DIAGNOSIS AND APPRAISAL OF BACTERIAL LEAF STREAK DISEASE SEVERITY IN WHEAT

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ABSTRACT

*Xanthomonas campestris* pv. translucens causes bacterial leaf streak (BLS) and black chaff in wheat (*Triticum aestivum*). Proper diagnosis and severity assessment are important for disease management and effective germplasm screening. Conventional diagnostic techniques are often inefficient and inaccurate. Severity assessment is difficult as there are no standardized methods in regular use for bacterial diseases of small grains. Here we examined application of the Biolog micro-plate system for pathogen identification and a double digit (00-99) disease severity rating scale. Bacteria were isolated from symptomatic wheat leaf tissue and identified by using the Biolog system. The isolates were inoculated onto wheat seedlings to test their pathogenicity, then re-isolated following ‘Koch’s postulates’ for validation. Field experiments were conducted in Brookings and Codington counties in SD in 2009. Forty-five spring wheat lines were spray-inoculated using isolate XtSD-017. After heading, disease severity was assessed four times at 7-day intervals using a modification of Saari and Prescott’s (00-99) scale. Area under disease progress curve (AUDPC) was estimated from the scores. Results showed that the Biolog system was efficient and economical in identifying bacterial isolates. AUDPC scores ranged from 639 to 1449 and analysis revealed differential reactions among wheat lines to pathogen challenge, indicating the utility of the double-digit scale as a good means of severity assessment. Of the 45 genotypes, most were susceptible, however, one genotype (SD4205) appeared resistant and two were moderately resistant. The findings of the study have implications on diagnostics and disease screening for bacterial diseases of wheat.