Redescription of *Chelifer eucarpus* Dalman (Arachnida, Chelonethi, Withiidae) and first records of pseudoscorpions in copal from Madagascar and Colombia

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Abstract

Chelifer eucarpus Dalman, 1826, which was previously considered a nomen dubium, is redescribed from the holotype tritonymph and transferred to the genus *Withius* Kew, 1911 (Withiidae). The provenance of the fossil is unknown, but it is most likely to be of East African origin (Zanzibar copal). *Eucarpus* Hagen, 1870 is a generic nomen nudum, based on a misinterpretation of the binomen *Chelifer eucarpus*. The first pseudoscorpions from Madagascan copal are recorded: a male and female of the genus *Tyrannochthonius* Chamberlin, 1929 (Chthoniidae), and the deutonymphal exuviae of an unidentified genus of Atemninae (Atemnidae). The first pseudoscorpions from Colombian copal are recorded: a female of *Paratemnoides nidificator* (Balzan, 1888) (Atemnidae) and an adult of *Pachychernes* aff. *subrobustus* (Balzan, 1892) (Chernetidae) (first record of the genus *Pachychernes* from Colombia).

K e y w o r d s : Pseudoscorpions, copal, East Africa, Madagascar, Colombia, taxonomy.

Zusammenfassung

Chelifer eucarpus Dalman, 1826, bisher als ein nomen dubium betrachte, wird anhand des Holotypus, einer Tritonymphe, neu beschrieben und der Gattung *Withius* Kew, 1911 (Withiidae) zugeordnet. Die Herkunft des Fossils ist unbekannt, aber sehr wahrscheinlich stammt es aus Ostafrika (Sansibar-Kopal). Die Gattung *Eucarpus* Hagen, 1870 ist ein nomen nudum, basierend auf einer Fehlinterpretation des Binomens *Chelifer eucarpus*. Die ersten Pseudoskorpione aus dem Madagaskar-Kopal werden beschrieben: ein Männchen und ein Weibchen der Gattung *Tyrannochthonius* Chamberlin, 1929 (Chthoniidae) und die Exuvie einer Deuteronymphe einer unbestimmten Gattung aus der Unterfamilie Atemninae (Atemnidae). Ferner werden auch aus dem Kolumbianischen Kopal die ersten Pseudoskorpione beschrieben: ein Weibchen von *Paratemnoides nidificator* (Balzan, 1888) (Atemnidae) und ein adultes Exemplar von *Pachychernes* aff. *subrobustus* (Balzan, 1892) (Chernetidae) (der erste Nachweis der Gattung *Pachychernes* aus Kolumbien).

Contents

1. Introduction

The pseudoscorpion *Chelifer eucarpus* Dalman, 1826 was described by Dalman (1826) from 'copal' of unknown provenance. Although mentioned in Latreille (1837), Dalman's species was largely overlooked (e. g. Beier 1932; Keilbach 1982) until Harvey (1991) listed it in his catalogue as a nomen dubium. Hagen (1870) mistakenly interpreted *Eucarpus* as a generic name, which he attributed to "Dalmann, 1825" [i. e. Dalman, 1826], and the same information was repeated in Scudder's (1891) catalogue. Because no species was included, *Eucarpus* Hagen, 1870 is a generic nomen nudum. Recently, T. Kronestedt brought to my attention the presence of the holotype of *C. eucarpus* in the collections of Naturhistoriska Riksmuseet, Stockholm, and kindly made it available for study. The specimen is in remarkably good condition and, although immature, it clearly belongs to the family Withiidae. It is redescribed here and provisionally assigned to the genus *Withius* Kew, 1911.

Although commercial dealers have offered pseudoscorpions in Madagascan and Colombian copal for sale on the internet in recent years, there have been no published accounts of such inclusions. Three pseudoscorpions in Madagascan copal and two in Colombian copal, which were received for study from J. Wunderlich (Hirschberg, Germany), are recorded here. These copals are the subfossil resins of leguminous trees of the genus *Hymenaea* (Langenheim 1995, 2003; Wunderlich 2004a) and probably range in age from a few decades to a few thou-

sand years. Arthropod inclusions are often abundant in both these copals, but the arachnids are only beginning to receive attention (e. g. Lourenço 1996, 2000; Bosselaers 2004; Wunderlich 2004a, 2004b; Penney et al. 2005; Bosselaers et al. 2010).

