

Efficacy of different insecticides used in sugar beet seed coating: results of international field trials

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Introduction

Both soil diseases and pests can strongly affect the sugar beet yield. The quantification of plant damages and yield losses caused by pests is often insufficient or missing at all. This is mainly due to the unpredictable occurrence and infestation severity of pests, which greatly depends on environmental conditions. This problem can partly be solved through an increase of the number of trials and their optimal regional distribution including internationally conducted trials. The aim of the trial series was to examine the efficacy of different insecticides used in sugar beet seed coatings against different pest species.

Methodology

- ∅ The field trial series with insecticide pelleting was initiated in cooperation with the Coordination Board at the Institute of Sugar Beet Research (IfZ) and the chemical companies Bayer CropScience, FCS and Syngenta Agro. It was organised by IfZ and carried out by the regional working groups or sugar factories.
- ∅ The field trials were conducted in 31 (2006) and 29 (2007) locations in Austria (A), Czech Republic (CZ), Germany (D), Hungary (H), Poland (PL) and Slovakia (SK).
- ∅ **Treatments:** besides the untreated control 8 different treatments were tested each year, 6 of the 2006 treatments (Akteur, Imprimo, Poncho Beta+, Janus forte, Cruiser & Force, Force Magna) were repeated in 2007.
- ∅ **Design:** randomized complete block design, 4 replications, distance of seed placement within row approx. 17-18 cm, 6 rows per plot, 3 middle harvested rows per plot, plot length ≥ 6 m (net).
- ∅ **Assessed parameters:** number of plants (countings at 50% and 100 % field emergence, and at canopy closure), pest crop damage during plant development, root yield and quality of sugar beet (brei analysis of sugar, potassium, sodium, amino-nitrogen contents).

Results

- ∅ The main pests present in all locations included beet fly (*Pegomyia betae*) (1), beet seedling weevil (*Bothynoderes punctiventris*) (2), black bean aphid (*Aphis fabae*) (3), flea beetle (*Chaetocnema tibialis*) (4) and pygmy beetle (*Atomaria linearis*) (5) (Table 1, Figure 1).

Table 1. Number of trial locations with pests in different countries

Pest / Country	A	CZ	D	H	PL	SK	Total
1. Beet fly	1	-	2	2	2	2	9(3)
2. Beet seedling weevil	3	-	-	5	3	2	13(10)
3. Black bean aphid	1	2	6	4	2	2	17(10)
4. Flea beetle	2	1	1	5	4	2	15(11)
5. Pygmy beetle	1	1	11	-	1	2	16(11)

() number of trials included for analyses



Figure 1. Top: pests (1-5), bottom: corresponding damage pattern

- ∅ The first counting indicated a faster field emergence in treatments with low insecticide concentration (Akteur, Janus forte, Force Magna) compared to treatments with high insecticide concentration (Imprimo, Poncho Beta+ and Cruiser&Force) within pellets. The plant countings at 100% field emergence and at canopy closure showed significant differences in field emergence between the control and all insecticide treatments, but none among insecticide treatments.

- ∅ Averaged over all locations (2006-2007)

- treatments Imprimo, Poncho Beta+ and Cruiser&Force were most efficient against **black bean aphids** and **beet fly** infestation (Figure 2).
- treatments Cruiser&Force, Force Magna and Poncho Beta+ tended to show highest efficacy against crop damages caused by **seedling weevils**.
- treatments Cruiser&Force, Imprimo and Force Magna tended to provide best results in **flea beetle** control.
- the treatment Imprimo, followed by Poncho Beta+ and Cruiser & Force, had both the highest control efficacy against **pygmy beetle** and lowest damages on the root, hypocotyl and leaf of sugar beet leaf.

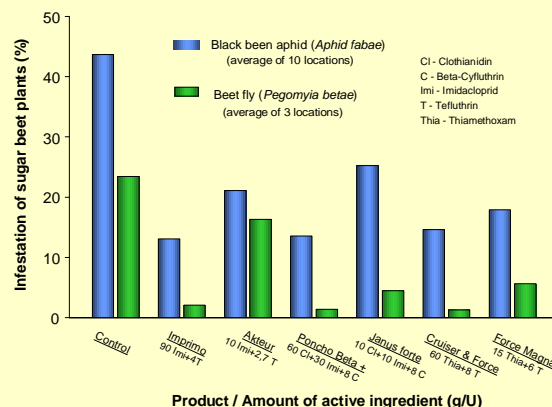


Figure 2. The efficacy of different insecticide treatments against black bean aphid and beet fly infestation on sugar beet in 2006-2007.