EFFECT OF SEED TREATMENT WITH A PLANT GROWTH REGULATOR ON THE EMERGENCE AND GROWTH OF COTTON (*GOSSYPIUM HIRSUTUM* L.) SEEDLINGS

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Abstract

Preliminary experiments at the University of Arkansas have shown that in-furrow application of the plant growth regulator PGR-IV, can be beneficial to the early establishment of cotton (*Gossypium hirsutum* L.) seedlings under field growing conditions. In a subsequent experiment, three formulations of PGR-IV (liquid PGR-IV, PGR-IV in graphite, and PGR-IV in 'Microspheres') were evaluated for their effect on the germination and seedling growth of cotton, by both in-furrow application and preplant seed treatment. Seeds of the cotton cultivar DPL 51 treated with PGR-IV at 1, 2 and 4 fl. oz/acre equivalents (0.55, 1.1 and 2.2 ml/100 g seed), using 12 lb/acre seeding rate, were planted in both growth chamber and field environments.

Under the more optimum temperature and humidity conditions of the growth chamber, the germination of cotton seeds, emergence and growth was more rapid than in field environment, regardless of PGR-IV treatment. Plant height and leaf area increased numerically with liquid PGR-IV treatment, compared to the other PGR-IV formulations and the untreated control. In-furrow PGR-IV at 2 fl. oz/acre promoted a greater increase (P=0.05) in plant height and leaf area than the untreated control. Total leaf and plant dry weights were significantly higher (P=0.05) at both 2 and 4 fl. oz/acre in-furrow applications, compared to the 1 fl. oz in-furrow, 2 fl. oz seed treatment and the control. Seed treatment with PGR-IV at 2 fl. oz/acre caused a higher percentage germination by day 4, and significantly greater shoot elongation (P=0.05) by day 7 after planting compared to the control.

With field planting, both PGR-IV in graphite (PGR-IV-G) and PGR-IV in 'Microspheres' (PGR-IV-M) caused a greater increase in plant height, compared to liquid PGR-IV and PGR-IV plus Delta-coat (PGR-IV+D). However, only PGR-IV-M promoted a significantly greater increase (P=0.05) in plant height than the control. Compared to PGR-IV-M, seed treatment with PGR-IV-G at an equivalent of the manufacturer's recommended rate of 2 fl. oz/acre (146.2 ml/ha), decreased most of the growth parameters measured, with the exception of plant height under field environment.

These experiments indicate that the powdered carriers of PGR-IV are potentially beneficial when used for preplant seed treatment. Additional research is however, required to establish the optimum concentrations for desirable growth response.

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