Acknowledgements

I am very grateful to T. Kronestedt (Naturhistoriska Riksmuseet, Stockholm) for the loan of the holotype of *Chelifer eucarpus* and for providing a copy of Dalman's (1826) paper. The pseudoscorpions in Madagascan and Colombian copal were kindly made available for study by J. Wunderlich (Hirschberg, Germany). A. Nel (Muséum national d'Histoire naturelle, Paris) provided help with literature and information on Dalman's *Ripidius* species. M. S. Engel (Natural History Museum, University of Kansas) provided information on bees in copal from the Hope collection. The ant preserved with the holotype of *C. eucarpus* was identified by J. Casevitz-Weulersse (Muséum national d'Histoire naturelle, Paris). Helpful comments on the manuscript were made by M. S. Harvey (Western Australian Museum, Perth) and an anonymous referee.

2. Material and Methods

The surfaces of the copal piece containing the holotype of *Chelifer eucarpus* (originally prepared as a cuboid) showed superficial crazing when received. The face above the pseudoscorpion was ground and polished to improve the visibility. Because of the position of the pseudoscorpion and other inclusions in the piece, the other faces were not repolished. The Madagascan copal pieces were very fragile (surface friable), hence no preparation of these was attempted. Specimens were examined with a Leitz Dialux 20 or Leitz Laborlux S microscope, each equipped with a drawing tube and an ocular micrometer. Photographs were taken with a Nikon Coolpix 995 camera mounted on a Wild M5A stereomicroscope; Figs. 7 and 8 were produced by stacking images in different focal planes, using the CombineZP freeware package. Terminology follows Chamberlin (1931) and Judson (2007a). Measurements were taken following Chamberlin's (1931) reference points, with the lengths of obliquely orientated parts being calculated by trigonometry (values in z-axis determined from calibrated fine focus of microscope). The symbols "+" and "–" in measurements of the chela respectively indicate inclusion and exclusion of the pedicel (Judson 2007b).

The holotype of *Chelifer eucarpus* is deposited in the Naturhistoriska Riksmuseet, Stockholm. The Madagascan copal material is currently in the collection of Jörg Wunderlich (Hirschberg, Germany).

Abbreviations

eb, *esb*, *est*, *et*, *ib*, *isb*, *ist*, *it*, *b*, *sb*, *st* and *t* standard designations of trichobothria; *F* femur; *P* patella; *pc* coupled proximal sensilla ($p_1 + p_2$); *TR* trochanter; *TS* tactile seta.

3. Redescription of *Chelifer eucarpus* Dalman

Superfamily Cheliferoidea Risso, 1826
Family Withiidae Chamberlin, 1931
Genus *Withius* Kew, 1911

Withius eucarpus (Dalman, 1826) n. comb.
Figs. 1–3

1826 *Chelifer eucarpus*. – Dalman, pp. 408–410, pl. 5, fig. 25.
1828 *Chelifer eucarpus*. – Dejean, p. 290.
1837 *Chelifer eucarpus*. – Dufour et al. in Latreille, p. 316.
1878 *Chelifer eucarpus*. – Lucas, p. L.
1991 *Chelifer eucarpus* Dalman, nomen dubium. – Harvey, p. 669.
1993 *Chelifer eucarpus* Dalman 1826. – Spahr, p. 20.
2008 *Chelifer eucarpus* Dalman, 1826. – Dunlop & Jekel, p. 91.

Fig. 1. *Withius eucarpus* (Dalman), holotype tritonymph, subdorsal view; most likely of East African origin (Zanzibar copal).

Fig. 2. Labelled wrapper containing holotype of *Withius eucarpus* (Dalman).

Material examined: Holotype tritonymph (Fig. 1), preserved in a small (11 × 6.5 × 3 mm), yellow piece of copal, prepared in the form of a cuboid, originally labelled simply "*Chelifer!*" (Fig. 2). Although not accompanied by any other data, there is no doubt that this is the holotype of *Chelifer eucarpus* Dalman. The specimen agrees well with the original description and figure (particularly concerning the proportions of the palp), and the scale line (about 2.2 mm), representing the length of the specimen in Dalman's figure, roughly corresponds to the distance between the tip of right palp to the end of opisthosoma (2.4 mm). The paper wrapper in which the specimen was conserved looks contemporary and there are no other copal pseudoscorpions in the Naturhistoriska Riksmuseet that could correspond to Dalman's type (T. Kronestedt, in litt.).

Syninclusions: The piece also contains a worker ant of the genus *Aphaenogaster* Mayr, 1853 (Formicidae, Myrmicinae) and the incomplete remains of a small, unidentified spider.

