

NOTE

Discovery and Spread of the Asian Horntail, *Eriotremex formosanus* (Matsumura) (Hymenoptera: Siricidae), in the United States¹

David R. Smith

Systematic Entomology Laboratory, PSI, Agricultural Research Service,
U. S. Department of Agriculture, c/o National Museum of Natural History,
MRC-168, Washington, D.C. 20560 U.S.A.

J. Entomol. Sci. 31(2): 166-171 (April 1996)

KEY WORDS Siricidae, *Eriotremex formosanus*, Asian horntail, adventive species, distribution, southeastern United States

Eriotremex formosanus (Matsumura) is native to and relatively rare in Asia, based on the few records available, but it has become rather common in the southeastern United States since it was first detected over 20 years ago. The earliest records are 1974 from several counties in Florida and Georgia. To date, it is known to occur in nine states, as far west as eastern Texas and as far north as southeastern Virginia. The exact circumstances of its introduction and how long it has actually been in the United States may never be known. It undoubtedly occurred here a number of years before it was detected, and its presence could be the result of multiple introductions. Earlier non-detection may be because of its similarity to the native *Tremex columba* (L.), a common siricid in deciduous trees in the eastern United States, but there are no known records of *E. formosanus* prior to 1974. If it were relatively common, chances are that such a large and showy insect would have been occasionally collected before that date.

Several factors probably contributed to the introduction, successful establishment, and spread of *E. formosanus* in the United States. Siricidae are commonly distributed by commerce around the world. The larvae are wood borers and can easily be transported undetected in dunnage, crating, pallets, or other wood or wood products. The wood-boring habit in conjunction with the large amount of traffic, especially military, between southeastern Asia and the United States during and since World War II may be the avenue of its introduction. Some of the earliest records are from near military bases, e.g., Fort Rucker Military Reservation in southern Alabama and Hunter Army Air Field in Savannah, GA. It is probably parthenogenetic since males have never been collected, and its life cycle may be shorter than some other Siricidae (see hosts

¹ Received for publication 26 June 1995; Accepted for publication 10 January 1996.

and biology below), thus allowing for rapid establishment. Its host is not known in Asia, but the species has obviously found favorable hosts and a favorable environment in which to reproduce and expand in the United States.

Eriotremex may be separated from other genera of North American Siricidae by Smith's (1975. U. S. Dept. Agr., Coop. Econ. Insect Report 25: 851-854) key. It resembles the native *Tremex columba*, but there are coloration and several other differences. The coloration of *T. columba* is variable, though generally uniformly reddish brown and the wings are usually uniformly yellowish to black. *Eriotremex formosanus* is relatively uniform in color with the pronotum yellow, broad yellow bands covering more than half of the apical segments of the abdomen, and the forewing with a dark spot below the stigma and the apex much darker than the rest of the wing (Fig. 1). The body of *E. formosanus*, especially the abdomen, is very densely hairy, whereas *T. columba* has very few or no hairs, and the antennae of *E. formosanus* are 20-21 segmented, whereas those of *T. columba* are about 15-segmented.

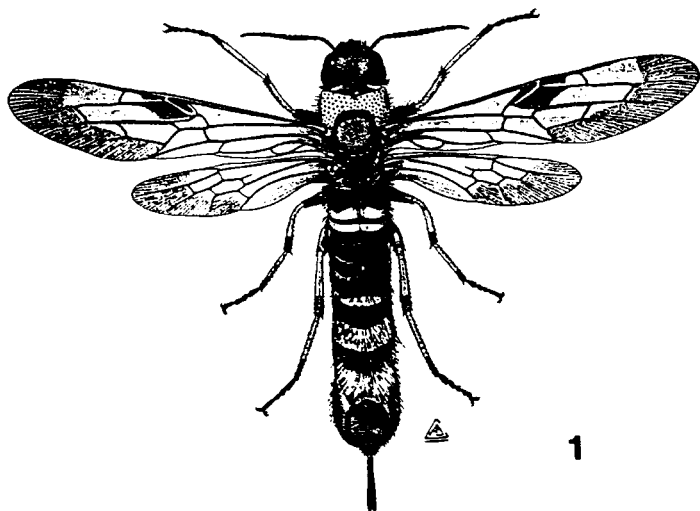


Fig. 1. Dorsal view of *Eriotremex formosanus*.

