

# A new *Uroctea* from the Jordan desert (Araneae: Oecobiidae)

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**Abstract.** *Uroctea hashemitorum* sp. n. (Araneae, Oecobiidae) is described from a male specimen collected in a desert location in the neighbourhood of Wadi Rum, Jordan. The new species is figured and a cladistic analysis of eight *Uroctea* species, based on male palpal characteristics, has been performed. The new species belongs to the "sahelian-sudanian group" of *Uroctea* species.

**Samenvatting.** Een nieuwe *Uroctea* uit de Jordaanse woestijn (Araneae: Oecobiidae)

*Uroctea hashemitorum* sp. n. wordt beschreven aan de hand van een mannelijk specimen, verzameld in de woestijn in de omgeving van Wadi Rum, Jordanië. De nieuwe soort wordt afgebeeld en er is een cladistische analyse uitgevoerd op acht *Uroctea* soorten, gebaseerd op kenmerken van de mannelijke palp. De nieuwe soort behoort tot de "saheliaans-sudanese groep" van *Uroctea* soorten.

**Résumé.** Une nouvelle espèce d'*Uroctea* du désert jordanien (Araneae: Oecobiidae)

*Uroctea hashemitorum* sp. n. est décrite à partir d'un spécimen masculin, collectionné dans le désert aux environs de Wadi Rum, Jordanie. La nouvelle espèce est figurée et une analyse cladistique, basée sur des caractères du palpe maxillaire mâle, est exécutée sur huit espèces d'*Uroctea*. La nouvelle espèce appartient au "groupe sahélien-soudanais" d'*Uroctea*.

**Zusammenfassung.** Eine neue *Uroctea* Art aus die Wüste Jordaniens (Araneae: Oecobiidae)

*Uroctea hashemitorum* sp. n. (Araneae, Oecobiidae) wird beschrieben an der Hand eines männliches Specimens, eingesammelt in der Wüste in der Gegend des Wadi Rum, Jordanien. Die neue Art wird abgebildet und eine cladistische Analyse auf Grund von Merkmalen des männlichen Tasters ist ausgeführt auf Acht *Uroctea* Arten. Die neue Art gehört zur "sahelisch-sudanesische Gruppe" von *Uroctea* Arten.

**Key words:** *Uroctea hashemitorum* sp. n. – new species – Jordan.

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## Introduction

The old world genus *Uroctea* Dufour, 1820 serves as an interesting example of how opinions on spider classification have evolved in the course of this century. In his "Histoire naturelle des araignées", Simon (1893) accomodates *Uroctea* in the family Urocteidae Thorell, 1869 ("2<sup>e</sup> section, Araneae Verae Ecribellatae, 2<sup>e</sup> sous-section, Entelegynae"), where it is the single genus. He comments: "...il ne présente d'analogies bien frappantes qu'avec le genre *Oecobius*, qui appartient cependant à une série différente, celle des *Araignées cribellatae* (voy. p. 244). Les auteurs modernes, qui n'ont pas tenu compte dans leurs classifications du cribellum et du calamistrum, particulièrement Thorell et Cambridge, ont réunis les *Oecobius* et les *Uroctea* dans une même famille, comme je l'avais fait dans mes *Arachnides de France* (t. II, p. 1)."

The cribellum is a flat plate which did arise from the anterior median spinnerets and which bears hundreds to tens of thousands of small spigots producing a special kind of flocculent silk. This silk is manipulated by cribellate spiders with a comb-like arrangement of setae on mt IV, the calamistrum.

In his "Histoire naturelle des araignées" Simon applies the views of Bertkau (1882) and states that the presence of a cribellum is the decisive character which unites what he considers to be a natural group of eight spider families, the "Cribellatae".

Since then, this concept prevailed in all spider classifications, until Petrunkevich (1923) questioned it and judged it probable that cribellum and calamistrum evolved independently in different families. He therefore considered Urocteidae Thorell, 1869 and Oecobiidae Blackwall, 1862 as closely related.

