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A REVIEW OF THE BIRD GENUS *RHINOMYIAS* (MUSCICAPINI)

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INTRODUCTION AND ACKNOWLEDGMENTS

Following a suggestion of Dr. E. Mayr I started some time ago a generic revision of the flycatchers of the tribes Muscicapini and Pachycephalini. Every species has been examined, but when I came to the genus *Rhinomyias* I found that the status of the various forms was confused, there being no agreement as to what constitutes a species, perhaps because no revisionary study has been made of the group as a whole, these birds being scarce in collections. The present study was undertaken, then, first as an attempt to define the species, and, second, because it was thought that this small but interesting genus might throw some light on the relationships of other groups. *Rhinomyias* consists of eight species which in structure and habit apparently run the scale from flycatcher to thrush.

Some of the forms are poorly represented in the collections of the American Museum of Natural History, but thanks to the authorities of the following institutions, to whom I am very

grateful for lending me all their specimens, I was able to gather a series of 208 specimens, including 18 types, three of these being cotypes selected by the author of the form. Since some *Rhinomyias* are scarce, the location in collections of the specimens examined is given in the lists of specimens as follows:

A.M.N.H., the American Museum of Natural History
A.N.S.P., the Academy of Natural Sciences of Philadelphia
C.N.H.M., Chicago Natural History Museum
M.C.Z., Museum of Comparative Zoölogy
U.S.N.M., the United States National Museum

I wish also to express my thanks to Dr. G. C. A. Junge of the Leiden Museum, Dr. E. Sutter of the Basle Museum, and Mr. J. L. Peters of the Museum of Comparative Zoölogy for their very prompt and gracious cooperation. Dr. Junge has examined for me a type in his museum and has traced some obscure manuscript names which originated in Leiden; Dr. Sutter sent me his field notes on the habits and food of *R. oscillans stresemanni*; and Mr. Peters helped with an obscure locality of Mjöberg. I am, as always, in debt to my colleagues, Dr. E. Mayr, Dr. D. Amadon, Mr. J. Delacour, and Dr. J. P. Chapin for their friendly suggestions. Dr. Mayr has also read the manuscript, and Dr. Amadon helped with the ratio diagrams.

RHINOMYIAS SHARPE

Rhinomyias SHARPE, 1879, Catalogue of the birds in the British Museum, vol. 4, p. 367. Type here designated as *Alcippe pectoralis* Salvadori, 1868, Atti R. Accad. Torino, vol. 3, p. 350 (Borneo) = *Rhinomyias umbratilis* (Strickland), 1849, in Jardine, Contributions to ornithology, p. 126, pl. 35 (Borneo), as shown by Stone, 1902, Proc. Acad. Nat. Sci. Philadelphia, vol. 54, p. 686.

Addoea MATHEWS, 1925, Bull. Brit. Ornith. Club, vol. 45, p. 93. Type, by original designation, *Microeca addita* Hartert.

Olcynornis BAKER, 1930 (March), Fauna of British India, vol. 7, p. 137. Type, by original designation, *Cyornis olivacea* Hume.

HISTORY OF THE GENUS

This genus, as here understood, consists of eight species. It was erected by Sharpe for two species, the first cited being *pectoralis* Salvadori, a redescription of *umbratilis* Strickland, 1849; and the second, *ruficauda* Sharpe, 1877. In 1888, another species, *gularis*, was described by the same author (Ibis, p. 385). In 1898, a fourth species was added by the description of *colonus* by Hartert (Novitates Zool., vol. 5, p. 131). In 1901, *olivacea*

Hume, 1877, was transferred from *Siphia* to *Rhinomyias* by Finsch (Notes Leyden Mus., vol. 23, p. 42), but *olivacea* had already been added indirectly to the genus by Hartert in 1896 when he erroneously described the population of this species from Bali as a race of *R. pectoralis* (Novitates Zool., vol. 3, p. 549). *Siphia brunneata* Slater, 1897, was added indirectly to *Rhinomyias* in 1902 when Richmond described specimens of this species from the Nicobars as *R. nicobarica* (Proc. U. S. Natl. Mus., vol. 25, p. 295).

No other species were added to the genus until 1931 when Rensch (Mitteil. Zool. Mus. Berlin, vol. 17, p. 559) remarked, correctly I believe, that in his opinion *Microeca oscillans* Hartert, 1897 (Flores), and *Microeca stresemanni* Siebers, 1928 (Sumba), were better placed in *Rhinomyias* and *Microeca addita* Hartert, 1900 (Buru), though farther removed from *oscillans* and *stresemanni*, formed perhaps part of the same superspecies.

DISTRIBUTION OF THE GENUS

This genus, with one exception, is Indo-Malayan and non-migratory. The exception, *brunneata*, breeds not far away in eastern China, from Chekiang south to northern Kwangtung and eastern Kwangsi, and migrates to winter in the Nicobars and lower Malay Peninsula. The other species range from southern Tenasserim through the lower Malay Peninsula, Sumatra, Java, Bali, and Borneo to the Philippines, Molucca Sea (Peling, Sulas, and Buru), and to the Lesser Sundas (Flores and Sumba). On Celebes, *Rhinomyias* is known so far only from a single specimen collected at the end of the eastern peninsula directly opposite Peling.

The genus is best represented on northern Borneo where four species occur: *olivacea*, *umbratilis*, *ruficauda*, and *gularis*. Elsewhere no more than two breeding species occur: *olivacea* and *umbratilis* in Sumatra, Billiton, Natunas, and possibly peninsular Siam south of Trang where they seem to meet and perhaps overlap slightly; *umbratilis* and *ruficauda* in Sarawak; *ruficauda* and *gularis* on Mindanao.

There is much evidence, however, that the overlapping species are separated ecologically. For instance, on Borneo, *umbratilis* is widely distributed throughout the lowlands or at low altitudes, but it apparently does not occur in the mountains of Sarawak and it does not occur on Kinabalu where *olivacea*, *ruficauda*,

and *gularis*, in that order, replace one another both altitudinally and in different types of forest, viz: the "thin lowland forest," the "primary high forest," and the dense "mossy forest." On Mindanao, the same altitudinal and ecological preferences separate *ruficauda* and *gularis*.

These "overlapping" species are quite distinct from one another, but other forms that are geographical representatives, such as *brunneata* and *olivacea* or *colonus* and *ruficauda*, are not so well differentiated morphologically and might be linked as sub-

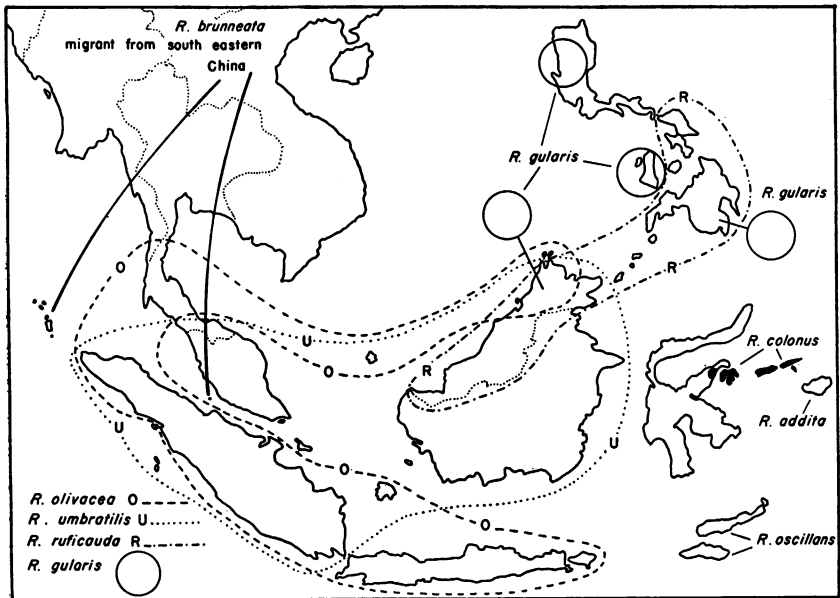


FIG. 1. Distribution of the genus *Rhinomyias*.

species. However, since *brunneata* and *colonus* have begun to differentiate geographically in a manner independent from the geographical variation prevailing, respectively, in *olivacea* and *ruficauda*, they are probably better treated as separate species. Superspecies have been suggested (Rensch, for *addita*, *oscillans*, and *stresemanni*), but in my opinion nothing is gained through this method in the case of a small genus such as *Rhinomyias* which is almost entirely restricted to a single geographical region. Furthermore, I believe this treatment would be definitely misleading in the case of *addita*.

After a study of the genus as a whole my opinion is that it consists of eight separate species (*oscillans* and *stresemanni* are considered to be conspecific), the known distribution of which is shown in figure 1.

DESCRIPTION OF THE GENUS

Rather heavily set, medium-sized to rather large-sized fly-catchers. Tarsus booted or with a vague trace of one or possibly two anterior scutes, relatively short to moderately long (22 to 30 per cent of the wing length). Bill broadened at base, rather flattened but usually well ridged, moderately hooked, well feathered at the base with very well-developed antrorsal bristles; the nostrils are concealed and the rictal bristles are long and strong (see fig. 5 which shows one exception, *R. gularis insignis*). Wing rounded, first primary long, about 55 per cent of the wing length, exceeding the primary coverts by 6 to 21 mm.; basic wing formula $4 = 5 > 3 = 6 > 7 > 8 > 9 > 2 > 10$, or sometimes the wing is still more rounded: $4 = 5 = 6 > 7 > 3 > \text{or} = 8 > 9 > 2 = 10$. Plumage soft and full.