Eriotremex formosanus is known from one of the southern islands of Japan, Taiwan, Laos, and Vietnam. JAPAN: Amami-Oshima Island, 29-VI-1980, collected on a path in the central forest area of the island (Togashi and Hirashima, 1982. *Esakia* 19: 185-189). LAOS: Vientiane Prov., Phou Kou Khouei, 800 m, 12-13-IV-1965 (Smith, 1981. *Proc. Entomol. Soc. Wash.* 83: 389); Indo-China, Haut Mekong, Vien Poukha (Benson, 1943. *Bull. Entomol. Res.* 34: 27-50). TAIWAN: Holotype, labeled "Formosa, Matsumura" (Matsumura, 1912. *Thousand Insects of Japan, Suppl. IV.*, 20-21, pl. XLIII, fig. 4) (examined 1979, in the Matsumura Collection at Hokkaido University, Sapporo, Japan); Hori, ?July 1919 (Sonan, 1938. *Trans. Nat. Hist. Soc. Formosa* 28: 88-94). VIETNAM: Tonkin: Mt. Bavi, 800-1000 m (Maa, 1949. *Musée Heude, Notes d'Entomol. Chinoise* 8: 11-189).

Eriotremex formosanus is currently known from nine southeastern states (Fig. 2). The first records from 1974 through 1978 were from Alabama, Georgia, and Florida. It was discovered in Louisiana in 1979 and in South Carolina and Mississippi in 1980. Its spread northward and westward is indicated by the first records for North Carolina in 1987, Virginia in 1989, and Texas in 1990. Its spread has been primarily coastal, but it is apparently also spreading inland. The most inland records are in North Carolina, South Carolina, and Louisiana. Because of the availability of favorable hosts and probable favorable climate, it is likely to spread somewhat farther north and to more inland localities in the south, as well as farther west into Texas. I have seen or obtained the following United States records. For many of these, I am indebted to those mentioned in acknowledgments.

ALABAMA: *Butler Co.*, Evergreen, 9-VIII-1975, dead oak trees. *Coffee Co.*, Elba, 7-X-1975, in firewood, hardwood and pine. *Covington Co.*, Dozier, V-1975; Dozier, emerging from water oak firewood, 25-VI-1975. *Dale Co.*, 1 m E Level Plains, 11-VII-1983; Ft. Rucker Mil. Res., 5-8-VII-1994. *Houston Co.*, Dotham, 9-IX-1978.

