

## Studentship Project: Annual Progress Report 10/2019 to 10/2020

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<b>Project Title:</b>	Genetics of the interaction between rapeseed and the cabbage stem flea beetle		
<b>Lead Partner:</b>	John Innes Centre		
<b>Supervisor:</b>	Steve Penfield		
<b>Start Date:</b>	1/10/2017	<b>End Date:</b>	30/09/2021

### 1. Project aims and objectives

To identify biological and genetic traits which confer resistance to adult and larval cabbage stem flea beetle within oilseed rape, to aid development of more targeted pest management approach.

### 2. Key messages emerging from the project

There is significant variation in feeding preferences of the adult cabbage stem flea beetle (CSFB) in *Brassica napus*, with particular lines repeatedly demonstrating strong or weak palatability.

Some of these differences appear to be maintained in the field.

There is significant variation in plant damage from CSFB larval infestation *between Brassica napus/ Brassica juncea and Sinapis alba*.

Adult emergence from soil is recorded to significantly vary between two commercial *Brassica napus* lines.

Variation in adult emergence is observed between *Brassica napus* lines from a diversity set. Variation in egg quality between beetles potentially explains some of this variation.

Confirmation of a beneficial wasp species which parasitizes adult CSFB.

### 3. Summary of results from the reporting year

From adult CSFB feeding assay, provisional candidate genes have been identified to have a role in CSFB palatability and are currently being explored in more detail. *Arabidopsis thaliana* mutants have been obtained for use in feeding assays to further investigate this relevance of these genes in CSFB feeding preferences.

The 2020-2021 field trial near Norwich saw far less damage from adult CSFB compared with the previous year. However, data has been collected on establishment and damage levels. As the trial has survived the initial adult feeding period we have the opportunity to score the larval load of these varieties in the field.

Egg inoculation experiments of a *Brassica napus* diversity panel are still ongoing and initially indicated variation in adult emergence. However, this experiment had to be paused due to lockdown restrictions in March 2020 (it has since resumed). During this time, a subset of *Brassica napus* lines (which showed the greatest variation in adult emergence from the main experiment) were inoculated with CSFB eggs from the same beetle populations, with a higher replication rate, to confirm differences observed in adult emergence. Extreme differences between these lines were not confirmed from these repeats.

### 4. Key issues to be addressed in the next year

The results described in this summary report are interim and relate to one year. In all cases, the reports refer to projects that extend over a number of years.

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Adult CSFB assays of *Arabidopsis thaliana* mutants to help confirm the involvement of particular gene in palatability.

Field trial ongoing and made it through initial adult CSFB damage. Therefore, larval load data for lines of particular interest to be collected in December 2020 and February 2021.

Egg inoculation experiment ongoing and decision to continue will be reviewed in February 2021.

#### 5. Outputs relating to the project

*(events, press articles, conference posters or presentations, scientific papers):*

Output	Detail
Scientific paper	Contributing author to paper titled: The potential of the solitary parasitoid <i>Microctonus brassicae</i> for the biological control of the adult cabbage stem flea beetle, <i>Psylliodes chrysocephala</i> .

#### 6. Partners (if applicable)

Scientific partners	John Innes Centre, AHDB
Industry partners	Elsoms
Government sponsor	