

## A new species of *Feaella* Ellingsen from north-western Australia (Pseudoscorpionida: Feaellidae)

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### Summary

The first Australian representative of the family Feaellidae, *Feaella (Tetrafeabella) anderseni*, sp. nov., is described from specimens collected in the Kimberley region of north-western Australia. The biogeographical consequences of this discovery are discussed.

### Introduction

The pseudoscorpion superfamily Fealloidea, recently revealed as the sister-group of the Chthonioidea (Harvey, 1986), currently includes only two known families, Feaellidae and Pseudogarypidae, each with remarkably restricted distributions. The Pseudogarypidae contain seven Recent species from U.S.A., Canada and Australia (Tasmania), while the Feaellidae include ten species from Africa (Congo, Guinea-Bissau, Ivory Coast, Kenya, South Africa, Zaire, Zimbabwe), Madagascar, the Seychelles Islands, Bangladesh, India and Sri Lanka, all currently placed in a single genus, *Feaella* Ellingsen. During a recent survey of some rainforest remnants of the Kimberley region in northern Australia, several unusual pseudoscorpions were collected, including a new species of the genus *Feaella* which is described here.

Most specimens are mounted on slides in Euparal, and all are lodged in the Western Australian Museum, Perth (WAM).

### Genus *Feaella* Ellingsen

*Feaella* Ellingsen, 1906: 260; Chamberlin, 1931: 233; Beier, 1932: 241. Type species *Feaella mirabilis* Ellingsen, 1906, by monotypy.

### Remarks

The genus is divided into three subgenera based upon the number of anterior carapaceal protuberances: specimens of *Feaella* s. str. possess six, those of *Tetrafeabella* Beier four, and *Difeabella* Beier two.

### *Feaella (Tetrafeabella) anderseni*, new species (Figs. 1-13)

#### Types

Holotype ♀, Cape Bougainville, Western Australia, Australia, 14°04'55"S, 126°08'00"E, 7-11 June 1988, vine thicket litter, A. N. Andersen (WAM, 88/1269). Paratypes: 3 tritonymphs, same data (WAM, 88/1270-1272); 1 ♀, 1 tritonymph, 1 protonymph, SW Osborne Island, Western Australia, Australia, 14°23'S, 125°57'E, June 1988, litter, J. D. Majer (WAM, 88/2728-2730); 1 ♀, 1 tritonymph, Carson escarpment,

Western Australia, Australia, 14°51'S, 126°49'E, June 1988, litter, J. D. Majer (WAM, 88/2731-2732).

### Etymology

This species is named for Alan Andersen, collector of some of the specimens.

