

Occurrence of barley leaf disease and control strategies in Denmark

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Abstract

Barley (*Hordeum vulgare*) is one of the major crops in Denmark and of special importance for malting and for pig feed. In 2016, the crop was grown covering a total area of 700,000 ha; approximately 25% of arable area in Denmark. To ensure high yield of around 60 dt ha⁻¹, disease-tolerant cultivars and fungicide treatments are required. Each year, barley cultivars are assessed for susceptibility towards leaf diseases in national observation plots. The most predominant fungal leaf diseases in Denmark are barley scald (*Rhynchosporium secalis*), net blotch (*Pyrenophora teres*), brown rust (*Puccinia hordei*), mildew of barley (*Erysiphe graminis f.sp. hordei*) and Ramularia (*Ramularia collo-cygni*). In recent years, brown rust and net blotch have been the most important disease in terms of yield losses. As most cultivars have *mlo* resistance, powdery mildew is today seen as a minor problem. Significant attack of Ramularia has been observed in more recent years, but normally first late in the season, having less impact on yield. Yield responses following fungicide treatments are commonly in the range of 3-10 dt ha⁻¹. One or two fungicide treatments are recommended to minimise the risk of epidemics. The standard application comprises a mixture of strobilurin and triazole fungicides at ca. half field rate around flag leaf emergence (GS 37-51). Both fungicide groups still provide good control – the most effective triazoles being prothioconazole and epoxiconazole. Fungicide resistance of mildew and net blotch have been observed, especially against strobilurins conferred by mutation F129L, affecting mainly azoxystrobin. No resistance has been observed for *P. hordei* and *R. secalis*. Currently, only one SDHI is registered in Denmark, boscalid, used in combination with epoxiconazole and pyraclostrobin. In field trials, SDHI have proven to be quite effective against all leaf diseases, aside from brown rust and mildew. Denmark has a national record system for pesticide usages. All farmers upload their fungicide use by crop, creating a good basis for assessing the differences in use pattern across different regions and cropping systems.