CEREALS / SEED TREATMENT TRIALS IN SPRING BARLEY / Control of leaf stripe and loose smut

Study director: Peppi Laine

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Purpose of trials: Evaluation of the biological efficacy of the seed treatment fungicides against loose smut (*Ustilago nuda* f. sp. *Hordei*) and leaf stripe (*Pyrenophora graminea*) in spring barley.

SUMMARY

Naturally infected seeds of susceptible barley varieties were used in the trials. The infection level of loose smut in the seeds had been detected in Seed Testing Department of The Plant Production Inspection Centre (KTTK) and the leaf stripe infection in greenhouse tests in MTT. The trials in Jokioinen were sown on the sandy clay soil and the trials in Kuuma were on carex peat soil. The spring 2005 was cool and dry favoring the appearance of the seed borne diseases. The disease incidence became very high in the trials. There was leaf stripe in two of the trials and loose smut was found in all four trials. In addition net blotch was found in one trial (with variety Kalle).

Efficacy against leaf stripe was studied in two trials. The trial F-05-226-05 was with seeds of Rolfi (15% infected by leaf stripe). In the untreated plots 499 plants per plot (about 50/sqm) were diseased by leaf stripe. The trial F05-236-05 was made with Rolfi seeds with lower infection level (8.8% infected by leaf stripe). In untreated plots 272 plants per plot were diseased by leaf stripe. The seed treatments did not have significant effect on the emergence but they increased the barley yield (10-18%) in both trials.

Loose smut was found in all four spring barley trial. The trial F-05-227-05 was sown with seeds of Barke (8% infected by loose smut) and 607 ears infected by loose smut were found in untreated plots. The trial F-05-237-07 was sown with seeds of variety Kalle (5.6% infected by loose smut). In untreated plots 440 ears infected by loose smut were found. The control of loose smut with seed treatments increased the barley yield (7-15%) in the trials with heavily infected seeds. Some loose smut was found also in the trials F-05-226-05 and F-05-236-07, the number of detected smut ears in untreated plots was 16.5 and 7, respectively.

The new seed treatment fungicides were tested in the trials. The efficacy of Zardex G was evaluated against loose smut and leaf stripe at rates 300 ml, 200 ml and 100 ml (diluted with 100 ml water) per 100 kg seeds in altogether four spring barley trials. The efficacy of Raxil was evaluated at rates 400 ml, 200 ml and 100 ml per 100 kg in two trials and the efficacy of Fungazil Gold in one barley trial against loose smut. Premis Robust 400 ml/100 kg was used as a standard treatment in all the trials with very good (97-100%) efficacy on both leaf stripe and loose smut.

The seed treatment with Zardex G and Raxil seemed to affect the emergence of spring barley, especially at high rates. However, the yield results with them were on the same level as with the standard treatment. The efficacy of Zardex G and Raxil was very good against leaf stripe and loose smut but there was a clear dose response in the efficacy. The efficacy with both Zardex G and Raxil were on the same level as with the standard treatment when the application rate was at least 200 ml per 100 kg seeds. Fungazil Gold did not have any effect on the emergence of spring barley and the efficacy against loose smut was almost on the same level as with the standard treatment. The efficacy results with the seed treatment fungicides are presented in the following figures 1-8.
Figure 1. The seed treatment with Raxil seemed to reduce slightly the number of emerged barley seedlings but the difference was not significant compared to the untreated plots.

Figure 2. With the high application rate the seed treatment with Zardex G reduced slightly the number of emerged seedlings in the spring barley trials.

Figure 3. The efficacy of Raxil IM ES 035 was very good (96-99%) against leaf stripe, when the normal or double rate (200 ml or 400 ml per 100 kg) was used. With lower application rates (50 ml and 100 ml per 100 kg) the control effect was weaker (79% and 92%, respectively).

Figure 4. The seed treatments with Zardex G controlled leaf stripe effectively with the application rates 200 ml or 300 ml per 100 kg (control effect 97-98%). With the lowest rate (100 ml/100 kg) the efficacy was slightly weaker (89-92%) than with the standard product Premis Robust (97-98%).
Figure 5. The efficacy of Raxil at rates 400 ml or 200 ml per 100 kg was excellent (99-100%) against loose smut in barley. In the high disease pressure the control effect of Raxil at the normal dose (200 ml) seemed to be slightly better than that of Premis Robust. Rather good control effect (94-100%) was achieved also with the half dose of Raxil (100 ml/100 kg) but with the quarter dose (50 ml/100 kg) the efficacy was not sufficient (77-82%).

Figure 6. The seed treatment with Zardex G had full (100%) control effect on loose smut at application rate 300 ml/100 kg. At rate 200 ml/100 kg the effect of Zardex G was on the same level as with the standard treatment (98-100%). With the lowest tested rate (100 ml/100 kg) the effect of Zardex G was clearly weaker (79-94%), especially in high disease pressure.

Figure 7. The effect of Fungazil Gold was very good (99%) but slightly weaker than with the standard treatment Premis Robust (100%) in the spring barley trial.

Figure 8. Baytan Universal, Fungazil Gold and Zardex G at the highest rate had full control of the seed borne net blotch infection. All the seed treatments controlled the disease about as well as Premis Robust.