Journal of Natural History
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/tnah20

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Published online: 02 Dec 2010.

To cite this article: Edward A. Ueckermann & Timothy G. Grout (2007) Tydeoid mites (Acari: Tydeidae, Edbakerellidae, Iolinidae) occurring on Citrus in southern Africa, Journal of Natural History, 41:37-40, 2351-2378, DOI: 10.1080/00222930701589921

To link to this article: http://dx.doi.org/10.1080/00222930701589921

Journal of Natural History, 2007; 41(37–40): 2351–2378

Tydeoid mites (Acari: Tydeidae, Edbakerellidae, Iolinidae) occurring on *Citrus* in southern Africa

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(*Accepted 23 July 2007)*

Abstract
Tydeoids were collected from different southern African localities by beating citrus foliage and branches. *Pronematus ubiquitus* (McGregor) was the most frequently encountered, followed by *Tydeus munsteri* Meyer and Ryke. Some species appeared to be restricted to certain climate types, e.g. *Parapronematus geminus* Meyer and Rodriques being found only in coastal conditions of Mozambique and *Triophtydeus immanis* Kuznetzov only occurring in the arid lower Orange River Valley. Four new genera (*Tetratriophtydeus*, *Orfareptydeus*, *Kakamasia*, and *Lourus*) are proposed along with four new species (*O. stepheni*, *K. cataracta*, *Pseudopronematulus augrabiensis*, and *L. citricolus*). A key is presented and has been created to facilitate the identification of the tydeoids found and to encourage further research on the role of tydeoids in the citrus ecosystem in southern Africa.

Keywords: *Acari, Tydeoidea,* Citrus*, Mozambique, South Africa, Swaziland, Zimbabwe*

Introduction

Mites of the superfamily Tydeoidea have been recorded on citrus foliage in many parts of the world and certain species are widespread. One such species is *Tydeus spathulatus* Oudemans (= *Tydeus californicus* Banks, 1904?) that has been collected from citrus in California (McGregor 1956), Israel (Gerson 1968), Egypt (Rasmy et al. 1972), Spain (Garcia-Marí et al. 1985), and Portugal (Carmona 1970), and herein also from Zimbabwe. *Pronematus ubiquitus* (McGregor) is also widespread with records on citrus from California (McGregor 1956), Spain (Garcia-Marí et al. 1985), Italy (Castagnoli 1984; Vacante and Nucifora 1986), and Egypt (Rasmy et al. 1972). These species probably serve as prey for various predatory mites on citrus as has been found in other crop systems (Flaherty and Hoy 1971; Calis et al. 1988). Some tydeids are themselves predators of phytophagous mites on citrus (Muma 1965; Rasmy 1969). Only one tydeid has been considered a pest of citrus, namely *Lorryia formosa* Cooreman, originally described from Morocco (Smirnoff 1957, 1959; Cooreman 1958; Baker 1968a; Flechtmann 1973; Garcia-Marí et al. 1985). Flechtmann (1981) referred to this species, which is also widespread and common on citrus

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ISSN 0022-2933 print/ISSN 1464-5262 online
DOI: 10.1080/00222930701589921

in Florida (Aguilar and Childers 2000), northeastern Mexico (Badii et al. 2001) and Spain (Garcia-Marí et al. 1985), as being predaceous, microphagous, saprophagous, and phytophagous. In Mexico, *L. formosa* was found to be more suited to orange leaves than to grapefruit leaves and was considered to be only a casual visitor on the latter species (Badii et al. 2001). This mite is also known to feed on sooty mould or honey-dew (Smirnoff 1957; Mendel and Gerson 1982), which may apply to other tydeids too (English-Loeb et al. 1999).

The phytoseiid mite fauna on citrus foliage in southern Africa has been fairly well studied (Grout 1994, 2001) and certain species are known to contribute to the biological control of citrus pests (Keetch 1972; Grout and Richards 1992). However, little is known about tydeoid mites on citrus in southern Africa, though they are as frequently encountered as phytoseiids. Meyer (1998) considers *T. munsteri* Meyer and Ryke to be a predator of *Eutetranychus orientalis* (Klein) in South Africa and the second author has often collected *P. ubiquitus* in association with *Calacarus citrifolii* Keifer. This study was undertaken to identify the tydeoids that are present in citrus before establishing what contribution they may be making towards the biological control of the pests, or whether any of the species are phytophagous.

Four new genera and species are proposed herein. The nomenclature of the Tydeoidea follows André and Fain (2000). Notations for dorsal body setae follow Kethley (1990) and for legs André (1981). Measurements are in micrometres (μm).

Material and methods

Most of the tydeoids were collected from citrus foliage and branches during 2002 and 2003. Some specimens were collected earlier by colleagues working in outlying areas. In all cases, mites were collected by beating branches with a length of black polyethylene irrigation tubing (25 mm diameter) over a dark blue plastic board. Usually, four or five trees were beaten for a period of about 5 min. No attempt was made to compare population densities but only to acquire enough tydeoids to serve as a representative sample. The tydeoids were transferred from the board to 75% ethyl alcohol by using a very fine paintbrush. Permanent mounts were made using either Hoyer's solution (Krantz 1978) or PVA. The first author identified all the mites. Length of body includes the gnathosoma, width was measured at the level of setae c_{1-2}, setae from tip to base, and legs from articulation facet between coxa and trochanter to tip of tarsal claws.

The type and voucher material are deposited in the National Collection of Arachnida (NCA), Plant Protection Research Institute, Pretoria, South Africa.

Distribution

Only two samples were obtained from the Western and Eastern Cape provinces so it is likely that other species may occur on citrus there. The records (Table I) show that *Pronematus ubiquitus* is the most widespread tydeoid on citrus foliage in southern Africa and that *Tydeus munsteri* is the next. *Parapronematus geminus* Meyer and Rodriques was well distributed amongst the low-altitude localities of Mozambique with quasi-coastal conditions. *Triophtydeus immanis* was found only in the arid climate of the lower Orange River Valley. The remaining species were each found only at a few localities, but in some cases these localities were more than 1000 km apart. This was the case for *T. grabouwi* and

Table I. Distribution of tydeoid species collected from citrus foliage and branches in southern Africa.

Genus	Species	Locality	Southern African province or country
Kakamasia	*cataracta*	Kakamas	Northern Cape
Brachytydeus	*monticola*	Brits	North-West
Brachytydeus	sp.	Kakamas	Northern Cape
Triophtydeus	*immanis*	Blouputz	Northern Cape
		Kakamas	Northern Cape
Tetratriophtydeus	*myacanthus*	Nkwaleni	KwaZulu-Natal
Parapronematus	*geminus*	Boane	Mozambique
		Mapinhane	Mozambique
		Maxixe	Mozambique
		Nicuadala	Mozambique
		Zandamela	Mozambique
Pseudopronematulus	*augrabiensis*	Augrabies	Northern Cape
Lourus	*citricolus*	Maxixe	Mozambique
		Zandamela	Mozambique
Orfareptydeus	*stepheni*	Tzaneen	Limpopo
		Letsitele	Limpopo
		Nelspruit	Mpumalanga
		Addo	Eastern Cape
		Nkwaleni Valley	KwaZulu-Natal
		Tshaneni	Swaziland
		Chegutu	Zimbabwe
Perafrotydeus	*meyerae*	Hectorspruit	Mpumalanga
		Bindura	Zimbabwe
Pretydeus	*curiosa*	Polokwane	Limpopo
Pronematus	*ubiquitus*	Melmoth	KwaZulu-Natal
		Nkwaleni	KwaZulu-Natal
		Bela-Bela	Limpopo
		Hoedspruit	Limpopo
		Letsitele	Limpopo
		Mokopane	Limpopo
		Naboomspruit	Limpopo
		Burgersfort	Mpumalanga
		Groblersdal	Mpumalanga
		Hazyview	Mpumalanga
		Komatipoort	Mpumalanga
		Malelane	Mpumalanga
		Nelspruit	Mpumalanga
		Blouputz	Northern Cape
		Kakamas	Northern Cape
		Upington	Northern Cape
		Brits	North-West
		Mapinhane	Mozambique
		Bindura	Zimbabwe
		Chegutu	Zimbabwe
		Chiredzi	Zimbabwe
		Harare	Zimbabwe
		Mazowe	Zimbabwe
		Mutare	Zimbabwe
		Mvurwi	Zimbabwe

Table 1. Continued.

