

Corn seed treatment effects on soil microbial activity and grain yield at the 2022 Soil Health School

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Many corn producers have interest in knowing the effects of omitting corn seed treatments on plant stand, microbial activity and grain yield. A small field scale evaluation was conducted on a farmer's field that was included in the 2022 South Dakota Soil Health Coalition Soil Health School. One hybrid, with and without seed treatment (Poncho 250) was planted on 5-14-22 at 32,500 seeds/a in random 6-30 inch row strips across a field. Plot lengths varied from 950 to 1050 ft. Seedling plant emergence counts were obtained from predetermined small plots near the west end of the field strips. Early season climatic temperatures were lower than normal and seedlings took longer than usual to emerge from the soil. The first corn seedlings to emerge came on 5-27-22, 12 days after planting. Seed treatment did not cause corn seedling to emerge more quickly compared to seeds without treatment. The opposite effect is shown on figure 1. Corn seeds with no seed treatment had advanced emergence compared to those with seed treatment. Final stands are slightly higher from seeds with no treatment at about 32,000 (plants/a) while the stand from treated plots was 30,000 (plants/a). The effects on soil microbiology show that untreated seed plots had higher CO₂ respirations and microbial active carbon (Table 1). It is unknown if these difference have a significant impact on soil biology function and benefits and should be further investigated. Grain yield averages were not different between treatment plots with and without seed treatment. A summarization for this project would include caution on eliminating seed treatments on corn because this is only one year of data. It should be considered that possibly improved soil health provides enough beneficial insects and soil microbes that mitigate the benefits of corn seed treatments.

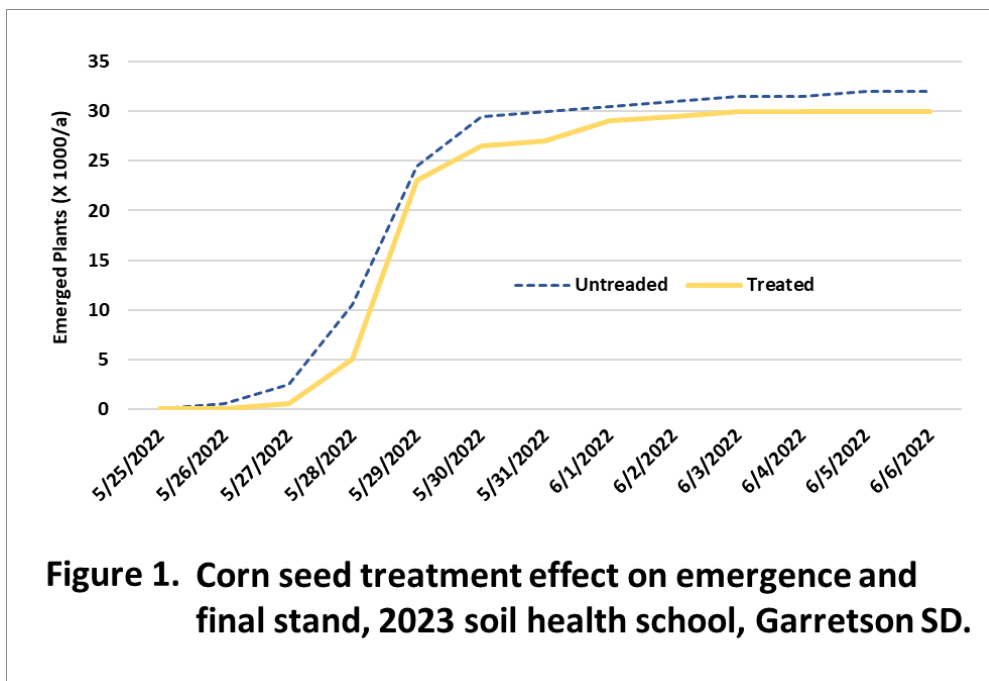


Figure 1. Corn seed treatment effect on emergence and final stand, 2023 soil health school, Garretson SD.

Table 1. Corn seed treatment comparison, Soil Health School 2022, Garretson SD.

Seed Treatment ^A	CO ₂ burst ^B ppm C	MAC ^C %	Grain Yield ^D bu/a
Yes	137.7	128.8	217.1
No	154.6	155.3	217.5

^A Seeds from same hybrid either treated or untreated, planted at same population (32,500) on May 14, 2022. The seed treatment was Poncho 250.

^B Carbon Dioxide (CO₂) captured from microbial activity after soil wetting.

^C Microbial active carbon = % of water extractable carbon that is from microbial respiration.

^D Grain yield average of 4 replications (randomized strips) at 15% moisture.
Soil Organic Matter (LOI) for soil type at this site = 4.6%