

## Having a bitter bit? The use of cover crop to manage slugs.

### 1. Rationale and Significance

Cover crops are used to maintain and even promote soil health and prevent erosion. While becoming a current practice on the DELMARVA Peninsula, little is known about the potential of using cover crops for pest management. Slugs in particular are a challenging pest of soybean that are capable of causing significant stand and yield losses. Preliminary data from laboratory trials suggest that slugs may not perform well on all cover crop species. Planting a cover crop that slugs prefer could favor the slugs and result in increased slug survival. However, planting a cover crop that slugs dislike has the potential to reduce slug survivorship resulting in less damage to the following soybean crop. We therefore propose to explore slug feeding preferences to various cover crop species. Planting the right cover crop could then have the dual benefit of protecting soils and reducing slug injury on soybean.

### 2. Objectives

- Evaluate feeding preferences of slugs (e.g., grey garden or marsh slugs) for various cover crop species
- Evaluate the impact of cover crop species on the development of slugs (e.g., grey garden or marsh slugs)

### 3. Experimental Plans

#### *Slug collection and handling*

Slugs were collected from fields (e.g., UD Newark farm and fields in DE and MD) using shingle traps (1x1m). Each trap (6 total) were placed in commercial fields and visited bi-weekly to collect slugs to us in the experiments. Slugs will be kept in Petri-dishes (5 individuals per dish) and fed on carrots until used in the laboratory feeding trails.

#### *Laboratory feeding trials*

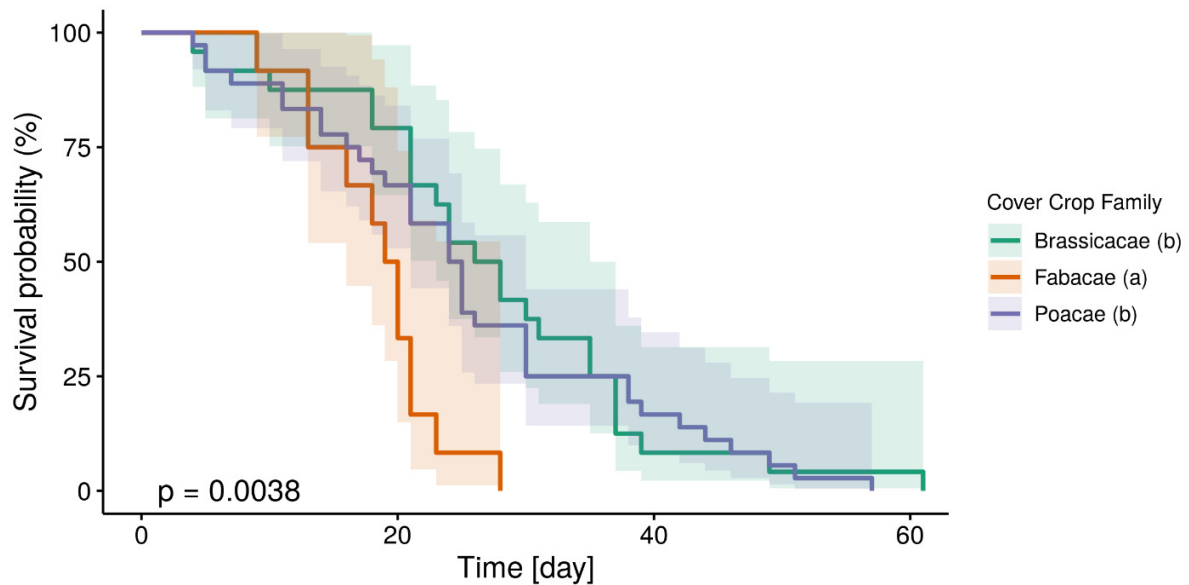
We tested 12 species of cover crops (Tab. 1). Plants were grown in pots in our greenhouse for about 4 weeks. After this period of time, they were transferred in the laboratory and infested with one slug each. Prior to the infestation, the slug were starved for 24h and weighed to record its mass prior to the experiment. The cover crops were then covered with transparent plastic pot to prevent slugs from escaping while allowing for direct observations. Slugs were weighed weekly and their survival was monitored until the individual died.

