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Notes on a hitherto unknown specimen of *Neolesbia nehrkorni* (Berlepsch, 1887; Trochilidae) with a discussion of the hybrid origin of this 'species'

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In 1887, Berlepsch reported on a magnificent ("überaus prächtiges") specimen of hummingbird that his friend Adolph Nehrkorn from Riddagshausen (near Braunschweig, Germany) had recently received in a collection of about 200 skins from 'Bogotá' (Colombia; see Chapman 1917: 14). He described it as a new species, *Cyanolesbia nehrkorni*, in a publication treating hummingbirds from Bogotá collections (Berlepsch 1887a). Later he provided a detailed description of *Cyanolesbia nehrkorni*, and added a colour plate (Berlepsch 1887b). However, in both papers he offered doubts concerning the generic affinity of the new species because it differed distinctly from the other two species of the genus, which are now treated as *Agelaiocercus kingi* and *A. coelestis* (e.g. Wolters 1975–82, Hilty & Brown 1986). Subsequently, Salvin (1892) placed it in a monotypic genus, *Neolesbia*.

Neolesbia nehrkorni is a medium-sized hummingbird with a predominantly blue plumage. The bill is slightly decurved and of about the same length as the head. The tail is long and deeply forked, the rectrices blue with a violet sheen. There are some greenish-blue feathers in the head, neck and back. Forehead and crown are lighter blue-coloured than the general plumage.

Specimens

Whereas Berlepsch (1887a, 1887b) mentioned a unique adult male that he had in his private collection, Salvin (1892) stated that the species is "known from two specimens. That submitted to me is of the usual Bogota make, and was sent to Count Berlepsch by Mr Nehrkorn, who possesses the second specimen." Simon (1921: 306) indicated that only a single specimen is known, whereas Berlioz & Jouanin (1944) added that according to Salvin (1892) there may be a second individual. Peters (1945: 49) also mentioned two specimens.

While preparing a list of the Colombian bird species, Meyer de Schauensee (1947) cited two specimens that had not been mentioned previously. Both are from 'Bogotá' and still exist in the collections of the American Museum of Natural History, New York (AMNH no. 484177, ad. [?] ♂), and the Academy of Natural Sciences of Philadelphia (ANSP no. 159261 [ad. ♂]).

The type specimen is apparently lost. Berlepsch's collection was acquired by the Forschungsinstitut Senckenberg at Frankfurt/Main, but the *Neolesbia* specimen is missing today and there is no indication what happened to it (D. S. Peters, pers. comm.). J. Steinbacher (*in litt.*) added that the Frankfurt collection suffered some losses during the last war and that the type of *Neolesbia nehrkorni* might have been sent to the Museum für Naturkunde der Humboldt-Universität zu Berlin, but the specimen is not there at present. Many small bird skins were lost during the last war (G. Mauersberger, pers. comm.). Today it appears impossible to determine whether, as stated in Salvin's (1892) note, a second specimen once existed in the Nehr Korn collection or not. In Nehr Korn's handwritten catalogue (now in the Staatliches Naturhistorisches Museum Braunschweig), species no. 145 in the hummingbird section is recorded as "Neolesbia nehrkorni, Berl. ♂ Bogota", no. 1850 of his collection. No date is given and we are not able to determine if this specimen was the one given to Berlepsch (and perhaps sent back to Nehr Korn after 1887?) or was the second specimen mentioned by Salvin (1892). The Nehr Korn skin collection was later acquired by the Braunschweig museum but there is no *Neolesbia* specimen there today.

Fortunately, we were able to discover another, hitherto unpublished specimen of *Neolesbia nehrkorni* in the collection of the Museum Heineanum Halberstadt (MHH no. I 6843 A1, ad. ♂). The label indicates "Colombia: Sta. Fé de Bogotá (v. [=from] W. Gehlsen, Barranquilla). Sammlung (=collection) R. H. Jung." Jung, a private collector of Jena, had received the specimen in 1924 from A. L. Butler who probably obtained it (directly?) from W. Gehlsen. In 1936, the Museum Heineanum Halberstadt purchased the Jung collection. Although an additional new MHH label indicates "Sammlung Schlüter", this famous merchant of natural history specimens of Halle/Saale never owned this bird. Thus, there exist no more than 4 (or 5?) specimens of *Neolesbia nehrkorni*, all males.

