

The female of *Ricinoides westermanni* (Guérin-Méneville), with notes on those of *R. afzelii* (Thorell) and *R. karschii* (Hansen & Sørensen) (Ricinulei)

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Summary

The previously unknown female of *Ricinoides westermanni* (Guérin-Méneville) is described from a specimen from Ghana, and the female genitalia of *R. afzelii* (Thorell) and *R. karschii* (Hansen & Sørensen) are described.

Introduction

The type species of the genus *Ricinoides* Ewing, *R. westermanni* (Guérin-Méneville), is poorly known. The original description was based on a single male from "Guinée" which is apparently lost (Tuxen, 1974), and the only available adult material is a male, collected from Bismarckburg, Togo (Hansen & Sørensen, 1904), which Tuxen (1974) designated as the neotype. Several other specimens, all nymphs, attributed to this species have been collected from Ghana, Togo and Ivory Coast (Legg, 1977b, 1982).

A female and several nymphs of a species considered to be *R. westermanni* were recently found in the Australian National Insect Collection, Canberra. This paper presents a description of this female, including a description of the genitalia, which have proved to be of immense value in the taxonomy of American ricinuleids (Brignoli, 1974; Dumitresco & Juvara-Bals, 1977a; Platnick & Shadab, 1976, 1977, 1981a, 1981b; Platnick & Paz, 1979; Platnick & Pass, 1982), but have been little studied in the African genus *Ricinoides*.

For comparative purposes, the female genitalia of *R. afzelii* (Thorell) and *R. karschii* (Hansen & Sørensen) are also described.

Materials and Methods

The specimens examined are lodged in two depositories, the Australian National Insect Collection,

Division of Entomology, CSIRO, Canberra (ANIC) and the British Museum (Natural History), London (BMNH).

The female genitalia were dissected from the specimens in the following manner: the posterior genital plate was grasped with forceps and gently tugged while the lateral muscles holding the plate were severed using a pair of microscissors. The remaining dorsal muscles were then cut, and the plate (with the spermathecae attached) was removed. This technique is superior to those in which the genitalia are simply examined and drawn *in situ*.

The diagrams of the genitalia are presented as if the posterior genital plate were dorsal; it is, in fact, anatomically ventral.

The left chelicera and left pedipalp of the female of *R. westermanni* were removed, mounted on micropins and gold coated for examination in a JEOL JSM-35C Scanning Electron Microscope.

***Ricinoides westermanni* (Guérin-Méneville) (Figs. 1-9)**

Cryptostemma westermanni Guérin-Méneville, 1838a: 10-12; Guérin-Méneville, 1838b: 353-354, pl. 539, figs. 7, 7a; Gervais, 1844: 131, pl. 47, fig. 4; Hansen & Sørensen, 1904: 149-150, pl. VII, figs. 3a-b, pl. VIII, figs. 1a-f.

Cryptostemma plebejum Hansen & Sørensen, 1904: 148, pl. VIII, figs. 2a-f (synonymised by Legg, 1977b).

Ricinoides westermanni (Guérin-Méneville): Ewing, 1929: 597; Tuxen, 1974: 102-103, figs. 1d, 34-38; Legg, 1977b: 124; Legg, 1982: 288-290, figs. 1a-c.

Ricinoides plebejum (Hansen & Sørensen): Ewing, 1929: 597; Tuxen, 1974: 105.

Material examined: 1 ♀, 1 deutonymph, 1 protonymph, Mt Atewa, Ghana, 6°15'N 0°32'W, rainforest, 17-20 October 1968 (R. W. Taylor), ANIC (Berlesate No. 126). 2 larvae, same data as above, ANIC (Berlesate No. 125). 1 protonymph, Tafo, Ghana, 6°15'N 0°20'W, rainforest, 12 October 1968 (R. W. Taylor), ANIC (Berlesate No. 117).

