

EPIDEMIOLOGY AND ASSESSMENT OF IMPORTANCE
OF SEPTORIA LEAF SPOT

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Summary

Septoria leaf spot (*Septoria tritici*) occurs in all the wheat (*triticum* sp) growing areas of New Zealand, and since the introduction of systemic fungicides it has been possible to evaluate the importance of this disease.

ECONOMIC SIGNIFICANCE

Over the past few years there has been an increasing awareness of Septoria leaf spot (*Septoria tritici*) throughout the world and considerable work is now being conducted to determine its economic importance. The first trial in New Zealand was conducted in 1964 when Sanderson (1964) found that a 10% increase in yield of 'Aotea' wheat (*Triticum* sp) could be gained with partial control of the disease. Yield trials by Hampton and Close (1975) at Lincoln College obtained 14% and 17% increases in yield by spraying at varying times with benomyl or mancozeb. Trials in the Ellesmere County by the Plant Diseases Division of the DSIR over the past 2 years using a combination spray of benomyl and mancozeb have resulted in yield increases of between 1.6 and 2.8% depending on time of application (Table 1). Luckily the disease in New Zealand does not appear to be as devastating as it is in some parts of N.S.W., Australia, where yield increases of 76% have been achieved in spray trials on early sown 'Summit' wheat (Kuiper 1976).

TABLE 1: EFFECT ON YIELD OF DELAYING THE
COMMENCEMENT OF SPRAY APPLICATION TO
CONTROL SEPTORIA LEAF SPOT

Farm	Season	Date of 1st spray (2-weekly sprays thereafter)	% Increase over untreated plots	
			Total yield	1000 grain weight
Heslop	75 - 76	1 August*	16	5.8
Heslop	74 - 75	5 August	13.3	6.7
Smith	75 - 76	15 September	3.4	3.5
Timms	75 - 76	15 September	2.8	1.9
Heslop	75 - 76	9 November*	3.3	4.1

* Two treatments of the same trial.

SYMPTOMS

The first symptoms of Septoria leaf spot appear as light-green to yellow areas between the veins of the leaves of the young seedling wheat and it is this early seedling infection which appears to cause the greatest

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loss of yield in autumn sown crops (Table 1). The lesions spread rapidly to form light-brown irregular patches which take on a speckled appearance as the small spore-producing bodies (*pycnidia*) develop. Often associated with the Septoria lesions are extensive areas of yellowing and tip burn. As the pycnidia mature they soon produce the spores which are responsible for the rapid spread of the disease within the crop. By the time the crop has reached the 3 leaf stage it is usual for all plants to be infected. Of the 34 wheat crops surveyed in the Lincoln-Southbridge area during August and September 1975, 53% were infected with Septoria leaf spot, equal to or more severe than the paddocks selected for the spray trials.

