

Erection of a New Family in the Lepidopterous Suborder Dacnonypha.

By

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The homoneurous moth genus *Agathiphaga* was described by Dumbleton in 1952. The genus comprises two species, occurring in Queensland (Australia) and on Fiji, respectively; the larvae of both feed in the seeds of Kauri pines (*Agathis*). The adult anatomy indicated affinities to both Micropterygidae and Eriocraniidae; Dumbleton decided however, that the weight of evidence was for considering *Agathiphaga* as a specialized genus of Micropterygidae. On the other hand Hinton (1958) after examining the *Agathiphaga*-larvae found these to possess several apomorph characters characteristic of Dacnonypha and higher Lepidoptera and to be devoid of any of the features characteristic of the Micropterygid larvae. He therefore concluded that the genus belongs to the Eriocraniidae or a closely related family. The correctness of the transferring of *Agathiphaga* to the suborder Dacnonypha cannot be doubted; however, in the adult anatomy the genus differs from the Eriocraniidae as well as from the other dacnonyphous families (*Mnesarchaeidae*, *Neopseustidae*) in many important features, and consequently has to be regarded as constituting a separate family, which is defined below.

***Agathiphagidae* fam. nov.**

Type-genus: *Agathiphaga* Dumbleton, 1952.

D i a g n o s i s. Adult: Articulated mandibles present, galeae not haustellate, lobular lacinia present, tibia 2 and 3 with paired subapical and apical spurs, forewing with closed cell between M and Cu, ♂-genitalia with long and simple, dorsally curved valvae, phallus with short posteriorly directed ventral apodeme.

In these characters the family differs from all other Dacnonypha.

Supplementary description. Adult: Ocelli absent, compound eyes relatively small (diameter about half the height of headcapsule), mid-cranical sulcus long (reaching level of antennal sockets, labrum unreduced, apical labial palp segment with sensory pit, hypopharynx a rather broad lobe with dorsal salivary opening, closed cell between Rs-branches in both wingpairs, jugofrenate wing-coupling, ♂ sternum V with paired processes containing openings from glands, ♂-genitalia with anterior margin of segment IX laterally produced as apodemes which almost reach the anterior limit of segment VIII, tergum IX forming two lateral lobes, ♀-terminalia eversible.

The presence of dorsal tentorial arms could not be demonstrated in the existing material. The posterior parts of the anterior tentorial arms are much reduced, not discernible; posterior arms and corporotentorium are well developed (Dumbleton, pers. communication).

The labial palp is stated to be 4-segmented. This also is the case in a few species of *Sabatınca* (Micropterygidae). However, as 3 segments in the labial palp certainly is the primitive number in insects and as generally in the suborders Zeugloptera and Dacnonypha the prementum is laterally shaped very much like a palp segment it seems likely that the basal "segment" in these cases is actually a part of the prementum (a study of the musculature is needed to elucidate this point).

The pupae are decticious, exarate.

The larva are devoid of legs and prolegs.

For illustrations and further details of all stages see the original description by Dumbleton (1952).

Systematic relationships. The Agathiphagidae is the most overall primitive dacnonyphous family; this is particularly evident in the structure of the mouthparts, which apart from the absence of glossae and paraglossae are very similar to the generalized type found in the suborder Zeugloptera. The presence of distinct anterior and posterior mandibular articulations makes it unlikely that the unspecialized state of the galea is due to secondary reduction.

Amongst the dacnonyphous families the Agathiphagidae seem to be most similar and consequently most genetically related to

the Eriocraniidae. Phylogenetically, however, they are not more closely related to this family than to the remaining families since the similarities in question are symplesiomorphies. Agathiphagid features retained in Eriocraniidae include e.g. the relatively small and ventrally situated compound eyes, the shape of the labrum and the maxillary palp (especially the condition in the Australian species, *A. queenslandensis*), the presence of a sensory pit on the apical labial palp segment, the closed Rs-cell in the hind wing (in Eriocraniidae this feature is only retained in the genus *Acanthopteroctetes* Braun, 1921), the processes on sternum V in ♂ and the eversible female terminalia. The reduction of the posterior part of the anterior tentorial arms is a peculiar feature also found in the Eriocranid genera *Dyseriocrania* and *Eriocrania*; however, this similarity has to be considered a convergence rather than a synapomorphy since the anterior tentorial arms are fully developed in the genus *Heringocrania* (Kristensen 1968 a).

The family Mnesarchaeidae is considered (Kristensen 1968 b) to be a specialized group derived from an Eriocraniidae-like ancestor. Consequently it shows less overall similarity to the Agathiphagidae than does the Eriocraniidae. The family Neopseustidae, which probably is the sister-group of the Mnesarchaeidae is anatomically rather isolated amongst recent Dacnonypha. The absence of ocelli in Agathiphagidae and Mnesarchaeidae-Neopseustidae is in all probability due to convergence (the ocelli have been independently lost in several other lepidopterous families).

The diagram (Fig. 1) illustrates the author's present view on the phylogenetic interrelationships of the dacnonyphous families. Important apomorph characters of each monophyletic group are indicated.

