

MOSQUITO STUDIES (Diptera, Culicidae)

XXII. A NEW SUBGENUS AND SPECIES OF AEDES

FROM ARIZONA¹

by

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In June 1969, John F. Burger of the University of Arizona sent a single female of a very unusual mosquito with a mesonotal pattern superficially similar to that of *Aedes aegypti* to John N. Belkin at the University of California at Los Angeles. The specimen had been collected in the Coyote Mountains, Pima County, Arizona, by Martha L. Noller, also of the University of Arizona. Several members of the "Mosquitoes of Middle America" project staff examined the specimen and concluded that it was an undescribed species of *Aedes* so distinct from other known New World forms that it should probably be recognized at the subgeneric level. From the highly ornamented nature of the adult it was surmised that the immature stages would be found in treeholes or rockholes. After both Mr. Burger and Miss Noller kindly provided additional information about Mendoza Canyon, where the mosquito had been taken, and furnished directions for getting to the area, I visited the region and collected for a few days during the first week in September 1969. Although mosquito larvae and pupae were collected from numerous treeholes and rockholes and many biting adult mosquitoes were caught, the new form was not found. In late December 1969, Lewis T. Nielsen of the University of Utah and I revisited Mendoza Canyon and collected water and debris from a large number of treeholes. The material which we gathered was divided and portions of it were reared at the University of Utah and portions at the University of California at Los Angeles. Although no specimens of the unusual new species were recovered from the material reared in Utah, 2 males and 3 females with associated larval and pupal skins were reared in Los Angeles from eggs taken from an oak treehole by Dr. Nielsen. Study of these additional specimens, particularly the immature stages and males, supports the original conjecture that this new species should be placed into a separate subgenus of *Aedes*. The new subgenus, *Abraedes*, is briefly diagnosed and the species, *papago*, is fully described below.

The limited material presently available does not permit preparation of slides of adults and, consequently, no drawings of adult morphology are presented here. It is hoped that such drawings can be included in a future revision of the New World treehole and rockhole *Aedes*.

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ABRAEDES, new subgenus

TYPE SPECIES: *Aedes (Abraedes) papago*, n.sp.

FEMALE. Highly ornamented; integument of head and thorax dark brown to black, strongly contrasting with yellowish to amber integument of abdomen.

Head: Eyes broadly separated above antennae, the space with broad flat silvery scales. Decumbent scales of vertex broad and flat. Erect scales of vertex few in number. Proboscis conspicuously longer than forefemur. Palpus short, 0.26-0.29 length of proboscis; apparently 4-segmented. Antenna subequal to proboscis in length.

Thorax: Long rows of acrostichal and dorsocentral bristles present. Mesonotum with narrow scales; dark with conspicuous pattern of white and silvery lines superficially similar to that of *Aedes aegypti*. Scutellar lobes with patches of large broad flat silvery scales. Paratergite moderately broad; with broad flat silvery scales in lower anterior portion. Pleural bristles absent on lower *mep*, few on *stp*. Pleuron with broad flat silvery scales in small dense patches or lines.

Legs: Disproportionately short. Tarsi conspicuously marked with white bands or rings. Claws simple.

Wing: Plume scales present on dorsum of veins R_s , R_{2+3} , R_2 , R_3 , middle 0.60-0.70 of M and sometimes apical portion of 1A.

Abdomen: Distal tergites and sternites with dense lateral patches of outstanding black and iridescent silvery scales; tergites VI and VII with large bristly submedian apical scaleless area. Sternite VIII large, exerted, nearly devoid of scales, but with numerous setae. Genitalia deeply retracted, only dark tips of cerci projecting from sternite VIII.

MALE. Similar to female except for sexual characters. Palpus subequal to proboscis in length; 5-segmented; segments 4 and 5 bent ventrad. Antenna slightly shorter than proboscis; torus enlarged; flagellum strongly plumose. Larger claw of foreleg and midleg toothed. Apical abdominal segments and genitalia bent ventrad. Tergite VIII short, only 0.70-0.78 length of sternite VIII; largely retracted; with only a few apical black scales.

MALE GENITALIA. Tergite IX very poorly developed, short, without lobes; 1 or 2 fine submedian setae on each side. Sidepiece without basal or apical lobes; sternomesal surface without specialized scales. Claspette filament developed, long, simple. Aedeagus subparallel-sided in basal half, bulbous in distal half in dorsal aspect. Proctiger unusually long in dorsal aspect; without the normal dorsal lobe of the basolateral sclerotization.

PUPA. No cephalothoracic hairs elongate. Trumpet short; tracheoid virtually absent. Hair 1-II farther from midline than 1-I. Hair 2-I-VII relatively long and strong;

usually mesocephalad of hair 1 on segments III-V. Hair 5-IV-VI shorter than corresponding tergite. Hair 9-II-VI relatively long and strong, becoming longer on posterior segments; usually cephalad of level of hair 6 on segments II-IV, cephalad or caudad of level of hair 6 on V, caudad of level of hair 6 on VI. Hair 9-VIII relatively far mesad of caudolateral angle of segment. Paddle deeply emarginate; outer margin distad of external buttress and inner margin with long filamentous spicules.

LARVA. Length and width of head subequal. Labial plate subquadrate. Hairs 5,7-C at about level of antennal base. Hairs 5-7-P on separate tubercles. Hair 2-III-V usually mesocephalad of hair 1. Hair 3-VII relatively short, not reaching base of siphon. Hair 12-I absent. Hair 13-VI relatively long, usually double or triple (2-4), laterad and usually caudad of 10-VI. Comb scales large; few (4 or 5); consisting of an elongate to oval plate from which 1 or rarely 2 large unfringed spines and several smaller spines project. Siphon short; without acus. Caudal margin of anal saddle without strong spines. Ventral brush weakly developed; with 5 pairs of hairs from irregular basal boss; hair 4a-X short, multiple.

DISCUSSION. See *papago* below.

Aedes (*Abraedes*) *papago*, n.sp.

Figs. 1,2

TYPES: *Holotype* male (UCLA 550-39) with slides of associated larval and pupal skins and genitalia, Mendoza Canyon, Coyote Mountains, Pima County, Arizona (31°59' N, 111°30' to 111°31' W), elevation about 1070 m, egg obtained from a rothole in a living evergreen oak tree, 28 Dec 1969, L.T. Nielsen [USNM]. *Allotype* female (UCLA 550-33) with slide of associated larval and pupal skins, same data as holotype [USNM]. *Paratypes:* 1 lpM (550-36), 2 lpF (550-37,38), same data as holotype [UCLA]; 1 F, E slope Coyote Mts., Pima Co., Arizona, 3500 ft, 13 Aug 1968, M.L. Noller [ARIZ].

FEMALE. Wing: 3.15 mm. Proboscis: 2.06 mm. Forefemur: 1.65 mm. Abdomen: about 3.2 mm.

Head: Integument dark brown to black. Frontal bristles absent. Orbital bristles 10-13 pairs. Ocular border of broad flat silvery scales. Ornamentation complex, consisting of white median longitudinal line bordered on each side by 3 progressively smaller black patches alternating with 3 progressively smaller white to silver-white patches; posterior portion of submedian black patch usually with some white scales; occiput with narrow curved white scales. Underside of head usually with silver-white scales. Erect scales of vertex largely restricted to anterior portion of submedian dark patch, black, some elongate and narrow, some proclinate; erect scales of occiput numerous, entirely or largely black, moderately long and broad. Clypeus moderate in size, bare. Proboscis scales predominantly black with metallic coppery to green reflections; white speckles in middle portion, especially dorsally. Palpus black scaled with white patch at base of segment 3; white patch covering all of segment 4; usually with white speckles or patch on segment 2. Torus with large dorsomesal patch of broad silvery scales; flagellar segment 1 with mesal line of white scales.

Thorax: Integument largely dark brown to black. Mesonotum with numerous long, strong, dark bristles; humeral, lateral prescutal, posterior fossal, supraalar and parascutellar bristles present. Scutellum with 4-6 well developed bristles on mid-

lobe and 3-7 well developed bristles on lateral lobe. Mesonotal background of small dark brown to black curved scales which become larger and broader laterally and posteriorly. Conspicuous pattern of narrow white or silvery lines as follows: (1) a long para-acrostichal line of narrow white to silver-white scales from anterior promontory to near level of wing root; becoming narrower and slightly converging towards its mate posteriorly, (2) a more or less continuous line of enlarged silvery scales from humeral angle to scutellum via scutal suture and outer posterior dorsocentral line; scales denser in posterior part of line; line not broadened in area of scutal angle, (3) a nearly transverse patch of large silvery scales in front of wing root, (4) a short median acrostichal line of white to silver-white scales from about level of end of para-acrostichal line to prescutellar bare space, (5) a tuft of silver-white scales on anterior promontory, (6) an irregular patch of large silvery scales behind scutal angle, and (7) sometimes enlarged silvery scales in a patch at anterior end of prescutellar bare space or in a narrow lateral prescutellar line. Pleuron with bristles on *apn*, *ppn*, *ppl*, *psp*, *stp*, *pra* and upper *mep*; *ssp* bristles absent. Pleural scales forming a long more or less continuous silvery diagonal line from upper anterior *apn* across lower *ppn*, *ssp* and upper middle *stp* to lower posterior portion of *mep*; additional silvery patches on upper and lower *pst*, *ppl*, upper portion of *pcx*, *pra*, lower posterior *stp* and upper *mep*; longer nearly horizontal silvery line across middle portion of *stp*; *ppn* usually with a few silvery scales, sometimes bare; *psp* and metameron usually without scales.

Legs: Integument of coxae dark brown to black. Coxal bristles normal. All coxae with patches of broad flat silvery scales, as follows: (1) forecoxa with upper and lower anterior patches, (2) midcoxa with small upper posterior, middle anterior and lower anterior patches, (3) hindcoxa usually with large patch from upper portion to middle of anterior surface and small lower anterior and lower posterior patches; forecoxa with black scales between silvery patches. All trochanters with black and white scales. Femora predominantly black scaled on all surfaces of all legs; many black scales, particularly on midfemur and hindfemur, with metallic silvery, light green, blue or violet reflections; forefemur with incomplete narrow subbasal oblique white band and numerous scattered white scales; midfemur and hindfemur with usually complete narrow subbasal oblique white ring and fewer scattered white scales. Knee spots small, usually incomplete on forefemur. Tibiae predominantly black scaled, with slight metallic green, blue or violet reflections; all tibiae with narrow to moderately broad dorsally incomplete basal white band; foretibia and midtibia with narrow white ring or band 0.25-0.33 distance from base; hindtibia with broader white ring 0.45-0.50 distance from base. Tarsi black scaled, with conspicuous white dorsal patches, bands or rings, as follows: (1) foretarsus with moderately broad patch or band at base of segment 1 and smaller patch at base of segment 2 and usually segment 3, (2) midtarsus with moderately broad basal band or ring on segment 1 and small patch at base of segment 2 and sometimes segment 3, and (3) hindtarsus with moderately broad subbasal white band or ring on segment 1, moderately broad basal band or ring on segments 2 and 3 and moderately broad basal patch or band on segments 4 and 5. Claws of all legs subequal in size, small, simple.

Wing: Dark scaled except for a white line in basal 0.16-0.20 of anterior surface of costal vein.

Haltere: Integument light tan. Stem black scaled distally. Knob black and white scaled.

Abdomen: Integument predominantly very light, yellowish white to amber. Sil-

very and, to lesser extent, dark scales with light metallic coppery, green, blue or violet reflections. Tergite I with numerous dark scales dorsally; laterotergite with large patch of silver-white scales. Tergites II-VIII predominantly dark scaled, with lateral basal or subbasal silvery patch followed distally by lateral patch of black scales; scales of lateral patches becoming progressively denser and more outstanding on distal segments; tergites VI and VII with outstanding black scales middorsally; tergite VIII with dense outstanding black scales and long apical setae which project beyond apices of cercal setae. Sternite I bare. Sternites II-IV variably scaled, sometimes largely bare, usually with at least a few dark or black scales apically, sometimes with small lateral subbasal or median silvery patch. Sternites V-VII usually at least partly bare basally, black scaled apically and with lateral median silvery patch; scales becoming progressively denser and more outstanding on distal segments.

MALE. Essentially as in female except for sexual characters.

Head: White speckling of proboscis reduced or absent. Palpal segments 2 and 3 ankylosed, long, making up about 0.67 length of palpus; segment 4 short, about 0.16 length of palpus; segment 5 short, about 0.12 length of palpus; slender except for slightly swollen apex of segment 3; apex of segment 3 and all of segments 4 and 5 with bristles; dark scaled except for conspicuous dorsal white patch or band near base of segment 2 and at base of segments 3-5. Torus with silvery scales dorsomesally; flagellar segment 1 with small scales.

Legs: Anterior foreclaw and midclaw large, with a single long slender subbasal tooth; posterior foreclaw and midclaw medium sized, simple; hindclaws small, simple.

Abdomen: Scaling of sternite VIII similar to tergite VIII of female.

MALE GENITALIA (fig. 1). Unusually colored, segment IX, proctiger, phallosome, claspette and clasper largely very weakly pigmented, yellowish; sidepiece and spiniform more deeply pigmented, light brown; apex of paraproct black.

Segment IX: Tergite without the normal integumentary spicules middorsally. Sternite well developed, long, with numerous strong setae distally.

Sidepiece: Well developed, relatively long and slender, more or less spindle shaped. Mesal surface membranous from base to apex. Basal tergomesal area not swollen, without clumped or enlarged bristles, but with normal bristles of dorsal surface of sidepiece shorter and slightly more numerous. Median sternomesal sclerite not developed. Distal dorsomesal surface with short setae; dorsal surface, distal lateral surface and ventral surface with long bristles. Dorsal surface with dark scales among bristles; basal portion of dorsolateral and lateral surfaces with dense broad silver-white scales with iridescent coppery, green, blue or violet reflections; distal portion of lateral surface with dense broad dark scales.

Claspette: Well developed. Stem moderately long, bent mesally in distal portion in dorsal aspect. Base and all but distal portion of stem spiculate. Mesal and mesoventral surface of stem with 3-6 weakly developed setae. Filament more or less evenly curved dorsally, subterete; without a ridge or retrorse barb on convex side.

Clasper: Simple, moderately long, curved inward distally. Broadest at base, tapering evenly to narrower apex. Dorsal basal portion spiculate. Surface not conspicuously wrinkled. Ventral surface with 2 setae near apex. Apical spiniform moderately long, about 0.30-0.35 length of clasper, slightly curved inward.

