

SCIENTIFIC NOTE

TOXORHYNCHITES RUTILUS SEPTENTRIONALIS: NEW OCCURRENCES IN UPSTATE NEW YORK

JOHN KOKAS¹ AND JOON-HAK LEE²

ABSTRACT. Records of *Toxorhynchites rutilus septentrionalis* findings in New York State are few, and collections north of New York City are rare. This is the 1st official documentation of *Tx. rutilus* found in upstate New York in the past 46 years and the farthest northern record. In 2002, immatures of *Tx. rutilus* were found in artificial containers in 2 locations in the Hudson Valley region, at Quarryville (Ulster County) and Blauvelt (Rockland County), NY. A study conducted at Quarryville in 2002 and 2003 found that breeding occurred continuously through the season, and that overwintering possibly could be occurring at that site.

KEY WORDS *Toxorhynchites rutilus*, distribution record, population survey, New York State

Toxorhynchites (*Tx.*) *rutilus* (Dyar and Knab) is a large, diurnal species with limited natural control capability. The larvae are predaceous upon other mosquito larvae and the adults do not bloodfeed. Two subspecies are found in North America.

Toxorhynchites rutilus has been reported to range from Valles, Mexico (Eads and Campos 1963), north to southern Ontario, Canada (Parker 1977). In the USA, this species occurs in the southeastern states west to Texas, north to New Jersey (Lake 1953, Hemmerlein and Crans 1968), and occasionally in New England in the northeast. Recorded collections from New England states include Connecticut (Main et al. 1976), Rhode Island (Lawson et al. 1994), and Massachusetts (Dennehy and Livdahl 1999).

Two records have been published of *Tx. rutilus* occurring in New York State, a larva collected in a tree hole in New York City (Klots 1961) and larvae from tires in Suffolk County, Long Island (Guirgis and Van Orstrand 1976). In addition, Main et al. (1976) stated that the Yale collection contains a single specimen, an adult male, that was taken at Chappaqua, Westchester County, in July 1956. Means (1987) listed the distribution of *Tx. rutilus* in Nassau County in Long Island from personal communications, and a specimen in the Cornell University collection from "Pine Brook," probably in Tompkins County.

On July 3, 2002, a *Tx. rutilus* was discovered in Quarryville, NY. The mosquito, a 3rd instar, was collected from an automobile tire at an old disposal site located in a forested area of northern Ulster County. The tire was located in the woods surrounding a waste tire pile, (42°07'28"N, 73°59'22"W). A sub-

sequent visit was made on July 11, 2002, and 12 other tires in well-shaded spots were found at the site. *Toxorhynchites rutilus* was present in 2 of 8 tires that contained water.

After finding larvae in multiple tires in July, we decided to continue to monitor the population of *Tx. rutilus* at this site for the remainder of the season. The tires in the wooded area were numbered and their locations were flagged. Monthly sampling visits were made on August 8, September 11, and October 8, 2002. The total number of *Tx. rutilus* found in each container, along with their developmental stage, was recorded each month. The majority of the individuals found were counted in the field and returned to their original containers. Fifteen immatures were brought back to the laboratory, where several larvae were preserved and the rest were raised to adults. An adult male specimen was identified as the northern subspecies, *Tx. rutilus septentrionalis* (Wood et al. 1979). Male, female, and larval *Tx. rutilus* were kept for voucher specimens.

Toxorhynchites rutilus was found in 3 (33%) of 9 tires sampled in July, 4 (36%) of 11 tires sampled in August, 4 (40%) of 10 tires sampled in September, and 8 (67%) of 12 tires sampled in October. Thirty-seven *Tx. rutilus* were observed. Based on their developmental stage, at least 35 different individuals were detected. Nine *Tx. rutilus* were found in July, 9 were found in August, 4 were found in September, and 15 were found in October. In 58% (11/19) of collections, a single specimen was found per tire. Multiple *Tx. rutilus*, from 2 to 6 individuals per container, were found in 42% (8/19) of collections. All individuals found in July were late instars or pupae. All of the *Tx. rutilus* found in October were late instars or pupae.

Monitoring results indicated that breeding occurred throughout the season. Temporal occurrences indicated that 3 or 4 generations were produced. Peak results occurred in October in both the num-

¹ Arthropod-Borne Disease Program, New York State Department of Health, Sullivan County Community College, 112 College Road, Loch Sheldrake, NY 12759.

² Arthropod-Borne Disease Program, New York State Department of Health, Hudson Valley Community College, 80 Vandenburg Avenue, Troy, NY 12180.

ber of individuals observed and the number of tires occupied.

This is the 1st record of *Toxorhynchites rutilus* found in upstate New York in 46 years and the most northern occurrence documented in the state. Historically, collections of *Tx. rutilus* in New York have almost exclusively been from the metropolitan area and Long Island, with only two museum specimens noted to be collected north of New York City. Quarryville is located in the Hudson Valley approximately 170 km north of New York City and 6 km west of the Hudson River. The only finding in the literature of this species occurring north of Quarryville is the northernmost record (42°15'N, 71°49'W) from Worcester, MA (Dennehy and Livdahl 1999).

If *Tx. rutilus* is present in northern Ulster County, other recent occurrences in the lower to mid-Hudson Valley are possible as well. We contacted the mosquito control units in 4 county health departments located between New York City and Ulster County to inquire if any other upstate New York collections had been made. The Rockland County Health Department (RCHD) stated that they had found *Tx. rutilus* in 4 locations in 2002 and in 1 location in 2001 (RCHD, personal communication). A joint survey of these sites was conducted with the RCHD on October 22, 2002, and a single *Tx. rutilus* was found. This specimen, a late instar, was found in an automobile tire in Blaauvelt (41°03'51"N, 73°57'01"W). A single adult was said to be taken in a Centers for Disease Control light trap on September 11, 2002, from the same site in Blaauvelt. This is the 2nd upstate county in which this species was found in 2002.

The Quarryville site was revisited in 2003 to determine if a local population of *Tx. rutilus* had become established. On April 25, 2003, the water had thawed and all of the tires that contained larvae or pupae in October 2002 were resampled. No *Tx. rutilus* was observed to overwinter in the tires. Two 3rd-stage larval *Tx. rutilus* were found in 1 of 14 containers sampled on July 29, 2003. On October 9, 2003, 15 *Tx. rutilus* were observed in 9 of 14 tires.

The immature *Tx. rutilus* in Ulster County were found in association with larvae of 6 other mosquito species. *Toxorhynchites rutilus* was collected with *Ochlerotatus triseriatus* (Say) and *Ochlerotatus japonicus japonicus* (Theobald) on 10 occasions, with *Culex territans* Walker on 3 occasions, with *Culex restuans* Theobald and *Anopheles barbari* Coquillett on 2 occasions, and once with *Anopheles punctipennis* (Say).

New findings in 2 counties in the lower and mid-Hudson Valley indicate that *Tx. rutilus* may be

found farther north and west than previously reported in New York. The occurrences in successive years at the same site suggest that an established population may exist. Although no mosquitoes were observed to overwinter in the tires, no sources of new introduction occurred. A waste tire dump had operated at the Quarryville site until being shut down in 1996. Since then, half a million tires have been removed in a cleanup effort and no new imports have been received. *Toxorhynchites rutilus* have been observed to overwinter as mature larvae in a tree hole in New Jersey (Lake 1954). They possibly were able to survive the winter in natural containers at Quarryville.

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