

EFFECTIVENESS OF SEED DRESSING WITH GAUCHO 350 FS  
IN PROTECTION OF SPRING BARLEY AGAINST PESTS  
IN PIEDMONT CONDITIONS

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Abstract. The paper present results from the studies carried out in the years 1999-2000 on the effectiveness of seed dressing of spring barley with the insecticide Gaucho 350 FS (a.i. imidachloprid) to control frit flies, gout flies, aphids and thrips in piedmont conditions.

Key words: spring barley, frit fly, gout fly, aphids and thrips, control, imidachloprid

#### I. INTRODUCTION

Observations conducted for many years have shown that in the area of southeastern Poland (especially in Podkarpacie, i.e. at the foothills of the Carpathians), spring barley does not grow to a full height. Its stems are strongly reduced, damaged leaves dry out and plants mature precociously. As a result, the obtained yields of this cereal crop are low and the grain is bad quality. Besides, an infestation with pathogens, particularly with the fungus *Pyrenophora teres* (Died.) Dreschs, a causal agent of net blotch of barley (Lisowicz 1999), an important cause of grain losses was feeding of insect pests, such as frit flies (*Oscinella frit* L.), gout flies (*Chlorops pumilionis* Bjerk.) as well as aphids (*Aphididae*) and trips (*Thysanoptera*), on barley plants (Lisowicz 2000). As applying insecticides becomes a problem during the growing season in piedmont conditions (especially in rainy years) it is necessary to find out the alternative methods, which could help to control barley pests. Seed dressing with an insecticide of a prolonged biological activity may become such a method. The aim of the studies was to estimate the effectiveness of this method in protection of spring barley against insect pests in piedmont conditions.

#### II. MATERIALS AND METHODS

The studies were carried out at the Experimental Station of Cultivar Testing in Dukla in 1999-2000 on plot trials established in four replications. Two cultivars of spring barley were used in the studies in each experimental year: cvs. Rabel and Refren in 1999 and cvs. Rudzik and Scarlet in 2000. On April 5<sup>th</sup> 1999 and April 18<sup>th</sup> 2000 the seed grain of these cultivars was sown in two combinations, as control and seed dressing/treatment where Gaucho 350 FS (imidachloprid) was applied at the rate of 1 l per 100 kg.

The following analyses and calculations of the effectiveness of this seed dressing in pest control were made in the vegetation season:

- on June 15<sup>th</sup> 1999 and on June 2<sup>nd</sup> 2000 (when the plants were at growth stages 33-34) the percentage of stems damaged by spring generation larvae of the gout fly was calculated
- on July 6-8<sup>th</sup> 1999 and on July 3-5<sup>th</sup> 2000 (when the plants were at growth stages 65-69), degree of stem (neck) injuries caused by spring generation larvae of the gout fly was estimated and on the basis of those data the grain yield losses induced by the pests were calculated using a three-degree scale and coefficients set up by Węgorok (1972);
- on July 16-17<sup>th</sup> 1999 and on July 13-14<sup>th</sup> 2000 (when the plants were at growth stages 71-75) analyses were made to calculate percentage of grain damages caused by summer generation larvae of the frit fly;
- during occurrence of aphid and thrip on barley plants their numbers were determined by analyses performed at 7-day intervals.

For analyses 50 stems (spikes) and 100 grains were taken from each experimental plot. The significance of differences of studied characteristics was estimated for compared objects using Duncan's test at the level of 0.05

### III. RESULTS AND DISCUSSION

The estimated percentages of stems and grains injured by frit flies and the effectiveness of Gaucho 350 FS in controlling that pest are presented in Table 1.

The percentage of stems injured by the frit fly spring generation was high in the both years of the studies. The seed dressing was highly effective for stem protection against larva feeding. The percentage of grains injured by summer larvae of the pest was low in 1999 and high in 2000, particularly on the cv. Rudzik. A consequent effect of seed dressing biological activity on larvae of that generation was fairly good in 1999 but in 2000 was unsatisfactory.