Phallosome: Aedeagus moderately long, without teeth. Ventral paramere appearing unusually short and broad in dorsal aspect.

Proctiger: Strongly developed. Paraproct with single large heavily sclerotized

curved apical spine. Cercal setae fine, short, 2-4.

PUPA (fig. 1). Abdomen: about 4.0 mm. Trumpet: 0.54 mm. Paddle: 0.81 mm. Integument very lightly pigmented, uniformly light straw yellow, strongly contrasting with dark trumpet and hairs.

Cephalothorax: All hairs relatively short, stout, darkly pigmented and usually single or double. Hair 6-C usually as stout as or stouter than 7-C.

Trumpet: Dull brown in color except for slightly lighter apex of pinna. Tracheoid represented at extreme base of lateral (ventral) surface only. Index about 3.1-3.3; pinna about 0.22-0.33 of total length.

Metanotum and Abdomen: Integumentary reticulation and spiculation very inconspicuous on anterior segments, becoming slightly more pronounced on posterior segments. Most hairs relatively short, stout, darkly pigmented and single or double. Float hair (1-I) well developed, relatively short, with numerous dendritic branches; lateralmost branches of float hair usually diverging at an angle of less than 100 degrees. Hair 1-II-VII relatively short, usually subequally developed and single or double (1-3) on all segments, but sometimes enlarged and multibranched (5-7) on segment II. Hair 2 usually laterocephalad of hair 1 on segments II, VI, VII. Hair 3-I-III subequal in development, moderately long, single (1 or 2); hair 3-IV-VII subequal in development, usually single on V-VII, single or double on IV. Hair 4-II mesad of 5-II. Hair 5-II, III subequally developed, relatively short, distinctly finer than hair 3 of corresponding segment, usually single (1 or 2); hair 5-IV-VI subequally developed, subequal to or slightly longer than 3-I-III, about 0.7-0.9 length of corresponding tergite, usually single (1 or 2); hair 5-VII similar to 5-II, III or slightly longer and/or stronger, usually double (1 or 2). Hairs 6, 7-I much finer and shorter than 3-I. Hair 6-II slightly thickened and elongate, single (1 or 2); hair 6-III-V usually distinctly shorter and finer than 6-II, usually single (1-3); hair 6-VI quite stout and elongate, single; 6-VII usually only slightly longer and stronger than 6-III-V, single. Hair 9-VII long and strong, double or single. Hair 9-VIII most strongly developed and longest hair of pupa, with 2-4 (2-5) primary branches. Hair 10 conspicuously more mesad and cephalad of hair 11 on segment VI than on segment VII.

Paddle: Shape as figured; length 1.30-1.55 of maximum width. Evenly light straw yellow in color. Midrib brighter and deeper yellow in color, extending to highly wrinkled area basad of apical emargination. Hair 1-P relatively long and strong, single.

LARVA (fig. 2). Head: 0.97 mm. Siphon: 0.72 mm. Anal Saddle: 0.28 mm. Strongly developed stellate hairs and conspicuous spicules absent.

Head: Integument smooth. Medium straw yellow in color except for slightly darker anterior portion of ventral surface and much darker collar. Ocular area not lightened. Mental plate normal, brown, with 8 or 9 (8-10) lateral teeth. Hair 1-C very stout, widened before middle, smooth. Hairs 4, 6-C relatively far cephalad. Hair 4-C small, with 5-8 branches (4-9), located mesocephalad of hair 6 and mesad of hair 1. Hair 5-C single, laterad of 6-C. Hair 6-C single, usually slightly widened beyond base, slightly laterad of 1-C. Hair 7-C usually triple or double (1-3). Hair 11-C weakly developed, short, stellate, with 3-5 branches. Hair 14-C rather stout, usually triple (2 or 3). Hair 15-C located in anterior 0.25 of labial plate; long, extending beyond apex of mental plate, with 3 or 4 branches.

Antenna: Relatively short. Integument without spicules, but sometimes with conspicuous annular wrinkles. Medium straw yellow in color except for slightly darkened base. Hair 1-A usually single; unusually short, length only 1.5-2.0 diameter

of antennal shaft at insertion of hair; inserted on dorsal or dorsomesal surface of shaft.

Thorax: Living larva white, without conspicuous pigmentation in epidermis or fat body. Integument without spicules. Hairs moderately pigmented. Hairs 1-3-P sometimes arising from a weakly sclerotized common plate. Hair 3-P much shorter and weaker than 1-P. Hair 4-P with 3-5 branches. Hairs 5,7-P long, usually with 4 or 5 branches (2-6), each sometimes with small basal plate. Hair 8-P relatively short, usually with 4-6 branches (3-7). Hair 11-P,M,T short, weak, usually double (1-3), much smaller than 9-P. Hair 1-M shorter than 3-M, with 2-4 branches. Hair 5-M double or single. Hair 14-M short, single to triple. Hairs 1,13-T subequal, small, usually with 2-4 branches (1-4). Hair 4-T usually longer and stronger than 1-T. Hair 5-T small, single to triple.

Abdomen: Coloration and spiculation as for thorax. Most hairs moderately pigmented. Hair 1-I,II subequally developed, moderate, usually with 3 or 4 branches (2-7); hair 1-III-V subequally developed, slightly longer than 1-I,II, with 3 or 4 branches; 1-VI,VII subequally developed, longer than 1-III-V, usually with 3 or 4 branches (3-5). Hair 2-I-VII relatively stout, usually triple (2 or 3) on I,II, usually single or double (1-3) on III-V, single on VI,VII; usually located laterocephalad of hair 1 on I,II,VI and VII. Hair 5-I-VII subequally developed, moderate, similar to 1-III-V, usually with 3 or 4 branches (2-6). Hairs 6,7-I with separate basal plates. Hair 6-I-V long, double or triple on I,II, double on III-V; hair 6-VI shorter, single or double. Hair 7-I long, 7-II-VI usually becoming progressively shorter; usually double (1 or 2) on I, double or triple (1-3) on II-VI. Hair 11-I moderately developed, usually with 4-7 branches (3-8). Hair 13-I relatively small, usually with 3 or 4 branches (1-4); hair 13-II larger, subequal to 11-I, usually double or triple (1-3); hair 13-III-V subequally developed, long, much longer than hair 1 of corresponding segment, usually triple (2-4).

Segment VIII: Integument smooth except for rows of inconspicuous spicules in area of comb scales. Hair 1-VIII moderately developed, usually with 4 or 5 branches (3-5), frequently arising from a small basal plate. Hair 3-VIII large, usually with 6 or 7 branches (5-8), arising from basal plate.

Siphon: Short, index apparently about 1.9-2.3 (determined from skins). Light yellow brown to light brown in color except for darker base, especially dorsally, and apex. Integument smooth to very weakly and indistinctly imbricate. Basal margin of siphon irregular and wavy. Pecten teeth moderate in size; usually 12-14 (12-18); brown except for hyaline apex; usually with 2-4 basal denticles. Pecten in straight, slightly curved or slightly sinuous row in basal 0.32-0.42 of siphon; often 1 or more of the basal teeth displaced dorsad or ventrad of row; no apical teeth detached. Hair 1-S arising beyond pecten row, about 0.38-0.52 distance from base; moderately developed, usually triple or double.

Anal Segment: Saddle moderate in size, extending to or slightly beyond middle of segment; ventral edge frequently irregular; more or less concolorous with siphon; integument smooth to weakly imbricate on body of saddle, slightly spiculate near distal margin dorsolaterally. Hair 1-X arising on saddle near apicoventral angle; strongly developed, relatively long, usually triple or double (1-4). Hair 2-X long, usually with 3 or 4 branches (3-7). Hair 3-X very long, single. Hair 4a-X short, usually with 4 or 5 branches (4-6); hairs 4b,c-X long, double or single; 4d-X moderately long, single; 4e-X short, double or single. Dorsal and ventral gills subequal in length, very long, at least 3.0-4.2 length of anal saddle (determined from skins); sausage-shaped; gills contiguous in living larva until shortly before pu-

pation, when they become spreading.

SYSTEMATICS. This species is one of the most remarkable container breeding *Aedes* of the New World. The adult characters, in particular, are very striking. The diagnostic features of all stages are set forth above in the subgeneric description.

This species shows no obvious relationships to any other. It is apparently another one of the many unusual New World container breeding *Aedes*, most of which are currently placed, incorrectly in my opinion, in the subgenus *Finlaya*. The resemblance to the Old World subgenus *Stegomyia* is superficial only.

The living larva is white, rather elongate and is easily distinguished from others found in treeholes in southeastern Arizona by the apposition of its 4 long anal gills. The living pupa is macroscopically separated from others of the area by its weak movements and by the dark trumpets and float hairs which contrast strongly with its very light integument.

The only striking variation observed in any stage of the small series of specimens available is the development of abdominal hair 1-II of the pupa. This hair is usually short, single or double and developed similarly to 1-III-VII, but on both sides of 1 specimen and on 1 side of another, the hair is enlarged and has 5 to 7 branches.

BIONOMICS. The original adult female of *papago* was caught while attempting to bite. The larvae apparently occur in treeholes. The reared specimens were hatched from eggs unknowingly collected along with a relatively small amount of water and organic sludge from a small rothole in a living evergreen oak tree (*Quercus*). The nature of the treehole prevented scraping the cavity or collecting large pieces of debris in a deliberate attempt to obtain aedine eggs. Only a single young instar *Orthopodomyia* larva, presumably *kummi*, was present in the water at the time of collection. Upon arrival at the laboratory in Los Angeles the water from the rothole was placed into an enamel pan and diluted with tap water. A few aedine larvae appeared within the next few days, but all of them and the *Orthopodomyia* larva died when oil from an overhead refrigerating unit dripped into the pan. The pan was moved to a more favorable position in the rearing room and the water evaporated. After the debris had been dry for 7-10 days the pan was filled with distilled water. Several eggs hatched within the next 1 or 2 days. Most of the larvae, an undescribed species in the *Aedes kompi* group, matured rapidly. When the unusual attitude of its long gills was noticed macroscopically, the 1 slow-growing larva was examined microscopically and determined to be an unknown species. This was the first larva of *papago*. The debris was permitted to dry again and, after several days, was reflooded with distilled water and subjected to a vacuum of 20-25 inches of mercury for 30 minutes. Several additional eggs hatched; again, most larvae were the undescribed species near *kompi*, but 1 was *Aedes (Kompia) purpureipes*. After these larvae were reared, the debris was dried, reflooded with distilled water and subjected to the vacuum treatment 3 times in close succession without any additional hatch. Following this series of floodings the debris was left dry for 6 or 7 weeks. It was then flooded and subjected to the same vacuum treatment as before. Quite unexpectedly, numerous *Aedes* eggs hatched; among the larvae were more or less equal numbers of *purpureipes* and the undescribed species near *kompi* and fewer of *papago*. Four of the latter were successfully reared. As before, these larvae matured much more slowly than the accompanying species. The debris has been subjected to 1 additional drying and reflooding but no additional eggs hatched.

The oak bearing the rothole from which *papago* was collected was growing in

a small lateral canyon formed along a fault in the north-facing wall of Mendoza Canyon. This oak was at an elevation near that of the main canyon bottom and was one of the lowest in the area. Since no specimens of *papago* were obtained in numerous collections of debris and water made from oaks higher on the canyon walls, the species may be restricted to the lower edges of the xeric evergreen forest. If so, this may explain why it has not been found earlier, for there is a tendency, at least on my part, when looking for mosquitoes, to go to higher elevations where oaks and other trees are more numerous and more easily accessible. The relatively long larval life may also restrict the number of treeholes suitable for breeding of this species.

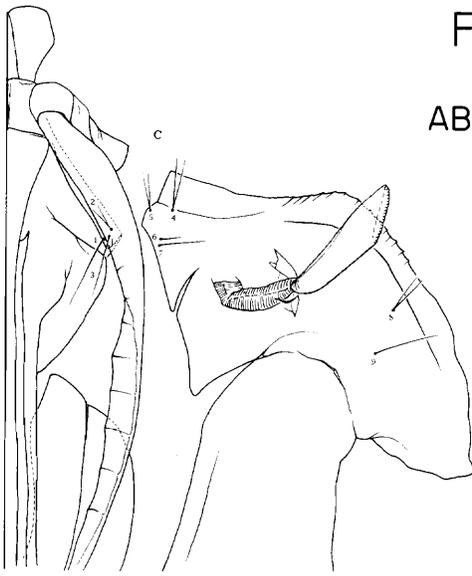
DISTRIBUTION. At present *papago* is known from only Mendoza Canyon, Coyote Mountains, Arizona. It undoubtedly occurs in northwestern Mexico and could be more widespread in southeastern Arizona where it may have been overlooked because few attempts have been made to collect treehole mosquitoes at elevations as low as 1100 m, the approximate elevation of Mendoza Canyon. All material examined is listed above in the type series.

