

# Entomopathogenic fungi for managing the invasive Bagrada bug, *Bagrada hilaris*



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*Bagrada bug (Bagrada hilaris)* is an invasive stink bug in California and parts of Arizona attacking cole crops and various other hosts. Conventional growers have several chemical pesticide options for managing this new pest, but organic growers and home gardeners are looking for non-chemical solutions. Laboratory assays were conducted using commercial formulations of the entomopathogenic fungi, *Beauveria bassiana* (strain GHA), *Metarhizium brunneum* (strain F52), and *Isaria fumosorosea* (strain FE 9901). Preliminary results indicate that *B. bassiana* and *I. fumosorosea* can be effective in controlling *Bagrada bug* adults. Unlike some other agricultural pests which are mainly a concern in the crop fields or effectively controlled with various management tools, *Bagrada bug* poses a serious threat to organic farms or home gardens that have limited control options and offers a good opportunity for exploring microbial control. Additional studies will help develop an effective management strategy with a strong microbial control component.



Life stages of the Bagrada bug. Barrel shaped eggs, different nymphal instars, and adults. Younger nymphs only have black and orange coloration while the later instars and adults develop white markings as well.



## Damage

*Bagrada* bugs have piercing and sucking mouthparts and feed on the plant juices. Depending on the crop and plant part they infest, damage can vary from stippling with necrotic spots, stunted growth, loss of apical dominance, and formation of multiple heads to death. They migrate from alternate weed hosts such as wild mustard to crop plants.

## Bioassays

Laboratory assays were conducted using various organically labeled pesticides that included entomopathogenic fungi, bacterial metabolites, pyrethrins, insecticidal soap, and essential oils. Products were used at field application rates. Broccoli florets were treated with respective treatment materials, placed in a cup, and 10 adult *Bagrada* bugs were released. Cups covered with perforated lids and mortality of the insects was monitored for five days. Dead insects treated with entomopathogenic fungi were surface-sterilized and incubated on oatmeal dodine agar medium for fungal emergence. Assays were repeated three times.



*B. hilaris* on treated broccoli

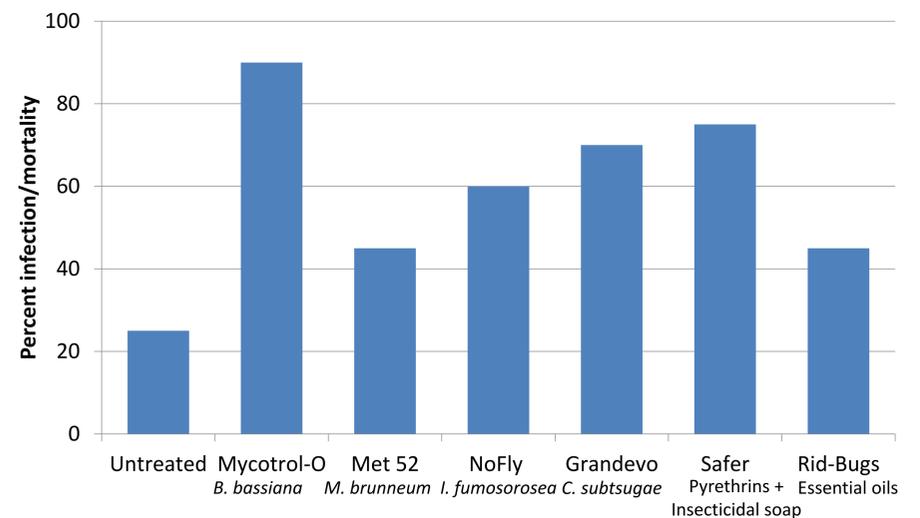


Fungus emerging from surface-sterilized cadavers



Scan for a short video on *Bagrada* bug

Active Ingredient	Product	Application Rate
<i>Beauveria bassiana</i> strain GHA	Mycotrol O®	1 quart/100 gal
<i>Metarhizium brunneum</i> strain F 52	Met 52®	1 quart/100 gal
<i>Isaria fumosorosea</i> strain FE9901	NoFly®	28 oz/100 gal
<i>Chromobacterium subtsugae</i> strain PRAA4-1	Grandevo	3 lb/100 gal
Pyrethrins + potassium salts of fatty acids	Safer Yard & Garden Insect Killer	Ready-to-use
Essential oil blend	Rid-Bugs	60 ml/gal



*B. hilaris* killed by *B. bassiana* (A), *M. brunneum* (B), and *I. fumosorosea* (C)