Section VI.
Biological and Cultural Control

SUBLETHAL EFFECTS OF *BEAUVERIA BASSIANA* ON *LYGUS HESPERUS* FEEDING AND OVIPOSITION

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Our field trials in summers of 96-97 suggest that the tested strain of *Beauveria bassiana* had little impact on lygus bug populations in southern Idaho alfalfa seed fields. However, we observed high proportions of both lygus nymphs and adults infected by *B. bassiana* after applications (Fig.1). Perhaps infected bugs that did not die may show sublethal effects (i.e., changed feeding and oviposition rates) that could impact crop damage, though *Lygus* populations are not reduced. Thus, this study was conducted to investigate sublethal effects of *B. bassiana* on *Lygus hesperus*.

OBJECTIVE

To determine the sublethal / prelethal effects of *B. bassiana* on *L. hesperus* feeding and oviposition.

MATERIALS AND METHODS

Lygus bugs. *L. hesperus* females were collected from alfalfa seed fields between June and August 1997 in Parma, Idaho, and were reared on green beans. Only females were used for the feeding experiments because their feeding damage is significantly greater than males (Table 1).

***B. bassiana* inoculation**. Conidia (GHA strain, Mycotech Corp., Butte, Montana) solutions of LC10, 50, and 90, determined by the previous bioassay (Fig. 2), were sprayed onto *L. hesperus* females using the spray tower and technique described by Noma and Strickler (see 1996 report) .

Feeding. Wisconsin fast plants (*Brassica rapa*) were grown to the flower bud stage in the greenhouse. Each *B. bassiana*-inoculated or untreated *L. hesperus* was placed on a caged plant and was allowed to feed on buds for 5 days. The plants and bugs were kept at 25°C, ≈ 70%RH, and L:D = 16:8. The number of damaged buds and aborted flowers per plant were counted after 5 days. Lygus bug survival was monitored daily. 10-15 bugs were inoculated with each concentration of *B. bassiana*. The experiment was repeated three times.

Oviposition. *B. bassiana*-inoculated or untreated *L. hesperus* females were caged with green beans for food and oviposition sites. Each cage contained 4-6 females and each treatment was replicated three times. (= three cages of bugs per *B. bassiana* inoculation concentration) Beans were replaced daily for 5 days and eggs were counted each day. Lygus survival was monitored daily. The experiment was repeated five times.

RESULTS

Feeding. Generally *B. bassiana* infection increased lygus bug feeding rate measured for 5d, although concentration responses varied between trials (Fig. 3).

Oviposition. *B. bassiana* infections did not significantly affect lygus bug oviposition rate in all trials (F test, $\alpha = 0.05$). Lygus bug oviposition and mortality rates were highly variable between trials (Fig. 4).

CONCLUSIONS

Lygus bug oviposition was too variable to detect an effect of *B. bassiana*. In the lab, *B. bassiana*-infected lygus bugs often fed more than non-infected bugs. Increased feeding rate due to sublethal / prelethal infection may increase alfalfa seed damage in treated plots. This strain of *B. bassiana* is not an effective control measure for lygus bugs in alfalfa seed fields.

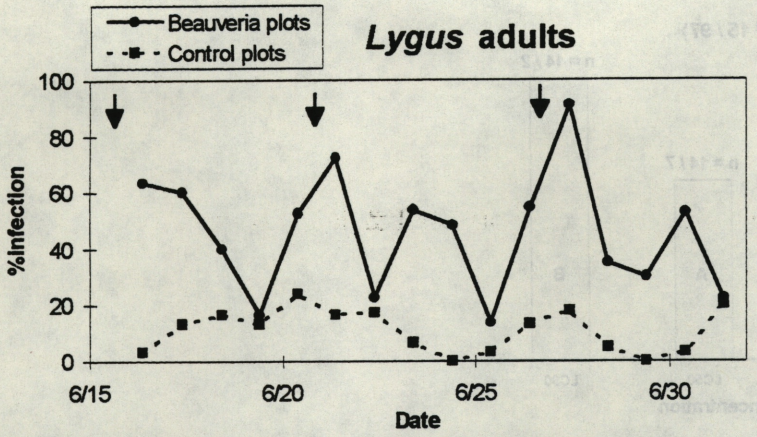


Fig. 1. Percentages of *B. bassiana* infected lygus bugs in *B. bassiana*-treated and control plots. Arrows indicate *B. bassiana* applications.