FIGURES

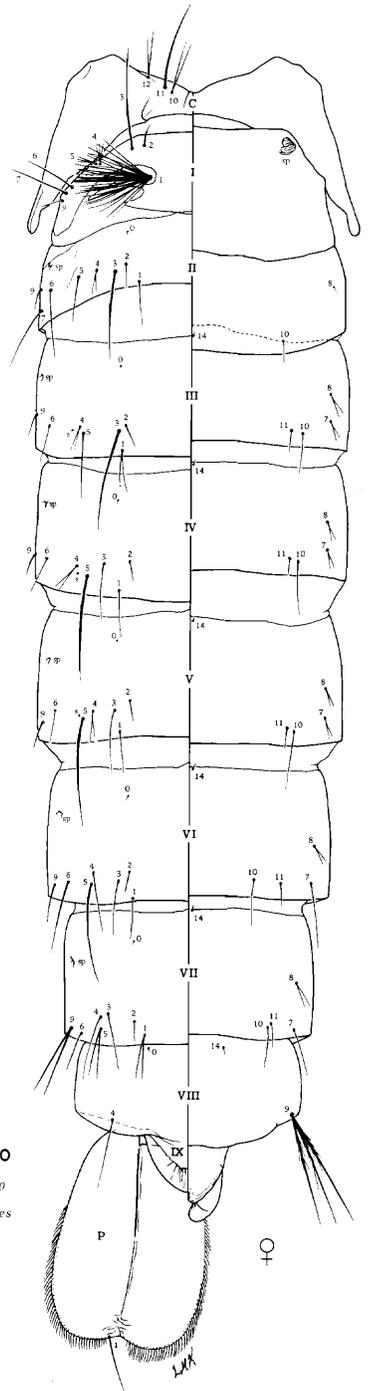
1. *Aedes (Abraedes) papago*; male genitalia and pupa
2. *Aedes (Abraedes) papago*; larva

Fig. I

ABRAEDES



1.0



papago

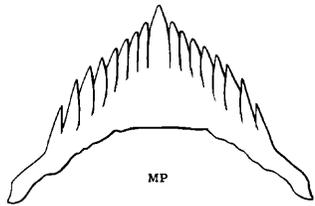
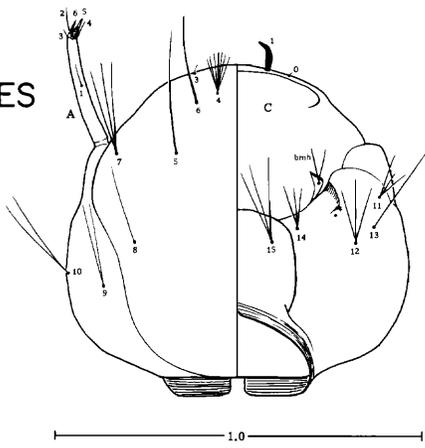
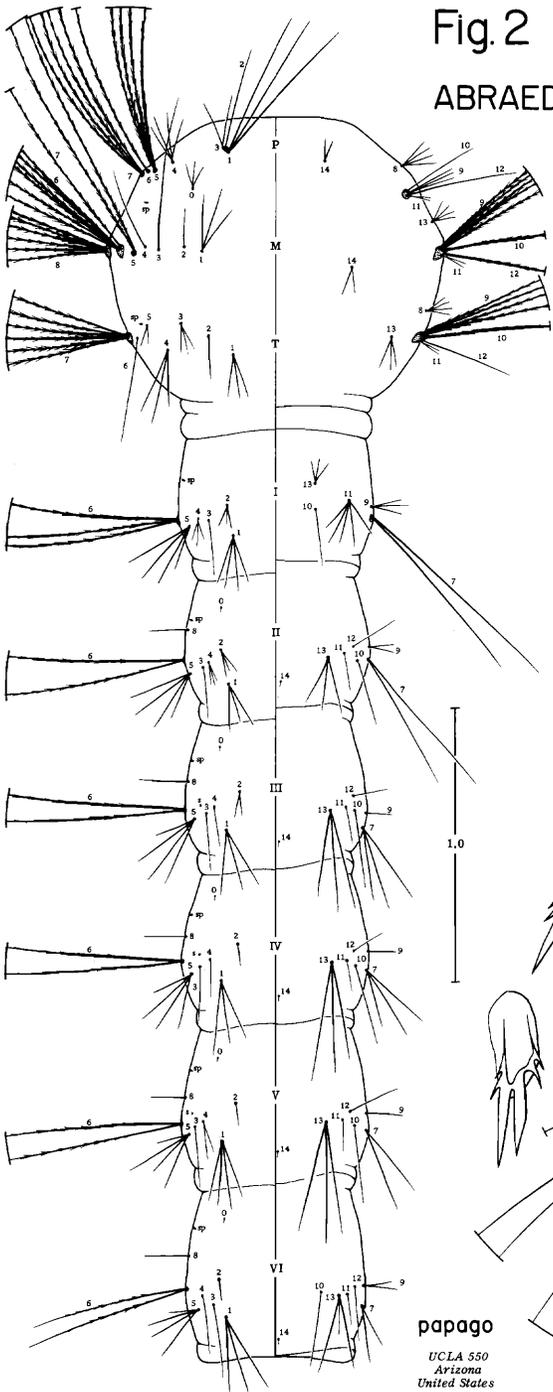
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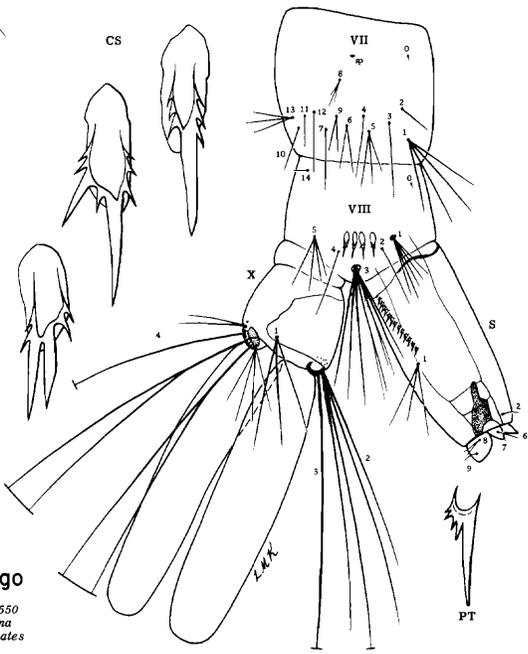
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Fig. 2
ABRAEDES



1.0

papago
UCLA 550
Arizona
United States



XXIII. ADDITIONS AND CORRECTIONS TO THE REVISION
OF THE AEADES TERRENS GROUP¹

by

Robert X. Schick²

The present additions and corrections to my recent revision of the Terrens Group (Schick, 1970a) are based upon collections obtained in Venezuela by a UCLA team and local collaborators in 1969; in Argentina by Osvaldo Casal, Miguel Garcia and associates in 1967-1969; in Colombia by Marston Bates in 1941 and 1944; and from these and other countries in South America by other workers. Described here are 1 new species, 2 new forms and the hitherto unknown immature stages and female of *braziliensis* Gordon & Evans and the male of *berlini* Schick. Important new records of previously described species are given, some revisions are made in the Terrens and Insolitus Subgroups and corrected keys are provided for the entire group.

The Terrens Group is still poorly known throughout most of South America. This is especially evident in northern Argentina from where there are several small collections of adults which do not agree with any of the known species.

The format and methods of this paper (Schick, 1970b) is similar to that of the earlier one except that (1) complete literature citations are not given for the previously treated species, (2) in the descriptions of the species only the diagnostic features are given, the less useful characters being omitted, (3) the length of the free portion of the midapical comb scales is given to the nearest 0.005 mm rather than to the nearest 0.001 mm, (4) the L/S to the nearest 0.1 rather than 0.01, and (5) an anterior view of femur III is included in the illustrations of the species in which the female is described to indicate the width of the dark bands. The figure numbers follow the sequence started in Schick (1970a). Figures 1-60 appeared in the latter paper and 61-68 are represented in the present one. The known geographic distributions are indicated by circumscribing lines on the maps but only the new records are spotted.

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The following are corrections in Schick (1970a):

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- p. 58, line 38. Length of sidepiece should be corrected to 0.27-0.35 mm.
 p. 59, line 6. Hair 4-C should read 5-C.
 p. 60, line 28. *Cundinimarca* should read *Cundinamarca*.
 p. 69, line 13. 12 lp♂ should read 12 lp♀.
 p. 70, line 21. 352-12 should read 352-13.

Thorntoni Subgroup

2. *Aedes* (*Finlaya*) *argyrothorax* Bonne-Wepster & Bonne

Figs. 2,13,14,62

1920. *Aedes argyrothorax* Bonne-Wepster and Bonne, 1920:179.

Aedes (*Finlaya*) *argyrothorax* of Schick (1970a:36-38).

SYSTEMATICS. *Aedes argyrothorax*, previously known from the coastal lowlands of South America, from eastern Venezuela southward into the state of Rio de Janeiro, Brazil, with 1 possible record from Iquitos, Peru (fig. 2), is now recorded from the highlands of Colombia. The Colombian *argyrothorax* may be disjunct from the populations to the east since this species was not taken by the UCLA team in the northcentral state of Aragua, Venezuela, either along the coast or in the Cordillera de la Costa.

NEW RECORDS (fig. 62). Material examined: 6 specimens; 2 M, 1 F, 1 pupa, 2 larvae; 2 individual larval rearings.

COLOMBIA. *Meta*: Villavicencio [elev. ca 460 m], 1944, M. Bates, 2 IM (42-A, 42-7), 1 pF (57-AA) [USNM].

Terrens Subgroup

The following taxonomic changes are made in this subgroup: (1) *berlini* is removed, (2) *apollo* is synonymized with *terrens*, and (3) *terrens* and *braziliensis* are redefined. The subgroup consequently comprises 3 distinct species, *terrens*, *braziliensis* and *zavortinki*. In addition, a new form, the *Teresopolis form*, is recognized.

With the removal of *berlini*, 1 variable, the presence or absence of subspiracular scales, can be eliminated from the subgroup description (Schick, 1970a:39). All the species have these scales. However, another variable is introduced with the inclusion of the *Teresopolis form*. The primary branches of hair 1-I of the pupa of this form are predominantly single or double, whereas in the other species they are predominantly multiple.

The character of the color of the broad decumbent scales of the male vertex can be added to the subgroup description to further distinguish the Terrens and Insolitus Subgroups. In the former the scales are dark and in the latter they are silver. This character is of value in determining the species when the mesonotum is rubbed. These 2 subgroups can be generally separated in the larva by the number of hairs of the ventral brush. In the Insolitus Subgroup it is 11-13 and in the Terrens Subgroup, 13-17.

The undescribed form without a basal dark band on femur III mentioned in

Schick (1970a:43) is *casali*, actually a member of the Insolitus Subgroup.

4. *Aedes* (*Finlaya*) *terrens* (Walker)

Figs. 3,7,8,15,16,61

1856. *Culex terrens* Walker, 1856:429.

1970. *Aedes* (*Finlaya*) *apollo* Schick, 1970a:46-48. NEW SYNONYMY.

Aedes (*Finlaya*) *terrens* in part of Schick (1970a:41-43).

Aedes (*Finlaya*) *apollo* in part of Schick (1970a:46-48).

FEMALE (figs. 7,15). Vertex with all decumbent scales narrow curved; erect occipital setae generally pale or dark; complete acrostichal line absent; fossal macula variously developed, at fullest extent not interrupted laterally by dark scales and fairly broad, at least extent reduced to narrow submarginal, longitudinal band divided into anterior and posterior portions; *pra* hairs pale or dark; vein C with silver scales at base.

MALE (figs. 8,15). Vertex with all decumbent scales narrow curved; complete acrostichal line absent; mesonotal disc not transversely silvered or transversely silvered anteriorly for at most 0.25 length of fossa; fossal macula reaching mesal margin of fossa or not; *pra* hairs pale or dark.

MALE GENITALIA (fig. 15). Sidepiece length 0.31-0.38 mm; median sternomesal sclerite of sidepiece weakly developed; prosopallus width 0.11-0.15 mm.

PUPA (fig. 15). Cephalothorax without highly contrasting dark markings on wing and leg cases; hair 1-I with primary branches predominantly multiple; paddle rounded or slightly tapered apically.

LARVA (fig. 16). Head hair 5-C single to triple; 6-C single or double; 11-C much shorter than 7-C; L/S 2.0-2.4.

SYSTEMATICS. *Aedes terrens* is redefined here to include those forms of the *Terrens* Subgroup in which (1) all the decumbent scales of the vertex are narrow curved, (2) the mesonotum of the male is not transversely silvered or only very narrowly so, and (3) a complete acrostichal line is absent. These characters separate adult *terrens* from the other species of the subgroup except for the female of *zavortinki*. Female *terrens* can often be distinguished from *zavortinki* by the presence of a characteristic lateral dark area on the fossa but this dark area may or may not be developed in some populations of *terrens* including those of the Villavicencio area of Colombia where the 2 species are sympatric. I have identified female *terrens* from this region by the generally dark erect scales of the occiput, assuming that *zavortinki* here would show pale erect scales. The closest known population of *terrens* shows generally dark scales (Venezuela) and the closest one of *zavortinki*, generally pale scales (Panama). Further support for the *terrens* determination is the occurrence of a male and female *terrens* in the same lot (57xy). It should be noted that a female of the *zavortinki* type with pale erect scales is unknown from Colombia, but the total number of specimens of the subgroup from the country is small and male *zavortinki* is represented by only 2 specimens. The immature stages of *terrens* can be separated from those of *braziliensis* and the *Teresopolis form* (see) but apparently not from *zavortinki*.

A third species of the subgroup, *braziliensis*, also occurs in the Villavicencio area. Here both *terrens* and *braziliensis* share an unusual character for the *Terrens*

Group, the presence in both sexes of dark rather than pale hairs on the upper *mep*. This led me to incorrectly associate the female of *terrens* and the male of *braziliensis* of this region in my previous paper and to describe them as a distinct species, *apollo*. I did note, however, that 2 species were possibly involved (Schick, 1970a:47). Whether the occurrence of these dark hairs in both species is due to parallelism or hybridization is unknown. The former possibility is suggested by development of this character in the single female of *berlini* (Insolitus Subgroup) known from the Villavicencio area but not in the females from the other parts of its range.

Aedes terreus in my previous revision was recorded from Brazil south of the Amazon basin southward into northern Argentina. Owing to the generally broadened definition of this species, a northern strip in the Caribbean countries of South America is now added to this geographic range, but *terrens* is still unknown from the intervening Amazon basin.

The widely distributed *terrens* comprises several distinctive geographic populations. The majority can be grouped into 2 general types in which there is a concordance of most or all of the following characters.

Type A. Female: Occiput with erect scales generally dark; fossal macula relatively broad, usually not interrupted laterally by dark scales but when so interrupted dark scales forming at most small patch or narrow line; *pra* hairs dark. **Male:** Mesonotum transversely silvered anteriorly; fossal macula coextensive with fossa; *pra* hairs dark. **Larva:** Head capsule with conspicuous fine spicules; hair 5-I often shorter than 4-I; saddle often extending about 0.5 or less around anal segment; ventral brush usually with 15,16 hairs (14-17); hair 4a-X with 9-13 branches.

Type B. Female: Occiput with erect scales generally dark; fossal macula interrupted by relatively broad lateral area of dark scales, the macula consequently forming narrow submarginal longitudinal band; *pra* hairs usually pale, rarely dark. **Male:** Mesonotum not transversely silvered; fossal macula not reaching mesal margin of fossa; *pra* hairs pale. **Larva:** Head capsule without conspicuous fine spicules; hair 5-I subequal in length to or longer than 4-I; saddle extending more than 0.5 around anal segment; ventral brush usually with 13, 14 hairs (13-15; in 1 specimen, 17); hair 4a-X with 7-10 branches.

Type A *terrens* occurs in northern South America from Colombia eastward into French Guiana and disjunctly in the Salvador area of Brazil and in the General Enrique Mosconi (Vespucio) area of Argentina and type B in Brazil south of the Amazon basin southward into northern Argentina (Iguazu) and disjunctly in French Guiana. Type A would appear to represent the more primitive state since the fossal macula is not reduced and the distribution is more of a relict type. The populations of type B vary in the branching of hairs 5,6-C in the larva; in some they are usually single (1 or 2), in others usually double or triple (1-3). Only the former condition is developed in type A larvae.

