Crop Emergence and Yield Response of Peanuts Planted at Different Seeding Depths and Planter Downforces in Loamy Sand Soils

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Consistent and uniform seeding depth across the field helps in rapid seed germination and uniform stand establishment. On most row-crop planters, row-unit downforce is adjusted during initial planter setup to achieve the desired seeding depth throughout the field. Lack of adequate downforce during planting can result in seed depth variations leading to non-uniform or delayed emergence. Limited research exists on the influence of planter depth and downforce settings on crop emergence and yield in peanuts. Therefore, research studies were conducted at the University of Georgia's Southeastern Research and Extension Center located in Midville, GA from 2017 to 2019 to investigate the aforementioned effect in peanuts. During all three years, study treatments consisted of three seeding depths of 1.5, 2.5, and 3.5 inches each depth paired with three different downforces of 100, 200 and 400 lbs. The fields consisted predominantly of Dothan loamy sand soils. All treatments were replicated four times and planted in plots that measured 6 ft. wide (4-rows) by 30 ft. long. Plots were planted using a 4-row Monosem NG*Plus* planter (36 inch row-spacing) equipped with a mechanical downforce system. For data collection, stand counts were collected in center two rows (10 ft. sections) at one, two and three weeks after planting. Yield data was collected by harvesting the full-length (30 ft.) of the center two rows. Results suggested that full crop emergence in all plots was mostly achieved by two WAP in each year and no subsequent increase in crop emergence occurred after two weeks. Data analysis indicated that seeding depth had a more profound effect on crop emergence than planter downforce during all three years. In 2017 and 2019, peanuts planted at the 2.5 inch seeding depth exhibited the highest emergence (60 - 70%) followed by the emergence at 3.5 and 1.5 inch seeding depths (56 – 66% and 53 – 57 %, respectively). In 2018, crop emergence decreased from 76% to 46% with an increase in seeding depth from 1.5 to 3.5 inches. Observed variations in crop emergence among seeding depths were primarily attributed to differences in local weather and soil conditions at planting between the study years. Lack of downforce effect of crop emergence was likely due to the relatively low downforce requirements in sandy soils, where the lowest planter downforce of 100 lbs was sufficient to achieve the desired seeding depths of 1.5, 2.5 and 3.5 inches. Peanut yield was not affected by seeding depth or downforce during all three years. Yield variations as large as 1000 lbs/ac were observed among the study treatments during each year. The highest yields were attained at the 1.5 – 2.5 inch seeding depths irrespective of the planter downforce. Future studies need to evaluate seeding depth and planter downforce in other soil types including medium and heavy textured soils to identify how downforce requirements change with soil texture to maintain a desired seeding depth when planting peanuts.