References:

Alvarez, L. W., Alvarez, W., Asaro, F. & Michel, H. V. 1980. Extraterrestrial cause for the Cretaceous-Tertiary extinction. *Science* 208: 1095–1108.

Becking, J. H. 1971. The breeding of *Collocalia gigas*. *Ibis* 113: 330–334.

Bleiweiss, R., Kirsch, J. A. W. & Lapointe, F.-J. 1994. DNA-DNA hybridization-based pylogeny for "Higher" nonpasserines: reevaluating a key portion of the avian family tree. *Mol. Phylogenet. Evol.* 3: 248–255.

Bock, W. J. & Miller, W. D. 1959. The scansorial foot of the woodpeckers, with comments on the evolution of perching and climbing feet in birds. *Amer. Mus. Novit.* 1931: 1–45.

Brooke, R. K. 1970a. Taxonomic and evolutionary notes on the subfamilies, tribes, genera and subgenera of the swifts (Aves: Apodidae). *Durban Mus. Novit.* 9: 13–24.

Brooke, R. K. 1970b. Zoogeography of the swifts. *Ostrich* Sup. 8: 47–54.

Caple, G., Balda, R. P. & Willis, W. R. 1983. The physics of leaping animals and the evolution of preflight. *Am. Nat.* 121: 455–476.

Chantler, P. & Driessens, G. 1995. *Swifts. A Guide to the Swifts and Treeswifts of the World.* Pica Press, Sussex.

Chiappe, L. M. 1995. The first 85 million years of avian evolution. *Nature* 378: 349–355.

Clark, H. L. 1906. The first 85 million years of swifts and hummingbirds. *Auk* 23: 68–91.

Clayton, D. H. & Harvey, P. H. 1993. Hanging nests on a phylogenetic tree. *Curr. Biol.* 3: 882–883.

Collins, C. T. 1983. A reinterpretation of pamprodactyly in swifts: a convergent grasping mechanism in vertebrates. *Auk* 100: 735–737.

de Queiroz, A. & Wimberger, P. H. 1993. The usefulness of behavior for phylogeny estimation: levels of homoplasy in behavioral and morphological characters. *Evolution* 47: 46–60.

De Roo, A. 1968. Taxonomic notes on Swifts, with description of a new genus (Aves: Apodidae). *Rev. Zool. Bot. Afr.* 77: 412–417.

Feduccia, A. 1996. *The origin and evolution of birds.* Yale University Press, New York.

Francis, C. M. 1987. *The management of edible bird's nest caves in Sabah.* Sabah Forest Department, Sabah.

Futuyma, D. J. 1986. *Evolutionary biology*, Second edition. Sinauer Associates, Sunderland, Massachusetts.

Glenny, F. H. 1955. Modifications of pattern in the aortic arch system of birds and their phylogenetic significance. *Proc. United States Nat. Mus.* 104: 525–621.

Harrison, C. J. O. 1984. A revision of the fossil swifts (Vertebrata, Aves, suborder Apodi), with descriptions of three new genera and two new species. *Meded. Werkgr. Tert. Kwart. Geol.* 21: 157–177.

Holmgren, J. 1993. Young Common Swifts roosting in foliage of trees. *Brit. Birds* 86: 368–369.

Karkhu, A. A. 1992. Morphological divergence within the order Apodiformes as revealed by the structure of the humerus. *Los Angeles County Museum of Natural History, Science Series* 36: 379–384.

Kennedy, M., Spencer, H. G. & Gray, R. D. 1996. Hop, step and gape: do the social displays of the Pelicaniformes reflect phylogeny? *Anim. Behav.* 51: 273–291.

King, B. 1987. The Waterfall Swift *Hydrochous gigas*. *Bull. Brit. Orn. Cl.* 107: 36–37.

Lanyon, S. M. 1992. Review of "Phylogeny and Classification of Birds. A study in Molecular Evolution". *Condor* 94: 304–307.

Lee, P. L. M., Clayton, D. H., Griffiths, R. & Page, R. D. M. 1996. Does behavior reflect phylogeny in swiftlets (Aves: Apodidae)? A test using cytochrome *b* mitochondrial DNA sequences. *Proc. Natl. Acad. Sci. USA* 93: 7091–7096.

Lowe, P. R. 1939. On the systematic position of the swifts (suborder Cypseli) and humming-birds (suborder Trochili), with special reference to their relation to the order Passeriformes. *Trans. Zool. Soc. Lond.* 24: 4: 307–348.

