Pteruthiidae and Erpornithidae (Aves: Corvides): two new family-group names for babbler-like outgroups of the vireos (Vireonidae)

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Pteruthiidae and Erpornithidae (Aves: Corvides): two new family-group names for babbler-like outgroups of the vireos (Vireonidae)

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The Old World genera *Erpornis* Hodgson, 1844, and *Pteruthius* Swainson, 1832, were long considered babblers Timaliidae (Deignan 1964, Sibley & Monroe 1990, Howard & Moore 1991). This was based on gross morphology (in *Erpornis*, similarity to *Yuhina*; in *Pteruthius*, bold plumage pattern reminiscent of, e.g., the laughingthrush genus *Garrulax*) and biogeography (presence alongside many 'other' species of babblers in the Oriental region), rather than phylogenetic analysis.

In the first molecular phylogenetic analysis of babblers, Cibois *et al*. (2002) found that the species known as '*Yuhina*' *zantholeuca* was not closely related to other species of *Yuhina* but was placed in an unresolved position near the crows *Corvus* and cuckooshrikes *Coracina*. As a consequence, the species was removed from *Yuhina* and placed in the monotypic genus *Erpornis* (Cibois *et al*. 2002). *Erpornis* was subsequently found to be closely related to the New World vireos Vireonidae (Barker *et al*. 2004). Another study showed that *Pteruthius* does not belong with the babblers but is sister to the *Erpornis*–Vireonidae clade (Reddy & Cracraft 2007). These findings were corroborated by Jønsson *et al*. (2016), Oliveros *et al*. (2019) and Stervander *et al*. (2020).

Following the discovery that *Erpornis* and *Pteruthius* represent successive sister groups of the vireos, they were lumped within an expanded Vireonidae in several taxonomies (Dickinson & Christidis 2014, Winkler *et al*. 2015, Fjeldså *et al*. 2020b). Placing *Erpornis* and *Pteruthius* in Vireonidae was probably necessitated by the lack of available family-group names for these two taxa. However, a good reason to refrain from placing *Erpornis* and *Pteruthius* into Vireonidae is that it changes the meaning of Vireonidae and affects several aspects of the systematics and biogeography of the family. For example, the time to their most recent common ancestor (MRCA) is shifted at least ten million years backwards (Stervander *et al*. 2020: fig. A2.1), the geographic origin of the MRCA shifts from the Americas to Asia, and the synapomorphies and diagnostic character states of 'Vireonidae' are modified. One can argue that these changes were unnecessary and potentially confusing. Given the long stability of the meaning of the name Vireonidae (e.g. Sharpe 1903, Wetmore 1930, Mayr & Amadon 1951, Deignan 1964, Wolters 1980, Sibley & Monroe 1990, Dickinson 2003), the alternative taxonomic solution, to exclude *Erpornis* and *Pteruthius* and place these in new family taxa, should be proposed. For example, Slager *et al*. (2014), who were aware of the close relationship of *Erpornis* and *Pteruthius* to the vireos, used the name Vireonidae in its traditional sense, i.e. for the New World taxa alone, excluding *Pteruthius* and *Erpornis*.

Placing *Erpornis*, *Pteruthius* and Vireonidae in separate family taxa is in line with the current classification of Passeriformes, as reviewed in Fjeldså *et al*. (2020a). Fjeldså *et al*. (2020b) followed the idea, within Passeriformes, of temporal banding (Avise & Johns 1999), in which the classification at higher ranks (i.e. families and genera) should correspond to groups of similar age, based on calibrated phylogenies. They did not, however, establish a strict cut-off line (as had Jønsson *et al*. 2016 for Corvides), knowing that confidence intervals of nodes are often wide and can vary among analyses (e.g. Oliveros *et al*. 2019, Stervander

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TABLE 1
Divergence times of *Pteruthius* and *Erpornis* from Vireonidae calculated in various dated phylogenies.

