

# THE IDENTIFICATION OF *Aedes albopictus* IN THE NEARCTIC REGION

RICHARD F. DARSIE, JR.<sup>1</sup>

**ABSTRACT.** An introduced, breeding population of *Aedes albopictus* has been established in Harris County, Texas, and several parishes in Louisiana. The problem of its identification and separation from the indigenous Nearctic mosquito fauna is addressed. Using the keys of Darsie and Ward (1981), the author offers suggested inserts which will accomplish the identification of adult females and larvae in the Nearctic Region. Additional pointers are given for distinguishing *albopictus* from the 2 common container breeders, *Ae. aegypti* and *Ae. triseriatus*.

## INTRODUCTION

Recent articles in the Centers for Disease Control *Morbidity and Mortality Weekly Report* (MMWR) (1986) and Sprenger and Wuithiranyagool (1986) have indicated that an introduced, breeding population of *Aedes albopictus* (Skuse) has been established in Harris County, Texas, and probably has spread to surrounding counties. Chapman and Johnson (1986), have reported it from Iberia, Tammany and Vermilion parishes in Louisiana. This introduces the problem of its identification and separation from the indigenous Nearctic mosquito fauna, which is the subject of this note.

## MODIFIED KEYS

Darsie and Ward (1981) published revised keys to the adult females and fourth instar larvae of the Nearctic Region. With information that follows, *Ae. albopictus* can be identified through the use of these same keys by adding suggested inserts. Descriptions of *Ae. albopictus* by Huang (1968, 1971, 1972) and Tanaka et al. (1979) were consulted as well as studying adult females from Pahang, Malaysia, and larvae from Harris Co., Texas.

**ADULT FEMALE** (Fig. 1). In the generic key, *Ae. albopictus* will pass to couplet 7 easily, where it can be distinguished from species of the genus *Psorophora* by the absence of prespiracular setae, and by the presence of basal, tergal, pale-scaled abdominal bands.

In the key to species of *Aedes*, *Ae. albopictus* passes to couplet 9 with ease, except for a minor problem in couplet 2. The first part reads, "Hindtarsomeres pale-banded on basal part of segment only." In the case of *Ae.*

*albopictus* and *Ae. zoosophus* Dyar and Knab, this applies to all tarsal segments except 5 which is entirely pale-scaled. In couplet 9 *Ae. albopictus* must be differentiated from *Ae. zoosophus*. By revising this couplet and adding couplet 9A as follows, the separation can be achieved.

9(8). Hindfemur with complete basal ring of pale scales; hindtarsomere 5 entirely pale-scaled . . . . . 9A

Hindfemur with anterior surface dark-scaled or with dark and pale scales intermixed, extending to base; hindtarsomere 5 partially or entirely dark-scaled . . . . . 10