Genus	Species	Locality	Southern African province or country
Tydeus	*grabouwi*	Citrusdal	Western Cape
		Mvurwi	Zimbabwe
		Augrabies	Northern Cape
	munsteri	Addo	Eastern Cape
		Nkwaleni	KwaZulu-Natal
		Tshipise	Limpopo
		Burgersfort	Mpumalanga
		Malelane	Mpumalanga
		Nelspruit	Mpumalanga
		Kuruman	Northern Cape
		Tshaneni	Swaziland
		Chegutu	Zimbabwe
	spathatus	Nicuadala	Mozambique
	spathulatus	Mvurwi	Zimbabwe

Perafrotydeus meyerae. It is therefore likely that the latter two species will be found on citrus anywhere in the region.

Taxonomy

Family EDBAKERELLIDAE André, 2004
Subfamily TRIOPHTYDEINAE André, 1980
Genus *Triophtydeus* Thor, 1932

Triophtydeus Thor 1932, p 88; André 1985, p 192.
Metatriophtydeus André 1980, p 119.

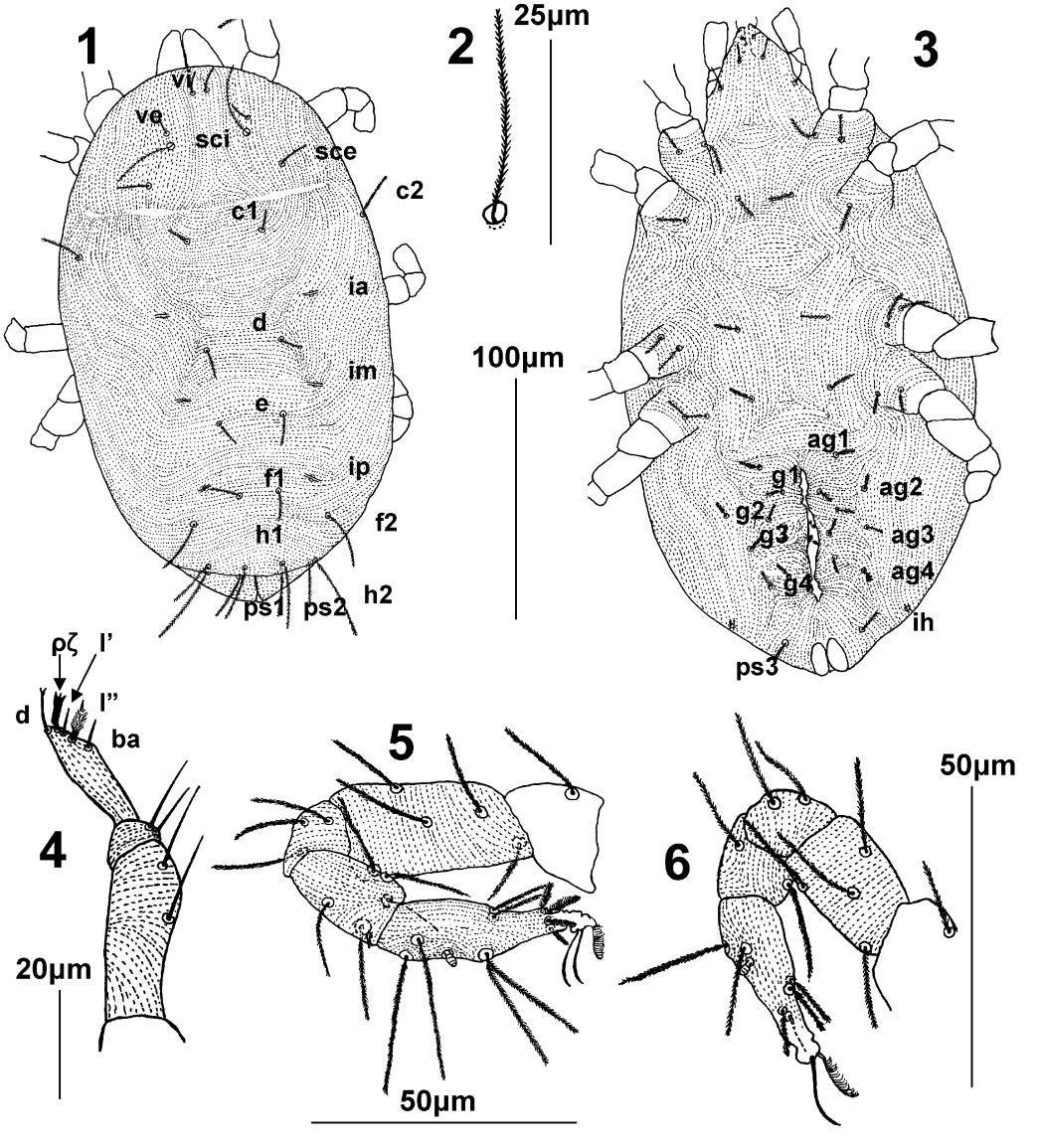
Type species. *Tydeus triophthalmus* Oudemans, 1929.

Diagnosis

Adults. André (1985) examined the type species *T. triophthalmus* (Oudemans) and redefined the genus and synonymized his genus *Metatriophtydeus* (André, 1980) with *Triophtydeus*. Originally the genus was only characterized by the presence of three eyes, which are absent in most cleared specimens. This genus can be defined as follows: prodorsum with three pairs of eyes (not always visible) and four pairs of setae, including a pair of trichobothria; opisthosoma with eight pairs of setae and four pairs of slit-like pores or cupules, namely *ia* halfway between setae c_1 and *d*, *im* halfway between *d* and *e*, and *ip* lateral to setae f_1, a fourth pore (*ih*) is lateral to setae ps_1, posteroventrally; genital area with four to six pairs of genital setae (*g*), four to five pairs of aggenital setae (*ag*), two pairs of eugenital setae (*eu*) in female and six in male and two pairs of anal setae (*ps*); epimeral formula in adults (coxal plus ventral setae): 3-1-3-3; leg chaetotaxy (with solenidia in parentheses): tarsi 10(ω)-6(ω)-5-5, tibiae 5-2-1-2, genua 3-2-2-2, femora 5-4-1-1+2, trochantera 1-1-1-0, femur IV is divided.

Twenty-nine species were originally placed in *Triophtydeus*. However, besides the type species, only four others fit this new definition, namely *T. craveni* Wood, 1965, *T. flatus*

Livshitz, 1973 (Kuznetzov and Livshitz 1973), *T. immanis* Kuznetzov, 1973 (Kuznetzov and Livshitz 1973), and *T. lebruni* André, 1980. André (1985) opined that *T. lebruni* and *T. triophthalmus* are conspecific but maintained the *status quo* until a thorough revision of the genus could be contemplated. An examination of the paratypes of *T. flatus* indicated that the latter and *T. triophthalmus* may also be conspecific. South African specimens were compared with the type of *T. immanis* and resemble the latter in all respects, thus until DNA studies can be conducted we are left with no other choice but to consider them conspecific, and this is also the first record of this species from South Africa.



Figures 1–6. *Triophtydeus immanis* Kuznetzov, female. (1) Dorsum. (2) Seta *sci*. (3) Venter. (4) Palp. (5) Leg I. (6) Leg II.

Triophtydeus immanis Kuznetzov
(Figures 1–6)

Triophtydeus immanis Kuznetzov 1972, p 15; André 1985, p 193.

Material examined

Crimea: four paratype females from *Rhamnus davurica* Pall (Rhamnaceae); South Africa: Northern Cape Province: 10 females from *Citrus* sp., Augrabies (28°37′S, 20°22′E) near Kakamas and Zeekoeisteek near Blouputz (29°49′S, 21°22′E), Northern Cape Province, 14 May 2003, T. G. Grout.

Diagnosis

Adults. This species is unique in having four pairs of genital and aggenital setae.

Female (n=5). Dimensions (measurements of a paratype in parentheses): length of body, 246–268 (252); width (at level of *c* setae) 117–132 (130); legs: I 138–146 (148); II 94–108 (104); III 101–108 (104); IV 104–110 (120); setae: *vi* 9 (9); *ve* 9 (9); *sci* 25–28 (25); *sce* 13 (13); c_1 9 (9); c_2 16 (16); *d* 9 (9); *e* 13 (13); f_1 13–16 (14); f_2 22–28 (22); h_1 25 (22); h_2 28–32 (25); ps_1 19–25 (16); ps_2 16–19 (16); ps_3 9 (9).