Indeed, Simon (1892) himself already noted about the single genus *Oecobius* Lucas, 1846 in his Cribellate family Oecobiidae: "Les *Oecobius* ressemblent complètement aux *Uroctea* par leur forme générale, leurs pièces buccales, leurs filières et leur tubercule anal

dont la structure est très particulière.” Simon also admitted that *Oecobius* stands isolated within his Cribellatae.

Chamberlin & Ivie (1935) comment: “The presence or absence of the cribellum and calamistrum have since been shown to be of much less significance. They are primitive characters and have undoubtedly been lost on several independent occasions in the phylogeny of different branches.” They subsequently combine *Uroctea* and *Oecobius* in one family, Urocteidae.

Lehtinen (1967) also argued that the presence of a cribellum is a symplesiomorphy of araneomorph spiders and that the cribellum has subsequently been lost in a homoplasious way in several lineages. Correctly applying priority rules, he united oecobiid and urocteid spiders in the family Oecobiidae.

Ample support has in the meantime been given to Chamberlin & Ivie’s and Lehtinen’s hypothesis by a number of austral taxa. In the family Desidae, for example, the cribellate genera *Goyenia* Forster, 1970 and *Tuakana* Forster, 1970 are obviously closely related to the cribellate genus *Matachia* Dalmás, 1917 (Forster 1970). Cribellum reduction can further be demonstrated in Lycosoidea and Amaurobioidea (Lehtinen 1967).

As a result of these new insights, the association of the genera *Oecobius* and *Uroctea* in the family Oecobiidae is now generally accepted. Baum (1972) gives a good historical overview and literature survey concerning this subject.

Apart from *Oecobius* and *Uroctea*, the family Oecobiidae presently encompasses the genera *Platoecobius* Chamberlin & Ivie, 1935, *Urocteana* Roewer, 1961, *Uroecobius* Kullmann & Zimmermann, 1976, and *Paroecobius* Lamoral, 1981 (Platnick 1997). The Oecobiidae are considered to occupy a basal position within Entelegynae: Platnick *et al.* (1991) presented a cladogram where *Oecobius* and the eresid genus *Stegodyphus* Simon, 1873 are sister taxa, while Coddington & Levi (1991) state Oecobiidae and Hersiliidae as sister taxa, grouped together with Eresidae in Eresoidea.

To date, 16 species have been described in the genus *Uroctea* (Roewer 1942; Brignoli 1983; Platnick 1989, 1993, 1997): *U. durandi* (Latreille, 1809) from the Mediterranean (♂♀), *U. limbata* (C. L. Koch, 1843) from the Mediterranean, the Middle East and Arabia (♂♀), *U. septempunctata* (Cambridge, 1872) from Israel (♀), *U. sudanensis* Benoit, 1966, from Sudan (♂), *U. paivani* (Blackwall, 1868) from the Canary and Cape Verde Islands, *U. grossa* Roewer, 1960, from Afghanistan (♀), *U. indica* Pocock, 1900, (♀), *U. matthaii* Dyal, 1936, (♂♀) and *U. manii* Patel, 1987, (♀) from India, *U. compactilis* L. Koch, 1878, from China, Korea and Japan (♂♀), *U. lesserti* Schenkel, 1936, (♂♀) and *U. undecimmaculata* Schenkel, 1953, (♀) from China and *U. schinzi* Simon, 1887, (♀), *U. quinquenotata* Simon, 1910, (♀), *U. semilimbata* Simon, 1910, (♀) and *U. septemnotata* Tucker, 1920, (♀) from South Africa.

On April 12, 1999, in the mountains NE of Aqaba, Jordan, the author collected a dead adult male *Uroctea* belonging to a new species. It is described below.

### Methods and abbreviations

While collecting, latitude, longitude and altitude above sea level were measured as accurately as allowed by the US government, using a Garmin GPS-12 satellite receiver. The specimen was observed and drawn using a stereomicroscope equipped with an eyepiece grid. All measurements are in mm.

Cladistic analysis (Kitching *et al.* 1998) of male palpal characters was performed using the computer programmes Pee-Wee 2.6 (Goloboff 1997a), NONA 1.6 (Goloboff 1997b), Hennig86 1.5 (Farris 1988), PAUP 4.0 beta 2 (Swofford 1999), VitA 0.9c (De Laet 1997) and CAFCA 1.5c (Zandee 1996). Optimisation of character states and printing

of the resulting trees was performed using Clados 1.9.1 (Nixon 1998). Depending on the platform needed, the programmes were run on Compaq Prolinea 575 and Mac IICI machines.

