(NM 11040); 1 ♀, Regenstein, 26 Feb 1973, B. Harding (SMN 432); 1 ♀, id. (NM 11039); 1 ♂ 1 ♀, Portsmut, 7 Feb 1969, B. Lamoral (NM 10572); 1 ♀, Windhoek, 12 July 1961, S. Bredenmeier (SMN 14); 1 ♂, Windhoek, 23 Nov 1973, W. Giess (SMN 493); 1 ♀, Mukorob, 12–14 Apr 1974, M-L. Penrith (SMN 519); 1 ♂ 1 ♀, Avis Dam, 31 Oct 1972, C. Molier (SMN 399); 1 ♀, juvs, Nubuamis, 2 June 1974, M-L. P. (SMN 523); 1 ♀ 1 ♂, Lichtenstein Mitte, 21 Jan 1960, E. Rusch (SMN 87); 1 ♀ 1 ♂, Witmanshaar, 8 Oct 1972, H. Strauss (SMN 394); 1 ♀, id. (NM 11035); 1 ♀, Kub, 19 Nov 1971, P. G. O. (SMN 317); 1 ♀, Windhoek, 16 Nov 1962 (SMN 207); 1 ♀, id. (NM 11036); 2 ♀ 2 ♂, Aar 29 Feb 1976, B. Lamoral (NM 11030); 1 ♂, Molepolole, Knobel (McGregor Museum, Kimberley); 1 ♂, Avis Dam, 29 Oct 1972, C. Molier (SMN 410); 1 ♂ 1 ♀, Portsmut, 19 Apr 1972, Jones (NM 10579); 1 ♀, juvs, Windhoek, 8 Apr 1963, F. Daalen (SMN 21); 1 ♀, Heide, 10 June 1966, C. v.d. Hooven (SMN 62); 1 ♂ 1 subad ♂ 1 subad ♀ 3 juv ♂, Berseba, 27 Feb 1976, B. Lamoral (NM 10872); 2 subad ♂ 1 juv ♂, Kranzberg, 23 Mar 1976, B. Lamoral (NM 11031); 1 ♂, Augrabies Falls, 20 Feb 1976, B. Lamoral (NM 10871); 1 ♂, Koreangab Dam, 12 Oct 1972, H. Strauss (SMN 398); 2 juv, Bruckaros, 26 Feb 1976, B. Lamoral (NM 11038); 1 ♂, Ameib, 1–2 Feb 1972, C. G. C. (SMN 334); 1 ♂, Fish River Canyon, B. Lamoral (NM 11045).

Distribution: Central and southern half of Namibia and northern Cape Province in South Africa.

Bionomics: Nocturnal, hemiedaphic and digs shallow scrapes under rocks on consolidated sandy to hard gritty ground in areas of vegetation type 4, 8 and 9 (Fig. 4). It is sympatric with *planimanus, gracilior, carinatus* and *schlechteri* in part of their ranges.

Uroplectes vittatus (Thorell, 1877)

Lepreus vittatus Thorell, 1877: 121–122.

Diagnosis: The following combination of characters separates *U. vittatus* from *otjimbinguensis* to which it is most closely related. Telson vesicle with a distinct subaculear tooth. Pectines: ♀ 19–20, ♂ 20–22 teeth per pecten. Tergites I–VII, with a pale median band flanked by a dark lateral band on either side.

Remark: As *U. vittatus* has not yet been recorded from Namibia and there is no doubt regarding the validity of this easily determined species, it is not re-described and illustrated here. *U. vittatus* has, however, been recorded at localities in Botswana, close to the north-eastern regions of Namibia and it seems likely that more extensive collecting in Kavango and the Caprivi Strip will reveal the occurrence of *vittatus* in those regions. Bearing this possibility in mind, *vittatus* has been included in the key to the Namibian species of *Uroplectes*.

Family Scorpionidae Pocock, 1893

Subfamily Ischnurinae Pocock, 1893

Genus *Hadogenes* Kraepelin, 1894*a*

Type species: *Scorpio trichiurus* Gervais, 1843, by original designation.

Diagnosis: The following combination of characters separates *Hadogenes* from the other genera of the subfamily: pedipalp, external and ventral of handback

and tibia numerous and intraspecifically variable in numbers and distribution; prosoma and mesosoma distinctly compressed dorso-ventrally; carapace median eyes sunken in, ocular tubercle obsolete; caudal segments II–V and telson strongly compressed laterally and distinctly slender; hemispermatophore hook with two apices.

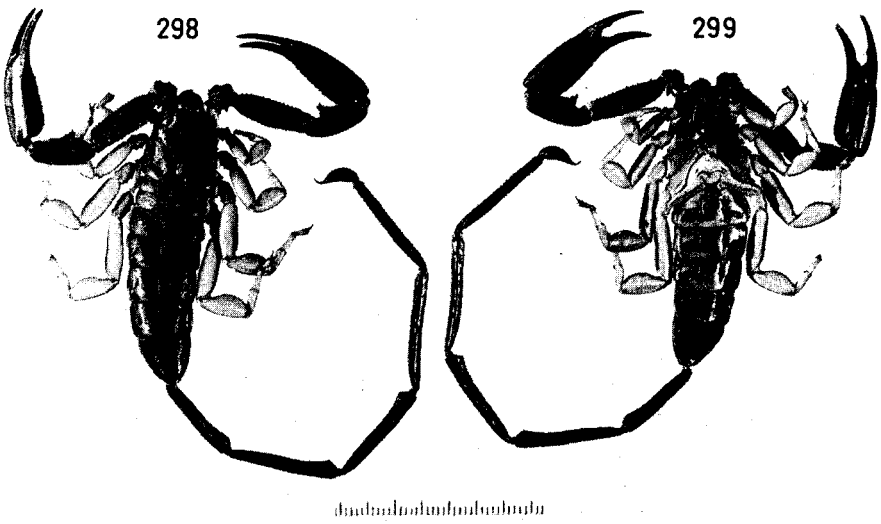
Remark: The genus *Hadogenes* needs extensive revision. As a result interspecific relationships of the three Namibian species are not discussed.

Distribution: South Africa, Namibia, Botswana, Zimbabwe and Mozambique.

Hadogenes phyllodes (Thorell, 1877). Figs 298–301, 306

Ischnurus taeniurus phyllodes Thorell, 1877: 254–258.

Diagnosis: H. phyllodes is separated from other species of the genus by the following combination of characters. Caudal segments, Figs 298–299: cauda I higher than wide, greatest height/greatest width ratios 1,15 (1,10–1,20) in ♀, 1,22 (1,20–1,24) in ♂; entire cauda 1,2 (1,1–1,3) times as long as combined prosomal and mesosomal length in ♀, nearly twice as long in ♂. Pedipalp hand: movable finger length/handback length ratios 0,89 (0,85–0,93) in ♀, 0,85 (0,82–0,88) in ♂. Sternite VII, Figs 300–301, lateral margins slightly convex.



Figs 298–299. *Hadogenes phyllodes*, ♂ (NM 9941). Scale in mm.

Description: The following account supplements Thorell's original description.
Colour: Varying within the colour ranges described for *H. tityrus*. Pale specimens tend to have darkened carapace, pedipalps and cauda.
Pedipalps: Chelae of adult ♂ with a distinct mesial notch at base of fixed finger and a mesial lobe near base of movable finger. It is expected that these structures will also be found to occur in adult ♀ when specimens become available.

Trichobothria: As for *H. tityrus*, with no diagnostic differences in either numbers or distribution.

Hemispermatophore: Distal half as in Fig. 306; hook with two apices; differing diagnostically from *taeniurus* and *tityrus* in the following character states: percentage ha → w distance of dcr → w distance 31,5%; percentage w → bc distance of dcr → bc distance 25,0%; greatest width of distal lamina 1,0 mm. Paraxial organ, as for *tityrus*.

Variation: Sexual dimorphism: No adult females have been collected yet and the following differences are based on subadult females, subadults and one adult male: Cauda of ♂ twice as long as trunk, of ♀ equal or slightly longer; first proximal middle lamella of each pecten mesially angular in ♂, shallowly curved in ♀; ♂ pectinal teeth twice as long as ♀; ♂ with 16–18 and ♀ with 13–14 teeth per pecten; ♂ genital operculum suboval, ♀ subpentagonal. Sternite VII of ♂ longer than wide, of ♀ wider than long, see Fig. 300–301.

