RHONE-POULENC AG COMP  
975 WALNUT ST, SUITE 300N  
CARY NC 27511  
USA  
9194810303

ROGER MUSICK  
CROP-GUARD, INC  
P.O. BOX 238  
EAKLY OK 73033  
USA

TATEO NAKANISHI  
CHIEF OF PEANUT LAB  
CHIBA AGRIC EXTN STN  
He-199, YACHIMATA INBA, CHIBA  
JAPAN  
0434440676

RICHARD NASH  
P. O. BOX 1667  
TIFTON GA 31793  
USA  
9123827994

JAMES S NEWMAN  
TX A&M - AGRIC EXP STN  
P. O. BOX 292  
STEPHENVILLE TX 76401  
USA  
8179684144

ROBERT L NICHOLS  
PPG INDUSTRIES  
601 CHESNUTT AVE.  
TIFTON GA 31794  
USA

KEN NOEGEL  
MOBAY CORPORATION-AG CHEM DIV  
8400 HAWTHORN RD  
KANSAS CITY MO 64120  
USA

BRUCE E NOWLIN  
CROP-GUARD, INC  
P. O. BOX 238  
EAKLY OK 73033  
USA  
4057973213

FORREST W NUTTER, JR  
DEPT PLANT PATH, PLANT SCI BLDG  
UNIVERSITY OF GEORGIA  
ATHENS GA 30602  
USA  
4045422571

DR. ABBAS OMRAN, PROJECT LDR.  
HIGHLAND OILSEED PROJECT  
INSTITUTE OF AGRICULTURAL RESEARCH  
P.O. BOX 2003 ADDIS ABABA  
ETHIOPIA

W. WYATT OSBORNE  
IAI, INC.  
1319 N. MAIN ST.  
SOUTH BOSTON VA 24592  
USA  
8045755059

TOMMY NAKAYAMA  
GEORGIA EXPERIMENT STATION  
DEPT OF FOOD SCIENCE  
EXPERIMENT GA 30212  
USA  
4042287284

PAUL R NESTER  
AMERICAN CYANAMID CO  
42 W. TRACE CREEK DR  
THE WOODLANDS TX 77381  
JSA

STEVE NEWTON  
AMER FARM BUREAU FED  
225 TOUHY AVENUE  
PARK RIDGE IL 60068  
USA  
3123995741

SHYAM N NIGAM  
ICRISAT/AGINSPO-IIIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

A J NORDEN  
ROUTE 2, BOX 350-A  
HIGH SPRINGS FL 32643  
USA  
9044543467

RONALD T NOYES  
OKLAHOMA STATE UNIVERSITY  
224 AG HALL  
STILLWATER OK 74078-0497  
USA  
4057448416

WILLIAM C ODLE  
FERMENTA PLANT PROTECTION  
13281 KERRVILLE FOLKWAY  
AUSTIN TX 78729  
USA

ROBERT L ORY  
7324 LIGUSTRUM DR.  
NEW ORLEANS LA 70126  
USA  
5045897075

ABDELRAHMAN K OSMAN  
WESTERN SUDAN AG RES. PROJECT  
EL OBEID RESEARCH STAT.-PO BOX 429  
EL OBEID  
SUDAN

JACK OSWALD  
FL FOUNDATION SEED PRODUCERS  
P. O. BOX 309  
GREENWOOD FL 32443  
USA

HORACE PALMER  
HOLSUM FOODS  
P. O. BOX 218  
WAUKESHA WI 53187  
USA  
4145444444

WILBUR A PARKER  
SEABROOK BLANCHING CORP.  
P. O. BOX 609  
EDENTON NC 27932  
USA  
9194824456

ARAN PATANOTHAI  
KHON KAEN UNIVERSITY  
FACULTY OF AGRICULTURE  
KHON KAEN  
THAILAND

HAROLD E PATTEE  
NCSU-USDA/ARS  
BOX 7625  
RALEIGH NC 27695-7625  
USA  
9197373121

DONALD R PATTERSON  
6328 RALEIGH LA GRANGE RD  
MEMPHIS TN 38134  
USA  
9013887446

MIKE PATTERSON  
AUBURN UNIVERSITY  
208 EXTENSION HALL  
AUBURN UNIVERSITY AL 36849  
USA

G.D.C. PAUER  
TEXAS AGRIC EXP STN  
P.O. BOX 755  
YOAKUM TX 77995  
USA

JAMES R PEARCE  
P.O. BOX 129  
TARBORO NC 27886  
USA

ASTOR PERRY  
1201 PINEVIEW DRIVE  
RALEIGH NC 27606  
USA  
9198514714

ROBERT E PETTIT  
DEPT. PLANT PATHOLOGY AND MICROBIOLOGY  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA  
4098457311

PATRICK M PHIPPS  
VPI&SU  
TRACEC  
SUFFOLK VA 23437  
USA

CALVIN PIGG  
SOUTHWEST FARM PRESS  
13531 N CENTRAL EXPWY, SUITE 2010  
DALLAS TX 75243  
USA  
2146900721

ROY N PITTMAN  
USDA-ARS, REG PLANT INTRO STN  
AGRIC EXP STN, 1109 EXPERIMENT ST  
GRIFFIN GA 30223-1797  
USA

JOSEPH POMINSKI  
SOUTHERN REGIONAL RESEARCH CTR  
P. O. BOX 19687  
NEW ORLEANS LA 70179  
USA  
5045897012

J. MATTHEW POPE  
HANCOCK PEANUT COMPANY  
BOX 198  
COURTLAND VA 23837  
USA

D. MORRIS PORTER  
USDA-ARS, TIDEWATER RES CTR  
SUFFOLK VA 23437  
USA  
8046576744

NORRIS L POWELL  
TIDEWATER AGR EXPNT STA  
P.O. BOX 7099  
SUFFOLK VA 23437  
USA  
8046576450

CLIFFORD M PRESTON  
P.O. BOX 13925  
GAINESVILLE FL 32604  
USA

K V RAMANAIAH, DIRECTOR  
FACULDADE DE AGRONOMIA  
UNIVERSIDAD EDUARDO MONDLANE  
CAIXA POSTAL 257 MAPUTO  
MOZAMBIQUE

V. RAMANATHA RAO  
ICRISAT/AGINSPO - IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

D V RGAHAVA REDDY  
ICRISAT/AGINSPO - IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

LEONARD M REDLINGER  
3910 DOSTER ROAD  
MONROE NC 28110  
USA

PAUL L RIDAUGHT  
MONSANTO AG PRODUCTS  
RT. 1, BOX 327-A  
GREENWOOD FL 32443  
USA  
9044821012

ROBERT L ROBERTSON  
409 HOLLY CIRCLE  
CARY NC 27511  
USA  
9194671162

E W ROGISTER, JR  
ROUTE 1 BOX 19-A  
WOODLAND NC 27897  
USA

A ROUZIÈRE  
IRHO-SECTEUR EXP DU SENEGAL  
STATION DE DAROU  
B.P 75 KAOLACK  
SENEGAL

B K RAI  
CARDI UNIVERSITY  
P.O. BOX 2  
BELMOPAN BELIZE  
BELIZE  
082602

N M RAMASWAMY  
GENETIC ENG SECTION, PLANT RES. CTR.  
CE FARM, AGRIC. CANADA, BLDG. 50  
OTTAWA ONTARIO K1A 0C6  
CANADA

MICHAEL J READ  
PMB AUSTRALIA  
P. O. BOX 26  
KINGAROOY QUEENSLAND  
AUSTRALIA  
071622211

L J REDDY  
ICRISAT/AGINSPO-IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

HOWARD N REYNOLDS  
RHONE-POULENC AG CO  
P.O. BOX 902  
GROVE HILL AL 364651  
USA  
2052758751

DENNIS ROBBINS  
DOTHAN OIL MILL COMPANY  
P. O. BOX 458  
DOTHAN AL 36302  
USA  
2057932148

DAVID ROGERS  
MOBAY RESEARCH FARM  
ROUTE 4, BOX 2870  
TIFTON GA 31794  
USA  
9123827994

JIANG RONG WEN  
OIL CROPS RESEARCH INSTITUTE  
CHINESE ACADEMY OF AGRIC SCIENCE  
WUHAN HUBEI  
REPUBLIC OF CHINA

BILLY K ROWE  
RHONE-POULENC AG CO.  
520 CENTRAL PKWY, SUITE 114  
PLANO TX 75074  
USA  
9195492384

ROBERT C ROY  
TOBACCO RESEARCH STATION  
BOX 186  
DELHI, ONTARIO, N4B 2W9  
CANADA  
5195822861

V. RUMORE, R & D DIR.  
PLANTERS LIFESAVERS COMPANY  
PO BOX 1942, 100 DEFOREST AVE.  
EAST HANOVER NJ 07936-1942  
USA  
8045392343

