

Effect of Bean Leaf Beetle (BLB) Feeding Injury On Early-Growth Stage Snap Beans – 2007

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Introduction

The bean leaf beetle (BLB), *Cerotoma trifurcata* (Forster), is a major pest of snap beans in the eastern and central U.S. Adults feed on leaves and pods of soy beans, snap beans and other legumes. Research on economic injury levels for this pest has focused primarily on soybeans. In order to gain more insight into the impact of early-season BLB defoliation on snap beans we conducted field-cage and manual leaf-hole punch studies.

Experimental design & materials

The experiment was conducted at the Virginia Tech AREC, Pinter, Virginia on 'Bronco' snap beans. The field was fertilized to growing standards and a pre-emergence herbicide was applied. Beans were planted 28 May 2007 using a commercial planter. Plants were 12 in. apart. Field cages were 12 x 12 x 6 feet. The experiment consisted of 5 reps with a control. The Cages contained 60 plants. BLB were placed in cages at varying densities on 13 June 2007. The hole-punch study used a CRB design with 25 reps per group. Plants defoliated by a percentage of 0, 25, 50 and 75% using a manual hole-punch. The defoliations were done in two groups. Group 1 received two defoliations and group 2 had four total defoliations. A foliar insecticide was sprayed to prevent arthropod defoliation.

Procedures

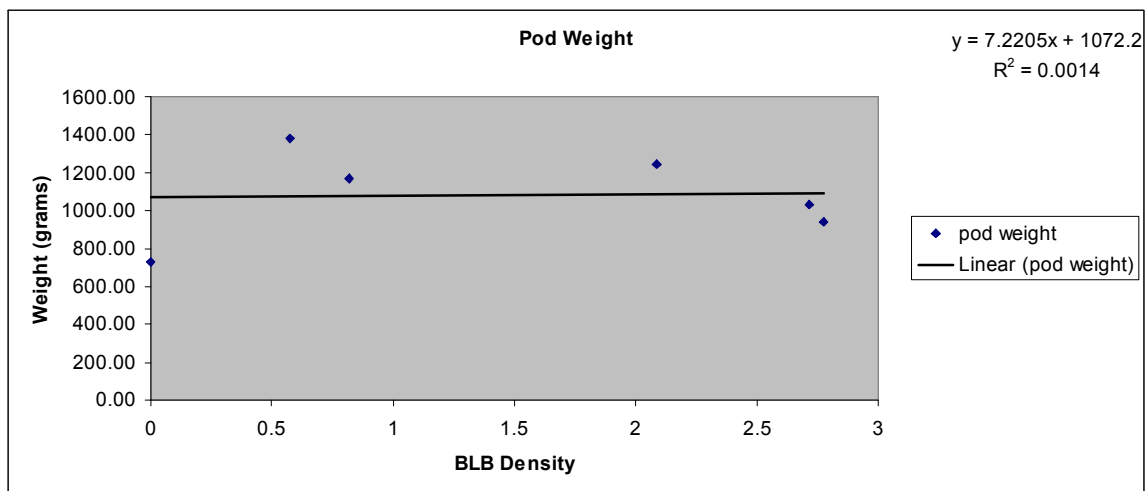
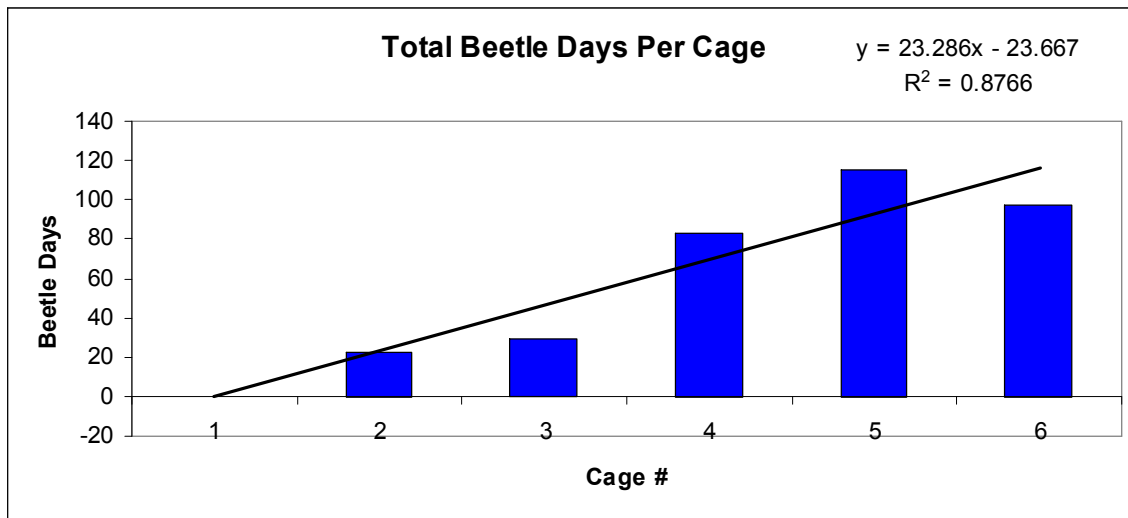
Beetle days were calculated in all of the cages for the entire duration of the experiment. Two defoliation measurements were taken on day 30 and 40 post planting. Five plants from each cage were evaluated at each of the sample dates. A leaf area meter was used to determine the area consumed by the beetles. A Xerox copy of each leaf was also measured and a percentage of actual defoliation was calculated. The percent defoliation was compared to the beetle days for each cage. Whole plant weight as well as pod weights for each cage was evaluated at harvest. All data were analyzed using a linear regression.

