

A new genus and species of Euparagiinae from the Late Cretaceous of southern Africa (Hymenoptera: Vespidae)

Denis J. BROTHERS¹ & Alexandr P. RASNITSYN²

¹School of Biological and Conservation Sciences, University of KwaZulu-Natal, Pietermaritzburg, Private Bag X01, Scottsville, 3209 South Africa

²Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya Str. 123, 117868 Moscow, Russia and Natural History Museum, Cromwell Road, London SW7 5BD, UK

ABSTRACT

The Turonian deposits at Orapa, Botswana, include a single specimen with well preserved wing venation that shows characters intermediate between *Priorvespa* (Priorvespinae) and *Curiosivespa* and *Euparagia* (Euparagiinae), but shows some synapomorphies with the latter. It is described as *Priorparagia anancites* Brothers & Rasnitsyn, gen. et sp. nov., and probably represents the sister group to the remaining Euparagiinae.

KEY WORDS: fossil, Orapa, Priorvespinae, Turonian

INTRODUCTION

The Turonian (lower Upper Cretaceous) fossil assemblage from the diamond pipe at Orapa in Botswana (southern Africa) is uniquely of that age in the Southern Hemisphere and so is of considerable importance for understanding of the Late Mesozoic history of the territory, as well as for the history of various groups of insects, including the hymenopterans. In respect of these, besides a general review (Brothers & Rasnitsyn, 2003), information is available for a euparagiine wasp (Brothers, 1992), ants (Dlussky *et al.*, 2004), and the evanioid and proctotrupoid *s.l.* parasitic wasps (Rasnitsyn & Brothers, 2007). These findings have demonstrated close similarities in some insect groups recorded in southern Africa and in Asia, and considerable dissimilarities in other groups. The genus *Curiosivespa* Rasnitsyn, 1975 (Euparagiinae: Vespidae) is an example of similarity (known from both the African and Asian Turonian), and the ants other than Armaniinae represent the opposite situation. This paper describes another vespid wasp which shows definite relationships to *Curiosivespa*, but which has no direct counterpart in Asia.

For more information about the deposits at Orapa see Brothers & Rasnitsyn (2003); for detailed taxonomy of the lower vespidae subfamilies concerned, the Priorvespinae and Euparagiinae, see Carpenter & Rasnitsyn (1990).

SYSTEMATIC PALAEOLOGY

Family Vespidae Latreille, 1802

Subfamily Euparagiinae Ashmead, 1902

GENUS: *Priorparagia* Brothers & Rasnitsyn, gen. nov.
(Figures 1, 2, 6)

Type species: *P. anancites* sp. nov.

Etymology. A combination of components of the names of the related genera *Priorvespa* Carpenter & Rasnitsyn, 1990 and *Euparagia* Cresson, 1879. Gender feminine.

Diagnosis. Forewing apparently not longitudinally folded at rest; pterostigma small; marginal cell apically rounded at wing margin; 1st abscissa of Rs short; Rs+M subequal in length to 1st abscissa of M; 3rd submarginal cell (3rm) shorter than 2nd, receiving 2m-cu crossvein at its midlength, not exceeding apex of marginal cell (3r); 3r-m crossvein curved but not distinctly sigmoid; 1st discoidal (1m-cu) cell moderately long (as long as three submarginal cells combined), apparently very slightly shorter than submedial (1cua) cell; cu-a crossvein long, apparently sigmoid



Figure 1. *Priorparagia anancites* sp. nov., gen. nov., holotype, habitus, oblique lighting.