Marín, M. 1997. Some aspects of the breeding biology of the Black Swift. *Wilson Bull.* 109(2): 290–306.

Marín, M. & Stiles, F. G. 1992. On the biology of five species of swifts (Apodidae, Cypseloidinae) in Costa Rica. *Proc. West. Found. Vert. Zool.* 4: 287–351.

Mayr, E. 1988. *Toward a New Philosophy of Biology*. Harvard Univ. Press, Cambridge.

Mayr, E. & Bond, J. 1943. Notes on the generic classification of the swallows, Hirundinidae. *Ibis* 85: 334–341.

Paterson, A. M., Wallis, G. P. & Gray, R. D. 1995. Penguins, petrels, and parsimony: does cladistic analysis of behavior reflect seabird phylogeny? *Evolution* 49(5): 974–989.
Prum, R. O. 1990. Phylogenetic analysis of the evolution of display behavior in the Neotropical manakins (Aves: Pipridae). *Ethology* 84: 202–231.
Sarich, V. M., Schmid, C. W. & Marks, J. 1989. DNA hybridization as a guide to phylogenies: a critical analysis,. *Cladistics* 5: 3–32.
Sclater, P. L. 1865. Notes on the genera and species of Cypselidae. *Proc. Zool. Soc. Lon.* 39: 593–617.
Sibley, C. G. & Ahlquist, J. E. 1990. *Phylogeny and Classification of Birds. A Study of Molecular Evolution.* Yale Univ. Press, New Haven.
Somadikarta, S. 1968. The Giant Swiftlet, *Collocalia gigas* Hartert and Butler. *Auk* 85: 549–559.
Turner, A. & Rose, C. 1989. *Swallows and martins of the world.* Helm, London.
Whitacre, D. F. 1989. Conditional use of nest structures by White-naped and White-collared Swifts. *Condor* 91: 813–825.
Winkler, D. W. & Sheldon, F. H. 1993. Evolution of nest construction in swallows (Hirundinidae): A molecular phylogenetic perspective. *Proc. Natl. Acad. Sci. USA* 90: 5705–5707.

Address: J. Holmgren, Rödhakevägen 23, S-274 33 Skurup, Sweden.

On types of trochilids in the Natural History Museum, Tring. I. *Amazilia Sumichrasti* Salvin, in relation to morphology and biogeography within the *A. beryllina* complex

by André-A. Weller

Received 7 July 1997

Within the genus *Amazilia*, about 30 species (e.g. Peters 1945: 29, Walters 1980: 33, Sibley & Monroe 1990: 30) and numerous subspecies are recognized. Peters (1945; based on Simon 1921) gives the most complete list comprising 81 taxa and further types of uncertain status, many of which must be judged from an historical point of view. In certain cases only single specimens were available to the describer, and some of these were believed to be aberrant individuals or hybrids. Moreover, taxonomic work on *Amazilia* has been mainly restricted to selected taxa or species groups (subgenera). In view of their heterogeneous treatment in publications before and after Peters' check-list, further examination as presented in this study can throw new light on the validity of critical specimens or taxa. Here, I examine morphological variation within the Berylline Hummingbird, *Amazilia beryllina*, and ascribe *A. sumichrasti* to a distinct subspecies.

Material and methods

Geographic variation in coloration and morphometric data of *Amazilia* specimens in the Natural History Museum, Tring (BMNH) collection

(including types; see Warren 1966) were compared with those of specimens from other museums (see Acknowledgements). The analysis of differences in mensural characters between populations was based on measurements of the bill (proximal end of nasal operculum to tip), wings and tail (rectrices 1, 5). As colours in *Amazilia* species (subfamily: Trochilinae) are mainly iridescent, general descriptions of plumage patterns are subjective and comparisons were made with types or selected individuals. Other colours mentioned in the text refer to Smithe (1975). Subadult birds could be easily recognized mainly by the brownish borders of the body feathers (especially neck, rump), or brownish coloration of the breast and abdominal parts. Measurements of such birds were excluded from the analysis of mensural data.

Information on sex and localities of the specimens were obtained from their labels. However, in some cases the phenotypic characters or measurements indicated that a specimen was wrongly sexed. Collecting sites were located using various maps (scale: 1:4,000,000, 1:1,800,000) and monographs (Friedmann *et al.* 1950, Binford 1989), respectively. In order to obtain reasonable sample sizes, specimens from adjacent localities were grouped in "pools" (method after Vuilleumier 1968).

