Evaluating Accuracy and Distribution Uniformity of Gypsum Application in Peanut for a Spinner-Disc Broadcast Spreader

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Gypsum application in peanut is important to provide calcium in the pegging zone and to ensure high peanut yield and quality. Spinner-disc spreaders are the common application equipment to broadcast apply gypsum in peanut. Application issues with spinner-disc spreaders are common and several recent studies have reported the non-uniformity issues when spreading dry granular fertilizer with spinner-disc spreaders. Similar research on gypsum application is limited, therefore the objective of this study was to evaluate the application accuracy and distribution uniformity across the swath for gypsum applied using a spinner-disc spreader. Field tests were conducted in a large-scale peanut field at the Southwest Research and Education Center in Plains, GA in 2021. Before making a spreader pass, collection pans – spaced 6 ft. apart – were placed along the spread swath at three different transects (approx. 100 ft. apart) within the same pass and gypsum applications were made at three different spreader settings (flow divider position 1”, 4” and 7” where 4” was the nominal setting used by the farm manager). The target application rate for gypsum was 900 lbs/ac while the spreader was set up to apply at a spread width of 36 ft. swath. After each spreader pass, material from each collection pan for all three transects was collected and weighed to determine the actual applied rate as well as the uniformity of distribution across the swath as represented by coefficient of variation (CV). Results showed that the actual application rate attained in the field was always lower (354 – 646 lbs/ac) than the target rate (900 lbs/ac) and it also varied among the spreader settings. The results also indicated that gypsum application was highly non-uniform (CV = 30% - 65%) across the swath with a heavy material deposition directly behind the spreader for all three spreader settings. Considerable differences in spread uniformity (30 – 50%) were also observed for the material collected in the three transects within the same spreader pass. This study highlights the inconsistencies associated with achieving accurate application rate and uniform material distribution when spreading material with spinner-disc spreaders. While application errors due to equipment limitations and material properties are completely unavoidable, proper spreader setup and calibration is important to attain acceptable application accuracy, especially for peanut seed growers. Future research will also evaluate the similar application data for large self-propelled high clearance broadcast spreaders.