



## Redescription of the holotype of *Finlaya lepchana* Barraud, 1923 (Diptera: Culicidae: Aedini)

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Barraud (1923a) provided the original description of *Finlaya lepchana* and based it on the holotype male and two other males from India, Tindharia, Darjeeling Hills, which were reared from larvae collected from bamboo stumps in October 1922. The description is brief and lacks many morphological details. Therefore, the holotype male, deposited in the Natural History Museum (NHM), London, United Kingdom, is redescribed below. The specimen is mounted on a minuten pin extending more or less vertically through the thorax between the mesal margins of the upper proepisterna and exiting the scutum anterior to the prescutellar area. The lower part of the minuten pin is inserted in a rectangular, yellow, plastic stage which is attached near its margin to an insect pin. Four labels are attached to the insect pin and include the following information: *Finlaya lepchana* Barr., ♂ TYPE (handwritten in black ink except TYPE is typed on a red, paper, triangular label); terminalia ON SLIDE (hand printed in black ink on a white, paper, rectangular label); India: Tindaria, Darjiling Hills, IX.1922, bamboos, Capt. P.J. Barraud, B.M. 1923-207 (partially handwritten and remainder typed in black ink on a white, paper, rectangular label); HOLO- TYPE (printed in black ink on a small, circular, white, paper label with red border). The male genitalia, previously mounted on a microscope slide, have two labels as follow: AÆDES (FINLAYA) LEPCHANA Barr., INDIA, TINDHARIA, DARJEELING Dist., x.1922, from Bamboos, Coll. P. J. BARRAUD, B.M. 1923-207 (hand printed in black ink on a rectangular, brown paper label attached to the left side of the slide); HOLO- TYPE (label printed on a small, circular, white paper label with red border attached to the left side of the slide). The genitalia are mounted beneath a square cover slip and five psocids are embedded in the mounting medium on the margin of the cover slip. The spelling of “Tindaria” and “Darjiling” on the adult label differs from that reported by Barraud (1923a).

Barraud (1923b) provided dorsal and lateral photographs of the male and illustrations of the claspette and gonostylus of the male genitalia for *Finlaya lepchana*. Barraud (1934) listed *Finlaya lepchana* as a synonym of *Aedes (Finlaya) albotaeniatus* (Leicester). Knight (1948) removed it from synonymy, reinstated it to specific status, but noted that it is “possibly a synonym of *albolineatus*”. Knight & Marks (1952) and Knight & Stone (1977) listed both *albolineatus* and *lepchana* as valid species. When I compared males of *lepchana* and *albolineatus* the two were easily separated by the pale-scaled area of the proboscis in the former and dark-scaled proboscis in the latter. Both of these species were easily distinguished by narrow, curved, white scales on the midlobe of the scutellum from *harperi* which possessed broad, silvery, scales on this structure.

Nomenclature used in the description follows Harbach & Knight (1980, 1982) and Reinert (1999).

### Description of holotype male

**Head:** Vertex with broad decumbent scales, white on median and posterior areas, small patch of brown scales on anterolateral area, median anterior area with small patch of narrow, curved, white scales; occiput with several pale brown, erect, forked scales; postgena with broad, white scales; ocular line narrow, with broad, white scales and similar scales extending onto small, interocular space; several long, dark brown, ocular setae; 2 long, dark brown, interocular setae; antenna dark brown, whorls with numerous, long setae directed dorsally and ventrally, terminal 2 flagellomeres elongate, pedicel dark brown, with several small, broad, non-overlapping, white scales on mesal surface; maxillary palpus dark brown-scaled, palpomere 1 short, palpomeres 2 and 3 long, narrow, palpomere 3 with few long, brown setae ventrally on distal part, palpomeres 4 and 5 short, with numerous moderately long and long setae directed forward, primarily on ven-