M. BAKHEIT SAED  
AGRICULTURAL RESEARCH CORP  
PO BOX 126-GEZIRA AGRIC RES STN  
WAD MEDANI  
SUDAN

PHILIPPE SANKARA  
UNIVERSITE DE OUAGADOUGOU  
B.P. 7021  
OUAGADOUGOU BURKINA FASO  
WEST AFRICA

JAMES D SCHAUB  
7672 KINDLER ROAD  
LAUREL MD 20707  
USA

TERRY L SCHINDELDECKER  
LEAF, INC.  
1155 N. CICERO  
CHICAGO IL 60651-3297  
USA

LOREN L SCHULZE  
AGENCY FOR INTERN'T'L DEVELOPMENT  
RM. 413C SA-18, S&T/AGR/AP  
WASHINGTON D. C. 20009  
USA

EDWARD B SEIFRIED  
CIBA-GIEGY  
P. O. BOX 4828  
MCALLEN TX 78502  
USA  
5126875786

MOSTAFA S H SERRY, UNDERSEC'Y.  
AGRICULTURAL RESEARCH CENTRE  
OHMAN, GIZA, CAIRO  
EGYPT

RICHARD RUDOLPH  
MOBAY CORPORATION  
1587 PHOENIX BLVD., SUITE 6  
ATLANTA GA 30349  
USA

KYLE W RUSHING  
GUSTAFSON, INC  
P. O. BOX 660065  
DALLAS TX 75266-0065  
USA  
2149318899

TIMOTHY H SANDERS  
NATIONAL PEANUT RESEARCH LAB  
1011 FORRESTER DRIVE S.E.  
DAWSON GA 31742  
USA  
9129954441

RUSTICO B SANTOS  
ISABELA STATE UNIVERSITY  
ECHAGUE ISABELA 1318  
PHILIPPINES

ROBERT SCHILLING  
INST DE RECHERCHES, SERV DOCUMENT  
11 SQUARE PETRARQUE  
PARIS 75116  
FRANCE  
5536025

A M SCHUBERT  
PLANT DISEASE RESEARCH STN  
P. O. BOX 755  
YOAKUM TX 77995  
USA  
5122936326

BETH E SEARS  
PENNWALT CORP-AGCHEM DIV  
137 N. RACE ST.  
STATESVILLE NC 28677  
USA

IQBAL S SEKHON  
FRESNO REGIONAL LAB  
6014 N. CEDAR AVE.  
FRESNO CA 93710  
USA  
2092942982

M. ALI SHAMS  
HOME BRANDS COMPANY  
4600 LYNDALE AVE., NORTH  
MINNEAPOLIS MN 55412-1494  
USA

MEHBOOB B SHEIKH  
PEANUT RES LAB-DIV OF AGR SCI  
FLORIDA A&M UNIVERSITY  
TALLAHASSEE FL 32307  
USA  
9045993227

BARBARA B SHEW  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA  
9197373281

JAMES R SHOLAR  
OKLAHOMA STATE UNIVERSITY  
376 AG HALL, DEPT AGRONOMY  
STILLWATER OK 74078  
USA  
4057446421

BHARAT SINGH  
ALABAMA A&M UNIV - FD SCI DEPT  
P. O. BOX 274  
NORMAL AL 35762  
USA

DONALD H SMITH  
TEXAS A&M UNIVERSITY  
P. O. BOX 755  
YOAKUM TX 77995  
USA  
5122936326

JOHN C SMITH  
VPI&SU  
TIDEWATER AGR. EXPT. STATION  
SUFFOLK VA 23437  
USA  
8046576450

RON SMITH  
SOUTHEAST FARM PRESS  
345 W. HANCOCK AVE  
ATHENS GA 30601  
USA

JUAN H SOAVE  
RIVADAVIA 5809  
GENERAL CABRERA  
ARGENTINA 1406

RICHARD K SPRENKEL  
NFREC  
ROUTE 3 BOX 4370  
QUINCY FL 32351  
USA  
9046279236

JOHN L SHERWOOD  
OKLAHOMA STATE UNIVERSITY  
DEPT PLANT PATHOLOGY  
STILLWATER OK 74078  
USA  
4057449950

F M SHOKES  
N.FL. RES & EDUCATION CTR  
RT. 3, BOX 4370  
QUINCY FL 32351  
USA  
9046279236

CHARLES E SIMPSON  
TEXAS AGRIC EXP STN  
P. O. BOX 292  
STEPHENVILLE TX 76401  
USA  
8179684144

SATHORN SIRISINGH  
DEPARTMENT OF AGRICULTURE  
KASRTSART UNIVERSITY CAMPUS  
BANGKHEN, BANGKOK, 9  
THAILAND

H. RAY SMITH  
CIBA-GEIGY CORPORATION  
2807 S. WILDERNESS  
COLLEGE STATION TX 77840  
USA  
4096968071

OLIN D SMITH  
DEPT SOIL & CROP SCIENCES  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA  
4098458795

JOHN S SMITH, JR  
NATIONAL PEANUT RESEARCH LAB  
1011 FORRESTER DRIVE, SE  
DAWSON GA 31742  
USA  
9129954481

MONTIEN SOMPEE  
KHON KAEN FIELD CROPS RESEARCH CENTE  
AMPHOE MUANG  
KHON KAEN  
THAILAND

HARVEY W SPURR, JR  
USDA-ARS - OXFORD TOBACCO LAB  
BOX 1555  
OXFORD NC 27565-1555  
USA  
9196935151

H. THOMAS STALKER  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA  
9197373281

JAMES L STARR  
DEPT PLANT PATH & MICRO  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA  
4098457311

TED STELTER  
ROHM & HAAS CO  
224 DESOTA RD  
W. PALM BEACH FL 33480  
USA  
3055856517

RICHARD STRANGE  
DEPT. OF BOTANY AND MICROBIOLOGY  
UNIVERSITY COLLEGE LONDON  
GOWER STREET, LONDON WC1E 6BT  
ENGLAND

BRYAN STUART  
DOW CHEMICAL USA  
8702 EL REY BLVD.  
AUSTIN TX 78737  
USA  
5122883903

JOSEPH R.R. SUAH  
CARDI  
UWI MONA CAMPUS  
KINGSTON JAMAICA  
WEST INDIES  
9271231

GENE SULLIVAN  
NCSU-CROP SCIENCE DEPT  
BOX 7620  
RALEIGH NC 27695-7620  
USA  
9197373331

SHIGERU SUZUKI  
CHIBA PRIF AGRI EXP STA  
HE-199, YACHIMATA, INBA-GUN  
CHIBA-KEN 289-11  
JAPAN

CHARLES W SWANN  
TIDEWATER AG EXP STATION  
6321 HOLLAND RD-PO BOX 7099  
SUFFOLK VA 23437  
USA

J R STANSELL  
DEPT AG ENGINEERING  
COASTAL PLAIN EXPERIMENT STN  
TIFTON GA 31793  
USA  
9123863377

JAMES L STEELE  
USDA-ARS  
1515 COLLEGE AVE  
MANHATTAN KS 66502  
USA

PETER STONEHOUSE  
DEPT AG ECONOMICS  
UNIVERSITY OF GUELPH  
GUELPH, ONTARIO, N1G 2W1  
CANADA  
5198244120

DAVID STRONG  
C/O RJR-NABISCO  
100 DEFOREST AVE, BOX 1942  
EAST HANOVER NJ 07936  
USA  
2018544858

R V STURGEON, JR  
1729 LINDA LANE  
STILLWATER OK 74075  
USA  
4053720405

JOE S SUGG  
517 SHADY CIRCLE DR.  
ROCKY MOUNT NC 27801  
USA  
9194467801

R J SUMMERFIELD  
UNIV OF READING, PEL, SHINFIELD GRG  
CUTBUSH LANE, SHINFIELD  
READING RG2 9AD  
ENGLAND

CAREL J SWANEVELDER  
AGRICULTURAL RESEARCHER  
PRIVATE BAG X1251  
POTCHEFSTROOM 2520  
SOUTH AFRICA  
0148125504

RUTH A TABER  
DEPT PLANT PATH & MICRO  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA  
4098457311