Among the specimens of *Neolesbia nehrkorni*, there is some variation in both colouration and measurements (Table 1). Meyer de Schauensee (1947) reported on differences between the description of the type specimen (Berlepsch 1887b) and the specimen in the Academy of Natural Sciences of Philadelphia (shape and colour of the crown patch, size and colour of the throat patch, breast and belly colours, feathering of the tarsi, and shape and length of the bill) as well as between that and the specimen in the American Museum of Natural History (shape and colour of the throat patch, colour of the crown, and shape and length of the bill). Meyer de Schauensee (1947) emphasized some slight colour differences between the description of the type specimen (Berlepsch 1887b) and the accompanying colour plate (tail, back, crown, throat and underparts). The specimen in the Museum Heineanum Halberstadt (MHH) more

TABLE 1

Measurements (mm) of male specimens of *Neolesbia nehrkorni* (furca = difference between longest and shortest pairs of rectrices; * = moult of rectrices)

Specimen	Bill	Wing	Outer rectrices	Inner rectrices	Furca	Reference
Type specimen	19.25	63.5	67.5	27	40.5	Berlepsch 1887a, 1887b
MHH I 6843 A1	19	64	66.5	25.5	41	—
AMNH 484177	17	61.5	*	*	*	Meyer de Schauensee 1947
ANSP 159261	15.5	67.5	65	29	36	Meyer de Schauensee 1947

closely resembles the description of the type specimen. A “greenish mixture” is missing in the crown patch as well as in the lower back and most of the underparts, “a kind of broad golden breast band” is lacking but there is some greenish colouration in the breast, and the outer tail feathers are as violet-blue as the remaining pairs. There is no indication of tarsal feathers. The measurements of the MHH specimen are very similar to those of the type specimen. With the exception of these slight differences, the MHH specimen matches Berlepsch’s description. Measurements of the specimens are presented in Table 1.

Neolesbia nehrkorni was considered to be an extremely rare though valid species. It might be regarded as an extremely rare or already extinct valid species, an unknown plumage variation of a well-known hummingbird species, or a hybrid. We favour the last of these, and provide arguments to corroborate our assumption.

Hybrid origin

Berlepsch (1887a, 1887b) considered *Neolesbia nehrkorni* to be perfectly valid (“ausgezeichnete neue Species”) and several subsequent authors (Salvin 1892, Boucard 1895, Hartert 1900, Cory 1918, Peters 1945) saw no reason to doubt it. However, probably influenced by the existence of only a single specimen in collections, Simon (1921: 85) stated that he would not be surprised if this bird turned out to be a hybrid between *Lesbia* and *Thalurania*, but he did not provide reasons for this speculation. Later authors adopted the possible hybrid origin of *Neolesbia nehrkorni* and offered several species pairs as possible parents (Table 2). Meyer de Schauensee (1947), however, was “inclined to doubt the hybrid origin of *Neolesbia*; it somehow does not have the ‘look’ of a hybrid”. Later, Meyer de Schauensee (1948–52, 1966) offered two different possibilities of hybrid origin (Table 2), and *Neolesbia* fell into oblivion.

Our attempts to determine the real identity of *Neolesbia nehrkorni* are based on the examination of two specimens (AMNH no. 484177, R.W.D.; MHH no. I 6843 A1, C.H. and B.N.), literature descriptions (Berlepsch 1887a, 1887b, Salvin 1892, Hartert 1900, Meyer de Schauensee 1947), and comparison with all species of hummingbirds found in Colombia (based on the compilation of Hilty & Brown 1986). In particular, we

TABLE 2

Possible parent species of the hybrid hummingbird *Neolesbia nehrkorni* according to several authors. With the exception of Hinkelmann, Nicolai & Dickerman, these opinions are not supported by morphological character analyses

<i>Lesbia</i> sp. × <i>Thalurania</i> sp.	Simon 1921, Berlioz 1927, 1929, Gray 1958
<i>Thalurania</i> sp. × <i>Cyanolesbia</i> [= <i>Agelaiocercus</i>] <i>kingi</i>	Berlioz & Jouanin 1944
<i>Thalurania nigrofasciata</i> × <i>Agelaiocercus kingi</i>	Meyer de Schauensee 1948–52
<i>Agelaiocercus kingi</i> × <i>Ramphomicron microrhynchum</i>	Meyer de Schauensee 1966
<i>Thalurania furcata nigrofasciata</i> × <i>Agelaiocercus kingi</i>	Wolters 1975–82
	Hinkelmann, Nicolai & Dickerman (this paper)

investigated species with either a relatively long, slightly decurved bill, or a long forked tail. These striking characters are both found in *Neolesbia* and, if of hybrid origin, should point to the parent species; in Colombia, there are no hummingbird species with both characters. Thus, if *Neolesbia* is in fact of hybrid origin, its striking bill and tail characters should be intermediate between two parent species.