Table 1

Effectiveness of seed dressing with Gaucho 350 FS in the control of frit fly (*Oscinella frit* L.)

Year	Treatment	% infected		Effectiveness in protection of	
		stems	grains	stems	grains
1999	Rabel – control	12.0	3.5	–	–
	Rabel – seed dressing	1.0	1.4	91.7	60.0
	Refren – control	9.5	2.1	–	–
	Refren – seed dressing	0.5	0.8	94.7	61.9
	NIR <sub>0.05</sub>	2.8	0.5		
2000	Rudzik – control	6.0	22.7	–	–
	Rudzik – seed dressing	0.0	16.3	100.0	28.2
	Scarlet – control	10.4	6.2	–	–
	Scarlet – seed dressing	0.0	5.3	100.0	14.5
	NIR <sub>0.05</sub>	2.5	3.6		

Table 2

Effectiveness of seed dressing with Gaucho 350 FS in the control of gout fly (*Chlorops pumilionis* Bjerk.)

Year	Treatment	% infected stems				% in yield losses	% yield increase	Effectiveness %
		in degree			total			
		1	2	3				
1999	Rabel – control	3.1	3.1	7.1	13.3	8.5	–	–
	Rabel – seed dressing	2.7	2.4	5.5	10.6	6.7	1.8	21.2
	Refren – control	3.8	3.8	1.9	9.5	4.6	–	–
	Refren – seed dressing	4.0	0.0	1.0	5.0	2.2	2.4	52.2
	NIR <sub>0.05</sub>					1.7		
2000	Rudzik – control	1.6	1.6	5.0	8.2	5.5	–	–
	Rudzik – seed dressing	1.6	0.0	0.0	1.6	0.5	5.0	90.9
	Scarlet – control	1.6	1.6	3.3	6.5	4.1	–	–
	Scarlet – seed dressing	0.0	1.6	0.0	1.6	0.7	3.4	82.9
	NIR <sub>0.05</sub>					1.4		

The percentages of stems damaged by the gout fly spring generation as well as effects of larva control with the tested insecticide are summarized in Table 2.

Rather high percentage of injured necks in a range from 4.1% in the case of Scarlet in 2000 to 8.5% for the cv. Rabel in 1999 was noted. The effectiveness of the tested seed dressing used to control gout flies was unsatisfactory in 1999 in the case of the susceptible cv. Rabel, whereas that seed dressing appeared to be more effective in protecting the less susceptible cv. Refren. In the year 2000, barley was sown very late because of continuous rainfalls in April. Meanwhile, as a result of warm weather in May the gout fly population

Table 3

Effectiveness of seed dressing with Gaucho 350 FS in the aphids control (*Aphididae*)

Year	Treatment	Number of aphids					
		15 VI	22 VI	29 VI	6 VII	13 VII	20 VII
1999	Rabel – control	2	12	17	8	4	1
	Rabel – seed dressing	0	2	5	3	2	0
	Refren – control	2	10	13	7	5	1
	Refren – seed dressing	0	1	3	2	1	1
	NIR <sub>0.05</sub>	2	6	7	6	4	2
		19 V	26 V	2 VI	9 VI	15 VI	21 VI
2000	Rudzik – control	6	125	462	242	24	5
	Rudzik – seed dressing	0	0	0	5	3	0
	Scarlet – control	5	116	326	154	18	5
	Scarlet – seed dressing	0	0	0	0	2	0
	NIR <sub>0.05</sub>	3	15	25	23	8	3

Table 4

Effectiveness of seed dressing with Gaucho 350 FS in the thrips control (*Thysanoptera*)

