COMPARISON OF ISOLATION METHODS AND MEDIA FOR QUANTIFYING VERTICILLIUM DAHLIAE POPULATIONS IN SOIL

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Abstract

Quantifying populations of Verticillium dahliae, causal agent of Verticillium wilt, in soil is essential in estimating disease pressure and making management decisions in cotton. Studies were conducted in the United States and Australia to compare wet and dry isolation methods in conjunction with different selective media. Four fields with a history of moderate to severe Verticillium wilt, located near Lubbock, TX and Narrabri, NSW were selected and three replicate samples were collected from depths of 2-12 cm and 13-24 cm. Inoculum densities ranged from 0 to 90 microsclerotia per cc of soil and were consistently greater for the two Australian fields. Higher numbers of V. dahliae microsclerotia were obtained on Sorenson's NP-10 semi-selective media compared to other media evaluated. When combined across locations and depths, differences in isolation method, media and their interaction ($P \le 0.001$) were observed. Lowering pH of Sorenson's NP-10 reduced germination of microsclerotia by 50 and 68% for the dry and wet method, respectively. Soil sampled from 2-12 cm had higher inoculum densities, accounting for 56% and 62% of the total inoculum recovered for the dry and wet method, respectively. In estimating field populations, the top 12 cm of soil should be sampled. These results support the advantage of Sorenson's NP-10 media in quantifying V. dahliae in soil. Dry plating yielded higher estimates of inoculum density than the wet method, while requiring only half the amount of materials and taking considerably less time to perform. Additional sampling will be conducted to examine temporal changes during the growing season. By comparing quantification methods, the efficacy and efficiency of lab practices can be improved; the potential for further improving lab practices through similar efforts is extensive.