NEW RECORDS (fig. 61). Material examined: 137 specimens; 20 M, 42 F, 48 pupae, 27 larvae (mounted); 45 individual rearings (25 larval, 20 pupal).

ARGENTINA. Salta: General Enrique Mosconi (Vespucio) [elev. ca 500 m], 18 Feb 1967, treehole, H. Fernandez, M. Garcia and O. Casal (ARG 601,603), 2 lpM (603-15,17), 3 lpF (601-10,11; 603-16), 1 pM (603-101), 3 pF (601-102,103; 603-100), 14 L (601-2), 40 L (603-1) [UCLA]. Tablillas, 7 km from (nearest town General Enrique Mosconi, elev. ca 500 m), 25 Feb 1967, O. Casal and M. Garcia (ARG 618), 1 lpM (618-14), 4 lpF (618-10,12,16,18), 3 pM (618-104,108,115A), 1 F, 2 p, more than 100 L (618-1); 6 June 1969 (ARG 773), 7 pF (773-102,103,105,106,110,114,115), 3 L (773-2) [UCLA]. **Tucuman:** Churqui, 4 Dec 1922, 1 F (IMR 29) [UCLA].

COLOMBIA. *Meta*: Finca Vanguardia (Schick, 1970a:48). Villavicencio [elev. ca 460 m], 2 June 1941, very low treehole, M. Bates, 1 F (277); June 1942, W. Komp, 1 F (207B-45); M. Bates, 1 IF (C-57AA), 2 F, 2 p (57-AA); same data, 1 M, 1 F, 2 I (57xy) [USNM]. Villavicencio, river rd to Bosque Ocoa, 1 June 1942, treehole, 1 M (207B-10) [USNM].

FRENCH GUIANA. *Guyane*: Montabo (nearest town Cayenne), elev. 80 m, 30 Jan 1965, small treehole, height 1 m, T. Aitken, R. Martinez and A. Guerra (FG 1), 1 lpM (1-10), 1 lp (1-11) [UCLA]. *Locality not specified*: 1944, H. Floch, 2 M, 2 F (207E-1) [USNM].

VENEZUELA. *Aragua*: El Limon (nearest town Maracay), elev. 600 m, 15 July 1969, small treehole, height 2 m, J. Pulido and J. Valencia (VZ 211), 2 pM (211-100,101), 2 F (211-1) [UCLA]. El Ricon Bonita (nearest town Guigüe), elev. 500 m, 24 July 1969, small treehole, height 1 m, J. Pulido and J. Valencia (VZ 266), 1 lpM (266-20), 1 lpF (266-20), 2 lp (266-21,23) [UCLA]. Guamitas (8 km S Rancho Grande on rd to Maracay), elev. 700 m, 18 Aug 1969, small treehole, height 2 m, J. Pulido and J. Clavijo, 1 lpM (VZ 373-10) [UCLA]. Ocumare de la Costa, 2 km N on hwy 8, elev. 100 m, 12 July 1969, small treehole, height 2 m, J. Pulido and J. Valencia (VZ 178), 1 lpM (178-10), 2 lpF (178-11,12); 28 July 1969, small treehole, height 1 m, J. Pulido and J. Valencia (VZ 272), 1 pM (272-100), 3 pF (272-100,102,120), 1 M, 4 F (272-2) [UCLA]; 15 Aug 1969, large treehole, height 1 m, J. Valencia, 2 lpF (VZ 307-10,50); same data, but small treehole, 2 lpF (307-10,11) [UCLA].

5. *Aedes* (*Finlaya*) *braziliensis* Gordon & Evans

Figs. 3,21,61,63,64

1922. *Aedes* (*Finlaya*) *oswaldi* var. *braziliensis* Gordon and Evans, 1922:329.

Aedes (*Finlaya*) *braziliensis* of Schick (1970a:43-44).

Aedes (*Finlaya*) *apollo* in part of Schick (1970a:46-48).

FEMALE (fig. 63). Vertex with an area of broad decumbent scales adjacent to narrow curved scales of median longitudinal line; occiput with erect scales generally pale; complete acrostichal line absent; fossal macula well developed, not interrupted by dark scales; *pra* hairs dark; vein C with silver scales at base.

MALE (fig. 21). Vertex with decumbent scales as in female; complete acrostichal line present; mesonotal disc transversely silvered anteriorly for at least 0.5 length of fossa; fossal macula reaching mesal margin of fossa; *pra* hairs dark.

MALE GENITALIA (fig. 21). Sidepiece length 0.30-0.34 mm; median sternomesal sclerite of sidepiece weakly developed; prosophallus width 0.11-0.13 mm.

PUPA (fig. 63). Wing pad with broad and dark subbasal band; leg cases with or without dark pigmentation; hair 1-I with primary branches predominantly multiple; paddle slightly tapered apically.

LARVA (fig. 64). Hair 5-C single or double; 6-C single; 11-C much shorter than 7-C; L/S 2.5-2.8.

SYSTEMATICS. *Aedes braziliensis*, as more broadly interpreted here, comprises those populations of the *Terrens* Subgroup in which there is a lateral area of broad scales on the vertex. The mesonotum of the male is broadly silvered anteriorly as in *zavortinki*. The ornately marked cephalothorax of the pupa may separate *braziliensis* from the other members of the subgroup but the reliability of this character cannot be determined without additional material. The larva generally differs from *terrens* and *zavortinki* in the greater L/S. In the Villavicencio area of Colombia *braziliensis* and *terrens* may be further distinguished by the length of hair 5-I; in *braziliensis* it is much shorter than 4-I and in *terrens* it is subequal.

Aedes zavortinki also occurs in the Villavicencio area but the larva is unknown from this region.

Aedes braziliensis was previously known only from Brazil and French Guiana at low elevations (fig. 3). The range is now extended into Colombia at moderately high elevations. This species, however, was not taken by the UCLA team in an intervening area, namely the state of Aragua, Venezuela.

NEW RECORDS (fig. 61). Material examined: 31 specimens; 6 M, 5 F, 6 pupae, 13 larvae; 1 individual larval rearing.

COLOMBIA. *Meta*: Villavicencio [elev. ca 460 m], 1944, M. Bates, 4 l (24-4), 2 l (24-78), 1 M, 3 p, 3 l (C-24), 1 M, 4 F (24); same data, 1 l (42♂8), 2 P (42♀6, 42♀8) (C-42-6); Komp, 1 M, 1 F (H-9-10) [USNM]. Villavicencio, Bosque Ocoa, 11 June 1944, 1 M [USNM].

FRENCH GUIANA. *Guyane*: Cabassou, elev. ca 30 m, 31 Jan 1945, small treehole, height 0.5 m, T. Aitken, R. Martinez and A. Guerra (FG 12,14), 1 lpF (12-14), 1 L (12-1), 1 L (14-1) [UCLA].

6. *Aedes* (*Finlaya*) *zavortinki* Schick

Figs. 3,8,9,61

1970. *Aedes* (*Finlaya*) *zavortinki* Schick, 1970a:45-46.

FEMALE (fig. 8). Vertex with all decumbent scales narrow curved; occiput with all or most erect scales pale; complete acrostichal line absent; fossal macula well developed, not interrupted laterally by dark scales; *pra* hairs dark; vein C with silver scales at base.

MALE (fig. 8). Vertex with decumbent scales as in female; mesonotal disc transversely silvered anteriorly for at least 0.5 length of fossa; fossal macula reaching mesal margin of fossa; *pra* hairs dark.

MALE GENITALIA (fig. 8). Sidepiece length 0.32-0.35 mm (0.27-0.42 mm); prosopallus width 0.14-0.15 mm (0.13-0.15 mm).

PUPA. Cephalothorax without highly contrasting dark markings on wing and leg cases; hair 1-I with primary branches predominantly multiple; paddle rounded apically.

LARVA (fig. 9). Head hair 5-C usually double (1-3); hair 6-C single; 11-C much shorter than 7-C; L/S 2.1-2.4.

SYSTEMATICS. The above description is essentially condensed from Schick (1970a) and the definition of the species remains unchanged.

Aedes zavortinki is very similar morphologically to some forms of *terrens* and generally can be separated from that species only by the mesonotal markings of the male (see *terrens*). The separation of *zavortinki* from *braziliensis* and the *Ter-esopolis* form is discussed under those species.

Aedes zavortinki, previously known only from the Canal Zone and eastern Panama at low elevations, 90 m or less (fig. 3), is now recorded from Colombia at an elevation of about 460 m.

NEW RECORDS (fig. 61). Material examined: 2 M.

COLOMBIA. *Meta*: Villavicencio [elev. ca 460 m], 17 May 1939, 1 M; 2 June 1941, very low treehole, M. Bates, 1 M (277) [USNM].

7. *Aedes* (Finlaya) sp., Teresopolis form

Figs. 61,65,66

Aedes (Finlaya) *terrens* in part of Schick (1970a:41-43).

FEMALE (fig. 65). Vertex with all decumbent scales narrow curved; occiput with erect scales pale; complete acrostichal line present; fossal macula with a narrow sublateral longitudinal band transversely divided into anterior and posterior portions; *pra* hairs pale; vein C without silver scales at base.

MALE (fig. 65). Vertex with all decumbent scales narrow curved; complete acrostichal line present; mesonotal disc not transversely silvered; fossal macula not reaching mesal margin of fossa; pleural hairs missing.

MALE GENITALIA (fig. 65). Sidepiece length 0.35 mm; median sternomesal sclerite of sidepiece broad and well developed; prosophallus width 0.14-0.16 mm.

PUPA (fig. 65). Cephalothorax without highly contrasting markings on wing and leg cases; hair 1-I with primary branches predominantly single or double; paddle broadly rounded apically.

LARVA (fig. 66). Hair 5-C triple or 4-branched; 6-C with 4-6 branches; 11-C subequal in length to 7-C; L/S 1.7-2.1.

SYSTEMATICS. The *Teresopolis form*, apparently most closely related to *terrens*, differs from that species in the following characters: (1) complete acrostichal line present in both sexes, (2) vein C of female without silver scales at base, (3) the median sternomesal sclerite of the sidepiece more strongly developed, (4) hair 1-I of the pupa with fewer secondary branches, (5) hair 6-C of the larva more highly branched, (6) hair 11-C of the larva much longer (longer than in any of the other species of the group), and (7) L/S tending to be lower (1.7-2.1 vs 2.0-2.4).

The male from Teresopolis is unusual in that the cercal setae are absent. These are present on the P 48-1 male (see distribution).

The *Teresopolis form* is not provided with a formal name at this time because of insufficient adult material and lack of collections from adjacent localities.

DISTRIBUTION (fig. 61). Brazil. Material examined: 9 specimens; 3 M, 1 F, 2 pupae, 3 larvae; 2 individual rearings (1 larval, 1 pupal).

BRAZIL. *Rio de Janeiro*: Fazenda Boa Fe, Teresopolis [elev. 500-1000 m], 13 Nov 1942, treehole, L. Gomes, 2 L (28773-3,4); same data, but habitat not specified, 1 lpF (28774-12); 12 Dec 1942, 1 pM (29078-1) [UCLA]. *Locality not specified*: 1 M (P 48-1); 1 M (P 100(1)); lam. P 82/P 81 [genitalia slide missing] [UCLA].

Alboapicus Subgroup

9a. *Aedes* (Finlaya) sp., Chaco form

Figs. 62,63

FEMALE (fig. 63). Vertex with an area of moderately broad, dark decumbent scales adjacent to narrow curved scales of median longitudinal line; erect occipital scales dark; proboscis subequal in length to femur I; acrostichal setae absent; fossal macula reduced to small posterior spot about 0.5 length of fossa; supraalar

macula small, very narrowly joined to fossal macula; *ssp* scales present; *pra* hairs dark; femora I and II with well-developed posterior patch of silver scales; femur I with small knee spot; tarsi 5-I-III silver; femur II with moderately broad knee spot, a few of the silver scales extending basad of subapical setae; tarsus 1-II with median dark band 0.75; femur III with broad basal dark band and very broad subapical dark band (about 0.42); veins C and R with silver lines subequal in length, neither reaching level of crossvein *h*.

MALE, PUPA, LARVA. Unknown.

SYSTEMATICS. The *Chaco form* is provisionally placed in the *Alboapicus* Subgroup because of the silvered 5th tarsal segments and the broad basal band of femur III. A less tenuous placement must await the discovery of the other stages.

The *Chaco form* differs from *alboapicus* in the completely silvered tarsus 1-I, the presence of a knee spot on femur I, the greater reduction of the fossal macula, the presence of well-developed posterior silver patches on femora I and II, the very broad subapical dark band of femur III and the long silver line on vein R. The presence of a knee spot on femur I and a silver line on vein R in the female are unusual characters for the *Terrens Group*. The former character occurs elsewhere only in *amabilis* and the latter only in *argyrothorax*.

DISTRIBUTION (fig. 62). Northern Argentina. Material examined: 1 F.

ARGENTINA. *Chaco*: Saenz Pena (rd to Tres Isletas) [elev. ca 100 m], 6 Apr 1963, in forest, biting in afternoon, M. Castro, 1 F (Ch 61b) [UCLA].

Insolitus Subgroup

Three species may now be recognized in this subgroup, *insolitus*, *berlini* (transferred from the *Terrens Subgroup*) and a new species, *casali*.

The description of the subgroup must be broadened to accommodate the latter 2 species. The additions to the description are indicated in *italics* in the following statements: (1) proboscis of female *usually longer* than femur I, (2) femur II with knee spot usually present, *narrow* to broad, (3) femur III with basal dark band *absent*, *incomplete* or complete, usually broad, and (4) sidepiece with median sternomesal sclerite weakly to *strongly* developed.

Further subgroup characters that are of value in separating this from the *Terrens Subgroup* are given under the latter.

Aedes casali occurs in northern Argentina, the southern limit of the geographic range of the *Terrens Group*, and is broadly disjunct from the other 2 species of the subgroup. The occurrence of such a relict species at the periphery of the range of the group supports the hypothesis that the *Insolitus Subgroup* is of relatively great antiquity (Schick, 1970a:20).

12. *Aedes* (*Finlaya*) *insolitus* (Coquillett)

Figs. 4,29,30,62

1909. *Verrallina insolita* Coquillett, 1906:62.

