The spread of Septoria leaf blotch in spring triticale stands of Lithuania

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Assessments with a view to investigating the spread and development of Septoria leaf blotch in spring triticale stands were carried out in Dotnuva in 1997–2000. Over the experimental period, Septoria leaf blotch *(Septoria* spp.*)* occurred in spring triticale 'Gabo' stands annually. The disease can be detrimental for spring triticale from the economic point of view.

Key words: spring triticale, Septoria leaf blotch

INTRODUCTION

Cultivation of spring triticale in Lithuania was started not long ago. The first triticale varieties included in the variety registration list recommended for growing in Lithuania were the Polish varieties 'Gabo' (listed in 1996) and 'Wanad' (listed in 2000). Due to a high grain yield and good quality, currently spring triticale accounts for 3.5% of the total spring cereal area in the country.

Triticale is more resistant to a greater number of diseases than wheat. Triticale disease resistance test results suggest that the majority of genotypes were less resistant to the causal agents of leaf rust and leaf spot than to powdery mildew. A complex resistance to the powdery mildew, leaf and stalk rust was found [1]. Triticale is a new plant, and resistance to obligate parasites in it may be provided by absence of evolutionary relations between the parasite and the host plant [2].

The two major pathogens comprising the Septoria disease complex on wheat and triticale are *Septoria tritici* (Rob.) Desm. causing Septoria leaf blotch or speckled leaf blotch, and *Stagonospora nodorum* (Berk.) Cast. (syn. *Septoria nodorum* (Berk.) Berk.), causing Septoria leaf and glume blotch. Both pathogens are economically harmful worldwide.

The level of leaf blotch caused by *S. tritici* was influenced by a lower temperature, but the growth stage had no effect on the disease severity. *S. nodorum* caused high levels of glume blotch at higher temperatures and was more pathogenic in late growth stages. This suggested an explanation for the seasonal occurrence of these two pathogens. Cooler temperatures in spring favour the development of leaf blotch caused by *S. tritici*. The greater prevalence of *S. nodorum* later in the season may be a consequence of an increasing susceptibility of a wheat plant to the pathogen [3–4].

S. nodorum is the most important pathogen of triticale leaves and ears in Poland. The results of cross inoculation of triticale and wheat show that *S. nodorum* isolates from triticale were more pathogenic to triticale and wheat than isolates from wheat. It is suggested that triticale should be avoided as a forecrop for wheat and triticale due to the high pathogenicity of *S. nodorum* isolates from triticale [5]. The triticale lacked complete resistance to *S. nodorum,* but spring triticale appears to have a higher resistance than spring wheat to this disease [6].

METERIALS AND METHODS

The disease assessments were conducted during the 1997–2000 growing seasons at the Trial Department of the Lithuanian Institute of Agriculture in Dotnuva. The spring triticale variety 'Gabo' was sown at a rate of 4.5 million/ha with 12 cm interrow spacing. Fertilisers were applied in the spring before planting. Nitrogen application rate was 90 kg/ha. The crop preceding spring triticale in 1997–1999 was spring barley and in 2000 winter wheat. The plots for disease assessment were 10 m long and 2.5 m wide with four replicates.

Plant growth stages were assessed according to a decimal scale [7]. Growth stage was recorded when disease severity was assessed. The leaf positions on tillers are numbered relative to the uppermost leaf (the flag leaf). Thus, the leaf immediately below the flag leaf (F) is designated F-1, the second leaf below the flag leaf is F-2, and so on. Plots were as-

sessed weekly – a ten-day period for disease from flag leaf emergence until late milk ripening stage. The percent of leaf area showing symptoms of leaf diseases was used to quantify the disease severity. Disease severity was assessed on each plot at five randomly selected places on three adjacent tillers F, F-1 and F-2 leaves using a percentage scale 0, 1, 5, 10, 25, 50, 75. The percentage of diseased leaves was used to quantify the disease incidence.

RESULTS AND DISCUSSION

Warm and wet weather conditions in the spring of 1997 stipulated an early infection of Septoria leaf blotch in the spring triticale stands. At the beginning of heading (GS 51) the initial symptoms appeared on F-1 leaves. At that time the incidence of leaf blotch on F-2 reached 38.4% and on F-3 leaves 87.8%. The rainy and warm June determined a fast disease development, and at spring triticale anthesis in the middle of July leaf blotch incidence was on F 55%, F-1 98.3%, F-2 100%. The disease severity was on F 0.98%, F-1 5.6% and F-2 18.63% (Figure). At the milk ripe stage, leaf blotch became severe and the disease incidence on leaves was nearly 100%. The disease severity at early milk ripe (GS 73) was on F 3.1%, F-1 8.73% and F-2 30.65%, at late milk ripe (GS 77) 9.88, 29.63 and 42.98%, respectively. At senescence some glume blotch spots on ears were observed.