Redescription. – Carapace with straight (not sinuous) sides; only anterior furrow distinct, about 0.59 length

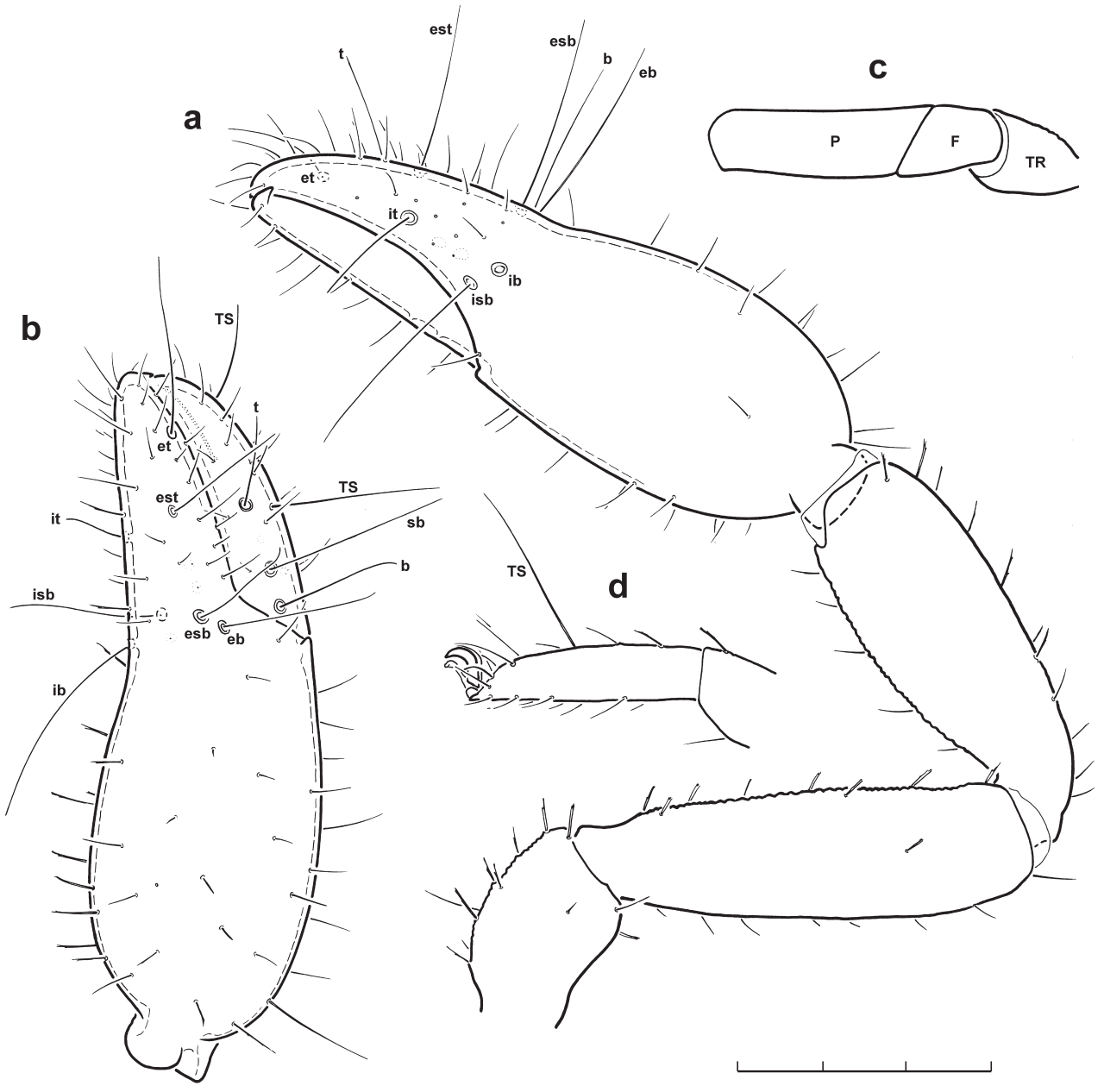

Fig. 3. *Withius eucarpus* (Dalman), holotype tritonymph; most likely of East African origin (Zanzibar copal). – **a**. Subdorsal view of right palp. **b**. Sublateral (slightly dorsal) view of right chela. **c**. Dorsal view of femur, patella and trochanter of left leg I. **d**. Lateral view of tarsus of right leg IV. – Scale line: 0.3 mm (all figures to same scale).