WILLIAM B TAPPAN  
106 CHEESEBOROUGH AVENUE  
QUINCY FL 32351  
USA  
9046279236

W. KENT TAYLOR  
NOR-AM AGRIC PRODUCTS, INC  
ROUTE 6 BOX 194  
TIFTON GA 31794  
USA  
9123821018

SAMUEL S THOMPSON  
BOX 1209  
TIFTON GA 31793  
USA  
9123863509

LELAND D TRIPP  
2811 CAMELOT  
BRYAN TX 77802  
USA

CHI-YEH TSAI  
GUANGXI ACADEMY OF AGRIC SCIENCE  
NANNING, GUANGXI  
REPUBLIC OF CHINA

JOHN R TURNER  
CONSULTANT  
401 PINECREST DRIVE  
AMERICUS GA 31709  
USA  
9129240858

MR. URI  
NETAFIM MAGAL  
IRRIGATION EQUIPMENT & DRIP SYSTEMS  
KIBBUTZ MAGAL, D.N. HEFER  
ISRAEL 38845

PETER VALENTI  
RJR NABISCO, INC  
1100 REYNOLDS BLVD  
WINSTON-SALEM NC 27101  
USA

P.J.A. VAN DER MERWE  
GRAIN CROPS RESEARCH INSTITUTE  
PRIVATE BAG X1251  
POTCHEFSTROOM 2520  
SOUTH AFRICA

S L TAYLOR  
UNIV OF NEBRASKA-DEPT FOOD SCI  
FILLEEY HALL, EAST CAMPUS  
LINCOLN NE 68583-0919  
USA  
4024722831

STEPHEN D THOMAS  
GENERAL DELIVERY  
DULCE NM 87528  
USA

JAMES W TODD  
GA COASTAL PLAIN EXP STATION  
P.O. BOX 748  
TIFTON GA 31793  
USA  
9123863374

JOHN M TROEGER  
USDA-ARS  
P. O. BOX 748  
TIFTON GA 31793  
USA  
9123863348

JIM TURNER  
BASF CORPORATION  
121 CHEROKEE AVE  
ATHENS GA 30606  
USA  
4043536684

GREG TURPIN  
OKLAHOMA STATE UNIVERSITY  
562 AG HALL-AGRONOMY DEPT  
STILLWATER OK 74078  
USA

SAMUEL N UZZELL  
PITT COUNTY EXTENSION SVC  
1717 W. FIFTH STREET  
GREENVILLE NC 27834  
USA  
9197581196

JOSE F M VALLS  
EMBRAPA/CENARGEN  
C.P.10.2372  
SAIN-PARQUE RURAL, BRASILIA-DF  
BRAZIL - 70770

JOHN R VERCELLOTTI  
SOUTHERN REGIONAL RESEARCH CTR  
P. O. BOX 19687  
NEW ORLEANS LA 70179  
USA

DR. FARID WALIYAR  
ICRISAT-AGINSPO IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 1001724  
USA

MILTON E WALKER  
CPES - AGRONOMY DEPT  
TIPTON GA 31793  
USA  
9123863327

TAWANA WALKER  
CPC INTERNATIONAL, INC.  
8500 FRAZIER PIKE, BOX 309  
LITTLE ROCK AR 72203  
USA  
5014901441

I S WALLERSTEIN  
AGRICULTURAL RES. ORGANIZATION  
THE VOLCANI CENTER, PO BOX 6  
BET DAGAN 50250  
ISRAEL

L R WALTON  
PET, INC  
400 S. FOURTH STREET  
ST. LOUIS MO 63166  
USA

AREE WARANYUWAT  
KASETSART UNIV, DEPT AGRON  
KAMTHAENGSAN CAMPUS  
NAKHON PATHOM 73140  
THAILAND

KURT WARNKEN  
WILCO PEANUT COMPANY  
P. O. BOX B  
PLEASANTON TX 78064  
USA  
5125693808

GREG WATSON  
CIBA-GEIGY CORP  
7145-58TH AVE  
VERO BEACH FL 32967  
USA

G. CHRIS WEED  
ICI AMERICAS INC  
3490 PRINCE GEORGE  
MONTGOMERY AL 36109  
USA  
2052771228

JAMES R WEEKS  
AUBURN UNIVERSITY  
ROUTE 2 BOX 86A  
ASHFORD AL 36312  
USA  
2056932010

GLENN WEHTJE  
AUBURN UNIVERSITY  
AGRONOMY DEPT  
AUBURN AL 36849  
USA  
2058264900

THOMAS B WHITAKER  
NCSU  
BOX 7625  
RALEIGH NC 27695-7625  
USA  
9197373101

PETER WHITE  
DELHI RESEARCH CENTER  
BOX 186  
DELHI, ONTARIO, N4B 2W9  
CANADA  
5195822861

E B WHITTY  
UNIVERSITY OF FLORIDA  
303 NEWELL HALL  
GAINESVILLE FL 32611  
USA  
9043921817

JOHN A WIGHTMAN  
ICRISAT-C/O MRS. TOBY WAGLE  
IIE-809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

BILL WILCKE  
AG ENGINEERING DEPT.  
214A SEITZ HALL-VIRGINIA TECH  
BLACKSBURG VA 24061-0303  
USA

JOHN WILCUT  
TIDEWATER AG EXP STA-VA TECH  
6321 HOLLAND RD-P.O. BOX 7219  
SUFFOLK VA 23437-0219  
USA

E. JAY WILLIAMS  
USDA-ARS  
P. O. BOX 748  
TIPTON GA 31793  
USA  
9123863348

J H WILLIAMS  
ICRISAT-AGINPO IIE  
809 UNITED NATIONS PLAZA  
NEW YORK NY 10017  
USA

LEONARD J WILLIAMS  
RHONE-POULENC INC.  
ROUTE 4, BOX 91  
HARRISONBURG VA 22801  
USA  
7034333695

REX B WILSON  
GOLD KIST PEANUTS  
P.O. BOX 488  
ASHBURN GA 31714  
USA

LUKE WISNIEWSKI  
12002 DEBONAIR DRIVE  
CREVE COEUR MO 63146  
USA  
3145675395

MR. ATO YEBIO WOLDEMARIAM  
INSTITUTE OF AGRICULTURAL RESEARCH  
HOLETTA STATION-P.O. BOX 2003  
ADDIS ABABA  
ETHIOPIA

HARRY WOOD  
UNIV OF FLORIDA  
BOX 46  
EVINSTON FL 32633  
USA  
9043756228

STEVE D WOODHAM  
MONSANTO AGRIC CO  
ROUTE 1, BOX 287  
BOSTON GA 31626  
USA  
9122284394

JOHNNY C WYNNE  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA  
9197373281

CLETUS YOUNG  
AMERICAN CYANAMID  
310 W. 8TH ST  
TIFTON GA 31793  
USA  
9123868413

J. MICHAEL WILLIAMS  
P. O. BOX 1030  
EDENTON NC 27932  
USA

DAVID WILSON  
COASTAL PLAIN EXPERIMENT STATION  
DEPT. PLANT PATHOLOGY  
TIFTON GA 31793  
USA  
9123863370

HARRY C WINTER  
BIO CHEM, MED SHCOOL-1301 CATH ROAD  
UNIVERSITY OF MICHIGAN-M5312/0606  
ANN ARBOR MI 48109-0606  
USA  
3137649266