Results and discussion

Biogeography and morphology within the A. beryllina *group*

The current distribution of the races of *A. beryllina* centres on the Pacific slopes from Mexico to El Salvador. The species is a relatively common inhabitant of oak-rich woodlands, forest edges and shrub (Howell & Webb 1995). Morphologically, the most obvious geographic variation occurs in the dorsal plumage, including the tail. In the western states from Sonora to Guerrero, *A. b. viola* can be regarded the least contrasted taxon of the group. The plumage is dark golden green, similar to *A. b. beryllina*, but with a rufous lower belly and abdomen. The upperparts have sometimes a certain greyish tinge and show dark violet (172 in Smithe 1975) only in the tail coverts and rectrices. Some intergradation in the ventral coloration towards the nominate form can be observed in Michoacán specimens that possess reduced rufous parts abdominally. *A. b. beryllina* ranges from District Federal eastward to Veracruz (here reaching the Atlantic slope), and southward to northeastern Oaxaca, with an altitudinal distribution between 600 and 3,000 m. Concerning the dorsal coloration, more variation is recognizable in nominate *beryllina* than in *A. b. viola*, with copperish to purplish gloss on the lower back and rump. Besides, the rectrices in *A. b. beryllina* are more contrasting copper to rufous.

Within the southern *beryllina* forms, two striking colour morphs exist in the colour pattern of the tail. *A. b. lichtensteini* shows in both sexes a rather light gloss in the rectrices that can be best described as chrome-coloured (see Moore 1950); partially, the lateral parts are purplish. In contrast to all other races, this taxon inhabits a very limited area in western Chiapas that seems mainly to be restricted to the slopes of Cerro Brujo. *A. b. devillei* is the only member of the

species that occurs outside Mexico, in the highlands of southern Guatemala, El Salvador and central Honduras. It represents the richest coloured race of the *beryllina* group. Remarkably, the dorsal plumage is more golden to bronze-green than in all other forms. In particular, the upper tail-coverts and rectrices vary from copperish to intensive purple red. A common feature shared with *A. b. lichtensteini* is the less extended (visible), paler chestnut coloration at the wing base than in *A. b. beryllina* and *A. b. viola*.

From the arid valley of Rio Motagua, northeastern Guatemala, Carriker & Meyer de Schauensee (1935) described a questionable subspecies, *A. b. motaguae*. No validity was given to this taxon by following reviewers (e.g. Peters 1945, Land 1970). My examination of the type series revealed that the most important distinguishing characters (i.e. brownish tips in rectrices) should be mostly counted on juvenile or female characters. As there exists a relatively high amount of intraracial variation in *A. b. devillei*, the validity of *A. b. motaguae* should be rejected. Additionally, the southernmost Mexican population of *A. beryllina*, ranging from the coastal Atlantic slopes to the central mountainous areas of Chiapas, has been included in *A. b. devillei* (i.e. Friedmann *et al.* 1950, Howell & Webb 1995).

Morphological aspects and type locality of Amazilia Sumichrasti *(Salvin 1891)*

Holotype: BMNH 1887.3.22.1865, Santa Efigénia, Tehuántepec, Oaxaca, Mexico.

In its general appearance, the type resembles a highly coloured individual of the southernmost *beryllina* race *devillei*. Characteristic features are the relatively dark glittering green plumage, especially on the head, and below extending to the abdomen, the chestnut bases of the inner primaries and secondaries as well as the contrasting tail (see Salvin 1891). It is of interest that the colour of the latter shows a certain purplish gloss instead of only "coppery bronze" mentioned in the first description. As found in other members of the genus, the chin and upper throat feathers lack conspicuous white subterminal bars, suggesting the type to be a male.

The type locality is situated in extreme southeastern Oaxaca (Santa Efigénia). Thus, it has been believed by some authors to represent an extreme western example of *A. b. devillei* or an intermediate towards the nominate form (see below), respectively, although the collecting site is in particular close to the range of *A. b. lichtensteini*.

With the single type at hand, it was not possible to detect either significant morphological or morphometric differences in comparison to other *beryllina* races. The later comparison of a series of possible *A. b. devillei* specimens from Chiapas with typical representatives of the race from Guatemala (holdings of MLZ), with regard to the "unique" features of the *Sumichrasti* type, revealed evidence for the subspecific distinctness of the southern Mexican population of *A. beryllina*.

Taxonomic aspects

The taxonomic history of *A. Sumichrasti* is comparable to those of other single specimens once described as new taxa. Salvin & Godman