FLORIDA: *Alachua Co.*, Melrose, 25-IX-1982; Gainesville, many records, 27-VI-1987, 10-IX-1990, 1-3-XII-1079, 4-8-XII-1979, 3-V-1980, 1-V-1980, 15-V-1980, 21-V-1980, 18-IV-1982, 29-V-1983, 19-IX-1978, 1-2-XI-1975, 4-VII-1986, 19-V-1983, 11-XI-1987, specimens from blacklight trap, laurel oak, under pine straw, and ex firewood (*Liquidambar styraciflua* L.). *Baker Co.*, Olustee, 10-X-1981. *Calhoun Co.*, Neil Lumber Co. 12-IX-1974, on bark, longleaf pine. *Clay Co.*, SW Orange Park, 17-IX-1977, flying around oak; Gold Head Branch State Park, 17-V-1994, turkey oak-rosemary. *Columbia Co.*, Osceola Natl. Forest, nr jct. Rt. 90, 8-20-X-1976, Malaise trap. *Columbia and Baker co.* line, Osceola Natl. Forest, 28-IV-17-V-1977, Malaise trap. *Dixie Co.*, 5-VIII-1977; Old Town Hammock, 29-IV-1989; 3 mi N Old Town, 10-V-1979, 23-V-1979; 3.5 mi N Old Town, on Rt. 349, 17-V-1978; Old Town, 20-V-1978; 3.7 mi N Old Town 20-V-1978. *Duval Co.*, Ponte Vedra, 4-VII-1985, beach. *Flagler Co.*, Relay - 10 mi S Bunnell on hwy, 11-IX-1977, found with ovipositor embedded in slash pine, *Pinus elliotii*. *Gulf Co.*, Wewahitchka, 8-V-1987. *Hernando Co.*, Withlacoochee St. For., Goat Rd., 27-28-IV-1990. *Jackson Co.*, Spring Lake, 21-V-1979, on fallen trunk of *Quercus nigra*; Spring Lake, 25-V-1975, fly at edge of deciduous woods; Spring Lake, 8 mi SW Mariana, 25-V-1975; 7 1/2 mi SW Mariana 28-II-1987. *Lee Co.*, Buckingham, V 1984. *Liberty Co.*, Tarpon State Park, 12-VI-1974.

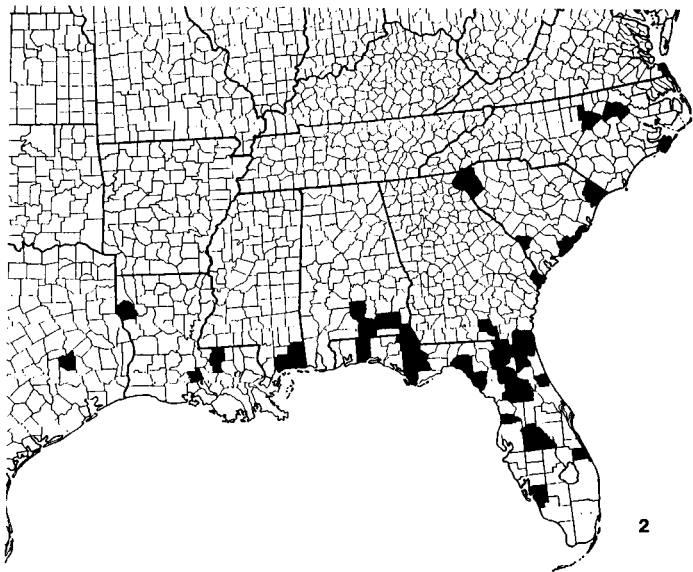


Fig. 2. Distribution of *Eriotremex formosanus* in the United States.

Marion Co., 25-VIII-1977, sitting on *Pinus taeda*. Nassau Co., Ft. Clinch State Park, 29-X-1983. Okaloosa Co., Blackwater River State Forest, Lee Canoes, 22-IX-1987. Polk Co., Haines City, 7-XI-1979. St. Lucie Co., Ft. Pierce, 8-V-1978. Taylor Co., 5 mi S Keaton Beach, 30-IV-1976. Union Co., Hwy. 241 at Santa Fe River, 8-V-1985, 23-IV-1989, 20-X-1985.

GEORGIA: Chatham Co., Savannah, 1 mi from Hunter Army Air Field, 4-XI-1974. Clinch Co., Dupont, 9-XI-1982, black light.

LOUISIANA: DeSoto Parish, Stonewall, 27-XI-1994, near wood pile. East Baton Rouge Parish, IX-1979, dead hickory; 13-X-1981; 21-IX-1983; 9-X-1983; 13-IX-1985; 10-X-1988; Baton Rouge, VI-1991. East Feliciana Parish, 2 mi NW Norwood, Section 67, 25-IX-1983. St. Martin Parish, 4 mi S Belle River, 11-XI-1994, window pane trap.

MISSISSIPPI: George Co., T35-R9W, Sec. 15, 23-V-1980. Harrison Co., Lizana, 21-X-1991. Jackson Co., 11 mi W Vancleave, 5.VI-1984.