Sexes alike. Coloration of the upper parts, sides of face, and in some species sides of throat rufous brown more or less tinged with gray or olive (in *R. gularis goodfellowi* all these parts are dark slate). Outer edges of the wing feathers, upper tail coverts, and tail varying from chocolate brown to rather bright reddish chestnut. A faint trace of buff or of grayish or whitish on the lores, or loreal spot distinct, or lacking but replaced in *R. gularis* by a conspicuous buffy or white superciliary stripe. Under parts variable: in six species (*olivacea*, *brunneata*, *umbratilis*, *ruficauda*, *colonus*, and *gularis*), the center of the under parts is unstreaked. These parts are white, whitish, grayish, or buffy, with a distinct or vaguely defined pectoral band, varying in width, separating the throat from the center of the breast or abdomen. The flanks are more or less heavily pigmented, their pigment and that of the pectoral band varying from gray to grayish buff or olive brown or buff to bright tawny rufous. In forms in which the pectoral band is broad or distinct the white of the throat is conspicuous; in other forms the pectoral band is obsolete. In *R. oscillans* the under parts are unstreaked, but the throat is pigmented or shows but a slight trace of white. In *R. addita* the under parts are whitish and faintly but clearly streaked.

The young of *addita* and *oscillans* are apparently unknown.

The young of *olivacea*, *brunneata*, *ruficauda*, *colonus*, and *gularis* are well spotted. No very young specimen of *umbratilis* has been examined and apparently none are reported, but in a first year bird collected in August there are still one or two large spots on the crown. In this specimen, as in another first year bird reported by Chasen (1939), the upper wing coverts are tipped with rufous.

RELATIONSHIPS

The relationships of the eight species are shown in a diagram (fig. 2). The spacing indicates the presumed degrees of relationships as indicated by general structure, habits, and the changes in the pattern described above. The six species on the right are obviously more closely related to one another than they are to the two species on the left. But in the first group a significant gap separates *ruficauda* and *colonus* from *gularis* in which new characters unknown in the other *Rhinomyias* appear. These new characters are discussed below. In the second group, a perhaps wider gap separates *addita* and *oscillans*.



FIG. 2. Relationships of the species in the genus *Rhinomyias*.

The linking of *addita* and *oscillans* to the other *Rhinomyias* may be questioned, for these two forms occur in the Moluccas and on Flores and Sumba, while the others are chiefly restricted to the Malaysian and Philippine regions. A typical *Rhinomyias*, however, occurs also in the Moluccas, but this form (*colonus*) is closely related to *ruficauda* and was probably derived from the Philippines. However, even if *addita* is not too closely related phylogenetically to the other species, *oscillans* is certainly not far removed, and both fit nowhere else and are therefore much better placed in *Rhinomyias* than in the Australo-Papuan genus *Microeca* in which they were formerly placed. Morphologically these two species differ from the other *Rhinomyias* only in the pattern of the under parts, whereas they differ in virtually every

character from *Microeca* which consists of rather small and more slightly built species, with no rufous brown in the plumage (in which yellow-green predominates), the plumage itself not so soft and full, the wing formula different, and in the true *Microeca* discussed by Mayr (1941) the feet weaker and the tarsus shorter. The clear-cut differences in proportions are shown in figures 3 and 4.

Habits might be a good clue to relationships, but they are inconclusive in this case and not too well known. *Microeca* appears to be a true flycatcher, while *Rhinomyias* is chiefly a

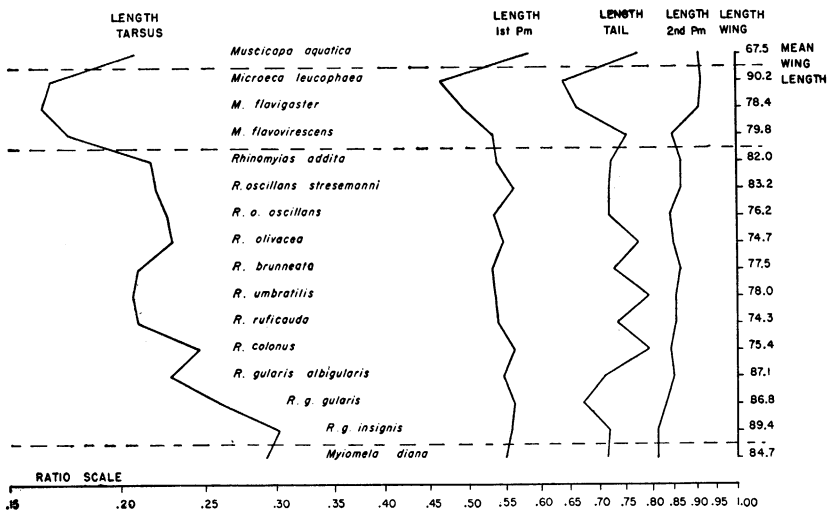


FIG. 3. Comparison by ratio diagram of proportions in *Rhinomyias*, and in three species of *Microeca*, and one each of *Muscicapa* and *Myiomela*.

dweller of the undergrowth where some species may feed on the ground. But the most common and best known species (*olivacea* and *umbratilis*) behave like true flycatchers, hawking for insects from the tree tops. *R. addita* also behaves like a true flycatcher, but *oscillans* is intermediate. It is found both in the tree tops and in the undergrowth or under cover, and its food and manner of feeding are not those of a typical flycatcher, for its food on occasions is composed chiefly of fruits. Other *Rhinomyias* are also fruit eaters. In this small genus, then, habits, food, and manner of feeding range all the way from those typical of true flycatchers to those typical of thrushes.

In the pattern of its plumage, also, *oscillans* is intermediate between *addita* and the other *Rhinomyias*. Of these the least specialized appear to be *olivacea* and *brunneata*. These two are closely related and being geographical representatives have been treated as subspecies by La Touche (1925), followed by Delacour (1947), but Chasen (1935) states that he "doubts if they are thus closely related" so as to be conspecific. For reasons stated above, I agree with Chasen. *R. umbratilis* stands about halfway between *olivacea-brunneata* and *ruficauda-colonus*. The last two, again, are closely related and are geographical representatives but, as stated, are probably better kept as separate species.

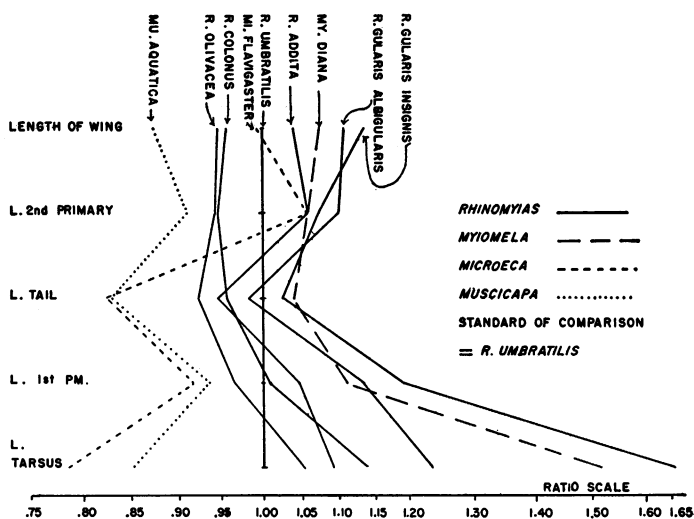


FIG. 4. Comparison by ratio diagram of the proportions of forms selected from figure 3 with the proportions of *R. umbratilis*.

Some races of *gularis* diverge quite widely from the closely related species just enumerated, so much so that Chasen and Kloss (1930) have questioned whether this species was correctly placed in *Rhinomyias*. But in my opinion there is no doubt that *gularis* is a true *Rhinomyias*. One of its races (*albigularis*) is still so close to the typical *Rhinomyias* that it is treated as a race of *ruficauda* by Mayr (1946), although the presence in *albigularis* of a superciliary stripe lacking in *ruficauda* and its general body size (longer wing, more heavy build, and considerably larger

skull) show it to be a race of *gularis*. In *albigularis*, also, the typical *Rhinomyias* pattern (pectoral band and white throat) is more strongly emphasized than in any other species, but new characters have appeared (the heavy body size and the superciliary stripe mentioned). The superciliary stripe and other characters in the other races appear in a series of stages. In *albigularis* the stripe may be lacking or, when present, is poorly defined and buffy. In nominate *gularis* the stripe is always present and conspicuous and is buffy but lighter. In *goodfellowi* and *insignis* it is pure white, and longest, broadest, and most conspicuous in *insignis*. The unique specimen of *goodfellowi* was not examined, but in the same order (in *albigularis*, nominate *gularis*, and *insignis*) the bill (fig. 5) becomes progressively narrower, more compressed laterally, more highly ridged and curved, and more feebly hooked; the rictal bristles become shorter and weaker, the tarsus is longer, and the white throat patch smaller. New pigments appear. Above, these three races are olive brown more or less tinged with rufous, but *goodfellowi* is slate. Below, *insignis* is bright fawn on the flanks, and this pigment is present but weaker in occasional specimens of nominate *gularis*.