The following abbreviations are used in text or illustrations:

- C conductor
- ci consistency index
- E embolus
- MA median apophysis
- Ra radix
- RaA radix apophysis
- rc rescaled consistency index
- ri retention index
- ST subtegulum
- STA subterminal apophysis
- T tegulum
- TA terminal apophysis

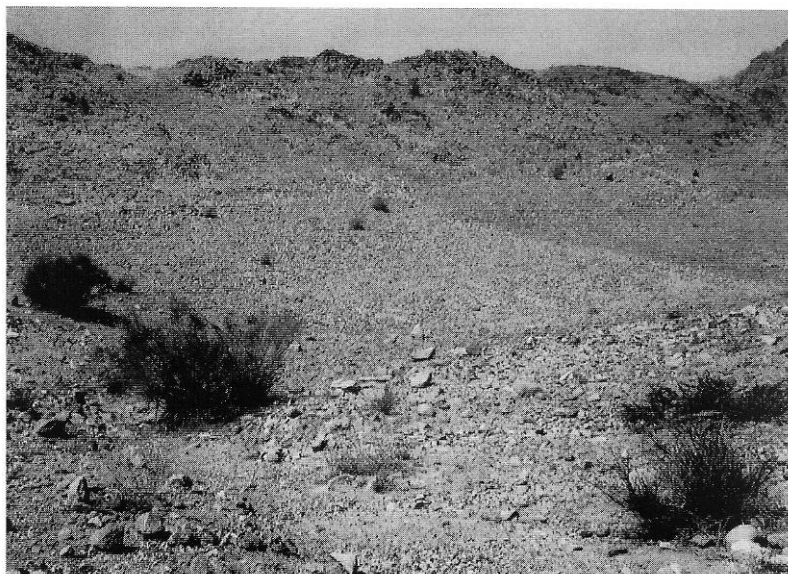


Fig. 1: Type locality of *Uroctea hashemitorum* sp. n. - Jordan, Wadi Rum, granitic desert at an altitude of 700 m, 21 km NE of Aqaba.

### ***Uroctea hashemitorum* sp. n.**

Holotype male: Jordan, Aqaba governorate, Wadi Rum, 21 km NE of Aqaba, elev. 700 m, N29°37'20" E35°11'14". One dead male specimen collected from silken retreat underneath stone in desert along King's highway, 12.IV.1999, J. Bosselaers leg. The type locality is a moderate altitude desert with pink granitic substrate (fig. 1), isolated bushes of *Ochradenus baccatus* Delile, *Asparagus stipularis* Forskal and *Retama raetam*.

(Forskal) Webb. et Berth., and dispersed small xerophytes, e.g. *Asteriscus pygmaeus* (DC.) Cosson & Dur. The following arthropods were encountered at the site: *Hyalomma* sp. (Ixodidae, Acari), 1♂; *Galeodes* sp. (Solpugida, Arachnida), 1 juvenile; *Leiurus quinquestriatus hebraeus* (Birula, 1908) (Buthidae, Scorpiones), 1 juvenile; Araneae: Dysderidae, unidentified, 1♀; *Evipa praelongipes* (O. P. Cambridge, 1870), 1♀, 1 juvenile; *Zelotes scrutatus* (O. P. Cambridge, 1872), 1♀; *Oecobius cellariorum* (Dugès, 1836), 1♀.

The holotype specimen is deposited in the Royal Belgian Institute for Natural Sciences, Brussels (RBINS).

**Diagnosis:** the new species can be distinguished from other *Uroctea* species by the relatively long and thin embolus and the small radix apophysis, combined with a large and sickle-shaped terminal apophysis with a wide and fan-shaped end.

**Description. Male:** total length: 5.3.

**Carapace:** length: 2.5; width: 2.9. Reniform, as is typical for the genus (fig. 2). Colour: greyish brown with white patches and isolated black spots, partly faded in the type specimen.

