

Short-Term Effects of Seed Dressing With Azorhizobium Caulinodans on Establishment, Development and Yield of Early Maturing Maize (Zea Mays L.) In Zimbabwe

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Abstract : The majority of soils in communal areas of Zimbabwe are sandy and inherently infertile and sustainable cultivation is not feasible without addition of plant nutrients. Most farmers find it difficult to raise the capital required for investments in mineral fertilizer and find it cheaper to use low nutrition animal manure. An experiment was conducted to determine the effects of nitrokara biofertiliser on early growth, development and maize yield while also comparing nitrokara biofertiliser on availability of nitrogen and phosphorous in soil. The experiment was conducted at Africa University Farm. The experiment had six treatments (nitrokara +300kg/ha Compound D, nitrokara+ 300kg/ha Compound D(7N;14P;7K) + 75kg/ha Ammonium Nitrate(AN), nitrokara +300kg/ha Compound D +150kg AN, nitrokara +300kg/ha Compound D +225kg/ha AN, nitrokara +300kg/ha Compound D + 300 kg/ha AN and 0 nitrokara+300kg/ha Compound D +0 AN). Early maturing SC 403 maize (Zea mays) was inoculated with nitrokara and a compound mineral fertilizer at 300 kg/ha at planting while ammonium nitrate was applied at 45 days after planting. There were no significant differences ($P > 0.05$) on emergence % from 5 days up to 10 days after planting using maize seed inoculated with nitrokara. Emergence percentage varied with the number of days. At 5 days the emergence % was 62% to a high of 97 % at 10 days after emergence among treatments. There were no significant differences ($P > 0.05$) on plant biomass on treatments 1 to 6 at 4 weeks after planting as well as at 8 weeks after planting. There were no significant differences among the treatments on the availability of nitrogen after 6 weeks ($P > 0.05$). However at 8 and 10 weeks after planting there were significant differences among treatments on nitrogen availability ($P < 0.05$). There were no significant differences among the treatments at week 6 after planting on soil pH ($p > 0.05$). However there were significant differences among treatments pH at weeks 9 and 12 ($p < 0.05$). There were significant differences among treatments on phosphorous availability at 6, 8 and 10 weeks after planting ($p < 0.05$). There were no significant differences among treatments on stem diameter at 3 and 6 weeks after planting ($p > 0.05$). However at 9 and 12 weeks after planting there were significant differences among treatments on stem diameter ($p < 0.05$). There were no significant differences among treatments on plant height from week 3 up to week 6 on plant height ($P > 0.05$). However there were significant differences among treatments at week 9 and 12 ($p < 0.05$). There were significant differences among treatments on days to early, 50% and 100% anthesis ($P < 0.05$). There were significant differences during early, 50% and 100% days to silking among the treatments ($P < 0.05$). Also there were significant differences during early, 50% and 100% days to silking among the treatments ($P < 0.05$). The study revealed that inoculation of nitrokara biofertiliser at planting with subsequent addition of ammonium nitrate has a positive effect on maize crop development and yield.

Keywords : nitrokara, biofertiliser, symbiotic, plant biomass, inoculated

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