Aedes (*Finlaya*) *insolitus* of Schick (1970a:57-61).

SYSTEMATICS. *Aedes insolitus* was reported from Central America, Colombia

and Trinidad, primarily at high elevations, in my previous paper (fig. 4). New records show that this species also occurs in northern Venezuela.

NEW RECORDS (fig. 62). Material examined: 82 specimens; 16 M, 21 F, 25 pupae, 20 larvae; 24 individual rearings (14 larval, 9 pupal, 1 incomplete).

COLOMBIA. *Meta*: Villavicencio [elev. 460 m], 19 June 1941, treehole, M. Bates, 1 F (278) [USNM].

VENEZUELA. *Aragua*: Carretera 2, 8.7 km S Choroni, elev. 300 m, 16 July 1969, cut bamboo, T. Zavortink et al, 1 M (VZ 228-2); 15.9 km S Choroni, elev. 650 m, 16 July 1969, cut bamboo, T. Zavortink et al (VZ 230), 1 pF (230-100), 1 M, 4 F (230-1); Cumbre de Choroni, elev. 900 m, 26 July 1969, cut bamboo, J. Pulido and J. Valencia (VZ 269), 1 lpM (269-50), 1 lpM (269-50), 1 lp (269-51), 1 M, 1 F, 21 (269-5); 20 km N Maracay, elev. 800 m, 6 Aug 1969, cut bamboo, J. Valencia (VZ 314,315), 1 lpM (314-70), 1 pM (315-104); 4 km N Maracay, elev. 800 m, 6 Aug 1969, small treehole, height 1 m, J. Valencia (VZ 317), 1 lpM (317-10), 1 M, 1 F, 1 l (317-1) [UCLA]. Guamita (8 km S Rancho Grande), elev. 700-800 m, 15 July 1969, cut bamboo, T. and J. Zavortink (VZ 203), 1 lpM (203-54), 2 lpF (203-56,58), 1 lp (203-61); 11 Aug 1969, small treehole, height 1 m, J. Valencia (VZ 328), 1 lpF (328-12), 1 pM (328-105); 18 Aug 1969, cut bamboo, J. Pulido and J. Clavijo (VZ 371), 1 lpF (371-10), 2 pF (371-101,103); 18 Aug 1969, small treeholes, height 1-2 m, J. Pulido and J. Clavijo (VZ 372,373,375), 2 lpM (373-11,12), 3 lpF (373-13-15), 1 pM (372-100), 3 pF (373-100,101; 375-101), 1 IP (373-16), 1 l (375-1) [UCLA]. Turiamo [elev. near sea level], 11 Sept 1944, 1 M; date unknown, 2 M [UCLA].

12a. *Aedes* (*Finlaya*) *casali* Schick, n.sp.

Figs. 62,67,68

TYPES: *Holotype male* (ARG 618-108) with associated pupal skin, ca 7 km from Tablillas (nearest town General Enrique Mosconi (Vespucio), elev. ca 500 m), 25 Feb 1967, fallen tree, O. Casal and M. Garcia [USNM]. *Allotype female* (618-106) with associated pupal skin, same data as holotype [USNM]. *Paratypes*: 1 pM (618-103), 1 M (618-113), same data as holotype [UCLA]. This species is dedicated to Osvaldo Casal of the Instituto Nacional de Microbiologia, Buenos Aires, Argentina.

FEMALE (fig. 67). Vertex with broad decumbent scales usually forming variously developed dark patch surrounded by silver scales; infrequently all scales silver; anterior promontory silvered; acrostichal line absent; acrostichal setae present, most posterior seta at about 0.5 from anterior end; fossal macula moderately well developed (ARG 773-109) or reduced to small anterior patch (IMR 29); *ssp* scales present; *pra* hairs pale; femur II with knee spot narrow, often longitudinally divided anteriorly by streak of dark scales; tarsus 1-II with complete median dark band, usually about 0.4-0.6 (0.4-0.7); tarsus 2-II with complete dark apical band; femur III usually without basal dark band, incomplete when present.

MALE (fig. 67). Mesonotal disc transversely silvered anteriorly for about 0.5 length or up to prescutellar space; *ssp* scales present; tarsus 1-II with incomplete median dark band or band complete, as broad as 0.6; femur III with basal dark band as in female.

MALE GENITALIA (fig. 67). Sidepiece length 0.32-0.35 mm; median sternomesal sclerite weakly to strongly developed; prosophaallus length 0.09-0.10 mm; filament ratio 0.55-0.80.

PUPA (fig. 67). Cephalothorax without pale inverted V-shaped marking; hair 1-I with primary branches predominantly single-double or double-triple; 2-II lat-

erad of 3-II or mesad for as much as 0.4 the distance from 1-II to 3-II.

LARVA (fig. 68). Hairs 5,6-C single or double; 14-C, *bmh* usually double and branching from base (1-3); hair 11-P longer than 0.5 of 14-P; hair 14-P single; 4-M double; 7-II single to triple; 12-VII single; apical comb scale with free portion 0.035-0.040 mm; 2-VIII single; siphon length 0.67-0.92 mm; L/S 2.1-2.3.

SYSTEMATICS. *Aedes casali* is distinguished from the other species of the subgroup by the absence of a complete band at the base of femur III and by the coloration of the broad scales of the vertex of the female. The pupa is similar to that of the other species. The larva apparently shows no features that separate it from *insolitus* but can be distinguished from *berlini* by fewer branches in many of the hairs and by the smaller L/S.

DISTRIBUTION (fig. 62). Northwest Argentina at elevations of about 500 m. Material examined: 52 specimens; 9 M, 22 F, 11 pupae, 10 larvae; 6 individual pupal rearings.

ARGENTINA. *Salta*: Tablillas, ca 7 km from (nearest town General Enrique Mosconi (Vespucio), elev. ca 500 m), 25 Feb 1967, fallen tree, O. Casal and M. Garcia (ARG 618, type series), 2 pM (618-103,108), 1 pF (618-106), 1 M (618-113), 8 L (618-1) [USNM, UCLA]; 6 June 1969, treehole, O. Casal and M. Garcia, 3 pF (ARG 773-109,113,116) [UCLA]. *Tucuman*: Churqui, 4 Dec 1922 (IMR 29), 1 pF (slide 2217), 8 M, 17 F, 1 M gen (360), 4 p (2216), 2 L (2213) [UCLA].

(8) 12b. *Aedes* (*Finlaya*) *berlini* Schick

Figs. 3,21,22,62,63

1970. *Aedes* (*Finlaya*) *berlini* Schick, 1970a:48-49.

FEMALE (fig. 21). Vertex with decumbent scales usually all dark, some scattered silver scales sometimes present; anterior promontory silvered or dark; acrostichal line absent; acrostichal setae present or absent, most posterior seta at about 0.25 from anterior end or as far caudad as in posterior 0.5; fossal macula relatively well developed; *ssp* scales absent; *pra* hairs dark; femur II with broad knee spot, the silver scales extending well basad of anterior subapical setae; tarsus 1-II with complete median dark band, about 0.4-0.5; tarsus 2-II with complete dark apical band; femur III with complete and broad basal dark band.

MALE (fig. 63). Mesonotal disc transversely silvered anteriorly for about 0.5 length or up to prescutellar space; *ssp* scales absent; tarsus 1-II with incomplete or complete median dark band, as broad as 0.5; femur III with basal dark band as in female.

MALE GENITALIA (fig. 63). Sidepiece length 0.29-0.31 mm; median sternomesal sclerite weakly developed; prosopallus length 0.08 mm; filament ratio 0.90-1.10.

PUPA (fig. 21). Cephalothorax with or without pale inverted V-shaped marking; hair 1-I with primary branches usually predominantly double or triple, often multiple, sometimes single; 2-II mesad of 3-II for 0.2-0.5 the distance from 1-II to 3-II.

LARVA (fig. 22). Hairs 5,6-C single to triple; 14-C, *bmh* single or double, when double not branching from base; 11-P greater or less than 0.5 of 14-P; hair 14-P single or double; 4-M usually triple or 4-branched (2-4); hair 7-II with 4-7 branches; 12-VII single or double; apical comb scale with free portion 0.030-0.035 mm; 2-

VIII single or double; siphon length 0.80-0.92 mm; L/S 2.3-2.6.

SYSTEMATICS. *Aedes berlini*, previously known from only the type locality, the island of Tobago (fig. 3), is now recorded from Trinidad, Venezuela and Colombia. The populations fall into 2 types, Island (Trinidad, Tobago) and Mainland (Venezuela, Colombia). The former populations occur at elevations of up to 120 m and the latter from 700 to 900 m. They differ in the following 3 morphological characters (Island character state cited first): (1) acrostichal setae absent or when present not extending caudad of anterior 0.25 vs acrostichal setae always present, most posterior seta at 0.5 or in caudal 0.5, (2) hair 11-P of the larva less than 0.5 of 14-P vs subequal in length to 0.5, and (3) mesonotum of male transversely silvered up to prescutellar space vs to about 0.5-0.67 of length.

This broad treatment of *berlini* is consistent with that of *insolitus*. The latter species also occurs at a wide range of elevations and shows the same or a similar type of geographic variation in the above 3 characters.

Aedes berlini differs from the other species of the subgroup in the absence of *ssp* scales, the dark *pra* hairs of the female, and the single or nonbasally branched hairs 14-C and *bmh* of the larva. The fossal macula of the female, relatively well developed, is more constant in its degree of development than in the other species.

Emphasis was placed on the taxonomic value of the length of hair 7-VII of the pupa in Schick (1970a:49). Although long in all the new material examined, this character is variable enough to negate its taxonomic value at least as a species criterion in the *Insolitus* Subgroup.

Aedes berlini and *insolitus* are sympatric in Venezuela and Colombia and have been taken in the same treehole in the former country.

NEW RECORDS (fig. 62). Material examined: 114 specimens; 21 M, 19 F, 40 pupae, 34 larvae; 38 individual rearings (23 larval, 11 pupal, 4 incomplete).

COLOMBIA. *Cundinamarca*: Santander (Santandercito), 1 F (207D-6/2), 1 F (207D-8/3) [UCLA]. *Meta*: Forzosa Forest (ca 5 mi from Villavicencio, elev. ca 460 m), 12 June 1944, treehole 6, M. Bates, 1 IM [USNM]. Villavicencio, 1944, M. Bates, 1 lpF (78) [USNM].

TRINIDAD. *Saint George*: Grandwood (ca 2 km Chaguaramas), elev. ca 120 m, 11 June 1961, treehole, T.H.G. Aitken, 2 lpM (11-VI-61-8,13), 3 lpF (11-VI-61-11,12,14), 1 pM (11-VI-61-4), 7 lp (11-VI-61-5,7,9,10,15,16,18), 3 p (11-VI-61) [UCLA].

VENEZUELA. *Aragua*: Guamita (8 km S Rancho Grande), elev. 700-800 m, 15 July 1969, small treehole at ground level, T. and J. Zavortink (VZ 198), 1 lpM (198-10), 4 L (198-2) [UCLA]; small treehole, height 1 m (VZ 200,201), 3 lpM (200-10,13; 201-11), 2 lpF (200-11,12), 1 pM (200-100), 1 M, 1 l (200-1) [USNM, UCLA]; cut bamboo, height ca 1-2 m (VZ 203), 1 lpM (203-50), 4 lpF (203-51,52,60,64), 3 pM (203-100,103,110), 1 lp (203-53), 1 M, 2 L (203-6); 11 Aug 1969, small treehole, height 1 m, J. Valencia (VZ 328), 1 lpF (328-10), 1 pM (328-103), 1 pF (328-101); cut bamboo, height ca 1 m, J. Valencia and J. Clavijo (VZ 331), 1 lpF (331-11), 1 M (331-1); 18 Aug 1969, cut bamboo, height ca 1 m, J. Pulido and J. Clavijo, 1 pM (VZ 371-100); small treehole, height 1 m, 2 lpM (VZ 372-10,40); small treehole, height ca 2 m (VZ 374), 1 pF (374-100), 1 F (374-1) [UCLA]. Maracay, 4 km N on rd to Choroni, elev. 800 m, 6 Aug 1969, small treehole, height ca 1 m, J. Valencia, 1 pM (VZ 317-100) [UCLA]. Maracay, 20 km N on rd to Choroni, elev. 800 m, 6 Aug 1969, cut bamboo, height near soil level, J. Valencia, 1 lpF (VZ 314-71) [UCLA].

Podographicus Subgroup

25. *Aedes* (*Finlaya*) *podographicus* Dyar & Knab

Figs. 6,52-57

1906. *Aedes podographicus* Dyar and Knab, 1906:165.

Aedes (Finlaya) podographicus of Schick (1970a:82-86).

SYSTEMATICS. The *podographicus* of Schick (1970a) comprised coastal populations in Central America and Mexico which occurred at elevations of less than 300 m. A widely disjunct but apparently conspecific population, cited simply as belonging to the *podographicus* complex, was known from the Maracay area of Venezuela at higher elevations but was not treated as *podographicus* proper since the immature stages were not known. These are now available and show no striking differences from those of typical populations of Central America and Mexico.

Although *podographicus* abounds in the coastal areas to the north, it is apparently absent along the coast of South America. In recent UCLA collections in the state of Aragua, Venezuela, *podographicus* was taken only in the Maracay area, although another member of the Terrens Group (*terrens*) was commonly encountered on the coast.

NEW RECORDS. Material examined: 292 specimens; 81 M, 142 F, 37 pupae, 32 larvae; 33 individual rearings (24 larval, 9 pupal).

