

Order STRIGIFORMES
Family STRIGIDAE

Fossils of an extinct endemic genus of strigid owl have been recovered from four of the main Hawaiian Islands. In the following comparisons, the dissertation of Ford (1967) on the osteology of the Strigiformes proved useful. Ford found that postcranial differences between the various subgroups and genera of Strigidae were very slight or nonexistent, for which reason we have based our determination of the relationships of the new genus of Hawaiian owls mainly on characters of the skull. The generic groups are those of Ford (1967), with whom we found ourselves in agreement wherever we had appropriate material.

The new genus differs from the Tytonidae in possessing an ossified loop (retinaculum extensorii) on the anteroproximal face of the tarsometatarsus. Whereas this is not always ossified in the Strigidae, it is invariably unossified in the Tytonidae, from which there are numerous other differences as well.

Within the Strigidae, the skull in the *Asio* group has a distinctive shape caused partly by the "extensive vertical flattened area over the orbit" (Ford 1967:56-57). Another character of the *Asio* group not mentioned by Ford is the extremely long, slender zygomatic process. In *Aegolius* the auditory area is characterized by the extreme asymmetry of the tympanic wings. In the *Ninox* group and the *Surnia* group there is a distinctive dorsal process on the posterior portion of the quadratojugal bar and in the latter group the skull is very short and rounded, with a long, pointed supraorbital process (except in *Micrathene*), and a posteriorly directed ectethmoid. Because all of the preceding characters are lacking in the new Hawaiian owl, it is assumed that it was not derived from any of these groups.

The resemblances of the new genus are closest to the core of "typical" owls represented by the *Otus*, *Bubo*, and *Strix* groups. In size it is considerably larger than any of the *Otus* group except *Lophostrix*, and much smaller than any of the *Bubo* group. In *Otus* the interorbital septum is thin and fenestrate anteriorly. In *Bubo* the flattened area on the lateral surface of the frontals between the prefrontal bone and the supraorbital process is short and wide, and the rims of the middle trochlea of the tarsometatarsus are not equally developed (Ford 1967). In these respects, the new Hawaiian owl differs from the *Otus* and *Bubo* groups and resembles the *Strix* group. Within the *Strix* group, it differs from *Pulsatrix*, in which the rostrum is much deeper and wider and the frontal area is inflated so that the cranial roof is horizontal. The resemblance of the new Hawaiian owl is thus closest to *Strix* (including *Ciccaba*), particularly in the narrower, shallower, and more elongate rostrum, in which it differs from all other owls to which it could possibly be related.

Comparative material examined: Tytonidae. *Tyto glaucops* USNM 288593; *Phodilus badius*, USNM 20310.

Strigidae. *Otus* group: *Otus asio*, USNM 556918; *Otus* ("Gymnoglaux") *lawrencii*, USNM 554287. *Bubo* group: *Bubo virginianus*, USNM 553903; *Nyctea scandiaca*, USNM 491639; *Ketupa zeylonensis*, USNM 18999 [the differences between genera in this group are very slight]. *Strix* group: *Strix varia*, USNM 556919; *S. nebulosa*, USNM 556948; *S. aluco*, USNM 559072; *S. occidentalis* (skulls only), USNM 206148, USNM 221672; *S. uralensis*, 500252; *Ciccaba woodfordi*, USNM 291790; *Pulsatrix perspicillata*, USNM 18350. *Surnia* group: *Surnia ulula*, USNM 290337; *Glaucidium siju*, USNM 555176; *Micrathene whitneyi*, USNM 502286; *Athene noctua*, USNM 490358; *Athene* ("Speotyto") *cunicularia*, USNM 553670. *Aegolius* group: *Aegolius acadicus*, USNM 556838. *Ninox* group: *Ninox novaeseelandiae*, USNM 492457; *N. scutulata*, USNM 343047. *Asio* group: *Asio otus*, USNM 553816; *Asio flammeus*, USNM 553816; *Pseudoscops grammicus*, USNM 559185.