Dorsum (Figure 1): all dorsal setae plumose. Prodorsum with four pairs of setae, with *sci* the longest (Figure 2). No eyes are visible. Opisthosoma with eight pairs of setae and three pairs of slitlike cupules (*ia*, *im* and *ip*). Striae longitudinal on prodorsum, transverse medially and longitudinal to diagonal laterally on opisthosoma.

Venter (Figure 3): genital region with two pairs of eugenital setae in acetabulum and four pairs of genital and aggenital setae. Epimeral formula 3-1-3-3. Cupule *ih* lateral to setae ps_3. Anal opening caudally with three pairs of anal setae ($ps_{1–3}$), with $ps_{1–2}$ being dorsal.

Gnathosoma (Figure 4): palp chaetotaxy (tarsus to trochanter): 5-2-2-0. According to André (1980, 1985) it is 6-2-2 with a solenidion on tibiotarsus. This solenidion is difficult to detect and was observed only once in a remounted specimen (H. M. André, personal communication). A thorough examination of the tibiotarsus of paratype and local specimens showed only five setae and no sign of a solenidion. Tibiotarsus with seta $p\zeta$ tridentate distally, *d* forked distally, l'' plumose, and setae l' and *ba* simple. Cheliceral stylets (11) almost half the length of palp tibiotarsus (19).

Legs (Figures 5, 6): leg chaetotaxy as in André (1985). Solenidia on tarsi I–II very short, club-shaped. All leg setae plumose. Coxae I without coxal glands.

Genus ***Tetratriophtydeus*** gen. nov.

Type species. *Triophtydeus myacanthus* Ueckermann, 1988 (in Meyer and Ueckermann 1988).

Diagnosis

Adults. This genus is closely related to *Pretriophtydeus* André, differing from the latter in the chaetotaxy of tibiae I–IV, namely 4-2-2-2 instead of 5-3-2-2, and in having five pairs of genital and aggenital setae instead of six pairs of genital and aggenital setae.

This genus can be defined as follows: dorsum of idiosoma with 14 pairs of setae (*vi*, *ve*, *sci*, *sce*, $c_{1–2}$, *d*, *e*, $f_{1–2}$, $h_{1–2}$ and $ps_{1–2}$) including a pair of trichobothria (*sci*); tarsus I with 12 setae

and a solenidion; poroidotaxy: 4 (*ia*, *im*, *ip*, *ih*); genital organotaxy: 2-6-5-5 (eugenital (*eu*) ♀-eu ♂-genital (*ge*) ♀-aggenital (*ag*) ♀ setae); solenidiotaxy: 2 (tarsi I and II); epimeral formula: 3-1-4-3 (ventral setae plus coxal setae); chaetotaxy of some leg segments: tarsi 12(ω)-6(ω)-5-5, tibiae 4-2-2-2, genua 3-2-2-2, femora 5-4-3-2 + 1 (telofemur two and basifemur one), and trochantera 1-1-1-0. Femur IV divided. Palp chaetotaxy (tarsus to trochanter) 5-2-2-0.

Etymology

The prefix *Tetra* refers to the main distinguishing character of the genus, namely the four setae on tibia I.

Tetratriophtydeus myacanthus (Ueckermann) comb. nov.

Triophtydeus myacanthus Ueckermann 1988 (Ueckermann and Meyer), p 22.

Material examined

South Africa: Kwa Zulu-Natal: three females from *Citrus* sp., Nkwaleni Valley (28°46′S, 31°28′E), South Africa, 30 January 2003, P. R. Stephen.

The features of this monotypic genus also define the species.

Family TYDEIDAE Kramer, 1877
Subfamily PRETYDEINAE André, 1980
Genus *Pretydeus* André, 1980

Pretydeus André 1980, p 143; Kaźmierski 1996, p 172.

Type species. *Lorryia kevani* Marshall, 1970.

Diagnosis

Adults. This genus can be recognized by the prodorsum bearing four pairs of setae, including *sci* trichobothria, opisthosoma with 10 pairs of setae; female with six pairs of genital setae and four pairs of aggenital setae; palp chaetotaxy 6(ω)-2-2; tibia I with a solenidion, genua II, III and IV without setae, and trochanter II with a seta, femur IV not divided.

Pretydeus curiosa (Ueckermann and Meyer)

Lorryia curiosa Ueckermann and Meyer 1979a, p 44.
Pretydeus curiosa (Ueckermann and Meyer); Kaźmierski, 1996, p 180.

Material examined

South Africa: Limpopo Province: four paratype females from *Citrus* sp., Polokwane (23°52′S, 29°26′E), 13 September 1970, J. den Heyer.

Diagnosis

Adults. This species can be recognized by the following combination of characters: dorsum incompletely reticulated except for median area of prodorsum, which is evenly reticulated,

dorsal setae short and serrated except for setae *sci*, which are twice as long as all other dorsal setae and smooth.

Subfamily TYDEINAE André, 1980

Genus *Orfareptydeus* gen. nov.

Type species. Orfareptydeus stepheni sp. n.

Diagnosis

Adults. This genus resembles *Afrotydeus* Baker and *Perafrotydeus* André in most respects, differing from these genera in the unique chaetotaxy of the leg femora and trochantera, namely 2-1-0-0 and 1-0-0-0, respectively. Poroidotaxy: 3.

Etymology

The name of this genus is an anagram of the *Afro* of *Afrotydeus* and *Per* of *Perafrotydeus*.

Orfareptydeus stepheni sp. n.
(Figures 7–12)