TOMMY WOFFORD  
ROHM AND HAAS CO  
4246 MAHOGANY RUN SE  
WINTER HAVEN FL 33884  
USA  
8133246390

HERB WOMACK  
RURAL DEVELOPMENT CENTER  
P. O. BOX 1209  
TIFTON GA 31793  
USA  
9123863424

KENNETH E WOODARD  
TEXAS AGRIC EXPR STATION  
BOX 292  
STEPHENVILLE TX 76401  
USA

F. SCOTT WRIGHT  
USDA-ARS - TRACEC  
SUFFOLK VA 23437  
USA  
8046576403

WALLACE YOKOYAMA  
BEATRICE/HUNT-WESSON  
1645 W. VALENCIA DR.  
FULLERTON CA 92633-5703  
USA  
7149455703

CLYDE T YOUNG  
NCSU - DEPT FOOD SCI  
236 SCHAUB HALL  
RALEIGH NC 27695-7624  
USA  
9197372964

HERB YOUNG  
RHONE-POULENC  
3022 HUNTINGTON DRIVE  
TALLAHASSEE FL 32312  
USA  
9043859561

GERRY C ZEKERT  
PLANTERS LIFESAVERS CO  
200 JOHNSON AVENUE  
SUFFOLK VA 23434  
USA

JAMES H YOUNG  
NCSU  
BOX 7625  
RALEIGH NC 27695-7625  
USA  
9197373101

## ORGANIZATIONAL MEMBERS

ALDUS MARKETING ASSN  
RANDY MOORE  
1619 S. KENTUCKY, BLDG D, #1000  
AMARILLO TX 79109  
USA  
8063539953

AMERICAN PELLETIZING CORP  
CONRAD DYER  
13 ISLAND DRIVE  
BRICK TOWN NJ 08724  
USA

BIRDSONG PEANUTS  
T H BIRDSONG III  
P. O. BOX 698  
GORMAN TX 76454  
USA  
8177342266

BORDEN PEANUT CO, INC  
P. O. BOX 28  
PORTALES NM 88130  
USA  
5053568545

CHIPMAN CHEMICALS, INC  
DENNIS M DANIELSON  
2127 E. MEMORIAL DRIVE  
JANESVILLE WI 53545  
USA

EMPRESS FOODS, LTD  
BERTHA FOK  
7155 11TH AVENUE  
BURNABY, BRIT. COLUMBIA, V3N 2M5  
CANADA  
5260731

ALFORD REFRIG WAREHOUSES, INC  
BRYANT SHUMPERT  
P.O. BOX 655088  
DALLAS TX 75265  
USA

ANHEUSER BUSCH/EAGLE SNACKS  
STEVE GALLUZZO  
1 BUSCH PL, 4TH FLR, BEVO  
ST. LOUIS MO 63118  
USA  
3145773931

BIRDSONG PEANUTS  
TOM WEST  
P. O. BOX 1400  
SUFFOLK VA 23434  
USA  
8045393456

CANADA PACKERS, INC  
TERESA PRATT  
3 OVEREND STREET  
TORONTO ONTARIO M5A 3R2  
CANADA  
4163664671

E I DUPONT DE NEMOURS & CO.  
RAY GEDDENS  
STINE-HASKELL, BLDG. 200, PO BOX 30  
NEWARK DE 19714  
USA

FARMERS FERTILIZER & MILLING CO  
JERRY C GRIMSLEY  
P. O. BOX 265  
COLQUITT GA 31737  
USA

G. F. HARTNETT & CO, INC  
GEORGE F HARTNETT  
540 FRONTAGE ROAD  
NORTHFIELD IL 60093  
USA

GEORGIA FARM BUREAU FEDERATION  
ROBERT W MARLOWE  
P. O. BOX 7068  
MACON GA 31298  
USA

GFA PEANUT ASSOCIATION  
CHARLES F COKER  
U.S. 19 SOUTH  
CAMILLA GA 31730  
USA  
9122365241

GOLDEN PEANUT CO.  
HOWARD VALENTINE, V.P.  
1100 JOHNSON FERRY RD, SUITE 580  
ATLANTA GA 30342  
USA  
4048437850

HERSHEY FOODS CORP/TECH CENTER  
GIOVANNI BIGALLI  
P. O. BOX 805  
HERSHEY PA 17033  
USA

HOBBS & ADAMS ENGINEERING CO  
OLIVER K HOBBS  
P. O. BOX 1833  
SUFFOLK VA 23434  
USA  
8045390231

IRHO/CIRAD-DOCUMENTA. SERV  
AGNES LAUR  
AVE DU VAL DE MONTFERRAND BP5035  
MONTPELLIER CEDEX 34032  
FRANCE

J.R. JAMES BROKERAGE CO., INC.  
JAMES L MOORE  
P.O. BOX 220, 419 N. MAIN ST  
SUFFOLK VA 23434  
USA  
8049343211

JACK COCKEY BROKERAGE CO  
JOHN S COCKEY, JR  
P. O. BOX 1075  
SUFFOLK VA 23434  
USA

JACOBS SUCHARD/BRACH INC.  
T T SCHULZ  
BOX 802  
CHICAGO IL 60690  
USA

KALO INC.  
DR. TOM WACEK  
4370 W. 109TH ST #210  
OVERLAND PARK KS 66211  
USA

KRISPY KERNELS  
DANIELLE SAMSON  
2620 WATT, PARCCOLBERT  
STE-FOY QUEBEC G1P 3T5  
CANADA  
4186584640

M&M/MARS  
ABRAHAM VARGHESE  
HIGH ST.  
HACKETTSTOWN NJ 07846  
USA

MARS BV  
ATTN.: MRS. ELAIS  
POSTBUS 31  
5460 BB VEGHEL  
THE NETHERLANDS

NABISCO BRANDS INC.-LIBRARY  
S D MEURER  
P.O. BOX 1942  
EAST HANOVER NJ 07936-1942  
USA

NC CROP IMPROVEMENT ASSOC  
FOIL W MCLAUGHLIN  
3709 HILLSBOROUGH STREET  
RALEIGH NC 27607  
USA  
9197372851

OILSEEDS BOARD  
P. O. BOX 211  
PRETORIA 0001  
SOUTH AFRICA

OKLAHOMA CROP IMPROVEMENT ASSOC  
F E LEGRAND  
OK. STATE UNIV., 368 AG HALL  
STILLWATER OK 74078-0507  
USA  
4056247117

PEANUT PROCESSORS, INC  
BOX 160  
DUBLIN NC 28332  
USA

PERT LAB, INC  
J R BAXLEY  
P. O. BOX 267  
EDENTON NC 27932  
USA

PLANTERS LIFESAVERS COMPANY  
ORIS E HOLLOWAY  
PO BOX 1942, 100 DEFOREST AVE.  
EAST HANOVER NJ 07936-1942  
USA  
2018844000