Intraspecific variation: Pectinal teeth which in ♀ number 13–14 and in ♂ 16–18 teeth per pecten. Colour, as described above. Lack of further observations on variations is ascribable to the paucity of samples.

Type material: Thorell's ♀ holotype, originally a dry specimen, was deposited in the collection of the Göteborgs Naturhistoriska Museet (GNM). A search of the collection has failed to yield the type. At the time of writing there was no positive proof that the holotype has been lost or destroyed and the search will go on, until satisfactory evidence has been obtained. The current description of *phyllodes* is based on Thorell's original description and material thought most likely to be conspecific.

Material examined: 1 ♂, Namaqualand (NM 9941); 1 subad ♂, Huams, 1 Feb 1969, B. Lamoral (NM 10027); 2 subad ♂ 2 subad ♀, Bruckaros, 26 Feb 1976, B. Lamoral (NM 10718); 1 juv ♀, Rosh Pinah, 7 Oct 1970, P. Buys (SMN 181); 1 subad ♀, Kochenau, 11 Mar (SMN 268); 1 juv ♂, Amnis Fontein, 21 Nov 1975, E. Griffin (SMN 569).

Distribution: Rocky and mountainous regions of southern quarter of Namibia and north-western Cape Province of South Africa. The northernmost locality in Namibia is Bruckaros crater.

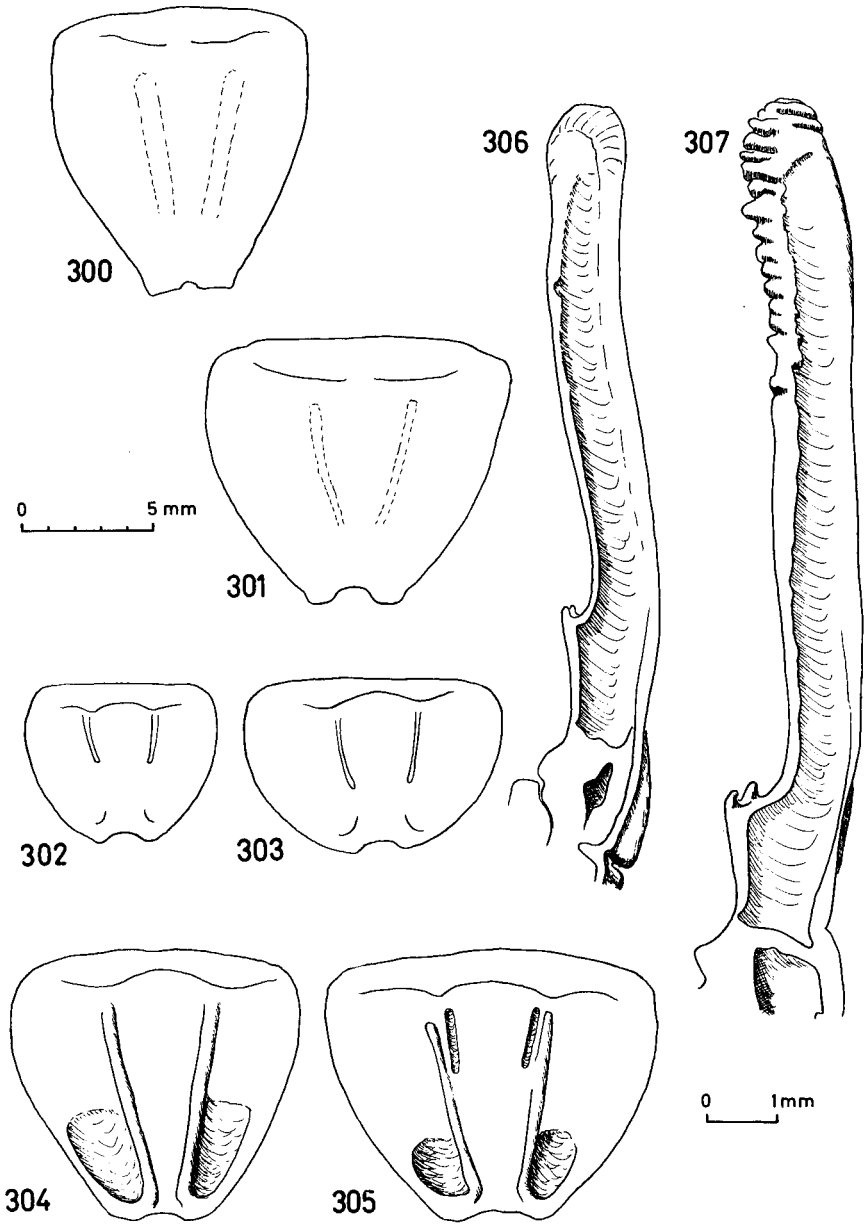
Bionomics: As for *H. tityrus*. A poorly known and collected species.

Remark: Hadogenes gracilis namaquensis Hewitt, 1918 and *gracilis fluvialis* Lawrence, 1955, both described from the northern Cape are probably conspecific with *phyllodes*.

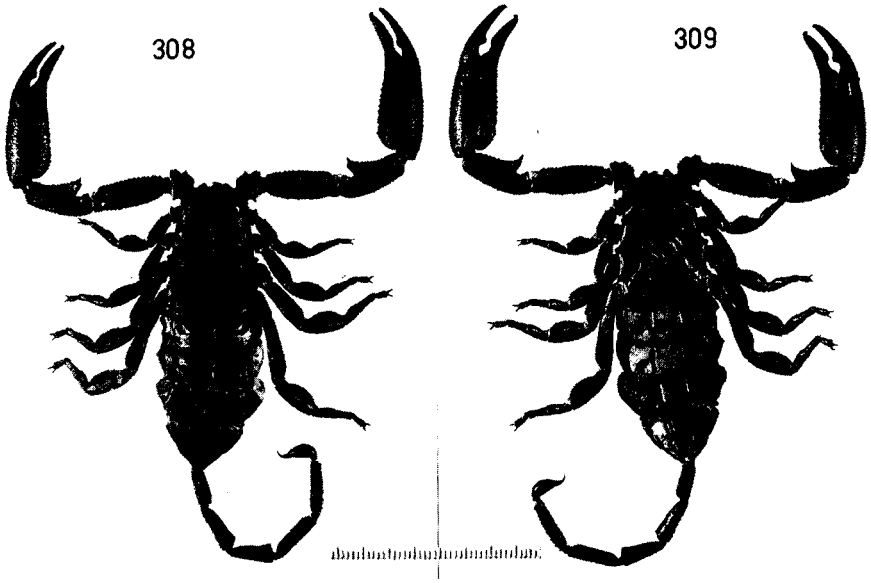
Hadogenes taeniurus (Thorell, 1877). Figs 304–305, 307–309

Ischnurus taeniurus Thorell, 1877: 254.

Diagnosis: H. taeniurus is separated from other species of the genus by the following combination of characters in adults. Caudal segments, Figs 308–309 cauda I slightly wider than high, greatest height/greatest width ratios 0,85 (0,75–0,95) in ♀ and ♂; entire cauda nearly as long as or occasionally as long as combined prosomal and mesosomal length in ♀, one and a half times as long in ♂.



Figs 300–307. *Hadogenes* species. 300–305, sternite VII, ventral aspect; 300–301, *H. phyllodes;* 300, ♂; 301, ♀; 302–303, *H. tityrus*; 302, ♂; 303, ♀; 304–305, *H. taeniurus*; 304, ♂; 305, ♀; 306–307, distal half of right hemispermatophore, ventral aspect; 306, *H. phyllodes* (NM 9941); 307, *H. taeniurus* (SMN 61). *Scales*: 300–305, upper left; 306–307, lower right.



Figs 308–309. *Hadogenes taeniurus*, ♀ (NM 10670). Scale in mm.

Pedipalp hand: movable finger length/handback length ratios 0,79 (0,75–0,83) in ♀, 0,83 (0,80–0,86) in ♂. Sternite VII, Figs 304–305, lateral margins slightly convex; with distinct postero-lateral oval depressions, median keels distinct.

