

## Selective control of mildew in greenhouse experiments with yellow rust on barley and wheat by seed treatment with Milstem (PP 149)

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Greenhouse experiments with yellow rust (*Puccinia striiformis*) on barley and wheat are often disturbed by spontaneous contamination with mildew of the plant material under study. Only in very specific situations, e.g. multiplication of races of yellow rust, can a variety be used which is resistant to mildew. But in many cases this is impossible.

To facilitate our research it was therefore investigated whether mildew could be controlled by a new fungicide Milstem (PP 149, developed by ICI – England) without having a depressive influence on the development of the yellow rust fungus. Last year our experience with this fungicide in field trials (Slootmaker and van Essen, 1969) was very satisfactory. The fungicide is applied as a seed dressing and is said to act by forming of a store in the soil around the grain, whence over a fairly long period, it is taken up by the plant thus acting in effect, as a systemic fungicide (Brooks 1968, personal communication).

Seeds of the wheat varieties ‘Tadorna’ and ‘Ibis’ and the barley varieties ‘Haisa’ and ‘Heine 4808’ were treated with a low dose (M<sub>1</sub>, about 1 g/100 g seed) and with a higher dose (M<sub>2</sub>, about 2 g/100 g seed) of Milstem, and besides there were untreated controls. Per treatment five seeds were sown in jiffy-pots.

Both wheat varieties are susceptible to mildew and to race 60 of yellow rust, which was the race used in this experiment. Both barley varieties are susceptible to the two known races 23 and 24 of barley yellow rust, ‘Haisa’ being less susceptible than ‘Heine 4808’. The differential susceptibility is most pronounced when race 23 is used. As for mildew, ‘Haisa’ is susceptible and ‘Heine 4808’ resistant.

Rust inoculations were performed on the first leaf, all on the same day. Five days later inoculations with mildew were carried out, on the second leaf.

A precis of all treatment and the results of the inoculations with the respective pathogens are given in Table 1 and 2. It may be concluded from the tables that:

1. With both dosages of Milstem, mildew was fully controlled in the case of barley, whereas on wheat it was markedly reduced in severity. The known fact that the compound gives a specific control of barley mildew was thus confirmed.
2. The development of yellow rust was not influenced in any treatment. Even with ‘Haisa’ normally only moderately rusted, when infected with race 23 there was no

Table 1. Inoculations performed and resulting attack by yellow rust and mildew on barley varieties treated with Milstem (PP 149).

Variety	Seed treatment	Infection with		Attack <sup>1</sup> by	
		yellow rust race	mildew	rust	mildew
		23	24		
Heine 4808	O	+	—	+++	—
Heine 4808	O		+	+++	—
Heine 4808	M <sub>1</sub>		—	+++	—
Heine 4808	M <sub>1</sub>		+	+++	—
Heine 4808	M <sub>2</sub>	+	—	+++	—
Heine 4808	M <sub>2</sub>		+	+++	—
Haisa	O	+	—	+	—
Haisa	O	—	+	—	+++
Haisa	M <sub>1</sub>	+	—	+	—
Haisa	M <sub>1</sub>	+	+	+	—
Haisa	M <sub>2</sub>	+	—	+	—
Haisa	M <sub>2</sub>	+	+	+	—
Haisa	O		+	++	—
Haisa	O		—	—	+++
Haisa	M <sub>1</sub>		+	++	—
Haisa	M <sub>1</sub>		+	++	—
Haisa	M <sub>2</sub>		+	++	—
Haisa	M <sub>2</sub>		+	++	—

Tabel 1. Uitgevoerde inoculaties en de daarop volgende aantasting door gele roest en meeldauw op gerstrassen, die behandeld waren met Milstem (PP149).

Tabel 2. Inoculations performed and resulting attack by yellow rust and mildew on wheat varieties treated with Milstem (PP 149).

Variety	Seed treatment	Infection with		Attack <sup>1</sup> by	
		yellow rust race 60	mildew	yellow rust	mildew
Tadorna and Ibis	O	+	—	+++	—
	O	—	+	—	+++
	M <sub>1</sub>	+	—	+++	—
	M <sub>1</sub>	+	+	+++	±
	M <sub>2</sub>	+	—	+++	—
	M <sub>2</sub>	+	+	+++	±

- <sup>1</sup> +++ severe attack  
 ++ appreciable attack  
 + slight attack  
 ± slight attack (intermediate type)  
 — no attack

Tabel 2. Uitgevoerde inoculaties en de daarop volgende aantasting door gele roest en meeldauw op tarwerassen, die behandeld waren met Milstem (PP149).

difference in the severity of rust infection between treatments  $M_1$ ,  $M_2$  and the control. This offers an elegant method of controlling mildew in greenhouse experiments to study rust reactions of both barley and wheat. Although mildew control is not complete in the case of wheat, the degree of infection seems to be reduced and the amount of released spores far less. It remains to be investigated whether this holds good for field conditions.

Selective control of mildew is not only valuable in experiments with other cereal leaf diseases, but could also facilitate researches of other types in greenhouses or growth chambers, e.g. physiological experiments with cereals.

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### **Samenvatting**

*Selectieve bestrijding van meeldauw in kasproeven met gele roest op gerst en tarwe door zaadbehandeling met Milstem (PP 149)*

Het is mogelijk gebleken contaminatie door meeldauw in proeven met gele roest op gerst en tarwe te voorkomen door zaadbehandeling met een nieuw fungicide Milstem (PP 149). Het middel werkt specifiek tegen gerstmeeldauw maar reduceert ook tarwemeeldauw aanzienlijk. De ontwikkeling van gele roest wordt door het middel niet nadelig beïnvloed. De vaak storende aantasting door meeldauw in kasproeven kan hiermee waarschijnlijk ook in andere onderzoeken dan alleen over gele roest met gerst en tarwe belangrijk worden gereduceerd.

### **Reference**

Slootmaker, L. A. J. & Essen, A. van, 1969. Yield losses in barley caused by mildew attack. Neth. J. agric. Sci. 17: 279-282.