POND BROS PEANUT CO, INC  
RICHARD POND  
P.O. BOX 1370  
SUFFOLK VA 23434  
USA

PROCTOR & SCHWARTZ, INC  
WALTER G FRICK  
251 GIBRALTER ROAD  
HORSHAM PA 19044  
USA  
2154435200

SGS QUANTUM  
JULIE IVISON  
P.O. BOX 21  
EAST BRISBANE QUEENSLAND 4169  
AUSTRALIA

SOUTHEASTERN PEANUT ASSOC  
JOHN T POWELL  
P.O. BOX 70157  
ALBANY GA 31703-0003  
USA

SOUTHWESTERN PEANUT SHELLERS ASSN.  
SYDNEY C REAGAN  
10 DUNCANNON CT, GLENN LAKE  
DALLAS TX 75225  
USA

SUNGENE TECHNOLOGIES CORP.  
ATTN: INFORMATION CENTER  
2050 CONCOURSE DRIVE  
SAN JOSE CA 95131-1818  
USA  
4158563200

PEERLESS MANUFACTURING CO  
W E DYKES  
P. O. BOX 245  
SHELLMAN GA 31786  
USA  
9126795353

PLANTERS LIFESAVERS  
PETER C VALENTI  
1100 REYNOLDS BLVD  
WINSTON-SALEM NC 27102  
USA

PMB-AUSTRALIA  
ALEX BAIKALOFF  
P. O. BOX 26  
KINGAROY, QUEENSLAND, 4610  
AUSTRALIA  
071622211

PORTALES VALLEY MILLS, INC  
HERB MARCHMAN  
P. O. BOX 329  
PORTALES NM 88130  
USA  
5053566691

SEVERN PEANUT CO., INC.  
DALLAS BARNES  
P. O. BOX 28  
SEVERN NC 27877  
USA

SMITH BROKERAGE CO, INC  
EDWARD D SMITH  
P. O. BOX 910  
SUFFOLK VA 23434  
USA

SOUTHWESTERN PEANUT GROWERS ASSN  
ROSS WILSON, MGR  
GORMAN TX 76454  
USA  
8177342222

STEVENS INDUSTRIES  
W P SMITH  
DAWSON GA 31742  
USA

TARA FOODS  
NADINE BATOHA  
1900 COWLES AVENUE  
ALBANY GA 31708  
USA  
9124397726

THE LEAVITT CORPORATION  
JAMES T HINTLIAN  
P. O. BOX 31  
EVERETT MD 02149  
USA

THE PROCTER & GAMBLE CO  
KEN NELSON  
6071 CENTER HILL ROAD  
CINCINNATI OH 45224  
USA  
5139777568

THE PROCTER & GAMBLE COMPANY  
S R CAMMARN  
WINT HILL TECH CTR-6071 CENTER HILL  
CINCINNATI OH 45224  
USA

THE PROCTER & GAMBLE COMPANY  
WINTON HILL TECHNICAL LIBRARY  
6090 CENTER HILL ROAD  
CINCINNATI OH 45224-1792  
USA

TOYO NUTS COMPANY, LTD.  
30, FUKAE-HAMAMACHI, HIGASHINADA-KU  
KOBE CITY  
JAPAN  
0784527211

UB (FOODS) LTD  
P M BUCKINGHAM  
EASTWOOD TRADING ESTATE  
ROTHERHAM SOUTH YORKSHIRE S65 1TD  
ENGLAND

UNIROYAL CHEMICAL  
A B ROGERSON  
158 WIND CHIME COURT  
RALEIGH NC 27615  
USA

UNIVERSAL BLANCHERS, INC  
TOM BEATY  
P. O. DRAWER 727  
BLAKELY GA 31723  
USA

VIRGINIA-CAROLINA PEANUT ASSOC  
W. RANDOLPH CARTER, EXEC SEC  
LOCK DRAWER 499  
SUFFOLK VA 23434  
USA  
8045392100

WILCO PEANUT CO  
C H WARNKEN, JR  
P. O. BOX B  
PLEASANTON TX 78064  
USA  
5125693808

## SUSTAINING MEMBERS

ALABAMA PEANUT PRODUCERS ASSOC  
JAMES E MOBLEY  
P. O. BOX 1282  
DOTHAN AL 36302  
USA  
2057926482

ANDERSON'S PEANUTS  
JOHN W ANDERSON  
P. O. DRAWER 420  
OPP AL 36467  
USA

BASF CORPORATION  
BILL WISDOM  
100 CHERRY HILL ROAD  
PARSIPPANY NJ 07054  
USA  
2012633400

BEST FOODS/CPC INTERNATIONAL  
ROBERT E LANDERS  
P.O. BOX 1534/1120 COMMERCE AVE  
UNION NJ 07083  
USA  
2016889000

DOTHAN OIL MILL CO  
JOE SANDERS  
P.O. BOX 458  
DOTHAN AL 36301  
USA  
2057924104

ELANCO PRODUCTS COMPANY DIVISION  
ELI LILLY AND COMPANY  
INDIANAPOLIS IN 46285  
USA

FERMENTA PLANT PROTECTION  
GARY L EILRICH  
P.O. BOX 8000  
MENTOR OH 44061-8000  
USA

FRITO-LAY INC, R&D LIBRARY  
PAT ARNOLD  
P.O. BOX 152231  
IRVING TX 75015  
USA  
2145792271

GRIFFIN CORPORATION  
JIM R BONE  
P. O. BOX 1847  
VALDOSTA GA 31603-1847  
USA  
9122428635

HERSHEY CHOCOLATE CO  
RONALD T MURPHY  
19 EAST CHOCOLATE AVE  
HERSHEY PA 17033  
USA  
7175344595

N.C. PEANUT GROWERS ASSOC  
NORFLEET L SUGG  
P. O. BOX 1709  
ROCKY MOUNT NC 27801  
USA  
9194468060

OKLAHOMA PEANUT COMMISSION  
WILLIAM FLANAGAN  
BOX D  
MADILL OK 73446  
USA  
4057953622

PEANUT GROWERS COOP MKTG ASSOC  
DELL COTTON  
P. O. BOX 59  
FRANKLIN VA 23851  
USA  
8045624103

PLANTERS-LIFE SAVERS CO.  
J E BEAM  
1100 REYNOLDS BLVD.  
WINSTON-SALEM NC 27102  
USA

SUNNY JIM-PACIFIC FOODS, INC.  
GENE FRASER  
P.O. BOX 3663  
SEATTLE WA 98124  
USA

FLORIDA PEANUT PROD ASSN  
BUSTER SMITH, EXEC DIR  
P. O. BOX 447  
GRACEVILLE FL 32440  
USA

GA AG COMMODO, COMM FOR PEANUTS  
EMORY M MURPHY  
110 E. FOURTH STREET  
TIPTON GA 31794  
USA  
9123863470

HELENA CHEMICAL COMPANY  
ALLEN K UNDERWOOD  
5100 POPLAR, SUITE 3200, CLARK TWR  
MEMPHIS TN 38137  
USA

ICI AMERICAS, INC  
G.L.P. RANDALL  
P. O. BOX 208  
GOLDSBORO NC 27530  
USA  
9197363030

NATIONAL PEANUT COUNCIL  
C. EDWARD ASHDOWN  
101 S. PEYTON ST., SUITE 301  
ALEXANDRIA VA 22315  
USA  
7038389500

PEANUT BUYERS, INC.  
WILLIAM T FAIR  
P.O. BOX 246  
SEMINOLE TX 79360  
USA

PENNWALT CORPORATION  
3 PARKWAY, ROOM 619  
PHILADELPHIA PA 19102  
USA

SOUTH CAROLINA PEANUT BOARD  
DEBORAH GLEATON  
P.O. BOX 11280  
COLUMBIA SC 29211  
USA

TEXAS PEANUTS PRODUCERS BOARD  
MARY WEBB  
P. O. BOX 398  
GORMAN TX 76454  
USA  
8177345853

THE NITRAGIN COMPANY, INC  
STEWART SMITH  
3101 W. CUSTER AVENUE  
MILWAUKEE WI 53209  
USA  
4144627600

VIRGINIA PEANUTS GROWERS ASSOC  
RUSSELL C SCHOOLS  
P. O. BOX 149  
CAPRON VA 23829  
USA  
8046584573

UNITED STATES GYPSUM COMPANY  
MARGARET RHEA  
101 S. WACKER DR, DEPT 982-3  
CHICAGO IL 60606  
USA  
3123214399

## STUDENT MEMBERS

CHRYSANTUS N AKEM  
OKLAHOMA STATE UNIVERSITY  
DEPT. PLANT PATHOLOGY, 104 LSE  
STILLWATER OK 74078  
USA

SUSAN ARRENDELL  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA

GAETAN BOURGEOIS  
UNIVERSITY OF FLORIDA  
2911-51 SW 13TH ST  
GAINESVILLE FL 32608  
USA  
9143748023

TRACY A COLE  
AUBURN UNIVERSITY  
201 FUNCHES HALL  
AUBURN UNIVERSITY AL 36849  
USA  
2058264100

NEHRU B ESSOMBA  
AGRONOMY DEPARTMENT  
VIRGINIA TECH  
BLACKSBURG VA 24061  
USA

MICHAEL FITZNER  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA

WILLIAM F ANDERSON  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA  
9197273281

JEFFREY S BARNES  
DEPT OF PLANT PATHOLOGY  
COASTAL PLAIN EXP. STATION  
TIFTON GA 31793  
USA

JOE BROWDE  
NCSU-ENTOMOLOGY DEPT  
BOX 7613  
RALEIGH NC 27695-7613  
USA

ALBERT K CULBREATH  
NCSU-PLANT PATHOLOGY  
BOX 7616  
RALEIGH NC 27695-7616  
USA

WILLIAM FIEBIG  
2901-232 SW 13TH ST  
GAINESVILLE FL 32608  
USA

LUIS GIRAUDO  
J-311 UNIV.VILLAGE  
ATHENS GA 30605  
USA

TRACY M HALWARD  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA

SANUN JOGLOY  
NCSU-CROP SCIENCE DEPT  
BOX 7629  
RALEIGH NC 27695-7629  
USA

MICHELE D KEZIAH  
N.C. STATE UNIVERSITY  
3014 FARRIOR RD  
RALEIGH NC 27607  
USA

LEXIE MCKENTLY  
THE LAND-EPCOT CENTER  
P.O. BOX 10,000  
LAKE BUENA VISTA FL 32830  
USA  
3058277256

KIM MOORE  
UNIV OF FLORIDA  
5734 SW 46TH PL  
GAINESVILLE FL 32603  
USA  
9043744966

STEPHEN J NECK  
DEPT PLANT PATH & MICROBIO  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA

LUIS A PAYAU  
UNIVERSITY OF FLORIDA  
IFAS-NEMATOLGY LAB, BLDG 78  
GAINESVILLE FL 32611  
USA

LINDA J RAINEY  
NORTH CAROLINA STATE UNIV  
3225 CALUMET DR, APT E  
RALEIGH NC 27610  
USA  
9198335495

KIRBY R SAUER  
A&M ROUTE, BOX 59  
CUERO TX 77954  
USA

VINT HICKS  
AUBURN UNIVERSITY  
201 FUNCHESS HALL  
AUBURN UNIVERSITY AL 36849  
USA  
2058264100

USENI KEMBOLO  
UNIVERSITY OF FLORIDA  
3028 MCCARTY HALL  
GAINESVILLE FL 32611  
USA  
9043929343

ELLA LISWARA  
UNIVERSITY OF FLORIDA  
315 C NW 17TH ST  
GAINESVILLE FL 32603  
USA  
9048751515

L C MERCER  
100 HORNE ST., APT. 3  
RALEIGH NC 27607  
USA

OUSMANE NDOYE  
TEXAS A&M UNIVERSITY  
C/O DR. OLIN D. SMITH-SOIL SCIENCES  
COLLEGE STATION TX 77843  
USA  
4098458802

GREGORY B PARKER  
P.O. BOX 9387  
COLLEGE STATION TX 77842-0387  
USA

RICARDO PEDELINI  
UNIVERSITY OF FLORIDA  
2909-34 SW 13TH ST  
GAINESVILLE FL 32608  
USA  
9043772127

TURNJIT SATAYAVIRUT  
NCSU-ENTOMOLOGY DEPT  
BOX 7613  
RALEIGH NC 27695-7613  
USA

JILL R SIDEBOTTOM  
NCSU-PLANT PATHOLOGY DEPT  
BOX 7616  
RALEIGH NC 27695-7616  
USA

ELLEN SYKES  
RR#1  
CALEDONIA ONTARIO NOA 1A0  
CANADA

ANNE MARIE TISLER  
VPI & SU  
DEPT ENTOMOLOGY  
BLACKSBURG VA 24061  
USA

MUSUNGAYI TSHITEBWA  
UNIVERSITY OF FLORIDA  
3028 MCCARTY HALL  
GAINESVILLE FL 32611  
USA  
9043756143

DAVID E WILLIAMS  
INSTITUTE OF ECONOMIC BOTANY  
THE NEW YORK BOTANICAL GARDEN  
BRONX NY 10458  
USA

## INSTITUTIONAL MEMBERS (by country)

MR. R. JACKSON  
RES SCHOOL OF BIOL SCI-A.N.U.  
P.O. BOX 475  
CANBERRA ACT 2601  
AUSTRALIA

LIBRARIAN, NORTHERN REGION LIBRARY  
D.P.P., BOX 51  
BERRIMAH NORTHERN TERRITORY 5788  
AUSTRALIA

DEPARTMENT OF PRIMARY INDUSTRIES  
O.I.C. ORDERS AND ACCESSIONS  
WILLIAM STREET-CENTRAL LIBRARY  
BRISBANE, QUEENSLAND 4000  
AUSTRALIA

DEPARTMENT OF PRIMARY INDUSTRIES  
O.I.C. ORDERS AND ACCESSIONS  
WILLIAM STREET-CENTRAL LIBRARY  
BRISBANE, QUEENSLAND 4000  
AUSTRALIA

LIBRARIAN, SERIALS DEPARTMENT  
UNIVERSITY OF QUEENSLAND  
MAIN LIBRARY  
ST. LUCIA QUEENSLAND 4067  
AUSTRALIA

VIC LIBRARY  
VIENNA INTERNATIONAL CENTRE  
WAGRAMERSTRASSE 5, P.O. BOX 100  
VIENNA, A-1400  
AUSTRIA

INSTITUTO AGRONOMOICO  
BIBLIOTECA  
CAIXA POSTAL 28  
13100 CAMPINAS-SP  
BRAZIL

F MISIAK-RUBIN  
LIBRARY-CANADA PACKERS INC  
2211 ST CLAIR AVE W  
TORONTO M6N 2K4  
CANADA  
4167664311

RESEARCH STATION  
AGRICULTURE CANADA  
P.O. BOX 186  
DELHI ONTARIO N4B 2W9  
CANADA

LIBRARY - SERIALS DIVISION  
UNIVERSITY OF GUELPH  
GUELPH, ONTARIO, N1G 2W1  
CANADA

LIBRARY/ BIBLIOTHEQUE  
AGRICULTURE CANADA  
EDFICE SIR JOHN CARLING BLDG.  
OTTAWA, K1A 0C5  
CANADA

M.G.R. SMITH, LIBRARIAN  
UNIV NOTTINGHAM/AG SCI LIBRARY  
SUTTON BONINGTON  
LOUGHBOROUGH, LE12 5RD  
ENGLAND

MARS CONFECTIONERY  
MARS CONFECTIONERY  
LIBRARY, DUNDEE ROAD  
SLOUGH SL1 4JX BERKS  
ENGLAND

THE BRITISH LIBRARY  
SCIENCE REFERENCE LIBRARY (A)  
25 SOUTHAMPTON BLDGS.  
CHANCERY LANE, LONDON, WC2A 1AW  
ENGLAND

M PLANCK INST FUR ZUCHTUNGS.  
ERWIN BAUR INSTITUT, BIBLIOTHEK  
D 5000 KOLN 30  
(VOGELSANG)  
F.R. WEST GERMANY

EDITH BRINKMANN  
UNIVERSITAT. DER TECHNISCHEN  
D-3 HANNOVER 1  
WELFENGARTEN 1B  
FED. REP. OF GERMANY

THE LIBRARIAN  
TROPICAL PRODUCTS INSTITUTE  
56-62 GRAY'S INN ROAD  
LONDON, WC1X 8LU  
GREAT BRITAIN

KONINKLIJK INST VOOR DE TROPEN  
BIBLIOTHEEK - SSS  
MAURITSKADE 63  
1092 AD AMSTERDAM  
HOLLAND

THE LIBRARIAN CENTRAL LIBRARY  
GUJARAT AGRICULTURAL UNIV  
JUNAGADH 362 001  
INDIA

POSTIS  
CENTRAL FOOD TECHNOLOGICAL  
RESEARCH INSTITUTE  
MYSORE, 570 013  
INDIA

HEAD, LIBRARY & INFORMATION SERVS.  
BHABHA ATOMIC RESEARCH CENTER  
CENTRAL COMPLEX, TROMBAY  
BOMBAY, 400 085  
INDIA

DIRECTORATE OF OILSEEDS RESEARCH  
LIBRARY, THE OFFICER IN-CHARGE  
RAJENDRANAGAR  
HYDERABAD, 500 030  
INDIA

THE PRINCIPAL  
S.V. AGRICULTURAL COLLEGE  
TIRUPATI 517 002  
INDIA

THE LIBRARIAN  
ICRISAT  
ICRISAT PATANCHERU P.O.  
ANDHRA PRADESH 502 324  
INDIA

TAMIL NADU AGRICULTURAL UNIV  
LIBRARY  
COIMBATORE 641 003  
INDIA

THE UNIVERSITY LIBRARIAN  
ANDHRA PRADESH AGRICULTURAL UNIVERSI  
RAJENDRA NAGAR  
ANDHRA PRADESH HYDERABAD 500 030  
INDIA

UNIVERSITY OF AGRIC'L SCIENCE  
LIBRARIAN  
G.K.V.K.  
BANGALORE 560 065 KARNATAKA STATE  
INDIA

THE DEPUTY LIBRARIAN  
COLLEGE OF AGRICULTURE  
DHARWAR, KARNATAKA, 580 005  
INDIA

UNIVERSITY LIBRARIAN  
MAHATMA PHULE AGRICULTURAL UNIVERSIT  
RAHURI 413 722  
DIST. AHMEDNAGAR MAHARASHTRA  
INDIA

THE UNIVERSITY LIBRARIAN  
MOHINDER SINGH RANDHAWA LIBRARY  
PUNJAB AGRICULTURAL UNIVERSITY  
LUDHIANA 141004 PUNJAB  
INDIA

THE LIBRARY  
MALANG RESEARCH INSTITUTE FOR FOOD  
J1 WILIS 10  
MALANG  
INDONESIA

PERPUSTAKAAN FAKULTAS PERTANIAN  
CFAC OF AG LIB, ATTN: BUDIWIJAYA  
UNIV GADJAH MADA, JLN SEKIP  
P.O. BOX 1, YOGYAKARTA 55581B  
INDONESIA