of carapace from anterior border. Tergites with scaly ornamentation. Setae of dorsal surfaces dentate (usually one subapical denticle and a median denticle) and only slightly broadened; ventral setae and setae of antiaxial faces of palp generally simple. Tergal setae difficult to count, but with about ten setae on each half-tergite of median segments. Tergite XI and sternites X–XI with long tactile setae laterally. Spinneret of chelicera with two apical and one subapical rami; galeal seta near tip of movable finger. Palps (Fig. 3a–b) fairly elongate, except for chela. Femur and patella with fine, dense granulation; palm of chela smooth. Trichobothria normal; *est* near middle of finger, slightly distad of *it*; *st* nearer to *b* than to *t*; sensilla *pc* between *st* and *t*; movable finger with two tactile setae; both fingers with venom glands (venom duct only visible in movable finger, but fixed finger with equally developed venedens); a few gland spots present in basal half of fingers; fixed finger with about 28 teeth, movable finger with about 26 teeth. Legs typical; joint between femur and patella of anterior legs oblique in dorsal view (Fig. 3d); tactile seta of legs III and IV long, only slightly distad of midpoint of tarsus (TS index for leg III = 0.54; tarsus IV in less suitable position for measuring, but TS approximately 0.57) (Fig. 3c).

Measurements (in mm, followed by standard ratios in parentheses): Body length 1.5. Carapace 0.55 × 0.50 (1.1). Palp femur 0.50 × 0.15 (3.3), patella 0.50 × 0.18 (2.8), chela^{+} 0.80 × 0.27 (3.0), palm^{+} 0.49 (1.8), palm^{-} 0.42 (1.5), movable finger 0.36 (0.73 × palm^{+}, 0.86 × palm^{-}).

Remarks. – Dalman's paper has often been cited as being published in 1825, but the cover-page for the volume specifies that it is for the year 1825 and published in 1826. Harvey (1991) also lists a paper supposedly published in 1824 by Dalman entitled "Memoire on Copal Insects". However, neither Harvey nor I have been able to find any trace of this, so it is likely that it represents an erroneous citation of Dalman's 1826 paper from a secondary source, hence it has been removed from Harvey's (2009) updated catalogue.

The provenance of the copal was unknown to Dalman (1826), but an African origin seems likely, given that it was purchased in London at the beginning of the nineteenth century. The main sources of copal at this time were East Africa ('gum copal', particularly from Zanzibar) and, to a lesser extent, West Africa ('gum Senegal'). Zanzibar copal was in particular demand for use as furniture varnish, due to its properties of hardness and elasticity, the best quality copal being found at the greatest depths (Sunseri 2007), thus being the oldest and most fossilized. Based on faunal similarities, Hope (1837) suggested that Dalman's 'copal' probably corresponded to 'anime' – a term that Hope used for resins from India (presumably white dammar) and Madagascar, in contrast to copal, which he regarded as limited to South America. However, the bees mentioned by Hope (1836) have since been found to be in East African copal (Engel 2001). The presence of an *Aphaenogaster* worker ant in the same piece as the holotype of *W. eucarpus* is not particularly informative in this context because it is widely distributed in the tropics and is also known from Baltic amber (de Andrade 1995). However, the genus is absent from South America, which suggests that the copal did not come from that continent. None of the other arthropods described by Dalman (1826) seem to have been revised on the basis of the original material. Perrichot et al. (2004) listed the beetles *Ripidius megalophus* Dalman, 1826 and *R. pyrrholophus* Dalman, 1826 as being from Baltic amber, but this is an error (A. Nel, pers. comm.).

Like Madagascan copal, Zanzibar copal is assumed to be derived mainly from the resin of *Hymenaea verrucosa* (Schlütter & von Gnielinski 1987; Langenheim 2003), but there have been few studies of its composition or age. Schlütter & von Gnielinski (1987) and Schlütter (1993) consider that Zanzibar copal could be semifossil or fossil and range to as early as the Upper Pliocene (1.8 Ma). The piece containing the holotype of *W. eucarpus* is in surprisingly good condition, given that it has been exposed to air for over 180 years. The excellent state of preservation of Dalman's copal material in general has been noted by Schlütter & von Gnielinski (1987). Most copal degrades rapidly once exposed to air, so it seems quite possible that the resin containing the holotype is subfossil or even fossil, rather than being copal in the strict sense. Evidently, further work on both the physical properties of Dalman's material and the systematic relationships of the other inclusions he described will be required before the question of its age and origin can be resolved.

