

A SCALE FOR APPRAISING THE LEAF BLIGHT OF WHEAT CAUSED BY *ALTERNARIA TRITICIMACULANS*

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SUMMARY

The aim of this work was to present an scale of measurement for appraising the progress of leaf blight of wheat (*Alternaria triticimaculans*) in the field. Approximately three hundred diseased leaves of wheat at the milky ripe stage from an artificially inoculated crop, were collected. Based on leaf affected area in relation to the total leaf area, a nine grade scale was propose as a rapid technique to estimate this foliar disease.

Key words: *Alternaria triticimaculans*, wheat (*Triticum aestivum*), scale, evaluation

INTRODUCTION

A new disease of wheat caused by *Alternaria triticimaculans* in Argentina was recently reported (Perelló et al., 1996).

Evaluation of this disease in field experiments require a precise scale of measurement.

A standardized disease scoring system can be used effectively in trials to establish losses, explain epidemic developments or identify resistant varieties. The degree of accuracy desired in diseased assessment varies according to the particular objectives of the research program.

Over the years a number of scales have been proposed for the foliar diseases of wheat and other small grains (Anonymous, 1971; Chester, 1950; James, 1971; Large, 1966). James (1971) illustrated 23 keys based on percentage of severity for several diseases on Cereals and other field crops. From an epidemiologic point of view, the use of logarithmic scales seems to be satisfactory as most of the pathogens grow up in logarithmic rates. (James, 1974). Horsfall and Barratt (1945) that the grades detected by the human eye are approximately equal divisions on a log scale, and generally follow the Webber-Fechner Law which states that visual acuity depends on the logarithm of the intensity of the stimulus.

This note illustrates a diagrammatic scale and its usefulness for recording the progress of leaf blight of wheat in the field. It is presented in order to provide a recorded reference for research workers.

MATERIALS AND METHODS

For the preparation of the scale, wheat leaves material from an experimental assay under field condition was used. The experiment was carried out to evaluate the behaviour of different cultivars to the leaf blight of wheat (*Alternaria triticimaculans*). The treatments differed sufficiently among themselves to give a spread in magnitude of infection over almost the whole range. The experiment was conducted at the Experimental Estation J. Hirschhorn, Los Hornos, Buenos Aires, Argentine, during 1995 and 1996.

Eight wheat cultivars were evaluated in the experiment (Buck Charrúa, B. Guaraní, B. Bagual, B. Ombú, B. Ñandú, B. Palenque, B. Poncho y B. Yapeyú) arranged in a randomized block design with four replications (total 32 plots). Each experimental unit consisted of a plot of

five rows spaced 20 cm apart (1 m wide x 4 m long). Planting density was 300 pl /m.

Alternaria triticimaculans was cultured on potato dextrose agar (PDA) during 10 days and exposed to near ultraviolet light in a controlled environment chamber (21 - 1 ° C with 12 h light, 12 h darkness and RH 75 %).

Inoculum was prepared using a conidial suspension of a mixture of different isolates in sterile distilled water adjusted to 5×10^5 conidia / ml. At heading stage (10.1-10.5) (Large, 1954) two groups of fifteen plants per plot randomly selected were sprayed. Fifteen plants of each cultivar served as non-inoculated controls. They were sprayed with sterile distilled water only.

The inoculated plants and controls were covered with plastic polyethylene bags during 48 hours.

Selected leaves were brought to the laboratory. The diseased leaf area in relation to the total leaf area was determined by measuring with the aid of millimeter paper.

To prepare the scale ten diseased leaves per plot of the inoculated wheat plants at the milky ripe stage (11.1, Large, 1954) of the crop from the flag leaf downwards, were collected (total: 320)

RESULTS AND DISCUSSION

After a number of attempts, it was decided that a 1 to 9 scale based on leaf affected area, would satisfy most requirements for the realistic recording of *A. triticimaculans* in the field.

The severity of the leaf blight was rated as follows: 1= free of infection; 2= 0-5 %; 3= 5-12 %; 4= 12-20 %; 5= 20-35 %; 6= 35-45 %; 7= 45-60 %; 8= 60-80 %; 9= more than 80 % of the leaf area affected.

To grade number 1 of the scale, leaves from the control (healthy) were used, indicating absence of disease.

One of the difficult problems in plant pathology is to measure rapidly and precisely the magnitude of disease attack.

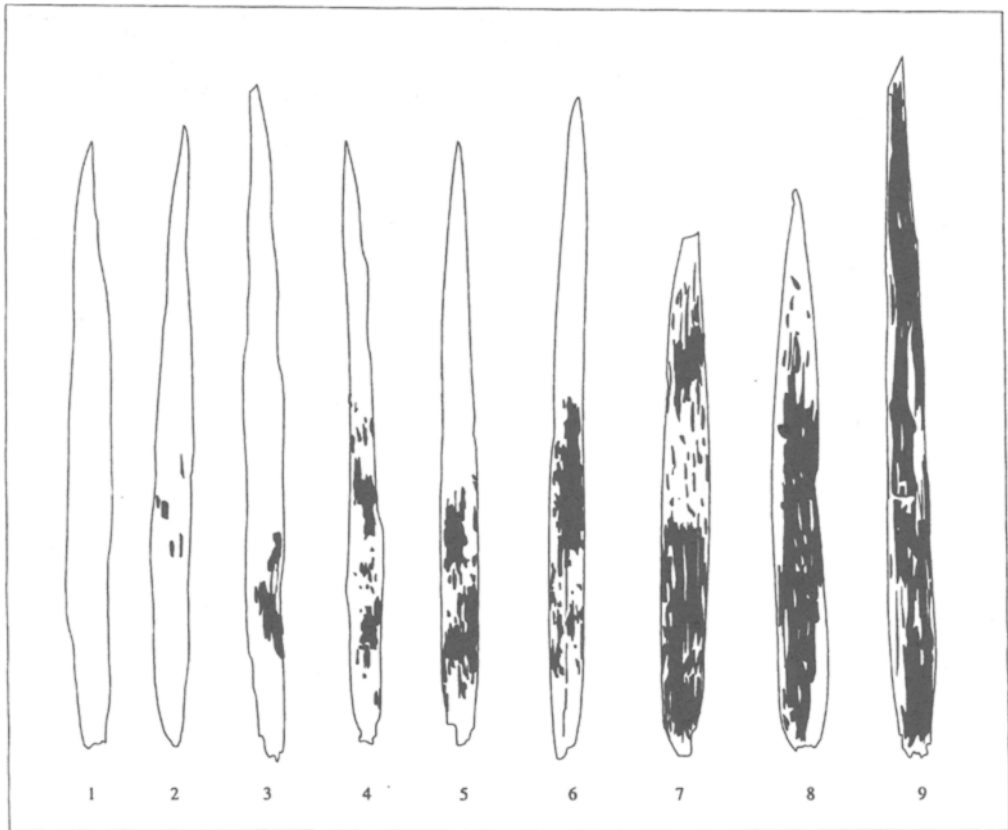


Figure 1. Scale for appraising foliar intensity of Leaf Blotch of Wheat (*Alternaria triticimaculans*), 1 to 9.

When dealing with a large number of field plots, it is necessary to have a rapid method that is also precise.

We proposed a rapid technique that depends upon grouping plants into 9 classes based on magnitude of disease. The scale is quick, simple and allows the rapid score of a large number of varieties.

The periodical observations on wheat leaf blight intensities, recorded with the aid of 9 grade diagrammatic scale would permit precise comparisons of various evaluations.

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