Female: Total length (excluding cucullus and pygidium) 9.6 mm. Colour dark red-brown, sternites nearly black. **Cucullus** (Fig. 8): 2.13 mm long, 3.28 mm wide, broadest anteriorly; with two curved lateral depressions and with a slight median depression in the basal half; anterior margin with many tubercles; covered with large white-rimmed tubercles except on anterior portion and in depressions; covered with many navicular setae. **Carapace** (Fig. 8): 3.59 mm long, 3.88 mm wide,

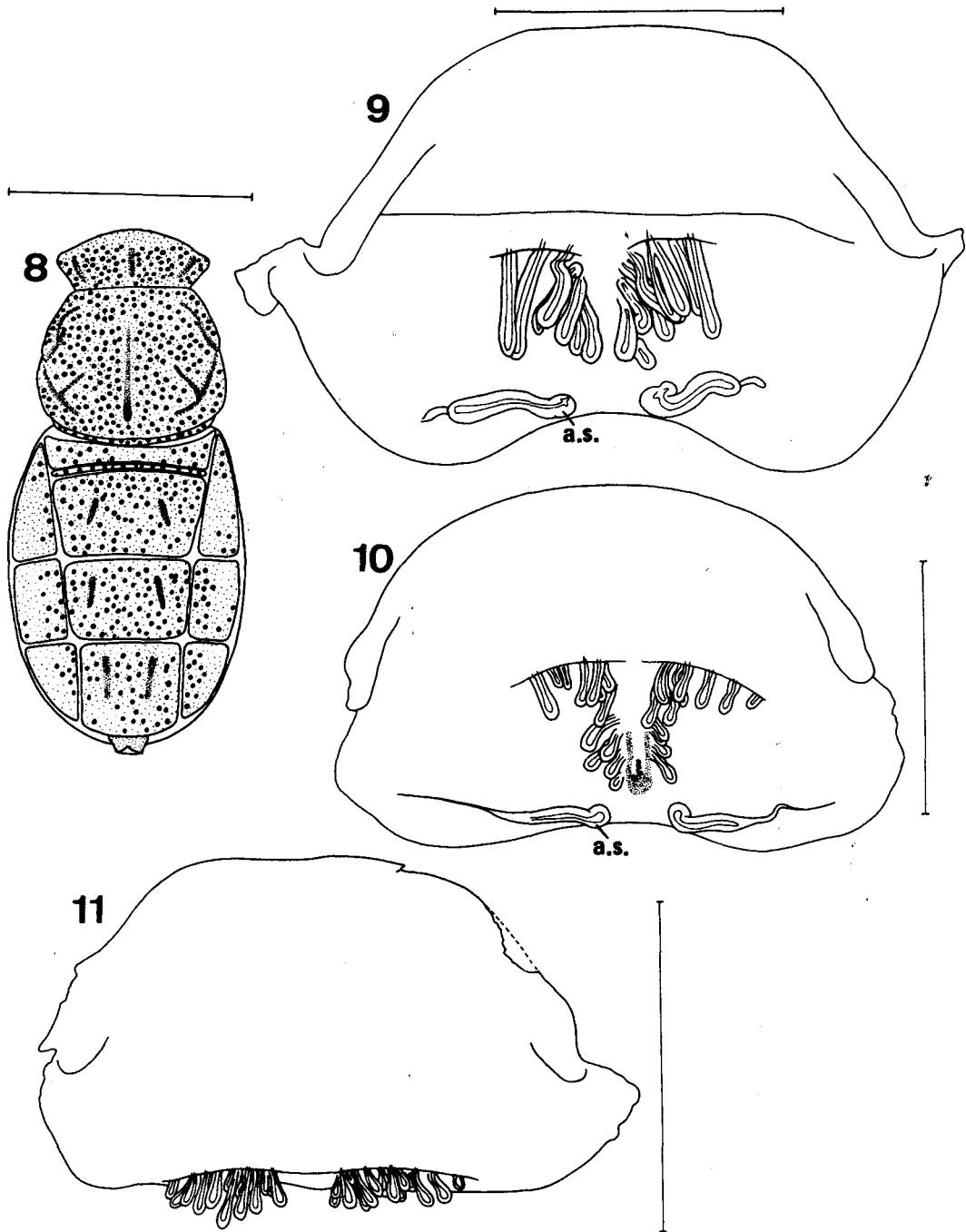


Fig. 8: *Ricinoides westermanni* (Guérin-Ménéville), ♀, body without legs, dorsal view. Scale line = 5 mm.

Figs. 9-11: Female spermathecae and posterior genital plate, posterior view. 9 *Ricinoides westermanni* (Guérin-Ménéville); 10 *Ricinoides afzelii* (Thorell); 11 *Ricinoides karschii* (Hansen & Sørensen). Scale lines = 0.5 mm. Abbreviation: a.s. = accessory spermatheca.

