

Establishment and Spread of *Pseudacteon curvatus* in Tennessee

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Several releases of *Pseudacteon curvatus* and *P. tricuspis* were made in Tennessee from 1999 to 2004. A summary of these releases, including the estimated number of flies or parasitized workers released, is presented in the table below.

Species	Date	Cooperating Institutions ^a	Location	Estimated no. released ^b	Release method ^c
<i>tricuspis</i>	8/99	CMAVE, UT	Bradley Co.	2350	adults
<i>tricuspis</i>	9 -10/02	SIPS, DOACS, TSU	Franklin Co.	2730	adults
<i>tricuspis</i>	7/03	SIPS, DOACS, TSU	Franklin Co.	2170	adults
<i>curvatus</i>	4/00	CMAVE, UT	Bradley Co.	4500	workers
<i>curvatus</i>	5 - 6/00	CMAVE, UT, AP	Fayette Co.	4000	workers
<i>curvatus</i>	9 - 10/00	CMAVE, UT	Monroe Co.	4000	workers
<i>curvatus</i>	9 - 10/02	BCPRU, TSU	Franklin Co.	3400	workers
<i>curvatus</i>	9/03	BCPRU, TSU	Franklin Co.	2100	workers
<i>curvatus</i>	7/04	BCPRU, TSU, UT	Hamilton Co.	8200	workers

^aCMAVE = USDA ARS Ctr. for Medical and Veterinary Entomol.; UT = Entomol. & Pl. Pathol. Dept., Univ. of Tennessee; SIPS = USDA APHIS PPQ CPHST ANPCL Soil Inhabiting Pests Section; DOACS = Florida Dept. of Agric. and Consumer Serv.; TSU = Inst. of Agric. & Environ. Res., Tennessee St. Univ.; AP = Ames Plantation; BCPRU = USDA ARS Biological Control Of Pests Research Unit. The Tennessee Dept. of Agric. cooperated with every release.

^b Estimated number of adult flies released was about 40 to 60 parasitized workers per mound. Estimated number of parasitized workers released based on approximate number of ants exposed in the laboratory and measured parasitism rates for laboratory colonies.

^cAdults: adult flies released at mounds; workers: IFA workers were exposed to ovipositing flies in the lab and then released back into their original mounds.

All of the release sites were pastures with the exception of the 2003 Franklin release of *P. curvatus* which was made at an ornamental nursery, and the 2004 release which was made at a cemetery. All releases of *P. curvatus* were of the Los Flores biotype except for the July 2004 release in Hamilton Co. where the Formosan biotype was released.

Sampling of imported fire ant (IFA) mounds at release sites in Bradley, Fayette and Monroe counties in 2000 and 2001 yielded no adult flies and the releases were considered failures. Collections of *P. curvatus* at the Franklin Co. pasture release site in July and August 2003 indicated the flies released the previous year had successfully overwintered and were established. Only one *P. tricuspis* adult has been collected: at the Franklin Co. release site in July 2003.

On July 13, 2004, while making the release of hybrid imported fire ant (HIFA) workers parasitized with *P. curvatus* Formosan biotype at a cemetery in southeastern Hamilton County near Chattanooga (the only release made at this site), J. Oliver and T. Rashid observed *Pseudacteon* adults hovering over disturbed IFA mounds. Flies were collected and identified as *P. curvatus*. The most likely source for this population was one or both of the releases made in 2000 in east Tennessee (Bradley and Monroe counties). This find prompted a multi-county sampling survey to determine the geographic range of *P. curvatus* in Tennessee.

IFA mounds were sampled at release sites and at approximate 8-km (5-mile) intervals along highways leading away from release sites. Sampling consisted of digging into a mound, crushing or electrocuting (with a modified cattle prod) workers to release alarm pheromone, and observing the disturbed area to detect and collect flies attracted to the disturbance. Collected flies were returned to the lab for identification. IFA workers were also collected from each mound sampled and sent to the lab of Dr. Robert Vander Meer, USDA-ARS-CMAVE, for identification using cuticular hydrocarbon analysis.

Mounds at 113 sites in 25 Tennessee counties were sampled for *P. curvatus*. Mounds located in northern counties of Alabama, Georgia and Mississippi were also sampled. *P. curvatus* was collected at 73 of the sites in 21 Tennessee counties, including all of the 2000 release sites. Sampling results indicate that the fly, although not detected in the year after its release, was apparently established at the release sites after the 2000 releases. The greatest distance a fly was collected from any release site was approximately 98 km (61 miles). Flies were collected at all six sites sampled in two Georgia counties; and in three of five sites sampled in four Mississippi counties. The flies collected in Georgia and Mississippi appear to be of the population originating from the 2000 releases in Tennessee. No flies were found at the four sites sampled in one Alabama county.

Results of the survey indicate *P. curvatus* has spread throughout most of the IFA-infested region in Tennessee. (Currently, all or a portion of 38 counties across the southern region of the state are under quarantine for IFAs.) Identification of IFAs collected from sampled mounds substantiated results of earlier collections to determine the distribution of IFA species in the state: *Solenopsis richteri* (the black imported fire ant or BIFA) predominates in the west and the HIFA is predominant in the east. Populations of *S. invicta* (the red imported fire ant or RIFA), which was collected during the 2004 survey from only one site (in east Tennessee), are rare.

Because BIFA is the natural host of the Los Flores biotype of *P. curvatus* in South America, and the biotype has shown host preference for BIFA and HIFA over RIFA in laboratory studies, the successful establishment and subsequent spread of the Los Flores biotype in Tennessee should not be surprising (even after the earliest releases were deemed failures). Sampling surveys will continue in summer 2005 to document further range expansion by *P. curvatus* in Tennessee.