Colombian hummingbird species of similar body mass to *Neolesbia nehrkorni* (estimated from all measurements) and occurring within 400 km of Bogotá with (a) a relatively long (18–25 mm) slightly decurved bill are: *Chrysuronia oenone*, *Chalybura buffonii*, *Thalurania furcata* and *T. colombica* (considered a subspecies of *T. furcata* by some authors); or with (b) a long forked tail are: *Lesbia victoriae* and *Agelaiocercus kingi*. Because geographic variation within *A. kingi* has not been satisfactorily analysed (K.-L. Schuchmann, pers. comm.), we do not consider the different subspecies of this species. Below, we present our reasons for excluding most of the possible species pairings as well as those for suggesting the most probable hybrid origin of *Neolesbia nehrkorni*.

The tail feathers of *Chrysuronia oenone* are narrower than those of *Agelaiocercus kingi* and *Lesbia victoriae*, which in turn are narrower than those of *Neolesbia*. In *Neolesbia*, there is no trace of shining golden coppery colouration of tail and tail coverts, and no red in the lower mandible as in *C. oenone*. Besides, in Colombia *C. oenone* occurs from sea level to 1500 m whereas *L. victoriae* is found above 2600 m. Thus, the two species may hardly come into contact.

Chalybura buffonii has prominent white under tail-coverts whereas in *A. kingi* they are green-iridescent and in *L. victoriae* ochraceous. *Neolesbia*, however, has greenish-blue iridescent under tail-coverts with white margins. *Neolesbia* also has shorter wings than *A. kingi* or *C. buffonii*. *Lesbia victoriae* has shorter wings than *Neolesbia* and *C. buffonii*. Both species lack iridescent under tail-coverts and blue colouration elsewhere except for some bluish tinge on the throat and blue lower sides of the rectrices in *C. buffonii*.

Thalurania furcata, *T. colombica* and *L. victoriae* have shorter wings than *Neolesbia*. Both *Thalurania* species occur in Colombia below 2000 m whereas *L. victoriae* is found above 2600 m in the Colombian Andes.

TABLE 3

Measurements (mm) of adult male specimens of *Agelaiocercus kingi*, *Thalurania furcata nigrofasciata* and *T. colombica* from Colombia (ZFMK specimens), and of adult male *Heliangelus regalis* from Peru

	n	Bill		Wing (chord)		Tail	
		mean	range	mean	range	mean	range
<i>Agelaiocercus kingi</i>	10	13.5	12.5–14.5	65.4	62–68	132.4	115–148
<i>Thalurania furcata nigrofasciata</i>	4	20.5	19.5–21.5	55.1	54–57.5	40.6	38–42
<i>Thalurania colombica</i>	10	17.9	17.5–19	54.9	53.5–56	40.0	37–45
<i>Heliangelus regalis</i> *	5	13.7	13.4–14.2	53.4	52.5–54.5	52.4	50.5–55
<i>Heliangelus regalis</i> (ZMUC 64198)	1	14		54.5		53	

*From Fitzpatrick *et al.* (1979)

Again, *Lesbia victoriae* may hardly come into contact with the *Thalurania* species in nature.

The offspring of an *Agelaiocercus kingi* × *Ramphomicron microrhynchum* (a suggestion offered by Meyer de Schauensee 1966 and Wolters 1975–82) would probably have a very short and straight bill similar to both parent species. The bill of *Neolesbia*, however, is longer than in both species and is, with the exception of the straight-billed ANSP specimen, slightly decurved.