In this species the changes in the length of the tarsus are striking and instructive. In *albigularis* the length of the tarsus and its proportions (figs. 3 and 4) are similar to those of the other *Rhinomyias*. The tarsus is longer in nominate *gularis* and longest in *insignis*. In this last, the tarsus and other proportions (fig. 3) are virtually identical with those of a typical non-migratory thrush also from the Indo-Malayan region (*Myiomela diana*). In *insignis* and *diana* the tarsus is booted: in round numbers it measures 25 mm. and is 29 per cent of the length of the wing in *diana*, 27 mm. and 30 per cent of the length of the wing in *insignis*. These two forms have bills (fig. 5) that are virtually identical in shape and in the development of the rictal bristles. Both live under cover and on or near the ground and probably feed in the same manner. It should be noted also that in its other proportions, *diana* is very similar to other species of *Rhinomyias* (compare it in fig. 4 with *olivacea*, a typical *Rhinomyias*). Other thrushes from Indo-Malaya, such as female *Brachypteryx montana floris* Hartert from Flores, are indistinguishable in pattern and coloration from the typical *Rhinomyias*. It may be added that in the only *Rhinomyias* in which the eggs are known,

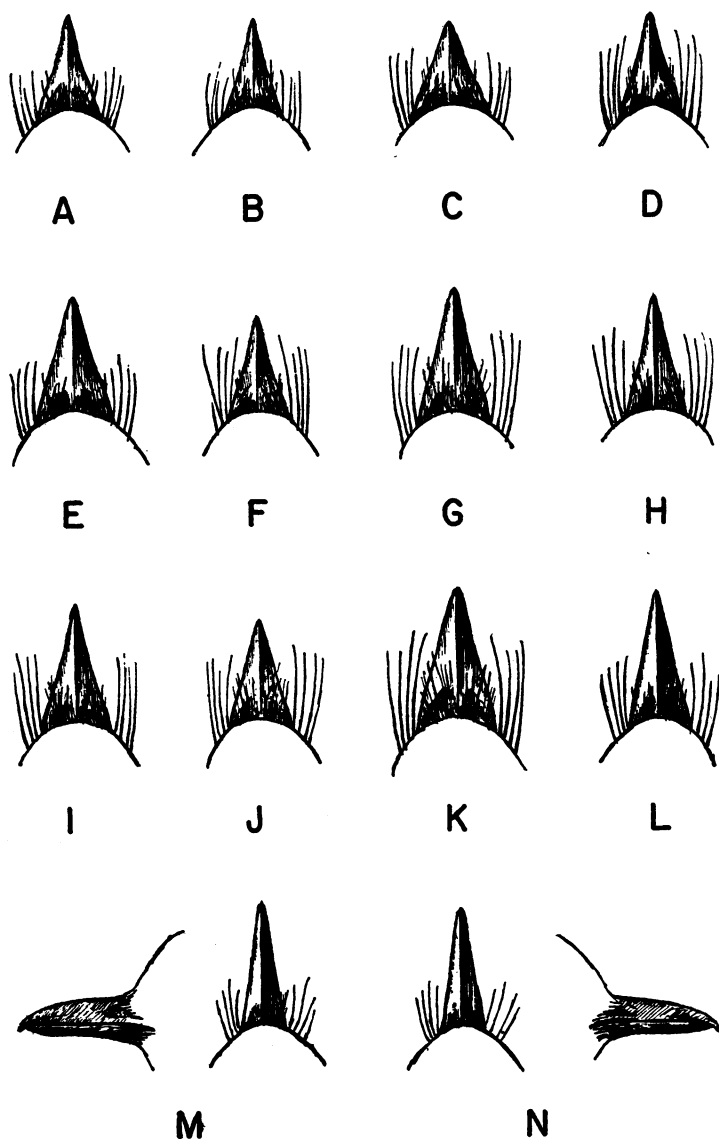


FIG. 5. Shape of the bill seen from above and length of the rictal bristles in two species of *Muscicapa*, in the species of *Rhinomyias*, and in *Myiomela diana*. Key: A. *Muscicapa striata*. B. *M. aquatica*. C. *Rhinomyias addita*. D. *R. o. oscillans*. E. *R. oscillans stresemanni*. F. *R. olivacea*. G. *R. brunneata*. H. *R. colonus*. I. *R. umbratilis*. J. *R. ruficauda*. K. *R. gularis albigularis*. L. *R. g. gularis*. M. *R. gularis insignis*, top and side view. N. *Myiomela diana*, top and side view.

Grant and Whitehead (1898) found that the eggs of *albigularis* "strongly resemble" those of a type laid by the Common Robin.

If some *Rhinomyias* are indistinguishable from true thrushes, others, such as *olivacea* and *umbratilis*, behave like true flycatchers, and *addita*, at the opposite end of the genus from *gularis*, is virtually indistinguishable from a typical non-migratory *Muscicapa* (such as *aquatica* of east Africa). The proportions of *addita* and *aquatica* are very similar (fig. 3), and the habits of *addita*, its streaked throat and breast, and its flat broad bill and its bristles (fig. 5) are those of a true *Muscicapa*.

One may fairly conclude that if a small genus such as *Rhinomyias* can apparently run the scale from flycatcher to thrush, it appears to be impossible to give any sort of family diagnosis separating the flycatchers of the Old World from the thrushes, as Hartert and others have stated long ago.

POSITION OF THE GENUS

The exact position of *Rhinomyias* is uncertain, but generally speaking this genus seems to stand about halfway between a group of more primitive ground-feeding, or largely ground-feeding, flycatchers represented by the Ethiopian *Bradornis* and related forms and the more typical flycatchers, the most specialized and more arboreal genus of which seems to be *Muscicapa*. If the thrush-like races of *gularis* are excepted, *Rhinomyias* in its structure, such as shape of the bill and its feathering, and its relatively short tarsus, is not too far removed from *Muscicapa*, and, as emphasized above, *addita* is virtually indistinguishable from a typical non-migratory *Muscicapa*, its habits, as well as those of *olivacea* and *umbratilis*, being those of a true flycatcher.

Wolters (1950) has stated that *Rhinomyias* cannot be separated generically from *Muscicapa*, for in his opinion *Rhinomyias* is "a primitive group which in some ways unites the gray flycatchers [*Muscicapa*] with the other *Muscicapa* species." In his diagram of relationships he places *Rhinomyias* between the *Bradornis* group and a number of other more or less well-defined genera which some authors have merged with *Muscicapa*. The arrangement of Wolters seems to be sound but, in my opinion, *Rhinomyias* is not manifestly derived from *Bradornis*, and true *Muscicapa* has diverged too much from *Rhinomyias* for the two to be treated as congeneric.

PROPORTIONS AND MEASUREMENTS

The proportions are compared graphically in figures 3 and 4 through the use of logarithmic ratio diagrams constructed in the manner explained by Amadon (1950). In these ratio diagrams the length of the first and second primaries and the length of the tarsus and the tail are compared to the length of the wing. As the sexes are identical in coloration and some specimens were not sexed, the measurements of the two sexes were not separated. In figure 3 all the principal forms in *Rhinomyias* as well as a typical non-migratory *Muscicapa*, a non-migratory thrush, and three true *Microeca* were compared. In figure 4, characteristic forms selected from figure 3 are compared to a typical *Rhinomyias*, in this case *umbratilis*, which is also the generic type.

The length of the longest primary (wing), tail, tarsus, and bill measured from the skull is given in table 2. Other measurements not shown are briefly discussed here. The width of the bill, taken at the level of the midpoint of the nostrils, varies from 4.7 to 7.1 mm., or, in terms of proportions, from 22.4 to 41.0 per cent of the length of the bill. In all *Rhinomyias*, with the exception of *gularis*, the width varies from 31.5 to 41 per cent. In *gularis*, as stated, it is progressively narrower as follows: *R. g. albigularis*, length 19.6, width 7.1, proportion 36.2; nominate *gularis*, length 20.1, width 5.9, proportion 28; *R. g. insignis*, length 20.1, width 4.7, proportion 22.4.

The length of the first primary varies from 36 to 55 mm.; of the second primary, 59 to 78, of the tenth primary, 57 to 77, and the excess of the second over the tenth primary is 0.4 to 4, excess of the first primary over the primary coverts 6 to 21.

A study of these measurements shows that they are usually correlated with the length of the wing, but there are slight variations which may be correlated with migratory or feeding habits. For instance, in the migratory *brunneata* where the length of the wing averages 77, the first primary is short, averaging 8 mm. longer than the primary coverts, and the second is relatively longer than the tenth, the excess averaging 3.8, but in non-migratory species with a similar wing length these measurements are, respectively: *olivacea*, 75, 11.8, 1.8; *umbratilis*, 78, 11.9, 1.6; *colonus*, 75, 12.3, 1.2. In *addita*, which feeds from the tops of trees, the wing length averages 82 and the second primary exceeds the tenth by 4, but in *R. g. albigularis* and

nominate *gularis*, which feed in the undergrowth or on the ground and in which the wing averages 87, the second and tenth are virtually equal, the second exceeding the tenth by only 0.4.

According to the sexing on the labels, sexual dimorphism in size is small. Males usually measure and average a little larger in all measurements, but this is less constant in the case of the tarsus, and apparently there is no sexual dimorphism, or very little, in the length of the first primary. In both sexes a long bill is usually wider, but this is far from being invariably true.

KEY TO RHINOMYIAS

1. Throat and breast streaked (Buru).....*addita*
- Throat and breast not streaked.....2
2. With a distinct superciliary stripe.....3
- Without a distinct superciliary stripe.....5
3. Upper parts dark slate (Mindanao).....*gularis goodfellowi*
- Upper parts olive brown or red-brown.....4
4. Upper parts olive brown, superciliary stripe pure white (Luzon).....
-*gularis insignis*
- Upper parts red-brown, superciliary stripe grayish or buff (north Borneo)
-*nominate gularis*
5. Whole throat distinctly gray or with a slight trace of whitish on center....
-*oscillans*
- Whole throat pure white or dull white.....6
6. A sharp or well-defined or distinct pigmented pectoral band separating the white of the throat from the white of the lower breast or belly.....7
- Pectoral band indistinct or obsolete.....10
7. Found on Negros and Guimaras; lores brown, usually with a vaguely indicated dark buff superciliary stripe; large (wing 83-91); pectoral band very broad, sharply defined, and heavily pigmented.....
-*gularis albigularis*
- Not found on Negros and Guimaras; lores white, whitish, pale gray, or buff, no superciliary stripe; small (wing 70-83); pectoral band well defined or distinct but not sharply defined¹.....8

¹ In most of the specimens of *umbratilis*, *brunneata*, and *olivacea* the pectoral band is well defined or fairly distinct but varies individually in width and depth of pigmentation, and in some specimens of *umbratilis* its center may be more or less invaded by the white of the throat; in this last form the white of the throat is always purer and more conspicuous than in the other two; *brunneata* can be distinguished from the other two by having the lower mandible pale instead of blackish.