NORTH CAROLINA: *Carteret Co.*, Salter Path, 12-13-VI-1990. *Durham Co.*, Research Triangle Park, Corwallis Rd., 17-X-1990. *Nash Co.* 4¼ air mile w Rocky Mound off St. Rd. 1544, 30-X-1987, *Quercus alba*, in trunk. *Nash or Edgecombe co.*, Rocky Mount, 23-VIII-1992. *Wake Co.*, Raleigh, Lochwre subdiv. 14-VII-1991, Raleigh, 6-IX-1992.

SOUTH CAROLINA: *Allendale Co.*, 5 mi N Allendale, 11-IX-1983. *Anderson Co.*, Pendleton/Aldwood, 7-X-1989. *Charleston Co.*, Charleston, 8-X-1983, floating in pool; Charleston, 26-V-1980, in swimming pool. *Horry Co.*, Conway, 28-X-1984; Myrtle Beach State Park, 6-IX-1982, washed on beach. *Oconee Co.*, Salem, 8-X-1988; Walhalla, 25-XI-1991, yard. *Pickens Co.*, Clemson, 15-VIII-1988, 7-VII-1990.

VIRGINIA: *City of Virginia Beach*, Seashore State Park, maintenance area, 30-X-1989.

TEXAS: *Walker Co.*, 10 mi W New Waverly, 16-IX-1990.

No biological work has been done on *E. formosanus*. Most information is from various data associated with specimens. These data indicate that *E. formosanus* prefers oak and hickory, but it is apparently not host specific and, according to collection records, may attack other deciduous trees and perhaps conifers. Oak associations are emerging from water oak, *Quercus nigra* L., dead oak trees, laurel oak, and in trunk of *Quercus alba* L. Association with hickory is given by Chapin and Oliver (1986. Proc. Entomol. Soc. Wash. 88: 190) who reported that specimens taken in East Baton Rouge Parish, Louisiana, emerged from the upper part of the trunk and lower branches of a hickory in 1979 which was cut in the summer of 1978 because it was dying. Specimen labels also state firewood of *Liquidambar styraciflua* L. and dead hickory. Label data referring to conifers are on bark of longleaf pine (*Pinus palustris* Mill.), ovipositor embedded in slash pine (*Pinus elliottii* Engelm.), and sitting on *Pinus taeda* L.

Dates of collection are from nearly all months of the year. Most are in April to June (36 records with 24 in May) and September to November (40 records with 16 in September and 16 in October), whereas 6 records are known for July, 7 for August, 2 for December, 1 for February, and none for January and March. This suggests two flight peaks a year, but few conclusions can be drawn from these data. Many Siricidae take two or more years to complete their life cycle. If *E. formosanus* has one or more generations a year, this could be one of the factors explaining its rapid spread.

I appreciate the assistance of the following for supplying records from their respective collections: B. Blinn, North Carolina State University, Raleigh; W. E. Clark, Auburn University, Alabama; R. L. Hoffman, Virginia Museum of Natural History, Martinsville; P. K. Lago, University of Mississippi, University, Mississippi; V. L. Moseley, Louisiana State University, Baton Rouge; E. G. Riley, Texas A&M University, College Station; B. Robinson, Clemson University, Clemson, South Carolina; T. L. Schiefer, Mississippi Entomological Museum, Mississippi State University; C. L. Smith, Museum of Natural History, University of Georgia, Athens; J. Wiley, Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Gainesville. I extend thanks to T. Kumata, Hokkaido University, Sapporo, Japan for

allowing study of Matsumura's collection. I thank the following for reviewing the manuscript: H. Goulet, Agriculture Canada, Ottawa; N. M. Schiff, Bee Research Laboratory, USDA, Beltsville, Maryland; and D. R. Miller and R. W. Hodges, Systematic Entomology Laboratory, USDA, Beltsville, Maryland, and Washington, D.C., respectively.