CENTRAL LIBRARY OF  
AGRICULTURAL SCIENCE  
P. O. BOX 12  
REHOVOT, 76100  
ISRAEL

H. VICTOR, HEAD LIBRARIAN  
THE LIBRARY  
RUPPIN INSTITUTE  
EMEK HEFER, CODE 60960  
ISRAEL  
053951317

FAO LIBRARY, SERIALS  
VIA DELLE TERME DI GARACALLA  
ROME, 1-00100  
ITALY

KOKKAI-TOSHOKAN  
KAGAKU-JPT  
NAGATA-CHO CHIYODA-KU  
TOKYO, 100  
JAPAN

UNIVERSITI PERTANIAN MALAYSIA 0955M  
ACQUISITIONS DIVISION  
SERIALS LIBRARY  
43400 UPM SERDANG SELANGOR  
MALAYSIA

UNIVERSITI PERTANIAN MALAYSIA 0955M  
ACQUISITIONS DIVISION  
SERIALS/LIBRARY  
43400 UPM SERDANG SELANGOR  
MALAYSIA

M. LY-TIO-FANE  
SUGAR INDUSTRY RESEARCH INST.  
REDUIT  
MAURITIUS

TAINAN DISTRICT AGRICULTURAL  
IMPROVEMENT STATION  
350 LIN-SEN ROAD, SECTION 1  
TAINAN, TAIWAN (FORMOSA) 70125  
REPUBLIC OF CHINA

TAIWAN AGRICULTURAL RESEARCH  
INSTITUTE LIBRARY  
189 CHUNG CHENG RD.  
WAN-FENG WU-FENG, TAICHUNG TAIWAN  
REPUBLIC OF CHINA

NTUG  
SCIENCE & TECHNOLOGY INF. CTR.  
PO BOX 4 NANKANG  
TAIPEI (11529) TAIWAN  
REPUBLIC OF CHINA

INSTITUT DE RECH POU HUILES ET OLEAGAGRIHOLD  
C.I.R.A.D.  
STATION DAROU-B.P. 75  
KAOLACK  
SENEGAL

THE LIBRARIAN  
P.O. BOX 912-055  
SILVERTON 0127  
SOUTH AFRICA

LIBRARY: HIGHVELD REGION  
DEPARTMENT OF AGRIC. & WATER SUPPLIE  
PRIVATE BAG X804  
POTCHEFSTROOM 2520  
SOUTH AFRICA

DIRECTOR LIBRARY SERVICES  
UNIVERSITY OF OFS  
P.O. BOX 301  
9300 BLOEMFONTEIN  
SOUTH AFRICA

ANTON DE KOM  
UNIVERSITY OF SURINAME  
P.O.B. 9212  
PARAMARIBO  
SURINAME

KASETSART UNIV/ MAIN LIBRARY  
KAMPHANGSEAN CAMPUS  
KAMPHANGSEAN DIST  
NAKORN PATHOM PROV 73740  
THAILAND

TURKIYE PETROLLERI A.O.  
BATMAN BOLGE MUDURLUGU  
KUTUPHANE BATMAN  
TURKEY

RALPH BROWN DRAUGHON LIBRARY  
SERIALS DEPARTMENT  
AUBURN UNIVERSITY AL 36849  
USA

PERIODICALS DEPT.  
GEORGE S. HOUSTON MEMORIAL LIBRARY  
212 WEST BURDESHAW ST.  
DOTHAN AL 36303  
USA

UNIV OF CALIFORNIA AT DAVIS  
ACQUISITIONS DEPT  
THE LIBRARY  
DAVIS CA 95616  
USA

UNIVERSITY OF CALIFORNIA  
SERIALS DEPARTMENT  
GENERAL LIBRARY  
BERKELEY CA 94720  
USA

BIBLIOGRAPHICAL SERVICE  
P.O. BOX 564  
COLORADO SPRINGS CO 80901  
USA

BIBLIOGRAPHICAL SERVICE  
P.O. BOX 564  
COLORADO SPRINGS CO 80901  
USA

BIBLIOGRAPHICAL SERVICE  
P.O. BOX 564  
COLORADO SPRINGS CO 80901  
USA

MRS. M. PLACK  
SOC. FOR INFO. & DOCUMENTATION  
1990 M ST., N.W., SUITE 680  
WASHINGTON D. C. 20036  
USA  
2024662808

JAY AGRICULTURE RESEARCH CENTER  
LIBRARY  
ROUTE 3 BOX 575  
JAY FL 32565  
USA  
9049945215

CENTRAL SCIENCE LIBRARY  
UNIVERSITY OF FLORIDA  
SERIALS DEPARTMENT  
GAINESVILLE FL 32611  
USA

COASTAL PLAIN EXPERIMENT STATION  
LIBRARY  
P. O. BOX 748  
TIFTON GA 31793  
USA

UNIVERSITY OF GEORGIA LIBRARIES  
ACQUISITIONS DEPARTMENT  
SERIALS SECTION  
ATHENS GA 30602  
USA

LIBRARY  
GEORGIA EXPERIMENT STATION  
GRIFFIN GA 30223-1797  
USA

CHARLES E METTS, USDA-ARS  
STORED PRODUCTS INSECT R&D LAB  
P. O. BOX 22909  
SAVANNAH GA 31403  
USA

PARKS LIBRARY- SERIALS DEPT.  
IOWA STATE UNIVERSITY  
AMES IA 50011-2140  
USA

UNIV OF ILLINOIS AT URBANA -  
CHAMPAIGN: SERIALS-FAX  
1408 W. GREGORY DRIVE  
URBANA IL 61801  
USA

TECHNICAL INFORMATION LIBRARY  
SANDOZ CROP PROTECTION CORP  
341 E. OHIO ST  
CHICAGO IL 60611  
USA

CONTINUATIONS SECTION  
MORRIS LIBRARY  
SOUTHERN ILLINOIS UNIVERSITY  
CARBONDALE IL 62901  
USA

USDA LIBRARY  
SOUTHERN REGIONAL RESEARCH CTR  
P. O. BOX 19687  
NEW ORLEANS LA 70179  
USA

ECONOMIC BOTANY LIBRARY OF OAKS-AMESUSDA NATIONAL AGRICULTURAL LIBRARY  
HARVARD UNIVERSITY  
22 DIVINITY AVE.  
CAMBRIDGE MA 02138  
USA

PRR  
10301 BALTIMORE BLVD-RM 002  
BELTSVILLE MD 20705  
USA

CURRENT SERIAL REC.- USDA-CSR  
USDA NATIONAL AGRICULTURAL LIBRARY  
ROOM 002, 1301 BALTIMORE BLVD  
BELTSVILLE MD 20705  
USA

CURRENT SERIAL REC. USDA-PRR  
USDA NATIONAL AGRICULTURAL LIBRARY  
ROOM 002-10301 BALTIMORE BLVD.  
BELTSVILLE MD 20705  
USA

