Introduction

Most plants face significant seed mortality, and often, pre-dispersal seed predators are an important source of this mortality (Petersen and Sleboda 1994). This study focuses on a prairie legume, Baptisia lactea. B. lactea suffers relatively little vegetative herbivory, due to high concentrations of alkaloid defense compounds (Petersen and Sleboda 1994). However, B. lactea suffers seed mortality rates of up to 98%, primarily from a pre-dispersal seed predator, the weevil Apion rostrum (Curculionidae) (Haddock and Chapin 1982).

The presence of A. rostrum was first documented in the Carleton Arboretum (the Arb) in the summer of 2008. Here, I provide the initial abundance and distribution for this native seed predator in the Arb.

Species Background

Apion rostrum is a native member of the Curculionidae family (Fig. 1). At the beginning of the summer, adult females bore holes in the base of B. lactea flowers, and lay several eggs in the developing ovary. The larvae feed upon the maturing seeds (Haddock and Chapin 1982).

Predated seed pods are identifiable by a lack of seeds and an abundance of frass (Fig. 2). To emerge, adult weevils may bore a hole through the seed pod wall, or wait for the seed pod to dehisce in autumn (Haddock and Chapin 1982).

Methods

Study Site- This study was conducted in the restored prairie of Carleton College’s Cowling Arboretum (Fig. 3). Age of prairie plantings range from 1 to 13 years old.

Data Collection- Data were collected in August, 2008. At each of 156 evenly distributed permanent plots (Fig. 4), the closest three B. lactea plants were sampled. Three pods were taken from each plant; one from the top, middle and bottom of the seed stalk. Number of A. rostrum found in each pod were recorded.

Results

26.7% of the 299 B. lactea plants sampled in the arb were infested with A. rostrum. These infested plants had on average 1.46 A. rostrum in each seed pod (Fig. 4).

The A. rostrum in the Arboretum is highly non-random ($\chi^2 = 329.96, P < 0.0001$) (Fig. 5). B. lactea density and location of the pod on the stalk had no discernable impacts on A. rostrum distribution. Fields six or more years old tended to contain higher densities of A. rostrum ($t=1.5$, one-tailed $P = 0.084$), but there was not a linear relationship between field age and weevil density.

Discussion

A population of A. rostrum has recently established itself in the Carleton’s Arboretum. Prior to this summer, this species had not been documented in the Arboretum (McKone, pers. com, 2008).

The presence of A. rostrum in the Arboretum’s prairies is a mixed blessing. It does indicate that our restoration is successfully maturing, as members of the native faunal assemblage return. However, A. rostrum is a thorough seed predator, and is known to impose high rates of mortality among Baptisia. The impacts of decreased seed production may be negligible, at least initially, since Baptisia is a long-lived prairie species and well-established in the Arb.

Personal observations made in prairie restorations where A. rostrum were more abundant suggest that an extremely small percentage of Baptisia seeds successfully mature when these seed predators become established.

Future Study

Several avenues of further research are suggested by the findings of this preliminary study:

• What is the dispersal ability of A. rostrum?
• Is there an edge effect with respect to A. rostrum density?
• What proportion of the Baptisia seed crop is being lost each year?

References