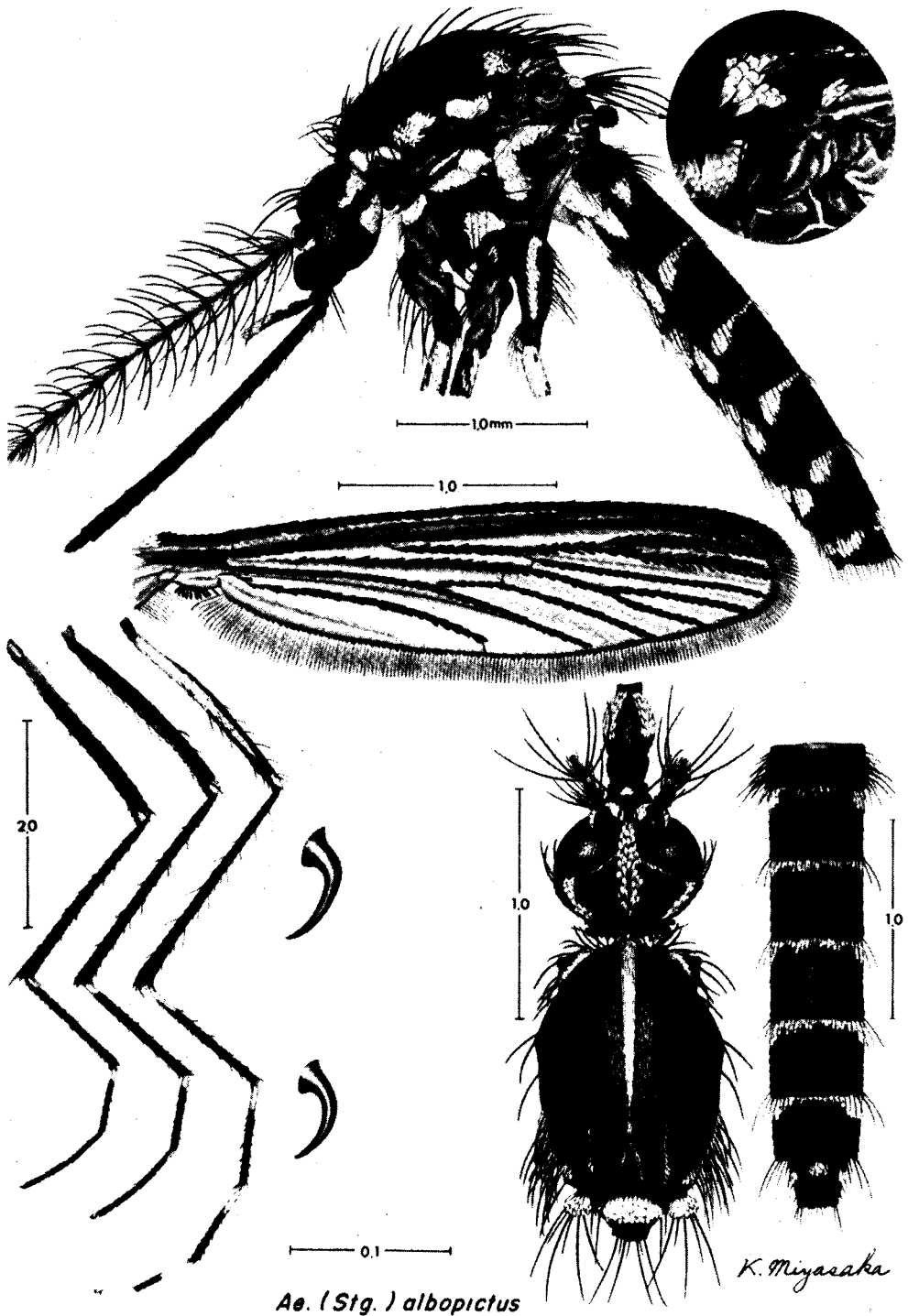
9A(9). Scutum with narrow, white-scaled median longitudinal stripe; abdominal terga III-VI with basolateral spots of white scales not connected to basal, white-scaled transverse bands. . . . . *albopictus*

Scutum with broad patch of cream-colored scales anteriorly; abdominal terga III-VI with basal transverse bands of pale scales continuous with large basolateral pale-scaled patches . . . . . *zoosophus*

**FOURTH INSTAR LARVA** (Fig. 2). The key to genera offers no difficulty in recognizing the larva of *Ae. albopictus* as a species of the genus *Aedes*. It comes out in couplet 14 where it must be distinguished from species of the genus *Haemagogus*. This can be done by checking the number of pairs of setae in 4-X, the vestiture of the saddle and the character of seta 3-VII. Seta 4-X in *Haemagogus* (only species *Hg. equinus* Theobald occurs in the Nearctic Region) has 5 pairs of setae, while *Ae. albopictus* larvae possess only 4 pairs. In addition, the saddle in larvae of *Haemagogus* has a cluster of prominent spicules dorsoposteriorly and seta 3-VII is stout and long, reaching well posterior to the anterior margin of the base of the siphon (Arnell 1976), whereas *Ae. albopictus* larvae have a saddle with very fine spicules dorsoposteriorly and seta 3-VII is weak and short, reaching only to the basal 0.25 of segment VIII.