Description: The following account supplements Thorell's original description and Hewitt's (1918: 163) short supplement.
Colour: As for *H. phyllodes*.
Pedipalps: Chelae of adult ♀ & ♂ with a distinct mesial notch at base of fixed finger and a mesial lobe near base of movable finger as in *H. tityrus*. These structures are undeveloped in subadults.
Trichobothria: As for *H. tityrus*, with no diagnostic differences in either numbers or distribution.
Hemispermatophore: Distal half as in Fig. 307; hook with two apices; differing diagnostically from *phyllodes* and *tityrus* as following: percentage ha → w distance of dcr → w distance 28,7% (28,6–28,8%); percentage w → bc distance of dcr → bc distance 25,8% (25,6–26,0%); greatest width of distal lamina 1,4 mm. Paraxial organ as for *H. tityrus*.

Variation: Sexual dimorphism: In adults, males differ from ♀ in the following characters: ♂ proportionally smaller and more slender, with width sternite V/carapace length ratio 1,03 (1,00–1,06) for ♂ and 1,14 (1,10–1,18) for ♀; cauda of ♂ one and a half times as long as trunk, of ♀ subequal or equal to length of trunk; first proximal middle lamella of each pecten mesially distinctly angular in ♂, slightly obtuse in ♀; ♂ pectinal teeth twice as long as ♀; ♂ with 17–19 and ♀ with 13–15 teeth per pecten.

Intraspecific variation: Little variation observed in studied material except in colour and number of pectinal teeth as reported above.

Type material: Thorell's ♀ holotype was examined. It is deposited in the collection of the Göteborgs Naturhistoriska Museet. There is no accession number on the original label inside the sealed glass jar, but the top bears the number 121 on the outside. The holotype is in good condition.

Homotype: I have selected a ♀ homotype (NM 10670).

Material examined: ♀ holotype, 'S. Afrika', 28 Nov 1864, Ch. Anderson (GNM 121 ?); 1 ♀ homotype, Okamiparara, 18 Dec 1973, G. Sander (NM 10670). 1 juv ♂, Welwitschia, Jan 1963 (NM 9049); 1 juv ♀, Okahandja, May 1960, F. Gaerdes (NM 7318); 1 subad ♂ 1 subad ♀, Benguela, 8 Sep 1970, J. Visser (NM 10002) 1 subad ♂, Zebra Mountain, Dec–Feb 1972, J. Menge (TM 10442); 1 subad ♀, Assuncas, 26 Mar 1971, W. Haacke (TM 10240); 1 subad ♂, Makukous Spring, 27 Apr 1976, W. Haacke (TM 1126); 1 subad ♂, Uis River, 12 Sep 1962, B. Grobbelaar (SMN 167); 1 ♂, Uitsig, 15 Mar 1963, C. de Wet (SMN 61); 1 juv, Portsmut, 7 Feb 1969, P. Olivier (SMN 222); 1 ♀, Hentiesbaai, Apr 1970, J. Viljoen (SMN 74); 1 juv, Goreangab Dam, May 1970, H. Strauss (SMN 252); 2 juv ♂, Ameib, 1–2 Feb 1972, C. G. C. (SMN 333); 1 juv ♂, Gorob Mine, J. Tebje (SMN 517); 1 subad ♀, Orumana, Mar 1973, Vermaak (SMN 437); 1 juv ♂, Hoanibrivier, 11 Nov 1965, C. Brits (SMN 130); 1 juv ♂, Waterberg, 5 Apr 1970 (SMN 168); 1 subad ♂, Albrechtshohe, 9 Mar 1970, H. Mittendorf (SMN 160); 1 subad ♀, Oncocua, 6 Sep 1969, C. Coetzee (SMN 165); 1 ♀ subad, Kamanjab, 5 Apr 1976, B. Lamoral (NM 10747).

Distribution: Rocky and mountainous regions of northern half of Namibia and southern Angola.

Bionomics: As for *H. tityrus*.

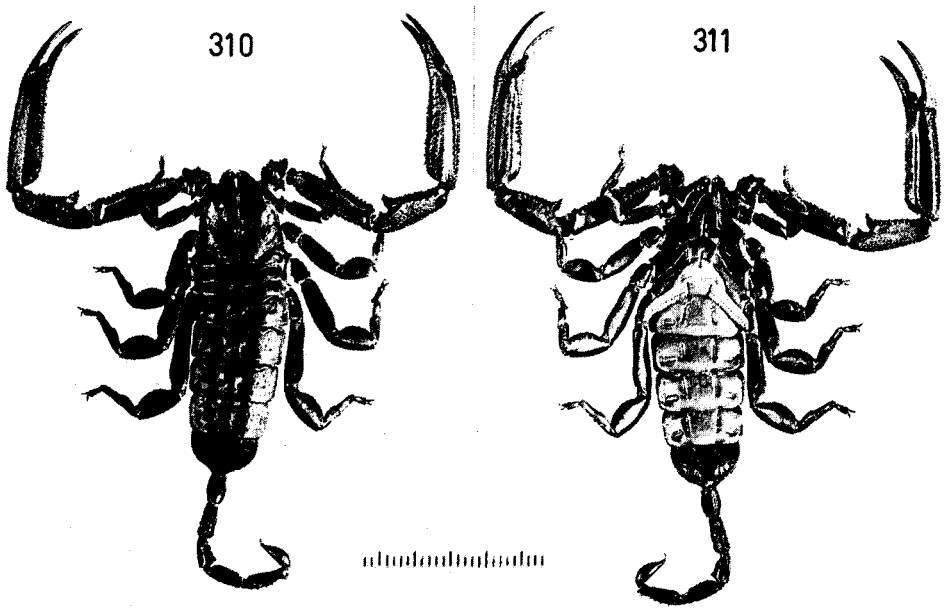
Hadogenes tityrus (E. Simon, 1877). Figs 302–303, 310–317

Ischnurius tityrus E. Simon, 1877: 383–384.
Hadogenes lawrencei Newlands, 1972*a*: 133–134, Figs 2–3, Table 1. **Syn. n.**

Diagnosis: The following combination of characters in adults separates *H. tityrus* from other species of the genus. Caudal segments, Figs 310–311: cauda I wider than higher, greatest height/greatest width ratios 0,72 (0,69–0,75) in ♀ and ♂; entire cauda only two-thirds as long as combined prosomal and mesosomal length in ♀, three-quarters as long in ♂; Pedipalp hand, Fig. 312–313: long and slender, dorsal and ventral margins of handback subparallel; handback long, fingers short, movable finger length/handback length ratios 0,68 (0,64–0,72) in ♀, 0,62 (0,57–0,67) in ♂. Sternite VII, Figs 302–303, lateral margins strongly convex.

Description: The following account supplements E. Simon's original description, Lawrence's (1966: 5–7) supplement and Newlands's (1972*a*: 133–134) description of *H. lawrencei*.

