Assessment of disease in low-input cereal cropping systems and variety trials

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Disease assessment is the basis for describing disease resistance characteristics of commercial varieties in national variety lists for all crops where disease is considered a problem. It is well known that 'disease' in a specific situation depends on a whole range of interacting hosts, pathogens and environmental conditions. However, the biological complexity conflicts with the wish to express disease resistance characteristics of a variety as a single score per disease. This problem will be illustrated by basic dynamics of growth and senescence of both host and pathogen over time. Disease expressed in terms of absolute diseased leaf area, disease relative to total leaf area or green leaf area will be discussed in general. Two particular problems in low-input systems will be discussed, i.e. increased variability in nutritional status in field plots, which may influence the balance between abiotic and biotic stresses (diseases) and interact with disease on individual varieties, as well as the influence of weeds and diverse crops (variety mixtures and composite cross populations). The presence of disease in organic and low-input cropping systems may be underestimated because abiotic stresses, which enhance a general senescence of leaves, may obscure disease assessment, in particular disease on leaves. Weeds may interact by harbouring disease showing similar symptoms as on the target crop, or by 'diluting' disease by additional healthy green leaf area of the 'crop' like in a variety mixture. Other general topics such as differences between host/pathogen systems, timing of assessment, assessment scale, and interpretation and analysis of data are also discussed.

Invited oral presentation at COST860 Workshop: Assessment of varietal characteristics in diverse crops and low-input especially organic growing systems. 3 - 6 July 2005, Edinburgh, Scotland