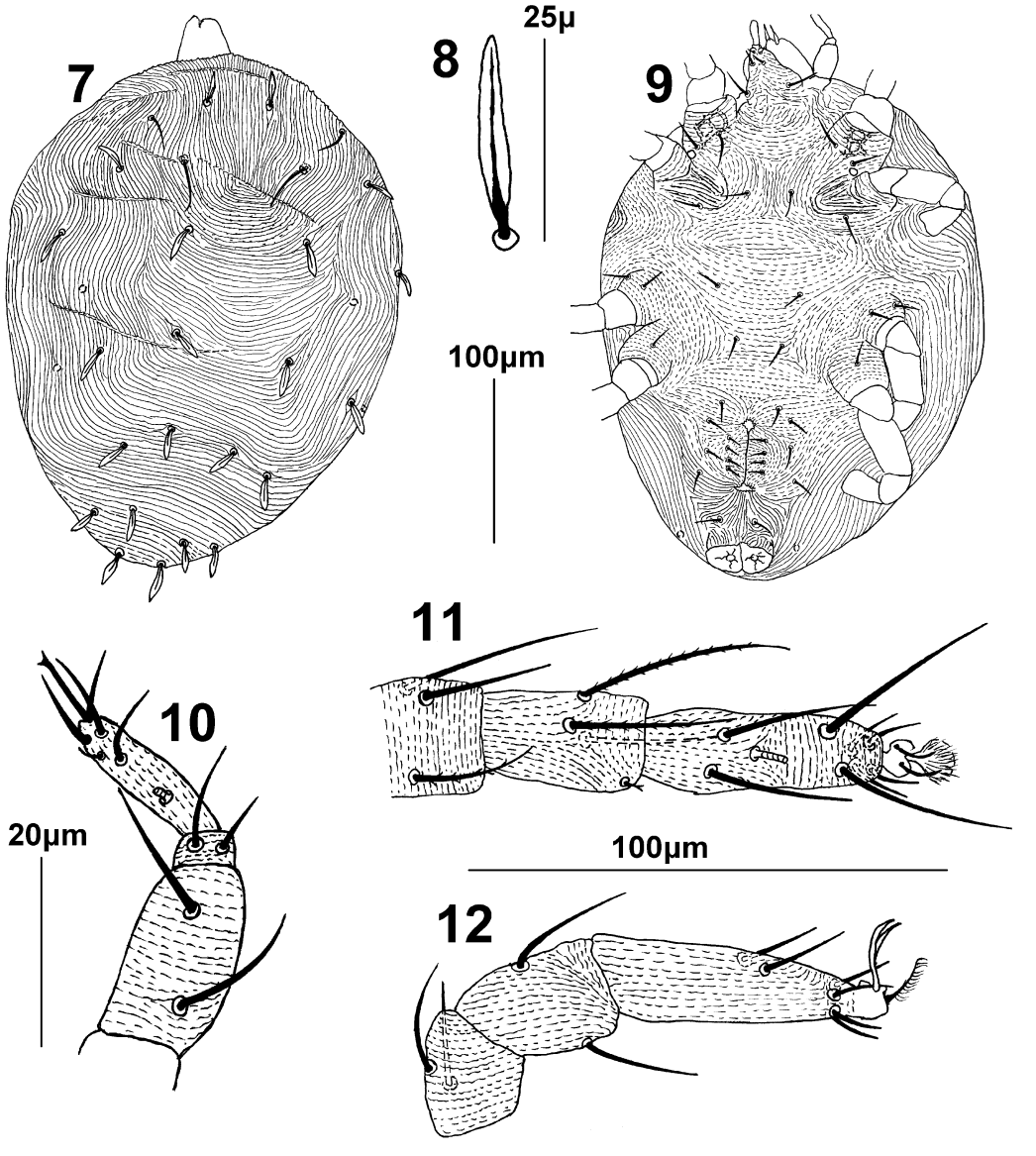
Type material

South Africa: Limpopo Province: holotype female, 26 paratype females, three paratype males, and five paratype nymphs from *Citrus* sp., Letaba Estate near Tzaneen (23°51.8′S, 30°19.1′E), 13 February 2003, P. R. Stephen; five paratype females, one paratype male and one paratype tritonymph from *Citrus* sp. Bosveld Sitrus near Letsitele (23°51.7′S, 30°26.1′E), 13 February 2003, P. R. Stephen. Mpumalanga Province: one paratype female from *Citrus* sp., Lowveld Agricultural College, Nelspruit (25°26.3′S, 30°58.8′E), 14 August 2003, T. G. Grout. Eastern Cape Province: 17 paratype females, two paratype males, and two paratype tritonymphs from *Citrus* sp., farm near Addo, 22 September 2003, W. Kirkman. KwaZulu-Natal Province: 10 paratype females, one paratype male, and one paratype tritonymph from *Citrus* sp., Freeman farm, Nkwaleni Valley (28°42′S, 31°37′E), 30 January 2003, P. R. Stephen. Swaziland: 10 paratype females, four paratype males, four paratype tritonymphs, one paratype deutonymph and two paratype females from *Citrus* sp., IYSIS, Tshaneni, November 2002, P. R. Stephen. Zimbabwe: one paratype female from *Citrus* sp., west of Chegutu, Etheredge's farm (18°06′S, 30°08.7′E), 6 August 2003, T. G. Grout.

Diagnosis

Adults. The features of this species are the same as those characterizing the genus. The leg chaetotaxy and epimeral formula are constant in all known stages (larva not seen) and appear to be a case of neoteny.

Female (n=7). Dimensions of holotype followed (in parentheses) by variations in measurements of paratypes: length of idiosoma 337 (293–365), width 167; legs: I 173 (170–217), II 164 (151–192), III 158 (151–183), IV 201 (158–202); setae: *vi* 25 (22–25), *ve* 25 (19–25), *sci* 38 (35–38), *sce* 22 (19–25), c_1 25 (19–25, c_2 25 (19–25), d_1 25 (19–25),



Figures 7–12. *Orfareptydeus stepheni* sp. n., female. (7) Dorsum. (8) Seta e_2. (9) Venter. (10) Palp. (11) Leg I. (12) Leg II.

d_2 25 (19–25), e_1 25 (16–25), e_2 25 (16–25), f_1 25 (16–25), f_2 25(16–25), h_1 19 (16–22), ps_3 missing (19–22); cheliceral stylets 15 (13–14); palptarsus 19 (19–22).

Dorsum (Figure 7): all 13 pairs of dorsal setae, except for *ve* and *sci*, spatulate (Figure 8). Setae *sci* longest and slender along entire length, others equal to subequal in length. Prodorsum has four pairs of setae, opisthosoma nine pairs and three pairs of cupules, *ip* apparently absent. Striae with small tubercles, longitudinal on propodosoma and transverse medially on opisthosoma.

Venter (Figure 9): epimeral formula 3-1-3-2. Genital area with four pairs of aggenital and genital setae and no eugenital setae. Only one pair of anal setae (*ps*) present and paraproctal suckers well developed. Cupule *ih* lateral to paraproctal suckers.

Gnathosoma (Figure 10): palp chaetotaxy (tibiotarsus to femur): 6(ω)-2-2. Setae $p\zeta$ and perhaps l'' slightly forked distally, setae *ba* and solenidion ω minute.

Legs (Figures 11, 12): chaetotaxy of leg segments: tarsi 8(ω)-6-5-5, tibiae 4-2-2-2, genua 3-2-1-1, femora 2-1-0-0, trochantera 1-0-0-0. Femur IV entire. All tarsi terminate in two claws and a hairy empodium. Coxa I with coxal organ.

Male (n=3). Dimensions: length of idiosoma (including gnathosoma) 290–268, width 180–202; legs: I 173–179, II 152–165, III 157–161, IV 164–176; setae: *vi* 19–22, *ve* 20–22, *sci* 28–35, *sce* 19–22, c_1 19–22, c_2 19–20, d_1 22, d_2 19–22, e_1 19, e_2 19, f_1 19, f_2 18, h_1 16, ps_3 16; cheliceral stylets 13; palptarsus 19.

Similar to female but differs in that the genital area has four pairs of aggenital, genital, and eugenital setae. Paraproctal suckers well developed. Coxa I with coxal organ.

Tritonymph (n=5). Dimensions: length of idiosoma (including gnathosoma) 221–280, width 151–208; legs: I 117–151, II 107–145, III 107–141, IV 113–148; setae: *vi* 16–22, *ve* 16–19, *sci* 28, *sce* 16–19, c_1 19–22, c_2 16–19, d_1 16–22, d_2 19–22, e_1 16–19, e_2 16–19, f_1 16–19, f_2 16–19, h_1 13–16, ps_3 16; cheliceral stylets 9; palptarsus 13–16.

Tritonymph differs from adults by lacking the progenital aperture, represented by two pores, presence of four pairs of aggenital (four on one side and three on the other side in one of the specimens), two pairs of genital, and one pair of anal setae. Paraproctal suckers well developed. Coxa I with coxal organ.

Deutonymph (n=1). Dimensions: length of idiosoma (including gnathosoma) 271, width 205; legs: I 135, II 120, III 117, IV 123; setae: *vi* 19, *ve* 19, *sci* 25, *sce* 19, c_1 19, c_2 19, d_1 19, d_2 16, e_1 16, e_2 16, f_1 16, f_2 16, h_1 16, *ps* 13; cheliceral stylets 9; palptarsus 16.

Deutonymph can be defined as having three pairs of aggenital, one pair of genital, one pair of anal setae, and two progenital pores. Paraproctal suckers well developed. Coxa I with coxal organ.

Protonymph (n=2). Dimensions: length of idiosoma (including gnathosoma) 198–217, width 148–161; legs: I 107–113, II 85–98, III 104, IV 101–104; setae: *vi* 13–17, *ve* 16–17, *sci* 25, *sce* 16, c_1 16, c_2 16, d_1 13–16, d_2 13–16, e_1 13, e_2 13–16, f_1 13–16, f_2 13–16, h_1 13, *ps* 9–13; cheliceral stylets 9; palptarsus 16.

Protonymph can be distinguished by the presence of only two pairs of aggenital setae, one pair of progenital pores, and one pair of anal setae. Paraproctal suckers small but well developed. Coxa with coxal organ.

Etymology

This species is named after the collector of many of the specimens in this study, P. R. Stephen.

Genus *Perafrotydeus* André, 1980

Perafrotydeus André 1980, p 142.
Tydeus (Afrotydeus) Baker 1970, p 164.

Type species. *Tydeus (Afrotydeus) meyerae* Baker, 1970.

Diagnosis

Adults. André (1980) defined this genus as follows: opisthosoma with 10 pairs of setae (*ps* included); poroidotaxy: three; genital organotaxy—adults: no eugenital setae in female (male not known), four pairs of genital setae and aggenital setae; chaetotaxy of leg segments: 8(*ω*)-6-5-5, tibiae 4-2-2-2, genua 3-2-1-1, femora 3-1-1-0, trochantera 1-0-0-0, epimeral formula adults: 3-1-4-2; solenidiotaxy: one, femur IV entire; palp chaetotaxy: 6(*ω*)-2-2.