In Sarawak and northern Borneo where *ruficauda* and *umbratilis* occur, and in northern Borneo where *ruficauda* and *olivacea* occur, the Bornean races of *ruficauda* can be distinguished from *umbratilis* and *olivacea* by their upper tail coverts and tail which are red-brown instead of brown, olive brown, or olive. It should be noted

8. Lores white or whitish; throat pure white; pectoral band gray or olive gray.....*umbratilis*
 — Lores gray or buff; throat white, dull white, or whitish but not pure white; pectoral band fulvous olive or brownish olive.....9
 9. Bill large (17–20), with pale lower mandible; pectoral band brownish olive; upper parts brownish.....*brunneata*
 — Bill small (15–17), with blackish lower mandible; pectoral band fulvous olive; upper parts olive or olive brown.....*olivacea*
 10. Occurring in the Molucca Sea and eastern Celebes; under parts strongly washed with dingy olive buff; little white on center of abdomen; whole throat or most of its upper part dingy white.....*colonus*
 — Occurring in Sarawak, northern Borneo, Sulus, Basilan, Mindanao, Samar, Bohol, and Leyte but not in the Molucca Sea and Celebes; breast more or less washed with grayish, or breast white or whitish; center of abdomen distinctly white; whole throat white (in some races the tail is unmistakably very bright reddish chestnut; in the race of the Sulus a chestnut eye ring is present).....*ruficauda*

SYSTEMATIC LIST

Rhinomyias addita Hartert

Microeca addita HARTERT, 1900, Novitates Zool., vol. 7, p. 234; type locality, Mt. Mada, 3000 feet, western Buru.

DESCRIPTION: Above, dull dark rufous brown, darker and more chocolate on the crown, brighter and more rufous on the wings, upper tail coverts, and tail. Under parts whitish, washed with dull gray from the point of the chin to the level of the lower breast, the center of the feathers, being darker, forming more or less faint but distinct streaks. Bill (fig. 5) well hooked, relatively broader at the base and flatter from above than in the other *Rhinomyias*.

SPECIMENS EXAMINED: Buru: Mt. Mada, 3000 feet, 1 ♂ (the type of *addita*), 1 ♀; Mt. Fogha, 4000–4500 feet, 1 ♂, 1 ♀, 1 unsexed ad. [♀] (A.M.N.H.).

RANGE: The highlands of Buru.

ECOLOGY AND HABITS: Chiefly highland forest or its margins. According to Stresemann (1914), supported by Siebers (1930), this species is a "true flycatcher, lively in behavior, reminding one of our native [western Palearctic] *Muscicapa* species."

Rhinomyias oscillans

DESCRIPTION OF THE SPECIES: Above, rufous brown, wings, upper tail coverts, and tail brighter and more rufous, crown and

that *umbratilis*, *brunneata*, *olivacea*, and the races of *ruficauda* from Borneo cannot be identified unequivocally without comparative material.

nape more or less tinged with olive gray. Below, unstreaked, throat and breast gray or buffy gray. This species differs from *addita* by having the under parts not streaked, by having the coloration of the upper parts less uniform and not so dark and not so brown.

GEOGRAPHICAL VARIATION: This species consists of two well-marked races, nominate *oscillans* (Flores) and *stresemanni* (Sumba). Nominate *oscillans* differs distinctly from *stresemanni* in size and coloration; it is smaller and has a smaller bill (fig. 5); it is duller and somewhat darker above, more olive, less bright rufous; below it is darker and more heavily pigmented, more gray, less buff, and has the under tail coverts buffy instead of white.

From a phylogenetic standpoint it is interesting to note that the more primitive pattern of the under parts begins to suggest the pattern of the following *Rhinomyias*. In nominate *oscillans* the throat is less dark gray than the breast and has a faint suggestion of whitish in the center, and in *stresemanni* this tendency towards a white throat is more emphasized and quite distinct.

***Rhinomyias oscillans oscillans* Hartert**

Microeca oscillans HARTERT, 1897, Novitates Zool., vol. 4, p. 170; type locality, "about 3500 feet," southern Flores.

SPECIMENS EXAMINED: Southern Flores, "above 3000, about 3500 feet," 1 ♂ (the type of *oscillans*), 2 ♂, 1 ♀ (A.M.N.H.).

RANGE: Flores.

***Rhinomyias oscillans stresemanni* Siebers**

Microeca stresemanni SIEBERS, 1928, Treubia, vol. 10, p. 399; type locality, Mao Maru, eastern Sumba.

SPECIMENS EXAMINED: Western Sumba, Langgaliru, 4 ♂, 1 ♀ [♂?], 5 ♀, 1 unsexed [♀ ?] (A.M.N.H.).

RANGE: Sumba.

ECOLOGY AND HABITS OF THE SPECIES

In Flores, according to Rensch (1931), nominate *oscillans* is a species of the mountain rain forests and of the Casurina woods and is "found just as well in the top of trees as also in the undergrowth and in its behavior recalls somewhat our German flycatchers." On Sumba, *stresemanni* is apparently not found in the tops of trees, and its food suggests that it is not a typical

flycatcher. I am very much indebted to Dr. E. Sutter of the Basle Museum for the following information which I quote rather in full since nothing has been published on the habits and food of this interesting form:

"*Rhinomyias stresemanni* seems to be a rather quiet bird, which may be easily overlooked. We found it in second-growth forest with small trees and bushes, sometimes in rather small, light forests and at the forest edge. The birds were sitting at a height of 2-4 meters in trees and bushes, that is they perch rather in cover and not, as it seemed, in the top of trees. On the other hand, they are not at all real undergrowth-birds as *Siphia harterti*.

"Only once I saw a bird apparently searching for food. It flew from a small tree on [onto] the road in the forest and returned to the tree. But I cannot say whether it hunts regularly on the ground. The stomach contents however suggest, that *Rhinomyias stresemanni* is not a typical flycatcher capturing flying insects." Dr. Sutter gives the stomach contents of seven specimens. Four had eaten only fruits or "some kernel of fruit or seeds," one had eaten "chiefly fruits" and some insects, and two had eaten both fruits and insects. He adds "I was rather surprised to find that, *Rhinomyias* is chiefly a fruit eater, at least during the months September-October (dry season)." The seven specimens were collected from September 13 to October 13, 1949.

Rhinomyias olivacea

DESCRIPTION OF THE SPECIES: Above, olive brown with slightly rufous tail. Below, whitish with a well-defined or fairly distinct, rather broad pectoral band of ocher or fulvous olive. Differs from *addita* and *oscillans* by the pattern of the under parts (white throat and pectoral band) and the more olive coloration of the upper parts.

GEOGRAPHICAL VARIATION: This species may consist of two slightly differentiated races, the widely ranging nominate *olivacea* (see below), and *perolivacea* from the small islands of Balambangan and Banguey off northern Borneo which was separated on the basis of having a less rufous tail. *R. o. perolivacea*, which was not examined, and some of the populations of nominate *olivacea* which may vary slightly geographically are discussed below.

***Rhinomyias olivacea olivacea* Hume**

Cyornis olivacea HUME, 1877, Stray Feathers, vol. 5, p. 338; type locality, extreme southern Tenasserim.

Hyloterpe brunneicauda VORDERMAN (not Salvadori), 1891, Nat. Tijdschr. Nederlandsch Indies, vol. 50, p. 460; type locality, Billiton.

Rhinomyias pectoralis baliensis HARTERT, 1896, Novitates Zool., vol. 3, p. 549; type locality, Bali.

Rhinomyias olivacea javanensis NEUMANN, 1941, Zool. Meded., vol. 23, p. 111; type locality, Indramajoe, western Java.

SPECIMENS EXAMINED: Peninsular Siam: Sichol, southeast of Bandon, 1 ♀ (U.S.N.M.); Kao Nong, east of Bandon, 1 ♀ (A.M.N.H.); Kao Soi Dao, west of Songkhla, 1 ♂, 2 ♀; Lay Song Hong near Trang, 1 ♂, 1 ♀; Trang, 1 ♂ (U.S.N.M.). Sumatra: Goempang River, Meluwak, 1 ♂, 1 ♀ (A.N.S.P.); northeast, Deli, Bandar Baroe, 2 ♀; southwest, Korinchi, Siolah Dras, 1 ♀. Java: west, Mt. Djenghol, Gobang, 2 ♂. Bali: Kembangari, 3000 feet, 1 ♂; Tjeboekanbawang, 1 ♀; Boeleleng, 2000–3000 feet, 2 ♂, 1 imm. ♂, 2 ♀; no locality, 2000–3000 feet, 1 ♂ (the type of *baliensis*), 1 ♀. Northern Borneo: Bongon, 1 ♂; Mt. Kinabalu, 1000 feet, 1 ♀ (A.M.N.H.).

RANGE: Extreme southern Tenasserim and peninsular Siam, Sumatra, Billiton (Chasen), Java, Bali, North Natunas (Chasen), northern Borneo.

DISCUSSION: The populations examined vary slightly in measurements and coloration, but the difference in measurements is hard to assess without additional material, and the differences in coloration may be unreliable as they are of the type caused through foxing. Concerning size, the males of the series examined from Bali have a slightly longer wing and tail than males from the other parts of the range (table 2), but the measurements compared are insufficient, and the difference may be due to sampling error since it is not confirmed by the measurements of females. Concerning coloration, the two specimens from western Java which are in very fresh plumage and were recently collected (1948) differ from the specimens of the other populations by being less rufous above, duller and more olive, the crown is distinctly grayer and the top of the tail less rufous, the flanks are darker and more olive, and the pectoral band is less yellowish. But the great majority of the specimens of the other populations are considerably older, the oldest series (the nine specimens from Bali) averaging brightest and most rufous, especially on the tail.