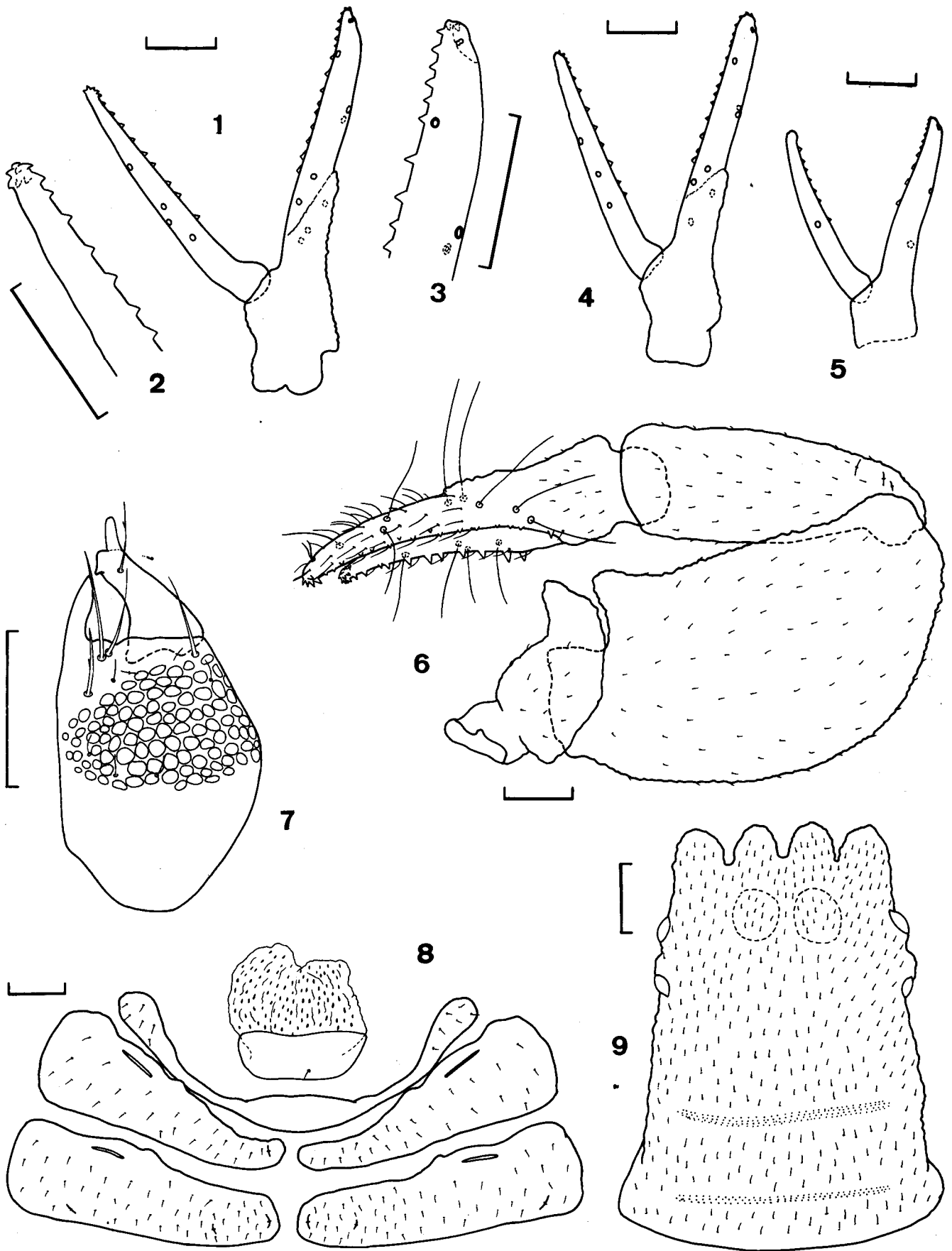
### Diagnosis

*Feaella anderseni* differs from all other members of the subgenus *Tetrafeabella*, except *F. leleupi* Beier from Zaire, by the presence of two dorsal carapaceal protuberances at the level of the anterior eyes. It differs from *F. leleupi* in the shape of the antero-lateral protuberances, which in *F. leleupi* are much broader than the antero-median protuberances, but which in *F. anderseni* are the same size as the anterior protuberances.