*Practical key to the families of the lepidopterous suborders
Zeugloptera and Dacnonypha.*

- 1 Mandibles with distinct articulations; galeae unspecialized; lacinia lobe-like 2
- Mandibles without distinct articulations, sometimes very reduced; galeae long, haustellate; lacinia vestigial or absent 3
- 2 Ocelli present; tibia 2 without spurs *Micropterygidae* (Zeugloptera)
- Ocelli absent; tibia 2 with paired apical and subapical spurs
..... *Agathiphagidae* (Dacnonypha)

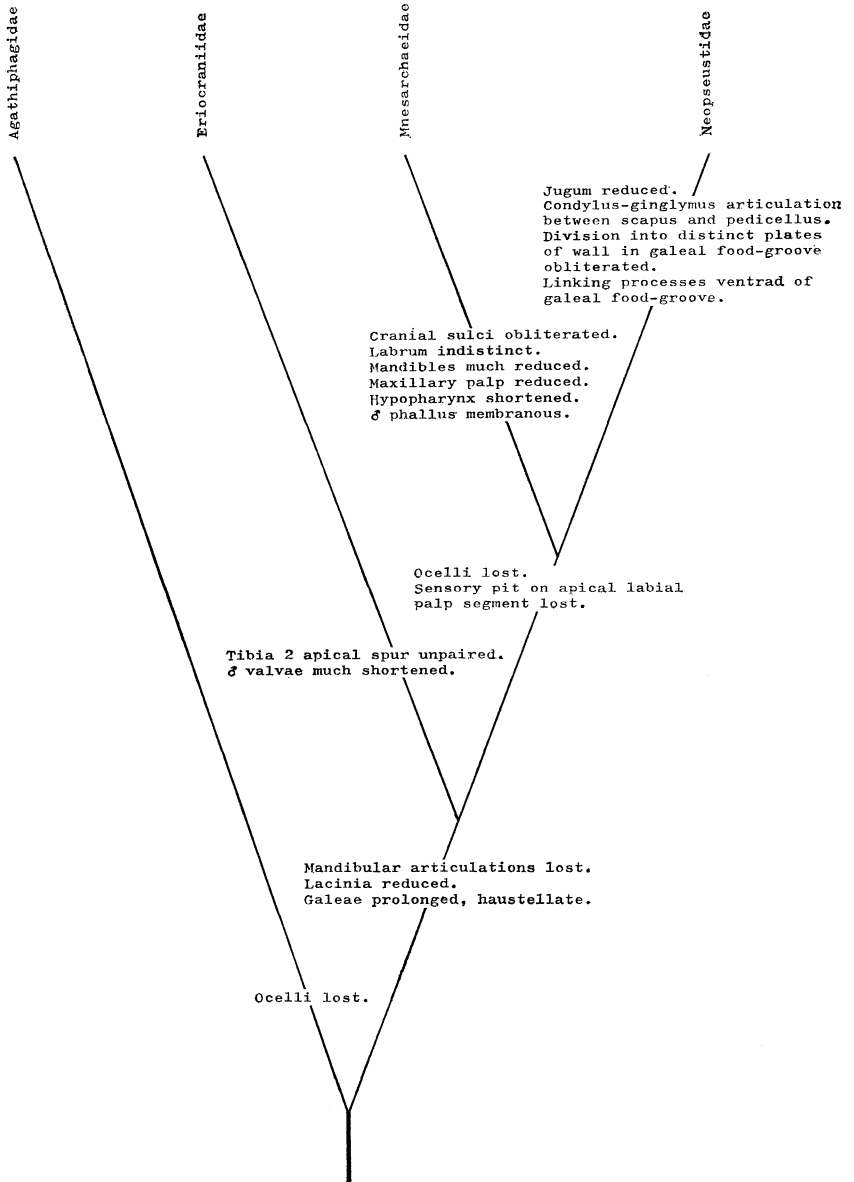


Fig. 1. Probable phylogenetic interrelationships of the daconyphous families. At present the Neopseustidae can be placed tentatively only.

- 3 Ocelli present; tibia 2 with unpaired apical spur
 *Eriocraniidae* (Dacnonypha)
 Ocelli absent; tibia 2 with paired apical spurs 4
- 4 Maxillary palp long, 5-segmented; jugum reduced
 *Neopseustidae* (Dacnonypha)
 Maxillary palp short, 3-segmented; jugum well-developed
 *Mnesarchaeidae* (Dacnonypha)

Note. In the keys of Viette (1947) and Brues, Melander & Carpenter (1954) the Mnesarchaeidae are said to be devoid of spurs on tibia 3 contrary to the Neopseustidae. However, in *Mnesarchaea hamadelpa* the present author found paired spurs to be present on tibia 3.

Acknowledgment. I wish to express my sincere gratitude to Mr L. J. Dumbleton, Christchurch, New Zealand, for his generous help in the preparation of this paper.

Summary.

The new family Agathiphagidae in the lepidopterous suborder *Dacnonypha* is erected on the basis of the genus *Agathiphaga* Dumbleton, 1952.

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