



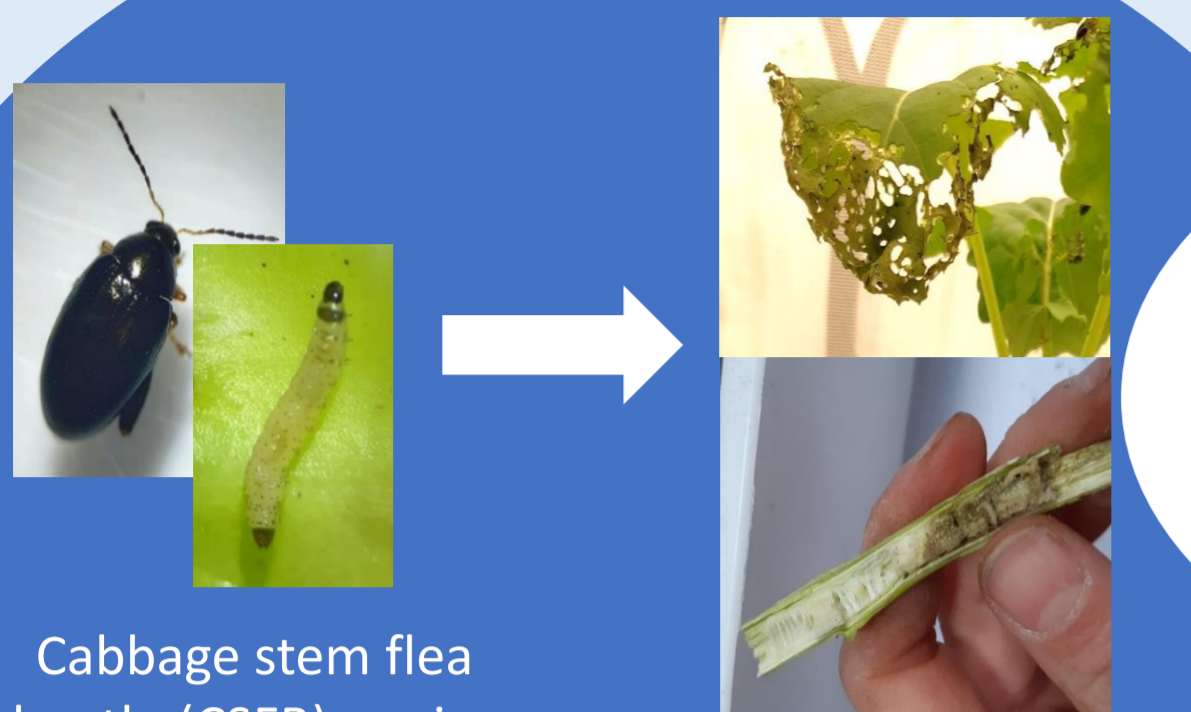
Biopesticides to control the cabbage stem flea beetle in oilseed rape crops

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Context



Cabbage stem flea beetle (CSFB), major pest in oilseed rape crops

Severe economic damage from reduced yields or total crop failure

European Union in 2013 → ~~Neonicotinoid insecticides~~
 Only alternative: **Pyrethroid insecticides** but insects are resistant

Objectives

Find viable alternatives to synthetic pesticides, such as entomopathogenic nematodes and bacteria.

Methods:

Initial leaf damage: 25 plants analysed: percentage of leaf damage eaten by adult CSFB recorded
Leaf damage (post treatment): 5 plants/plot analysed
Larval damage: 5 plants/plot collected and dissected, number of larvae/plant recorded
Adult density: 6 yellow water traps placed in the trial

Biopesticides sprayed

- T1: **FLiPPER** (fatty acid)
- T2: **CEU – 10239 – I – SL** (confidential)
- T3: **Hallmark Zeon** (lambda cyhalothrin, positive control) **applied 3 times**
- T4: **Botanigard WP** (*Beauveria bassiana* GHA, entomopathogenic fungus)
- T5: **Azatin** (azadirachtin)
- T6: **Botanigard WP + Azatin**
- T7: **FLiPPER + Hallmark Zeon**
- T8: **Water** (negative control)
- T9: **Hallmark Zeon** (lambda cyhalothrin, positive control) **applied 1 time**
- T10: **Untreated**

