



## A new genus and species of weevil from the Lower Cretaceous of southern England (Insecta: Coleoptera: Curculionoidea)

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*Metrixenoides pusillus* gen. et sp. nov. is described from the Lower Purbeck (Berriasian) of Dorset and placed with some reservation in the family Nemonychidae. This is the first definite weevil to have been found in the English Cretaceous succession.

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### 1. Introduction

Weevils are essentially phytophagous beetles and constitute the largest superfamily in the animal kingdom with some 60 000 living species (Zimmermann, 1994). Their fossil record extends back to the Triassic (Zherikhin & Gratshev, 1993). Beetles are the most common insects in the British non-marine Lower Cretaceous (Jarzembowski, 1995). However, the great majority of the disarticulated elytra and body parts cannot be classified with certainty based on our current knowledge of Wealden and Purbeck Coleoptera (Jarzembowski, 1987). The discovery of an articulated and undoubted weevil is therefore significant. The unique specimen from the Purbeck Limestone Group is formally described below. It has been mentioned and illustrated earlier by Coram *et al.* (1994) as a member of the family Eobelidae. The latter is considered now as a heterogeneous assemblage of Mesozoic weevil genera, some of which should be transferred to the Belidae and others to the Nemonychidae (Zherikhin & Gratshev, 1995). Weevils include diverse plant pests, and larval borings in coniferous wood resembling the work of the living bark beetles (Curculionidae: Scolytinae) have been described from the overlying Hastings Group (Jarzembowski, 1990). The Purbeck weevil might also have been associated with conifers because, with few exceptions, extant nemonychids feed on pollen of Araucariaceae and Pinaceae (Kuschel, 1983, 1994).

### 2. Systematic palaeontology

Order Coleoptera Linnaeus, 1758  
Suborder Polyphaga Emery, 1886  
Superfamily Curculionoidea Latreille, 1802  
Family? Nemonychidae Bedel, 1882  
Genus *Metrixenoides* gen. nov.

*Type species.* *Metrioxenoides pusillus* gen. nov., sp. nov.

*Diagnosis.* Small *Oxycorinoides*-like weevil with prothorax distinctly constricted ventrally before apex.

*Description.* Body small, weakly chitinized, elongate, dorsoventrally flattened. Rostrum originating from ventral head region, nearly straight, rather stout, not longer than pronotum. Labrum probably small, if indeed present. Mandibles small, not projecting forward. Antennae inserted before apex of rostrum, slender; first antennal segment short, not thickened, second and third longer; club distinct, rather short, oval, probably loosely segmented. Head distinctly convex on ventral surface; frons probably not wider than base of rostrum, strongly convex; eyes large, round, lateral in position; temples much shorter than eyes. Pronotum nearly flat in side view, with simple distinct lateral ridge. Prothorax in side view truncate apically, constricted ventrally before apex; constriction with transverse row of large punctures. Forecoxae rather large, subglobose, moderately protruding, originating near base of prothorax. Mesonotum probably lacking stridulatory files. Mid coxae globose, distinctly separated. Metathorax long and flat. Hind coxae reaching lateral margin of elytra. Elytra probably nearly parallel-sided, elongate, rather flat dorsally, gradually and rather weakly declining to apex, with distinct and regular rows of punctae. Abdominal sterna subequal in length except for anal one, flat, probably free; anal sternite a little shorter, rounded apically; pygidium covered by elytra. Legs rather short. Femora simple, not clavate; fore femora not enlarged; hind femora not reaching tip of abdomen. Tibiae simple, not widened, short, transversally truncate at apex.

*Composition.* Monobasic.

*Comparison.* Distinguished readily from all previously known nemonychid genera in possessing a punctate subapical ventral constriction of the prothorax.

*Metrioxenoides pusillus* sp. nov.