What is certain is that *eucarpus* belongs in the Withiidae, making it the first species of the family to have been described. Its generic position is harder to resolve because of the immaturity of the type. However, the submedian position of tactile seta on tarsus IV, the arrangement of the trichobothria (*it* and *est* near the middle of the finger), the form of the carapace and palps, and the presumed African provenance are consistent with the genus *Withius*. This is the most speciose genus of the family in Africa, but the general form of the palps, with a smooth, oval chelal palm, suggest that *W. eucarpus* may be related to *W. glabratus* (Ellingsen), which is known from Cameroon (Ellingsen 1910) and DR Congo (Beier 1959)[1]. They do not appear

[1] Vachon (1940) identified "sans trop de conviction" [without much conviction] specimens from Kouroussa, Guinea, as belonging to *W. glabratus*, but this material, collected by L. Berland, is not present in the MNHN collections and the record remains doubtful. Harvey (1991, 2009) lists Mali in the distribution of this species, but this is presumably a misinterpretation of Vachon's (1940) reference to 'A. O. F.' (Afrique occidentale française) in the title of his paper. The itinerary of Berland's collecting voyage to W. Africa was published in Berland & Millot (1941).

to be conspecific because the length/breadth ratios of the femur and chela of *W. eucarpus* are slighter higher than those of *W. glabratus*, whereas the reverse ought to be the case if they represented the tritonymph and adult of the same species.

Extant Withiidae are most diverse in Africa and South America, but the family is also found in Asia, Australasia and North America, and one species, *W. piger* (Simon, 1878), has been widely distributed by man. A single species of Withiidae, *Beierowithius sieboldtii* (Menge, 1854), is known from Baltic amber. The genus *Beierowithius* Mahnert, 1979 is assumed to be monotypic and extinct, but there have been no detailed comparisons with extant Withiidae. According to the descriptions of Menge (1855) and Beier (1937, 1955), this species is smaller than *W. eucarpus*. Fossil Withiidae, phoretic on platypodine beetles (Curculionidae), are also known in Dominican amber (Schawaller 1981; Poinar et al. 1999), but these have not been named. Schawaller (1981, 1984) tentatively attributed these fossils to the extant genus *Parawithius* Chamberlin, 1931, which has since been divided into the genera *Parawithius*, *Victorwithius* Feio, 1944 and *Cystowithius* Harvey, 2004 (Harvey 2004). However, if the uncertain trichobothriotaxy of the chela is ignored, it seems probable that the Dominican amber species belongs instead to the extant genus *Dolichowithius* Beier, 1932 which, unlike *Parawithius*, *Victorwithius* and *Cystowithius*, is known from the Caribbean region (Harvey 2009) and has been observed to be phoretic on Platypodinae (Aguiar et al. 1992; Aguiar & Bührnheim 1998).

4. Pseudoscorpions from Madagascan copal

The importance of copal inclusions rests mainly on their potential to illustrate faunal changes that have occurred in relatively recent periods. In the case of pseudoscorpions in copal, this value is more theoretical than real at the moment, because our knowledge of the extant fauna in regions such as Colombia and Madagascar is inadequate (Heurtault 1986; Ceballos & Florez 2007). Another difficulty derives from the quality of the material itself. Copal has poor optical qualities compared to most amber, due to its inhomogeneity and the frequent presence of tiny bubbles. These difficulties can be partially overcome by cutting the copal close to the specimen, but in practice this is often impractical due to the abundance of the inclusions and the brittleness of the copal. Even when suitably prepared, a specimen embedded in resin can never be observed in all suitable orientations using light microscopy, and internal details, even if preserved, cannot be readily examined. For these reasons, doubts will often remain concerning the identification of specimens in copal. Because species found in copal are potentially extant, it seems inadvisable to describe new taxa solely from copal material. For example, the spider *Hersilia madagascariensis* (Wunderlich, 2004a) was originally described from Madagascan copal and placed in its own genus, *Hersiliopsis* Wunderlich, 2004 (Wunderlich 2004a), but later found to be an extant species of *Hersilia* (Foord & Dippenaar-Schoeman 2006). Despite the increasing availability of copal inclusions from Colombia and Madagascar, no pseudoscorpion species have been described as new from such material, and it is to be hoped that this will continue to be the case.

Superfamily Chthonioidea Daday, 1888
Family Chthoniidae Daday, 1888
Tribe Tyrannochthoniini Chamberlin, 1962
Genus *Tyrannochthonius* Chamberlin, 1929

Tyrannochthonius sp.
Figs. 4–5

Material examined: 1 ♂, 1 ♀, in a small (29 × 18 × 9.5 mm), light-yellow piece of Madagascan copal; J. Wunderlich collection (F864). Also present in this piece are

Fig. 4. *Tyrannochthonius* sp., female, dorsal view; Madagascan copal.