MICHIGAN STATE UNIVERSITY  
LIBRARY - SERIALS  
EAST LANSING MI 48824-1048  
USA

ANHEUSER-BUSCH CO., INC.  
CORPORATE LIBRARY  
P.O. BOX 1828, BECHTOLD STATION  
ST. LOUIS MO 63118  
USA

LINDA HALL LIBRARY  
SERIALS DEPARTMENT  
5109 CHERRY  
KANSAS CITY MO 64110  
USA

MISSISSIPPI STATE UNIVERSITY  
MITCHELL MEMORIAL LIBRARY  
SER TECH SERV  
STATE COLLEGE MS 39762  
USA

CIBA-GEIGY CORPORATION  
THE LIBRARY  
P. O. BOX 18300  
GREENSBORO NC 27419  
USA

D H HILL LIBRARY  
NCSU-PER SER CTR  
BOX 7111  
RALEIGH NC 27695-7111  
USA

THOMAS J LIPTON, INC  
LIBRARY  
800 SYLVAN AVENUE  
ENGLEWOOD CLIFFS NJ 07632  
USA

SERIALS DEPT- LIBRARY  
EASTERN NEW MEXICO UNIVERSITY  
PORTALES NM 88130  
USA

THE ALBERT R. MANN LIBRARY  
ACQUISITIONS DIVISION  
STATE UNIV @ CORNELL UNIV  
ITHACA NY 14853  
USA

MAX MOORE  
CHEMICAL ABSTRACTS SERVICE  
P. O. BOX 3012  
COLUMBUS OH 43210  
USA

EDMON LOW LIBRARY  
OKLAHOMA STATE UNIVERSITY  
SERIALS SECTION  
STILLWATER OK 74078  
USA

CLEMSON UNIVERSITY  
AGRICULTURAL LIBRARY  
LIBRARIAN  
CLEMSON SC 29631  
USA

AGRICULTURE- VETERINARY MED LAB  
VET TEACHING HOSPITALE  
UNIVERSITY OF TENNESSEE  
KNOXVILLE TN 37996  
USA

LIBRARY SERIALS RECORD  
TEXAS A&M UNIVERSITY  
COLLEGE STATION TX 77843  
USA

TARLETON STATE UNIVERSITY  
THE LIBRARY  
TARLETON STATION  
STEPHENVILLE TX 76402  
USA

VPI & SU  
LIBRARIAN, SERIALS-RECEIVING  
UNIVERSITY LIBRARIES  
BLACKSBURG VA 24061  
USA

BIBLIOTEKA  
SELSKO-KHOZJAJSTVEN  
ORLIKOV PER., 3  
MOSCOW  
USSR

BIBLIOTECA CENIAP  
OFICINA COM AGRIC  
APDO 4653  
MARACAY EDO ARAGUA  
VENEZUELA

LIBRARIAN  
DEPARTMENT OF AGRICULTURE  
BARON-HAY COURT  
SOUTH PERTH 6151  
WESTERN AUSTRALIA

PROF. J F LONERAGAN  
SCHOOL OF ENV & LIFE SCI  
MURDOCH UNIVERSITY  
MURDOCH 6150  
WESTERN AUSTRALIA

EPADP  
EASTERN PROVINCE AGRIC. DEVELOPMENT  
P.O. BOX 19  
CHIPATA  
ZAMBIA

# AUTHOR INDEX

## AUTHOR

|                     |                    |                      |             |
|---------------------|--------------------|----------------------|-------------|
| Aboshosha, S.S.     | 36                 | Evans, J.R.          | 55          |
| Ahmed, E.M.         | 45                 | Fagbenle, H.H.       | 38          |
| Akem, C.N.          | 28,30              | Ferguson, W.G.       | 25          |
| Anderson, W.F.      | 13                 | Fillonow, A.B.       | 37          |
| Arnold, J.E.        | 34                 | Ford, S.A.           | 18          |
| Azaizah, H.A.       | 27                 | French, J.C.         | 16          |
| Bailey, J.E.        | 19,67              | Gardner, F.P.        | 44          |
| Baldwin, J.A.       | 19                 | Gorbet, D.W.         | 12,31,34    |
| Banks, D.J.         | 12                 | Grichar, W.J.        | 38,53       |
| Barnes, J.S.        | 37                 | Hagan, A.K.          | 16,35       |
| Basha, S.M.         | 43                 | Hagwood, H.B.        | 54          |
| Bates, M.R.         | 54                 | Haruthaithanasan, V. | 64          |
| Baxley, J.R.        | 62                 | Hewitt, T.D.         | 18          |
| Beasley, J.P., Jr   | 18                 | Hicks, T.V.          | 54          |
| Berger, R.D.        | 31                 | Holbrook, C.C.       | 13,13,61    |
| Beute, M.K.         | 36                 | Hoogenboom, G.       | 57          |
| Bishop, T.D.        | 54                 | How, J.S.            | 64          |
| Black, M.C.         | 40                 | Howell, R.K.         | 51          |
| Blankenship, P.D.   | 22,24,25,<br>42,47 | Huffman, S.B.        | 63          |
| Boote, K.J.         | 31,57              | Hulbert, J.C.        | 55          |
| Bourgeois, G.       | 31                 | Jackson, K.E.        | 28,38       |
| Branch, W.D.        | 13,13,41           | Jewell, E.L.         | 32          |
| Brecke, B.J.        | 53                 | Johnson, B.          | 42          |
| Brenneman, T.B.     | 32                 | Jones, A.            | 60          |
| Brooks, R.L.        | 55                 | Jones, J.W.          | 57          |
| Buchanan, G.A.      | 61                 | Jowers, H.E.         | 18          |
| Burnham, K.P.       | 28                 | Ketring, D.L.        | 41          |
| Bush, R.K.          | 48                 | Keziah, M.D.         | 45          |
| Butler, J.L.        | 21                 | King, J.             | 34          |
| Butts, C.L.         | 61                 | Kirby, J.S.          | 13          |
| Calahan, J.S., Jr.  | 43                 | Knauft, D.A.         | 12,15       |
| Campbell, W.V.      | 16                 | Kvien, C.S.          | 34,41,61    |
| Chaney, N.          | 51                 | Labrinos, J.L.       | 33          |
| Chen, W.Q.          | 42                 | Lansden, J.A.        | 46          |
| Chompreeda, P.      | 64                 | Lee, T.A., Jr.       | 67          |
| Civille, G.V.       | 47                 | Lewis, P.I.          | 37          |
| Coffelt, T.A.       | 14,52              | Littlefield, L.J.    | 66          |
| Cole, R.J.          | 22,24,25,25        | Lovegren, N.V.       | 47,47       |
| Cole, T.A.          | 54                 | Lynch, R.E.          | 17          |
| Colvin, D.L.        | 53                 | Mack, T.P.           | 16,60       |
| Crippen, K.L.       | 21,22,47           | Matsunobu, A.        | 63          |
| Csinos, A.S.        | 34,37,41           | McClendon, R.W.      | 59          |
| Cu, R.M.            | 32                 | McLean, H.S.         | 56          |
| Culbreath, A.K.     | 36                 | McMeans, J.L.        | 42          |
| Davidson, J.I., Jr. | 22,25,60           | Meier-Davis, S.      | 48          |
| Dickens, J.W.       | 21,22,23,26        | Melouk, H.A.         | 28,30,36,66 |
| Donner, J.W.        | 22,24,25           | Miller, M.           | 62          |
| Dowell, F.E.        | 22,25              | Miller, R.H.         | 51          |
| Elliott, V.J.       | 33                 | Mills, F.D., Jr.     | 20          |
| Erickson, J.E.      | 45                 | Moore, K.M.          | 15          |
|                     |                    | Mozingo, R.W.        | 28,45,65    |

|                   |                 |                   |           |
|-------------------|-----------------|-------------------|-----------|
| Musungayi, T.     | 44              | Some, S.A.        | 17        |
| N'Doye, O.        | 14              | Sprenkel, R.K.    | 34        |
| Neck, J.S.        | 30              | Spurr, H.W., Jr.  | 33        |
| Nelson, L.A.      | 45              | Starr, J.L.       | 39        |
| Nelson, S.C.      | 39              | Steele, J.L.      | 32,52,58  |
| Norden, A.J.      | 46              | Stipes, R.J.      | 29,32     |
| Nordlee, J.A.     | 48              | Sullivan, G.A.    | 21,44     |
| Nuttar, F.W., Jr. | 33,58           | Sumner, M.E.      | 41        |
| Odle, W.C.        | 56              | Szerszen, J.B.    | 26        |
| Osborne, W.W.     | 29              | Taber, R.A.       | 30        |
| Ouedraogo, A.D.   | 17              | Taylor, J.D.      | 29        |
| Oupadissakoon, C. | 64              | Taylor, S.L.      | 48        |
| Parker, G.B.      | 14,38           | Trammell, C.A.    | 54        |
| Parker, S.        | 60              | Tsai, Y.J.        | 22        |
| Pattee, H.E.      | 21              | Turner, J.C.      | 55        |
| Pedelini, R.R.    | 50              | Turpin, G.        | 49        |
| Pettit, R.E.      | 26,27           | Vercellotti, J.R. | 21,22,46, |
| Phipps, P.M.      | 14,29,32,35,58, |                   | 47,47     |
|                   | 67              | Walker, M.E.      | 24        |
| Porter, D.M.      | 28,49,52,58,66  | Waniska, R.D.     | 27        |
| Powell, N.L.      | 50              | Wang, Y.          | 60        |
| Rogers, D.D.      | 55              | Weeks, J.R.       | 16,35     |
| Register, E.W.    | 21              | Wehtje, G.R.      | 54        |
| Sanders, T.H.     | 22,23,24,25,    | Wergin, W.P.      | 51        |
|                   | 42,46,47,47     | Wheless, T.G.     | 41        |
| Shaffer, G.       | 47              | Whitaker, T.B.    | 26        |
| Sharma, S.B.      | 39              | Whitty, E.B.      | 50        |
| Sherwood, J.L.    | 42              | Wilcut, J.W.      | 54        |
| Shokes, F.M.      | 31              | Williams, E.J.    | 21,59     |
| Sholar, J.R.      | 49              | Wilson, D.M.      | 24        |
| Simpson, C.E.     | 15,39           | Wood, B.W.        | 42        |
| Slate, A.B.       | 23              | Woodard, K.E.     | 67        |
| Smal, H.          | 41              | Wright, F.S.      | 49,50     |
| Smith, D.H.       | 36,40           | Wynne, J.C.       | 13        |
| Smith, F.D.       | 29              | Young, C.T.       | 45,46     |
| Smith, J.S., Jr.  | 23              | Young, J.H.       | 57        |
| Smith, O.D.       | 14,38           |                   |           |