Pteruthius	*Erpornis*	Source
27.5–27.7 Mya	22.4–22.5 Mya	Reddy & Cracraft (2007)
23 Mya	21 Mya	Jønsson *et al*. (2016)
15 Mya	-	Moyle *et al*. (2016)
17 Mya	12.5 Mya	Oliveros *et al*. (2019)
27.5 Mya	21 Mya	Stervander *et al*. (2020)

TABLE 2
Taxa treated as families (*sensu* Fjeldså *et al*. 2020b) that were inferred to be of equal or younger age than *Pteruthius*. Taxa marked with an asterisk were inferred to be younger than both *Pteruthius* and *Erpornis*.

Chronogram	Taxa
Oliveros *et al*. (2019)	Dendrocolaptidae, Xenopidae, Furnariidae, Malaconotidae, Pityriasidae, Aegithinidae, Platysteiridae, Vangidae, Lamprolidae, Rhipiduridae, Ifritidae, Paradisaeidae, Corvidae, Platylophidae, Laniidae, Paradoxornithidae, Sylviidae, Timaliidae, Leiothrichidae, Pellorneidae, Buphagidae, Sturnidae, Mimidae, Polioptilidae, Troglodytidae, Viduidae, Estrildidae, Rhodinocichlidae, Plectrophenacidae, Emberizidae, Cardinalidae, Mitrospingidae*, Thraupidae*, Passerellidae, Parulidae*, Icteridae*, Calyptophilidae* and Phaenicophilidae*.
Stervander *et al*. (2020)	Furnariidae, Dendrocolaptidae, Xenopidae, Platyrhinchidae, Tachurisidae, Rhynchocyclidae, Chaetopidae, Eupetidae, Dicruridae, Lamprolidae*, Rhipiduridae*, Corcoracidae*, Platylophidae*, Paradisaeidae*, Laniidae*, Corvidae*, Melampittidae, Ifritidae*, Monarchidae*, Machaerirhynchidae, Artamidae*, Cracticidae*, Rhagologidae, Aegithinidae, Pityriasidae*, Malaconotidae*, Platysteiridae*, Vangidae*, Sylviidae, Zosteropidae, Timaliidae, Pellorneidae, Leiotrichidae, Polioptilidae, Troglodytidae, Buphagidae, Sturnidae, Mimidae, Urocynchramidae, Ploceidae, Amblyospizidae, Viduidae*, Estrildidae*, Passeridae, Fringillidae, Plectrophenacidae*, Rhodinocichlidae*, Emberizidae*, Calyptophilidae*, Mitrospingidae*, Thraupidae*, Cardinalidae*, Passerellidae*, Phaenicophilidae*, Icteridae* and Parulidae*.

et al. 2020). Most taxa treated as families by Fjeldså *et al*. (2020b), however, diverged around 20 Mya, a date similar to estimates for the *Erpornis* lineage and the *Pteruthius* clade (Table 1). In the chronogram of Oliveros *et al*. (2019), 38 taxa treated as families (*sensu* Fjeldså *et al*. 2020b) are of equal or younger age than *Pteruthius* and six of these are also of equal or younger age than *Erpornis* (Table 2). Similarly, in the unconstrained chronogram of Stervander *et al*. (2020), 56 taxa treated as families (*sensu* Fjeldså *et al*. 2020b) are of equal or younger age than *Pteruthius* and 28 of these are also of equal or younger age than *Erpornis* (Table 2).

Because no family-group names are available for *Erpornis* and *Pteruthius*, we propose:

Erpornithidae new family

Type genus *Erpornis* Hodgson, 1844

Diagnosis Small passerines (body length 12.0–13.5 cm) with rather plain plumage and distinct yellow vent and tail. Differs from all species of Vireonidae by combination of (i) short erect crest, (ii) uniform head without pale supercilium behind the eye or pale eye-ring, (iii) lack of wingbars, (iv) plain tertials and (v) pale pink legs.

Differs from all species of Pteruthiidae by combination of (i) slender bill, (i) short erect crest, (iii) lack of sexual dimorphism in plumage, (iv) greenish head and upperparts, (v) lack of a dark eyestripe and (vi) uniform greenish wings without wingbars.

Included taxa *Erpornis zantholeuca* Blyth, 1844.

