

NCERA 125  
Biological Control Arthropods and Weeds  
Division of Plant Sciences (Entomology)  
University of Missouri  
Columbia, MO 65211  
State Report  
2006

**Project Title:** Soybean Aphid (*Aphis glycines*), Pea Aphid (*Acyrtosiphon pisum*), Cowpea Aphid (*Aphis craccivora*)

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**Project Description:** As per 2005 no economic populations of the soybean aphid were encountered this year. The earliest aphids were detected in mid-August and by the end of September was present sporadically in both regular and double crop soybeans. These infestations were in fields primarily north of the Missouri River. Drought and natural enemies (predators and coccinellids) again contributed to keeping the aphid from attaining pest status. Again in September 2005 and in October 2006 the aphid was observed on its overwintering host *Rhamnus cathartica* (buckthorn) on the University of Missouri - Columbia campus. Syrphid larvae were actively feeding on the aphids.

Pea aphid populations on alfalfa in central Missouri were the highest encountered in many years. Estimates of 200+ aphids per sweep were recorded in early April and this population maintained itself throughout the month. By the first week of May, the aphid population was less than 10 per sweep. The reduction was primarily the result of mortality induced by the fungus (*Erynia neoaphidis*) predation by the coccinellids *Harmonia axyridus* and *Coccinella septempunctata*. Conspicuously absent throughout this period was the pea aphid parasite *Aphidius ervi*.

Interspersed with the above mentioned pea aphid was cowpea aphids. They were also reduced by predators. Yet in August in the absence of pea aphids a resurgence of cowpea aphid occurred. Its population was brought under control by the same predators as with pea aphid and the addition of *Hippodamia convergens* and *H. Parenthesis*. Disease and parasites were not observed.

**Project title:** St. John's Wort Aphid (*Aphis hyperici*)

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**Project description:** Prior to this study *Aphis hyperici* was only known from its original description from specimens collected at St. Louis (St. Louis County) Missouri in 1879 and later from Illinois. Its distribution in Missouri has been extended to include Columbia (Boone County) and Jefferson City (Cole County). Its hosts plants being the St. John's wort *Hypericum kalmianum* and *H. prolificum*. At the major study area the University of Missouri - Columbia, *H.*

*kalmianum* was the primary species present. It occurred as individual plants or as a hedge planting at a number of sites throughout the campus. *Aphis hyperici* infested *H. kalmianum* at all the sites but was more readily detectable at some sites more than others. The aphid persisted throughout the year, overwintering as immature nymphs and/or *apterous viviperae* on the underside of leaves that remain on the plant throughout the winter or in between linear leaves that substitute for buds.

Entomophagous species found associated with the aphid were two species of primary parasites *Aphelinus* sp (Aphelinidae) and *Binodoxys* sp nr *carolinensis* (Aphidiidae) and their associated hyperparasites *Asaphes vulgaris* (Pteromalidae), *Syrphophagus aphidivorus* (Encyrtidae), and *Alloxystra* sp (Charipidae). Predators present were two species of syrphids (*Allograpta obliqua*, and a *Metasyrphus* sp) and their ichneumonid parasite (*Diplazon laetatorius*) A coccinellid *Scymnus* sp and the green lacewing *Chrysoperla carnea* were also present feeding on the aphids.

**Project Title:** Alfalfa weevil (*Hypera postica*)

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**Project description:** In an alfalfa field in central Missouri mortality of the alfalfa weevil was monitored for parasites and disease. Five samples of 100 larvae/sample were reared encompassing the period of the first cutting (4/14 - 5/18). Initially 49% of the larvae were parasitized; 48% by *Bathyplectes anurus* and 1% by *B. curculionis*. *B. anurus* was still the dominate mortality factor in the next two samples with parasitism of 38% and 22%. *Bathyplectes curculionis* is also increased to 8% and 4%. Mortality attributed to the fungus *Zoophthora phytonomi* was 0% and 18%. The last two samples showed a marked reversal in parasitism by *B. anurus* declining to 6% and 1% with noticeable increases in *B. curculionis* to 13% and 38%. Fungus mortality was 10% and 25%.

The increase in parasitism by *B. curculionis* is noteworthy considering that in past years the species was rarely reared. It was replaced by *B. anurus* and apparent competition with the fungus. An attempt will be made in 2007 to determine the status of *B. curculionis* as a biocontrol agent of the alfalfa weevil in Missouri.

**Project Title:** Diseases of Grubs

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**Project description:** In 2000 the "milky disease" of masked chafers (*Cyclocephala* sp) grubs observed on the turf grass surface of the A. L. Gustin Golf Course at Columbia, MO was determined as *Paenibacillus lentimorbus*. This determination was primarily based on host association and gross microscopy. Further chemical studies on the disease from 2003 - 2005 indicated that the disease was *P. popilliae*. A final determination was made in 2006 as a result of 16S rDNA sequence analysis of isolates cultured from the original masked chafer disease

material as "*P. lentimorbus*". The same held true for isolates of milky disease of a May/June beetle (*Phyllophaga* sp) and the green June beetle (*Cotinis nitida*).

In 2005 a total of 49 chafer grubs were collected as described in the 2005 report and all were infected with milky disease. The first grub was found on September 30 and the last November 11. The highest number 23 was collected on October 14. Although the number of infected grubs was ca. 3x less than the 241 collected in 2004, they appeared over the same time period with maximum numbers on similar dates. Six *Phyllophaga* and one *C. nitida* also collected from the turf grass surface were infected with milky disease.

**Project Title:** Japanese beetle (*Popillia japonica*)

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**Project description:** A 100 female *Tiphia vernalis*, the spring *Tiphia* parasite of Japanese beetle grubs, were released at Meramac State Park (Sullivan, Franklin County, Missouri) in 1999. Definitive establishment was not obtained until 2005 with the collection of adult *Tiphia* that were subsequently determined in 2006 as *T. vernalis* (K. Ahlstrom, North Carolina Dept. Agric., Raleigh). It is interesting that there is an apparent cause-and-effect relationship regarding the population of Japanese beetles since the establishment of *T. vernalis*. A steady decline in the average number of beetles collected per trap was noted; 2,125 in 1999 to 716 in 2006.