Effects of Fungicides and Herbicides on Performance of Peanut (*Arachis hypogea)* Varieties at Different Densities

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Peanut (*Arachis hypogea)* is one of the grain legumes that is widely grown in Malawi for food, income and soil fertility. However, productivity is constrained by a number of biotic and abiotic factors including weeds, diseases, pests, unpredictable rainfall; low seed quality, and plant population. Field studies were conducted over two cropping seasons in 2019/2020 and 2020/2021 at two locations in Lilongwe, Malawi. The main objective was to evaluate the effects of fungicides and herbicides on productivity of two peanut varieties (CG9- Virginia type; and Chitala-spanish variety) at different plant densities. Lilongwe is in the mid altitude agro-ecological zones. The soils are largely medium textured ranging from sandy clay to sandy clay loams; and with low to medium levels of soil organic matter. In the fungicide trial, the treatments included two peanut varieties, fungicide (Chlorothalol) application and control (no fungicide). For the herbicides trial, two peanut varieties were planted at low and high densities; and four weed management options as follows: pre emergence herbicide only (Harness), post emergence herbicide only (Bentazone); pre and post emergence herbicides, and the control (untreated). Results over two seasons showed the benefits of inputs (fungicides and herbicides) on peanut productivity. There were variations in grain yield depending on variety and location. In the herbicide trial, the results on grain yield showed a significant variety x weed management interaction; and variety x density interactions. Application of herbicides increased peanut yield over the control with more benefits observed in Chitala variety than CG9. The findings also indicate that investments in herbicides should be made at high peanut densities. However, no differences were observed in grain yield among the herbicide treatments. In this paper, we also present results on weed diversity, the costs associated with different weed management options and implications on investments in weed management. Based on the results, we recommend the use of fungicides and pre-emergence herbicides at high peanut densities to optimize peanut productivity.