### Description

*Adult female*: Colour red-brown. Setae small, slightly curved and acuminate. Pedipalp (Fig. 6): trochanter 1.65-1.75, femur 1.78-1.91, tibia 2.75-2.81, chela (with pedicel) 3.65-4.00, chela (without pedicel) 3.21-3.62, hand 0.60-0.76 times longer than broad; trochanter with broad anterior projection; femur with thick antero-basal projection. Fixed chelal finger with 8 trichobothria, movable chelal finger with 4 trichobothria (Fig. 1): *eb* and *esb* sub-basal, *ib* and *isb* somewhat basal, *sb* closer to *st* than to *b*. Venom apparatus absent. Chelal teeth (Figs. 1, 6): fixed finger with 13-15 large, well-spaced, slightly retrorse lateral teeth, plus 28-30 internal teeth, in 2 ill-defined rows, and 6 distal teeth; movable finger with 11-14 large, well-spaced, slightly retrorse lateral teeth, plus 10-13 internal and 9-10 distal teeth. Fixed finger with *ds* situated in depression on distal end (Fig. 3). Movable finger much longer than hand (Fig. 1). Chelicera (Fig. 7): with 4 main setae on hand, in addition to 5 smaller setae; at least *sbs* with single serration, remainder apparently acuminate; hand dorsally ornamented as in Fig. 7; lamina exterior absent; flagellum not observed; movable finger with 1 seta, with single serration; galea thick and blunt; fixed finger lacking teeth; movable finger with a single distal tooth. Carapace (Fig. 9) 1.36-1.43 times longer than broad; lateral margins fairly straight, not convex; 4 corneate eyes; with many small setae; one wide sub-posterior furrow present; anterior margin with 4 equal-sized protuberances; 2 further dorsal protuberances present on level of anterior eye. Abdomen broadly ovate. Tergite I and sternites II-III undivided; tergites II-X and sternites IV-X divided; tergite I modified to receive posterior margin of carapace (as described by Chamberlin, 1931); anus surrounded by a platelet formed from fused tergite XI and sternites XI; sternite II very small and poorly sclerotised, with 1 seta, sternite III narrow (Fig. 8); tergites and sternites with many small setae not confined to posterior rows. Spiracles slit-like, without stigmatic helix, but with medial anteriorly directed apodeme; spiracles situated on anterior margin of sternites IV and V (Fig. 8);

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Figs. 1-9: *Faeella (Tetrafaella) anderseni*, new species, female holotype, unless otherwise stated. 1 Left chela, lateral; 2 Detail of distal portion of movable chelal finger; 3 Detail of distal portion of fixed chelal finger; 4 Left chela, lateral, paratype tritonymph; 5 Left chela, lateral, paratype protonymph; 6 Right pedipalp; 7 Right chelicera; 8 Sternites II-V; 9 Carapace. Scale lines = 0.1 mm.

tracheae quite short. Pleural membrane rugose; with 2 lateral rows each composed of 15 platelets; plus 2 additional rows of smaller platelets. Posterior maxillary lyrifissure absent. Coxa I with 4-5 stout, apparently immovable spines set in a semi-circular depression (Figs. 10-11). Female genitalia composed of large ill-defined membranous sac covered with cribriform plates. Legs (Figs. 12-13): homofemorate and homotarsate; arolium shorter than claws; claws simple.

Dimensions (mm): Body length 2.15-2.54/1.25-1.63. Pedipalps: trochanter 0.28-0.32/0.16-0.19, femur 0.60-0.64/0.33-0.36, tibia 0.44-0.50/0.16-0.18, chela (with pedicel) 0.51-0.58/0.13-0.15, chela (without pedicel) 0.45-0.52, hand length 0.09-0.10, movable finger length 0.33-0.39. Chelicera 0.23-0.25/0.13-0.15, movable finger length 0.09-0.10. Carapace 0.57-0.62/0.40-0.45; diameter of eyes, anterior 0.04-0.06, posterior 0.03-0.04; cucullus length 0.13; ocular breadth 0.37. Leg I: trochanter 0.16-0.18/0.11-0.13, basifemur 0.22-0.28/0.09-0.10, telofemur 0.20-0.23/0.09-0.10, tibia 0.18-0.21/0.07-0.08, tarsus 0.27-0.33/0.05-0.06. Leg IV: trochanter 0.26-0.31/0.13-0.14, basifemur 0.22-0.26/0.09-0.10, telofemur 0.31-0.38/0.12-0.13, tibia 0.37-0.43/0.07-0.08, tarsus 0.38-0.46/0.05-0.06.