Year	Treatment	Number of thrips					
		15 VI	22 VI	29 VI	6 VII	13 VII	20 VII
1999	Rabel – control	2	11	50	159	32	5
	Rabel – seed dressing	0	2	14	10	4	1
	Refren – control	1	9	28	86	25	4
	Refren – seed dressing	0	1	4	15	5	1
	NIR <sub>0.05</sub>	2	5	9	16	10	3
		9 VI	15 VI	21 VI	28 VI	3 VII	10 VII
2000	Rudzik – control	21	58	153	238	220	25
	Rudzik – seed dressing	0	0	7	6	5	2
	Scarlet – control	16	49	95	225	221	36
	Scarlet – seed dressing	0	1	10	8	7	3
	NIR <sub>0.05</sub>	4	9	21	24	23	8

developed rapidly and its larvae damaged not only necks, but also spike germs. Under these conditions, protection of barley against the gout fly as a result of seed dressing appeared to be quite effective.

Aphid number and the effects of its control by Gaucho 350 FS are given in Table 3.

In 1999, the intensity of aphid occurrence was very weak, whereas in 2000 aphids occurred in high numbers. In the first year of the studies the applied seed dressing reduced the intensity of these pests (at the peak of their occurrence) from 70.6 % on the cv. Rabel to 76.9% in the case of the cv. Refren. In 2000, the plants that grew out of the seed dressed with the tested insecticide were practically aphid-free.

The occurrence of thrips and results of their control obtained after using a seed dressing with the insecticide are presented in Table 4.

Thrips inhabited barley plants very numerous, especially in May 2000, when the weather was not hot. The procedure of seed dressing with the insecticide caused a decrease in this pest numbers. At the peak of thrips occurrence, their population decreased from 82.6% to 93.7% in 1999 and from 96.4% to 97.5% in 2000.

The effect of controlling the most important pests of barley were similar to the results obtained in the experiments carried out in the years 1993-1994, when the effectiveness of insecticidal dressings in control oat pests was tested (Lisowicz 1995).

#### IV. CONCLUSIONS

The performed studies have shown that seed dressing with Gaucho 350 FS may be an alternative treatment applied in protection of spring barley against pests instead of plant spraying with an insecticides during the vegetation season. Depending on weather condi-

tions in a given year, which have an influence on both crop plant and pest populations' development, that treatment is characterized by:

- a high effectiveness in controlling spring generation larvae of frit flies damaging stems,
- a rather high effectiveness in reduction aphids and thrips, and a little less stable medium effectiveness in controlling spring generation larvae of the gout fly feeding on barley necks and (in years of the pest early occurrence) in spike germs, and summer generation larvae of frit flies damaging caryopses.

That method of plant protection might be especially useful in the case, when there is a need to sow barley at a later date – in the second half of April.

#### V. REFERENCES

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### SKUTECZNOŚĆ ZAPRAWY GAUCHO 350 FS W OCHRONIE JĘCZMIENIA JAREGO PRZED SZKODNIKAMI W WARUNKACH PODGÓRSKICH

#### STRESZCZENIE

W latach 1999-2000 badano efekty ochrony jęczmienia jarego przed najważniejszymi szkodnikami, uzyskane w wyniku zaprawiania ziarna siewnego preparatem Gaucho 350 FS w dawce 1 l na 100 kg.

Stwierdzono: wysoką skuteczność zabiegu w zwalczaniu larw wiosennego pokolenia ploniarki zbożówki uszkadzających źdźbła tego zboża, dość znaczną redukcję populacji mszyc i przyżeńców oraz nieco mniej stabilną w poszczególnych latach (w zależności od przebiegu warunków meteorologicznych oraz ich wpływu na rozwój rośliny uprawnej i populacji szkodników) w zwalczaniu larw wiosennego pokolenia niezmiarki paskowanej uszkadzających dokłosa (a w 2000 r. także zawiązki kłosów) i larw letniego pokolenia ploniarki zbożówki żerujących w ziarniakach.

Zaprawianie ziarna siewnego badanym preparatem może być zabiegiem alternatywnym opryskiwania roślin insektycydami w okresie wegetacji. Ta metoda ochrony byłaby szczególnie przydatna w sytuacjach, gdy jęczmień musi być z konieczności wysiewany w terminie opóźnionym (w drugiej połowie kwietnia).