**Eyes:** eye arrangement typical of the genus. Both eye rows procurved when observed from above (fig. 2). Width of anterior row: 0.76; width of posterior row: 0.78. Trapezium of the median eyes, anterior width: 0.49; posterior width: 0.57; depth: 0.35. Distance between anterior median eyes: 0.11; distance between posterior median eyes: 0.32.

**Chelicerae:** very small. Basal part slender and cylindrical; fang short, suddenly narrowed into a pointed, thin and sickle-shaped tip.

**Sternum:** length: 1.5; width: 1.6. Heart-shaped, whitish grey with black spots.

**Labium:** short, wider than long. Endites broad, with serrula at the anterior end, surface covered with long, stout, forward pointing dark setae.

**Abdomen:** considerably shrunk in the type specimen (fig. 2), greyish white with isolated small black spots and some orange-yellow patches. Covered with long, pointed grey hairs. Anal tubercle present, as is typical for the family. No cribellum.

**Legs:** brown, covered with thin grey setae. No trace of colour pattern, which has probably faded. Tarsi with two large pectinate claws and a well developed third claw. Measurements:

	femur	patella	tibia	metatarsus	tarsus	total
I	3.5	1.5	2.5	2.8	1.5	11.8
II	3.5	1.5	2.8	3.4	1.6	12.8
III	3.6	1.5	2.5	3.3	1.4	12.3
IV	3.6	1.8	2.4	3.4	1.4	12.6

Leg spination (fig. 2):

Legs I and II: femur with three dorsal rows of spines (two lateral ones with five spines and a central one with three spines) and two ventral rows with 15–20 thin spines each. Patella with two prolateral, two retrolateral and one dorsal terminal spine. Patellar indentation ("encoche patellaire" of Ledoux & Canard 1991: 9) short and wide. Tibia with three prolateral, three retrolateral, two basal dorsal, and two rows of ventral spines. Metatarsus with three retrolateral spines (one basal, one submedian and one terminal), and two rows of 7–8 ventral spines. Tarsus: a few retrolateral spines and numerous ventral spines, more or less in two rows.

Legs III and IV: femur with about a dozen short dorsal spines, more or less arranged in three rows, and two ventral rows with 15–20 thin spines each. Patella with two prolateral, two retrolateral and one dorsal terminal spine. Patellar indentation short and moderately wide on patella III, long and narrow on patella IV. Tibia with three prolateral, three retrolateral, two basal dorsal, and two rows of ventral spines. Metatarsus heavily armed with numerous retrolateral spines and a large number of ventral spines, more or

less arranged in two rows. Spines less numerous on metatarsus III, as compared to metatarsus IV. Tarsus: armed with a few pro- and retrolateral spines and numerous short, stout ventral spines.