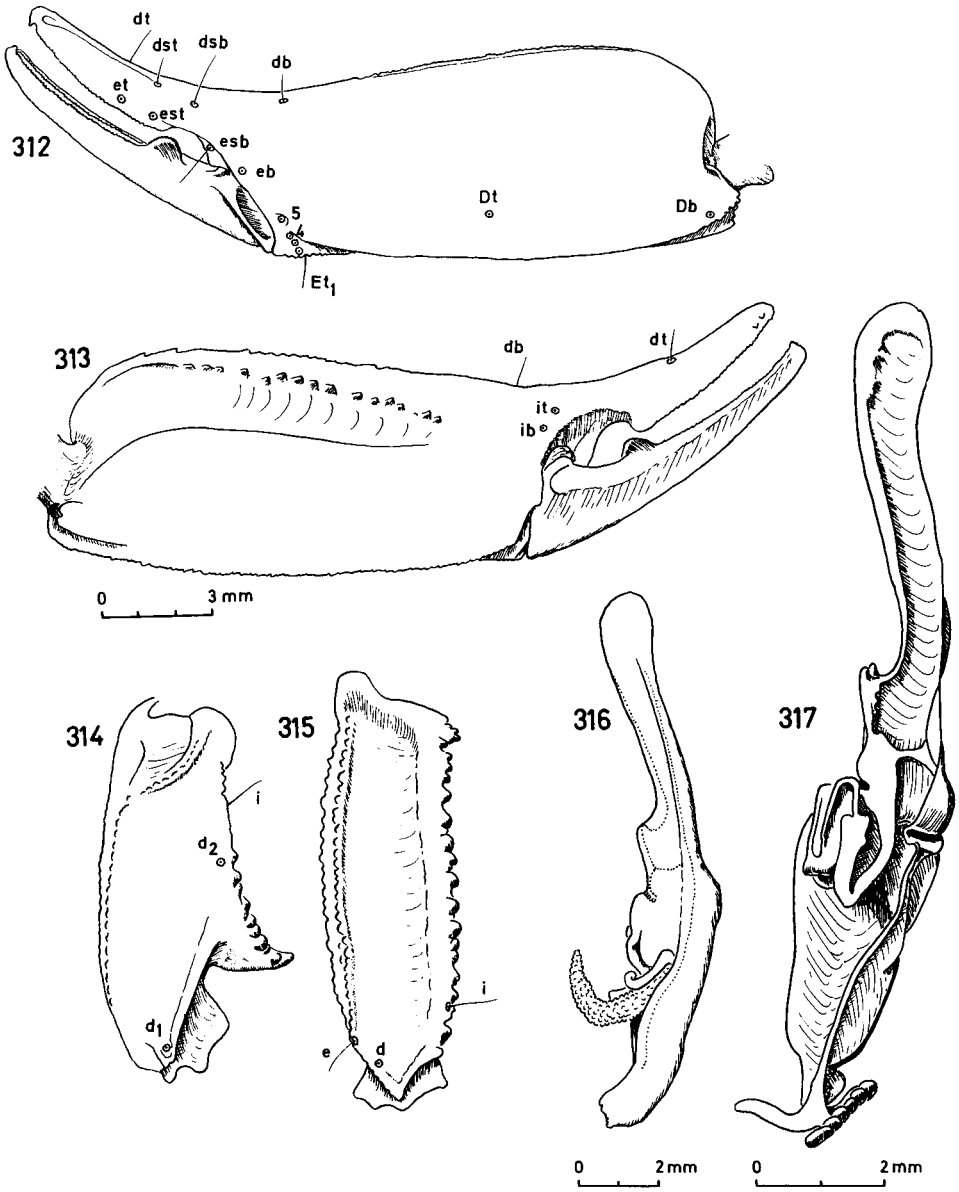
Colour: Body and appendages ranging from brown black No. 65 to strong yellowish brown No. 74 with the telson in latter specimens strong orange yellow No. 68. In dark specimens, the genital operculum, pectines, pectinal plate, sternites III–VI are usually lighter in colour than the rest of the body.



Figs 310–311. *Hadogenes tityrus*, ♂ from Omaruru district (NM 10424). Scale in mm.

Pedipalps: Chelae of adult ♀ and ♂ with a distinct mesial notch at base of fixed finger and a mesial lobe near base of movable finger as shown in Figs 308–309. The reports of Lawrence (1966: 7) and Newlands (1972*a*: 134) that these structures occur only in ♂ are incorrect; this applies only to immature specimens.
Trichobothria: As in Figs 312–315. Only the τ shown in these figures are stable in number and distribution. External and ventral τ of handback and tibia are numerous and numerically and distributionally too variable for diagnostic purposes.
Paraxial organ and hemispermatophore: As in Figs 316–317. Hemispermatophore: hook with two apices; distal lamina proportionately wider than in *phyllodes* and *taeniurus*; differing diagnostically from these two species as following: percentage ha → w distance of dcr → w distance 31,7% (31,6–31,8%); percentage w → bc distance of dcr → bc distance 32,2% (32,1–32,3%); greatest width of distal lamina 1,2 mm.

Variation: Sexual dimorphism: In adults, males differ from females in the following characters: ♂ proportionally smaller and slightly more slender, with width sternite V/carapace length ratios 1,0 (0,95–1,05) for ♂ and 1,10 (1,05–1,15) for ♀; cauda of ♂ three-quarters as long as trunk, of ♀ two-thirds as long; first proximal middle lamella of each pecten mesially angular in ♂ shallowly curved in ♀; ♂ pectinal teeth twice as long as ♀; ♂ with 11–17 and ♀ with 6–13 teeth per pecten; ♂ genital operculum sub-oval, ♀ subcordate.
Intraspecific variation: Pectinal teeth which number 6–13 teeth per pecten in ♀ and 11–17 in ♂. This character is subject to clinal variations along the western



Figs 312–317. *Hadogenes tityrus*. 312–315, ♀ holotype (MNHP RS 0378); 312–313, left hand; 312, outer aspect; 313, inner aspect; 314–315, left pedipalp, dorsal aspect; 314, tibia; 315, femur; 316–317, ♂ (NM 10671); 316, right paraxial organ, ventral aspect; 317, right hemispermatophore, ventral aspect. *Scales:* 312–315, middle left; 316, lower middle; 317, lower right.

and north-western regions of the species range. For instance, ♀ near the Brandberg mountains (SMN 89–90) and from Sarusas, northern Skeleton Coast (SMN 126) have 7–8 teeth and ♀ from Gorrasis farm, 65 km east of *H. lawrencei*'s type locality (NM 10715), have 7–9 teeth per pecten. Pedipalp tibia length varies from subequal, to equal to and longer than carapace length; femur length of leg IV varies from twice to two and a half times as long as maximum width, in samples from the same population. The above variations bridge the diagnostic character states used by Newlands (1972*a*: 133–135) to separate *H. lawrencei* from *tityrus*.

The colour variations described earlier do not appear to be clinal and available records indicate that populations from the north-west, the Naukluft, the south-western regions of the species range and the Richtersveld are paler in colour.

Type material: Simon's ♀ holotype was examined. It is deposited in the collection of the Museum national d'Histoire naturelle, Paris (RS 0378). Its condition suggests that it was reclaimed from a dehydrated state. The right pedipalp and leg III are missing. It is a ♀ and not a ♂ as stated in E. Simon's original description.

Material examined: ♀ holotype, Kalahari, Schinz (MNHP RS 0378, collection E. Simon 9618); *Hadogenes lawrencei* ♀ holotype ♀ paratype (SMN) and ♂ paratype (TM), (all subadults), Harus waterhole in Uri-Hauchab Mountains. 1 ♂, Windhoek, 22 Aug 1965, A. Mitchell (SMN 40); 1 ♂ 2 subad ♀ 1 subad ♂, Moltkeblick, 24 Aug 1968, A. Mitchell, (SMN 46);, 1 ♀ 2 subad ♀, Windhoek, 5 Apr 1964, P. Kellerman (SMN 58); 1 ♂, Heusis, Mar 1966, F. Wagner (SMN 59); 1 ♀, Kuiseb Canyon, 17 Oct 1968, W. Steyn (SMN 83); 1 subad ♀, Brandberg Wes, 29 Apr 1964, W. Steyn (SMN 89); 1 subad ♀ 1 juv ♂, Brandberg Wes Myn, 27 Mar 1964, F. Motonane (SMN 90); 1 subad ♀, Ai-Ais, N. Hoan (SMN 102); 1 juv ♀, Twyfelfontein, 25 June 1963, Dr Scherz (SMN 104); 1 juv ♀, Sarusas, 4 Oct 1965, C. Brits (SMN 126); 1 subad ♀, Zebrafontein, 14 Oct 1970, C. Coetzee (SMN 182); 1 subad ♀ 1 juv ♂ 1 juv ♀, Rosh Pinah, 10 Oct 1970, P. G. O. (SMN 192); 1 juv ♂, Moltkeblick, 12 May 1969, C. Coetzee (SMN 259); 1 ♂, Molteblick 24 Aug 1968 (SMN 275); 1 ♂, Regenstein, 30 Nov 1972, P. Olivier (SMN 407); 2 ♀ 1 subad ♀ 1 juv ♀, Regenstein, 26 Feb 1973, B. Harding (SMN 433); 1 subad ♀ 7 juv, Witmanshaar, 8 Oct 1972, H. Strauss (SMN 395); 1 ♀, Obibwasser, 17 Sep 1973, E. Mokgoabone (SMN 482); 1 juv ♀, Regenstein, 12 Dec 1973, C. G. C. (SMN 498); 1 subad ♀, Gorrasis, 25–29 Jan 1974, C. G. C., (SMN 510); 1 subad ♂ 2 subad ♀ 2 juv, Amnisfontein 22 Nov 1975, E. Griffin (SMN 570–572, 574); 3 ♂ 5 subad ♂ 9 subad ♀ 6 juv, Amnisfontein, 23 Nov 1975, E. Griffin & M-L. P. (SMN 575–586); 1 ♂ 1 subad ♀, Lekkersing, Feb 1962, W. Haacke (NM 9100); 1 ♀ 1 subad ♂, Otjikoko Süd, Apr 1973, G. Sander (NM 10374); 3 ♂ 5 ♀, Otjokoko Süd, Apr 1974, G. Sander (NM 10424); 2 ♂ 3 subad ♀, Remhoogte, Aug 1974, G. Sander (NM 10425); 1 ♂ 1 subad ♂ 4 subad ♀, Dobra, Sep 1973, G. Sander (NM 10667); 1 subad ♀, Plateau, Oct 1973, H. Erni (NM 10668); 2 juv ♀, Portsmut, 7 Feb 1969, B. Lamoral (NM 10669); 1 ♂ 3 ♀, Windhoek, B. Sander (NM 10671); 3 subad ♀ 6 juv ♀, Gorrasis, 6 Mar 1976, B. Lamoral (NM 10715); 1 ♀ 1 subad ♂ 9 juv, Kubub, 1 Mar 1976, B. Lamoral (NM 10716); 1 subad ♂ 1 subad ♀ 1 juv ♀,