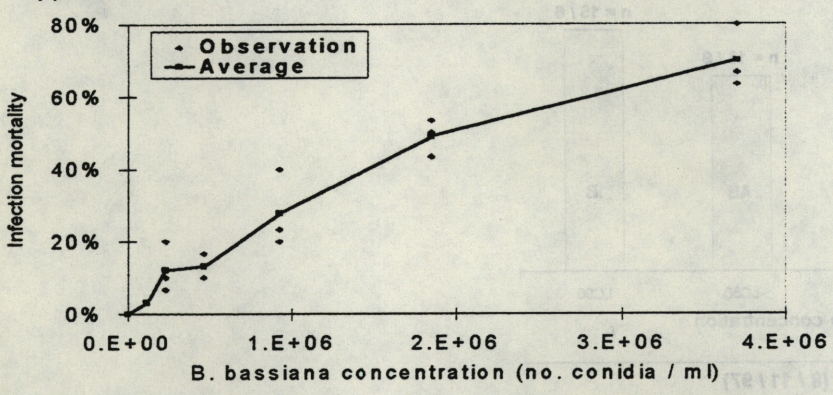


Fig. 2. Lygus bug mortality response to *B. bassiana* concentration at 25°C after 10 days.

Table 1. Lygus bug females feed on more flower buds than males (F = 8.33, P < 0.0098).

L.hesperus	N	Mean no. buds fed / bug / day (S.E.)
Female	10	2.48 (0.42) a*
Male	10	1.00 (0.30) b

