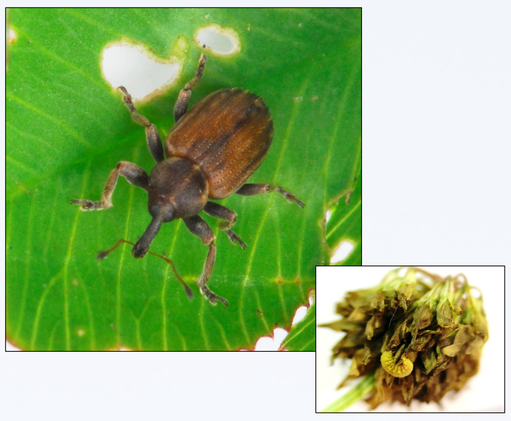
AARHUS UNIVERSITY
Science & Technology
Department of Agroecology

11th INTERNATIONAL HERBAGE SEED GROUP CONFERENCE
Angers 2023

The clover head weevil (*Hypera meles*) a pest in white clover seed



Adult and larva of the clover head weevil (*Hypera meles*)

Henrik Bak Topbjerg *
Birte Boelt

Aarhus University, Department of Agroecology

* Corresponding author: topbjerg@agro.au.dk

Adult and cocoons of the parasitoid *Bathyplectes curculionis*

Background

In Denmark the clover head weevil *(Hypera meles*) is one of two major pests in white clover seed production. Through a number of years a naturally occurring parasitoid *Bathyplectes curculionis* has been studied with the intent of evaluating if the parasitoid can be used as a biological control agent towards the pest. The graphical presentation 1 shows the interaction. In Later years the weevil pest was found in quantities not previously experienced. The sensitivity of the pest to λ-cyhalothrin was evaluated. Populations tested were from both traditional and areas with sparse seed production.

Material and methods

Parasitoid was sorted from the harvested material, in 2020 by AU and later in 2021 and 2022 by DSV and DLF Seeds. Cocoons were set out in the new white clover seed field before flowering, either in plastic boxes with net sides (AU) or open seed bags (DLF Seeds). The adult parasitoids could freely migrate away from the release points. Number of fields used for control varied between 6 and 8, fields for releases varied between 5 and 3. Before harvest 400 flower heads were collected in a transect walk. The flower heads were stored until weevil larvae had emerged as adult weevils. The number of adult weevils and parasitoid cocoons was counted to calculate the parasitation frequency. Cocoons in 80 g of harvested material from 143 fields were hand sorted and counted. Fields were pooled according to how intense white clover seed was grown in the area (Graphical presentation 2). In July of 2021 and 2022 weevil larvae were collected from 54 white clover seed fields and reared to the adult stage. The sensitivity of the weevils to λ-cyhalothrin were tested using the IRAC method 011 and adapting the assay to the weevil. Data analysis was done in R (R Core Team, 2017)

Table 1. Parasitization frequency of the pest between 2020 and 2022 for releases by AU and DLF

	Control	AU release	DLF release
2020	29 %	39 %	-
2021	28 %	20 %	46 %
2022	22 %	21 %	27 %
Average	26 %	26 %	37 %