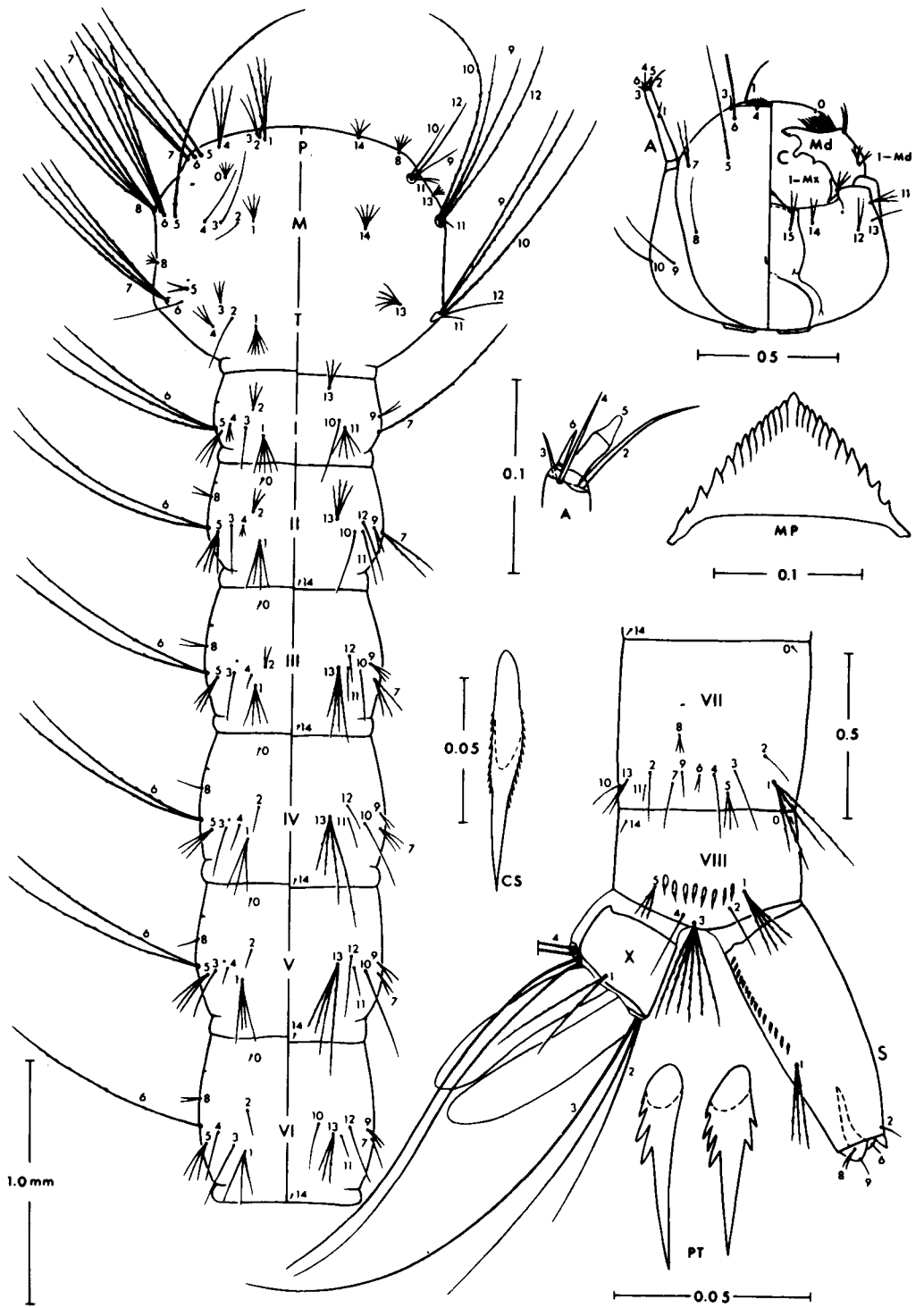
To identify the larva of *Ae. albopictus* to species, no difficulty should be encountered in

<sup>1</sup> Research Entomologist, Division of Parasitic Diseases, Center for Infectious Diseases, Centers for Disease Control, Public Health Service, U. S. Department of Health and Human Services, Atlanta, GA 30333. Assigned to the International Center for Public Health Research, University of South Carolina, P. O. Box 699, McClellanville, SC 29458.