***Ricinoides afzelii* (Thorell) (Fig. 10)**

Cryptostemma afzelii Thorell, 1892: 10-17, figs. 1-8; Hansen & Sørensen, 1904: 150-151, pl. VIII, figs. 2a-g.

Ricinoides afzelii (Thorell): Ewing, 1929: 597; Pollock, 1967: 19-22; Tuxen, 1974: 91-96, figs. 1a, 2-17; Legg, 1977b: 124-125, figs. 1-2.

Material examined: 1 ♂, 1 ♀, Bo, Sierra Leone, BMNH.

Female: Genitalia (Fig. 10): Posterior genital plate evenly curved; spermathecae generally medium-sized and slightly broadened distally; with 12 spermathecae on the left side and 13 spermathecae on the right side, inserted in two L-shaped rows, plus a pair of accessory spermathecae that insert medially and that possess long, tapering lateral ducts; between the two rows lies a small, dark orange patch of cuticle shaped as in Fig. 10.

Remarks: As discussed above, *R. afzelii* and *R. westermanni* are very similar, and can only be distinguished by the male tarsal process and the female spermathecae.

***Ricinoides karschii* (Hansen & Sørensen) (Fig. 11)**

Cryptostemma westermanni Guérin-Méneville: Karsch, 1892: 32, pl. 4, figs. 1-3 (misidentification).

Cryptostemma karschii Hansen & Sørensen, 1904: 153-154, pl. VIII, figs. 4a-b, pl. IX, figs. 1a-1.

Ricinoides karschii (Hansen & Sørensen): Ewing, 1929: 597; Hammen, 1979: 5, figs. 2-3, 5-21, 24-27.

Ricinoides karschi (Hansen & Sørensen): Tuxen, 1974: 100, figs. 1c, 29-33; Legg, 1977a: 243-248, figs. 1-21.

Material examined: 1 ♂, 1 ♀, Ja River (= Dja River), Cameroun (G. L. Bates), BMNH (08.8.11.43-44).

Female: Genitalia (Fig. 11): Posterior genital plate trapezoidal (slightly damaged), with 15 spermathecae on the left side and 14 on the right side; spermathecae generally short and globular, but some are moderately elongate; accessory spermathecae apparently absent.

Remarks: The female genitalia of this species are unusual because they apparently lack the accessory spermathecae that are present in most other species of *Ricinoides* (whose genitalia are known). While it is possible that they were lost during dissection, this is considered unlikely. In the females of the other two species examined the accessory spermathecae appear to be firmly attached to the posterior genital

plate. I could find no trace of them in any of the tissue remaining in the body cavity of the female of *R. karschii*. Further specimens are needed to clarify the situation.

Discussion

The female genitalia of four other species of *Ricinoides* are known: *R. hanseni* Legg (Legg, 1976; Dumitresco & Juvara-Bals, 1977b), *R. feae* (Hansen) (Dumitresco & Juvara-Bals, 1977b), *R. sjoestedtii* (Hansen & Sørensen) (Hammen, 1979) and *R. megahanseni* Legg (Legg, 1982). Most species are fairly similar, and all except *R. karschii* and *R. megahanseni* possess a pair of accessory spermathecae (as discussed above, those of *R. karschii* may have been lost during dissection). The spermathecae of *R. megahanseni* are most unusual and they resemble no other species so far described. They arise from a single duct and are short and globular (Legg, 1982).

It is unfortunate that only one female of each of the species described above has been available for study, because little is known of intraspecific variation in the genitalia.

