

Economic importance and management of Sclerotinia stem rot and Verticillium in winter oilseed rape in Germany

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Sclerotinia stem rot is a severe disease in winter oilseed rape (OSR) production in Germany with a high yield loss potential. At present, farmers in areas of intense OSR production apply fungicides at bloom on a routine basis. However, retrospective analyses have revealed a percentage of 66 % of fungicide applications being not cost-effective. Decision support systems for Sclerotinia in OSR predicting the necessity and exact timing of a fungicide application have been lacking until recently. Therefore, a new prediction model for Sclerotinia stem rot has been developed, involving weather data, field specific factors and damage thresholds. Comprehensive data sets from field trials of the state extension services between 1994 and 2004 in Germany were analysed to investigate the impact of different field factors such as cultivar, soil type, sowing time, crop rotation, fertilization and tillage. In climate chamber experiments, the microclimate effect in the plant cover on infection was determined. The resulting new prediction model SkleroPro was validated by retrospective runs performed with data sets from the state extension services and with meteorological data of the last ten years. The examination of the field specific factors showed that disease incidence mainly depended on factors such as crop rotation, sowing time, cultivar and soil type. The validation of SkleroPro showed that 70% of fungicide treatments at bloom recommended by the new model were cost-effective, compared to only 53% of routine applications. On the average of 72 field sites and eight years (1996-2004) SkleroPro reduced the frequency of sprayings by 39% compared to a routine application, without loss of productivity. Sprays based on SkleroPro resulted in average yield gains of 500 kg or 50 Euro of profit gain per hectare.

A second disease, which gains increasing importance in many areas in Germany in the last decade due to the expansion of OSR production is caused by *Verticillium longisporum*. *Verticillium* is a soil-borne, vascular fungal pathogen which attacks the roots and causes premature ripening. At present, no chemical control or resistant cultivars are available. In the field, the pathogen was assayed by ELISA in roots and stems on a low level first in April and strongly spread in upper plant parts only at growth stages close to maturity. Under these conditions of late attack yield losses by individual plants are compensated for by the whole plant stand. Enhanced breeding efforts are currently in effect in order to find sources of resistance to this disease.