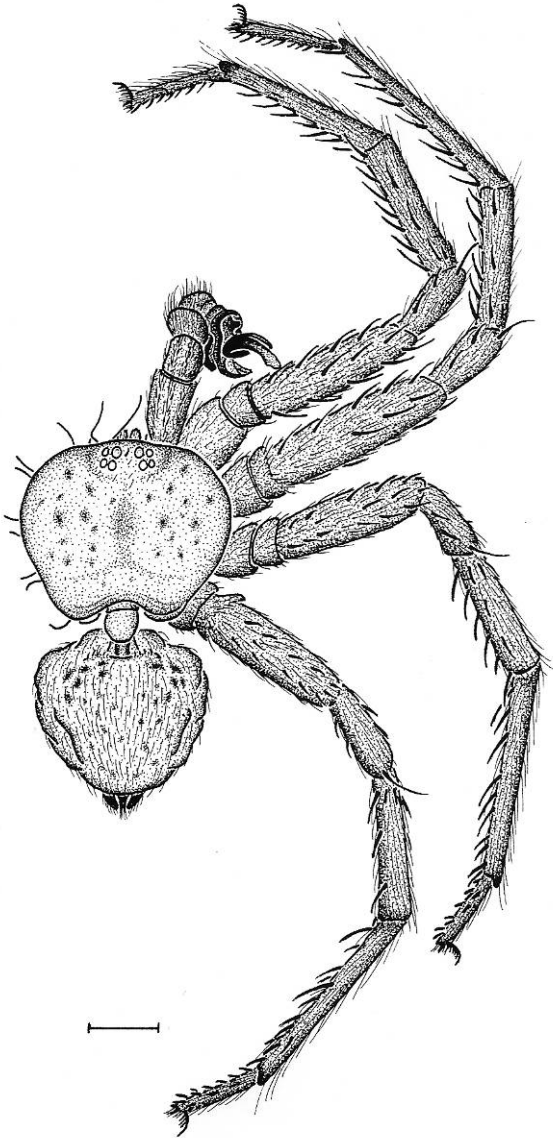


Fig. 2: *Uroctea hashemitorum* sp. n.; male holotype, Jordan, Wadi Rum, 21 km NE of Aqaba, granitic desert at an altitude of 700 m, 12.IV.1999, J. Bosselaers leg. et del.; habitus drawing, dorsal view. Scale bar: 1 mm.

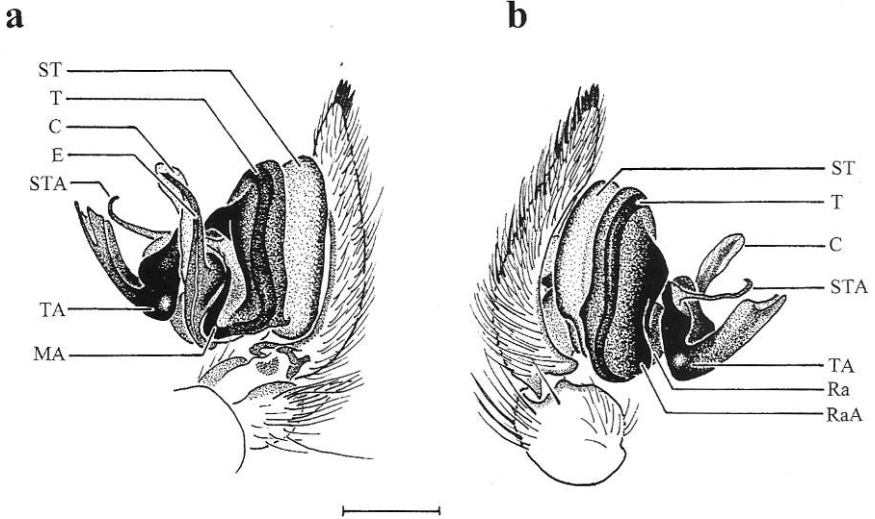


Fig. 3a-b: *Uroctea hashemitorum* sp. n.; male holotype, Jordan, Wadi Rum, 21 km NE of Aqaba, granitic desert at an altitude of 700 m, 12.IV.1999, J. Bosselaers leg. et del.; a. male palp, proterolateral view; b. male palp, retrolateral view. Scale bar: 0.5 mm. Abbreviations: see text.

**Male palp:** large (fig. 2) and globular, with a wide, greyish subtegulum, a dark brown tegulum with a clearly visible sperm duct and a relatively long, thin embolus flanked by a spoon-shaped, thin and membranous conductor (fig. 3a, b). Median apophysis connected to the tegulum by a whitish, weakly sclerotised membrane. Radix apophysis (Baum 1972) a small, longitudinal ridge. Subterminal apophysis whitish, long and thin, pointed. Terminal apophysis black, large and sclerotised, sickle-shaped, and with a fan-shaped end. The tip of the cymbium bears a bundle of dark, very stout spines.

**Female:** unknown.

**Etymology:** the new species is named *hashemitorum* in honour of the Hashemite dynasty, who have contributed considerably to the protection of vulnerable marine and terrestrial biotopes in Jordan.