*Tukey studentized range test

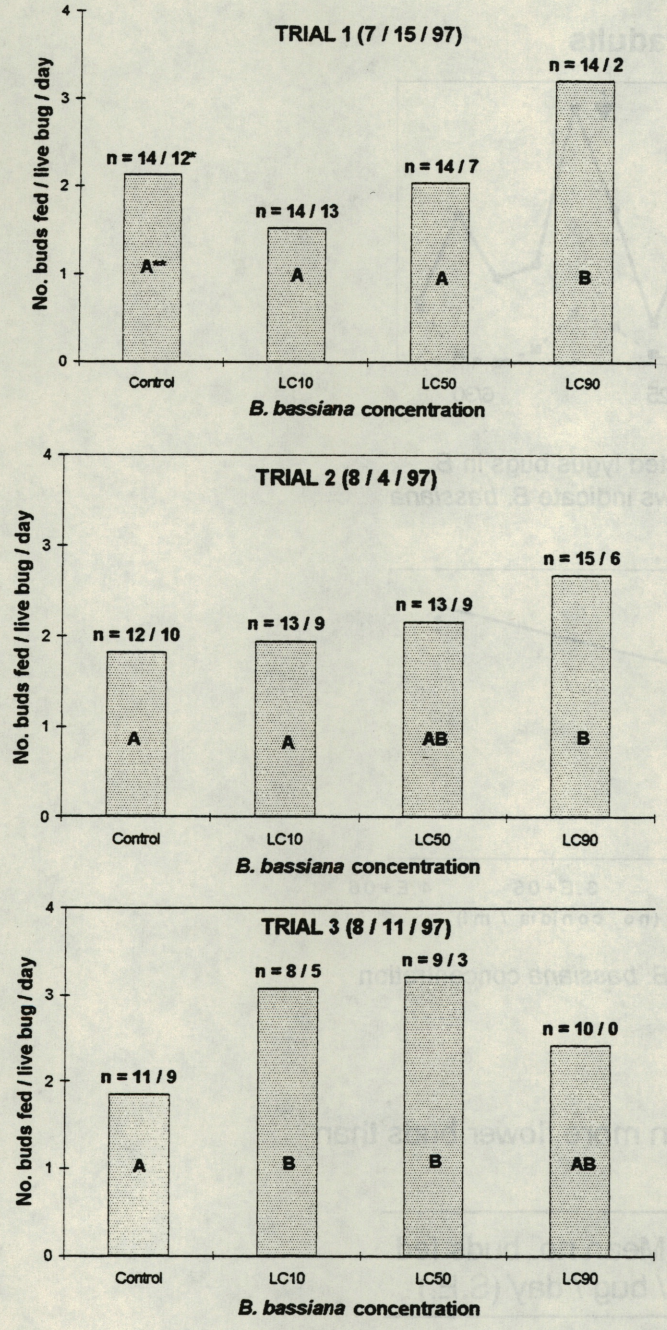
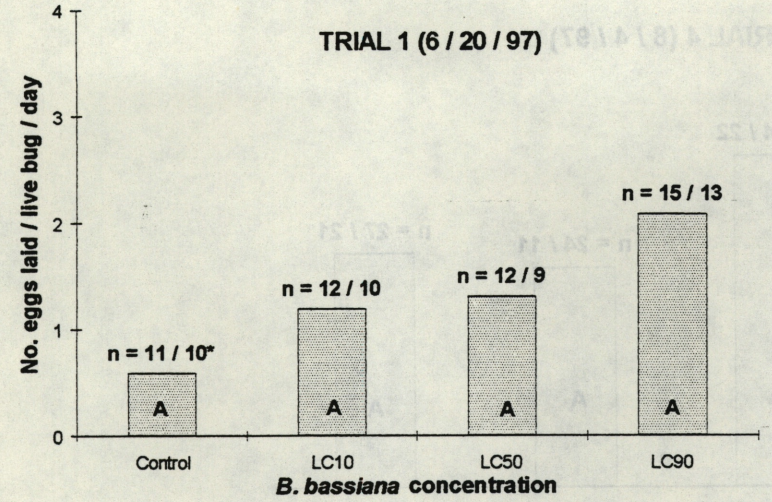
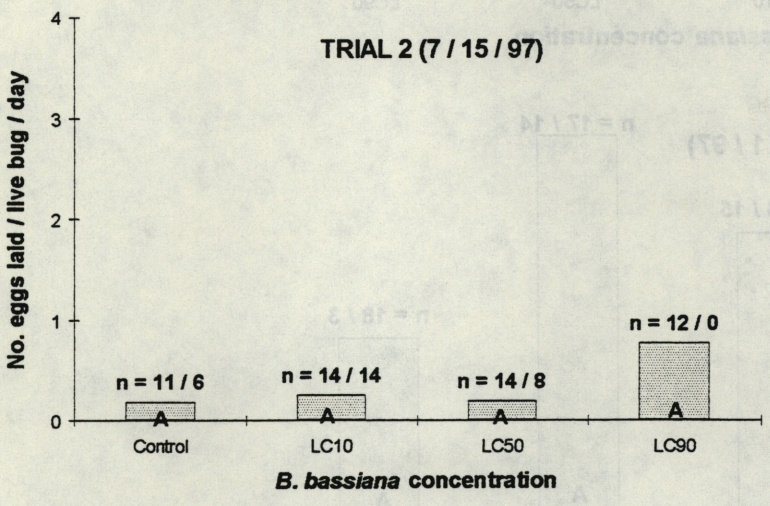
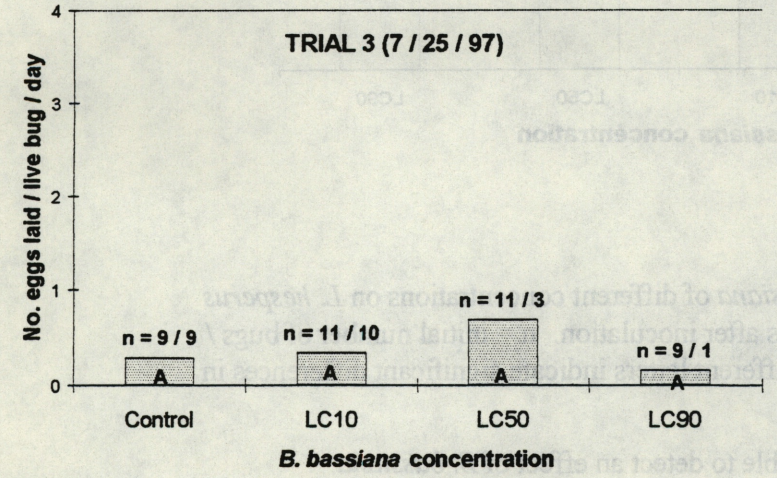