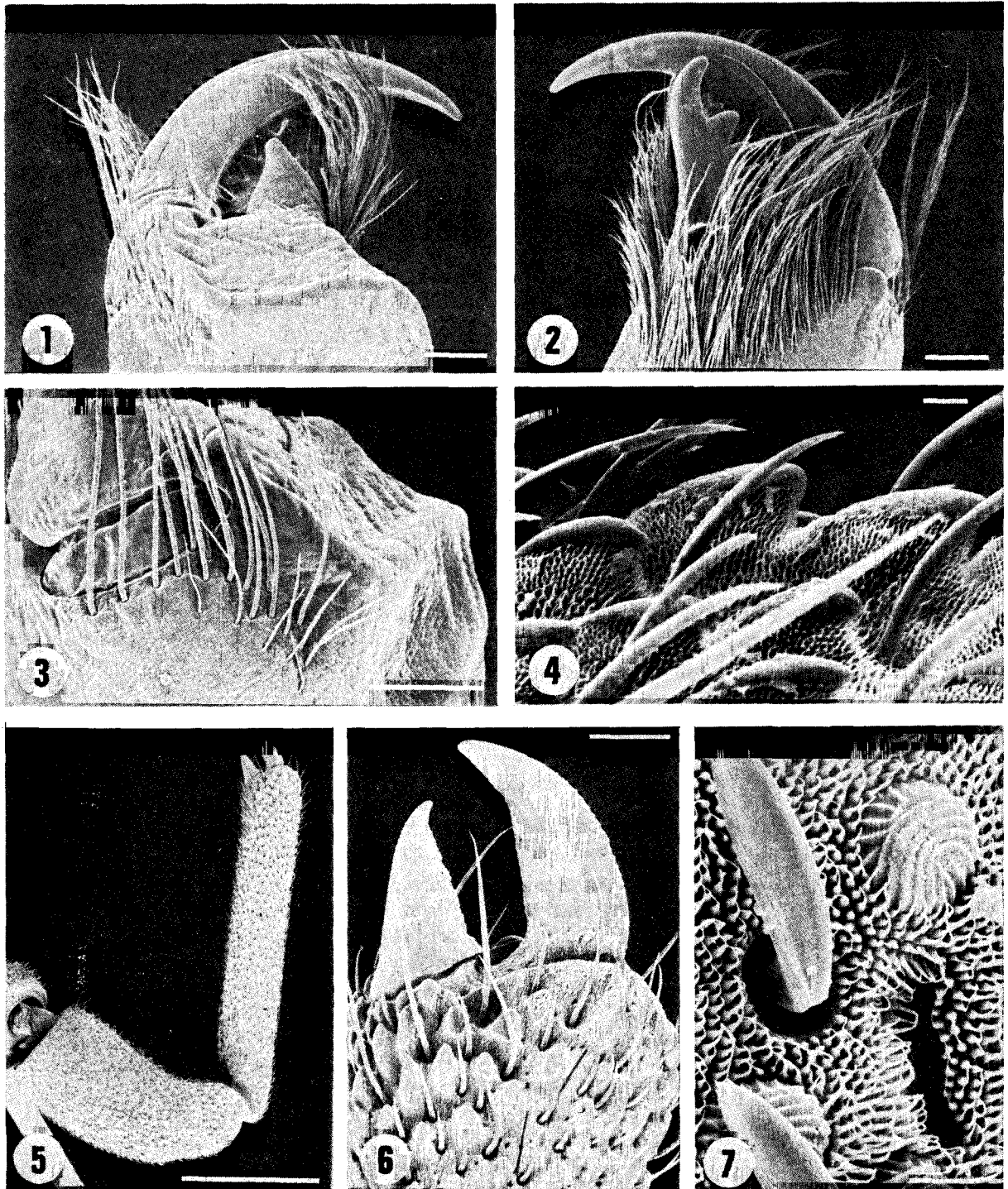
Acknowledgements

I wish to thank Mr P. D. Hillyard (BMNH) for the loan of specimens, Colin Beaton, Elizabeth Lockie and Katherine Pickerd for the Scanning Electron micrographs, Dot Cukier, Penny Gullan, Bruce Halliday, Russell Moran, David Rentz and Bob Taylor for critically reading the manuscript and CSIRO for providing laboratory facilities. The work was undertaken whilst being funded by an Australian Biological Resources Study grant.

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Figs. 1-7: *Ricinoides westermanni* (Guérin-Méneville), ♀, scanning electron micrographs. 1 Left chelicera, dorsal view; 2 same, ventral view; 3 same, lateral view; 4 left pedipalp, detail of basal portion of tibia; 5 same, ventral view; 6 same, detail of distal portion of tibia; 7 same, detail of distal portion of tibia. Scale lines = 0.1 mm (3, 6), 0.2 mm (1, 2), 0.01 mm (4, 7), 1 mm (5).