Perafrotydeus meyerae (Baker)

Tydeus (Afrotydeus) meyerae Baker 1970, p 165.
Perafrotydeus meyerae (Baker); André 1980, p 142.

Diagnosis

Adults. All dorsal setae, except for *ve* and *sci*, are lanceolate with finely serrated edges. Setae *sci* are long and slightly serrate, and although not mentioned in the description, setae *ve* may also be serrate, but are as slender as *sci*. Rest of features as for genus.

This species was found on *Citrus* sp. at Hectorspruit (Mpumalanga) and Bindura (Zimbabwe).

Genus ***Brachytydeus*** Thor, 1931

Brachytydeus Thor 1931, p 102.
Raphitydeus Thor 1933, p 54 sensu André 2005.
Lorryia Oudemans 1925, p 32 sensu Kaźmierski 1989, 1996.

Type species. *Tydeus cruciatus* Koch sensu André (2005).

Diagnosis

Adults. In his search for the true *Tydeus*, in the Oudemans Collection, André (2005) designated new type species for *Tydeus*, established that *Lorryia* is actually a monotypic genus based on unique characters and that *Brachytydeus* is a valid genus. All the species assigned to the genus *Lorryia* by Kaźmierski (1989, 1996) display the same chaetotaxy as *Tydeus cruciatus* which was designated as the type species of *Brachytydeus*. This genus is defined as follows: opisthosoma with 10 pairs of setae (*ps* included); poriodotaxy: three (*im* sometimes posterior to setae e_1); genital organotaxy—adults: no eugenital setae in female but male has four pairs, six pairs of genital setae are present and four pairs of aggenital setae in both adults; coxa I with coxal organ; chaetotaxy of leg segments: 8(*ω*)-6(*ω*)-5-5, tibiae 3 + *k*-2-2-2, genua 3-2-1-1, femora 3-3-2-1, trochantera 1-0-1-0, epimeral formula adults: 3-1-4-2; solenidiotaxy: two; femur IV entire; palp chaetotaxy: 6(*ω*)-2-2.

Brachytydeus monticola (Ueckermann and Meyer) nov. comb.

Paralorryia monticola Ueckermann and Meyer 1979b, p 118.

Material examined

South Africa: North-West Province: one female from *Citrus limon*, Mooidoring farm, near Brits (25°37.6′S, 27°46.6′E), 10 October 2002, E. A. Ueckermann.

Diagnosis

Adults. This species can be defined by the following combination of characters: dorsum striated with a small reticulate area anteriorly on prodorsum and reticulated elements distributed randomly on opisthosoma, dorsal setae lanceolate, faintly setose and curved, striae with semi-lunar lobes and leg tarsi with empodial claws.

***Brachytydeus* sp.**

A tritonymph of a *Brachytydeus* sp. was also found on citrus at Augrabies, Kakamas, Northern Cape Province together with *Pronematus ubiquitus*, *Triophtydeus immanis*, *Kakamasia cataracta*, and *Tydeus grabouwi*. It is closely related to the tritonymph of *B. monticola* but differs in that the striae are more prominent and smooth and the small, reticulated areas on the dorsum are absent. This single specimen does not justify a description.

Genus *Tydeus* Koch

Tydeus Koch 1836, p 11–12; Oudemans 1937, p 922 (in part); Kaźmierski 1989, p 292 (in part).
Brachytydeus Thor 1933, p 54 (in part).
Calotydeus Oudemans 1937, p 923 (in part).
Orthotydeus André 1980, p 127.

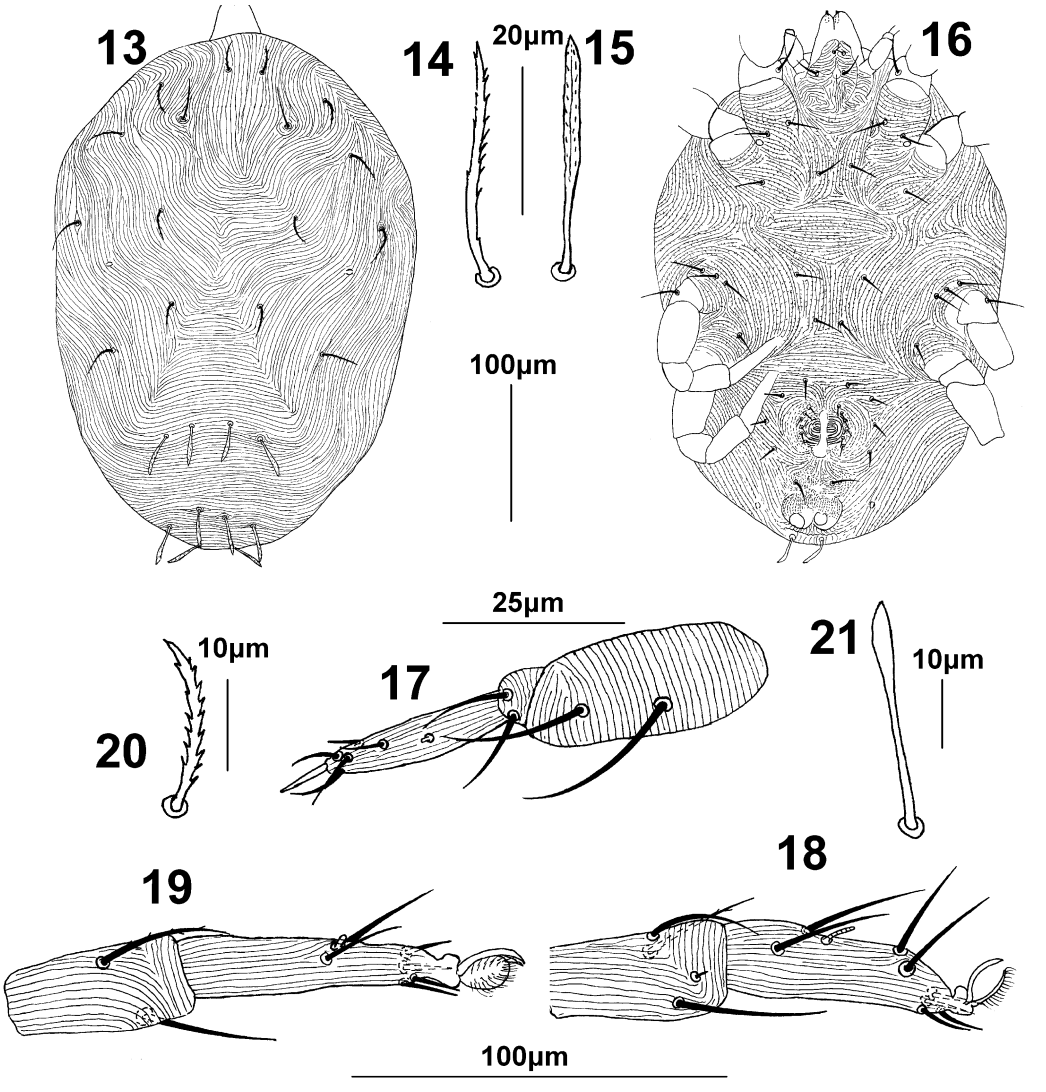
Type species. Tydeus spathulatus Oudemans, 1928 sensu André (2005).

Diagnosis

Adults. Kaźmierski (1989), in agreement with André (2005), redefined this genus as follows: opisthosoma with 10 pairs of setae (*ps* included); poroidotaxy: three; genital organotaxy, adults: no eugenital setae in female but four pairs in male, four or six pairs of genital and four pairs of aggenital setae in both adults; coxa I with coxal organ; chaetotaxy of leg segments: 8(ω)-6(ω)-5-5, tibiae 4-2-2-2, genua 3-2-1-1, femora 3-2-1-1, trochantera 1-0-1-0, epimeral formula, adults: 3-1-4-2; solenidiotaxy: two, femur IV entire; palp chaetotaxy: 6(ω)-2-2.

Tydeus munsteri Meyer and Ryke

Tydeus munsteri Meyer and Ryke 1959, p 413; Meyer and Rodriques 1966, p 22; Kaźmierski 1989, p 293.
Tydeus (Afrotydeus) munsteri Meyer and Ryke; Baker 1970, p 165.
Orthotydeus munsteri (Meyer and Ryke); André 1980, p 127.