In describing *javanensis* from western Java, Neumann stated that his specimens collected in 1929 at Indramajoe were "very similar" to specimens from Bali but were paler on the breast, had no rufous on the forehead, and were smaller, and that these specimens from both western Java and Bali differed from nominate *olivacea* from Malacca and Sumatra by having the tarsus brownish rather than yellowish or pale bluish fleshy. Neumann

does not state the date when his Bali specimens were collected. It should be noted also that in all the populations that I have examined the tarsus becomes progressively more bleached and yellowish with the age of the specimens.

Robinson and Kloss (1924) have stated that "birds from the Malay Peninsula, Sumatra, and West Java are alike." Stresemann (1928) found that a specimen collected in 1927 in western Java, also at Indramajoe, was identical with specimens from Bali (*baliensis*) and that this last population was darker brown and more olive and had darker tarsi, but in the following year he changed his opinion and stated (1929) that the population of western Java is nominate *olivacea*.

Although the slight differences noted in the coloration may be caused by foxing, the populations of the Malay Peninsula, Sumatra, Java, and Bali may vary somewhat geographically. At any rate, their characters do not appear, in my opinion, to be sufficiently well marked nor constant enough to warrant nomenclatural separation.

***Rhinomyias olivacea perolivacea* Chasen and Kloss**

Rhinomyias olivacea perolivacea CHASEN AND KLOSS, 1929, Jour. Ornith. Ergänz., p. 113; type locality, Balambangan Island.

Not examined.

RANGE: Balambangan and Banguey Islands, off northern Borneo.

DISCUSSION: This race is retained, since specimens are not available for comparison. Its validity, however, appears to be dubious, an opinion shared to a certain extent by its own authors since they state that it "is not a well-marked race." Although they emphasize its less rufous tail, its description ("upper parts rather greener, the tail less rufous, and the breast paler" than nominate *olivacea* of the Malay Peninsula) does not appear to be diagnostic, particularly in view of the changes caused through foxing described above.

ECOLOGY AND HABITS OF THE SPECIES

According to Chasen (1939) this species is a true flycatcher of the secondary forest or its outskirts. In Borneo it is a species of the "thin lowland forest"; in Sumatra, of the "secondary forest and plantations near villages, in isolated clumps of trees and bushes." He quotes Davison: "True flycatcher, they perch

on commanding twigs, whence they capture passing insects with short sharp flights, returning to the same perch. . . . I have never seen one on the ground, though often in low brushwood."

Rhinomyias brunneata

DESCRIPTION OF THE SPECIES: This species can easily be confused with *olivacea* or *umbratilis* and is best described by comparison (see also key): *brunneata* is browner, less olive, above than *olivacea* and has a distinctly longer and heavier bill (fig. 5), with the lower mandible pale yellow (flesh color in life) instead of blackish as in *olivacea* and *umbratilis*; the pectoral band is brownish olive, less fulvous than in *olivacea*, and not gray or olive gray as in *umbratilis* in which the throat is always pure white and more conspicuous than in either *brunneata* or *olivacea*; above, *umbratilis* is similar to *brunneata*, therefore less olive than *olivacea*.

RANGE OF THE SPECIES: Breeds in Chekiang (La Touche), Fukien, northern Kwangtung and Yao Shan in eastern Kwangsi (Yen). On migration and in winter in the Malay States, Malacca Strait, and the Nicobars.

GEOGRAPHICAL VARIATION: This species consists of two similar but distinct races, nominate *brunneata* described from the breeding population of northern Fukien and *nicobarica* described from wintering birds in the Nicobars. In the specimens examined an adult topotype of nominate *brunneata* differs distinctly from 12 specimens from the Nicobars by having a more pointed wing, the third primary being 6 mm. longer than the sixth, whereas the third and sixth are equal in five specimens from the Nicobars, or in seven specimens exceeds the sixth by only 0.5 to 1.0 (0.4). The topotype of nominate *brunneata* has a shorter bill, 17 instead of 18 to 20 (19.0), and differs also from the specimens from the Nicobars by being paler and less olive above, distinctly more rufous, especially on the tail, and by being distinctly whiter below and less heavily pigmented on the flanks. These differences in coloration may be valid, for the specimens are of comparative age.

Robinson, the only author who heretofore has compared breeding birds from eastern China with others taken in winter in the Malay States and the Nicobars, states (1927) that his examination "discloses no difference." Robinson did not, however, examine the shape of the wing and had but one specimen, "a not

quite adult male," from the Nicobars. In turn, I have examined but one breeding specimen of nominate *brunneata*, but in view of the distinct differences noted above and until more specimens can be compared, it would be misleading, I believe, to treat *nicobarica* as a synonym of nominate *brunneata*.

The specimen taken on migration in Malacca Strait was identified as *tardus* by Robinson and Kloss and is one of the specimens of *tardus* discussed by Robinson (1927). This specimen appears to have come from a population intermediate between *nicobarica* and nominate *brunneata*. In coloration it is much closer to *nicobarica*, but its bill (18) and wing tip as defined above (3.5) are intermediate.

Since the breeding grounds of *nicobarica* are unknown, my statement of range refers to that of the species as a whole. It must be noted, however, that since all the specimens examined from Great and Little Nicobar are unmistakably *nicobarica*, nominate *brunneata* may not reach the Nicobars. The breeding grounds of *nicobarica* are probably somewhere in eastern China, for according to Yen (1933) the breeding populations of this region differ slightly in coloration by being more or less rufous or olive above. Yen, unfortunately, was not aware of possible differences in the shape of the wing tip.

***Rhinomyias brunneata brunneata* Slater**

Siphia brunneata H. H. SLATER, 1897, Ibis, p. 175; type locality, Kuatun [near Chungan], northwestern Fukien.

SPECIMEN EXAMINED: Northwestern Fukien: Kuatun, May 5, 1 ♂ (U.S.N.M.).

***Rhinomyias brunneata nicobarica* Richmond**

Rhinomyias nicobarica RICHMOND, 1902, Proc. U. S. Natl. Mus., vol. 25, p. 295; type locality, Pulo Kunyi, Great Nicobar.

Rhinomyias tardus ROBINSON AND KLOSS, 1915, Jour. Federated Malay States Mus., vol. 26, p. 29; type locality, Genting Bidai, Selangor-Pahang boundary.

SPECIMENS EXAMINED: Malacca Strait: One Fathom Bank Lighthouse [about 15 miles from land off Selangor], November, 1 ♂ (U.S.N.M.). Nicobars: Great Nicobar, 1 ♂ (the type of *nicobarica*), 2 ♂, 2 ♀, 1 subad. ♀ (U.S.N.M.); 1 ♂, 2 ♀ (A.M.N.H.); 1 unsexed ad. (M.C.Z.). Little Nicobar: 1 subad. ♂, 1 subad. ♀ (U.S.N.M.). All specimens from Little and Great Nicobar were taken from March 2 to 21.

ECOLOGY AND HABITS OF THE SPECIES

Apparently this species, unlike *olivacea*, hides in the undergrowth and does not behave like a true flycatcher. According to Yen (1933), in Kwangsi, where it arrives about the second week of April and leaves around the middle of July, "It is very wild and always hides in dense thickets." In Fukien, according to La Touche (1925), "It is a shy bird, and frequents the thickest bamboo undergrowth in the woods." Yen and La Touche both remark upon its "powerful" or "loud" song.

Rhinomyias umbratilis Strickland

Trichostoma umbratile STRICKLAND, 1849, in Jardine, Contributions to ornithology, p. 126, pl. 35; type locality, Borneo.

Alcippe pectoralis SALVADORI, 1868, Atti R. Accad. Sci. Torino, vol. 3, p. 530; type locality, Borneo.

Muscicapa infuscata BLYTH, 1870, Ibis, p. 165; type locality, Sumatra, Java, and Borneo.

Cyornis albo-olivacea HUME, 1877, Stray Feathers, vol. 5, p. 488; type locality, Malacca.

Rhinomyias umbratilis richmondi STONE, 1902, Proc. Acad. Nat. Sci. Philadelphia, vol. 54, p. 686; type locality, Pulo Mansalar, western Sumatra.

Rhinomyias umbratilis eclipsis OBERHOLSER, 1912, Smithsonian Misc. Coll., vol. 60, no. 7, p. 12; type locality, Tana Masa Island, Batu Islands, western Sumatra.

DESCRIPTION: The diagnosis of this species is best given through comparison (see *brunneata*).

SPECIMENS EXAMINED: Malay States: Pahang, Gunong Tahan, 3 ♂, 1 ♀ (A.M.N.H.), 1 ♀ (U.S.N.M.); Perak, Tanjong Malim, 1 ♂, 1 ♀; Bukit Tangga, 1 ♀ (A.M.N.H.). Lingga Island: "peak, 1000 feet," 1 ♀ (U.S.N.M.), 1 ♂, 1 ♀ (A.M.N.H.). Western Sumatra islands: Batu islands, Tana Masa, 1 ♂ (the type of *eclipsis*); Mansalar Island, 1 unsexed ad. (the type of *richmondi*), (U.S.N.M.). Natuna Islands: Great Natuna, Mt. Ronai, 1 juv. ♀. Borneo: Southwest, Riam, Kotawaringin River, 1 ♂ (A.M.N.H.); east, Sungai Ritan, 1 ♂ (U.S.N.M.); north, Benkoker River, 1 ♂, 1 ♀; Lawas, 1 ♂; Labuan Island, 1 unsexed ad.; Brunei, Tutong River, 1 ♀ (A.M.N.H.); "Sarawak," 1 unsexed ad.; Sandakan, Kalabakang River, 1 ♀, 1 unsexed ad. (M.C.Z.).

