

COMMENTS ON THE OSTEOLOGY AND SYSTEMATICS OF THE NEW ZEALAND PASSERINES OF THE GENUS *MOHOUA*

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ABSTRACT

The osteology of the New Zealand genera *Mohoua* and *Finschia* shows that they are definitely not referable to the Pachycephalinae or any other group within the corvine assemblage. This is in contrast to Sibley and Ahlquist's original interpretation of their DNA-DNA hybridization studies and supports a recent reanalysis of that data by critics, who concluded that these genera belong among the "Passerida". Within that group, the relationships of *Finschia* and *Mohoua* remain uncertain. No osteological basis could be found for continuing to separate the genus *Finschia* from *Mohoua*. The three species in the expanded genus *Mohoua* show increasing specialization for use of the hindlimb in foraging and in order of most primitive to most derived should be listed as *M. novaeseelandiae*, *M. albicilla*, and *M. ochrocephala*. The last two species are very distinct from one another osteologically and are not to be regarded as subspecies of a single species.

Sibley & Ahlquist (1987) reviewed the taxonomic history of the New Zealand genera *Mohoua* and *Finschia* and investigated their relationships through DNA-DNA hybridization experiments. They concluded that *Mohoua* and *Finschia* were congeneric and that they belonged in the subfamily Pachycephalidae of the large Australasian corvine assemblage. Sarich *et al.* (1989:29) were severely critical of Sibley & Ahlquist's work, concluding that "virtually everything that they . . . have published on DNA hybrids" was "suspect until the actual data (that is, the raw scintillation counts) relevant to each claim of a resolved lineage are made available for general scrutiny."

Furthermore, Sarich *et al.* made a particular point of reanalyzing Sibley & Ahlquist's data concerning *Mohoua* and *Finschia* and found that the melting curves of these genera clearly placed them outside of the corvine assemblage and within the "Passerida", which includes the sylviid and acanthizid warblers.

Although the Whitehead (*Mohoua albigilla*) and the Yellowhead (*M. ochrocephala*) are quite distinct externally, at least one author (Mayr 1986) has lumped them into a single species. I examined the osteology of *Finschia* and *Mohoua* to see what light this might shed on their familial relationships and the number of genera and species involved.

MATERIAL EXAMINED

Skeletons: *Finschia novaeseelandiae* AM 320; *Mohoua albigilla* AM 317, NMNZ 22825; *M. ochrocephala* AM 318; NMNZ 16066; *Sericornis spilodera* USNM 489192; *Smicromis brevirostris* USNM 559031; *Acanthiza pusilla* USNM 492469; *Crateroscelis murina* USNM 489084; *Gerygone flavolateralis* USNM 561670, USNM 561675; *Ragologus leucostigma* USNM 559961; *Pachycephala pectoralis* USNM 557426; *Pitohui ferrugineus* USNM 489089; *P. dichrous* USNM 489088; *Falculculus frontatus* USNM 345150; *Colluricincla megarrhyncha* USNM 489099.

FAMILIAL RELATIONSHIPS

Finschia and *Mohoua* differ greatly from the Pachycephalinae in that they lack an ossified nasal septum (very well developed in the Pachycephalinae), the ectethmoid is much less inflated and does not extend laterally or ventrally as far as the quadratojugal bar, and the posterior expansion of the palatine is broad and truncate (except in *M. ochrocephala*) and lies nearly flat upon the ectethmoid, whereas in the Pachycephalinae there are large, pointed transpalatine processes that curve ventrally away from the ectethmoids, with most of the body of the expanded part being posterior to the ectethmoids.

The interorbital septum and anterior wall of the braincase in *Finschia* and *Mohoua* are more weakly ossified than in the Pachycephalinae. The tarsometatarsus is proportionately much longer and more slender than in the Pachycephalinae. Unlike all members of the corvine assemblage, including the Pachycephalinae, the humerus in *Finschia* and *Mohoua* is not pneumatic.

The black subterminal bar in the tail of *Finschia* is very reminiscent of the pattern observed among some members of the Acanthizinae (e.g. *Acanthiza pusilla*), for which reason I took pains to compare the osteology of the New Zealand genera with that group. The skull in *Mohoua* and *Finschia* is more similar to that in the Acanthizinae than the Pachycephalinae in the weaker ossification and lack of a nasal septum, but the configuration of the palatines and ectethmoids differs, although in the acanthizines the palatines do lie more on the ectethmoid than in the Pachycephalinae. The tarsometatarsus is slender in the acanthizines, as in *Mohoua*. The humerus is non-pneumatic in the Acanthizinae but differs from that of *Mohoua* in having the second fossa deeper and undercutting the head. All of the Acanthizinae examined have a well-developed carpometacarpal process, whereas this is absent in *Mohoua* and *Finschia* and may be present, absent, or weakly developed in the Pachycephalinae.

There is no convincing evidence from their osteology that *Mohoua* and *Finschia* are particularly closely related to the Acanthizinae, at least not to any of the genera in that group examined in this study. On the other hand, it is safe to say that on the basis of their osteology they do *not* belong in the Pachycephalinae or anywhere else in Sibley's group "Corvida", thus fully substantiating the reanalysis of the DNA data by Sarich *et al.* (1989).

