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IDENTIFICATION OF A NORTH AMERICAN MOSQUITO SPECIES, *AEDES ATROPALPUS* (DIPTERA: CULICIDAE), IN ITALY

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ABSTRACT. In late September 1996, during a routine survey for *Aedes albopictus* in Italy, a population of *Aedes atropalpus s.s.* was discovered in the Veneto Region (northern Italy). Larvae were collected in 2 tire storage areas belonging to tire recapping companies that imported loads of car and large equipment used tires from eastern Europe and North America. *Aedes atropalpus* is found only in North America and hence it is the origin of this species. Control measures were carried out in October, but by then any remaining *Ae. atropalpus* would have been diapausing in the egg stage. A follow-up survey will be conducted in the spring of 1997 to assess if *Ae. atropalpus* has been established in the area and the extent of the spread in Italy.

INTRODUCTION

Following the discovery of *Aedes albopictus* (Skuse) in Italy in the early 1990s (Sabatini et al. 1990, Dalla Pozza and Majori 1992), a national program for the surveillance and control of the exotic mosquito was established. This national program has documented the rapid spread of *Ae. albopictus* throughout northern and central Italy (Romi 1995, Knudsen et al. 1996). For the past several years, local public health agencies have been conducting routine surveys for both larvae and adult mosquitoes at sites considered at high risk of infestation (e.g., car and large equipment tire retreaders/dealers and used tire dumps). Field-collected mosquitoes normally are sorted and identified to species by trained personnel at local laboratories. However, unusual specimens are forwarded to a regional reference center or to the national reference center at Istituto Superiore di Sanità, Rome.

MATERIALS AND METHODS

In late September 1996, a survey conduced by a team from the Local Health Unit of Treviso, Veneto Region, collected adult and immature mosquitoes from 2 adjacent tire storage areas owned by 2 small tire recapping companies. At the Local Health Unit, the majority of the mosquitoes collected during this survey were identified as *Ae. albopictus* and *Culex pipiens* Linnaeus. However, several specimens not identifiable as Italian mosquito species were sent to the Laboratory of Parasitology, Istituto Superiore di Sanità, for further identification. Specimens yielding good taxonomic characters included 4 4th-instar larvae and 3 adult females, one collected in the field and slightly damaged and 2 obtained from laboratory-reared larvae and killed shortly after emergence.

Our investigation concerning the origin of the used tires with these unusual mosquitoes indicated that one company imported a load of used car and truck tires from eastern Europe (former Yugoslavia, Hungary, and Ukraine), whereas the other company had imported used large equipment tires from Canada (Ormstown) and the United States (Savage, MN; San Antonio and Malakoff, TX). The company importing tires from North America had been receiving 2 containers (each with 20–25 tires) per month since 1995.

RESULTS AND DISCUSSION

The morphologic features of our specimens identified them as members of the *Aedes atropalpus* group. Using the diagnostic morphologic characteristics proposed by O'Meara and Craig (1970), Zavortink (1972), and Darsie and Ward (1981), we attempted to determine which species of the *atropalpus* group was in Italy. The following features were noted on the Italian specimens.

Larva (4 specimens) with antennal prominence lighter than antenna and than anterior portion of head capsule; comb scales moderately numerous (average 29.2; range 22–34); base of siphon irregularly sclerotized ventrally between the 2 rows of pectin teeth, so that there is a basal ventral membranous area; seta 1-M reaching near to level of seta 1-P.

Adult (1 specimen) with eyes broadly separated above antennae, the shortest distance between them 3 times the diameter of one ommatidium; anterior lateral light-scaled crescent of mesoscutum very broad, extending mesad to dorsocentral area, yellowish cream and background scales of mesoscutum entirely or predominantly dark bronzy-brown; hindfemur entirely pale in basal 0.5; white costal patch in the wings longer than alula; sternites with distal band of dark scales interrupted.

The morphologic features of the Italian specimens matched those of *Ae. atropalpus*; only the comb scale number is somewhat low for *Ae. atropalpus,* but is still within the range (24–90) noted by Zavortink (1972).

The specific area where *Ae. atropalpus* larvae

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were collected from 2 used tire storage areas is located along a regional road in the community of Villorba (population *ca.* 16,000), approximately 5 km north of Treviso (45°40′N, 12°13′E; 90,000 inhabitants). Many industrial and commercial activities occur in and around this city. Unfortunately, the *Ae. atropalpus* larvae were found near the end of the mosquito season (generally between May and October). Moreover, in an effort to eradicate this new mosquito species, the area was treated with deltamethrin. A follow-up survey will be conducted in the summer 1997 to determine if *Ae. atropalpus* is still present.

Among the 25 species of *Aedes* recorded in Italy, *Ae. atropalpus* larvae are easily recognizable by the combination of the following 3 characters: comb scales fringed with subequal spinules, inner frontal setae (5-C) simple, and pecten on siphon with distal spines detached apically. Adults are also easily recognizable by the combination of the following characters: hindtarsomere with pale rings and the one on joint 1–2 subequal on 1 and on 2, wing with prominent patch of pale scales on base of vein C, and palpus entirely dark-scaled.

The route by which *Ae. atropalpus* was introduced in Italy was most likely via the importation of used tires from North America. In recent years, a similar path was probably taken by *Ae. albopictus* (Dalla Pozza et al. 1994). Although *Ae. atropalpus,* and the other North American member of the group *Ae. epactius* Dyar and Knab, 1908, often are considered rock-pool mosquitoes, in the past 2 decades the species have been found at many scrap tire locations far from any rock-pool habitats (Munstermann 1980, Darsie and Ward 1981). By invading scrap tires these mosquitoes have greatly expanded their distribution so that the western extension of the range of *Ae. atropalpus* overlaps the northeastern limits of *Ae. epactius* (Restifo and Lanzaro 1980, White and White 1980, Beier et al. 1983, Berry and Craig 1984, Andreadis 1988, Nawrocki and Craig 1989). It would be informative to determine if immature *Ae. atropalpus* occur in used tires in the vicinity of the exporters that shipped used tires to the site in Italy where *Ae. atropalpus* was found.

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