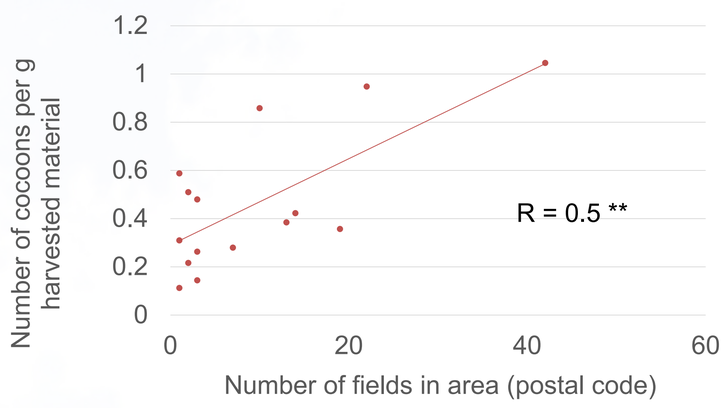


Figure 1. Relation between found number of cocoons and position of field

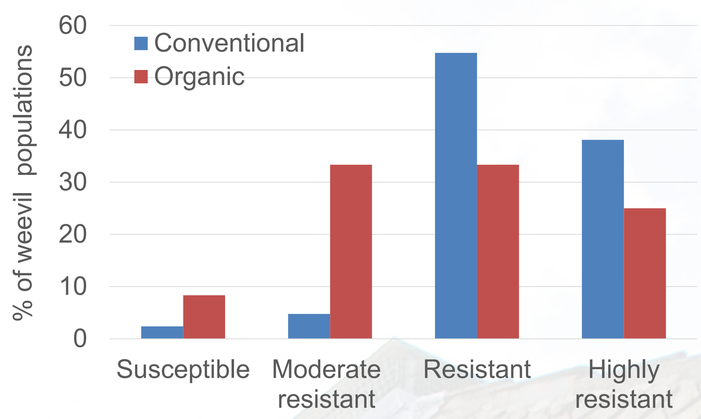
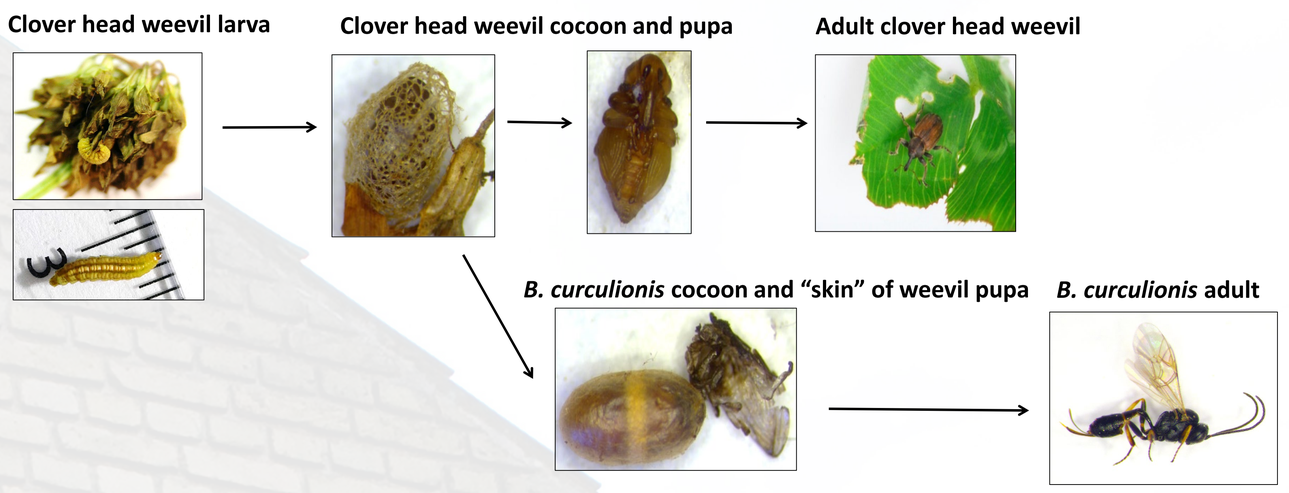


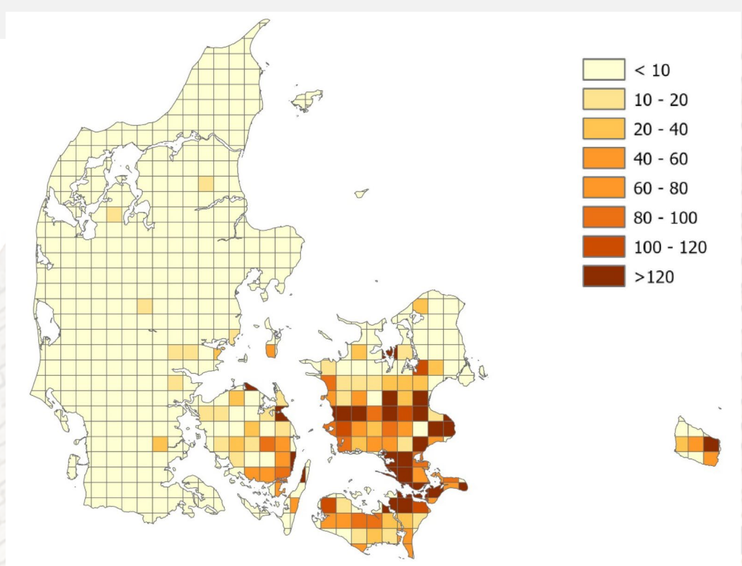
Figure 2. Response of weevil population to λ-cyhalothrin combined 2021 and 2022

Results and discussion

Setting out parasitoid cocoons did not give a clear increase in parasitization (table 1). Parasitization differences between fields varied between 0 to 50% for control and for releases, AU and DLF combined, between 3 and 52% (year 2022) (Topbjerg et al. in preparation). Number of cocoons in the harvested material could be related to how intense the production of white clover seed was in an area (Topbjerg et al. in preparation). Values in figure 1 are from 2019, analysis of samples from 2020 and 2021 are underway. The weevil pest have developed resistance to λ-cyhalothrin (figure 2), the active ingredient in the most common used insecticide (Kristensen et al. in preparation)



Graphical presentation 1. Parasitization of the clover head weevil by the parasitoid



Graphical presentation 2. Conventional white clover seed area ‰ of agricultural area in Denmark

References

R Core Team. 2017. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.

Frøafgiftsfonden

Fonden for økologisk landbrug