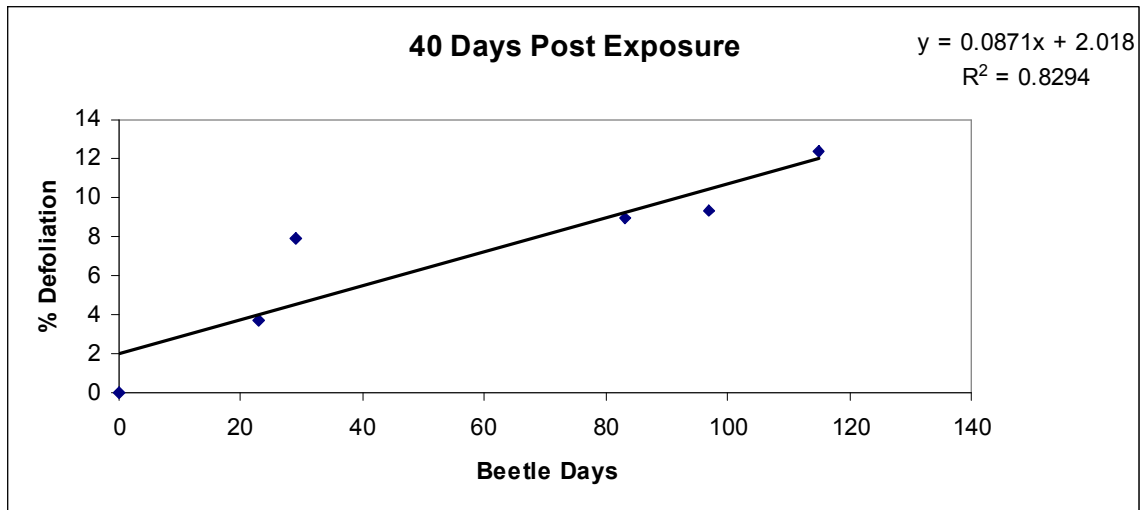
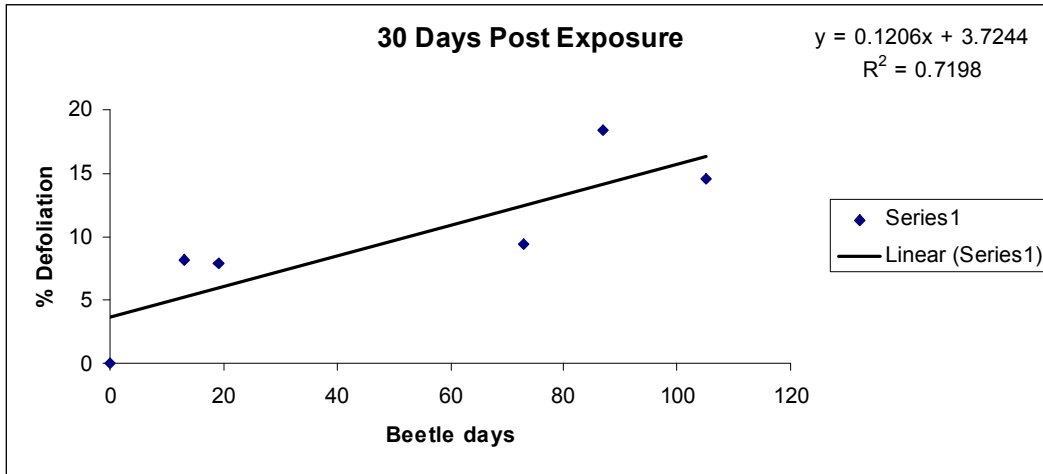
The hole-punch defoliations were carried out by measuring the total leaf area and then the amount of leaf area to remove was calculated. A standard hole-punch was used and removed a 0.3 cm² section of the leaf per punch. There was also a larger hole punch used that removed 8.4 cm² per punch. The larger hole-punch was used when over 100 hole punches were needed with the standard whole-punch, thus saving time. The hole-punch study used a CRB design with 25 reps per group. Plants defoliated by a percentage of 0, 25, 50 and 75%. Two groups were used to assess the impact of defoliation on yield loss. Group one had only two sessions of defoliation while group 2 had four sessions. Before each session leaf areas were calculated by using a leaf area meter and two randomly selected plants from each of the trials. The leaf area to be removed was calculated into cm² and then the number of holes punched was based on the total leaf area to be removed.

Results

The field cage study had intense pest pressure with the highest cage containing 1000 individuals with a beetle day total of 115. Even at this population density the damage inflicted on the 60 plants was not enough to cause a yield loss. There was a correlation between beetle days and percent defoliation for both the 30 and 40 day leaf area measurements. The hole-punch experiment showed significant treatment effect. The plants that experienced >50% defoliation had a significant yield loss for both the two-defoliation and 4-defoliation trials. There was some yield loss with the 25% defoliation for both trials, but it was not significantly different from the control.

Cage Trials





Hole-punch Studies