Figures 13–21. (13–19) *Tydeus spathulatus* Oudemans, female. (20, 21) *Tydeus grabouwi* Meyer and Ryke. (13) Dorsum leg II. (14) Seta d_2. (15) Seta e_1. (16) Venter. (17) Palp. (18) Leg I. (19) Leg II. (20) Seta d_1. (21) Seta e_2.

Material examined

South Africa: Mpumalanga Province: one female, four males, and three tritonymphs from *Citrus* sp., Lowveld Agricultural College, Nelspruit (25°26.3′S, 30°58.8′E), 14 August 2002, T. G. Grout. Northern Cape Province: three females and one male from *Citrus* sp., Kuruman (27°26.6′S, 23°25.6′E), 13 May 2003, T. G. Grout.

Meyer and Rodrigues (1966) also recorded this species on citrus from Grahamstown (Eastern Cape Province), Buffelspoort (North-West Province), Kiepersol (Mpumalanga), Durban and Richmond (KwaZulu-Natal), and Swaziland.

Diagnosis

Adults. For an unknown reason Baker (1970) placed this species in his subgenus *T. (Afrotydeus)*, with four pairs of genital setae, in spite of the fact that Meyer and Ryke (1959) clearly stated that *T. munsteri* has the same number of genital setae as *T. grabouwi* Meyer and Ryke, namely six. Perhaps the type specimen he studied was a tritonymph.

This species is characterized by the following combination of characters: all dorsal setae, except for *vi* and *ve*, short and spatulate and pointed distally, *sce* also appear pointed distally in some specimens. Setae *sci* longest and slightly spatulate distally.

Tydeus spathulatus (Oudemans)
(Figures 13–19)

Tydeus spathulatus Oudemans 1928, p 380.
Tetranychoides californicus Banks 1904, p 54. New synonym?

Material examined

Zimbabwe: two females and one tritonymph, from *Citrus* sp., southwest of Mvurwi, Arda farm (17°10.6′S, 30°56.9′E), 5 August 2003, T. G. Grout; five females, from *Citrus* sp. 5 km northeast of Mvurwi, Egdon farm, 5 August 2003, T. G. Grout; one female from *Citrus* sp., southwest of Mvurwi, Gem farm (17°15.3′S, 30°53.1′E). Israel: two females, one male, and one tritonymph from *Carya illioensis*, Ashdot Ya'acow, Jordan Valley (31°45.0′N, 34°40.0′E), 14 December 1976, H. N. Plaut.

Accession numbers: AcY: 03/276-278 and 78/134.

Diagnosis

Adults. The presence of five pairs of spatulate setae (e_{1-2}, f_{1-2}, and h_1) on the opisthosoma characterized this species.

Female (n=9). Dimensions of Zimbabwean specimens with those of the Israeli specimens in parentheses: length of idiosoma 347–438 (359–410), width 217–302 (205–280); legs: I 239–267, II 214–239, III 221–233, IV 201 268–233; setae: *vi* 19–25 (25), *ve* 22–28 (28–32), *sci* 25–38 (35–38), *sce* 25–32 (32), c_1 19–28 (28), c_2 25–32 (35), d_1 19–28 (25–32), d_2 25–32 (35), e_1 25–32 (35), e_2 28–35 (32), f_1 28–32 (33–35), f_2 28–32 (32–35); h_1 25–28 (28–32), *ps* 19–22 (22); cheliceral stylets 16–19 (19); palptarsus 22–25 (25).

Dorsum (Figures 13–15): all dorsal setae slightly serrated (Figure 14), except for setae e_{1-2}, f_{1-2}, and h_1 which are spatulate (Figure 15) and serrate; however, d_2 can also be spatulate in some specimens. Setae *sci* slightly longer than other dorsal setae. Prodorsum with four pairs of setae, opisthosoma with nine, only cupule *ia* could be detected. Striae with minute spike-like tubercles. Striae longitudinal on propodosoma and transverse medially on opisthosoma.

Venter (Figure 16): epimeral formula 3-1-4-2. Genital area with four pairs of aggenital and six genital setae and no eugenital setae. Striae immediately lateral to progenital opening smooth, not tuberculated. Only one pair of anal setae (*ps*) present and paraproctal suckers well developed. Cupule *ih* lateral to paraproctal suckers.

Gnathosoma (Figure 17): palp chaetotaxy (tarsus to trochanter): 6(ω)-2-2-0. Setae *ba* shortest, solenidion ω minute.

Legs (Figures 18, 19): chaetotaxy of leg segments: tarsi 8(ω)-6(ω)-5-5, tibiae 4-2-2-2, genua 3-2-1-1, femora 3-2-1-1, trochantera 1-0-1-0. Femur IV entire. All tarsi terminate in two claws and a hairy empodium. Coxa I with coxal organ.

Male (n=1). Dimensions of Israeli specimen: length of idiosoma (including gnathosoma) 315, width 192; setae: *vi* 22, *ve* 25, *sci* 33, *sce* 32, c_1 28, c_2 32, d_1 28, d_2 28, e_1 28, e_2 28, f_1 32, f_2 28, 16, *h* 25, *ps* 22; cheliceral stylets 19; palp tarsus 23.

Similar to female but differs in that the genital area has four pairs of aggenital, six pairs of genital, and four pairs of eugenital setae. Paraproctal suckers well developed. Coxa I with coxal organ.

Tritonymph (n=2). Dimensions (measurement of Israeli specimen in parentheses): length of idiosoma (including gnathosoma) 265 (302), width 173 (180); legs: I 199 (183), II 177 (170), III 157 (151), IV 173 (173); setae: *vi* 16 (19), *ve* 19 (19), *sci* 28 (?), *sce* 22 (25), c_1 16 (22), c_2 22 (25), d_1 19 (22), d_2 22 (25), e_1 22 (25), e_2 22 (28), f_1 22 (25), f_2 22 (25), *h* 16 (22), *ps* 16 (19); cheliceral stylets 13; palp tarsus 22.

Tritonymph differs from adults by lacking a progenital aperture, which is represented by two pores, presence of four pairs of aggenital, three pairs of genital, and one pair of anal setae. Paraproctal suckers well developed. Coxa I with coxal organ.

Remarks

The South African specimens resemble the redescription of *T. spathulatus* (André 2005) in all respects. *Tydeus californicus* (Banks) may be a junior synonym of *T. spathulatus* because it corresponds to the redescription of the latter in all respects; five pairs of lanceolate/clavate dorsal setae posteriorly, striae arrangement of genital area and blunt setae on genua III and IV. This is a new record for South Africa. Figures 20 and 21 show how the setae of *T. grabouwi* Meyer and Ryke, the closely related South Africa species, differ from that of *T. spathulatus.*

Tydeus spathatus Meyer and Rodrigues

Tydeus spathatus Meyer and Rodrigues 1966, p 22; Kaźmierski 1989, p 293.

Material examined

Mozambique: six females, six males, three tritonymphs, two deutonymphs, and one protonymph from *Citrus* sp., ADRA Citrus, Nicuadala (17°36′S, 36°48.6′E), 3 August 2003, T. G. Grout.

Diagnosis

Adults. This species can be distinguished as follows: dorsal setae c_2, e_2, f_{1-2}, and h_1 lanceolate/clavate, *sci* slightly shorter than dorsal setae, blunt distally.

Tydeus grabouwi Meyer and Ryke
(Figures 20, 21)

Tydeus grabouwi Meyer and Ryke 1959, p 410.

Material examined

South Africa: Northern Cape Province: one male from *Citrus* sp., Augrabies near Kakamas, 14 May 2003, T. G. Grout.

Diagnosis

Adults. This species can be recognized by having four pairs of lanceolate/clavate setae, e_2 (28) (Figure 21), f_{1-2}, and h_1, the latter located caudally on opisthosoma. Seta d_1 (18) is depicted in Figure 20. Setae *sci* are simple and not expanded distally as in *T. africanus* Baker.

Family IOLINIDAE Pritchard, 1956
Subfamily PRONEMATINAE André, 1980
Genus *Kakamasia* gen. nov.

Type species. Kakamasia cataracta sp. n.