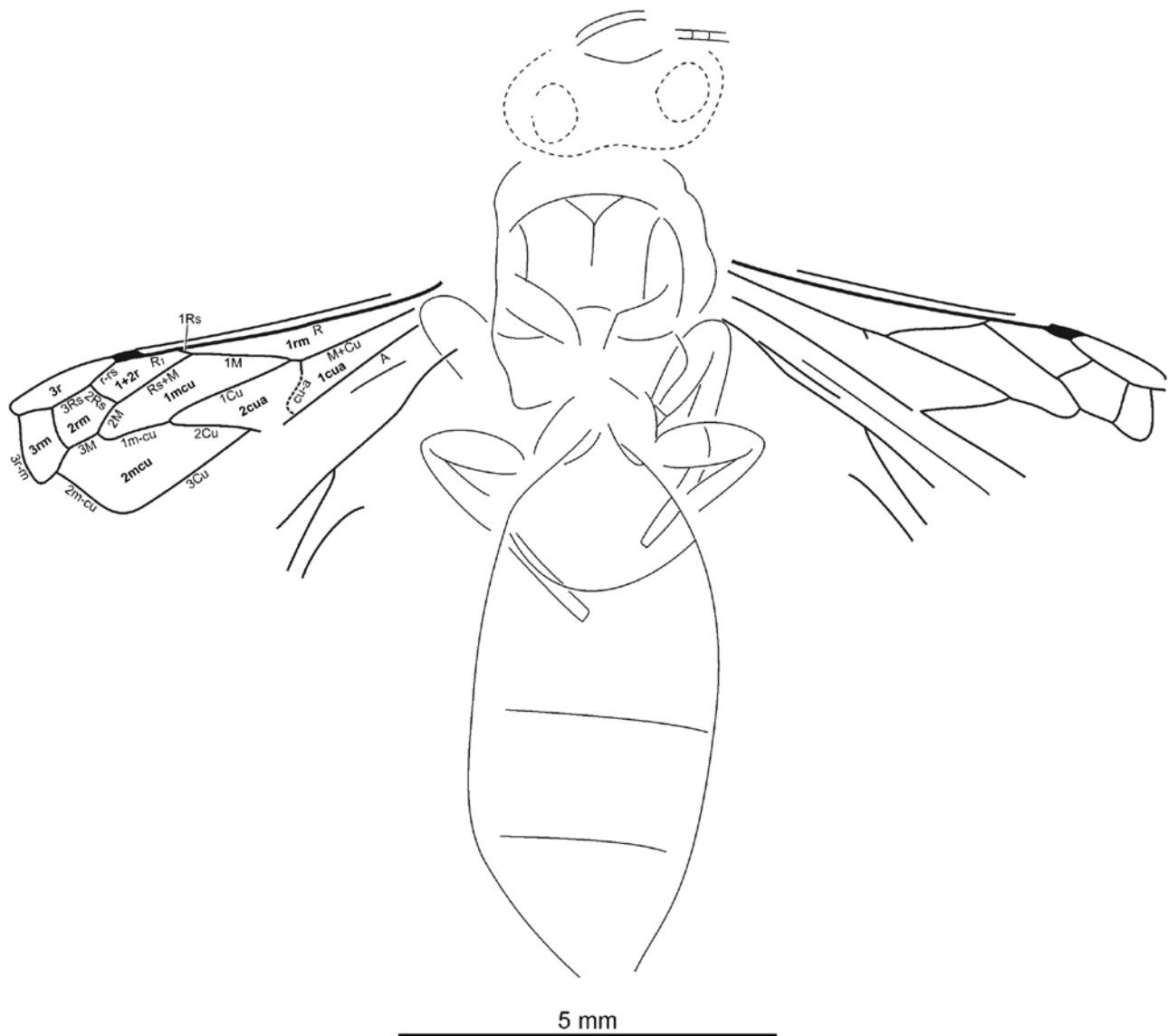


Figure 2. *Priorparagia anancites* sp. nov., gen. nov., holotype, habitus, drawing; labelling conventional, and see text.

(not well preserved), antefurcal; subdiscoidal (2cua) cell with anterodistal corner distinctly produced apicad; veins Rs, M, and Cu without free apex.

Species included. Type species only.

Remarks. The new genus shows several character states intermediate between those in the basal vespidae subfamily Priorvespinae Carpenter & Rasnitsyn, 1990 (sister group to the remaining Vespidae), and the next basal subfamily Euparagiinae (sister group to the remaining Vespidae except Priorvespinae) (see Figs 3-6). The character states in common with both of these but absent in other Vespidae are the long cu-a and, less distinctly, 2m-cu received into 3rd submarginal cell (also found in Gayellini and a few Eumeninae, but 2m-cu received into 2nd submarginal cell in *Curiosivespa derivata* Carpenter & Rasnitsyn, 1990 and *C. orapa* Brothers, 1992), and the wing not longitudinally folded at rest (although also known in Masarinae