Most probably *Neolesbia nehrkorni* is a hybrid between *Agelaiocercus kingi* and either *Thalurania furcata nigrofasciata* (the only subspecies occurring in Colombia) or *T. colombica*. The bill in *Neolesbia* is longer than in *A. kingi* and slightly shorter than in *T. furcata*, but of equal length with that of *T. colombica*. The wing of *Neolesbia* is slightly shorter than in *A. kingi* but longer than in *T. furcata* or *T. colombica* (Table 3). Several other characters appear to be intermediate between those of *A. kingi* and the two species of *Thalurania*: under tail-coverts, length as well as width and colour of the rectrices, colouration of lower breast and belly, tarsal feathers, wing-coverts, and the extension of nostril feathering (Fig. 1). A character of *Neolesbia* very similar to *A. kingi* is the non-iridescent inner halves of the central rectrices, whereas the underparts of the tail feathers and their black rachis point to *Thalurania*.

The contribution of *A. kingi* appears certain but it is more difficult to determine whether *T. furcata nigrofasciata* or *T. colombica* participated in the hybrid origin of *Neolesbia*. *T. colombica* has more blue colouration in its plumage (forecrown and most feathers of mantle, scapulars and wing-coverts are violet-blue instead of green), while *T. f. nigrofasciata* has a longer bill; both characters seem to be important prerequisites to create the particular appearance of *Neolesbia nehrkorni*.

In Colombia, *T. colombica* occurs in the lowlands west of the Andes as well as in the lower regions west of the eastern slopes of the Eastern Cordillera from sea level to 1900 m. *T. furcata* is limited to the lowlands east of the Andes; its altitudinal distribution ranges from sea level to 1800 m though most records are from below 1200 m. *Agelaiocercus kingi*