**Distribution:** Only known from the type locality.

### Phylogeny and discussion

In order to clarify the position of the new species within the genus *Uroctea*, a cladistic analysis of male palpal characters was performed. The nomenclature for male palpal structures follows Baum (1972), to which the reader is referred for details. The following characters were used in the analysis:

- 1 subtegulum
  - 0 narrow
  - 1 wide
- 2 median apophysis
  - 0 connected to tegulum by flexible membrane
  - 1 contiguous with tegulum
- 3 radix apophysis
  - 0 present
  - 1 absent
- 4 radix apophysis
  - 0 large
  - 1 small
- 5 terminal part of embolus
  - 0 short and wide
  - 1 long and thin
- 6 subterminal apophysis 1
  - 0 long and thin
  - 1 short and wide
- 7 end of subterminal apophysis 1
  - 0 pointed
  - 1 blunt
- 8 subterminal apophysis 2
  - 0 absent
  - 1 present
- 9 terminal apophysis
  - 0 large and sclerotised
  - 1 small and weakly sclerotised
- 10 shape of terminal apophysis
  - 0 triangular
  - 1 sickle-shaped
- 11 end of terminal apophysis
  - 0 narrow and pointed
  - 1 wide and fan-shaped
- 12 cymbium tip
  - 0 short and blunt
  - 1 long and narrowed
- 13 radix apophysis orientation
  - 0 ventral
  - 1 caudal

Characters of male palps of *U. durandi*, *U. compactilis* and *U. limbata* were scored from the excellent illustrations and descriptions in Baum (1972). A fourth species, erroneously named *U. paivani* in Baum (1972) has been found to belong to an as yet undescribed species and is referred to as *Uroctea* sp. here. In this respect, I follow Wunderlich (1987): "Baum bildet sub *U. paivani* aus Israel (?) möglicherweise eine andere Art ab. Die von dieser Autorin beschriebenen ♂ sind nicht wie angegeben im SMF deponiert (auch nicht im ZMH) sondern verschollen." A detailed illustration of the male palp of the real *U. paivani* was found in Kritscher (1966). Detailed illustrations of the male palps of *U. lesserti* were found in Feng (1990) and Kim & Namkung (1992) and an illustration of the male palp of *U. sudanensis* was found in Benoit (1966). In addition to this, the holotype (MRAC120.834) and an additional specimen (MRAC131.171) of *U. sudanensis* were seen. No information could be found on *U. matthaii*. The males of the other *Uroctea* species are unknown.

Characters (e.g. char. 3, 4) were scored with character states hierarchically related, as advocated by Hawkins *et al.* (1997), even though this necessitated coding missing entries due to character inapplicability in some instances. As a result, one new algorithm, LVB 1.0a (Barker 1997), could not be used because it treats missing entries in an inappropriate way, i.e. as an additional character state. *Oecobius cellariorum* was used as outgroup (Watrous & Wheeler 1981). The following data matrix was obtained (missing entries coded as "-"):

	Characters												
	01	02	03	04	05	06	07	08	09	10	11	12	13
<i>Oecobius cellariorum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Uroctea durandi</i>	0	1	1	-	1	1	1	1	1	0	0	0	-
<i>Uroctea compactilis</i>	0	1	1	-	1	0	1	1	0	0	0	0	-
<i>Uroctea limbata</i>	1	0	0	1	0	0	0	0	0	1	0	1	1
<i>Uroctea</i> sp.	1	0	0	0	0	0	1	0	0	1	1	1	0
<i>Uroctea hashemitorum</i> sp. n.	1	0	0	1	1	0	0	0	0	1	1	1	0
<i>Uroctea lesserti</i>	1	0	1	-	0	0	0	1	0	0	0	0	-
<i>Uroctea paivani</i>	1	0	0	0	0	0	1	0	0	1	1	0	1
<i>Uroctea sudanensis</i>	1	0	0	1	0	0	0	0	0	1	0	1	0

An equally weighted analysis of this matrix in Hennig86, PAUP, NONA or Vita resulted, after removal of two trees with "soft polytomies" (Coddington & Scharff 1996) in three fully resolved, equally parsimonious trees of 19 steps, with  $ci = 0.684$  and  $ri = 0.739$ . The strict consensus of these trees is identical to the tree illustrated in fig. 4b.