Aar, 29 Feb 1976, B. Lamoral (NM 10717); 1 ♂, Amnisfontein, 23 Nov 1975, M-L. Penrith (NM 11065).

Distribution: Rocky and mountainous regions of southern two-thirds of Namibia.

Bionomics: H. tityrus is nocturnal, hemiedaphic and lithoclasicolous. All the specimens, collected personally, were found wandering about on rock surfaces near crevices and fissures at night. As in other species of *Hadogenes* these represent the only ecological data available.

Dubious species

Hadogenes bifossulatus Roewer, 1943

Hadogenes bifossulatus Roewer, 1943: 232–234.

This species was described from 1 ♀ holotype collected in the Waterberg in Namibia and deposited in the collections of the Senckenberg Museum in Frankfurt, Germany (6739/146 NMS).

I have been unable to examine this specimen which could not be found in the collection of this museum.

Lawrence (1955: 254), states that this is a dubious species, and Newlands (1972*a*: 135) that it may possibly be a synonym of *Hadogenes taeniurus*.

Subfamily Lisposominae Lawrence, 1928

Genus *Lisposoma* Lawrence, 1928

Type species: *Lisposoma elegans* Lawrence, 1928, by monotypy.

Diagnosis: The only genus in this subfamily, *Lisposoma*, can be separated from other genera of the family Scorpionidae by the following combination of characters. Pedipalp chela: handback oval to normal in cross-section, without distinct finger or accessory keels, length greater than width; cutting edge of fixed and movable fingers with a single longitudinal row of small teeth flanked on the inner side by 5 to 6 (Fig. 322) or 14 to 16 larger teeth; τ Et_2, Et_1 and V_1 situated on the same transverse axis; τ Dt much closer to Db than Et_5. Pedipalp tibia: with 13 external τ; τ v_3 adjacent to external side of outer ventro-lateral keel. Carapace, Fig. 331: anterior margin linear to shallowly procurved, median furrow obsolete to absent, devoid of any sutures; median eyes situated anteriorly of carapace centre; keels or granular rows absent. Tergites: I–VI without keels or rows of granules. Cauda, Figs 332–334: segments I–V sub-hexagonal in cross-section; ventral and lateral surfaces of telson agranular. Legs: telotarsi lateral distal lobes sharply truncated and virtually obsolete, median dorsal lobes small; telotarsi III–IV ventral surface with a median row of 11–16 short spicules flanked by a ventral anterior and a ventral posterior row of three spine-like setae each. Sternum subpentagonal in outline, width greater than length. Pectines with median lamella consisting of 8 to 15 rounded lobes.

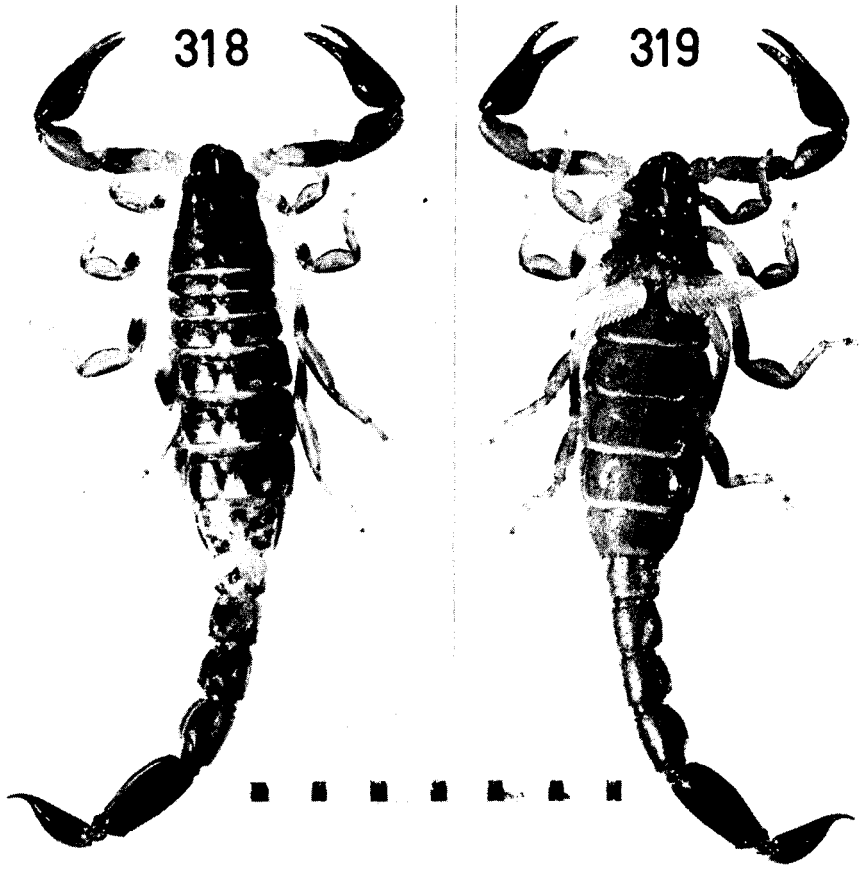
Distribution: Endemic to northern half of Namibia.

Lisposoma elegans Lawrence, 1928. Figs 318–326, 329–330

Lisposoma elegans Lawrence, 1928: 281–286.

Diagnosis: L. elegans is most closely related to *L. josehermana* but can be separated from it by the following combination of characters. Carapace anterior margin sublinear, with a small but distinct median projection. Pedipalp chela, dentate margin of movable finger with an inner longitudinal row of 6 isolated teeth (Fig. 322). Caudal segments, I–IV, dorsal keels obsolete to absent except for a single distal granule, dorso-lateral keels absent.

Description: The following account supplements Lawrence's (1928: 281–286) comprehensive original description.
Pedipalps: In ♂ and ♀, chela handback length is equal to movable finger length.
Carapace: Median eyes situated anteriorly with lc/x ratios 2,19 (2,16–2,22) for ♂ and ♀.



Figs 318–319. *Lisposoma elegans*, ♂ (NM 10035). Scale in mm.

Cauda: Ventral surface of cauda V occasionally lightly granular and not always smooth as described by Lawrence in his original description.

Trichobothria: As in Figs 320–326. Orthobothriotaxic for group C with 13 external τ on pedipalp tibia and not 14 as in the genus *Opisthophthalmus*. Pedipalp tibia, Figs 323–325: $\tau\, d_2$ much closer to i than d_1; $\tau\, esb_2$ smaller than esb_1; $\tau\, eb_4$ equidistant from eb_1 and eb_5 and thus distinctly more proximal than in the genus *Opisthopthalmus*; $\tau\, v_3$ adjacent to external side of outer ventrolateral keel. Pedipalp chela, Fig. 320–322: $\tau\, Dt$ much closer to Db than Et_5; $\tau\, V_2$ equidistant from V_1 and V_3; $\tau\, Et_2$, Et_1 and V_1 situated on the same transverse axis.