trolateral areas, 0.92 length of proboscis; proboscis 1.18 length of forefemur, dark brown-scaled, with moderately broad, white-scaled band near midlength, band somewhat poorly developed on ventral 0.40, pale scales extend proximally to near base on dorsal surface. **Thorax:** Integument dark brown; scutum (partially rubbed) covered with narrow, curved scales except for bare median, prescutellar area, scales dark brown except for white scales on following areas: large patch covering acrostichal and dorsocentral areas on anterior 0.70 of scutum (including anterior promontory and antedorsocentral areas), anterolateral part of patch continues outward onto cephalad third of scutal fossa (reaching lateral margin anteriorly and sloping at angle on posterior part), another large patch extending from lateral margin of scutum (between scutal angle and base of wing) mesally along anterior margin of prescutal suture and connects with acrostichal-dorsocentral patch, posterior margin of this combined patch with short, narrow, posterior projection on acrostichal area, additional short, narrow, posterior projection on supraalar area, and narrow line on lateral margins of prescutellar area mesad of setae; dark setae on following areas: few on anterior promontory, antedorsocentral area, scutal fossa, dorsocentral (1 on anterior area immediately anterior to juncture of prescutal suture, few on posterior area), several antealar, numerous supraalar, few prescutellar and 1 parascutellar; scutellum with narrow, curved, white scales and few long and short, dark setae on each lobe; mesopostnotum bare; paratergite narrow, bare; antepronota widely separated, each with patch of broad, white scales, several dark setae; postpronotum with patch of narrow, curved, white scales dorsally and broad white scales below on posterior area, 3,4 dark posterior setae; upper proepisternum with small patch of broad, white scales, 7,8 dark setae; lower proepisternum bare; postspiracular area with broad, white scales in small anterior and moderate-sized posterior patches, 1,2 dark setae; subspiracular area with small patch of broad, white scales; mesokatepisternum with moderate upper and small lower posterior patches of broad, white scales, 2,3 upper and several posterior setae; prealar area with small patch of broad, white scales on lower area and extending onto ventral part of upper area, 7,8 pale, upper setae; mesepimeron with moderate patch of broad, white scales covering upper and middle areas, 6,7 pale brown, upper, posterior setae, lower setae absent; other pleural areas bare. **Wing:** Left wing missing; right wing dark-scaled except for narrow, elongate, white-scaled patch on anterior surface at base of costa; remigium with 1 short, brown seta on dorsal surface distally; upper calypter with numerous pale brown setae on margin; alula with row of narrow, brown scales on margin; vein  $R_2$  longer than  $R_{2+3}$ ; anal vein terminating distal to juncture of CuA and mcu. **Legs:** Ante- and postprocoxal membranes bare; forecoxa with broad scales, patches of white scales dorsally and ventrally separated by patch of brown scales, several brown setae; midcoxa with elongate patch of broad, white scales on anterior surface, several brown setae; hindcoxa with upper and lower patches of broad, white scales on anterior surface, several brown setae; fore-, mid- and hindtrochanters with broad, white scales, few short setae; forefemur brown-scaled with narrow, basal, white-scaled band, anterior surface with narrow (1 scale wide), white-scaled, partially incomplete stripe on ventral margin extending from base to apex, posterior surface with white-scaled stripe on dorsal 0.50 extending from near base to apex; midfemur brown-scaled with narrow, basal, white-scaled band, anterior surface with well developed, white-scaled stripe on ventral area extending from near base to apex, posterior surface with basal 0.40 white-scaled except for small, brown-scaled patch subbasally on ventral area, white-scaled area continues on distal 0.60 as broad, ventral stripe; hindfemur brown-scaled with narrow, basal, white-scaled band, anterior surface with 2 broad, white-scaled patches, one patch extending from near base distally to beyond midlength and separated by short, brown-scaled area with 2–4 pale scales intermixed and second white-scaled patch that extends to apex, both white-scaled patches do not reach dorsal margin, apex with fringe of few brown scales, posterior surface with brown-scaled patch separating white-scaled, basal band from large, white-scaled patch, second brown-scaled patch on remainder of distal area except for narrow, white-scaled stripe ventrally on distal 0.60 of brown-scaled patch; tibiae brown-scaled, fore- and midtibiae with anterior surface with narrow, moderate-sized, ventral, white-scaled stripe at base, posterior surface with white-scaled stripe, stripe broad on foretibia and extends from base to apex, stripe narrow on midtibia and extends from base to near apex, distal part of stripe somewhat poorly developed, also with narrow patch of white scales on apical margin; hindtibia brown-scaled with elongate, narrow, white-scaled patch on ventral area basally on both anterior and posterior surfaces; tarsi brown-scaled, foretarsus with very small, white-scaled spot dorsobasally on tarsomeres 1 and 2, midtarsus with narrow, basal, white-scaled bands on tarsomeres 1 and 2, tarsomere 1 also with few apical white scales, hindtarsus with broad, basal, white-scaled bands on tarsomeres 1–4, tarsomere 4 also with few brown scales on ventral margin of white-scaled band, tarsomeres 1 and 2 also with very narrow fringe of white scales at apex; fore- and midtarsi each with 2 unequal unguis, larger unguis with 2 teeth, smaller unguis with 1 tooth, hindtarsus with 2 equal unguis, both simple. **Abdomen:** Terga dark brown-scaled, tergum I with patch of broad, white scales on laterotergite, terga II–V each with narrow, basal, white-scaled band, tergum VI with narrow, dorsobasal, white-scaled patch and rectangular, white-scaled patch on basolateral area, terga with numerous moderately long, curved setae on lateral and several on posterior margins, remainder of abdomen previously removed with genitalia; sterna brown-scaled with large basolateral patches of white scales connected mesally on basal area, with numerous setae. **Genitalia:** Tergum IX moderately pigmented, with 2 moderate-sized, lateral lobes projecting