*Ae. (Stg.) albopictus*

Fig. 1. Adult female of *Aedes albopictus*. Top—lateral view, middle—dorsal view of wing, bottom left—legs and tarsal claws, bottom right—dorsal view. (From Tanaka et al. 1979)



*Ae. (Stg.) albopictus*

Fig. 2. Fourth instar larva of *Aedes albopictus*, dorsal—left, ventral—right. A = antenna, C = head, CS = comb scales, M = mesothorax, MD = mandible, MP = mental plate, Mx = maxilla, P = prothorax, PT = pecten spine, S = siphon, T = metathorax, I–X = abdominal segments. (From Tanaka et al. 1979)

the specific *Aedes* key as far as couplet 44. There, *Ae. albopictus* should be included in an extra couplet 43A in which it is distinguished from the succeeding 4 species, *Ae. papago* Zavortink, *Ae. purpureipes* Aitken, *Ae. aegypti* (Linnaeus) and *Ae. muelleri* Dyar. Also couplets 44 and 46 were revised to incorporate additional characters which will make the identification more certain. These 4 couplets are as follows:

- 44(43). Seta 1-A short, not reaching more than 0.75 of distance to apex of antenna; siphon without acus ..... 45
- Seta 1-A long, at least reaching to near apex of antenna; siphon with large acus ..... 46A
- 45(44). Abdominal segment VIII with 3-5 comb scales; seta 1-C stout, broad and short ..... *papago*
- Abdominal segment VIII with 6-12 comb scales, seta 1-C long and thin ..... 46
- 46(45). Setal support plate of setae 9-12-M and -T with prominent spine; comb scales with strong subapical spines; seta 7-C simple ..... *aegypti*
- Setal support plate of setae 9-12-M and -T with short, thin spine; comb scales with lateral, basal fringe of fine spicules; seta 7-C branched ..... *albopictus*
- 46A(44). Integument of thorax and abdomen aculeate; with 3-7 comb scales ..... *purpureipes*
- Integument of thorax and abdomen glabrous; with 8-12 comb scales ..... *muelleri*

DISCUSSION

In the Nearctic Region, *Ae. albopictus* is most likely to be confused with *Ae. aegypti*, which it resembles superficially, especially the adult female and the general appearance and manner of swimming of the late instar larvae. In trapped specimens with rubbed scuta, these 2 species can be distinguished by examining abdominal sterna II-V. In *Ae. aegypti* they are entirely pale-scaled, while in *Ae. albopictus* they have dark-scaled apical or subapical bands (Tanaka et al. 1979). Larvae of the 2 species are readily separated by comb scale differences.

Another species whose larvae are frequently encountered in containers and tires is *Ae. triseriatus* (Say). This species can be separated easily from *Ae. albopictus* larvae by examining the comb scales, siphonal acus, anal papillae and seta 7-C. In general form the comb scales

of *Ae. triseriatus* resemble those of *Ae. albopictus*. However, on closer scrutiny, *Ae. triseriatus* comb scales have a complete fringe of short spicules around the apex, while those of *Ae. albopictus* larvae have a bare, large, apical spine and a row of small spicules basally on each side. Otherwise, *Ae. triseriatus* larvae have an acus at the base of the siphon attached to or detached from its main sclerite, the ventral pair of anal papillae shorter than the dorsal pair, and seta 7-C with 6 or more branches (Zavortink 1972). *Aedes albopictus* larvae have no siphonal acus, the 4 anal papillae are subequal in size and seta 7-C is double.

ACKNOWLEDGMENTS

The author wishes to thank B. A. Harrison for his help in formulating the larval keys, D. Sprenger for providing larvae of *Ae. albopictus* from Harris County, Texas, and Mac and Margaret Tidwell for reviewing the manuscript. Permission to reproduce figures 1 and 2 was granted by the American Entomological Institute.