Diagnosis

Adults. This new genus is closely related to *Pronematulus* Baker, *Pronematus* Canestrini, and *Homeopronematus* André. It differs from them all in that femur IV is divided (however, femur IV may be divided in some species of *Pronematulus*), and in the setal formula of the tarsi, namely 8(ω)-6(ω)-6-5, as opposed to 8(ω)-7(ω)-6-6 in *Pronematulus*, 8(ω)-6(ω)-5-5 in *Pronematus*, and 8(ω)-6(ω)-6-6 in *Homeopronematus*. It further differs from *Pronematus* and *Homeopronematus* in that genu II has three setae instead of two. Femur IV of both *Pronematus* and *Homeopronematus* bears two setae, instead of one seta as in *Kakamasia*. *Kakamasia* bears setae on trochantera I and II, whereas *Pronematus* has none.

This monotypic genus can be defined as follows: dorsum of idiosoma with 14 pairs of setae including a pair of trichobothria (*sci*); tarsus I without apotele; poroidotaxy: four (*ia*, *im*, *ip*, *ih*); genital organotaxy: 0-0-4 (eugenital (eu)-genital (ge)-aggenital (ag) setae); solenidiotaxy: three (tarsi I and II and tibia I); epimeral formula: 3-1-4-2 (ventral plus coxal setae); chaetotaxy of some leg segments: tarsi 8(ω)-6(ω)-6-5, genua 3-3-2-1, femora 3-3-2-1+0, and trochanters 1-1-1-0. Femur IV divided. Anal opening extends posterior to ps_3 to form a lobe.

Etymology

The genus name refers to the town close to the locality where this species was collected and its gender is feminine.

Kakamasia cataracta sp. n.
(Figures 22–25)

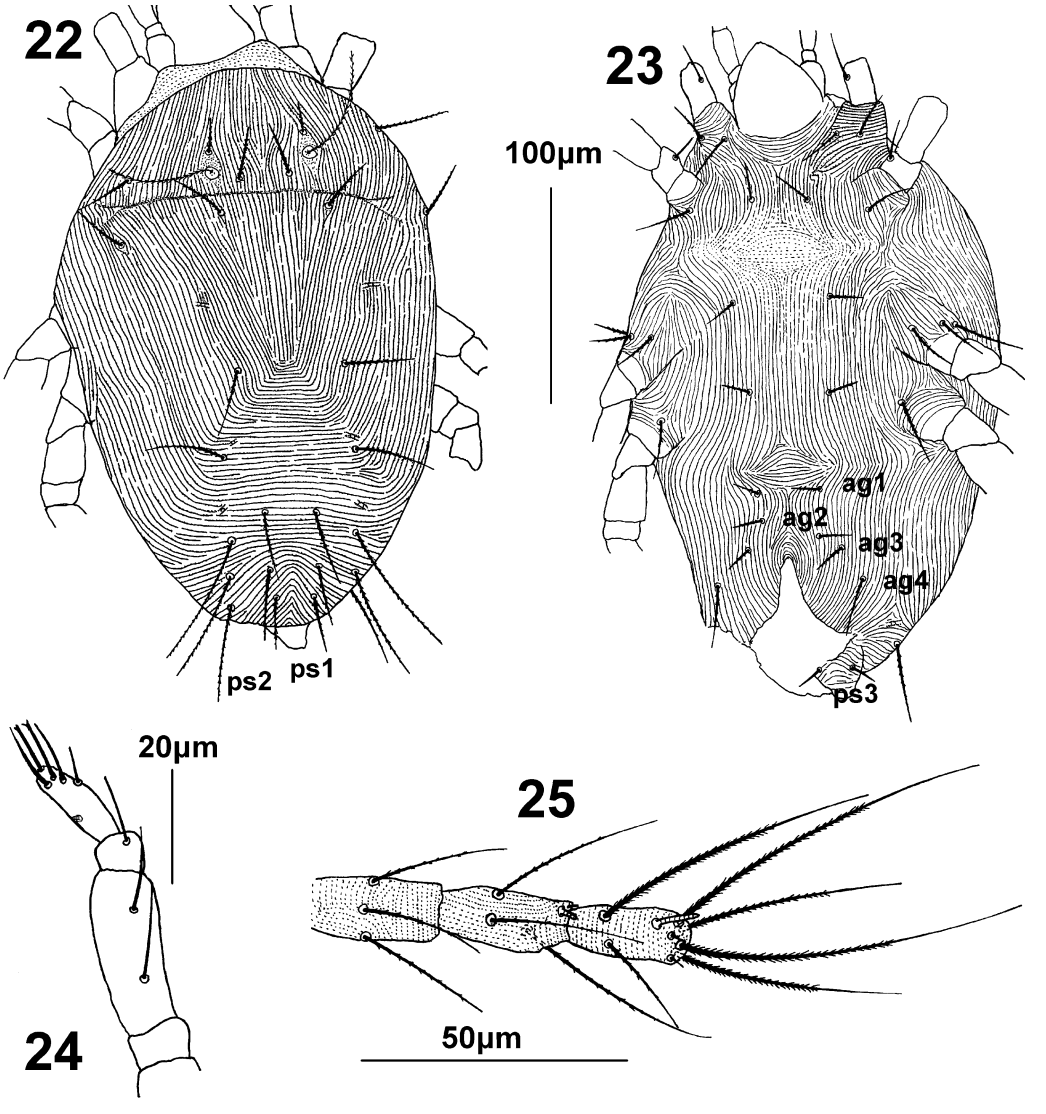
Type material

South Africa: Northern Cape Province: one holotype female, from *Citrus sinensis* (Delta Valencias), Augrabies near Kakamas (28°39.9′S, 20°27.5′E), 14 May 2003, T. G. Grout.
Accession number: Acy: 03/244.

Diagnosis

The diagnostic characters of this species are the same as those defining the genus.

Female (n=1). Dimensions of holotype: length of idiosoma 302, width 167; legs: I 158, II 154, III 177, IV 177; setae: *vi* 16, *ve* and c_{1-2} 25, *sci* 47, *sce*, *d* and h_1 32, *e* and f_1, f_2 63, h_2 54, ps_1 22, ps_2 44, ps_3 13; cheliceral stylets 13; palptarsus 16.



Figures 22–25. *Kakamasia cataracta* sp. n., female. (22) Dorsum. (23) Venter. (24) Palp. (25) Leg I.

Dorsum (Figure 22): prodorsum with four pairs of setae, including trichobothrium *(sci)*, *vi* is the shortest and *ve* situated posteromedially to *sci*. Opisthosoma with 10 pairs of setae and three pairs of cupules (*ia*, *im*, *ip*). All setae setose. Striae longitudinal on prodorsum and diagonal to longitudinal from setae c_1 to *d* and transverse from *d* to behind f_{1-2}.

Venter (Figure 23): epimeral formula 3-1-4-2. Genital area with four pairs of aggenital setae. Eugenital and genital setae absent but three pairs of anal setae (*ps*) present, only ps_3 situated ventrally. Anal opening extends posterior to ps_3 to form a lobe. Ventral cupule *ih* close to setae ps_2.

Gnathosoma (Figure 24): palp chaetotaxy (tarsus to trochanter): 5(?)-1-2-0. Solenidion minute, setae $p\zeta$ and *d* apparently forked distally.

Legs (Figure 25): chaetotaxy of leg segments: tarsi 8(ω)-6(ω)-5, tibiae 4(ϕ)-2-2-2, genua 3-3-2-1, femora 3-3-2-1+0, and trochantera 1-1-1-0. Solenidion ϕ and setae *k* are closely associated. All leg setae slightly serrated. Femur IV divided. Distal third of four terminal setae on tarsus I smooth. Tarsi II–IV each terminates in two claws and a hairy empodium. Solenidion on tarsus I short (9) but extends to anterior margin of tarsus. Coxae I without coxal organs.

Etymology

The species name *cataracta* is derived from the Greek word *kataraktes* (= waterfall), which refers to the Augrabies Waterfall close to the collection site.

Genus *Pseudopronematulus* Fan and Li

Pseudopronematulus Fan and Li 1992, p 396.

Type species. Pseudopronematulus acus Fan and Li, 1992.

Diagnosis

Adults. This genus can be defined as follows: prodorsum with three pairs of setae and a pair of trichobothria (*sci*), setae *ve* posteromedially to *sci*; opisthosoma with 10 pairs of setae; setal formula of genua 3-3-2-1; tarsus I without apotele and femur IV divided.

