SURVEY OF PLANT PARASITIC NEMATODES ASSOCIATED WITH VIRGINIA COTTON PRODUCTION

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Abstract

Plant parasitic nematodes limit yield potential of cotton throughout production areas including those in southeastern Virginia. Efficacy of and need for nematode management strategies, including host resistance, rotation, biological control, and chemical control, depends on the type and numbers of nematodes present. Thus, an assessment of parasitic nematodes associated with cotton in Virginia and their distribution is needed as a basis for making management recommendations. The objectives of this survey were to 1) determine the geographic distribution of plant parasitic nematodes in the cotton-growing region of Virginia; 2) assess nematode populations in "problem fields" and make management recommendations; and 3) evaluate impacts of crop rotation on nematode populations. A nematode survey was initiated in 2015 and will be continued for a minimum of three years. In 2015 and 2016, a total of 204 fields from throughout the cotton-growing counties of Virginia were sampled in late summer/early fall prior to harvest. Each sample was a composite of soil cores taken at a 6-in. depth in a zig-zag pattern from across approximately 10 acres. Sampled fields varied in current crop planted (cotton, soybean, peanut, or corn), but all have cotton in the rotation. Nematodes were extracted with an elutriator and each of the important genera of crop parasitic nematodes were counted with an inverted bright-field microscope. Based on numbers of nematode genera, fields were categorized as having low, moderate, or high risk of damage to the cotton crop from plant parasitic nematodes using Virginia Cooperative Extension economic thresholds. Overall, 29% (N=60) of sampled fields were at low risk for damage to the cotton crop from nematodes, 21% (N=43) had moderate risk, and 50% (N=101) had high risk based on economic thresholds established for Virginia. Southern root-knot nematode is considered one of the most economically important nematodes for cotton, but only 7% (N=13) of the fields sampled had either moderate or high populations, and root-knot nematode was found in only 22% (N=44) of fields overall. In addition, most of the fields with root-knot nematode were planted to peanut or soybean, and nematode populations were most likely Northern (*Meloidogyne hapla*) rather than Southern (*M. incognita*) root-knot nematode and therefore not parasitic on cotton (species identification is in progress). Thirty percent (N=61) of fields had stubby root numbers indicating high risk for damage to cotton, and stubby root nematode populations were highest in fields planted to corn at the time of sampling. Sting nematode was found in 23% (N=46) of sampled fields, and this nematode can be highly damaging even at low numbers. Though lesion and lance nematodes were present in over 25% of fields, only 4% (lesion) and 12% (lance) of fields had numbers sufficient to impact the cotton crop. Grower-selected fields were likely biased based on suspected nematode problems, so results of this survey may not reflect overall nematode distributions in the cotton-production region of southeastern Virginia. However, results suggest Southern root-knot nematode is relatively rare in Virginia cotton fields but stubby root and sting nematode are likely having a significant impact on cotton production.