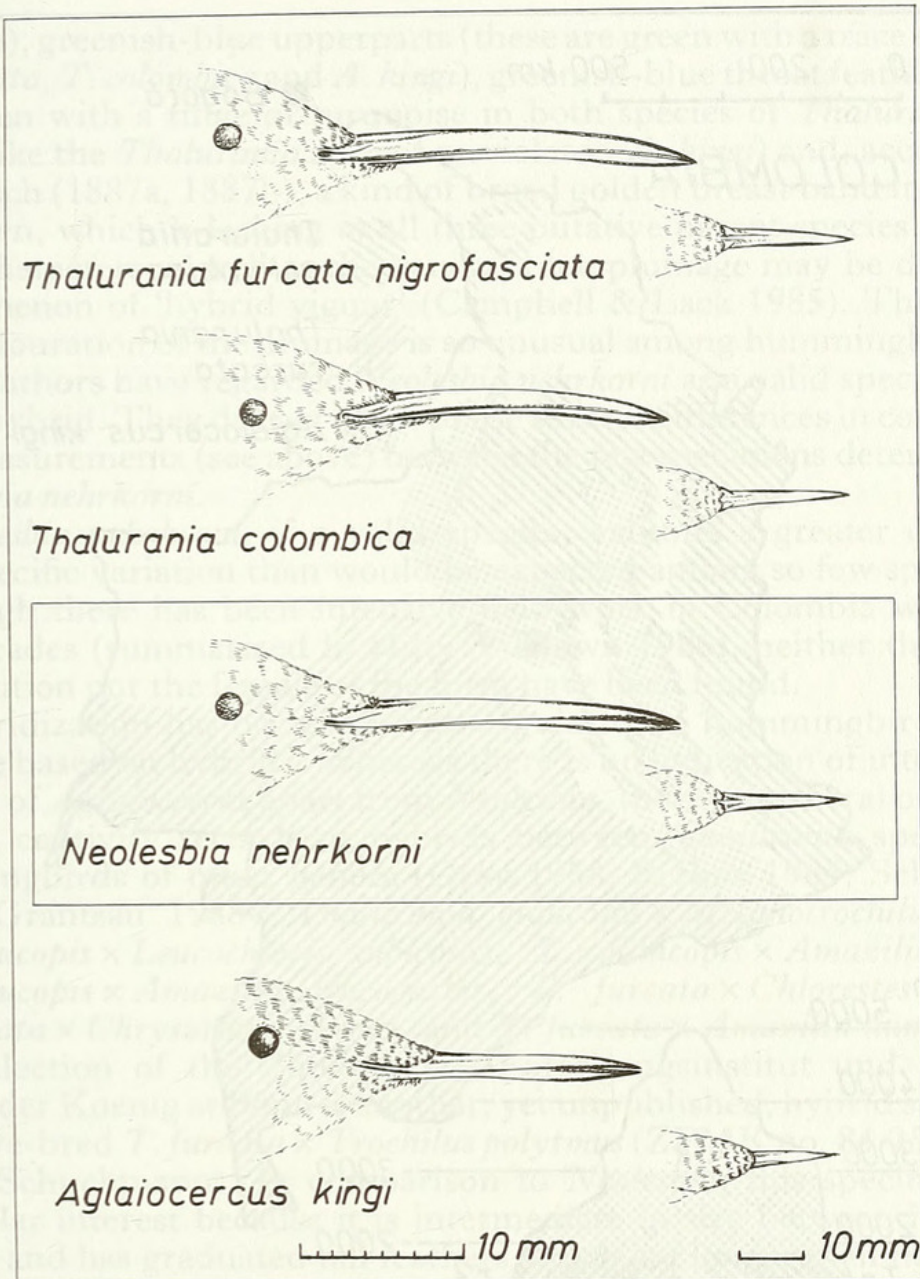


Figure 1. Heads of *Thalurania furcata nigrofasciata*, *T. colombica*, *Neolesbia nehrkorni* and *Aglaiocercus kingi*, demonstrating the different bill lengths and bill shapes as well as the various extensions of nostril feathering (based on specimens in the Museum Heineanum Halberstadt).

inhabits the Central Cordillera and some parts of the Western and Eastern Cordilleras above 1400 m (Fig. 2). The habitat preferences of all three species are more or less alike: humid and wet forest borders. The *Thalurania* species also occur in humid and wet forests, while *A. kingi* also inhabits second growth bushland, bushy clearings and similar habitats. They are probably rarely in contact in nature due to their altitudinal separation. However, this situation may be particularly liable to provide opportunities for *A. kingi* and the species of *Thalurania* to hybridize because where they may occasionally meet, at *Thalurania*'s upper altitudinal limit and *A. kingi*'s lower limit, opportunities to find a conspecific mate may well be reduced. This would be especially likely in the case of *A. kingi* and *T. furcata nigrofasciata* as there is less overlap in their altitudinal

