

## Cooperators for Japanese Beetle pathogen research

### Hello Cooperating MN Golf Courses, MN Public Gardens, and Arboretum,

My name is Michael Angstman (angst046@umn.edu) and I am an undergraduate researcher from the Department of Entomology, University of Minnesota. Our lab is conducting research on Japanese beetle (JB) management. We need to collect JB adults by using standard JB traps for 24hrs, near the Grounds Building one day every 2 weeks from July to Sept. We will search for an important natural biocontrol agent, a pathogenic fungus inside the adults. Eventually, we will release the pathogen at volunteer GC.

### Background

Japanese beetle (JB) is an economic pest of turf and landscape plants. Adults damage plant leaves and flowers, while grubs feed on and kill grass roots. It is estimated that the US spends more than \$460 million a year managing JB populations, and another \$156 million replacing and renovating damaged turf and plants. JB is targeted most successful at the grub stage (see Table 1).



From left to right: Japanese beetle adults feeding on a rose; different growth stages of JB grubs (Whitney Cranshaw, bugwood.org), and typical life cycle of JB in Minnesota (UMN).

**Table 1.** Recommended insecticides to control Japanese beetle grubs. More JB information can be found on our website: <https://ncipmhort.cfans.umn.edu/sites/ncipmhort.cfans.umn.edu/files/2022-03/2021-Japanese-Beetle-Management-in-Minnesota.pdf>

Common name	Trade name	Target	Class	Comments
imidacloprid	Merit, Menards Grub Control	grubs	neonicotinyl	Low toxicity to mammals. High toxicity to all bees.
clothianidin	Arena	grubs	neonicotinyl	Low toxicity to mammals. High toxicity to all bees.
chlorantraniliprole	GrubEx, Acelepryn	grubs	diamide	Conserves adult predators and bees. Environmentally friendly. Available to consumers and professionals.
trichlorfon	Dylox	grubs	organophosphate	High toxicity to birds, fish. Do not use within 100 yards of water. Available for homeowner use. Not effective in pH 8 water.
<i>Bacillus thuringiensis galleriae</i>	grubGONE!G	grubs	bacteria	Better than Milky spore, Japademic Doom, not effective
<i>Heterorhabditis bacteriophora</i>		grubs	nematodes	Water before and daily after application.

## Biocontrol insects released to manage Japanese Beetles, that did not work

There are two biocontrol agents of Japanese beetle (Winsome Fly, *Isocheta alldrichi*, and a parasitoid, *Tiphia vernalis*), that were released in the 1990's by MDA, but the fly and wasp do not manage JB.



Winsome fly (*Isocheta alldrichi*) adult on left (Joshua P. Basham, [bugguide.net](http://bugguide.net)). *Isocheta alldrichi* eggs on JB adult (Whitney Cranshaw, [bugwood.org](http://bugwood.org)). Larvae will hatch and feed on and kill the adult. Winsome flies were released by MDA in 1998.

*Tiphia vernalis* adult wasp (left), and a larva on a JB grub (Dave Shetlar, Ohio State University). This parasitoid lays an egg on JB grubs. Larvae will hatch and feed and kill the JB grub. *Tiphia vernalis* were released by MDA in 1998.

However, there is promise in the microsporidian (fungal) pathogen *Ovavesicula popilliae*, which has been found to kill JB grubs. This year the Krischik Lab is collaborating with Michigan State University, where the fungus has been studied for 10 years, and was eventually released in five states, including Arkansas, Colorado, Kansas, Kentucky, and Michigan. At 6 years post inoculation, JB grub numbers have dropped by 50%.

In Minnesota, *O. popilliae* has been found in low numbers in Stillwater and St. Paul. The Krischik Lab will be surveying multiple locations throughout Minnesota for the presence of *O. popilliae* at golf courses and other sites. In 2023 we will release the pathogen at 10 sites to encourage its spread. In addition, we will be researching the use of JB traps to spread the pathogen.



JB grubs ground up with *O. popilliae* and added to soil in Colorado.

## What we need from you

Our team is looking for collaborators that will allow us to set up Japanese beetle traps on their property to determine if *O. popilliae* is present. Each week JB traps would be set up and removed after 24 hours. If possible, we would prefer to setup the JB traps near the grounds building.

Please email or call with any questions.

Sincerely,

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Japanese Beetle trap (UMN)