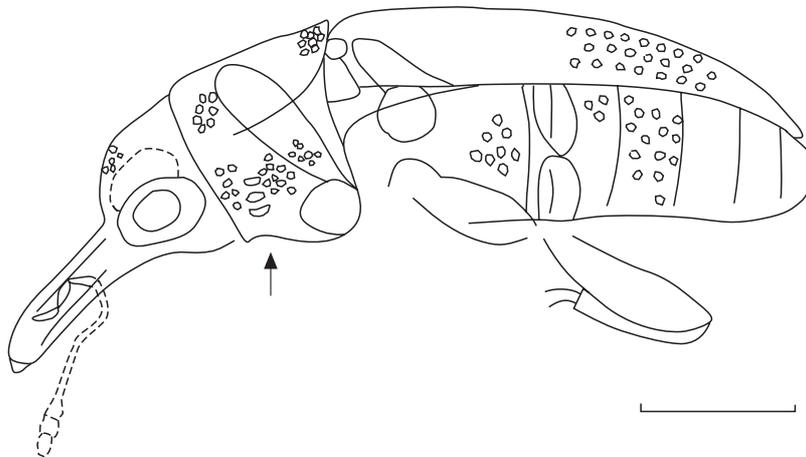
Figure 1

1995 Eobelid Coram, Jarzembowski & Ross: p. 146, fig. 10 [photograph]

*Material.* Holotype 019615/-6, an impression (part and counterpart) of an almost complete body of a small beetle, with the appendages preserved only partially; organic matter preserved as a fine film on micritic limestone; Coram Collection, Booth Museum of Natural History, Brighton. No additional specimens are known.

*Diagnosis.* As for genus.

*Description.* Body probably rather pale, bare, without distinct pubescence. Rostrum hardly shorter than pronotum, probably bare and impunctate, with distinct sublateral furrow from base up to antennal insertion. Antennae inserted at one quarter of length of rostrum from its apex, probably extending backwards only a little past apex of pronotum; first antennal segment about twice as long as wide, second and third only slightly narrower, second about two times longer than first and almost four times longer than broad, third a little shorter, about three times longer than broad; two basal segments of club probably subglobose, apical segment probably slightly longer. Head densely and rather coarsely punctate, distance between punctae nearly equal to their diameter. Pronotum densely and coarsely punctate, near middle somewhat rugosely; punctae a little larger than on



**Figure 1.** *Metrioxenoides pusillus* Gratshev, Zherikhin & Jarzembowski gen. nov., sp. nov. Drawing of holotype BMB 019615/-6 based on part and counterpart. Arrow indicates prothoracic constriction. Scale 0.5 mm.

head, distance between them nearly equal to their diameter. Prothorax laterally and ventrally with similar punctae, which are elongate and, in the subapical constriction, distinctly larger and less dense than elsewhere. Elytra 2.6 times longer than pronotum; punctate rows narrow and probably not impressed, with small and widely separated punctae; intervals much wider than rows, probably flat and impunctate. Metathorax and abdominal sterna (except anal) sparsely and coarsely punctate; punctae distinctly larger than on prothorax, distance between them clearly exceeding their diameter; anal sternite finely and densely punctate. Femora finely and densely punctate; fore femora slightly thicker than rostrum; hind femora a little thicker than fore pair. Hind tibiae distinctly shorter than femora, straight, narrow. First segment of hind tarsi narrow and probably long.

*Dimensions.* Body length of unique specimen, 2.3 mm (rostrum excluded).

*Stratum typicum.* The Slatt, Lower Purbeck beds, Lower Berriasian, Lower Cretaceous (Allen & Wimbledon, 1991).

*Locus typicus.* Suckthumb Quarry, Isle of Portland, Dorset, UK; Lower Cretaceous (Lower Berriasian), Purbeck Limestone Group, Lower Purbeck beds.

*Discussion.* *Metrioxenoides* is the first definite weevil to be found in the non-marine Lower Cretaceous of the UK. Its systematic position cannot be established with certainty because of the small size and incomplete preservation of the fossil. Many taxonomically important features are either not observable or doubtful (see above). Nevertheless, it definitely differs from all known Mesozoic weevils, at least at the generic level. The majority of Mesozoic weevil taxa are superficially rather similar and until recently were classified as belonging to the same primitive lineage within the family Nemonychidae (Kuschel, 1983; Zherikhin, 1986). However, study of hind wing venation in Upper Jurassic genera has shown that some of them should be placed in another family, the Belidae (Zherikhin & Gratshev, 1995). Unfortunately, neither the wing venation nor the mouthparts can be observed on the Purbeck specimen. Its placement in Nemonychidae is mostly based on the small body size: Mesozoic nemonychids are very variable in this respect, including a great number of species of comparable size, while Mesozoic

belids of the subfamily Eobelinae are much larger. Another belid subfamily represented in the Mesozoic, the Eccoptarthrinae, includes small weevils possessing very broad tarsi, which is not the case in *Metrioxenoides*.

The prothoracic constriction is the most unusual feature, allowing us to separate *Metrioxenoides* unequivocally from any Mesozoic weevil genera described previously, but at the same time somewhat confusing its taxonomic placement. The constriction is well defined and marked with large, pit-like punctures. This character state is clearly apomorphic and absent from any previously described nemonychid or belid genera, both extinct and living. A similar constriction with large oblong punctures occurs in modern Oxycorynidae, and this is reflected in the generic name referring to the living oxycorynid genus *Metrioxena* Pascoe. However, the Purbeck genus strongly differs from Oxycorynidae in its plesiomorphic leg structure with the narrow simple tibiae and long narrow first tarsal segment, as well as in the position of the rostrum.