RANGE: Malay Peninsula south of Trang, Sumatra (Chasen), western Sumatran islands (Batu and Mansalar), eastern Sumatran islands (Lingga), Billiton (Chasen), Karimata (Chasen). North Natuna Islands, the whole of Borneo with the exception of the mountains of the north.

DISCUSSION: The various populations examined show no

evidence of geographical variation. The pectoral band varies slightly in width and coloration and may be more or less invaded by the white of the throat but in the two larger populations (Malay States and Borneo) the range of variation is similar and purely individual.

"*Rhinomyias umbratilis richmondi*" and "*eclipsis*" were described on single specimens, Stone citing also another single specimen from Lingga as agreeing with "*richmondi*" which is said to be more olive, less "tawny brown," than the type of *umbratilis*. But Stone compared these two specimens only with this type, which is more than a hundred years old and undoubtedly has become browner through foxing. Oberholser compared his lone specimen only with "*richmondi*" which he states is "decidedly" larger. I have examined the specimens of Stone and Oberholser and cannot separate them in any way from my series of topotypical *umbratilis* from Borneo. For measurements, see table 2.

ECOLOGY AND HABITS: According to Chasen (1939) this bird is "a forest species, with a preference for submontane localities. . . . It is usually seen alone, hawking for insects from a tree in the usual flycatcher manner." It has been collected also near the coast, in lowlands, and one of the specimens examined was collected at 4600 feet on Gunong Tahan. It is the only *Rhinomyias* found in the lowlands of southern and eastern Borneo.

Rhinomyias ruficauda

DESCRIPTION OF THE SPECIES: This species, above, is rufous brown, more or less tinged with olive, and the tail is red-brown or bright reddish chestnut; below, it is whitish, more or less tinged with gray on the breast and flanks, and the pectoral band is obsolete or reduced to vague traces in *samarensis*. Generally speaking, this species is the brightest *Rhinomyias* on the upper parts and the palest below.

GEOGRAPHICAL VARIATION: This species consists of five races: nominate *ruficauda* on Basilan, *samarensis* on Mindanao, Samar, and possibly Bohol and Leyte, *ocularis* in the Sulus, *ruficrissa* on Kinabalu, and *isola* in the mountains of Sarawak. The geographical variation is fairly well marked but since it is not easy to describe without repetition and possible confusion, the various races are compared and contrasted in table 1.

TABLE 1
GEOGRAPHICAL VARIATION IN *Rhinomyias ruficauda*

Race	Back	Tail	Under Parts	Under Tail Coverts	Eye Ring
A ^a	Rufous brown tinged with olive	Bright reddish chestnut	Whitest, pectoral band obsolete, breast tinged with grayish ^b	White or whitish	None
B	As in A	As in A but slightly duller	Pectoral band ^c relatively marked	Usually ^d white or whitish	None
C	Dullest	Red-brown	As in A but breast grayer	As in A	Present ^e
D	As in C but more olive	As in C	As in C	Slightly buffy ^f	None
E	Darkest, richest rufous brown	As in C but slightly darker	Breast darkest and grayest	Buffy ^g	None

^a A, nominate *ruficauda*; B, *samarensis*; C, *ocularis*; D, *ruficrissa*; E, *isola*.

^b In nominate *ruficauda*, and to a lesser extent in *ruficrissa*, the sides of the upper throat and ear coverts are grayish instead of brownish.

^c The pectoral band is obsolete, except in *samarensis* where there are traces of a faint olive brown band; in the other races the breast is grayish to a varying degree.

^d Buffy in five of 32 specimens.

^e The eye ring is chestnut.

^f White or whitish in two of eight specimens.

^g White in one, slightly buffy in one, distinctly buffy in three of five specimens.

Rhinomyias ruficauda ruficauda Sharpe

Setaria ruficauda SHARPE, 1877, Trans. Linnaean Soc. London, new ser., vol. 1, p. 327; type locality, Isabela, Basilan.

Rhinomyias ruficauda basilanica HACHISUKA, 1932, Bull. Brit. Ornith. Club, vol. 52, p. 110; type locality, Basilan.

SPECIMENS EXAMINED: Basilan: Isabela, 1 ♂, 1 ♂?, 2 ♀, 1 ♀?, 1 imm. ♀ (U.S.N.M.); 15 kilometers northeast of Maluso, 1 ♀, 1 unsexed ad. (M.C.Z.); no locality, 1 unsexed ad. (A.M.N.H.).

RANGE: Basilan.

REMARK: "*Rhinomyias ruficauda basilanica*" Hachisuka is a pure synonym.

Rhinomyias ruficauda samarensis Steere

Setaria samarensis STEERE, 1890, A list of the birds . . . collected by the Steere expedition to the Philippines, p. 16; type locality, "Mindanao, Samar," here restricted to Samar.

Rhinomyias ruficauda mindanensis MEARNS, 1909, Proc. U. S. Natl. Mus., vol. 36, p. 439; type locality, Pantar, Mindanao.

SPECIMENS EXAMINED: Samar: Bonga, 3 ♂, 1 ♀ (A.M.N.H.); Catbalogan, 1 ♀ (A.M.N.H.), 1 ♂, 6 ♀, 2 subad. ♀ (U.S.N.M.), 1 ♂, 1 ♀ (M.C.Z.). Mindanao: Zamboanga, Katipunan, Saluyong, 1 ♂; Katipunan, Sigayan, 1 ♀ (C.N.H.M.); San Roque River canyon above Zamboanga, 1 ♂; Catagan, 2 ♂, 1 ♀; above Catagan, 1 ♀; Pantar, 1 ♂ (the type of *mindanensis*), 1 ♀ (U.S.N.M.); Lake Lanao, 2 ♂, 2 ♀ (A.N.S.P.); Davao, 1 ♀; Santa Cruz, 1 ♀; Piso, 1 ♂ (A.M.N.H.).

RANGE: Samar and Mindanao. The populations of Bohol and Leyte were not examined and may belong to this race.

DISCUSSION: Mearns separated the population of Mindanao as *mindanensis* on the basis of its being larger than the population of Samar and of slight differences in the color of the upper parts. In the good series examined from these two islands, which include Mearns' material, the variation in the color of the upper parts is very slight and runs within the same narrow range in both series. A detailed comparison of all measurements in both sexes shows a difference only in the case of the wing length of the males; males from Mindanao measure: 76, 76, 76, 76, 77, 77, 78, 80 (77.0); from Samar: 74, 74, 75, 75, 75 (74.6). Since all other measurements overlap, including the wing length of females, I believe that this difference is too slight to warrant the recognition of *mindanensis*, particularly since color differences are lacking.

Rhinomyias ruficauda ocularis Bourns and Worcester

Rhinomyias ocularis [sic] BOURNS AND WORCESTER, 1894, Occas. Papers Minnesota Acad. Nat. Sci., vol. 1, p. 28; type locality, "Sulu, Tawi Tawi."

SPECIMENS EXAMINED: Sulu, 1 ♂ (the type of *ocularis*), 3 ♂, 1 ♀; Tawi Tawi, 2 ♀ (U.S.N.M.).

RANGE: Sulu Archipelago.

Rhinomyias ruficauda ruficrissa Sharpe

Rhinomyias ruficrissa SHARPE, 1887, Ibis, p. 441; type locality, Mt. Kinabalu, north Borneo.

SPECIMENS EXAMINED: Kinabalu: 3000 feet, 1 ♀ (the type of *ruficrissa*), 1 ♀ (A.M.N.H.); Kiau, 3100 feet, 1 ♂, 1 imm. ♀ (M.C.Z.); 4800 feet, 1 ♀ (C.N.H.M.); 7000 feet, 1 ♂; no altitude, 1 ♀, 1 unsexed ad. (A.M.N.H.).

RANGE: North Borneo (Mt. Kinabalu).

Rhinomyias ruficauda isola Hachisuka

Rhinomyias ruficauda isola HACHISUKA, 1932, Bull. Brit. Ornith. Club, vol. 52, p. 110; type locality, 3500 feet, Mt. Dulit, Sarawak.

SPECIMENS EXAMINED: Sarawak: Mt. Dulit, 3500 feet, 1 ♂ (the type of *isola*) (A.M.N.H.); 4000 feet, 1 ♂ (A.N.S.P.); Mt. Penrisen, 1 ♀; Mt. Kalulong, 1 ♂ (A.M.N.H.); "Dutch Borneo," Pajau River, 1000 meters, 1 ♀ (M.C.Z.). This last specimen was collected on November 30, 1925, by E. Mjöberg. Mr. Peters has kindly tried to find this locality, but he states that Mjöberg furnished no itinerary, and his localities are uncertain. The only Pajau River I can find flows from Mt. Makitai on the border of Sarawak.

RANGE: The mountains of Sarawak.

DISCUSSION: Chasen (1935) states that he accepts *isola* "only after much hesitation" because the characters do not seem to be constant. In the specimens I have examined, however, the characters are constant and quite distinct.

ECOLOGY AND HABITS OF THE SPECIES

Very little information is available on the ecology of this species and, apparently, none as to its habits. According to collectors' notes and to localities, it seems to be a dweller of the deep forest, where it is probably confined to the undergrowth. It has been taken in "deep forest" on Basilan, the "forests" of the Sulus, and Whitehead (1899) took it in "the tree-forests of Samar and Leyte." On Borneo it is a montane form and was taken from 3500 to 4000 feet on Mt. Dulit, and on Kinabalu from 3000 to about 5000 feet, and once at 7000. According to Pendlebury and Chasen (1932) on Kinabalu the "primary high forest" extends from 3500 to 6000 feet but reaches farther down in some places. At 3100 feet at Kiau, where specimens have been collected, the secondary and primary forests meet. Above 6000, or from 5000 on some spurs of the mountain, to about 9000 feet the primary forest is replaced by the very dense "mossy forest" where *ruficauda* is replaced by the larger and heavier *R. gularis*. According to notations on the labels of specimens collected in the Sulus, this species eats fruits as well as insects. The fruit-eating habit in *Rhinomyias* is mentioned above under *R. oscillans*.

