

# The Influence of Ants on Native and Exotic Parasitoid Success

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## Introduction

Soybean aphids are an invasive species inducing a loss of up to 50% of soybean yields - or millions of dollars - each year. Parasitoids are small wasps that attack aphids and may reduce their population levels significantly. However, ants benefit from aphid exudates and will 'tend' aphids, or protect them from predators such as parasitoids. While there are native parasitoids that attack soybean aphids, they are not doing a sufficient job in controlling soybean aphid populations. A parasitoid called *Binodoxis communis* from the soybean aphid's native range (China) has been determined to be a biological control agent for the soybean aphid. This experiment was designed to determine the influence of ants on *B. communis* compared to a native parasitoid, *Lysiphlebus testaceipes*.

## Methods

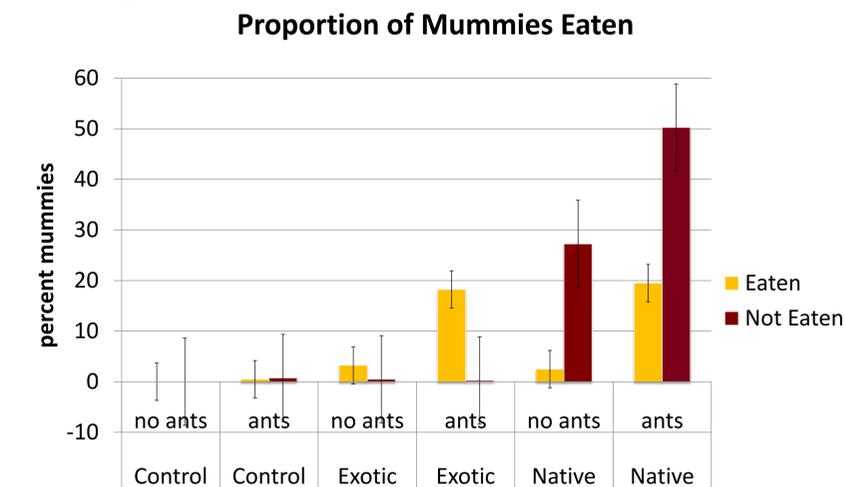
*L. testaceipes* colonies were reared in a growth chamber in the laboratory. *B. communis* colonies were reared in Greenhouses. Five females observed to be mating were collected for each field cage. The cages were made by covering single plants with 12"x12"x40" tomato cages with fine mesh, which was buried into the ground. The field cages consisted of six different treatments:

<i>Lysiphlebus testaceipes</i> with ants	<i>Lysiphlebus testaceipes</i> without ants
<i>Binodoxis communis</i> with ants	<i>Binodoxis communis</i> without ants
No parasitoids (control) with ants	No parasitoids (control) without ants

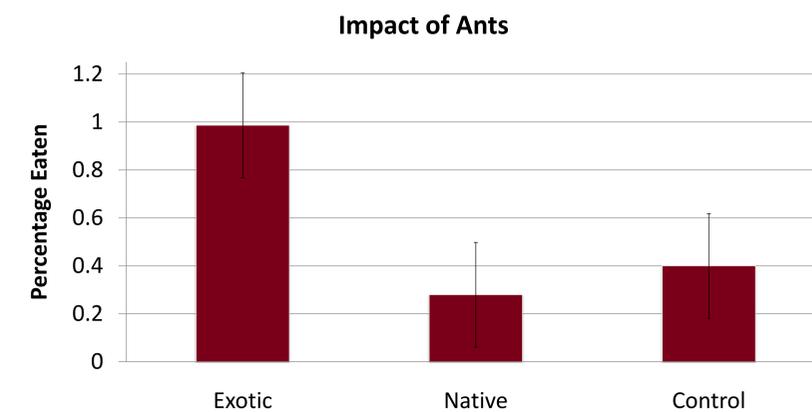
Prior to and after treatment all aphids, ants, parasitoids, mummies, and predators were counted along with the size of the soybeans (nodes) with all predators removed. Plants were selected for the observation of aphid tending by ants. For treatments requiring the absence of ants, ants were removed and Tanglefoot™ was applied to the base of the plants, all unwanted plants nearby were pulled out until a single plant remained in the treatment area. For treatments requiring ants, the plants were cut at the base to minimize ant nest destruction in the soil. Tanglefoot™ was applied to the remaining cut stems to not include bias. Cages were left unattended for nine days, the ninth of which a recount was conducted. Cages were in the field between June and August.



## Graphs



Percentage of mummies eaten and not eaten by cage treatment. *Lysiphlebus testaceipes* had a significantly higher amount of mummies with or without ants than *Binodoxis communis* ( $p=.008$ ).



Percentage of mummies eaten by parasitoid species. *Binodoxis communis* had a significantly higher percentage of total mummies eaten by ants compared to *Lysiphlebus testaceipes* ( $p=.005$ ).

## Results

Using ANOVA analysis it was shown that the difference of the total number of mummies between *L. testaceipes* and *B. communis* was significant ( $p=.008$ ). The proportion of mummies eaten by ants is significantly higher in *B. communis* than *L. testaceipes* ( $p=.005$ ). This indicates that while the native (*L. testaceipes*) and exotic (*B. communis*) parasitoids are producing similar numbers of mummies, the ants are eating a higher percentage of the exotic wasp mummies than the native mummies.

## Conclusions

These data suggest that while *L. testaceipes* produce more mummies than *B. communis*, with or without the presence of ants, a significantly higher proportion of *B. communis* mummies are eaten compared to *L. testaceipes*. This indicates that ants have a greater impact on *B. communis* than *L. testaceipes*. More research should be conducted to determine the reason of this occurrence. A question that deserves more study is if *B. communis* parasitoids are better defended against ants in their native range or do they suffer similar rates of attack? Do ants actively search them out or are they easier to detect than *L. testaceipes*? What implications does this have on their potential as a biological control agent of the soybean aphid? A more precise measure of ant influence could be obtained with a reiteration of this experiment on a larger scale.

## References

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