Hemispermatophore: As in Figs 329–330. Differing diagnostically from the genus *Opisthophthalmus* in having atrophied basal, inner and outer lobes and in the shape of the median lobe and the foot. Differing diagnostically from its sister species *L. josehermana* in the shape and size of distal lamina, hook notch, distal crest of distal lamina and in having an accessory crest on the ental side of the median lobe as shown in Fig. 330. In addition the following percentages are diagnostic for *L. elegans* (SAM B6077):

1. ha → w distance × 100/dcr → w distance = 48,0%
2. ha → bsh distance × 100/ha → w distance = 66,1%
3. ha → bsh distance × 100/dcr → bsh distance = 38,2%

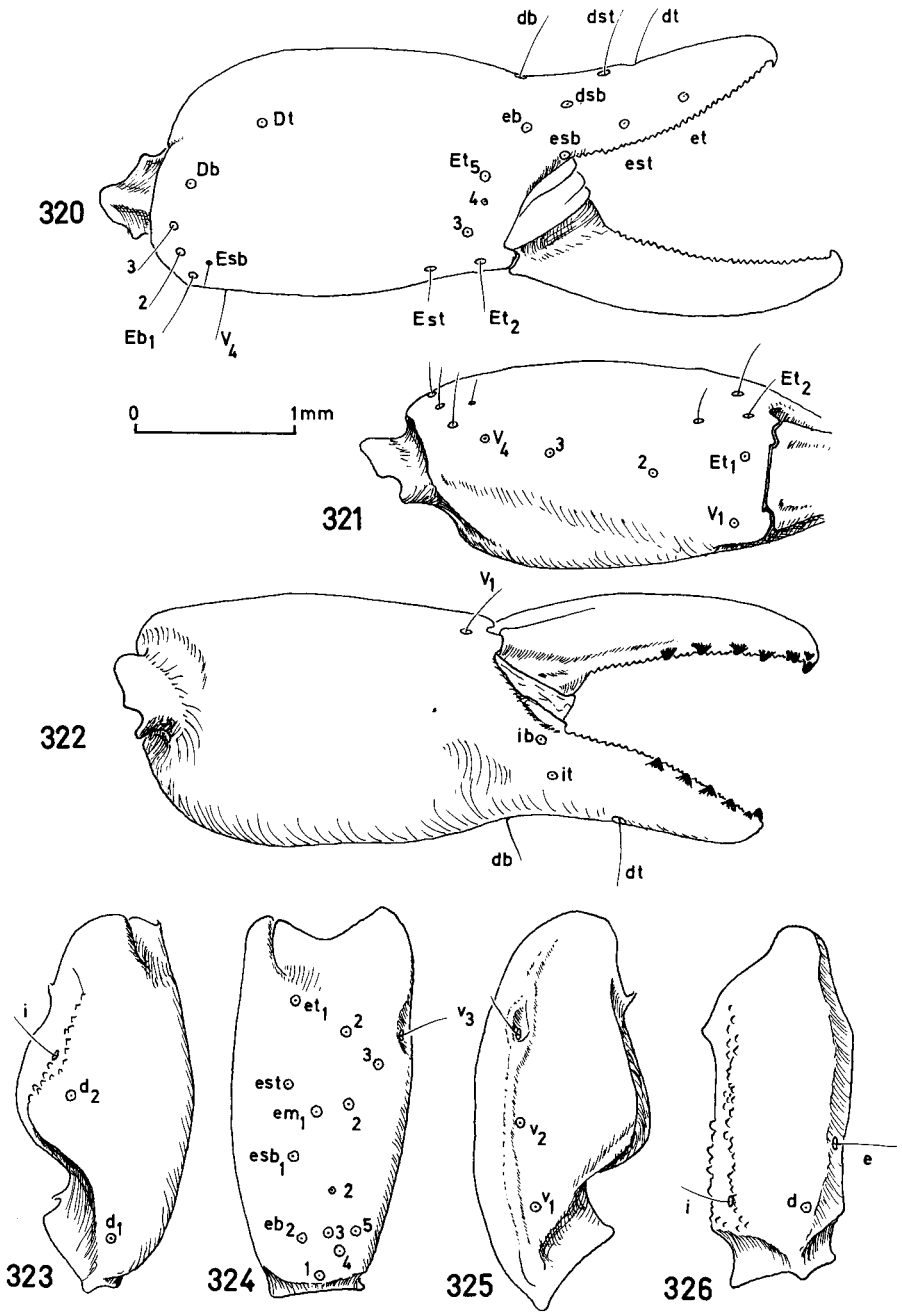
Variation: Sexual dimorphism: In adults, males differ from females in the following characters: ♂ trunk is more slender, with width sternite V/carapace length ratios 0,9 for the one adult ♂ available and 1,10 (1,08–1,13) for ♀; ♂ pedipalp handback wider and globose, with width handback/carapace length ratios 0,58 for the one adult ♂ available and 0,40 (0,38–0,43) for ♀; ♂ with 15–16 and ♀ 12–16 teeth per pecten.

Intraspecific variation: No distinctive variations in the material studied except in the presence or absence of granules on the ventral surface of cauda V as mentioned above.

Measurements: Maximum recorded body lengths in adult ♂ 1,8 cm (carapace 2,0 mm) in adult ♀ 2,8 cm (carapace 3,3 mm).

Type material: The original type series consisted of 'twenty two specimens from Outjo, Kaoko Otavi, Sesfontein' according to Lawrence (1928: 281) all of which are syntypes as Lawrence did not designate a holotype. Of these 12 ♀ and 4 ♂ were found in the collection of the South African Museum, the remaining six being lost. Out of the remaining syntypes, one adult ♀ (SAM B6980) is hereby designated as lectotype of *Lisposoma elegans* and the remaining specimens as paralectotypes. These types are deposited in the South African Museum.

Material examined: ♀ lectotype (SAM B6980). The following paralectotypes: 1 ♂ 3 subad ♂, Outjo, R. F. Lawrence (SAM B6077); 7 subad ♀, Sesfontein, 25 Feb 1925, R. F. Lawrence (SAM B6066); 1 ♀ 3 subad ♀, Outjo, Jan 1925, R. F. Lawrence (SAM B6077). The following non-types: 1 subad ♀, Orumana, Kaokoveld, 10 Feb 1975 (SMN 593); 1 ♀, Goreangab Dam, Windhoek, 19 Dec 1973, State Museum staff (SMN 503); 2 ♂ 1 ♀ subad, Portsmut farm, Hakos Mountains, 7 Feb 1969, B. Lamoral (NM 10035); 1 ♀, Annabis farm, Damaraland,



Figs 320–326. *Lisposoma elegans*, ♀ (NM 10886). 320–322, right hand; 320, outer aspect; 321, ventral aspect; 322, inner aspect; 323–325, right pedipalp tibia; 323, dorsal aspect; 324, outer aspect; 325, ventral aspect; 326, right pedipalp femur, dorsal aspect.

23 Feb 1969, B. Lamoral (NM 10032); 7 ♀ 1 subad ♀, Sesfontein, 4 Apr 1976, B. Lamoral (NM 10886); 2 ♀, Vrede, Damaraland, 31 Mar 1976, B. Lamoral (NM 10885). Dr. Endrödy-Younga has also collected the following specimens in pit-fall traps: 1 subad ♂, Us Pass, 20 km Park (23°03′S 15°44′E), 15 Nov 1974, (TM, coll. Endrödy-Younga 470 B); 2 ♂, Us Pass, 30 km Park (23°05′S 15°49′E), 15 Nov 1974, (TM, coll. Endrödy-Younga 471 G); 1 juv ♀, Us Pass, 44 km Park (23°04′S 15°56′E), 24 Jan 1975, (TM, coll. Endrödy-Younga 583 B); 1 ♀ 1 subad ♂, id., 5 June 1975, (TM, coll. Endrödy-Younga 856 E); 1 subad ♂, Us Pass, 46 km Park (23°03′S 15°58′E), 2 Mar 1975, (TM, coll. Endrödy-Younga 719); 2 subad ♀ 1 subad ♂, id., 5 June 1975, (TM, coll. Endrödy-Younga 857).

Distribution: Kaokoland, Damaraland down to the Windhoek district in central Namibia.

Bionomics: Specimens personally collected were found either resting on gritty to stony, hard surfaces at night or under small rocks on similar ground with surface hardness ranging from categories VIII–IX (Table 2). It is not known whether this species is a burrower. The known localities fall within areas with vegetation types 5 and 8 (Fig. 4). *L. elegans* is hemiedaphic and nocturnal.