Grallistrix, new genus

Type species: *Grallistrix geleches*, new species.

Included species: *Grallistrix auceps*, new species; *G. orion*, new species; *G. geleches*, new species; *G. erdmani*, new species.

Distribution: Kauai, Oahu, Molokai, and Maui.

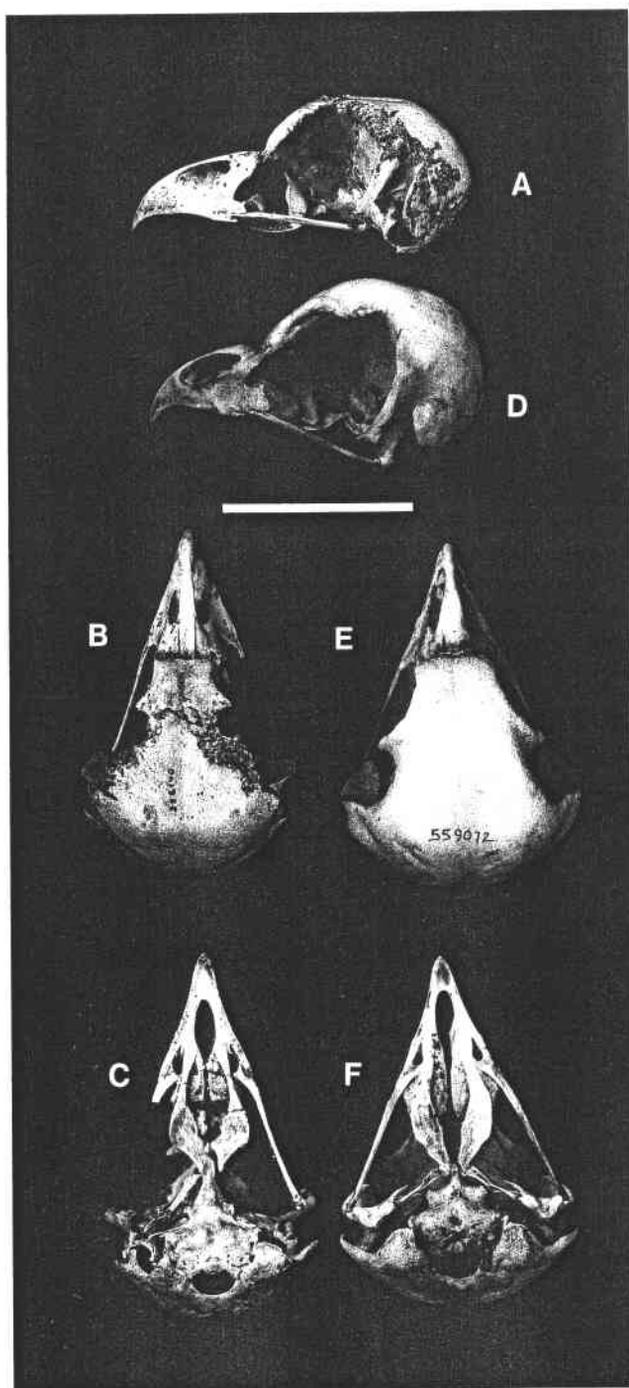


FIG. 20. Skull of *Grallistrix geleches*, new genus and species, holotype USNM 386140 (A–C), compared with *Strix aluco*, USNM 559072 (D–F): left lateral (A, D), dorsal (B, E), and ventral (C, F) views. Scale = 3 cm.

