

Report: Superboost in hybrid onion seed production

Authors: Dr. Sandra Gillespie, Rachael Long

During the summer of 2011 we investigated the potential for Superboost to increase visitation and yield in hybrid onion seed production. Due to a shortage of resources, and the high density of hives present at each site, we conducted a small preliminary investigation. Superboost was applied to hives at 4 sites, while 4 were left as controls. We were unable to randomly assign treatments, as sites were selected by the beekeeper we worked with.

We observed pollinator visitation at all 8 sites on 3 to 4 dates during peak bloom. At each site we recorded bee visits to both female (male fertile) and males (male sterile) plants in a 1x1 m plot at 4 locations in the field. We also recorded percent bloom of males and females, and the time of sampling. Finally we obtained clean yields from seed companies, as well as data on field size, insecticide and fungicide use.

We analyzed the effects of Superboost on visitation and seed yield using general linear models. Analysis of visitation included the effect of Superboost, location in field, flower sex, date, and time of day of observations. We also examined whether Superboost affected yield, by averaging visitation to females across all sampling locations and sampling dates, to get a site-level estimate of pollinator visitation. We then asked whether visitation to females, insecticide use, fungicide use or Superboost treatment impacted yield.

Results and Conclusions:

While Superboost did not have an overall effect on visitation to treated fields, there is some evidence that it changed patterns of visitation over time (Figure 1A). Visitation by honeybees in fields treated with Superboost stayed steady or slightly increased over time, whereas untreated fields experienced a steady decline in honeybee visits. This occurred independently of the effects of change in bloom over time. This doesn't seem to be driven by any overall site effect, where Superboost treated sites were also high visitation sites, as treated sites had overall lower visitation rates than untreated sites (Figure 1B). There was no statistically significant effect of Superboost on yield. It is unclear whether this pattern is due to the effects of Superboost, or due to the fact that Superboost treated sites tended to be larger than untreated sites (Figure 1C). All growers placed hives out at 10 hives per acre, so bee density should be similar across farms. However, large sites were also sprayed more, which could also negatively impact visitation.

Overall, we can only conclude that Superboost may change visitation rates over time, reducing reductions in visitation over time. However, it appears that, in our small study, overall visitation rates were lower at Superboost treated fields than at untreated fields, and this effect is confounded by field size and insecticide use. Given the low overall replication, it is difficult to say whether this is due to the choice of fields, or due to the impacts of Superboost. Further study is required to show conclusively that this product can benefit hybrid onion seed producers.

Figure 1: (A) Interaction between Superboost treatment and visitation over time, (B) Honey bee visits were overall lower in Superboost treated fields. (C) Field size was confounded with Superboost treatment. (D) Insecticide sprays increased with field size.