Lisposoma josehermana sp. n. Figs 327–328, 331–340

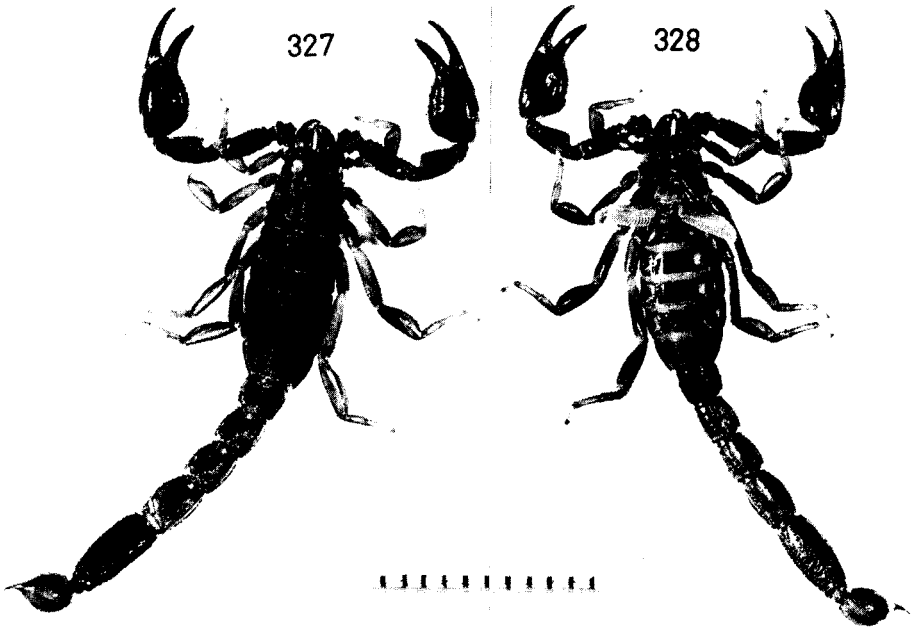
Derivation: Named in honour of my mother and father whose first names are Marie-Josée and Herman.

Diagnosis: L. josehermana is most closely related to *L. elegans* but can be separated from it by the following combination of characters. Carapace (Fig. 331), anterior margin sublinear, without a small median projection. Pedipalp chela, dentate margin of movable finger with an inner longitudinal row of 12–16 isolated teeth. Caudal segments (Fig. 332–334) I–IV, dorsal and dorso-lateral keels granular.

Description: The type series consists of 1 ♂ holotype, 2 subadult ♂, 2 juvenile ♂ 1 ♀ and 1 subadult ♀ paratypes. The following description is based on the adult ♂ holotype, unless otherwise indicated.

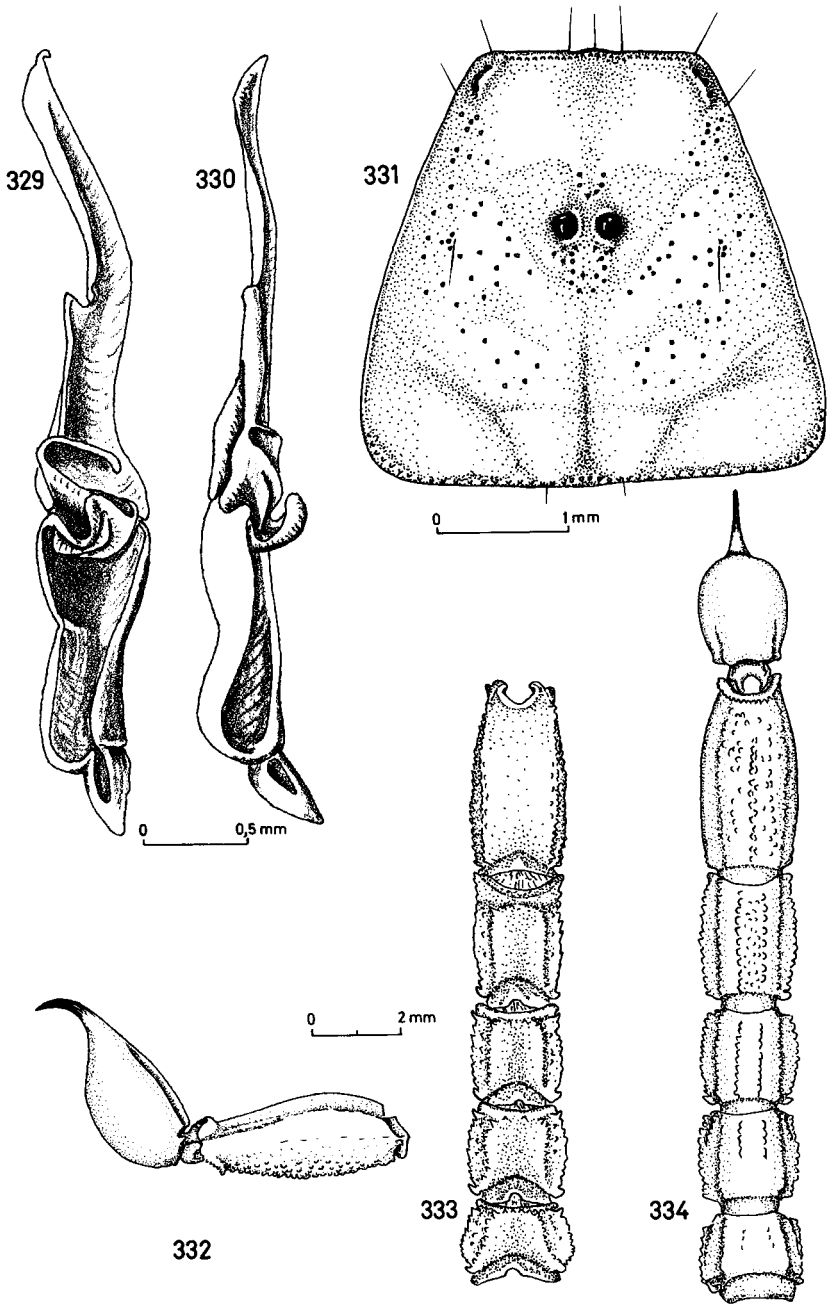
Granulation: The following surfaces finely shagreened with a few scattered granules: upper anterior and inner pedipalp handback; dorsal and anterior pedipalp femur and tibia; posterior and ventral pedipalp femur; carapace and tergites I–VI; anterior femora and patella of legs I–IV. Keels and granulation of caudal segments as in Figs 332–334. Keels of pedipalp tibia as in Figs 337–339. Pedipalp femur as for *L. elegans* in Fig. 326.

Colour: Pedipalp chela and tibia strong brown No. 55; pedipalp femur, carapace and cauda I–IV with non-infuscated surfaces strong yellowish brown No. 74; chelicerae telson, legs I–IV with non-infuscated surfaces dark orange yellow No. 72; sternites moderate yellow No. 87; pectines and genital operculum pale yellow No. 89. Pedipalp chela: proximal portion of fixed and movable fingers lightly infuscated; although no keels are visible on handback, their normal position is indicated by longitudinal lightly infuscated bands. Keels of pedipalp tibia and femur, lightly to moderately infuscated. Anterior, dorsal and posterior surfaces of pedipalp tibia and femur with light reticulated infuscations. Dorsal surface of



Figs 327–328. *Lisposoma josehermana* sp. n., ♂ holotype (NM 10697). Scale in mm.

cheliceral handback with very light reticulated infuscations. Carapace, tergites I–VII and dorsal surfaces of cauda I–V with moderately dark reticulated infuscations forming symmetrical patterns. Posterior half of lateral and ventral surfaces of cauda IV and V strongly infuscated. Anterior and to a lesser extent posterior surfaces of femora and patella of legs I–IV, lightly infuscated.
Chelicerae: As for *L. elegans,* with no diagnostic differences.
Pedipalps: Handback globose. Dentate margins of movable and fixed finger with an inner longitudinal row of 12–16 isolated teeth. Width handback/carapace length ratio 0,72 and length movable finger/handback length ratio 0,93.
Carapace: As in Fig. 331. Anterior margin sublinear, without either a median notch or projection. Median eyes large, situated anteriorly with lc/x ratio 2,23. Three lateral eyes on either side.
Tergites and sternites: Without keels. Sternites smooth and shiny. Tergites lightly shagreened and matt.
Legs: As for *L. elegans*, with no diagnostic differences.
Cauda: As in Figs 332–334.
Pectines: Much as in *L. elegans*. With 14–15 round middle lamella nodules. With 19–20 teeth per pecten. Pectinal teeth long, as long as medial combined width of middle and marginal lamellae.
Sternum: Subpentagonal in outline, with width 1,3 times greater than length.
Setation: As for *L. elegans,* a sparsely pilose species.
Trichobothria: As in Figs. 335–339. Not differing diagnostically from distribution of τ described for *L. elegans* in this revision.