Rhinomyias colonus

DESCRIPTION OF THE SPECIES: Above, olive brown, more or

less tinged with rufous and with a red-brown tail. Below, very dingy grayish buff tinged with olive, with scarcely or little white on the center of the abdomen, pectoral band obsolete, throat dingy white.

GEOGRAPHICAL VARIATION: This species consists of three slightly differentiated races, nominate *colonus* in the Sulas, *subsolanus* in the eastern peninsula of Celebes, and *pelingensis*, a new race described here, from Peling Island, Banggai Archipelago in the Molucca Sea. According to its description, *subsolanus* is apparently the most rufous race, for it is said to be "somewhat browner, less olive" on the back and edges of the wings and to have the base of the tail brighter red-brown than nominate *colonus*; the under parts were not compared. *R. pelingensis* differs from nominate *colonus* by being somewhat paler above, more olive, less brown, and by having the pattern of the under parts more contrasting, the lower part of the throat touching the breast being almost pure white, while the breast is more uniformly pigmented and averages darker and is more sharply defined from the center of the abdomen which is a little whiter.

Rhinomyias colonus is obviously closely related to *R. ruficauda* and was probably derived from the Philippines. Of the Philippine races of this last species (*ocularis* of the Sulus, nominate *ruficauda* from Basilan, and *samarensis* from Mindanao), *R. colonus* is closer to *ocularis* in size, proportions, shape and size of the bill, and general coloration, though it lacks the eye ring, and its under parts are much less pure.

***Rhinomyias colonus colonus* Hartert**

Rhinomyias colonus HARTERT, 1898, Novitates Zool., vol. 5, p. 131; type locality, Sula Mangoli.

SPECIMENS EXAMINED: Sula Archipelago: Mangoli, 1 ♂ (the type of *colonus*), 2 ♂, 1 imm. ♂, 2 ♀; Besi, 1 ♀ (A.M.N.H.).

RANGE: Sula Archipelago.

***Rhinomyias colonus subsolanus* Meise**

Rhinomyias colonus subsolanus MEISE, 1932, Ornith. Monatsber., p. 80; type locality, Tonkean, eastern Celebes.

Not examined. Known only from the type in the collection of the Dresden Museum destroyed in the past war.

RANGE: Known only from the type locality near the tip of the eastern peninsula of Celebes.

REMARK: According to Meise, the unique specimen of *sub-solanus* was wrongly identified as *Malacopteron affine* Blyth by Meyer and Wigglesworth (1898) who state that it was immature. However, the description of this specimen by Meyer and Wigglesworth and by Meise show that it was adult.

***Rhinomyias colonus pelingensis* Vaurie, new subspecies**

SPECIMENS EXAMINED: Peling Island, 1 ♂ (the type of *pelingensis*), 1 ♂, 1 ♀ (M.C.Z.).

RANGE: Peling Island, Banggai Archipelago, Molucca Sea.

This new race is compared and described above under *Rhinomyias colonus*, Geographical Variation. For measurements, see table 2. The type (M.C.Z. No. 270511) was collected on July 31, 1938, by J. J. Menden, and the other two specimens were taken on July 8 and August 18 by the same collector.

ECOLOGY AND HABITS OF THE SPECIES

Unknown. The only notation, on labels of the specimens from Peling, is that they were taken in the plains.

Rhinomyias gularis

DESCRIPTION AND GEOGRAPHICAL VARIATION: This species is distinctly larger and more heavily built than the other *Rhinomyias*. It consists of four very well-marked races: nominate *gularis* in the mountains of northern Borneo, *albigularis* on Negros and Guimaras, *insignis* in the mountains of northern Luzon, and *goodfellowi* in the mountains of southeastern Mindanao. The geographical variation is discussed in part in the introductory section of this paper, but the species as a whole may be briefly described here. Upper parts vary from rufous brown (nominate *gularis*), more or less tinged with olive (*albigularis* and *insignis*), to dark slate (*goodfellowi*). Below, the throat patch is white, variable in size but always very conspicuous; the pectoral band is sharp and bold, olive brown, and the belly white in *albigularis*; or the pigment of the band runs into that of the flanks and invades all but the center of the abdomen in the other races, this pigment varying from grayish olive (nominate *gularis*), to brownish buff (*goodfellowi*), to very strong rufous olive turning to bright red fawn on the lower flanks in *insignis*. A broad and very conspicuous pure white super-

ciliary band, variable in length, is present in *insignis* and *goodfellowi*, reaching to the nape in *insignis*, and in *goodfellowi*, judging by the published illustrations (Ogilvie-Grant, 1906; Hachisuka, 1935), to the area just behind the eye, or the band is broad but buffy in nominate *gularis*, or lacking or only vaguely shown in *albigularis*. Under tail coverts white in *insignis* and *goodfellowi*, whitish or tinged with buff in nominate *gularis*, or dingy white tipped with buff in *albigularis*. The tarsus varies in length (fig. 3) and the bill in width and shape (fig. 5); these variations in the tarsus and bill are discussed above under Relationships.

Although three of these four races are strongly differentiated, their characters, as stated in the introductory section, intergrade with those of *albigularis*, which is still very close to the other *Rhinomyias*. The differentiation of *insignis* and *goodfellowi*, which are most distinct, and of nominate *gularis*, which is less so, probably arose as a result of their isolation in the widely separated mountain ranges of northern Luzon, southeastern Mindanao, and northern Borneo. In these mountains, furthermore, these three races are narrowly restricted to a certain type of forest which occurs at high altitudes, and, judging by the specimens on record, the populations of *insignis* and *goodfellowi* are very small. The last is known only from the type, although Mt. Apo has been well collected by a number of expeditions. Northern Luzon has been fairly well collected, but only a few specimens of *insignis* have been taken: six by Whitehead (1899) on Mt. Benguet, and I have examined another taken by Rivera in the same province in April, 1930. It was not found by the recent expedition of the Chicago and Philippine museums to northern Luzon. This expedition collected, among other localities, on Mt. Data from April 2, to May 4, 1946.

***Rhinomyias gularis gularis* Sharpe**

Rhinomyias gularis SHARPE, 1888, Ibis, p. 885; type locality, Kinabalu, northern Borneo.

SPECIMENS EXAMINED: Northern Borneo: Kinabalu: 7000 feet, 1 ♂ (the type of *gularis*), 1 ♂, 1 imm. ♂, 1 ♀ (the allotype of *gularis*), 1 ♀ (A.M.N.H.); Lumu Lumu, 5500 feet, 3 ♂, 3 subad. ♂, 1 ♀, 1 subad. ♀, 1 imm. ♀ (M.C.Z.); no altitude, 4 ♂, 1 ♀, 2 imm. ♂ (A.M.N.H.), 1 ♂ (U.S.N.M.), 1 ♂, 1 ♀ (A.N.S.P.). Northern Sarawak: Lawas, 1 ♀ (A.N.S.P.); this last specimen was almost certainly not taken at Lawas which is on the coast.

RANGE: The mountains of northern Borneo, perhaps only Kinabalu.

***Rhinomyias gularis albigularis* Bourns and Worcester**

Rhinomyias albigularis BOURNS AND WORCESTER, 1894, Occas. Papers Minnesota Acad. Nat. Sci., vol. 1, p. 27; type locality, Bais, Negros.

SPECIMENS EXAMINED: Negros: Base of Canboan [Canlaon] Volcano, 2 ♂, 1 ♀ (A.M.N.H.); Bais, 1 ♂, 1 ♂ ? (the cotypes of *albigularis*) (U.S.N.M.); Pagyabunan, 1000 feet, region of Bais, 3 ♂; Kabongahan, region of Bais, 1 ♂; southern Negros, Lake Balinsasayao, 2500 feet, 1 ♂; southern Negros, region of Tolong, Naliong, 1500–2000 feet, 8 ♂, 1 imm. ♂, 3 ♀; region of Tolong, Candomao, 1000 feet, 1 ♂; region of Tolong, Balangbang, 1500 feet, 1 ♀ (C.N.H.M.).

RANGE: Negros, Guimaras (Bourns and Worcester).

***Rhinomyias gularis insignis* Ogilvie-Grant**

Rhinomyias insignis OGILVIE-GRANT, 1895, Bull. Brit. Ornith. Club, vol. 4, p. 40; type locality, Mts. of Lepanto [Mt. Data], northern Luzon.

SPECIMENS EXAMINED: Northern Luzon: Benguet, Haight's Place [about 6500 feet], 1 ♂; Lepanto, Mt. Data, "nearly 8000 feet," 1 ♂, 1 ♀ (the cotypes of *insignis*), 1 ♂, 1 ♀ (A.M.N.H.).

RANGE: The mountains of northern Luzon.

***Rhinomyias gularis goodfellowi* Ogilvie-Grant**

Rhinomyias goodfellowi OGILVIE-GRANT, 1905, Bull. Brit. Ornith. Club, vol. 16, p. 17; type locality, Mt. Apo, 8000 feet, southeastern Mindanao.

Not examined; known only from the unique type in the British Museum. Illustrated in color by Ogilvie-Grant (1906) and by Hachisuka (1934); the latter illustration shows the pattern and coloration better.

RANGE: Southeastern Mindanao (Mt. Apo).