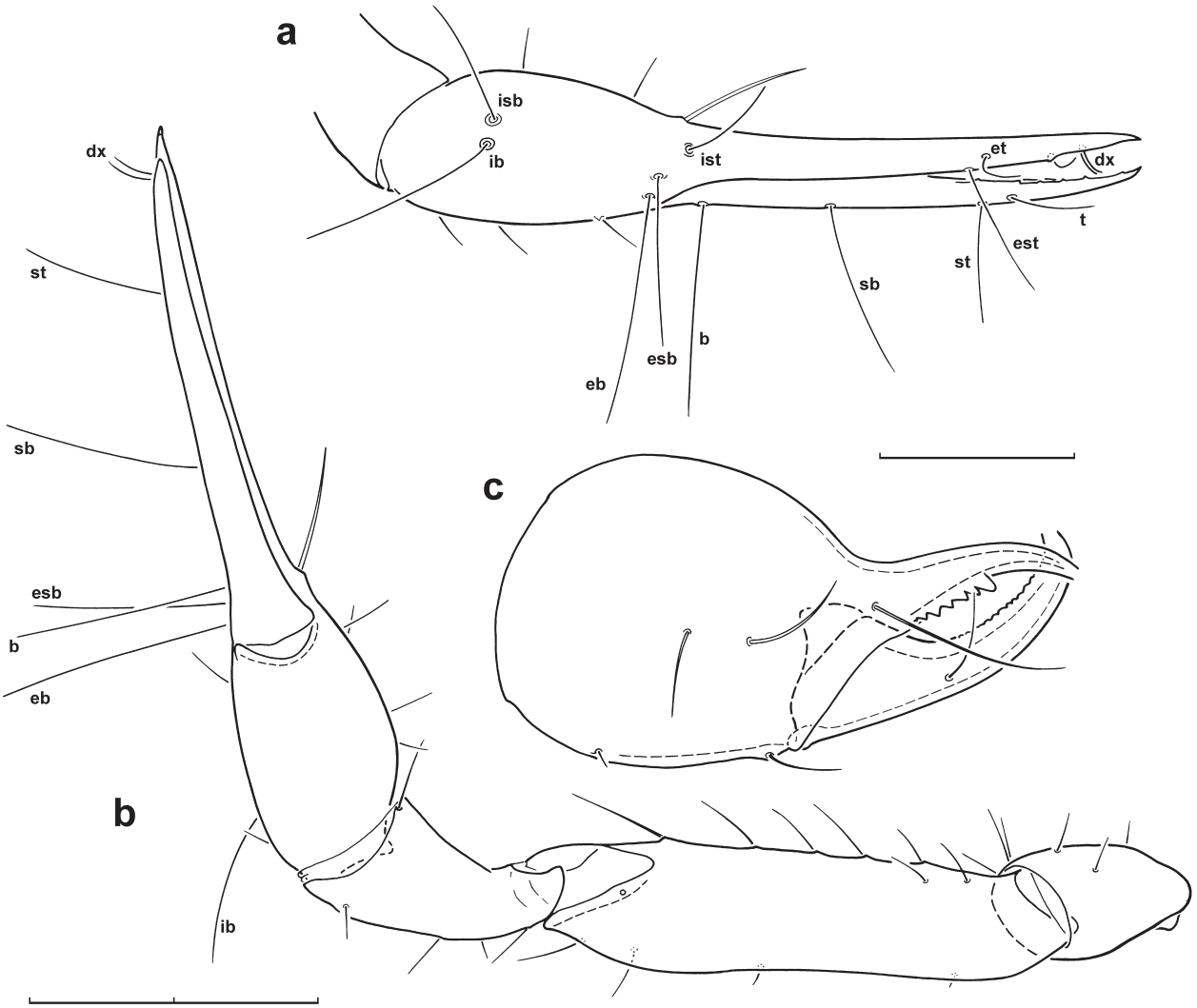

Fig. 5. *Tyrannochthonius* sp., female, Madagascan copal. – **a**. Subdorsal (slightly antiaxial) view of right chela. **b**. Ventral view of right palp. **c**. Right chelicera. – Scale lines: 0.2 mm (a and b), 0.1 mm (c).

a leaf fragment, stellate hairs (similar to those found in Baltic amber), small faecal pellets, two oribatid mites, a thrips, several collembolans, various small flies, a small wasp and a small cockroach. The female pseudoscorpion is in good condition, except that most parts are filled with air. The male is difficult to study because it is situated near a rounded edge, resulting in poor optical conditions.