VARIATION WITHIN *MOHOUA*

On the basis of their DNA data, Sibley & Ahlquist (1987) maintained that the degree of divergence between *Mohoua* and *Finschia* was no greater than that found between other congeneric species, and they thus suggested synonymizing *Finschia* Hutton, 1903, with *Mohoua* Lesson, 1835, so that the New Zealand Brown Creeper would become *Mohoua novaeseelandiae*. Considering that their analysis led them to place *Mohoua* in the wrong "Parvorder", it might also be questioned whether their data actually support a congeneric relationship for *Mohoua* and *Finschia*.

Nevertheless, on examination of their osteology, I could find no differences by which *Finschia* might reasonably be separated from *Mohoua*. The skulls of all three species are quite similar, the principal difference noted being that in *M. ochrocephala* there were distinct, broad transpalatine processes, whereas in *M. albicilla* and *F. novaeseelandiae* the posterior margins of the palatines were truncate and lacked these processes.

As discussed elsewhere (Olson 1990), the pelvis and hindlimb in *Mohoua* have become specialized for use of the feet in moving vegetation and litter while foraging. In this respect *Mohoua* is convergently similar to certain other passerines such as *Bowdleria* and *Orthonyx*. The species of *Finschia* and *Mohoua* show a decided gradation in their degree of specialization for this foraging behaviour, with *F. novaeseelandiae* being the most primitive and *M. ochrocephala* the most derived. In *F. novaeseelandiae* the pelvis is not markedly different from that of most passerines, with the anterior portions of the ilia being separated, although the postacetabular region is somewhat shortened. The femur is quite short and robust, which is the derived state, although the tibiotarsus is not particularly stout.

In *Mohoua*, the pelvis is much more specialized, with the anterior portions of the ilia enlarged and compressed laterally so that they meet on the midline and present a humped appearance in lateral view. The postacetabular portion is shortened and rotated ventrally. Although the hindlimb in *M. albicilla* is somewhat more robust than in *F. novaeseelandiae*, it is much more robust in *M. ochrocephala* than in either of the other two. The femur and tibiotarsus in *M. ochrocephala* are very broad and stout, with the proximal end of the tibiotarsus much more expanded and offset medially from the midline of the shaft (Figure 1). *M. ochrocephala* is also a considerably larger bird than *M. albicilla* (Figure 1).

To my knowledge, Mayr (1986) is the first author to list *Mohoua albicilla* as a subspecies of *M. ochrocephala*, an unparalleled example of compiler systematics that ignores such external differences as led earlier workers to place these two taxa in separate genera (Hutton 1903). Presumably the main reason for combining these species lies in their allopatric distributions, for which reason Mayr must feel compelled to lump any two congeneric populations no matter how different they may be.

Mohoua albicilla and *M. ochrocephala* are certainly very distinct species differing in plumage and external morphology, in size, and in degree of specialization of the hindlimb and pelvis. Although they are at present allopatric, it is difficult to conceive of their hybridizing if they were to come in contact. I see no reason why they could not coexist and perhaps they did

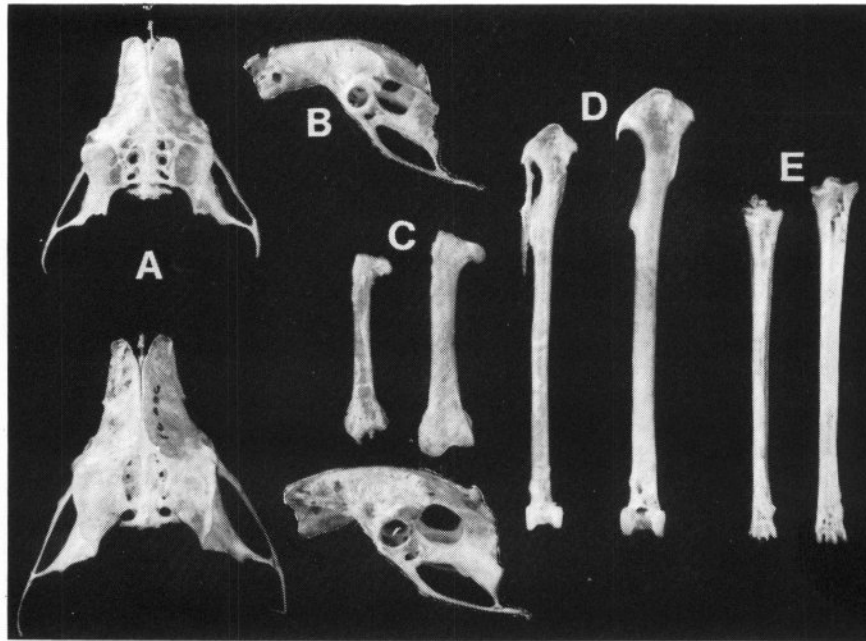


FIGURE 1 — Comparison of bones of the Whitehead *Mohoua albicilla* (NMNZ 22825) (top in A and B, on left in C-E) with those of the Yellowhead *M. ochrocephala* (NMNZ 16066) (bottom in A and B, on right in C-E). A, pelvises in dorsal view; B, pelvises in lateral view; C, femora; D, tibiotarsi; E, tarsometatarsi. Note how much larger and more robust is the Yellowhead, especially in the femur and tibiotarsus.

so in the past. Paleontologists in New Zealand should be alert to the possibility of finding one or the other species outside its historically known range.

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