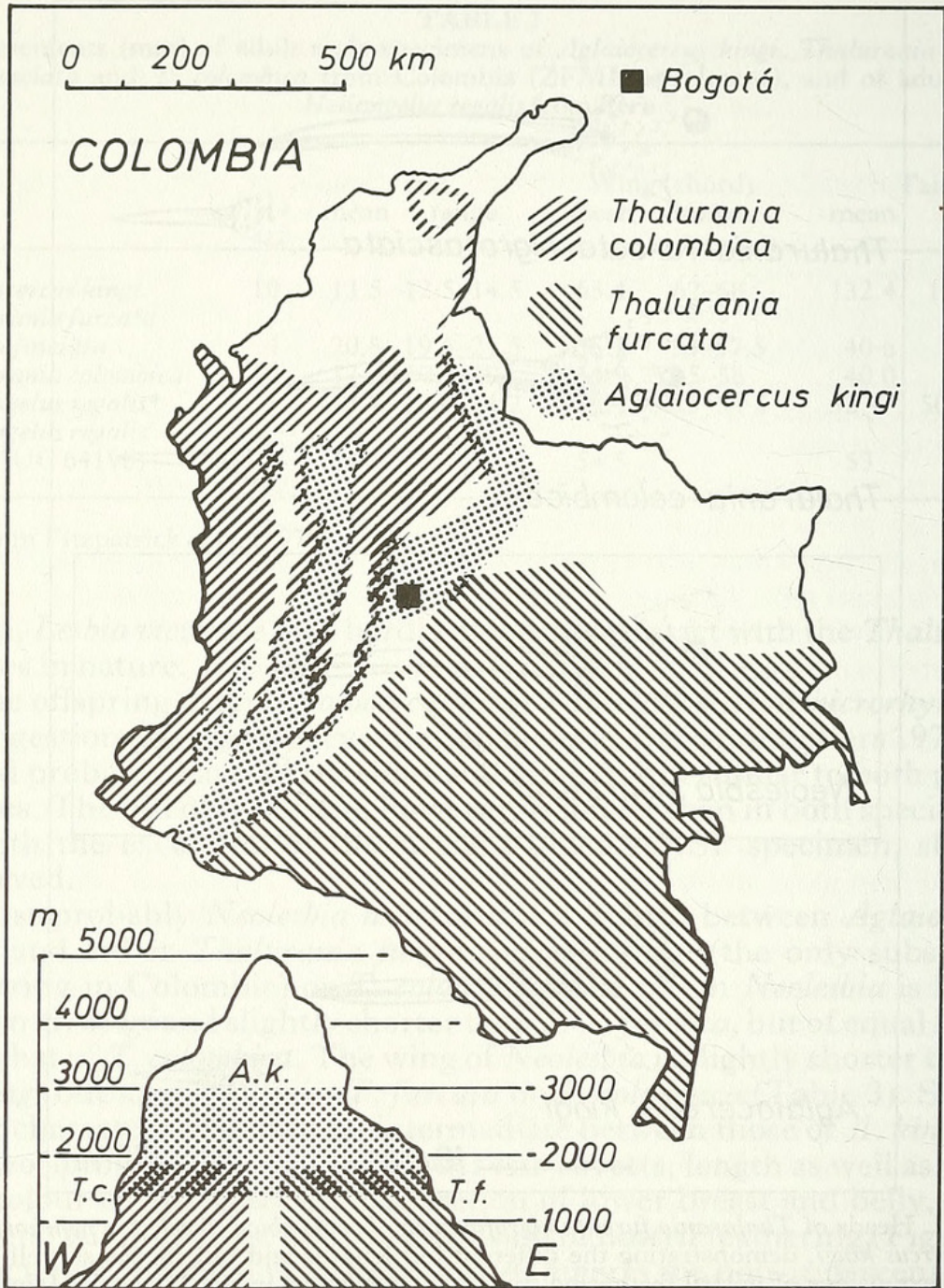


Figure 2. Geographical and altitudinal distributions of *Thalurania furcata*, *T. colombica* and *Aglaiocercus kingi* in Colombia (modified after Hilty & Brown 1986).

ranges than there is between *A. kingi* and *T. colombica*. Furthermore, the fact that the bill-length of *Neolesbia* is intermediate between that of *A. kingi* and *T. furcata nigrofasciata*, but not between that of *A. kingi* and *T. colombica* (being the same as that of *T. colombica*), suggests that *A. kingi* and *T. furcata* are the most likely parent species.

Though many characters point to the hybrid origin of *Neolesbia nehrkorni*, there are others which are difficult to reconcile with the suggestion that *Neolesbia* is the result of hybridization between *Aglaiocercus* and *Thalurania*: blue upper tail-coverts with a trace of violet (these are green in *T. furcata* and bluish-green in *T. colombica* and

A. kingi), greenish-blue upperparts (these are green with a trace of blue in *T. furcata*, *T. colombica* and *A. kingi*), greenish-blue throat feathers (these are green with a tinge of turquoise in both species of *Thalurania*, and either like the *Thalurania* species or violet in *A. kingi*) and, according to Berlepsch (1887a, 1887b), a kind of broad golden breast band in the type specimen, which is lacking in all three putative parent species. Perhaps these characters as well as the general blue plumage may be due to the phenomenon of 'hybrid vigour' (Campbell & Lack 1985). The general blue colouration of the plumage is so unusual among hummingbirds that many authors have regarded *Neolesbia nehrkorni* as a valid species rather than a hybrid. They did not know of the several differences in colouration and measurements (see above) between the few specimens determined as *Neolesbia nehrkorni*.

Neolesbia nehrkorni, if a valid species, exhibits a greater degree of intraspecific variation than would be expected among so few specimens. Although there has been intensive field-work in Colombia within the last decades (summarized in Hilty & Brown 1986), neither the precise distribution nor the female of the form have been found.

Hybridization has occurred with regularity in hummingbirds; many taxa are based on hybrids. Whereas there is no indication of intergeneric pairing of *Agelaiocercus* apart from *Neolesbia*, there are several obvious as well as captivity records of hybrids between *Thalurania* species and hummingbirds of other genera (Gray 1958, Berlioz 1964, Scheithauer 1975, Grantsau 1988): *Thalurania glaucopis* × *Melanotrochilus fuscus*, *T. glaucopis* × *Leucochloris albicollis*, *T. glaucopis* × *Amazilia lactea*, *T. glaucopis* × *Amazilia leucogaster*, *T. furcata* × *Chlorestes notatus*, *T. furcata* × *Chrysuronia oenone*, and *T. furcata* × *Amazilia dumerilii*. In the collection of the Zoologisches Forschungsinstitut und Museum Alexander Koenig at Bonn is another, yet unpublished, hybrid specimen, a captive-bred *T. furcata* × *Trochilus polytmus* (ZFMK no. 84.251, ♂, leg. K.-L. Schuchmann). In comparison to *Neolesbia*, this specimen is of particular interest because it is intermediate in size between its parent species and has graduated tail feathers which are longer than those of *T. furcata*, but shorter than the extremely elongated rectrices (pair next to the outermost) of *T. polytmus* males. In this hybrid specimen, the pair of rectrices next to the outermost are slightly longer than the outermost, but in general the tail appears very similar to that of *Neolesbia nehrkorni*.