*Tritonymph*: Colour paler than female. Pedipalp: trochanter 1.50, femur 1.82-1.83, tibia 2.67-2.71, chela (with pedicel) 4.00-4.16, chela (without pedicel) 3.67, hand 0.85-1.00 times longer than broad. Fixed chelal finger with 7 trichobothria, movable chelal finger with 3 trichobothria (Fig. 4): *isb* and *sb* absent. Carapace 1.20-1.30 times longer than broad. Coxa I with 3-4 spines set in a semi-circular depression. Legs: homofemorate and homotarsate.

Dimensions (mm): Body length 1.83-2.02/0.98-1.10. Pedipalps: trochanter 0.21/0.14-0.15, femur 0.51-0.53/0.28-0.29, tibia 0.38-0.40/0.14-0.15, chela (with pedicel) 0.50-0.52/0.12-0.13, chela (without pedicel)

0.44, hand length 0.11-0.12, movable finger length 0.34-0.36. Carapace 0.49-0.52/0.40-0.41.

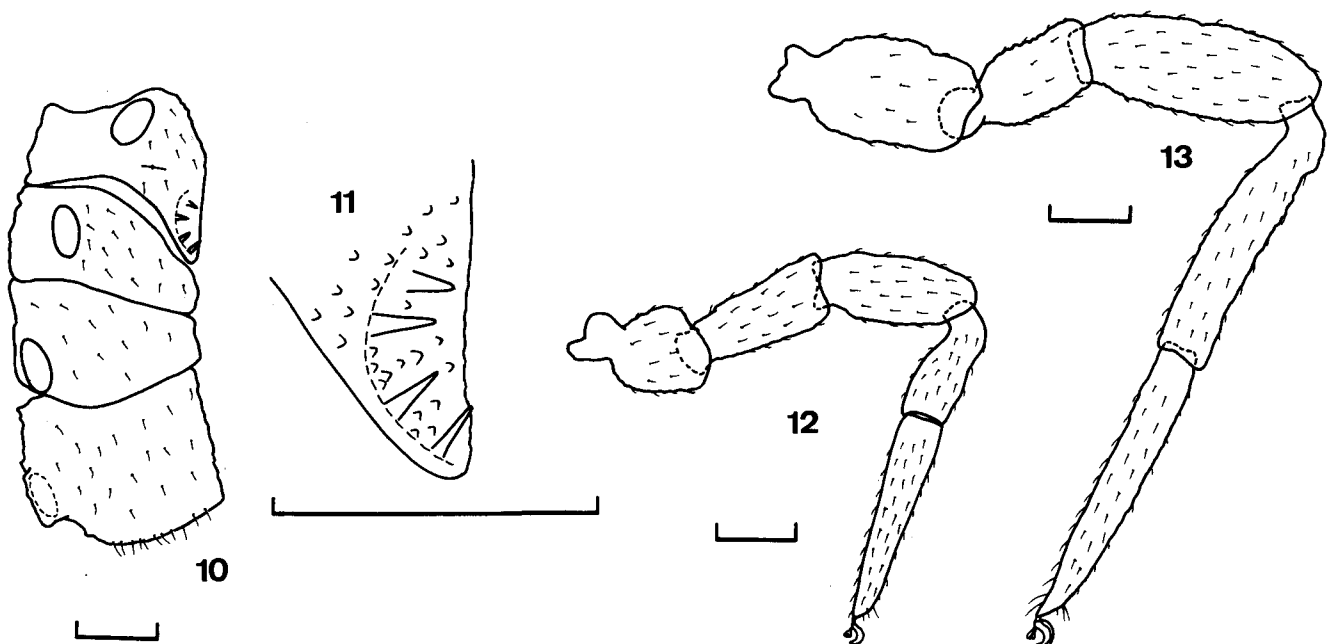
*Protonymph*: Colour paler than female. Pedipalp: trochanter 1.55, femur 2.00, tibia 2.09, chela (with pedicel) 3.60, chela (without pedicel) 3.20, hand 0.60 times longer than broad. Fixed chelal finger with 2 trichobothria, movable chelal finger with 1 trichobothrium (Fig. 5): *ist*, *it* and *st* present. Carapace 1.17 times longer than broad. Coxa I with 4 spines set in a semi-circular depression. Legs: homofemorate and homotarsate.