Figs 329–334. *Lisposoma* species. 329–330, *L. elegans* ♂ paralectotype (SAM 6077), right hemispermatophore; 329, ventral aspect; 330, inner aspect; 331–334, *L. josehermana* sp. n., ♂ holotype (NM 10697); 331, carapace, dorsal aspect; 332, telson and cauda V, right lateral aspect; 333, caudal segments I–V, dorsal aspect; 334, entire cauda, ventral aspect. *Scales*: 329–330, middle left; 331, upper middle; 332–334, lower middle.

Hemispermatophore: As in Fig. 340. Differing diagnostically from its sister species *L. elegans* in the shape and size of distal lamina, hook notch and distal crest of distal lamina. In addition the following percentages are diagnostic for this new species:

1. ha → w distance × 100/dcr → w distance = 41,1%
2. ha → bsh distance × 100/ha → w distance = 50,0%
3. ha → bsh distance × 100/dcr → bsh distance = 28,0%

Variation: Sexual dimorphism: The only adult male differs from the only adult female in the following characters: ♂ proportionally smaller with carapace length 1,7 mm in ♂ and 1,9 mm in ♀; Pedipalp handback more globose, subcircular in cross-section in ♂, suboval in ♀; ♂ pedipalp handback shorter with length movable finger/handback length ratio 0,96 in ♂, 0,81 in ♀; ♂ carapace and tergites finely shagreened and matt, in ♀ these smooth and shiny; ♂ with 19–20 and ♀ 21 teeth per pecten.
Intraspecific variation: No distinctive variation in the type series.

Measurements: Measurements not otherwise obtainable from figures of holotype, as following in mm: maximum heights cauda I 1,7, cauda II–V 1,6. Total body length of holotype ♂ 2,7 cm, of adult paratype ♀ 3,2 cm.

Type material: Holotype and paratypes in Natal Museum. One paratype ♂ in State Museum, Windhoek.

Material examined: Holotype ♂ (NM 10697), 1 subad ♂ and 2 juv ♂ paratypes (NM 11110) all from Elandshoek farm 771, Otavi Highlands, 8 Mar 1969, B. Lamoral. The following paratypes: 1 subad ♂, Kempten (Höhle) ges. im Lehm Canon, 6 Aug 1977, P. von Wrede (NM 11390); 1 subad ♀, Märchenhöhle, farm Uisib 427, 13 Feb 1977, P. von Wrede (NM 11388); 1 ♀, Märchenhöhle, farm Uisib 427, 7 Aug 1977, P. von Wrede (NM 11389).

Distribution: Otavi Highlands in Tsumeb and Grootfontein Districts.

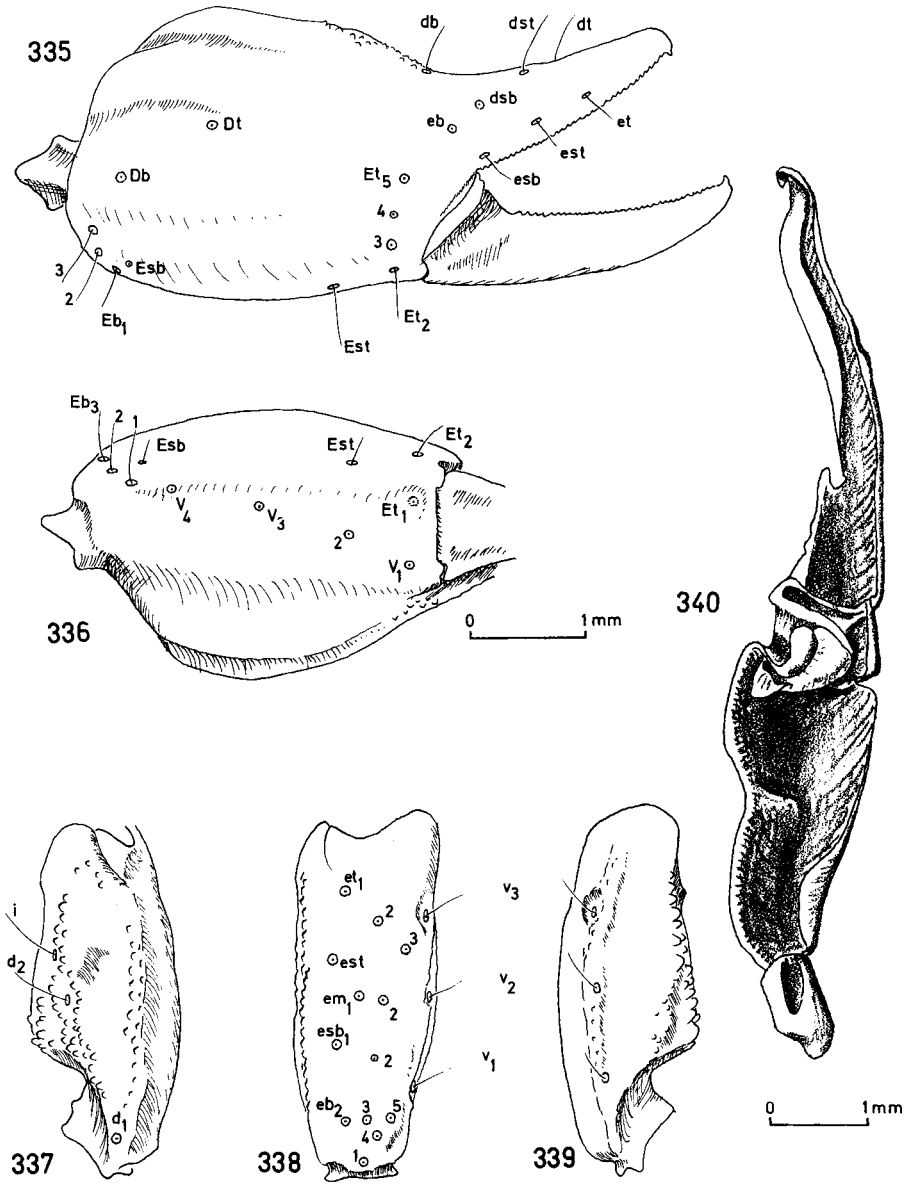
Bionomics: The types from Elandshoek farm were all found in burrows deep under the under surface of large boulders half imbedded in hard, slightly damp soil on south-facing hills supporting a fairly dense mixed Mopane/Acacia forest in an area of vegetation type 6 (Fig. 4). No specimens could be found from the south-facing hills supporting a less dense vegetation. All the other types were found in caves and *L. josehermana* is thus undoubtedly an endogean species occupying a euedaphic habitat.

Subfamily Scorpioninae Pocock, 1893

Genus *Opisthophthalmus* C. L. Koch, 1837

Opisthophthalmus C. L. Koch, 1837: 89.
Protophthalmus Lawrence, 1969: 105–106; see Newlands, 1972*b*: 241
Type species: *Scorpio capensis* Herbst, 1800, by original designation.

Diagnosis: Opisthophthalmus is most closely related to the genus *Scorpio* Linnaeus, 1758 but can be separated from it and other genera of the subfamily by the following combination of characters: chelicerae handback with stridulatory setae on inner surface; sternite VII without distinct and well-developed longi-



Figs 335–340. *Lisposoma josehermana* sp. n., ♂ holotype (NM 10697). 335–336, right hand; 335, outer aspect; 336, ventral aspect; 337–339, right pedipalp tibia; 337, dorsal aspect; 338, outer aspect; 339, ventral aspect; 340, right hemispermatophore, ventral aspect. *Scales*: 335–339, middle; 340, lower right.