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## GEOGRAPHIC VARIATION IN THE LESSER TREE-SWIFT

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The Lesser Tree-swift (*Hemiprocne comata*), as the name suggests, is the smallest of the three species of the Indo-Malaysian family Hemiprocniidae. These beautiful birds are variously known as tree-swifts, crested swifts, or whiskered swifts. The shortest of these vernacular names, adopted here, calls attention to the habit of tree-perching, one of the characters distinguishing the family from the true swifts (Apodidae). Wetmore (1951:7) has commented on the proposal by a few authors that the tree-swifts be reduced to subfamily rank. The species *Hemiprocne comata* is found from southern Tenasserim, Burma, southward through the Malay Peninsula to Sumatra, Borneo, and numerous smaller islands of the East Indies, and in the Philippines. A number of names have been applied to various populations of this species; in chronological order, and with type localities noted, these are as follows:

*Cypselus comatus* Temminck, 1824 (Sumatra).

*Macropteryx comata major* Hartert, 1895 (Luzon).

*Hemiprocne comata nakamurai* Hachisuka, 1930 (Samal Island, off Davao, Mindanao).

*Hemiprocne comata stresemanni* Neumann, 1937 (North Pagi Island).

*Hemiprocne comata barbarae* Peters, 1939 (Bayog, Naujan, Mindoro).

Peters (1939:95) appears to be the only author who has used all of these names for five supposedly valid subspecies. Mayr (1945:110) and other recent authors have reduced these to two. According to Mayr's concept, a large race, *major*, inhabits the northern and central Philippines, while the nominate race *comata* is found in the Philippines from Mindanao southward, as well as in the remainder of the species' range.

The two principal characters which have been used in defining subspecies of *Hemiprocne comata* have been size (the only character admitted by Mayr) and the color and relative amount of gloss of the back and underparts. In his key to the races, Peters (1939:95) also mentions a difference in the amount of white on the abdomen and in the shade of chestnut on the auriculars of males in separating *nakamurai* and *stresemanni*.

There is undeniably a size cline running from north to south in the Philippines, with the largest specimens coming from northern Luzon and the smallest from Mindanao, Basilan and the Sulus. The cline is apparent even within the island of Luzon itself. Wing measurements, partly compiled from the literature, are as follows (sexes alike in size):

Northern Luzon	140, 146.5
Central Luzon	136.5, 137, 140, 140, 140, 140.5, 141, 143
Southern Luzon	134, 135.5, 138, 138.5, 139
Mindoro	133, 137, 137, 137.5, 138, 138, 139, 139, 141, 144
Negros	138, 140, 141, 144
Mindanao	123, 127, 129.5, 131.5, 132, 134, 134.5, 136, 139
Basilan	124, 125, 132, 135
Sulus	125+ (worn), 129, 130

Zimmer (1918:224) long ago mentioned the large size of certain specimens from Mindanao supposed on geographic grounds to be referable to *comata*. In view of the

great overlapping of measurements and the clinal nature of the variation, there is little to be gained by continuing to attempt to define two subspecies of *Hemiprocne comata* within the Philippines on the basis of size. If a line is drawn north of Mindanao (the usual division between *comata* and *major*), fully 46.6 per cent of the specimens from the Philippines examined would fall within the zone of overlapping measurements and could be named only by reference to locality of origin.

Two races, *nakamurai* Hachisuka and *barbarae* Peters, have been named from the Philippines primarily or solely on the basis of color characters. Hachisuka (1930:172) claimed that the back and underparts of *nakamurai* were "more strongly tinged with green than the typical *major*," and Peters described *barbarae* as greenish rather than bronzy. My examination of specimens supports Mayr's contention (1945:110) that

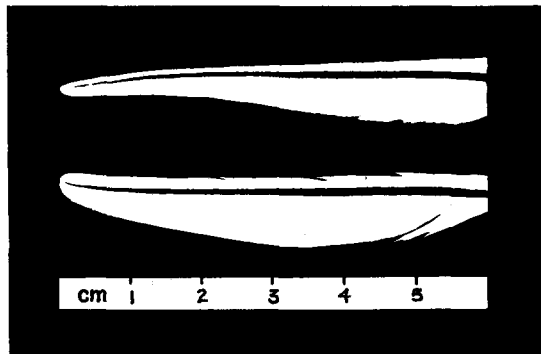


Fig. 1. Outer tail feathers of *Hemiprocne comata*. Illustrations prepared from direct impressions of feathers on photographic paper.

Upper, *H. c. comata*, A.M.N.H. 634407, Padang, Sumatra.

Lower, *H. c. major*, Carnegie 137032, Wawa, Luzon, Philippines.

relative greenness or bronzy of the plumage is directly correlated with degree of wear and is valueless for definition of geographic variation. As for the auricular color of males, Ripley and Rabor (1958:44) show quite correctly that this is subject to much individual variation, and, I may add, to fading with wear. Neither size nor color, therefore, supports recognition of more than one race of *Hemiprocne comata* within the Philippines.

