POTASSIUM FERTILITY LEVELS ALTER RENIFORM NEMATODE POPULATIONS IN COTTON

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Abstract

Yield improvement in modern cotton (*Gossypium hirsutum* L.) varieties has become stagnant in recent years, resulting in a plateau that cotton yields have not been able to break through. Speculation has arisen that a buildup of reniform nematodes (*Rotylenchulus reniformis*) has occurred during the past decade or more in fields growing continuous cotton and could be contributing to the yield stagnation. Previous research has indicated that cotton grown under insufficient K was more susceptible to root-knot nematode (*Meloidogyne incognita*) gall formation than cotton grown with adequate K. Therefore the objectives of this study were to assess the susceptibility of various cotton genotypes to reniform nematodes, and to determine if K fertilization altered the native reniform nematode population levels.

A field study was initiated in 1999 at Stoneville, MS to assess the susceptibility of nine cotton genotypes to reniform nematode infections when grown under varying levels of K fertilization and temik (aldicarb) application. Potassium fertilization rates were and 0 and 120 lbs acre^{-1}. Temik application rates were 0 and 12 lbs acre^{-1}, with the 12 lbs being applied as 6 lbs in-furrow at planting and 6 lbs sidedressed during mid-June. Genotypes utilized in this study were 'DP 32B', 'FiberMax 832', 'MD 51 ne', 'Paymaster 1218BR', 'Phytogen PSC 355', 'RGC 9811', 'Stv. BXN 47', 'Stv. LA 887', and 'Suregrow 747'. The experimental design was a randomized complete block consisting of six replicates and a split plot arrangement of treatments. The four K and temik factorial combinations were the main plots. Genotypes were the subplots. Data collected included nematode counts, dry matter partitioning, yield and yield components, and fiber quality.

In contrast to the behavior of root-knot nematodes, preplant counts of reniform nematodes were 407 pint^{-1} of soil in the non-K fertilized area, and 1089 pint^{-1} of soil in the area that received K fertilization. Reniform nematode counts taken during the early bloom stage confirmed the lower reniform nematode activity in the plots not receiving K fertilization (1822 pint^{-1} of soil) compared to plots that were fertilized with K (2713 pint^{-1} of soil). Similar levels of reniform nematode infestations were experienced by all genotypes. As expected, temik also reduced the counts of reniform nematode by 55% at early bloom. Dry matter partitioning data collected during the early bloom stage and at cutout showed few effects from either K fertilization or temik application. Greater specific leaf weight and harvest index under the non-K fertilized treatment during early bloom were the only significant effects detected. Although lint yield was not effected by either K or temik, boll size was significantly increased by applying either temik or K. Regardless of whether or not reniform nematodes are a contributing factor to cotton's yield problem, it is clear that a producer's production practices can alter the level of infestation.

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