Table 1. List of the cover crop species to be tested in the laboratory.

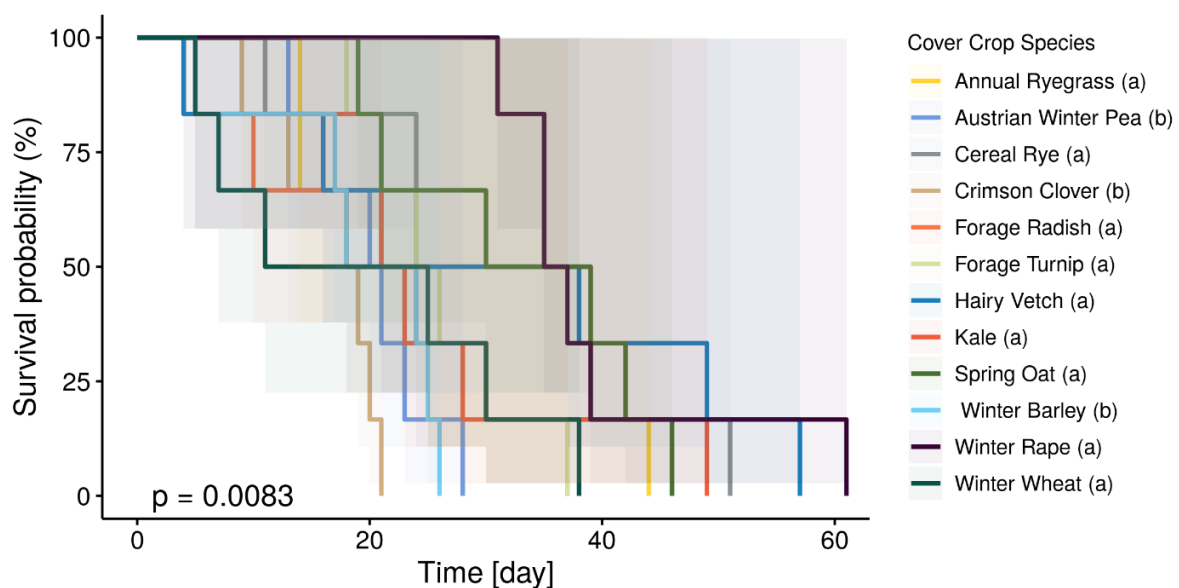
Cover crop species	Plant family	Number of replications
Kale	Brassicaceae	10
Winter rape	Brassicaceae	10
Forage radish	Brassicaceae	10
Forage turnip	Brassicaceae	10
Crimson clover	Fabaceae	10
Hairy vetch	Fabaceae	10
Austrian winter pea	Fabaceae	10
Annual ryegrass	Poaceae	10
Cereal rye	Poaceae	10
Winter wheat	Poaceae	10
Winter barley	Poaceae	10
Spring oat	Poaceae	10

#### 4. Results and Discussion

The feeding trials demonstrated that certain family of cover crop species significantly negatively impacted the survival of slugs (grey garden slugs) ( $p < 0.01$ , Fig. 1). We were expecting Brassicaceae to be less suitable as host because of their high content in glucosinolates, highly effective chemical defensive compounds natural produced by the members of this family, but surprisingly slugs survived significantly less longer (max 28 days) on Fabaceae than on Brassicaceae and Poacea. Obviously more complex, Figure 2 depicts slug survivals on each tested cover crop species.



**Figure 1.** Survival of slugs on the three different cover crop families herein tested. Letter indicate statistical differences between families.



**Figure 2.** Survival of slugs on the different cover crop species herein tested. Letter indicate statistical differences between families.

### 5. **Conclusions**

In addition to being of source of nitrogen for the cash crop, using cover crop species from the Fabaceae family can offer an ecological sound alternative to synthetic pesticides against mollusks and especially slugs.