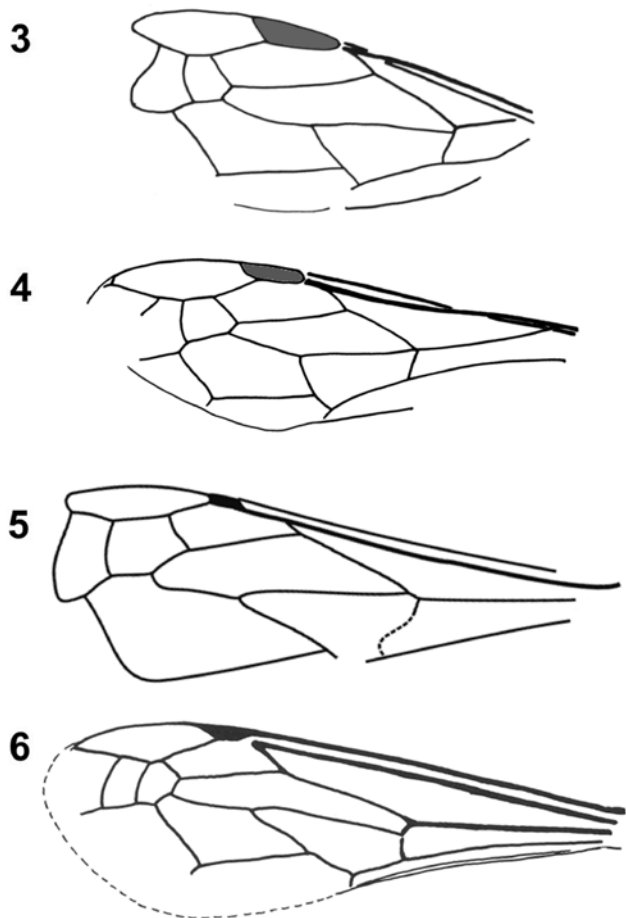
and Stenogastrinae) (cf. Carpenter & Rasnitsyn, 1990). The character states in common with Priorvespinae are Rs+M not much longer than the 1st abscissa of M, the 1st discoidal cell (1mCu) not much longer than the three submarginal cells combined, and 1st discoidal cell shorter than submedial cell (1cua). The character state in common with Euparagiinae and most higher Vespidae but not with Priorvespinae is the small pterostigma. The only, but conclusive, character state that unites the new genus with *Euparagia* and *Curiosivespa*, the distinctly produced anterodistal corner of the subdiscoidal cell, is a unique synapomorphy of Euparagiinae (Carpenter & Rasnitsyn, 1990). This compels attribution of the new genus to Euparagiinae.

Differences between *Priorparagia* and both other genera in the subfamily are mainly of a relatively plesiomorphic nature (short Rs+M and 1st discoidal cell in general, distal position of 2m-cu in respect of 3rd submarginal cell).

In addition, its long prestigma (R1) and the basad position of cu-a with respect to the fork of M+CuA are other differences from *Euparagia* and *Curiosivespa*, which have the prestigma short and cu-a at or beyond the fork of M+CuA. The sharply angled 1m-cu into the 2nd submarginal cell is shared with *Euparagia* and some *Curiosivespa* (*C. curiosa* Rasnitsyn, 1975 and *C. magna* Rasnitsyn, 1975, but not *C. antiqua* Carpenter & Rasnitsyn, 1990, *C. derivata* Carpenter & Rasnitsyn, 1990 nor *C. orapa* Brothers, 1992). The short 1st abscissa of Rs and the long strongly curved cu-a are possible synapomorphies of *Priorparagia* and *Euparagia* (1Rs long and cu-a less strongly curved in *Curiosivespa*). The loss of the free apex of Cu (along with those of the other longitudinal veins) apparently represents the only autapomorphy of the genus.

Priorparagia anancites Brothers & Rasnitsyn, sp. nov. (Figs 1, 2, 6)

Material examined. Holotype BP/2/28070-1; both forewings almost completely preserved, preservation of



Figures 3 - 6. Forewings. 3. *Priorvespa recidiva* Carpenter & Rasnitsyn, 1990 (Priorvespinae). 4. *Priorvespa quadrata* Carpenter & Rasnitsyn, 1990 (Priorvespinae). 5. *Priorparagia anancites* sp. nov., gen. nov., holotype (Euparagiinae). 6. *Curiosivespa orapa* Brothers, 1992 (Euparagiinae). (3 and 4 modified from Carpenter & Rasnitsyn 1990; 6 modified from Brothers 1992)

other parts rather poor, sex unknown; Botswana: Orapa diamond pipe; Upper Cretaceous, Turonian; in Bernard Price Institute of Palaeontology (BPI), University of the Witwatersrand, Johannesburg, South Africa.

Etymology. “Anancites” is a Latin word for “diamond” (when used as a remedy for distress of the mind), referring to the origin of the fossil from the diamond pipe and its somewhat enigmatic nature. Noun in apposition.