caudally, each lobe strongly sloping cephalad to midline and with very small, sclerotized lobe on submedian, posterior margin bearing one short, slender seta, lateral lobes connected mesally by membrane; gonocoxite moderately pigmented, moderately long, relatively narrow, with numerous spatulate scales on dorsal, lateral and ventral surfaces, dorsal surface with basomesal margin with small, compact patch of few long, moderately stout and several long, slender, nearly straight setae, several short slender setae on proximal area, several moderately long, slender setae on distal area and few long, stout setae on lateral area, lateral surface with numerous long, stout setae, ventral surface with compact patch of moderately long, narrow, lanceolate scales at approximately 0.40 from apex, moderate-sized, ovoid patch of short, slender, curved setae distal to lanceolate scales, elongate patch of long, fusiform scales ventral to lanceolate scales and extending more proximally, moderately long to long, stout setae scattered over remainder of ventral surface, mesal surface membranous; gonostylus attached at apex of gonocoxite, moderately long, 0.36 length of gonocoxite, narrow, distal part curved mesally, 3,4 short, slender setae subapically, gonostylar claw attached apically, long, 0.38 length of gonostylus, narrow, apex truncate; claspette with moderately long, slender, columnar stem, 1 short, slender seta at about midlength and 2 moderately long, moderately stout setae subapically, claspette filament attached at apex, moderately long, flattened, expanded postbasally and tapering to narrow, bluntly rounded apex, longitudinal striations on much of surface; proctiger with distal part darkly pigmented, apex rounded with short, pointed tooth directed tergally, 4 tiny, cercal setae; phallosome with aedeagus simple, trough-like, proximal part elongate ovoid, distal part strongly constricted subapically and terminating in small T-shaped structure, paramere darkly pigmented, long, 0.91 length of aedeagus, narrow, attached near midlength of basal piece; sternum IX moderately pigmented, moderately long, with 3 moderately long, moderately stout setae and 2 short, slender setae on median caudal area.

**Discussion.** Reinert *et al.* (2008) restored *Danielsia* Theobald to generic rank and included three species, i.e., *albotaeeniata* Leicester, *harperi* (Knight), and *lepchana*. *Danielsia lepchana* is most similar to *Da. albotaeeniata* especially in the male genitalia.

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## References

- Barraud, P.J. (1923a) A revision of the culicine mosquitoes of India. Part III. Notes on certain Indian species of the genus *Finlaya*, Theo. and descriptions of new species. *The Indian Journal of Medical Research*, 11, 214–219.
- Barraud, P.J. (1923b) A revision of the culicine mosquitoes of India. Part VI Some Indian species of the genus *Finlaya* Theo. adult stage. *The Indian Journal of Medical Research*, 11, 475–493 + plates XXII–XXXIII.
- Barraud, P.J. (1934) *The Fauna of British India, Including Ceylon and Burma. Diptera, Vol. V, Family Culicidae, Tribes Megarhinini and Culicini*. Taylor and Francis, London, UK, 463 pp. + plates I–VIII.
- Harbach, R.E. & Knight, K.L. (1980) *Taxonomists' Glossary of Mosquito Anatomy*. Plexus Publishing, Incorporated, Marlton, New Jersey, USA, 415 pp.
- Harbach, R.E. & Knight, K.L. (1982) Corrections and additions to *Taxonomists' Glossary of Mosquito Anatomy. Mosquito Systematics* (1981), 13, 201–217.
- Knight, K.L. (1948) The *Aedes* (*Finlaya*) *albotaeeniatus* (sic) group of mosquitoes (Diptera, Culicidae). *Proceedings of the Entomological Society of Washington*, 50, 1–8.
- Knight, K.L. & Marks, E.N. (1952) An annotated checklist of the mosquitoes of the subgenus *Finlaya* (sic), genus *Aedes* (sic). *Proceedings of the United States National Museum*, 101 (3288), 513–574.
- Knight, K.L. & Stone, A. (1977) *A Catalog of the Mosquitoes of the World (Diptera: Culicidae)*. The Thomas Say Foundation, Entomological Society of America, College Park, Maryland, USA, 611 pp.
- Reinert, J.F. (1999) Descriptions of *Zavortinkius*, a new subgenus of *Aedes*, and the eleven included species from the Afrotropical Region (Diptera: Culicidae). *Contributions of the American Entomological Institute (Gainesville)*, 31 (2), 1–105.
- Reinert, J.F., Harbach, R.E. & Kitching, I.J. (2008) Phylogeny and classification of *Ochlerotatus* and allied taxa (Diptera: Culicidae: Aedini) based on morphological data from all life stages. *Zoological Journal of the Linnean Society*, 153, 29–114.