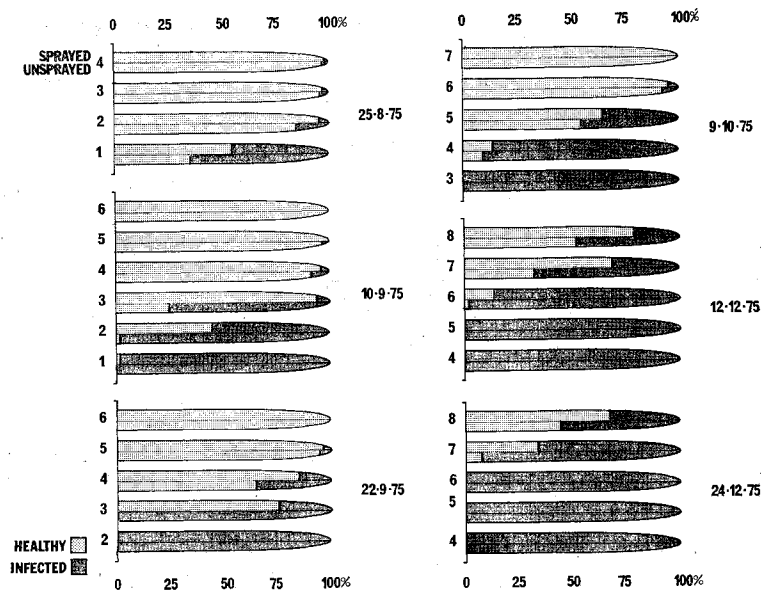


Fig. 1. A histogram demonstrating the effect of Septoria leaf spot on wheat at six stages during the growing season. The top half of each 'leaf' represents the sprayed plants and the lower half the untreated plants. The lighter area represents the photosynthetic portion of the leaf. The darker area represents the dead tissue of the leaf. Leaf 1 was the first leaf produced by the plants. Leaf 8 the flag leaf.

During the spring when the wheat crops become 'infected' with spring-yellows the effect of Septoria leaf spot is negligible, as leaves of the wheat plants yellow off before the disease has time to become established. During the summer months Septoria leaf spot once again develops, though from the evidence we have from our spray trials, this stage is not as important in reducing yields as is the seedling infection phase. Septoria leaf spot does not normally attack the heads of wheat in New Zealand nor has it been recorded as being seed-borne.

The final stage in the life cycle of the disease, and most important in terms of control, occurs on the dead leaves of the wheat stubble left in the field after harvest. It is on the dead leaves of the stubble that a second type of fruiting-body (*perithecia*) develops. Ascospores are

liberated from the perithecia during rain, become air-borne and can be carried many kilometres. If by chance they settle on a young wheat crop, they produce the primary points of infection of Septoria leaf spot in that crop. Ascospore showers are produced from the stubble as long as the stubble is left standing. It is the ascospores and therefore the wheat stubble which is the primary source of Septoria leaf spot in New Zealand. The present, and increasing practice, of undersowing wheat can only increase the incidence of this disease unless farmers make a conscious effort to destroy the stubble after harvest. The most practical method is by heavy stocking as soon as possible after harvest and essentially before sowing the following wheat crop in neighbouring paddocks.

REFERENCES

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- Kuiper, J., 1976. Wheat yield losses caused by *Septoria tritici*. A.P.P.S. 2nd National Plant Pathology Conference. (Abstracts) Brisbane. No. 41.
- Sanderson, F. R., 1964. Effect of leaf spot (*Septoria tritici*) in autumn-sown wheat crops. *N.Z. Wheat Review* 9: 56-59.

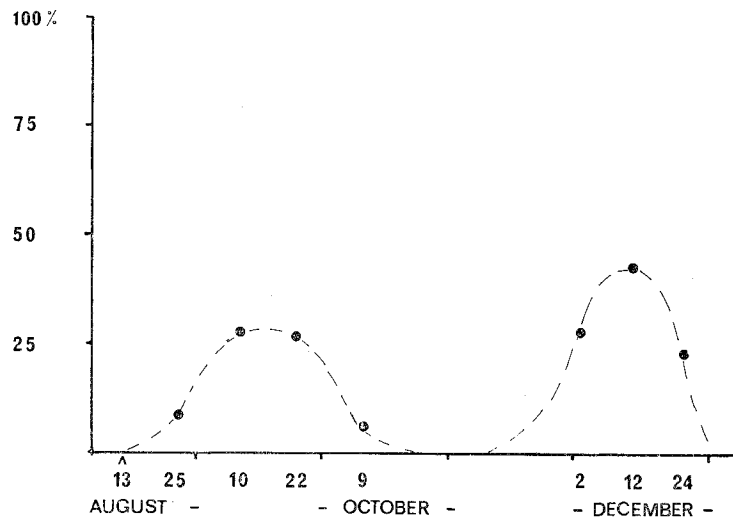


Fig. 2. The reduction in effective leaf area of wheat caused by Septoria leaf spot during the growing season.