Description. Body slightly infuscated, except metasoma pale beyond 1st segment. General stature moderately robust, with metasoma broadly fusiform. Antenna thin with moderately elongate flagellomeres (less than twice as long as wide). Head poorly preserved, apparently about as wide as mesosoma, with eyes rather small, widely oval. Pronotum moderately long medially as well as laterally, with hind margin broadly arching. Admedial lines broadly separated anteriorly and fusing posteriorly; notauli widely spaced and complete; scutellum narrow, longer than wide. Propodeum obtusely angular posterolaterally. Mid and hind legs short and rather thick. Forewing with pterostigma small, roughly twice as long as wide, convex along lower margin and obliquely truncate apically, receiving 2r-rs subapically; 1st abscissa of Rs roughly as long as pterostigmal width; 2r-rs subequal in length to Rs between Rs+M and 2r-rs, and between 2r-m and 3r-m, and distinctly shorter than between 2r-rs and 2r-m. Cell 2rm distinctly longer (along wing axis) than 1+2r and shorter than 3rm, receiving 1m-cu at midlength; 3rm receiving 2m-cu at midlength; 1m-cu strongly bent anteriorly. Length of body 12.5 mm, of forewing to apex of cell 3rm 6.5 mm.

Discussion. This fossil essentially represents a new missing link in the early diversity of the vespid wasps, being a slightly derived offshoot along the lineage connecting the vespid common ancestor, a wasp morphologically similar to Priorvespinae, with *Curiosivespa* and the living *Euparagia*, the more advanced members of subfamily Euparagiinae. The discovery of this wasp, together with the previously described *Curiosivespa orapa* Brothers, 1992, in southern Africa is of special significance. Other fossil Euparagiinae, all classified in *Curiosivespa*, are known from the earliest through the earlier Late Cretaceous (Berriassian through Turonian) of eastern Asia (Kazakhstan, East Siberia and Mongolia). The more-basal Priorvespinae have a similar distribution, but limited to the Early Cretaceous (Berriassian through Aptian) of Siberia and Mongolia (Carpenter & Rasnitsyn, 1990; the Berriassian age of the Siberian locality Baissa is after Rasnitsyn *et al.*, 1998). The apparent absence of *Priorparagia* from Asia is thus anomalous. The restriction of *Priorvespa* to Asia does not necessarily mean that vespid evolution began in Laurasia with emigrants colonizing Africa; the recorded distribution may well result from insufficient palaeontological exploration of the southern continents and particularly of Africa. However, to find two different representatives of a diverse Cretaceous Asian group in the African Turonian suggests regular rather than occasional faunal connections between such distant realms (see Fig. 7). Similar, although less conclusive, are observations on fossil ants, and par-

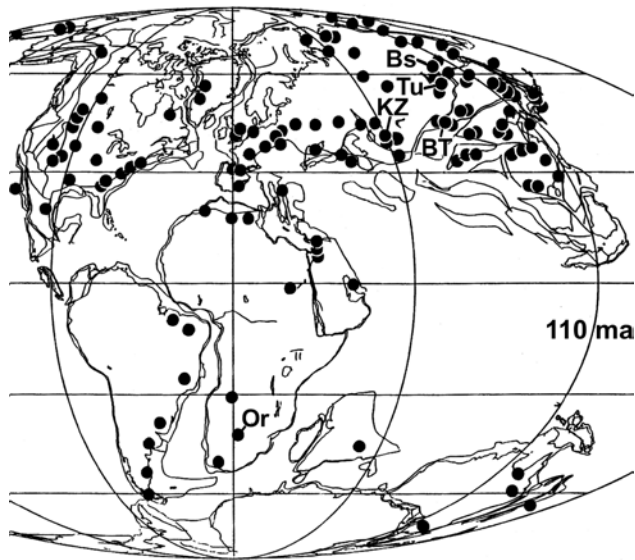


Figure 7. Map of Cretaceous insect sites. *Priorvespa* spp. (Priorvespinae) found at Bs, BT, Tu. *Priorparagia anancites* (Euparagiinae) found at Or. *Curiosivespa* spp. (Euparagiinae) found at Bs, BT, KZ, Or. Key: Bs = Baissa, BT = Bon-Tsagan, KZ = Kzyl-Zhar, Or = Orapa, Tu = Turga. (modified from Eskov 2002, fig. 501)

ticularly the presence of an otherwise exclusively northern Siberian subfamily, Armaniinae, at Orapa (Dlussky *et al.*, 2004). Further exploration of the Orapa insect assemblage may help to support a hypothesis of significant faunal interconnections between southern Africa and northeastern Laurasia.

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