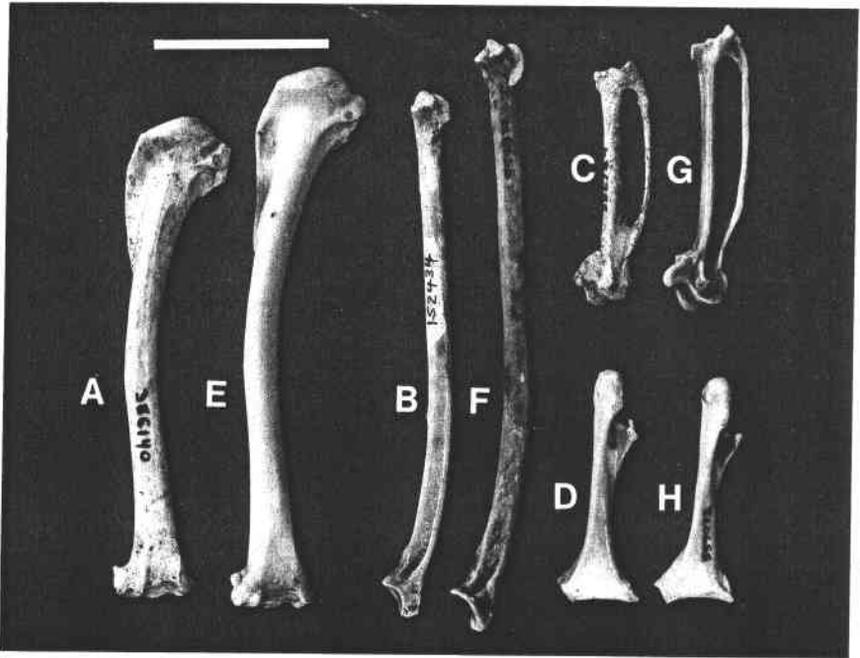


FIG. 21. Wing and pectoral elements of *Grallistrix geleches*, new genus and species (A–D), compared with *Strix aluco*, USNM 559072 (E–H): A, E, humerus (A, holotype USNM 386140); B, F, ulna (B, BBM-X 152434); C, G, carpometacarpus (C, USNM 386164); D, H, coracoid (D, BBM-X 147983). Scale = 3 cm.

Etymology: Latin, *gralla*, stilt, plus *strix*, owl, in reference to the extremely long legs that characterize the genus. The gender is feminine.

Diagnosis: Strigidae similar to *Strix* and different from other genera of owls in possessing the following combination of characters: narrow, elongate skull and rostrum (Fig. 20); posterior margin of orbit not vertically flattened; zygomatic process very short; interorbital septum thick, lacking fenestrae; flattened lateral portion of frontals long and thin; supraorbital processes short and triangular; ectethmoid directed straight ventrally; quadratojugal bar without dorsal process; tympanic wings not greatly asymmetrical; rims of middle trochlea of tarsometatarsus in distal view of about equal extent.

Differs from *Strix* in having the wing elements relatively much shorter (Fig. 21), but with the tibiotarsus and tarsometatarsus greatly elongated and slender (Fig. 22). The pedal phalanges are much wider and more robust (Fig. 23). The cranium is relatively narrower, the skull roof and maxillopalatines are markedly less inflated, the tympanic wing is deeper and less anteriorly projecting so that the space between the tympanic wing and postorbital process is greater (Fig. 20). In accordance with the narrower skull, the mandibular rami are less divergent; also the mandibular symphysis is relatively longer. The calcaneal ridge of the hypotarsus is shorter and wider.

Remarks: *Grallistrix* is so divergent from *Strix* that it was not possible to identify any of the living species of that genus as being more closely related to the insular derivative. In size, *Grallistrix* is rather small compared to most species of *Strix*.