VENEZUELA. *Aragua*: Guayabita, elev. 560 m, 14 July 1927, 1 M (35.III.20a) [USNM]; 30 Aug 1966, automobile tire, E. Russian Vasquez, 1 F (VZ 29) [UCLA]. Hacienda Santa Clara (nearest town San Joaquin), elev. 400 m, 19 July 1969, large treehole near soil level, J. Pulido and J. Valencia (VZ 249), 1 lpM (249-21), 1 lpF (249-20) [UCLA]. Macaro (nearest town Turmero), elev. 500 m, 12 Aug 1969, small treehole, height 2 m, J. Valencia and J. Pulido, 1 lpM (VZ 335). Maracay [elev. 600 m], 10 Jan 1926 (1-10-26), M. Nunez Tovar, 7 F; 24 Aug 1926, M. Nunez Tovar, 1 F; 8 Sept 1926, M. Nunez Tovar, 6 F; 11 Sept 1926 (9-11-26), M. Nunez Tovar, 1 F; 13 Sept 1926, M. Nunez Tovar, 4 F; 18 Sept 1926, M. Nunez Tovar, 1 F; 1926, M. Nunez Tovar, 5 M, 1 F; 3 Aug 1927, M. Nunez Tovar, 1 M, 1 F [USNM]; 30 M, 12 F (VZR 252); 23 M, 86 F (VZR 257) [UCLA]. Maracay, Hacienda Militar de San Jacinto, elev. 550-600 m, 17 July 1969, small treehole, height 1 m, J. Pulido and J. Valencia (VZ 233, 234, 239, 240), 4 lpM (233-12; 234-10; 239-20, 21), 3 lpF (233-11; 234-12, 13), 3 pM (233-101; 234-100, 101), 1 pF (233-100), 1 lp (234-16), 1 l (233-1), 6 M, 3 F, 3 p, 3 l (234-1), 2 F (240-3) [UCLA]. Maracay, Universidad Facultad de Agronomia, elev. 600 m, 15 July 1969, small treehole, height 1 m, J. Pulido and J. Valencia (VZ 205, 206), 3 lpM (205-31; 206-10, 11), 7 lpF (205-10, 12-16, 30), 2 pM (205-100, 101), 3 pF (205-102, 103; 206-100), 1 lp (205-17), 1 L, 2 l (205-1), 1 F, 1 p (206-1) [UCLA]. *Carabobo*: Mariara, 2 km E, elev. 400 m, 19 July 1969, small treehole, height 1 m, J. Pulido and J. Valencia, 1 lpM (VZ 245-11) [UCLA]. Punta Palmita (nearest town Mariara), elev. 400 m, 19 July 1969, small treehole, height 1 m, J. Pulido and J. Valencia (VZ 244), 1 lpM (244-12), 1 lp (244-11), 1 l (244-1) [UCLA].

KEYS TO SPECIES

FEMALES

(15. impostor unknown)

1. Femur III with complete basal dark band *and* supraalar macula broadly reaching scutal suture (figs. 63, *braziliensis*; 65, 67) 2
- Without the above combination of characters; femur III sometimes with complete basal dark band and supraalar macula sometimes broadly reaching scutal suture but both conditions not developed simultaneously 13

- 2(1). Midtarsi and hindtarsi unmarked except for inconspicuous silver band at base of tarsi 1-II,III **10. buenaventura**
 Midtarsi and hindtarsi with prominent silver bands at base and apex of tarsi 1-II,III and at base of tarsi 2-II,III 3
- 3(2). Tarsi 5-II,III silvered **9. alboapicus**, in part
 Tarsus 5-II usually dark, rarely silvered; 5-III always dark 4
- 4(3). Vertex with decumbent scales along longitudinal midline all broad . . . 5
 Vertex with decumbent scales along longitudinal midline all narrow curved 6
- 5(4). Mesonotal disc transversely silvered anteriorly (fig. 9); vein R without silver scales **1. thorntoni**
 Mesonotal disc not transversely silvered (fig. 13); vein R with small basal patch of silver scales **2. argyrothorax**
- 6(4). *Ssp* scales absent 7
Ssp scales present 8
- 7(6). Vertex with all decumbent scales narrow curved, most or all along longitudinal midline dark **11. metoecopus**
 Vertex with an area of broad decumbent scales adjacent to narrow curved scales of median longitudinal line, latter scales silver . . (8) **12b. berlini**
- 8(6). Vertex with all decumbent scales narrow curved 9
 Vertex with an area of broad decumbent scales adjacent to narrow curved scales of median longitudinal line 10
- 9(8). *Pra* hairs dark; fossal macula not strongly reduced, mesal margin sharply defined, evenly and gently curved or essentially straight (fig. 63) **5. braziliensis**
Pra hairs pale; fossal macula usually markedly reduced and mesal margin indistinct and irregular, infrequently well developed as above or completely absent (fig. 29) **12. insolitus**
- 10(8). Basal dark band of femur III narrow, at most about 0.05 (Mexico) **14. homoeopus**, in part
 Basal dark band of femur III broad, more than 0.10 (Panama, South America) 11
- 11(10). Complete acrostichal line present **7. Teresopolis form**
 Complete acrostichal line absent 12
- 12(11). Fossa without dark scales at lateral margin (fig. 17) (Panama, Colombia) **6. zavortinki**
 Fossa usually with at least a few dark scales at lateral margin, these often forming well developed patch or longitudinal band (fig. 15) (Colombia southward into Argentina) **4. terrens**

- 13(1). Mesonotal disc transversely silvered anteriorly 14
 Mesonotal disc not transversely silvered 15
- 14(13). Transverse silvered area of mesonotum extending caudad to about 0.5
 (fig. 11); *ppn* silver scaled. **3. bertrami**
 Transverse silvered area of mesonotum much narrower, extending caudad
 to less than 0.25 (fig. 39); *ppn* dark scaled **13. aitkeni**
- 15(13). Tarsus 5-III silvered 16
 Tarsus 5-III dark 18
- 16(15). Tarsus 1-I with broad apical silver band, about 0.4; midlegs and hindlegs
 shaggy **28. diazi**
 Tarsus 1-I with at most very narrow apical silver band, much less than
 0.4; midlegs and hindlegs not shaggy 17
- 17(16). Fossal macula developed up to anterior margin of fossa (fig. 23); femur I
 without knee spot; tarsus 5-I at most only partly silvered
 **9. alboapicus**, in part
 Fossal macula a small posterior spot (fig. 63); femur I with small knee
 spot; tarsus 5-I entirely silvered **9a. Chaco form**
- 18(15). Supraalar macula broadly reaching scutal suture (fig. 67) and mesal margin
 of fossal macula poorly defined (Argentina). **12a. casali**
 Supraalar macula rarely broadly reaching scutal suture; mesal margin of
 fossal macula usually sharply defined (Mexico, Central America) 19
- 19(18). Acrostichal setae absent; tarsus 1-II with median dark band usually in-
 complete or complete and narrow, at most about 0.33 20
 Acrostichal setae present; tarsus 1-II with median dark band usually com-
 plete and broad, about 0.33 or greater 22
- 20(19). Proboscis shorter than or subequal in length to femur I; femur II with
 knee spot moderately broad, the silver scales at most just reaching an-
 terior subapical setae **25. podographicus**
 Proboscis longer than femur I; femur II with knee spot broad, the silver
 scales extending basad of anterior subapical setae 21
- 21(20). Vertex with all decumbent scales silver **26. tehuantepec**
 Vertex with silver and dark decumbent scales, latter forming submedian
 patch **27. schroederi**
- 22(19). Femur II with or without knee spot, when present, narrow, a single row
 of apical scales; *ssp* scales absent 23
 Femur II with broad knee spot, the scales extending basad of anterior sub-
 apical setae; *ssp* scales present or absent 24
- 23(22). Fossal macula reduced only mesally (figs. 48,50); supraalar macula reach-
 ing scutal suture; femora I,II with well developed posterior patch of sil-
 ver scales **24. daryi**

- Fossal macula reduced anteriorly and mesally (fig. 44); supraalar macula not reaching scutal suture; femora I,II without posterior patch of silver scales 22. *galindoi*; 23. *campana*
- 24(22). *Ssp* scale patch absent although 1 or 2 scales sometimes present
 20. *vargasi*
Ssp scale patch present 25
- 25(24). Proboscis shorter than or subequal in length to femur I; midlobe of scutellum with silver scales 26
 Proboscis usually longer than, sometimes subequal in length to femur I, when subequal midlobe of scutellum without silver scales 27
- 26(25). Acrostichal line absent or represented by scattered silver scales (fig. 39); midlobe of scutellum usually with a mixture of silver and dark scales, the dark scales usually predominating, infrequently all scales silver 19. *sumidero*
 Acrostichal line present, complete (fig. 35); midlobe of scutellum with all scales silver 17. *gabriel*
- 27(25). Femur I with narrow knee spot; complete and strong acrostichal and posterior dorsocentral lines present (fig. 37) 16. *amabilis*
 Femur I without knee spot; complete and strong acrostichal and posterior dorsocentral lines usually absent, sometimes complete but weak 28
- 28(27). Vertex with an area of broad decumbent scales adjacent to narrow curved scales of median longitudinal line 18. *idanus*
 Vertex with all decumbent scales narrow curved 29
- 29(28). Midlobe of scutellum without silver scales; proboscis subequal in length to or longer than femur I 12. *heteropus*
 Midlobe of scutellum usually with silver scales; proboscis longer than femur I 14. *homoeopus*, in part

MALES

(3. *bertrami*, 9a. Chaco form, 13. *aitkeni*, 16. *amabilis*,
 27. *schroederi* and 28. *diasi* unknown)

1. Vein C with basal line of silver scales reaching crossvein *h*; mesonotal disc usually transversely silvered 2
 Vein C with small basal patch of silver scales or line reaching at most to about 0.5 to crossvein *h*; mesonotal disc not transversely silvered 14
- 2(1). Vein R with basal line of silver scales much longer than that of vein C 3
 Vein R with basal line of silver scales much shorter than that of vein C 4
- 3(2). Median sternomesal area of sidepiece with well developed tuft and usually with well developed convexity and sclerite (fig. 31) 14. *homoeopus*
 Median sternomesal area with these structures not strongly differentiated (fig. 33) 15. *impostor*

- 4(2). *Ssp* scale patch absent 5
Ssp scale patch present 6
- 5(4). Midtarsi and hindtarsi unmarked except for inconspicuous silver band at base of tarsi 1-II,III **10. buenaventura**
Midtarsi and hindtarsi with prominent silver bands at base and apex of tarsi 1-II,III and at base of tarsi 2-II,III; tarsi 5-II,III and sometimes 5-I silvered **9. alboapicus**
- 6(4). Vertex with decumbent scales along longitudinal midline all broad . . . 7
Vertex with decumbent scales along longitudinal midline all narrow curved 8
- 7(6). Transverse silvered area of mesonotal disc not emarginate posteriorly (fig. 9); palpus 1 or 2 labellum lengths shorter than proboscis. Claspette filament not expanded distally (figs. 9,11) **1. thornтони**
Transverse silvered area of mesonotal disc emarginate posteriorly (fig. 13); palpus 4-7 labellum lengths shorter than proboscis. Claspette filament expanded distally (fig. 13) **2. argyrothorax**
- 8(6). Vertex with an area of broad, silver decumbent scales adjacent to narrow curved scales of median longitudinal line; mesonotal disc usually transversely silvered anteriorly, the silvered area usually reaching caudad of fossa (fig. 29) and not emarginate caudally 9
Vertex with or without this lateral area of broad decumbent scales, these dark when present; mesonotal disc transversely silvered or not, the silvered area not reaching caudad of fossa and emarginate caudally (fig. 17) 11
- 9(8). Femur III without basal dark band or with incomplete band . . . 12a. **casali**
Femur III with complete basal dark band 10
- 10(9). *Ssp* scales present **12. insolitus**
Ssp scales absent **(8) 12b. berlini**
- 11(8). Mesonotal disc not transversely silvered 12
Mesonotal disc transversely silvered anteriorly 13
- 12(11). Complete acrostichal line present (fig. 65) **7. Teresopolis form**
Complete acrostichal line absent (fig. 15, Rio de Janeiro) **4. terrens**
- 13(11). Vertex with an area of broad decumbent scales adjacent to narrow curved scales of median longitudinal line **5. brazilensis**
Vertex with all decumbent scales narrow curved **6. zavortinki**
- 14(1). Acrostichal setae absent 15
Acrostichal setae present 17
- 15(14). Occiput with erect scales dark **11. meteocopus**
Occiput with erect scales pale 16

- 16(15). Palpal segment 3 without prominent tuft of setae, the setae at ventrolateral apex shorter than segments 4 and 5 combined. Prosopallus with lateral portion of mesal lobe usually moderately inclined, between 15° and 30° from horizontal; stems usually bowed and convergent (figs. 52,54,56). **25. podographicus**
 Palpal segment 3 with prominent tuft of setae as long as segments 4 and 5 combined. Prosopallus with lateral portion of mesal lobe slightly inclined, about 15° or less from horizontal; stems not bowed, divergent or essentially parallel (fig. 58) **26. tehuantepec**
- 17(14). Femur II without or with narrow knee spot, the silver scales a single row at apex of segment; *ssp* scale patch absent 18
 Femur II with broad knee spot, the silver scales extending basad of anterior subapical setae; *ssp* scale patch present 20
- 18(17). Femora I,II with well developed posterior patch of silver scales. Sidepiece with median sternomesal tuft poorly differentiated and the setae not wavy (figs. 48,50) **24. daryi**
 Femora I,II without posterior patch of silver scales. Sidepiece with median sternomesal tuft well differentiated and the setae wavy (figs. 44,46) 19
- 19(18). Prosopallus with median lobe projecting farther cephalad than lateral lobe (fig. 44) **22. galindoi**
 Prosopallus with median lobe projecting to about same level as lateral lobe (fig. 46) **23. campana**
- 20(17). Median sternomesal area of sidepiece with sclerite and tuft well developed; hook of filament strongly angulate (figs. 35,37) 21
 Median sternomesal area of sidepiece with sclerite and tuft absent or poorly developed; hook of filament not strongly angulate (figs. 39,40,42) 22
- 21(20). Palpus subequal in length to or slightly longer than proboscis. Basal tergomesal area of sidepiece without dense patch of long setae (fig. 35) **17. gabriel**
 Palpus about 2 labellum lengths shorter than proboscis. Basal tergomesal area of sidepiece with dense patch of long setae (fig. 37) **18. idanus**
- 22(20). *Ssp* scale patch absent; complete acrostichal or posterior dorsocentral lines absent (fig. 40); tarsus I-II with median dark band incomplete **20. vargasi**
Ssp scale patch present; complete acrostichal or posterior dorsocentral lines present; tarsus I-II with median dark band complete, about 0.33-0.4 23
- 23(22). Acrostichal line absent; posterior dorsocentral line complete (fig. 39); segment 3 of palpus with apical ventrolateral tuft not as long as segments 4 and 5 combined **19. sumidero**
 Acrostichal line present, complete, sometimes weakly developed; posterior

dorsocentral line incomplete (fig. 42); segment 3 of palpus with apical ventrolateral tuft as long as segments 4 and 5 combined . 21. **heteropus**

LARVAE

(3. **bertrami**, 9a. Chaco form, 16. **amabilis**
and 19. **sumidero** unknown)