Dimensions (mm): Body length 1.22/0.62. Pedipalps: trochanter 0.17/0.11, femur 0.32/0.16, tibia 0.23/0.11, chela (with pedicel) 0.36/0.10, chela (without pedicel) 0.32, hand length 0.06, movable finger length 0.26. Carapace 0.34/0.29.

#### Remarks

The relationships of *Feaella anderseni* are obscure, but as discussed above, it appears to most closely resemble *F. (T.) leleupi* from Zaire owing to the presence of two dorsal carapaceal protuberances. They differ not only in details of the anterior carapaceal protuberances (see above), but also in size, as *F. leleupi* is smaller than *F. anderseni*. Most other species of the subgenus differ from these two species by possessing four dorsal protuberances (*F. mucronata* Tullgren, *F. indica* Chamberlin, *F. affinis* Hirst, *F. parva* Beier and *F. perreti* Mahnert), while the remaining species (*F. capensis* Beier) and its subspecies (*F. capensis nana* Beier) appear to lack such protuberances.

The morphology and distribution of the coxal spines in *Feaella* spp. have been somewhat ignored in the literature, but should yield interesting phylogenetic results. Like the coxal spines of all Recent members of the Pseudogarypidae (Benedict & Malcolm, 1978; Muchmore, 1981), those of at least two feallids, *F.*



Figs. 10-13: *Feaella (Tetrafeaella) anderseni*, new species, female holotype. 10 Right coxae I-IV; 11 Detail of right coxa I; 12 Left leg I; 13 Left leg IV. Scale lines = 0.1 mm.

*perreti* (Mahnert, 1982) and *F. anderseni* (Fig. 11), are stout and apparently immovable, as they appear non-alveolate. In contrast, the coxal spines of *F. indica* (based on examination of specimens of both sexes from Sri Lanka) are quite slender, resembling long setae, and are obviously alveolate. Coxal spines are present only on coxa I in *F. anderseni*, *F. indica* and pseudogarypids, whereas they are present on coxae I, II and the pedipalpal coxae in *F. perreti*.

Another feature of fealloids that is worthy of comment is the position of the spiracles. Although the spiracles of pseudogarypids are situated in the pleural membrane between sternites III and IV, and IV and V, they are closely associated with sternites IV and V, respectively. In feallids, the spiracles are situated on the anterior margin of sternites IV and V (Fig. 8; Heurtault-Rossi & Jézéquel, 1965), in contrast to most other pseudoscorpions where the spiracles are situated either on the posterior margins of sternites III and IV, or postero-laterally in the pleural membrane (Chamberlin, 1931). This posterior movement of the spiracles constitutes yet another apomorphic character state for the Fealloidea (Harvey, 1986).

The presence of a member of the genus *Feaella* in Australia throws additional light on the geographic origins of the Feallidae. It seems reasonable to postulate that most of the present-day distribution of the family (which basically borders the Indian Ocean) reflects an ancient, Gondwanan distribution. Africa (including the Madagascar sub-plate), the Indian sub-continent, Australia and Antarctica were joined as part of Gondwana until the Upper Jurassic when India, then later Africa, broke away (Briggs, 1987). Relationships within the family remain poorly understood, and the Madagascan fauna, although alluded to by Vachon (1960), is undescribed. Detailed phylogenetic analyses

of the family may yield very interesting results in the light of the vicariance events of this portion of Gondwana.

#### Acknowledgements

Alan Andersen provided the specimens of the new species, and Dr J. Gruber (Naturhistorisches Museum, Wien) kindly supplied comparative material. The Australian Biological Resources Study provided funds.

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