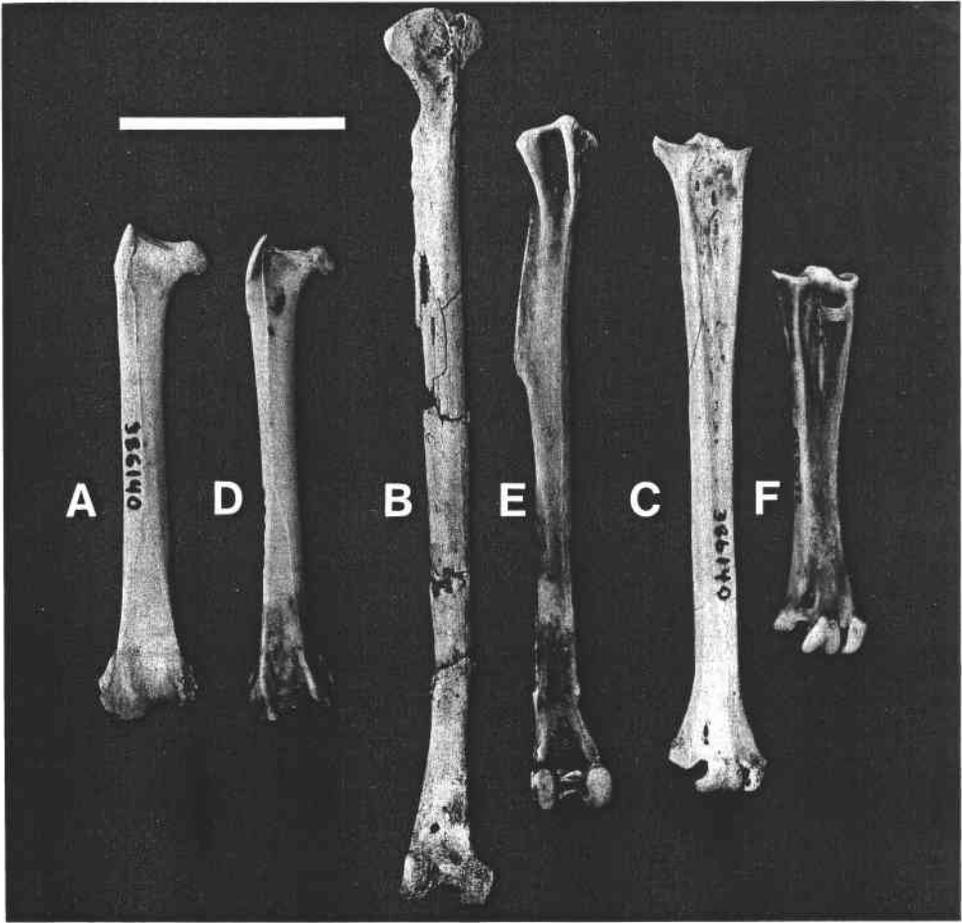


FIG. 22. Hindlimb elements of *Grallistrix geleches*, new genus and species (A–C), compared with *Strix aluco*, USNM 559072 (D–F): A, D, femur (A, holotype USNM 386140); B, E, tibiotalus (B, BBM-X 147928); C, F, tarsometatarsus (C, holotype USNM 386140). Scale = 3 cm.

In the type species, *G. geleches*, the skull, mandible, coracoid, furcula, and sternum are all about the same size as in the specimen of *Strix aluco* used in the comparisons, so the overall body size was similar to that species. The pelvis, however, is somewhat larger, whereas the femur is similar in size to that of *S. aluco*, possibly indicating that the femur is relatively shorter in *Grallistrix*. In contrast, the tibiotarsus and tarsometatarsus of *Grallistrix* are extremely elongated, whereas the humerus, radius, ulna, and carpometacarpus are very much smaller than in *Strix aluco* (Figs. 21, 22). The pedal phalanges are quite strong, being relatively more robust even than in such a large owl as *Strix nebulosa*.

We have documented fossil pellets showing that the species of *Grallistrix* fed on birds (Olson and James 1982b), and indeed there was little else in the Hawaiian Islands upon which they could have fed, other than insects. The elongated legs and shortened wings of *Grallistrix* may thus be specializations for bird-catching that parallel the skeletal proportions in the bird-eating hawks of the genus *Accipiter*.