1. Hair 11-C subequal in length to 7-C 7. **Teresopolis** form
Hair 11-C much shorter than 7-C 2
- 2(1). Hair 5-C usually with 4 or more branches (when fewer branches, only on 1 side) *and/or* 14-P branched 3
Hair 5-C usually single or double, sometimes triple (when more branches, only on 1 side) *and* 14-P usually single (when rarely branched, only on 1 side) 9
- 3(2). Hair 5-VII cephalad of 4-VII 10. **buenaventura**
Hair 5-VII caudad of 4-VII 4
- 4(3). Hairs 4-VII and 3-VI branched 9. **alboapicus**
Hair 4-VII single and 3-VI usually single (when rarely branched, only on 1 side) 5
- 5(4). Hair 2-II well mesad of 4-II (fig. 42); hair 14-P single 6
Hair 2-II mesad of 4-II for about only 1 alveolus width, often laterad of 4-II (fig. 44); hair 14-P branched 7
- 6(5). Hair 11-P less than half length of 14-P; hair 1-VIII shorter than 2-VIII; hair 6-C single or double; *bmh* single 18. **idanus**
Hair 11-P about half length of 14-P; hair 1-VIII usually at least subequal in length to 2-VIII; hair 6-C usually with more than 2 branches; *bmh* usually branched but often single 21. **heteropus**
- 7(5). Hair 14-C usually with 3 or more branches; 1-A usually branched but often single; free portion of apical scales ligulate, awl shaped or spatulate 24. **daryi**
Hair 14-C usually with fewer than 3 branches; 1-A usually single (when branched, only on 1 side); free portion of apical scales spatulate 8
- 8(7). Comb scales 35-47, in 4 rows; free portion of midapical scale longer than sessile portion 22. **galindoi**
Comb scales 23-32, in 3 rows; free portion of midapical scale shorter than or subequal in length to sessile portion. 23. **campana**
- 9(2). Hair 7-C short, less than half length of 6-C; hair 11-C short, less than length of mentum 10
Hair 7-C more than half length of 6-C; hair 11-C longer than mentum . . . 11
- 10(9). Hair 8-S single; 2-A about 2.0 distal portion of 6-A; anal saddle extending less than halfway around segment (fig. 14) 2. **argyrothorax**

- Hair 8-S multiple; 2-A about 3.0 or more length of distal portion of 6-A; anal saddle extending more than halfway around segment (figs. 10,12) **1. thorntoni**
- 11(9). Hairs 14-C and *bmh* usually basally branched, rarely single; 11-P usually at least 0.5 of 14-P **12. insolitus; 12a. casali**
Hairs 14-C and *bmh* usually single, when double usually branching about 0.25 or more from base; 11-P usually less than 0.5 of 14-P 12
- 12(11). Hair 4-VII at least double; 4-M and 3-III usually at least triple; hairs 10, 12-VII often branched 13
Hair 4-VII usually single, rarely double; 4-M and 3-III with less than 3 branches; 10,12-VII single 15
- 13(12). Ventral brush usually with 12 hairs (11-13); hair 4a-X usually 6-8 branched (5-9) (northern South America, Trinidad, Tobago) **(8) 12b. berlini**
Ventral brush usually with 14-16 hairs (13-17); hair 4a-X usually 10-12 branched (9-15) where sympatric with *berlini* 14
- 14(13). L/S 2.5-2.8 **5. braziliensis**
L/S 2.0-2.4 **4. terrens; 6. zavortinki**
- 15(12). Saddle extending around segment to at most moderate distance beyond horizontal midline, submarginal slit absent, ventral margin either with broad rounded incision or irregular in outline (fig. 52)
. **11. metoecopus; 14. homoeopus**
. **16. impostor; 17. gabriel; 20. vargasi; 26. podographicus**
Saddle extending around segment far beyond horizontal midline, with ventral submarginal or marginal slit (figs. 59,60) 16
- 16(15). Comb scales 33-54, in 4 rows, narrow (fig. 59) **27. tehuantepec**
Comb scales 20-29, in 2-3 rows, stout (fig. 60) **28. schroederi**

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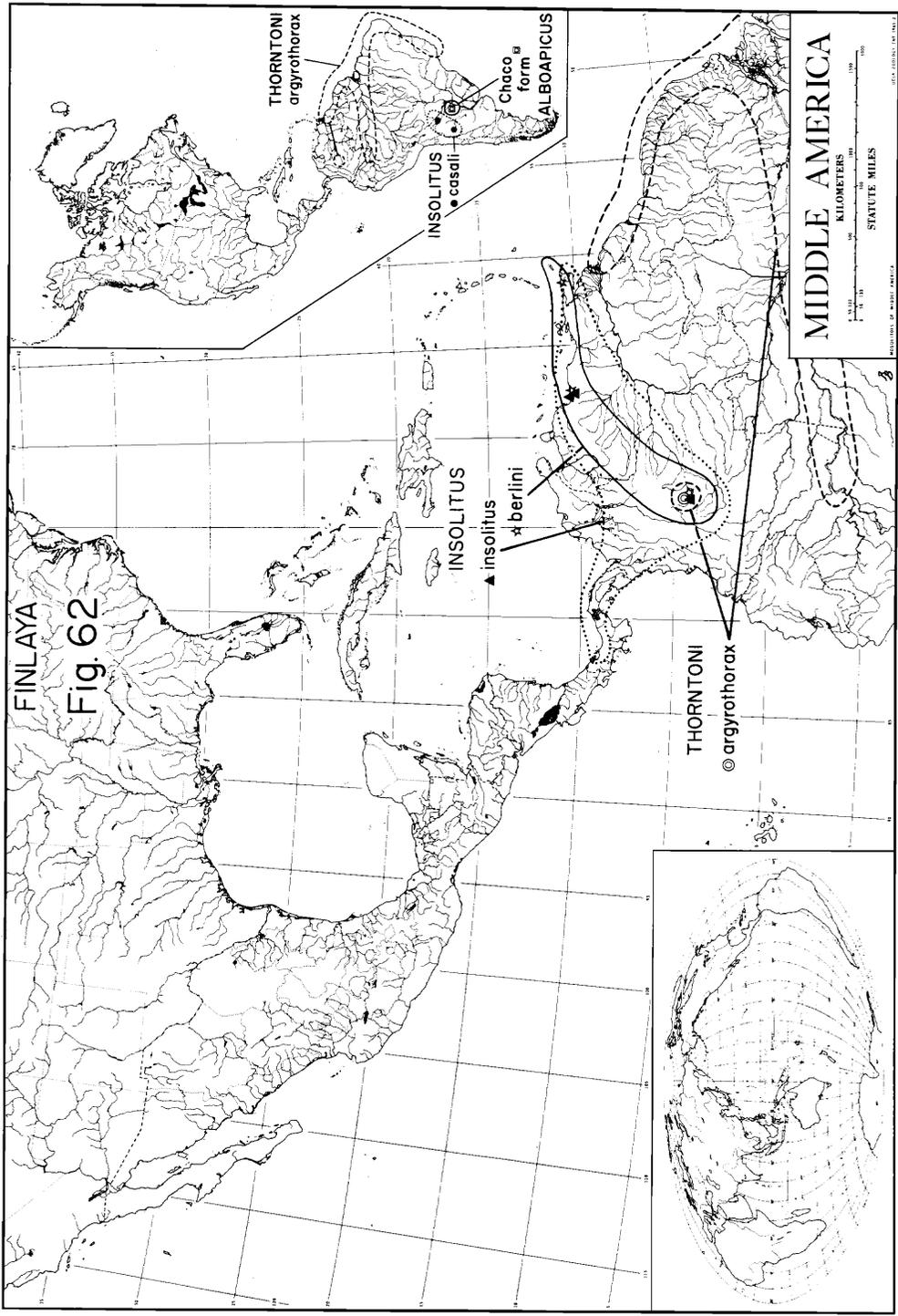
FIGURES

61. Distribution of the species of the Terrens Subgroup
62. Distribution of the species of the Thorntoni, Alboapicus and Insolitus Subgroups
63. *Aedes (F.) braziliensis*; female mesonotum, femur III and pupa. *Aedes (F.) sp., Chaco form*; female mesonotum and femur III. *Aedes (F.) berlini*; male mesonotum and genitalia
64. *Aedes (F.) braziliensis*; larva
65. *Aedes (F.) sp., Teresopolis form*; female and male mesonotum, femur III of female, male genitalia and pupa
66. *Aedes (F.) sp., Teresopolis form*; larva
67. *Aedes (F.) casali*; female and male mesonotum, femur III of female, male genitalia and pupa
68. *Aedes (F.) casali*; larva

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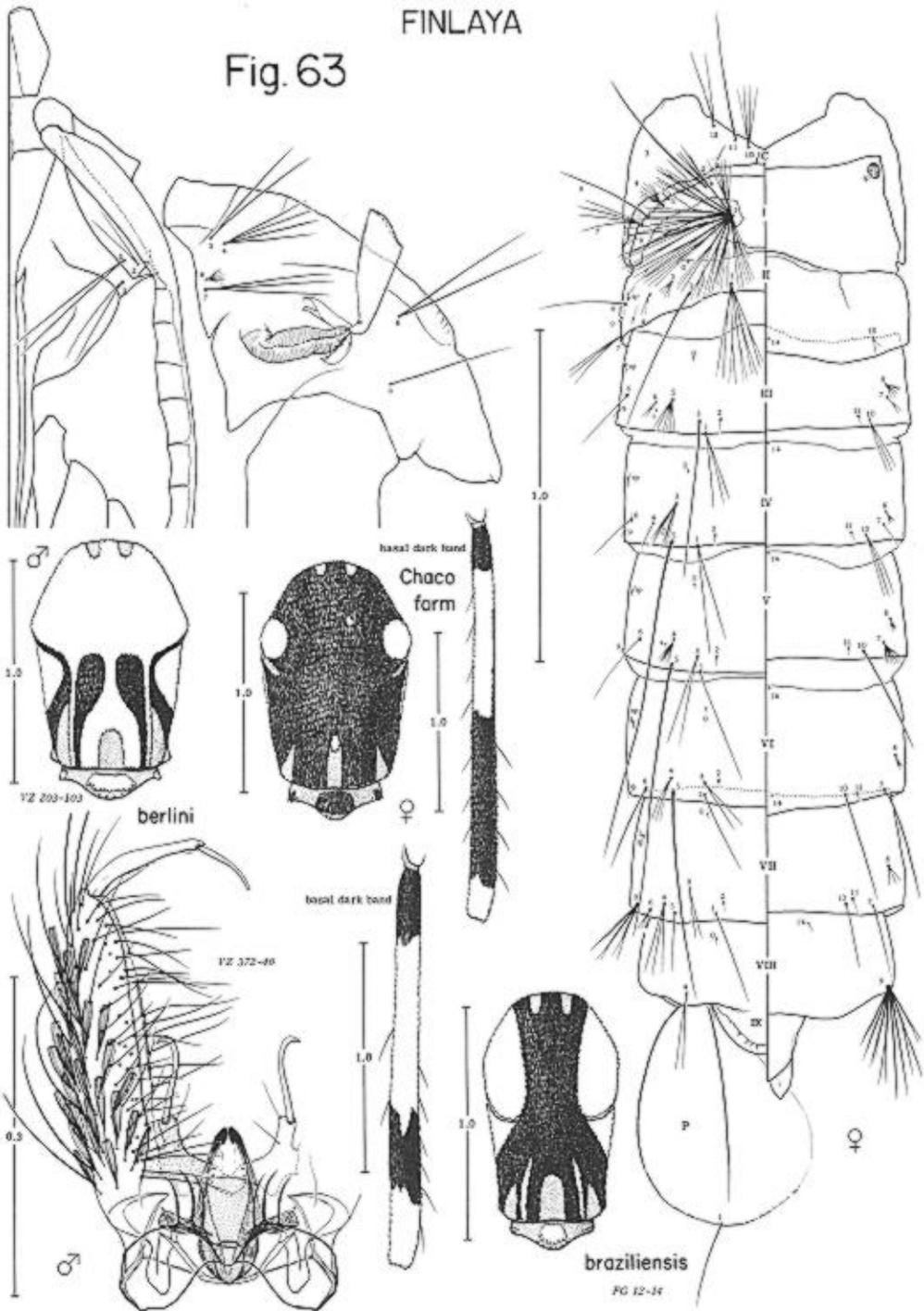
Names mentioned in the keys only are not included.

- | | |
|--|---|
| alboapicus, 20 | insolitus, 20, 20-21, 22, 23; 62f |
| Alboapicus Subgroup, 19, 20; 62f | Insolitus Subgroup, 13, 14, 15, 16, 20, 23; 62f |
| amabilis, 20; 62f | podographicus, 23-24 |
| apollo, 14, 15, 16, 17 | Podographicus Subgroup, 23 |
| argyrothorax, 14, 20 | Teresopolis form, 14, 18, 19; 61f, 65f, 66f |
| berlini, 13, 14, 16, 20, 22, 22-23; 62f, 63f | terrens, 14, 15-17, 17, 18, 19, 24; 61f |
| braziliensis, 13, 14, 15, 16, 17-18, 18; 61f, 63f, 64f | Terrens Subgroup, 13, 14-15, 15, 17, 20; 61f |
| casali, 15, 20, 21-22; 62f, 67f, 68f | Thorntoni Subgroup, 14; 62f |
| Chaco form, 19-20; 62f, 63f | zavortinki, 14, 15, 17, 18, 18; 61f |



