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Effect of *Bradyrhizobium japonicum* seed treatment (germinated and non-germinated) on soybean sudden death syndrome in controlled conditions

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Previous studies showed that cool soil temperature are one of the favorable factors for *Fusarium virguliforme*, the causal agent of soybean sudden death syndrome (SDS), infection. *Bradyrhizobium japonicum* (BJ), a nitrogen fixing  $\alpha$ -Proteobacterium symbiont that forms nodules on soybean, is indigenous to the United States soils. Minimum temperature for BJ to infect soybean was 17.5°C and that for *F.virguliforme* at 15°C. In this study, *Bradyrhizobium japonicum* strains obtained at Iowa State and from USDA collection were treated on germinated and non-germinated seeds of P22T61RR and were evaluated for SDS suppression in controlled conditions. Experiments were conducted in growth chambers and greenhouse conditions at 15, 20 and 25°C soil temperatures in a randomized complete block with factorial treatment structure. Results showed that SDS incidence at V2 stage were significantly ( $P<0.05$ ) lower in germinated (30%) and non-germinated (39%) seeds compared with untreated controls. Also, significant interaction was observed between seed treatments and temperatures. Average nodule counts on primary roots of treated seeds were highest at 20°C compared with ones at two other temperatures. Non-germinated treated soybean had better nodulation than germinated ones. This study suggested that temperature sensitive BJ seed treatment could provide plant health benefits in early planted soybean and also may act as a potential biocontrol agent against SDS.