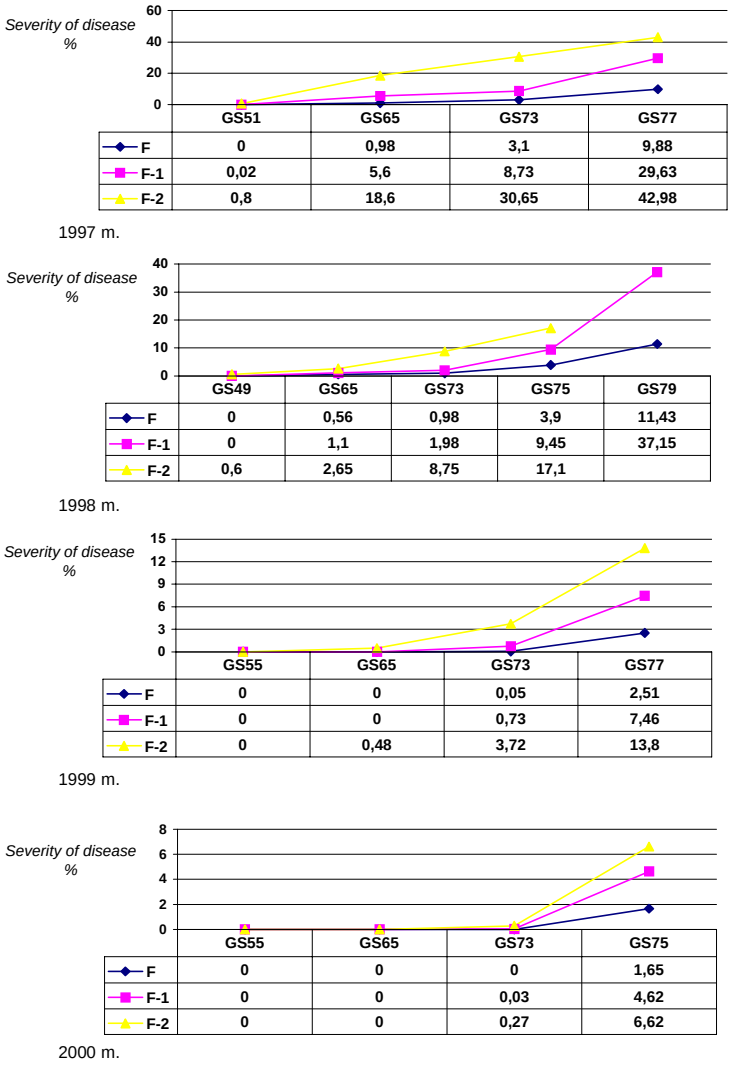

Figure. Severity of Septoria leaf blotch of spring triticale in 1997–2000

In 1998, due to the dry June, the severity of leaf blotch infection in the spring triticale stands was low. At the end of booting (GS 49), first symptoms of leaf blotch were found on 40% of F-2. July that year was rainy (202.8 mm, 15 rainy days ≤1 mm) and especially favourable for leaf blotch incidence. At anthesis, on 10 July, 8% of F, 60% F-1 and 92% F-2 leaves were diseased. The severity of leaf blotch was 0.56, 1.1 and 2.65%, respectively. At the early milk ripe stage, leaf blotch covered 85% of F and all F-1 and F-2 leaves. After a week, at GS 75, all leaves were infected, and at GS 79 F-2 leaves were dry due to a severe leaf blotch infection. At this time the severity of the disease on F was 11.43% and on F-1 37.15%. At senescence, glume blotch spots on the ears were observed that year, too, but the disease severity on glumes was week.

May of 1999 was dry and cool with frosts. The last ten-day period of May and two first ten- day periods of June were dry and hot, unfavourable for plant growing and disease incidence.

First symptoms of leaf blotch on spring triticale stands on F-2 appeared only at the end of June (GS 65), after heavy rains in the third ten-day period of June. Initial symptoms on 5 % F leaves appeared at early milk ripe, but at that time 37% of F-1 and 90% of F-2 leaves were infected, the disease severity reaching 0.05, 0.73 and 3.72%, respectively. Due to the hot weather with some rain after ten days at GS 77 nearly 90% of F, F-1 and F-2 leaves were diseased and spots of leaf blotch occupied an area on F 2.51%, on F-1 – 7.46% and on F-2 13.8%.

The spring of 2000 was early, dry and hot. Since the middle of April before May 20 there was a droughty period with sharp fluctuations in the temperature. It was unfavourable for Septoria leaf blotch development. The summer was cool and rainy, especially in July. Leaf blotch infection on spring tri-

ticale stands was late. Only at early milk stage symptoms of leaf blotch appeared on initial F-1 and on 20% of F-2 leaves. Due to a rainy July the incidence of leaf blotch was on a rapid increase. In the middle of the month (GS 75) 48% of F, 78% of F-1 and 90% of F-2 leaves were diseased. The disease severity at this time occupied 1.65, 4.62 and 6.62% of leaf surface, respectively. At late milk stage (GS 79) almost all leaves were diseased and dry due to a very severe leaf blotch.

The data of a four-year investigation revealed that Septoria leaf blotch on spring triticale stands occurred annually, and it can be economically important. The spread and development of the disease depends on the meteorological conditions of the season.

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LAPŲ SEPTORIOZĖ VASARINIŲ KVIETRUGIŲ PASĖLIUOSE LIETUVOJE

S a n t r a u k a

Grybinių lapų ligų plitimas vasariniuose kvietrugiuose buvo stebėtas Dotnuvoje 1997–2000 m. Tyrimų laikotarpiu lapų septoriozė (*Septoria* spp.) pasireiškė kasmet ir buvo pagrindinė vasarinių kvietrugių lapų liga. 1997 ir 1998 m. septoriozės dėmių pastebėta ir ant varpžvynių. Vasarinių kvietrugių pasėliuose lapų septoriozė kasmet gali stipriai išplisi ir padaryti ekonominę žalą.