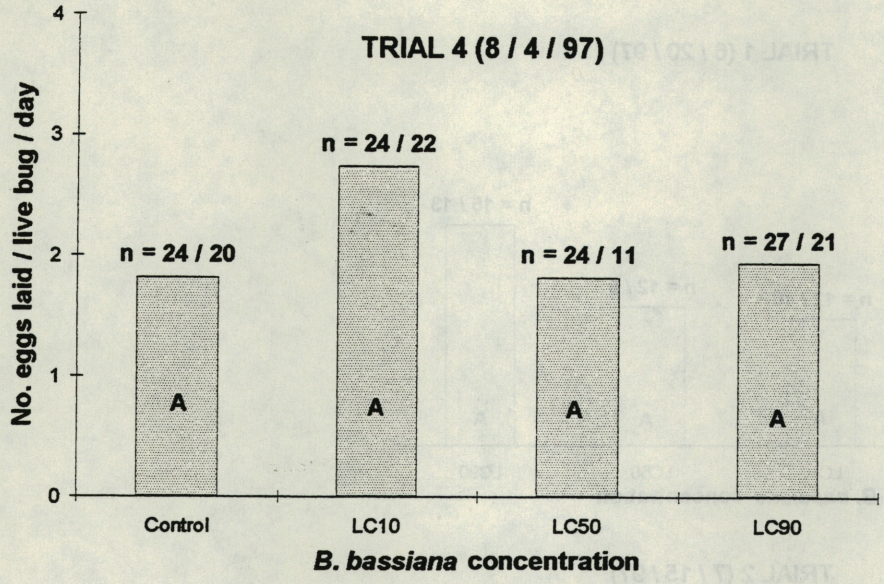
Fig. 3. Effect of infection by *B. bassiana* of different concentrations on *L. hesperus* female feeding rates measured for 5 days after inoculation. n = initial number of bugs / number of live bugs after 5 days. Different letters indicate significant differences in feeding rates (LSD, $\alpha = 0.05$).

B. bassiana-infected lygus bugs often fed more than non-infected bugs.


TRIAL 1 (6 / 20 / 97)
No. eggs laid / live bug / day
n = 11 / 10*
n = 12 / 10
n = 12 / 9
n = 15 / 13
A
A
A
A
Control
LC10
LC50
LC90
B. bassiana concentration


TRIAL 2 (7 / 15 / 97)
No. eggs laid / live bug / day
n = 11 / 6
n = 14 / 14
n = 14 / 8
n = 12 / 0
A
A
A
A
Control
LC10
LC50
LC90
B. bassiana concentration


TRIAL 3 (7 / 25 / 97)
No. eggs laid / live bug / day
n = 9 / 9
n = 11 / 10
n = 11 / 3
n = 9 / 1
A
A
A
A
Control
LC10
LC50
LC90
B. bassiana concentration



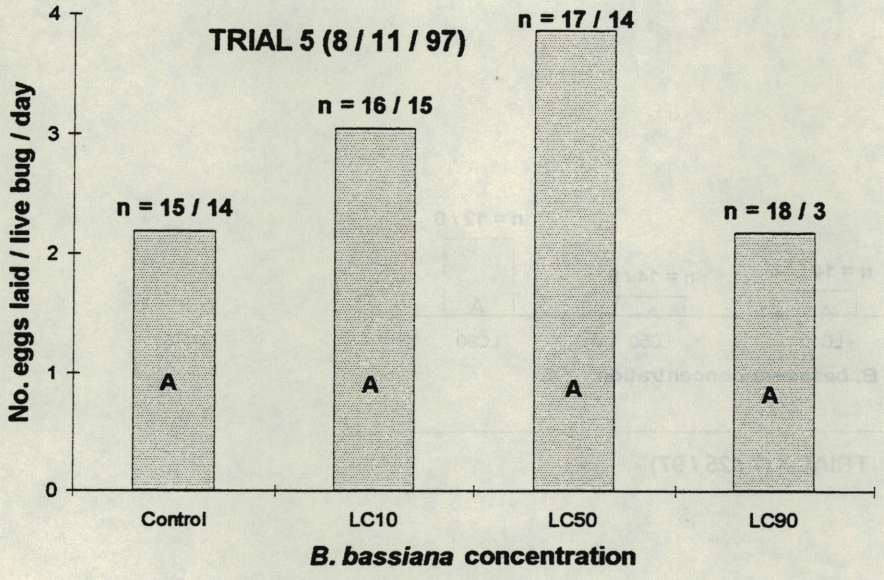


Fig. 4. Effect of infection by *B. bassiana* of different concentrations on *L. hesperus* oviposition rates measured for 5 days after inoculation. n = initial number of bugs / number of live bugs after 5 days. Different letters indicate significant differences in oviosition rates (LSD, $\alpha = 0.05$).

Lygus bug oviposition was too variable to detect an effect of *B. bassiana*.