References Cited

Arnell, J. H. 1973. Mosquito studies (Diptera, Culicidae) XXXII. A revision of the genus *Haemagogus*. *Contrib. Am. Entomol. Inst. (Ann Arbor)* 10(2):1-174.

Centers for Disease Control. 1986. *Aedes albopictus* introduction—Texas. *MMWR* 35:141-142.

Chapman, H. C. and E. B. Johnson. 1986. The mosquitoes of Louisiana. *La. Mosq. Control Assoc. Tech. Bull.* 1, 17 pp.

Darsie, R. F., Jr. and R. A. Ward. 1981. Identification and geographical distribution of the mosquitoes of North America, north of Mexico. *Mosq. Syst. Suppl.* 1, 313 pp.

Huang, Y. M. 1968. Neotype designation for *Aedes (Stegomyia) albopictus* (Skuse) (Diptera: Culicidae). *Proc. Entomol. Soc. Wash.* 70:297-302.

Huang, Y. M. 1971. A redescription of *Aedes (Stegomyia) scutellaris malayensis* Colless and the differentiation of the larva from that of *Aedes (S.) albopictus* (Skuse) (Diptera: Culicidae). *Proc. Entomol. Soc. Wash.* 73:1-8.

Huang, Y. M. 1972. Contributions to the mosquito fauna of Southeast Asia XIV. The subgenus *Stegomyia* of *Aedes* in Southeast Asia. I—The *scutellaris* group of species. *Contrib. Am. Entomol. Inst. (Ann Arbor)* 9(1):1-109.

Sprenger, D. and T. Wuithiranyagool. 1986. The discovery and distribution of *Aedes albopictus* (Skuse) in Harris County, Texas. *J. Am. Mosq. Control Assoc.* 2:217-219.

Tanaka, K., K. Mizusawa and E. S. Saugstad. 1979. A revision of adult and larval mosquitoes of Japan (including the Ryukyu Archipelago and the Ogasawara

Islands) and Korea (Diptera: Culicidae). Contrib. Am. Entomol. Inst. (Ann Arbor) 16:1-987.  
Zavortink, T. J. 1972. Mosquito studies (Diptera,

Culicidae) XXVIII. The New World species formerly placed in *Aedes (Finlaya)*. Contrib. Am. Entomol. Inst. (Ann Arbor) 8(3):1-206.

### ILLINOIS MOSQUITO CONTROL ASSOCIATION

1984-1985 MEMBERS OF THE EXECUTIVE COMMITTEE

Linn Haramis, Ph.D.  
IL. Dept. of Public Health  
Springfield, IL.

*Vice-President*  
Donald W. Webb, Ph.D.  
IL. Natural History Survey  
Urbana, IL.



*Secretary-Treasurer*  
Rosemarie Climpson  
South Cook County M.A.D.  
Harvey, IL.

*Past-President*  
Harvey J. Dominick  
IL. Dept. of Public Health  
Springfield, IL.

#### Members

Stephen Hill, DVM — Macon Mosq. Abate. Dist.  
Paul Gerry — Desplaines Valley M.A.D.  
Glenn Levinson — Northwest M.A.D.

**Annual Meeting—October 30-31, 1986**  
**Pheasant Run Resort Hotel**  
**St. Charles, IL.**

### THE SOUTH COOK COUNTY MOSQUITO ABATEMENT DISTRICT

155th Street and Dixie Highway  
P.O. Box 1030, Harvey, Illinois 60426

#### Board of Trustees

LAWRENCE P. GULOTTA—*President*  
GEORGE J. CULLEN—*Secretary*  
CLARENCE BOBBE—*Vice President*  
FRED MASSAT—*Treasurer*  
THEODORE COOK—*Vice President*  
KHIAN K. LIEM, Ph.D.—*Manager-Entomologist*

**The District has served South Cook County Illinois since 1954.**