Biocontrol agents for Japanese Beetle

Istocheta aldrichi is a parasitic fly that lays its eggs on adult Japanese beetles and, when the larvae hatch, they feed internally and eventually kill the beetle. The MDA released them in the late 1990s, but few established and they do not reduce JB population size.

Tiphia vernalis is a parasitic wasp that lays its eggs on late-instar Japanese beetle grubs during May and early June. The developing wasp larvae then consumes and kills the beetle grub. The MDA released them in the late 1990s, but few established and they do not reduce JB population size.

Ovavesicula popilliae is a microsporidian pathogen currently being used to control Japanese beetle populations. Infection starts in the Malpighian tubules which produces a chronic disease that weakens the beetle. This research plans to grown this pathogen in JB grubs and disperse the grubs around the state to establish long term control of JB.

Project Goals

First introduced to the US from Japan in 1916, Japanese beetle was commonly found in MN by the 1990's. Adult feeding by Japanese beetles result in damage to foliage and fruits and reduction in food for bees and wildlife

We are performing research to manage JB populations. In the 1960 JB where in high numbers in the Eastern states, then they slowly disappeared. Research atthe Conneticuit Agricultural Station in1989 demonstrated that soil pathogens were killing the JB grubs in the soil. Research at Michigan State University identified the pathogen as *Ovavesicula popilliae.* Results shows that infected grubs are between 25 to 50 % less likely to survive winter. Populations of beetles decrease by 60 % in 5 years.

The pathogen *Ovavesicula popilliae* was first described in CT and was introduced by researchers into MI, KY, AR, and KS.

Research at the UM Department of Entomology showed that shows that infected grubs are found in MN.

The long-term goal of this research is to establish an endemic, native pathogen to control Japanese beetle populations. We will do this by surveying 30 sites across Minnesota for the presence of Japanese beetles infected with *O. popilliae* using pheromone traps to capture them.

Additionally, a short-term goal is to determine the efficacy of new EPA-approved microbial products, such as GrubGone (*Bacillus thuringiensis galleriae*), another fungus (*Beauveria bassiana*), parasitic nematodes (*Steinernema scarabaei*), and the bee-friendly insecticide chlorantraniliprole found gor grubs in Scott's GrubEx..

Biocontrol and IPM in Bee Lawns in Parks and Parklands for managing Japanese beetles (JB) to conserve bees and other beneficial insects feeding on flowers or making nests in bee lawns.

https://ncipmhort.cfans.umn.edu/bees

Family Alictidae, green sweat bee, nest in ground

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EXTENSION

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Bee Lawns started in Europe

Traditionally, lawns found in parks and private homes consist of dense, well-manicured turf grass. Despite, their aesthetic appeal, traditional lawns provide few resources for pollinators, as they are managed with herbicides to prevent the growth of of flowers that provide pollen and nectar for the pollinators. There is a recent push towards replacing traditional lawns with bee lawns, which combine cool season grasses with other low growing flowering plants that provide resources for pollinators.

In Minnesota, bee lawns typically incorporate dutch white clover, self-heal, and creeping thyme, in addition to ground plum, lanceleaf tickweed, and calico american aster.

Visit the UMN Extension webpage at https://http://bwsr.state.mn.us/l2lextension.umn.edu/landscape-design/planting-and-maintaining-bee-lawn#flowers-for-bee-lawns-2939361and and

MN BOWSR Legume Program to learn how to install your own bee lawn http://bwsr.state.mn.us/l2l

UMN Bee Lab
https://beelab.umn.edu/bee-lawn

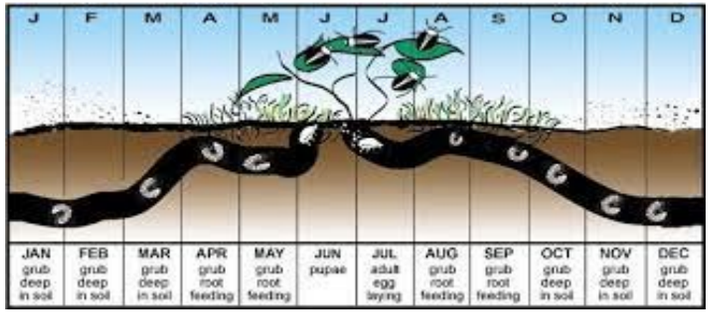
Reduce Pesticide Use in Bee Lawns

Integrated Pest Management (PM) offers different tactics to manage pests, the last of which is conventional pesticides. Using pesticides in or around bee lawns can have negative non-target effects on, beneficial insects and pollinators. This is particularly true as bee lawns attract and concentrate pollinators in local areas. Sprays of insecticides can drift into bee lawns and harm the bees directly through acute toxic effects, or the pesticide can be systemic, which means that the pesticide is translocated from leaves and roots to flower nectar and pollen. The harmful subletal effects of pesticides on bees include reducing reproductive, navigation, foraging, and memory.

Traditionally fungicides and herbicides on lawns were thought not to harm bees, research has shown that not to be true.

Visit this UMN websites to learn how to reduce pesticides, practice IPM, and conserve bees. https://ncipmhort.cfans.umn.edu/ and to identify ground-nesting native bees from social wasps https://ncipmhort.cfans.umn.edu/bees

Japanese Beetle



https://extension.umn.edu/yard-and-garden-insects/japanese-beetles

Japanese beetles are an invasive species to the US that feed on roots of grass only, and above ground leaves, and flowers. Every year, the US spends upwards of $616 million to manage JB and replace damaged turf and ornamental plants.

The pupae emerge in June and the adults feed from June to August and the grubs will feed on grass roots from Julyt o September and then in Spring form May to june before moving further underground to overwinter.