The prothoracic constriction enables the beetle to increase considerably the vertical movement of the head. This adaptive, apomorphic condition is connected with the mode of preparation of a hole in host plant tissues used for oviposition and has probably originated independently in *Metrioxenoides* and oxycorynids. The somewhat convex gular region of the head in *Metrioxenoides* seems to be linked with this constriction as a more globose shape of the head further facilitates movement in the vertical plane. In Oxycorynidae this morphological trend is much more pronounced and advanced. Mutually correlated characters constituting together the same adaptive syndrome should be regarded as a single rather than as several independent synapomorphies (Zherikhin & Egorov, 1990). The same syndrome is developed with some variation in other weevil groups such as Dryophthoridae, extinct Mesozoic Obrieniidae, some Brentidae (*sensu lato*), and some Barididae. Thus its phylogenetic value is probably low, although the similarity between *Metrioxenoides* and Oxycorynidae in this respect seems to be greater than between the former and other weevil taxa.

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### References

- Allen, P. & Wimbledon, W. 1991. Correlation of the NW European Purbeck-Wealden (non-marine Lower Cretaceous) as seen from the English type-areas. *Cretaceous Research* **12**, 511–526.
- Coram, R., Jarzembowski, E. A. & Ross, A. J. 1994. New records of Purbeck fossil insects. *Proceedings of the Dorset Natural History and Archaeological Society* **116**, 145–150.
- Jarzembowski, E. A. 1987. *Early Cretaceous insects of southern England*. Unpublished PhD thesis, University of Reading, 421 pp.
- Jarzembowski, E. A. 1990. A boring beetle from the Wealden of the Weald. In *Evolutionary paleobiology of behavior and coevolution* (ed. Boucot, A.), pp. 373–376 (Elsevier, Amsterdam).
- Jarzembowski, E. A. 1995. Early Cretaceous insect faunas and palaeoenvironment. *Cretaceous Research* **16**, 681–693.
- Kuschel, G. 1983. Past and present of the relict family Nemonychidae (Coleoptera, Curculionidea). *Geojournal* **7**, 499–504.
- Kuschel, G. 1994. Appendix: Nemonychidae of Australia, New Guinea and New Caledonia. In *Australian Weevils (Coleoptera: Curculionidea)* (Zimmermann, E. C.), **1**, pp. 563–637 (CSIRO, East Melbourne).

- Zherikhin, V. V. 1986. Zhuki-dolgonosiki. Scarabaeida, Curculionoidea [Weevils. Scarabaeida. Curculionoidea]. In *Nasekomye v rannemelovykh ekosystemakh Zapadnoy Mongolii* (ed. Tatarinov, L. P. et al.), *Trudy Sovmestonoy Sovetsko-Mongol'skoy Paleontologicheskoy Ekspeditsii* **28**, 105–108, pl. 9.
- Zherikhin, V. V. & Egorov, A. B. 1990. *Zhuki-dolgonosiki (Coleoptera Curculionidae) Dal'nego Vostoka SSSR: obzor podsemeystv s opisaniem novykh taksonov [Weevils (Coleoptera Curculionidae) of the Russian Far East: a review of the subfamilies, with descriptions of new taxa]*, 164 pp. (Biologo-Pochvennyy Institut Dal'nevostochnogo Otdeleniya Akademii Nauk SSSR, Vladivostok).
- Zherikhin, V. V. & Gratshev, V. G. 1993. Obrieniidae, fam. nov., the oldest Mesozoic weevils (Coleoptera, Curculionoidea). *Paleontological Journal* **27** (1A), 50–69.
- Zherikhin, V. V. & Gratshev, V. G. 1995. A comparative study of the hind wing venation of the superfamily Curculionoidea, with phylogenetic implications. In *Biology, phylogeny, and classification of Coleoptera: papers celebrating the 80th birthday of Roy A. Crowson* (eds Pakaluk, J. & Slipinski, S. A.), **2**, pp. 634–777 (Muzeum i Instytut Zoologii PAN, Warszawa).
- Zimmermann, E. C. 1994. *Australian Weevils (Coleoptera: Curculionoidea) Vol. 1, Orthoceri: Anthribidae to Attelabidae. The Primitive Weevils*, xxxii + 741 pp. (CSIRO, East Melbourne).