New Soybean Potassium Recommendations

MISSISSIPPI STATE UNIVERSITY EXTENSION

Thanks to the efforts of MSU Extension soil scientists and graduate students, with backing from the Mississippi Soybean Promotion Board, we have sufficient data to support changes in soybean potassium recommendations.

Soil samples are placed into one of five categories (very low to high) based on extractable potassium level and cation exchange capacity (CEC). From their assigned category, samples are given a fertilizer recommendation.

Beginning in January 2020, soybean groupings were revised to have lower thresholds to trigger a potassium rate recommendation. **Table 1** shows the previous categories, and **Table 2** shows the revised categories. In addition, soybean recommended rates for K_20 fertilizer in the low category changed (**Table 3**). These changes are intended to help producers optimize fertilizer rates and reach their yield goals.

Samples that are categorized as very low will remain at 120 pounds per acre of K_20. All samples that are categorized as low will now receive a recommendation of 90 pounds per acre (previously 60). Samples that are categorized as medium will continue to get a recommendation of 60 pounds per acre. No fertilizer recommendations are given for samples in the high or very high categories.

Table 1. Previous soybean potassium groupings based on soil test extractable K in pounds per acre.

Category	CEC ≤7	CEC 7–14	CEC 14–25	CEC 25+
Very Low	0–50	0–60	0–70	0–80
Low	51–110	61–140	71–160	81–180
Medium	111–160	141–190	161–210	181–240
High	161–280	191–335	211–370	241–420
Very High	280+	335+	370+	420+

Table 2. Revised soybean potassium groupings based on soil test extractable K in pounds per acre.

Category	CEC ≤7	CEC 7–14	CEC 14–25	CEC 25+
Very Low	0–70	0–90	0–120	0–150
Low	71–150	91–190	121–240	151–260
Medium	151–200	191–240	241–290	261–320
High	201–350	241–420	291–510	321–560
Very High	350+	420+	510+	560+

Table 3. Current and revised soybean recommended fertilizer rates in pounds per acre for K_20.

Category	Current	Revised
Very Low	120	120
Low	60	***90***
Medium	60	60
High	0	0
Very High	0	0

Here is an example of how this change might impact a sample recommendation: Under previous recommendations, soils testing at 250 pounds per acre extractable K with a CEC of 30 were classified as a high rate and, thus, did not get a potassium recommendation. Data from Dygert (2019; **Figure 1**) suggests this is not sufficient, and additional K would trigger a yield response. A minimum of 250 pounds per acre of extractable K is required for K to not be a limiting factor in soybean yields.

Additionally, data from research trials conducted from 2011 to 2019 in the Mississippi Delta suggests that, when soil test values are in the responsive range, 80 pounds per acre of K_2O are required to maximize soybean yields (**Figure 2**).

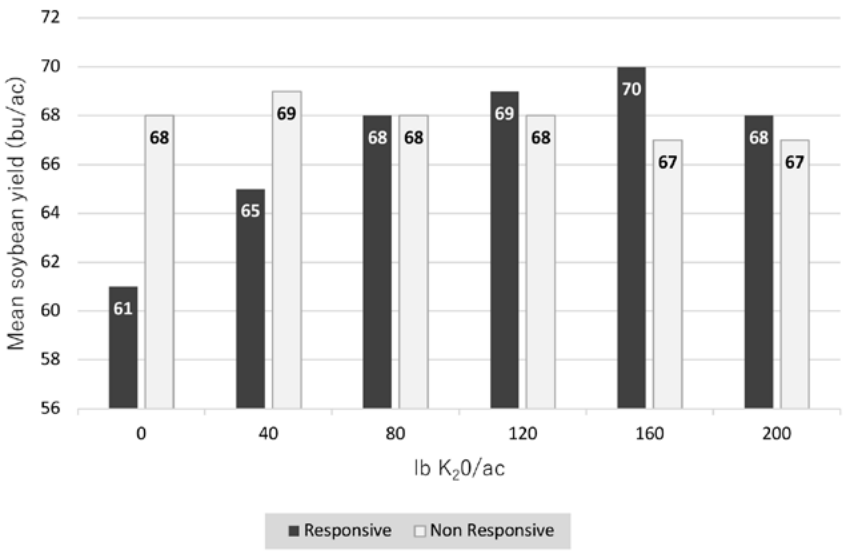

Figure 1. Soybean response to potassium application. Data from research trials conducted between 2011 and 2019 in the Mississippi Delta. Research conducted by Bobby Golden, PhD, Associate Extension/Research Professor, MSU Delta Research and Extension Center.

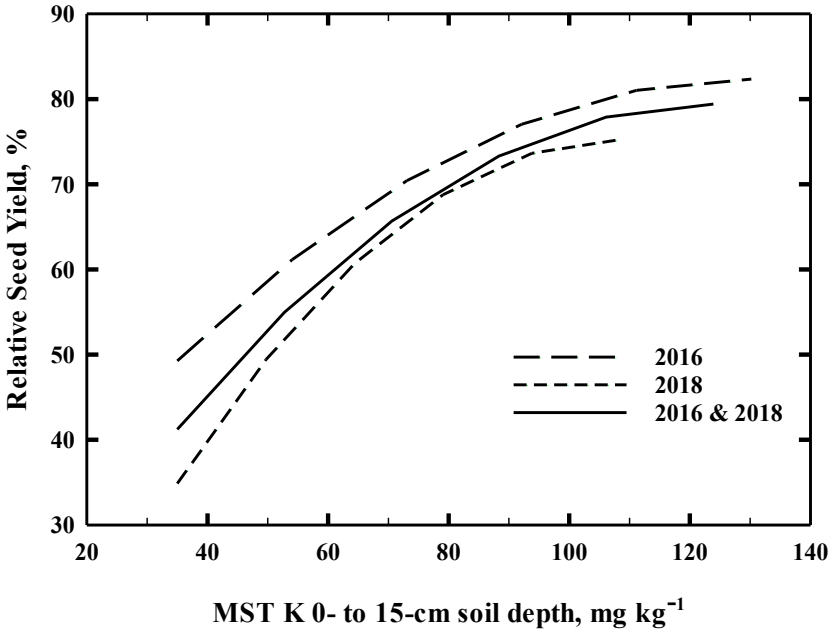

Figure 2. Response curve of relative seed yield influenced by increasing Mississippi soil test K for 0- to 15-cm soil depths up to the relative seed yield plateau. Data from Dygert (2019). Varietal and residual soil test K level effects on soybean leaf K status and yield. MS Thesis. Mississippi State University.

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