Brief description (mainly based on female). – Small *Tyrannochthonius* species of typical facies (Fig. 4). Anterior eyes moderately well developed lenses, posterior eyes reduced to spots and separated by roughly 1.5 ocular diameters from anterior eyes. Epistome well developed, triangular. Setae of carapace difficult to see, but probably numbering 16; anteromedian pair closely flanking epistome. Coxa I with well developed anterior process. Coxal spines present on coxa II only, arranged in an arc such that the spines of the two coxae together form a U-shape. Chelicera with palm broad and rounded (Fig. 5c); fixed finger with about 11 teeth, decreasing in size proximally; movable finger with numerous small teeth; palm with 5 setae, *vb* very small; seta of movable finger inserted at about the middle. Chelal palm with a single enlarged seta (ca. 0.09 mm long) on paraxial side at base of the fixed finger (Fig. 5a–b). Arrangement of trichobothria (Fig. 5a–b) typical for the genus. Tarsus of leg IV with a long (0.21 mm) tactile seta proximad of middle (TS 0.40) and a shorter tactile seta distad of middle (TS 0.62). Male posterior genital sternite with a very long notch.

Measurements of femal (in mm, followed by standard ratios in parentheses): Body length (strongly contracted) 0.80. Carapace ca 0.32 × 0.34. Palp femur 0.37 × 0.09 (4.2),

patella 0.17 × 0.09 (1.9), chela 0.53 × 0.11 (5.0), palm 0.17 (1.6), movable finger 0.35 (2.1 × palm). Leg IV tarsus 0.21 long.

Remarks. – *Tyrannochthonius* is one of the most abundant genera of pseudoscorpions in the tropics and subtropics. It is also present in Madagascar (Heurtault 1986), but no species have yet been identified. It is somewhat surprising that no fossils of *Tyrannochthonius* have yet been found in amber. Given the circumtropical distribution of the genus, one would at least expect it to be present in Dominican and Mexican amber. The absence of *Tyrannochthonius* from Baltic amber is interesting because the existence of relictual cavernicolous species in North America, North Africa and, perhaps, Europe (the latter with only the doubtful representative *T. psoglavi* Ćurčić, 1990) indicates that the genus once had a more extensive distribution in the Holarctic. If the failure to find fossils of *Tyrannochthonius* in Baltic amber is due to a real absence, it suggests that the genus might have arrived in the western Palaearctic after the Eocene.

Superfamily Cheliferoidea Risso, 1826
Family Atemnidae Kishida, 1929

Subfamily Atemninae Kishida, 1929

Although authorship of Atemnidae and Atemninae has generally been attributed to Chamberlin (1931), Kishida (1929) was the first to propose family-group names (Atemnidae and Atemnoidea) based on *Atemnus* Canestrini, 1884 (Judson 2010).

Atemninae sp.
Fig. 6

Material examined: Deutonymphal exuviae, left palp missing, in a moderately sized piece of Madagascan copal (30 × 21 × 13 mm), J. Wunderlich collection (F865).

Remarks. – The condition of this specimen and its immaturity prevent identification to genus or species. Atemninae are common members of the corticolous fauna of many tropical regions, including Madagascar.

5. Pseudoscorpions from Colombian copal

Superfamily Cheliferoidea Risso, 1826
Family Atemnidae Kishida, 1929
Subfamily Atemninae Kishida, 1929
Genus *Paratemnoides* Harvey, 1991

Paratemnoides nidificator (Balzan, 1888)
Fig. 7

Material examined: 1 ♀, in light-yellow piece of Colombian copal (44 × 41 × 11 mm), J. Wunderlich collection (F2208). Other inclusions: three alate termites and a number of additional shed termite wings, several small flies, a mite (Acari: Cunaxidae) and an immature spider.

Brief description. – Spinneret with about four rami. Palps smooth, apart from weak granulation on paraxial faces of femur, patella and palm. Palm of chela with tactile seta m_3 slightly proximad of middle of palm. Fixed finger with ca. 37, and movable finger with ca. 45 teeth. Arrangement of trichobothria normal. Tactile seta of tarsus IV close to base.

Fig. 6. Atemninae sp., deutonymphal exuviae; Madagascan copal.

