DISTRIBUTIONS OF PLANT PARASITIC NEMATODES IN COTTON PRODUCTION AREAS OF VIRGINIA

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Abstract

Crop parasitic nematodes suppress cotton yields throughout production areas of the southeastern U.S. including those in Virginia. The need for and effectiveness of nematode management strategies, including host resistance, crop rotation, and chemical control, depends on the type and numbers of nematodes present. Thus, an assessment of plant parasitic nematodes associated with cotton in Virginia and their distributions are needed as a basis for making management recommendations. The objectives of this study were to 1) determine the numbers and distributions of plant parasitic nematodes in the cotton-growing region of Virginia, 2) assess nematode populations in "problem fields" and make management recommendations based on economic thresholds, and 3) evaluate impacts of crop rotation on nematode populations. As part of a larger crop nematode survey conducted in Virginia from 2016-2018, 102 fields in cotton-producing counties were sampled each year in late summer/early fall prior to harvest. Sampled fields varied in current crop planted (cotton, soybean, peanut, corn, or other), and crop rotation history from 2015 on was determined.

Each sample was a composite of soil cores taken at a 6-in. depth in a zig-zag pattern from across approximately 10 acres. 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. Crop rotation history and number of years planted to cotton varied among fields. All crop parasitic nematodes that are economically important on cotton (root-knot, lesion, lance, stubby root, and sting nematodes) were detected from fields in all three years except for sting nematode which was not detected in 2017. The most frequently detected genera were lance and stubby root nematodes. Nematode populations and risk of damage to the cotton crop varied among years and crop sampled. The frequency of fields with moderate to high risk of damage to the next year's cotton crop based on fall sampling was 72% in 2016, 15% in 2017, and 30% in 2018. Within individual fields, risk of damage to the cotton crop was highly variable among years. This illustrates the importance of monitoring nematode populations over time in order to develop and assess management practices. Results of the multi-year survey indicate crop parasitic nematodes with the potential to damage the cotton crop and limit lint yields are widespread in southeastern Virginia.