ECOLOGY AND HABITS OF THE SPECIES

Apparently nothing is recorded as to the behavior of this species which ecologically appears to be strictly a dweller of the very dense forest where it is probably a bird of the undergrowth. On Negros and Guimaras, according to Bourns and Worcester (1894), *albigularis* "is a deep woods form." The labels with data of the specimens I have examined from Negros state that the birds bred "in deep forest" or were found "feeding on low trees in deep forest" at altitudes ranging from 1000 to 2000 feet.

The specimens collected on Canlaon Volcano were taken at the base of the mountain by Whitehead (Ogilvie-Grant and Whitehead, 1898).

The other three races are found only in the dense mossy forest at high altitude. On Kinabalu, nominate *gularis* replaces *R. ruficauda* (see this species) at a higher altitude and in the mossy forest. This forest usually starts at around 6000 feet, but according to Pendlebury and Chasen (1932) at Lumu Lumu, at 5500 feet where many of the specimens examined were collected, this forest extends farther down and is very tall and dense and very mossy. According to Hoogstraal (1951), on Mt. Apo where *goodfellowi* was found at 8000 feet, the mossy forest extends to about 7000 feet on the east slope and to 8000 and higher on the north slope. According to the same author, on Mt. Data in northern Luzon where *insignis* was first found at "nearly 8000 feet," this mountain "supports a well-developed mossy forest" at this altitude.

NIDIFICATION: A nest of *albigularis* was found on Negros by Whitehead on March 31. According to Ogilvie-Grant and Whitehead (1898) the nest was found at the base of Canlaon Volcano. "The nest, composed of moss and lined with fine roots, was placed in a hole in an old rotten tree about six feet from the ground." The clutch was composed of two eggs. "In general appearance these eggs strongly resemble one type laid by the Common Robin. Measurements 23 mm. \times 17 mm." This is the only description of the nest and eggs of a *Rhinomyias* I have found in the literature. The nidification of the other *Rhinomyias* may be unknown, for it is unknown according to Chasen (1939) in the case of the two more common species, *olivacea* and *umbratilis*, and is unknown in the case of *brunneata* according to La Touche (1925).

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TABLE 2
MEASUREMENTS OF THE ADULTS EXAMINED OF THE GENUS *Rhinomyias*

N	Wing	Tail	Tarsus	Bill
<i>addita</i> , Buru				
2 ♂	85, 86 (T) ^a	62 (T), 64	17.5, 18.2 (T)	16 (T), 16.5
3 ♀	79, 80, 80	56, 57, 58	17, 18, 18	15.5, 15.5, 16
Nominate <i>oscillans</i> , southern Flores				
3 ♂	75, 76 (T), 78	52 (T), 54, 56	17, 17, 17.5 (T)	15.5, 16, 16 (T)
1 ♀	76	56	17.5	16
<i>oscillans stresmanni</i> , Sumba				
5 ♂	82-87 (84.2)	60-64 (61.2)	17-19 (17.8)	18-19 (18.4)
6 ♀	78-82 (80.5)	54-59 (57.1)	18-19 (18.3)	17.5-18.5 (18.0)
Nominate <i>olivacea</i> , peninsular Siam				
3 ♂	74, 75, 76	54, 58, 59	15.5, 17, 17.5	15.5, 16.5, 17
5 ♀	70-76 (73.0)	51-56 (54.2)	16-17.5 (16.8)	15-16.5 (16.0)
Nominate <i>olivacea</i> , Sumatra				
1 ♂	75	59	18	15.5
4 ♀	73, 75, 75, 77	58, 58, 59, 61	16, 17.5, 17.5, 18	15.5, 16.2, 16.2, 17
Nominate <i>olivacea</i> , western Java				
2 ♂	73, 73	57, 58	17, 17.5	16, 16.5
Nominate <i>olivacea</i> , Bali				
4 ♂	78 (T), ^b 78, 79, 81	61 (T), 63, 64, 64	17.5, 18 (T), 18, 18	16.5, 17 (T), 17, 17
4 ♀	72, 72, 73, 74	54, 57, 57, 59	17, 17, 17.5, 18	16, 16, 17, 17
Nominate <i>olivacea</i> , northern Borneo				
1 ♂	75	58	17.5	16
1 ♀	76	59	16.5	17

^a Denotes the type.

^b Type of "*R. pectoralis baliensis*."

TABLE 2—Continued

Nominate <i>brunneata</i> , northwestern Fukien and Malacca Strait ^c	81,° 82	55,° 60	15, 16 ^c	17, 18 ^c
2 ♂				
<i>brunneata nicobarica</i> , Great Nicobar	75, 78, 79 (T), 80	54, 55, 56, 60 (T)	15.5, 16, 17 (T), 17	19 (T), 19, 19, 20
4 ♂	75, 76, 77, 80	53, 55, 56, 61	15, 16, 16, 16.5	all 19
4 ♀				
<i>umbratilis</i> , lower Malay Peninsula	78, 78, 78, 80	62, 63, 63, 64	17, 17, 17, 17.5	17, 18, 18.5, 19
4 ♂	74, 75, 75, 80	57, 58, 59, 65	15, 15, 16, 16.5	17, 17, 17.8, 18.5
4 ♀				
<i>umbratilis</i> , Lingga Island	80	65	15	17.5
1 ♂	73, 74	57, 58	16, 16.5	17, 17.5
2 ♀				
<i>umbratilis</i> , Batu Island (the type of "R. u. <i>eclipsis</i> ")	79	63	17	18.5
1 ♂				
<i>umbratilis</i> , Mansalar Island (the type of "R. u. <i>richmondi</i> "), unsexed	82	64	17	19
<i>umbratilis</i> , southwestern and eastern Borneo				
2 ♂	75, 79	61, 63	14, 17.5	18, 18.2
<i>umbratilis</i> , northern Borneo				
2 ♂	79, 81	61, 65	16.5, 16.5	17, 18
3 ♀	75, 78, 81	57, 64, 64	15, 16.5, 16.5	17.5, 18, 18.5
3 ^d	79, 81, 82	62, 63, 68	16.5, 17, 17.5	18, 19, 19.5
<i>ruficauda ruficrissa</i> , Kinabalu, northern Borneo				
2 ♂	76, 78	58, 59	15, 16	17.5, 18.5
4 ♀	72 (T), 74, 75, 75	52 (T), 54, 55, 56	15 (T), 15, 15.5, 16	18 (T), 18, 18, 18.5

^c Malacca Strait; see text.^d Unsexed.

TABLE 2—Continued

<i>ruficauda isola</i> , mountains of Sarawak					
3 ♂	71 (T), 76, 78	52 (T), 54, 61	15.5 (T), 15.5, 16.5	[17] (T), 18, 18.5	
2 ♀	77, 77	58, 58	16, 16	17, 17	
<i>ruficauda ocularis</i> , Sulus					
4 ♂	78, 79 (T), 80, 80	63 (T), 65, 66	17 (T), 18, 18, 18	17.5 (T), 18, 18, 18.5	
3 ♀	75, 76, 77	60, 60, 62	16.5, 17, 17.5	17, 17.2, 18.5	
Nominate <i>ruficauda</i> , Basilan					
2 ♂	73, 77	54, 57	15, 16	17, 17.5	
4 ♀	70, 70, 71, 71	50, 50, 51, 52	15, 15.5, 15.5, 16	16, 16, 16, 16.5	
♂ ^d	71, 76	54, 58	16, 16	15, 18	
<i>ruficauda samarensis</i> , Mindanao					
7 ♂	76-80 (77.0)	55-59 (57.3)	15-16.5 (16.1)	17-19 (17.9)	
8 ♀	71-76 (74.3)	49-55 (53.6)	15-16.5 (15.6)	16-18.5 (17.7)	
♂ ^e	76	54	16	17.5	
<i>ruficauda samarensis</i> , Samar					
5 ♂	74-75 (74.6)	54-56 (55.4)	15-16.5 (15.8)	17-18 (17.7)	
8 ♀	70-76 (71.7)	48-55 (51.3)	14.5-16 (15.2)	16-18 (17.0)	
Nominate <i>colonus</i> , Sulus					
3 ♂	77 (T), 78, 78	60, 62, 66 (T)	19, 20, 20 (T)	18, 18, 19 (T)	
3 ♀	70, 74, 74	55, 55, 57	17, 17, 18	16.5, 17, 17.5	
<i>colonus pelingensis</i> , Peling Island					
2 ♂	76, 78 (T)	62, 65 (T)	18, 19 (T)	17, 17.5 (T)	
1 ♀	74	58	19	18	
Nominate <i>gularis</i> , Kinabalu, northern Borneo					
10 ♂	86-90 (87.6)	55-61 (58.6)	21-23.5 (22.8)	19-21 (20.3)	
6 ♀	83-88 (84.9)	55-62 (56.9)	21-23 (22.1)	19.5-20 (20.0)	

^d Unsexed.^e Type of "*R. ruficauda mindanensis*."

TABLE 2—Continued

Types of nominate <i>gularis</i> , ♂ and ♀		♂ 90, ♀ 83	♂ 58, ♀ 56	♂ 22.5, ♀ 22	♂ 19, ♀ 20
<i>gularis albigularis</i> , Negros					
18 ♂		84-91 (88.0)	58-66 (62.9)	19-21 (20.0)	18.5-21 (19.7)
5 ♀		83-86 (83.8)	56-61 (58.4)	19-20 (19.4)	19-20 (19.2)
<i>gularis insignis</i> , northern Luzon					
3 ♂		90 (T), ^f 92, 93	66 (T), 67, 68	27 (T), 27, 28	19.5, 20 (T), 21
2 ♀		86, 88 (T) ^f	60 (T), 61	26, 27 (T)	19.5 (T), 20.5

^f Designated cotypes on original labels.