broadest at anterior edge of leg III; small, lateral, pale, translucent area present adjacent to leg II; with a deep median depression that is deepest posteriorly, and with three pairs of lateral depressions (arranged as in Fig. 8); covered with many large, white-rimmed tubercles, except in the depressions; covered with many navicular setae. *Chelicera* (Figs. 1-3): Anterior tooth present, slightly curved distally; fixed finger with four teeth increasing in size distally; moveable finger with eight teeth increasing in size distally; setal formula 1 + 23 (left chelicera) (Fig. 3) and 1 + 21 (right chelicera). *Pedipalp* (Figs. 4-7): Tibia 6.23 times longer than broad; elevated tubercles (*sensu* Platnick & Shadab, 1976) present only on distal third of tibia (Fig. 7); retrolateral surface of tibia with two distal lyriform organs (Fig. 6), and prolateral surface with three distal lyriform organs; prolateral surface of femur with one distal lyriform organ; covered with navicular setae (Fig. 4), except on distal third of tibia where the setae are longer and acicular. *Legs*: Femora sulcate; coxae I not meeting in midline; distal tarsus of legs III and IV much longer than other tarsi of legs III and IV; evenly covered with navicular setae (except in sulcations), except for tarsi which are rather densely covered with acicular setae.

Measurements (mm):

	I	II	III	IV	pedipalp
Coxa	1.56	2.21	1.86	1.74	0.93
Trochanter I	0.97	1.13	1.00	1.23	0.93
Trochanter II	—	—	1.27	1.17	0.87
Femur	2.23	3.91	2.62	2.93	1.58
Patella	1.37	1.86	1.47	1.47	—
Tibia	1.87	2.81	1.85	1.97	2.50
Metatarsus	2.13	3.01	1.90	2.03	0.32
Tarsus I	0.87	0.50	0.33	0.30	—
Tarsus II	—	0.48	0.30	0.27	—
Tarsus III	—	0.54	0.28	0.29	—
Tarsus IV	—	0.88	0.63	0.31	—
Tarsus V	—	0.75	—	0.82	—
Total	11.00	18.08	13.51	14.53	7.13

Abdomen (Fig. 8): 6.08 mm long, 4.78 mm wide; evenly covered with navicular setae; tergites with white-rimmed tubercles becoming less frequent laterally; sternites with an even covering of white-rimmed tubercles; pygidium with distinct dorsal notch. *Genitalia* (Fig. 9): Posterior genital plate trapezoidal; spermathecae generally long and slightly broadened distally; with nine spermathecae on the

left side and seven spermathecae on the right side, inserted in two roughly curved rows, plus a pair of accessory spermathecae that insert medially and that possess short lateral ducts.

Remarks: *Ricinoides westermanni* is very similar to *R. afzelii* in general body form, and in the disposition of the tubercles and depressions of the cucullus and carapace. Nevertheless, males are separable on the structure of the tarsal process and the shape of leg II (Tuxen, 1974) and females differ in the form of the spermathecae (Figs. 9, 10). Furthermore, they appear to be allopatric since *R. westermanni* has been found in Ghana, Togo and Ivory Coast, while *R. afzelii* has been collected in Sierra Leone and Guinea.

Even though the female from Mt Atewa was collected 260 km from the type locality (Bismarckburg, Togo, 8°11'N 0°41'E; now classified as a ruin by the U.S. Board on Geographic Names), it is believed to belong to *R. westermanni* for the following reasons:

(i) It possesses lyriform organs on the pedipalpal tibia and femur of very similar shape, number and position to those of the male neotype (Tuxen, 1974: fig. 36). (Tuxen (1974) has shown that each species possesses a slightly different pattern of pedipalpal lyriform organs.)

(ii) It possesses depressions in the cucullus and carapace that are very similar to those of the male neotype (Hansen & Sørensen, 1904: pl. VII, fig. 3a, pl. VIII, fig. 1a).

(iii): Both specimens are of similar, large body size.

The only major difference that I can detect between the female and the other specimens mentioned in the literature is the cheliceral setal formula. Legg (1977b) reported that the male neotype and three tritonymphs (including the holotype of *R. plebejum*) possessed 1 + (6 + 2), and later (Legg, 1982) that four nymphs from Ivory Coast possessed 2 + (10 + 6). The female possesses 1 + 23 and 1 + 21, while the nymphs from Ghana possess 1 + 10 (deutonymph), 1 + 7 and 0 + 8 (protonymphs) and 1 + 4, 1 + 5 and 1 + 7 (larvae). I am unsure how much emphasis should be placed on this character, and I suspect that it may be more variable than is generally assumed, especially since bilateral variation appears to be common.