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Pteruthiidae new family

Type genus *Pteruthius* Swainson, 1832

Diagnosis Small passerines (body length 11.5–21.0 cm) with short stout bill and colourful plumage (except the Green Shrike-Babbler *P. xanthochlorus* complex). Differs from Vireonidae by (i) sexual dimorphism in plumage and (ii) head pattern, with black head (in male Black-headed Shrike-Babbler *P. rufiventer*), black head with white supercilium (males of the Pied Shrike-Babbler *P. flaviscapis* complex), ear-coverts bordered by dark crescent and reddish throat (Black-eared Shrike-Babbler *P. melanotis* complex), dark lores, pale supercilium behind eye and reddish throat (Chestnut-fronted Shrike-Babbler *P. aenobarbus* complex), or plain greyish head with dark lores but no pale supercilium (*P. xanthochlorus* complex).

Differs from *Erpornis* by combination of (i) stout bill, (ii) lack of crest, (iii) sexual dimorphism in plumage, (iv) black or well-marked head in most species (except the *P. xanthochlorus* complex), and (v) wings either black with yellowish or chestnut tertials (in *P. flaviscapis* complex), black or dark brown with white to rufous-buff wingbars (*P. melanotis* and *P. aenobarbus* complexes), or greenish with paler wingbars (*P. xanthochlorus* complex).

Included taxa A single genus (*Pteruthius*) with nine or 19 species, depending on whether divergence in songs (Rheindt & Eaton 2009; Gill *et al*. 2021) or diagnosability of plumage (Reddy 2008), respectively, is used as the taxonomic criterion for species limits.

Discussion

An alternative solution would be to treat Erpornithidae as a subfamily of Vireonidae, based on (i) the view that placement of the Asian *Erpornis* with the New World vireos conveys useful biogeographic information because it would emphasise the Asian origin of Vireonidae, (ii) the fact that in the phylogeny of Oliveros *et al*. (2019) only a small number of families are younger than Erpornithidae, and these are all in the nine-primaried New World oscines, and (iii) the age of Erpornithidae is younger than a large number of nodes within families in the phylogeny of Oliveros *et al*. (2019), which means that if temporal banding is applied to these groups, many new families should be named.

Ranking is obviously subjective, and therefore disagreements about the 'appropriate' rank cannot be solved empirically. In this case, ranking *Erpornis* as a subfamily and placing it in Vireonidae has two negative consequences: it results in an unnecessary change of the name of the vireos ('Vireoninae') and attaches the name 'Vireonidae' to a different, larger, older and geographically much more widespread group. We are not convinced by the arguments in favour of merging *Erpornis* with the vireos in a single family. First, merging the Asian *Erpornis* with the New World vireos in itself would not convey any information about the geographic origin of the vireos. Rather, the origin of a particular group, i.e. the direction of past geographic movement, is inferred from mapping the geographic range of multiple groups on a phylogeny. Second, whereas in the phylogeny of Oliveros *et al*. (2019) only six families were younger than Erpornithidae, and these were all in the nine-primaried New World oscines, in the phylogeny of Stervander *et al*. (2020) no fewer than 28 were of equal or younger age than *Erpornis* (Table 2), and these were not restricted to the nine-primaried New World oscines. Several nine-primaried New World oscine taxa were ranked as families by Barker *et al*. (2013) to keep the names of several major previously recognised groups stable (e.g. Thraupidae, Cardinalidae, Icteridae, Parulidae). We agree with this approach because it serves nomenclatural stability, even if it results in relatively 'young' family-level taxa. We have applied this approach to Erpornithidae

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and Pteruthiidae, so that Vireonidae can be maintained for the vireos. Third, the fact that several lineages in other families are older than Erpornithidae does not imply that these should also be ranked as families. Only when temporal banding is enforced with a strict threshold will there be a need to change the rank of these taxa, and we believe this is not necessary. Ranking *Erpornis* as a family is in line with the current classification of Passeriformes, as reviewed in Fjeldså *et al*. (2020a), which is only loosely based on temporal banding.

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