FINLAYA
 Fig. 62

Fig. 63



FINLAYA

Fig. 64

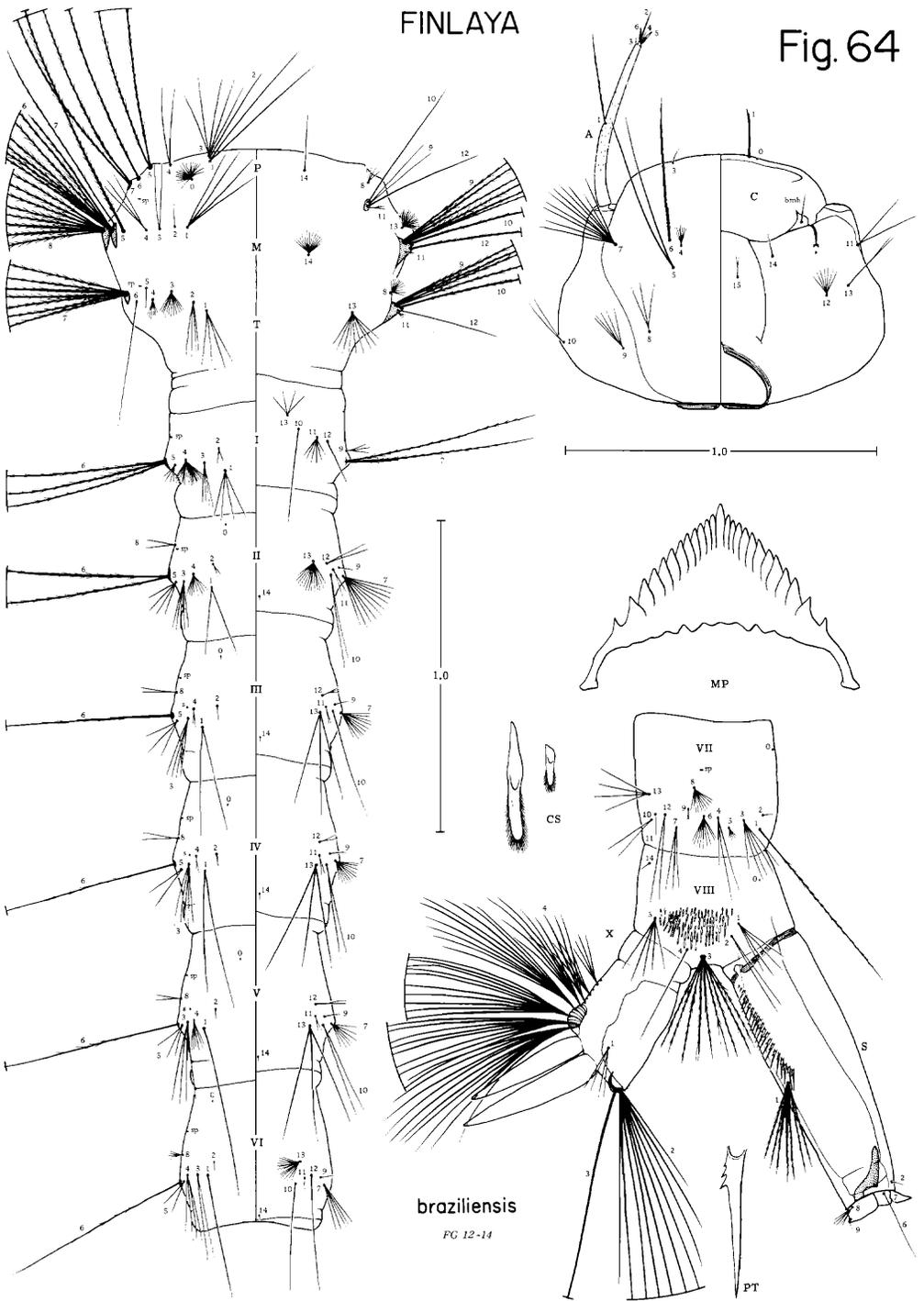
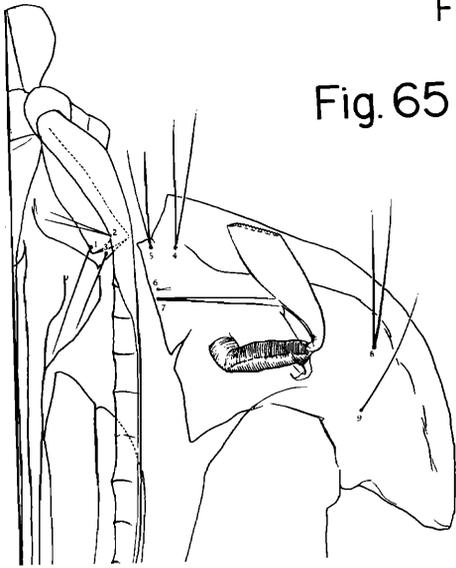
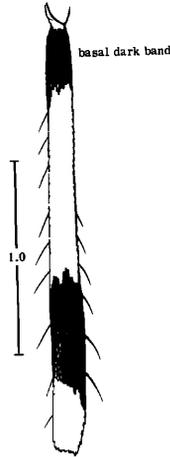


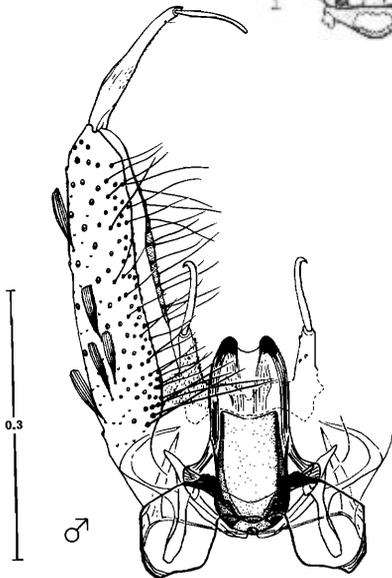
Fig. 65



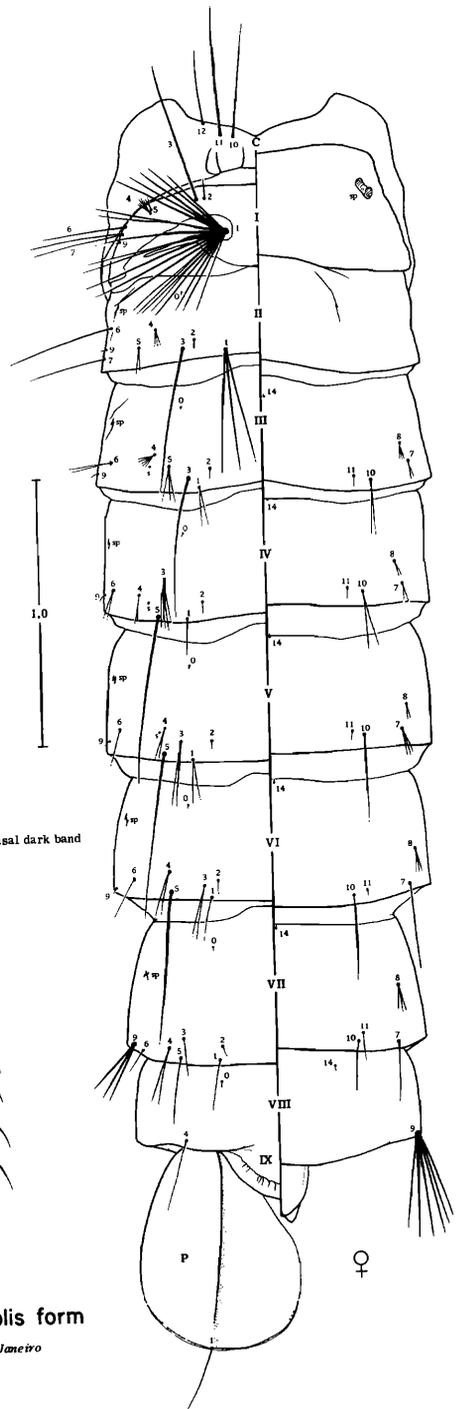
♀



basal dark band



♂

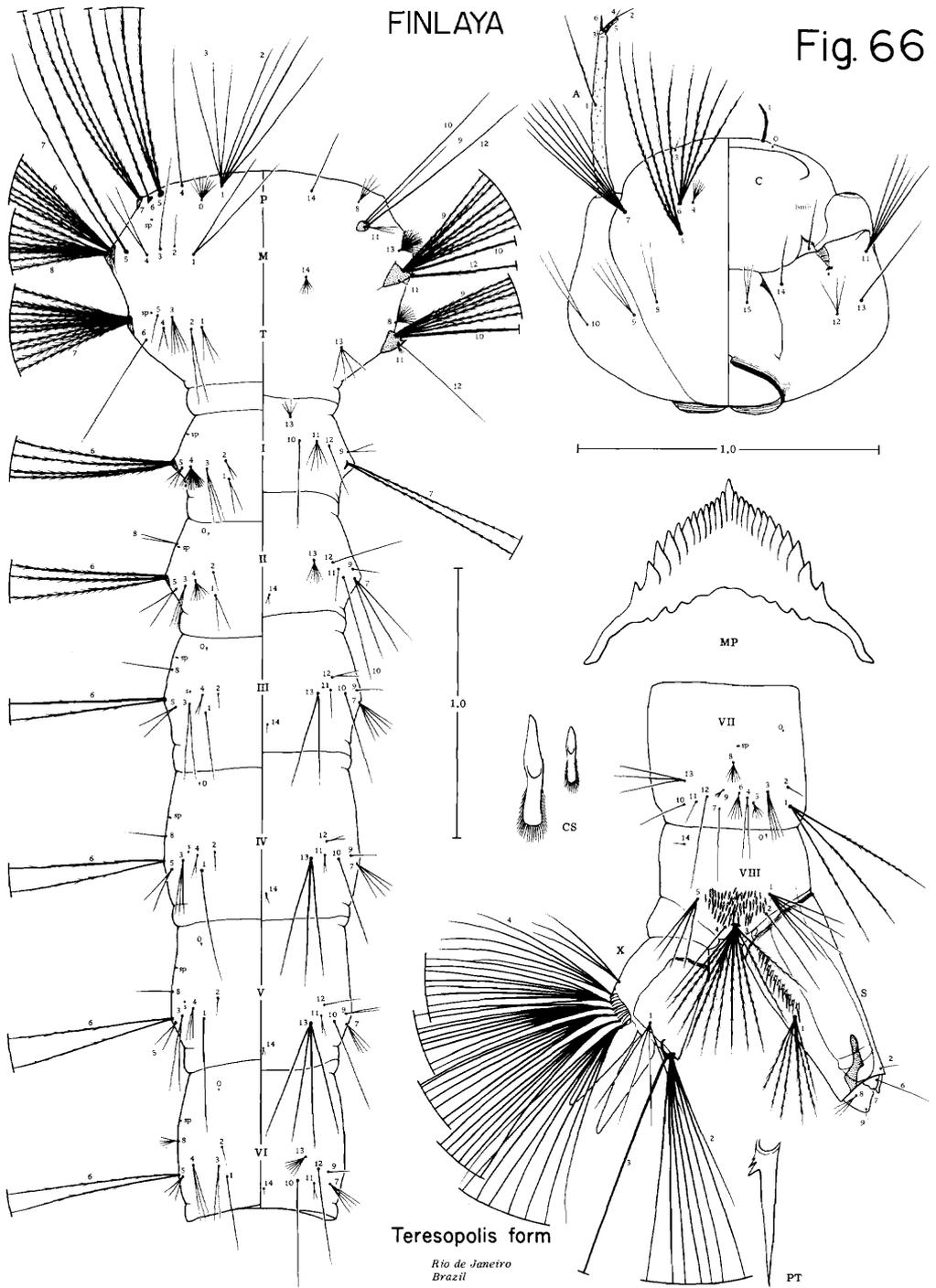


Teresopolis form

Rio de Janeiro
Brazil

FINLAYA

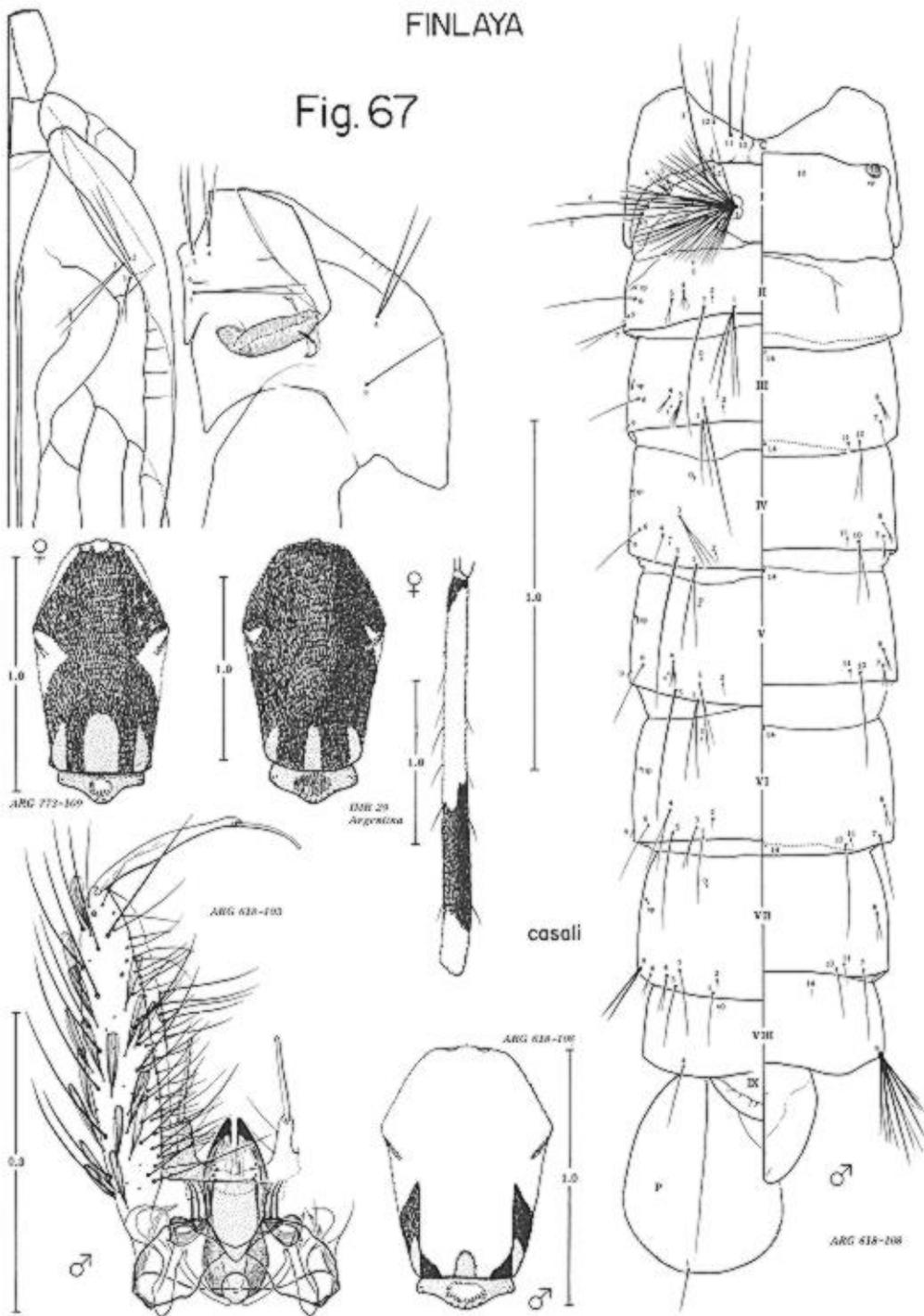
Fig. 66



Teresopolis form

Rio de Janeiro
Brazil

Fig. 67



FINLAYA

Fig. 68

