Measuring severities of foliar diseases in wheat crops

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Estimates of severity of foliar diseases in commercial wheat crops are usually made on plants sampled at random along 1 or 2 transects of the crop. The accuracy of this and alternative sampling procedures were assessed to select the most suitable procedure to be used for estimating severity of these diseases in extensive surveys in South Australia.

Methods

Crops with either stem rust (Puccinia graminis Pers. f.sp. tritici Eriks. & Henn.), leaf rust (P. recondita Roberge ex Desm. f.sp. tritici (Eriks.) O. Johnston) and speckled leaf blotch (Mycosphaerella graminicola (Fuckel) Sand.) were sampled at the soft dough growth stage. Three tillers were sampled at random at ten points, each 20 m apart, along ten parallel transects 20 m apart in six crops.

Severity of diseases was estimated using standard diagrams showing a range of severity. Contour plot analysis (Genstat Package) was used to interpolate severity within sampled areas. Means of disease severity at points equidistant along different transects were compared. The transect shapes were ◊, Δ ,V and / and traversed sampled areas.

Results and Discussion

Means of disease severity did not differ significantly (P 0.05) between transect types for each of the disease situations. Coefficients of variation ranged up to 16% for stem rust (with mean severity of up to 25%) but were up to 30% for the other diseases (with individual mean severity of up to 10%). Standard errors of mean disease severity for each transect shape were similar to those for single tillers at 18 points.

The method chosen for the extensive surveys was to sample at six points along a triangular transect. This was found to be the most convenient because it finished near the starting point and the transects could be readily relocated for subsequent samplings. This sampling pattern is similar to that used to survey for foliar diseases in wheat crops in Victoria (1).

1. Brown, J.S. and Paddick, A.G. 1980. Aust. J. Exp. Agric. Anim. Husb. 20: 94-6.