



The spring *Tiphia*: a natural enemy of the Japanese beetle

The Japanese beetle, *Popillia japonica*, was first detected in Riverton, NJ in 1916. Since then it has expanded its range continuing to be an important pest of ornamentals and turf. During 1920's and early 1930's USDA entomologists imported *Tiphia vernalis* Rohwer (Hymenoptera Tiphidae) from Korea to aid in Japanese beetle control. This wasp also known as the spring *Tiphia* is a small parasitic wasp that attacks the older larvae or grubs of the Japanese beetle. With their help, populations of Japanese beetles are reduced in number from what potentially could be more severe infestations. Numerous wasp releases were made by the USDA throughout the Northeast. In six of Connecticut's eight counties, releases of *T. vernalis* were made between 1936 and 1949. Surveys done in 2004 and 2005 confirmed that this wasp is present in every Connecticut county and it is found attacking Japanese beetle grubs. At one location, 61% of grubs sampled in mid-June had been attacked by *T. vernalis*. During spring look out for this wasp as one more beneficial that can aid you in dealing with the Japanese beetle.

Spring *Tiphia* females are about half an inch long and the males are about three-eighths of an inch long (Fig. 1). These shiny black wasps are solitary. They do not live in nests or swarms and they have only one generation per year. Male wasps emerge first and 3 to 4 days later females emerge. In Connecticut, *T. vernalis* adults are active from the first week of May to the beginning of June with a peak in adult numbers observed around the last week of May. Adult wasps feed on honeydew produced by insects like aphids and they are seen on the foliage of maple and cherry. Tulip trees are reported as being one of their preferred plants for seeking honeydew. After mating, female wasps burrow into the soil and search for grubs. When a host is found, the wasp stings it and paralyzes it momentarily while the wasp attaches one egg on the ventral groove between the third thoracic and first abdominal segments (Figs. 2 and 3).



Fig. 1. *Tiphia vernalis* adults



Fig. 2. *Tiphia vernalis* egg attached to Japanese beetle grub.



Fig. 3. *Tiphia vernalis* egg attached to Japanese beetle grub.

The egg stage lasts for 9-10 days and the larval stage lasts about 20 days. The parasitic larva after hatching is found outside the host, securely attached and feeding on it until the host dies (Figs. 4 - 6). The parasitic larva grows rapidly and the full-grown larva spins a papery, water resistant, silken cocoon (Fig.7). Within the cocoon it completes its development and transforms into an adult wasp. It passes the winter in this stage within the cocoon until the next spring

when adults emerge to start the cycle all over again. *Tiphia* females live for about a month and may lay 40-50 eggs on as many different grub hosts. The female wasps seek out the fully grown Japanese beetle grubs in the period of time when the grubs are feeding before pupation. The spring *Tiphia* wasp will also attack Oriental beetle grubs.



Fig. 4. Early *Tiphia vernalis* larva feeding on Japanese beetle grub.



Fig. 5. *Tiphia vernalis* larva feeding on Japanese beetle grub.



Fig. 6. Mature *Tiphia vernalis* larva completing its feeding on Japanese beetle grub.

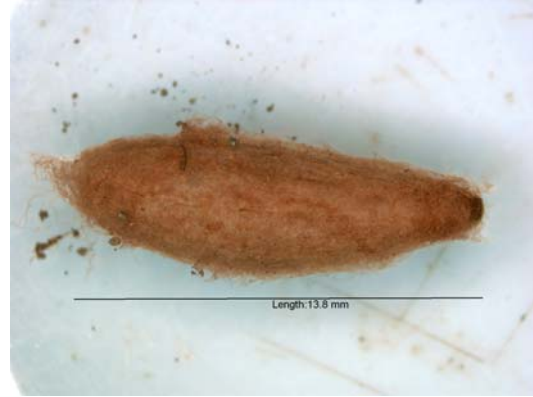


Fig. 7. *Tiphia vernalis* cocoon

References

Balock, J. 1934. The status of *Tiphia vernalis* Rohwer, an imported parasite of the Japanese beetle, at the close of 1933. *Journal of Economic Entomology* 27: 491-6.

King, J.L. and L. B. Parker. 1950. The Spring Tiphia, an imported enemy of the Japanese beetle. USDA, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, E-799, April 1950.

Ramoutar, D. and A. Legrand. 2007. Survey of *Tiphia vernalis* (Hymenoptera: Tiphidae) a parasitoid wasp of *Popillia japonica* (Coleoptera: Scarabaeidae) in Connecticut. *Florida Entomologist* 90(4): 780-2.
<http://www.fcla.edu/FlaEnt/fe90p780.pdf>

Reding, M. and M. Klein. 2001. *Tiphia vernalis* (Hymenoptera: Tiphidae) parasitizing Oriental beetle, *Anomala orientalis* (Coleoptera: Scarabaeidae) in a nursery. *Great Lakes Entomologist* 34: 67 - 8.

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Prepared by Ana Legrand
Assistant Extension Professor
Department of Plant Science
IPM Program

Photos by Ana Legrand,
Olga Zhivotovsky and Michelle Gelinias