Comparison with *Heliangelus regalis*

Until recently, *Neolesbia nehrkorni* appeared to be the only 'species' of hummingbird with an almost entirely blue plumage. However, in 1979 Fitzpatrick *et al.* described a new species from a semi-isolated mountainous area in northern Peru, *Heliangelus regalis*, which to date is known from only two localities along the Eastern Andes of northern Peru (Davis 1986). Males of this species have almost the entire plumage dark blue, with some variation in the blue colouration of the forecrown and slight iridescence on the body feathers. Like *Neolesbia*, *Heliangelus regalis* has a relatively long tail with dark blue rectrices graduated in length, the two outer pairs being slightly bowed inward. Because the descriptions and

illustrations of both taxa appeared very similar at first glance, we compared males of *Neolesbia nehrkorni* and *Heliangelus regalis* (*N. nehrkorni* MHH no. I 6843 A1—*H. regalis* ZMUC [Zoologisk Museum Copenhagen] no. 64198, ad. ♂, leg. Niels Krabbe, 3 September 1983, trail from San José de Lourdes to La Unión, S. Cordillera del Condor, N. Cajamarca, Peru, 1850 m, C.H. and B.N.; *N. nehrkorni* AMNH no. 484177—*H. regalis* AMNH no. 823987 [holotype] and 823988 [imm. ♂], R.W.D.). *Neolesbia* has a longer and heavier bill than *Heliangelus regalis*, which has a needle-like, straight bill. In general, *H. regalis* is smaller than *N. nehrkorni* (Table 3). Whereas *Neolesbia* has small, scale-like iridescent feathers on the chin and throat as well as on the crown, these are not different from the other body feathers in *Heliangelus regalis*. Feathers of the under tail-coverts are greenish-blue and iridescent in *N. nehrkorni*, but non-iridescent dark blue in *H. regalis*. There are also some slight differences in colouration and iridescence of hind neck, back and wing feathers, and the gradation of the rectrices is different. However, the superficial similarity between *Neolesbia nehrkorni* and *Heliangelus regalis* is impressive.

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Distribution and habitat selection of *Buteo polyosoma* and *B. poecilochrous* in Bolivia and neighbouring countries

by J. Cabot

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Buteo polyosoma and *B. poecilochrous* are two South American hawks with overlapping ranges. The distribution of the former includes the range of the latter. *B. polyosoma* occurs in central Colombia (perhaps only as a migrant; Hilty & Brown 1986), the Pacific lowlands and Andean regions of Ecuador and Peru, Andean and Chaquean regions of Bolivia (Cabot & Serrano 1986, 1988), mountains and pre-Andean hills of western Argentina to Tierra del Fuego, the Malvinas, and locally in Córdoba and Buenos Aires Provinces, Chile (south to Cape Horn), Paraguay, and possibly accidentally in Uruguay and Brazil. The subspecies *exsul* inhabits the Juan Fernandez Islands (Blake 1977). *B. poecilochrous* is distributed in the high chains and altiplanos of the Andes from southwestern Colombia (also considered as a possible migrant; Hilty & Brown 1986) to northwestern Argentina and northern Chile (Blake 1977).

The two species overlap in size. In general *B. poecilochrous* is larger than *B. polyosoma*, but the female of the latter is about the same size as the male of the former. Furthermore, the two demonstrate similarity and variability in plumage types. *B. polyosoma* has five plumage types (Vaurie 1962), four of them virtually duplicated in *B. poecilochrous*. The overlapping geographical distributions and sizes of the two species, the similarity and variability of their plumages and the lack of field studies of both species have led some authors, in the past, to consider *B. poecilochrous* as individual variants (Hellmayr & Conover 1949) or an altitudinal form (Amadon in Vaurie 1962) of *B. polyosoma*. Also the paucity of reliable sex data on the labels of museum specimens has added to the confusion.



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