- TA: **Nemasys** (*Steinernema feltiae*) entomopathogenic nematodes
- TB: **Nemasys-H** (*Heterorhabditis bacteriophora*) entomopathogenic nematodes

Results

- Leaf damage:
 - Nematodes : no difference between treatments and rates, but by the last assessment date, *damage was significantly lower than at earlier assessments in plots treated with Heterorhabditis bacteriophora* (see Figure 1)
 - Treatments T1-T10: by the latest assessment date, damage was significantly lower in plots treated with T7 (FLiPPER + Hallmark Zeon) and T9 (Hallmark Zeon x1) than in plots treated with other products. *Damage recorded on 19th October was significantly lower than the damage recorded on 30th September* (see Figure 2)
- Larval damage: no significant differences between treatments and rates in larval numbers per plants.
- Adult density below treatment threshold on this specific site.
- *Need to improve the field method: earlier start, spray in the evening, improved assessment method*

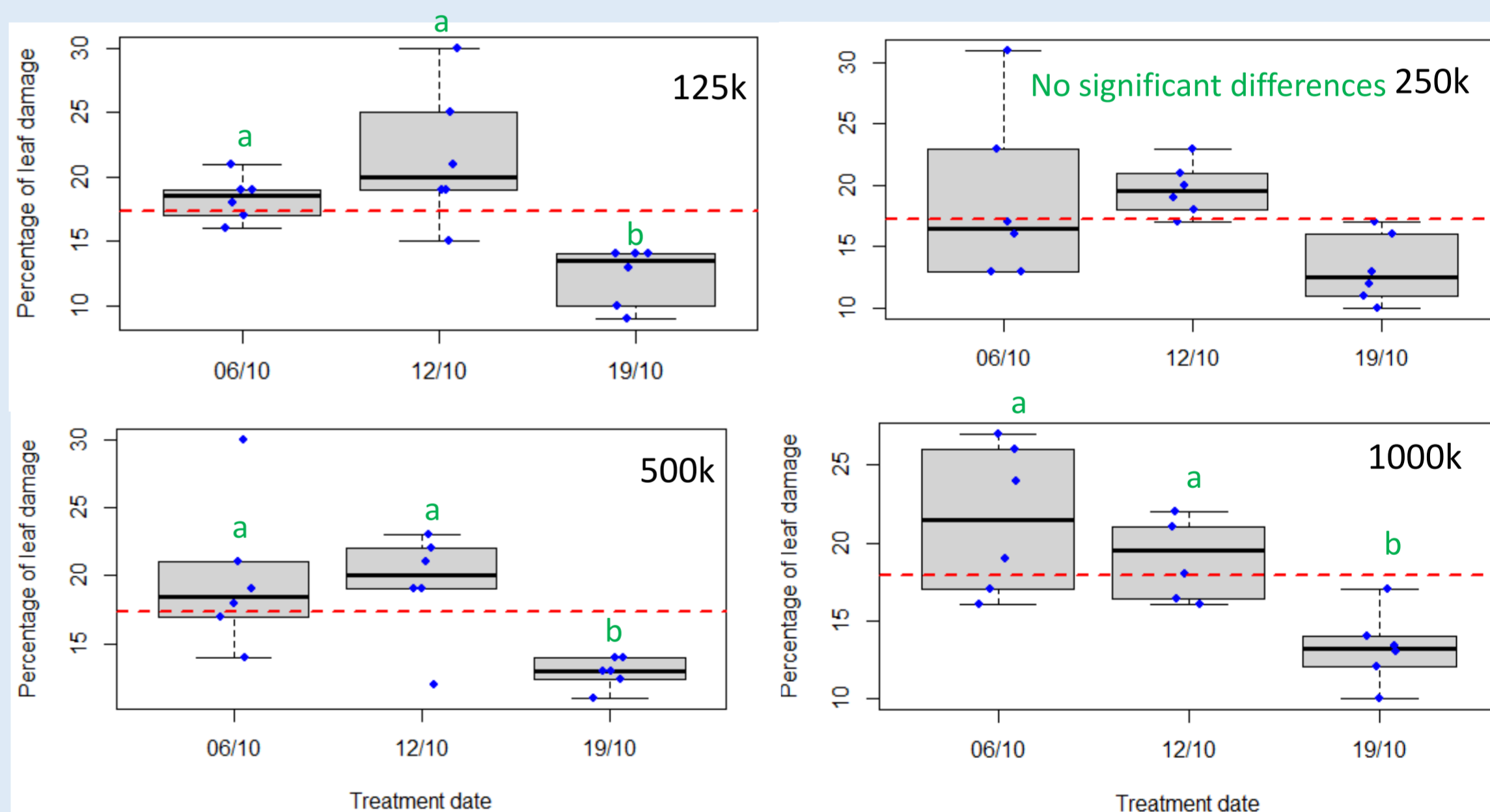


Figure 1: Percentage of leaf area eaten by adult cabbage stem flea beetles after nematodes treatment with TB (*Heterorhabditis bacteriophora*)

30/09 a

19/10 b

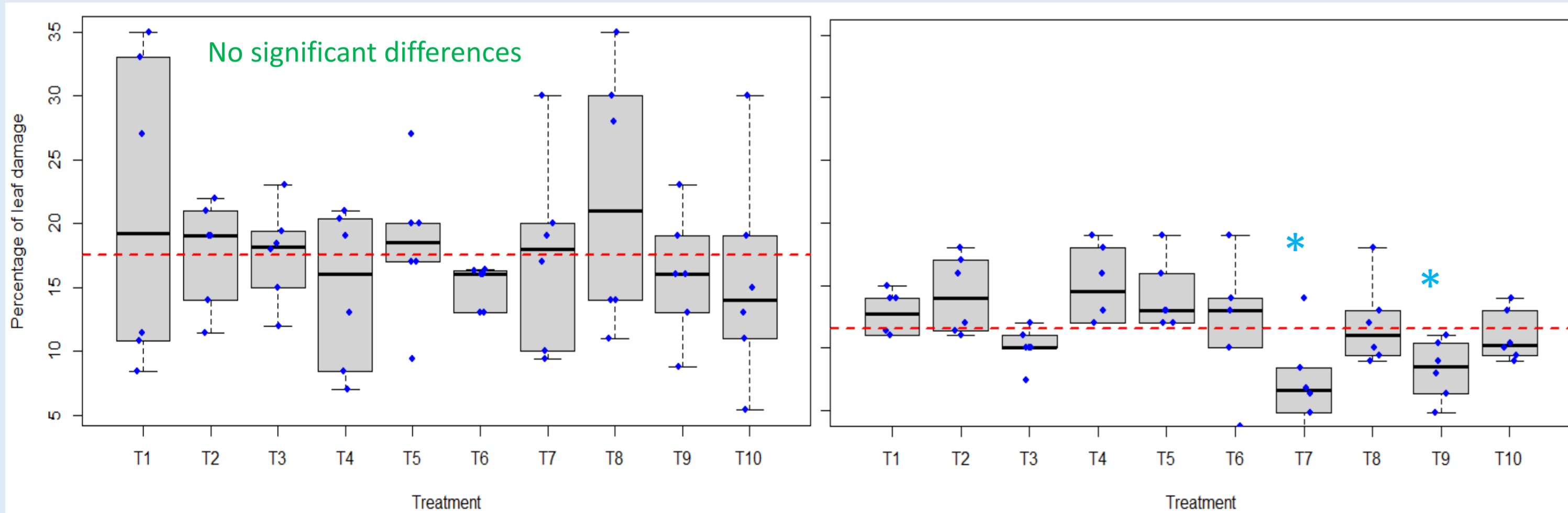
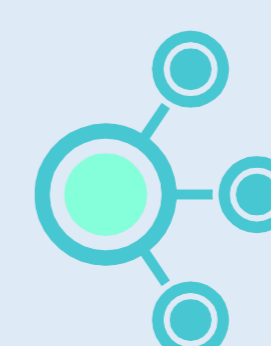


Figure 2: Percentage of leaf area eaten by adult cabbage stem flea beetles after treatments T1-T10

What next?

- New formulations of physically acting products tested in the lab
- Effect of various biopesticides on CSFB cuticle
 - Persistence of various biopesticides on oilseed rape leaves
- Cost/benefits aspects of selected biopesticides
- **Next September: another field experiment**



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