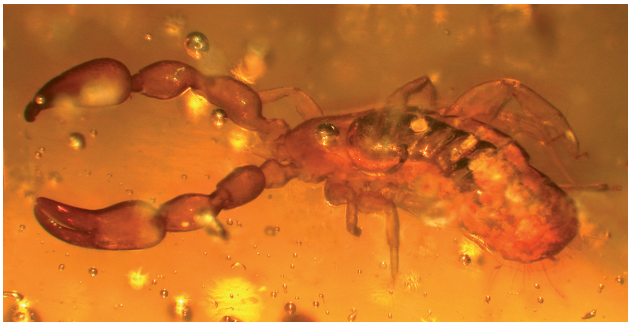

Fig. 7. *Paratemnoides nidificator* (Balzan), female, dorsolateral view; Colombian copal.

Measurements (in mm, followed by standard ratios in parentheses): Body length 2.6. Carapace length 0.80. Palp femur 0.71 × 0.35 (2.0), patella 0.68 × 0.36 (1.9), chela^{+} 1.39 × 0.45 (3.1), chela^{-} 1.24 (2.8), hand^{+} 0.79 (1.8), hand^{-} 0.72 (1.6), movable finger 0.65 (0.91 × palm^{-}, 0.82 × palm^{+}). Leg IV tarsus 0.41 × 0.13 (3.1).

Remarks. – The present specimen agrees well with the description of *P. nidificator* given by Mahnert (1979), under the synonymous name *P. minor* (Balzan, 1892) (Klausen 2006), except that the fingers of the chela seem somewhat longer. This species has a wide distribution in the Neotropics and has previously been recorded from Colombia (Ceballos & Florez 2007).

Family Chernetidae Menge, 1855
Genus *Pachychernes* Beier, 1932

Pachychernes aff. *subrobustus* (Balzan, 1892)
Fig. 8

Material examined: 1 adult (♀?), in light-yellow piece of Colombian copal (59 × 30 × 14 mm), J. Wunderlich collection (F2209). Other inclusions: whiteflies (Hemiptera: Aleyrodidae), alate and non-alate psocids (Psocoptera), an alate termite (Isoptera), a female fig wasp (Hymenoptera: Agaonidae), worker ants (Hymenoptera), a small bee (Hymenoptera), woodboring beetles (Coleoptera: Curculionidae: Platypodinae), various small flies (Diptera) and an immature spider (Araneae). Internal tissues of pseudoscorpion partially dissolved; opisthosoma containing a large bubble.

Brief description. – Carapace with weak granulation. Palps with moderate granulation. Chelal fingers not gaping when closed; each finger with about six antiaxial accessory teeth (none observed paraxially, but orientation less favourable). All trichobothria of internal series situated in proximal half of fixed finger; *b*, *sb* and *st* near base of finger, *t* slightly proximad of middle. Spinneret of chelicerae with about six rami. Leg IV: tibia about 3.4 times longer than broad, tactile seta short, near middle (TS 0.47); tarsus with tactile seta long, proximad of middle (TS 0.37).

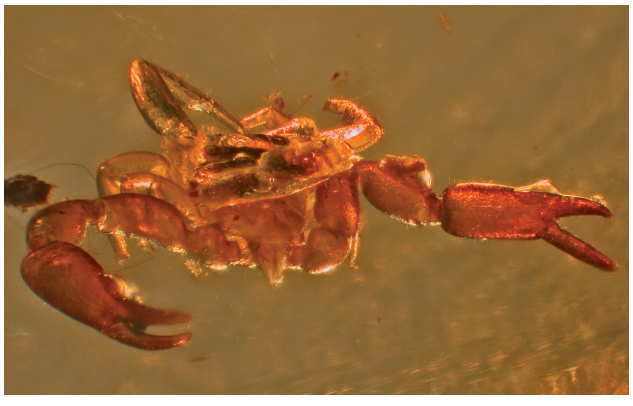

Fig. 8. *Pachychernes* aff. *subrobustus* (Balzan), adult, dorsal view, opisthosoma folded over carapace; Colombian copal.

Measurements (in mm, followed by standard ratios in parentheses): Palp femur 0.71 × 0.33 (2.2), chela+ 1.40 × 0.46 (3.0), chela^{-} 1.32 (2.9), palm^{+} 0.85 (1.8), palm^{-} 0.77 (1.7), movable finger 0.68 (0.88 × palm^{-}).

Remarks. – This specimen agrees in most respects with With's (1908) and Beier's (1932) descriptions of the female of *Pachychernes subrobustus*, except that the latter is slightly larger (e. g. palp femur length 0.75–0.81 mm) and has a much larger number of antiaxial accessory teeth (about 12–15) on each of the chelal fingers. It is worth noting that a species of *Pachychernes* has been described from Dominican amber (Schawaller 1980). This genus has not been reported previously from Colombia (Ceballos & Florez 2007).

6. References

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