Mayr (1945:110) considered birds from the southern Philippines inseparable from true *comata* of Sumatra. In this opinion he was supported by de Schauensee (1957:7), who considered three Mindanao specimens "identical with Sumatran examples." Since size is said to be the only valid character differentiating *major* and *comata* (Delacour and Mayr, 1946:130), and since, as shown above, no useful separation by size can be made in the Philippines, it would appear that the name *major*, too, would have to be suppressed, and we would end up with a monotypic species.

This is by no means a true interpretation of the actual situation, since the most important geographically variable characters have been overlooked or underestimated in the past. The Philippine population as a whole differs markedly from all other *Hemiprocne comata* in a striking structural character which has never been mentioned in the literature. In all specimens from the Philippines the rectrices are broad, and the outer-

most gradually tapers to a relatively blunt end. In nominate *comata* the rectrices are narrow, and the outermost is greatly attenuated (fig. 1). Although the degree of attenuation varies to some extent within *comata* (the figured specimen is by no means extreme), the difference between the rectrices of specimens from the Philippines and all others is clear-cut. By the standards of an earlier school of taxonomy, *major* would undoubtedly have been given specific rank on the basis of such a character; specimens from Sibutu Island, Sulus, and Sibattik Island, North Borneo, less than 120 miles apart, have tail shapes completely typical of *major* and *comata*, respectively. However, specimens from the Sulus do show an approach to *comata* in another character, as will be mentioned beyond.

Mayr (1945:110) mentioned a supposed difference in extent of white on the abdomen only to deprecate it, but it is a perfectly good character. Examination of the specimens in the collection of the American Museum of Natural History indicates that Mayr may have been misled by the great extent to which preparation techniques affect the superficial appearance of the abdominal region of these tree-swifts. All specimens from the Philippines have a clearly-defined area of white on the lower abdomen, with a slight tendency toward decrease from north (Luzon) to south (Mindanao and Basilan). Specimens from the Sulus are intermediate between *major* and *comata* in abdominal color, but they are referable to *major* on the basis of tail shape. The subspecies *comata* is characterized by having white on the under tail coverts only, not on the abdomen. In some specimens there is a certain amount of concealed white in the center of the posteriormost abdomen, but there is never a large clearly-defined patch as in *major*. White areas other than the abdomen, including tertials, chin, superciliary line, and crest, also average more extensive in *major* than in *comata*.

Within the range here assigned to *comata*, certain geographic trends in variation appear. Neumann (1937) described *stresemanni* from North Pagi Island in the Mentawai group on the basis of alleged differences in dorsal color; this is attributable to degree of wear as mentioned previously. Examination of a good series from North Pagi and other west Sumatran islands indicates that birds from this area do not differ from *comata* from Sumatra except for a slight tendency toward an increased amount of concealed white in the abdominal region. I follow Ripley (1944:355) and Mayr (1945:110) in synonymizing *stresemanni* with *comata*.

Specimens from northern Sumatra average larger than those from other populations of *comata*, but overlap is extensive. Wing measurements are as follows:

Northern Sumatra (21 specimens)	125-136 (av. 129)
Southern Sumatra	123.5, 125, 125
West Sumatran islands (18 specimens)	120.5-130 (av. 126.3)
East Sumatran islands (Bintan, Lingga, Sinkep)	125, 126.5, 128, 129
Malay Peninsula	122.5, 124, 125
Borneo (10 specimens)	119-130 (av. 123.8)

There is great individual variation in tail length in *comata*, correlated neither with sex, age, nor locality. There may be as much as 16 mm. difference in tail length between two adult males from the same locality. As in the case of *major*, then, no further subdivision of *comata* appears to be warranted on the basis of either size or color.

In summary, the two recognizable subspecies of *Hemiprocne comata* may be defined as follows:

*Hemiprocne comata comata* (Temminck). Synonym: *stresemanni* Neumann. Malay Peninsula, Sumatra, Borneo, and various smaller islands (for details see Peters, 1940:258). Averages smaller (wing 119-130 mm., specimens from northern Sumatra to 136 mm.); rectrices narrow, the outermost

greatly attenuated; white of abdomen much reduced or absent; white on tertials and chin reduced. 64 specimens examined.

*Hemiprocne comata major* (Hartert). Synonyms: *nakamurai* Hachisuka, *barbarae* Peters. Philippine Archipelago (apparently absent from Palawan). Averages larger, particularly in the north (wing 123–146.5 mm.); rectrices broad, outermost gradually tapered; large white patch present on lower abdomen; more white on tertials; white on chin more extensive; white superciliary line and crest averages broader. 32 specimens, including type, examined.

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