However, contrary to the opinion of some authors (Kluge, 1997), it is my conviction that differential character weighting is necessary in phylogenetic reconstruction under the parsimony principle (Goloboff, 1993). As a result the analysis was re-run applying implied weighting (Goloboff, 1993) using Pee-Wee and Vita, and applying successive weighting (Farris, 1969) based on  $ci$ ,  $ri$  and  $rc$  in PAUP. All these analyses resulted in the same single, fully resolved 19-step tree, identical to one of the three trees found under equal weighting. This same tree is also the single solution found when performing a "secondary analysis" under default options ("partial monothetic sets") in CAFCA, a



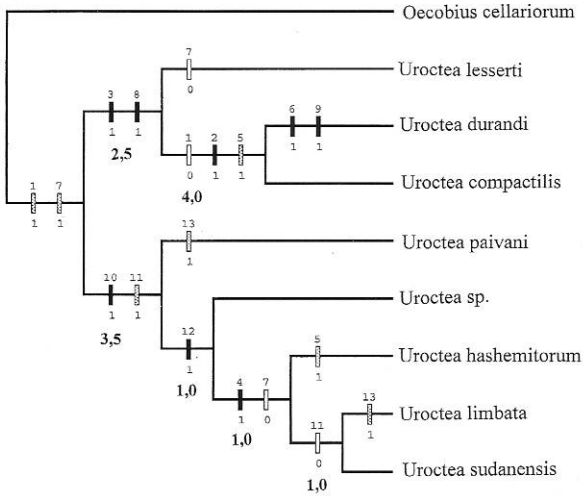
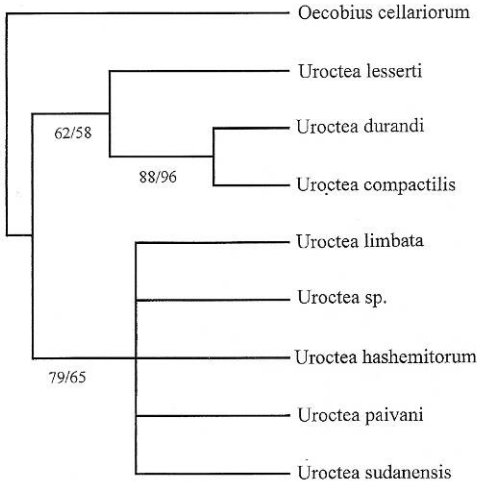
**a****b**

Fig. 4a-b: Phylogenetic relationships in the genus *Uroctea*, as reconstructed by a parsimony analysis of 13 male palpal characters; **a**. preferred tree with character state changes indicated, character state changes optimised favouring reversals over homoplasy ("ACCTRAN"); character numbers above hashmarks, character states below, hashmark shade: black = unique change, grey = homoplasious change, white = reversal; Bremer support values (as units Goloboff fit) indicated in bold below branches; **b**. majority rule consensus tree with bootstrap/jackknife proportions indicated below branches (collapsed branches have proportions below 50%).

programme which applies group compatibility methods. For all these reasons, this tree, which is illustrated in fig. 4a, is preferred.

In order to check which branches are best supported in the preferred cladogram, three non-parametric tests were applied to the tree as obtained under implied weighting. Bremer support values (Bremer, 1988), obtained in Pect-Wee (as units Goloboff fit, not steps) using the "bsupport" command, are added below branches in fig. 4a. Bootstrap and jackknife percentages, calculated in PAUP with 1000 replicates, are added below branches in the consensus tree in fig. 4b. It can be seen that, based on male palpal characters, *Uroctea* is divided in two rather well supported clades. The first clade, encompassing *U. durandi*, *U. lesserti* and *U. compactilis*, is characterised by the absence of a radix apophysis and the presence of a second subterminal apophysis. It corresponds to the "palaeartic group" mentioned by Benoit (1966). The second clade, constituted of *U. paivani*, *U. sp.*, *U. hashemitorum*, *U. limbata* and *U. sudanensis*, is characterised by a large, sickle-shaped terminal apophysis as a synapomorphy and corresponds to Benoit's "sahelian-sudanian group". A third group which Benoit recognises, the "austral group" of South African species, could not be included in the present analysis because no males are known of the species belonging to it. In order to further clarify relations within the genus *Uroctea* and in order to be able to decide whether or not the genus needs splitting, as already suggested by Lehtinen (1967), a thorough revision of the entire genus is definitely needed.

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