Pseudopronematulus augrabiensis sp. n.

(Figures 26–29)

Type material

South Africa: Northern Cape Province: one holotype female, from *Citrus sinensis* (Delta Valencias), Augrabies near Kakamas (28°39.9′S, 20°27.5′E), 14 May 2003, T. G. Grout.

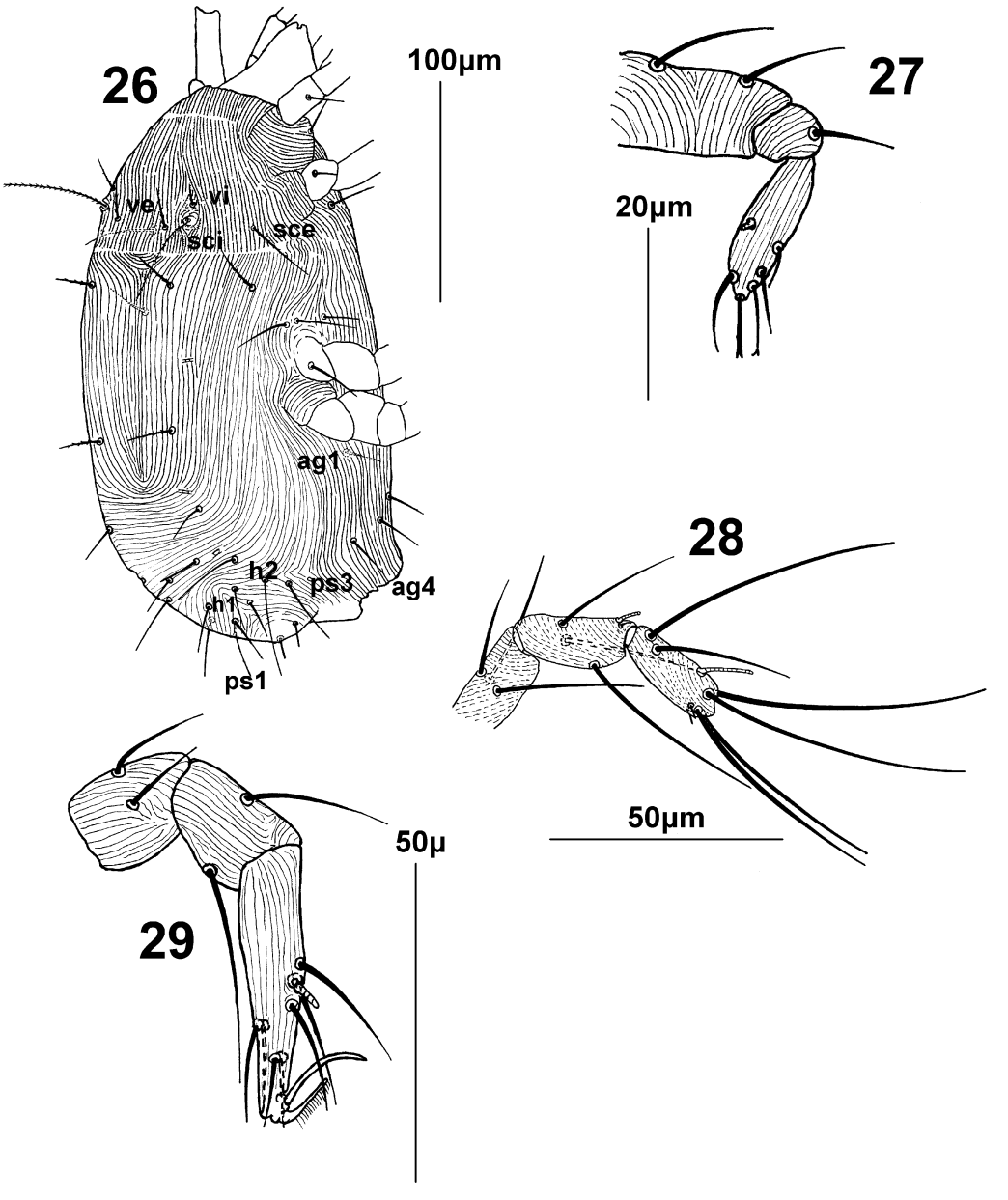
Diagnosis

Adults. This species can be recognized by setae *vi* (16) which are shorter than half the length of *sci* (47), *ve* (25) almost half its length, and *sce* (38) longer than half its length.

Female (n=1). Dimensions of holotype: length of idiosoma 299, width? (specimen in lateral position); legs: I 154, II 145, III 152, IV 169; setae: *vi* 16, *ve*, c_1, c_2, and h_1 25, *sci* 47, sce and f_2 38, *d*, *e*, and ps_1 22, f_1 19, h_2 50, ps_2 41, and ps_3 13; cheliceral stylet 14; palp tarsus 16.

Dorsum (Figure 26): prodorsum with four pairs of setae, *sci* a trichobothrium, setae *ve* posteromedially to *sci*. Opisthosoma with 10 pairs of setae. All setae slightly setose. Three pairs of cupules present, *ia* between setae c_1 and *d*, *im* anterior to *e*, and *ip* close to f_2. Striae longitudinal on prodorsum and extend past setae *d* on opisthosoma, but from anterior of *e* to level *h* they are transverse.

Venter (Figure 26): epimeral formula 3-1-4-2. Genital area with four pairs of aggenital setae. Eugenital and genital setae absent. Anal setae ps_{1-2} placed dorsally, ps_3 ventrally. Cupule *ih* lateral to ps_2.



Figures 26–29. *Pseudopronematulus augrabiensis* sp. n., female. (26) Lateral view. (27) Palp. (28) Leg I. (29) Leg II.

Gnathosoma (Figure 27): palp chaetotaxy 5-1-2. Solenidion on tibiotarsus, setae $p\zeta$ and d apparently forked distally.

Legs (Figures 28, 29): chaetotaxy of leg segments: tarsi 8(ω)-7(ω)-6-6, tibiae 3(ϕ)-2-2-2, genua 3-3-2-1, femora 3-3-2-1+1, trochantera 1-1-1-0. All leg setae slightly setose. Femur IV divided. Tarsus I with four long and smooth setae. Tarsi II–IV each with two claws and a hairy empodium. Solenidion ω_1 11 long and extends slightly past anterior margin of tarsus I. Coxae I without coxal glands.

Remarks

This species is closely related to the type species, *P. acus*, which differs from *P. augrabiensis* in that *vi*, *ve*, and *sce* are shorter than half the length of *sci* while only setae *vi* are shorter than half the length of *sci* in *P. augrabiensis*. Most opisthosomal setae of *P. augrabiensis* are relatively longer than those of *P. acus*. Apparently only setae *sci* are setose whereas the rest of the dorsal setae are smooth in *P. acus*. Unfortunately, the description of *P. acus* lacks enough detail, which renders a thorough comparison of these species impossible. *Pseudopronematulus augrabiensis* is the second species described for this genus.

Etymology

The species name refers to the place where this species was collected, namely Augrabies.

Genus *Parapronematus* Baker

Parapronematus Baker 1965, p 116; Salviejo 1969, p 270; André 1980, p 128.

Type species. *Parapronematus acaciae* Baker, 1965.

Diagnosis

Adults. *Parapronematus* can be recognized by seta *ve*, which is present (minute), or absent on prodorsum, *vi* posteromedially to *sci*, tarsus I without apotele distally, presence of forked setae on femora III and IV and femur IV entire.

Parapronematus geminus Meyer and Rodrigues

Parapronematus geminus Meyer and Rodrigues 1966, p 21.

Material examined

Mozambique: holotype female from *Gossypium* sp., R. Quetxoaio, 16 April 1964, M. C. Rodrigues; one female and two nymphs from *Citrus* sp. near Boane and Umbeluzi dam (26°05.3′S, 32°15.4′E), 25 July 2003, T. G. Grout; two females from *Citrus* sp., west of Maxixe, ADRA Research farm (23°52.2′S, 35°15.3′E), 28 July 2003, T. G. Grout; one female and one nymph from *Citrus* sp., Mapinhane north of Cheline (22°16.9′S, 35°06.9′E); one female from *Citrus* sp., Nicuadala, ADRA Citrus (17°36′S, 36°48.6′E), 3 August 2003, T. G. Grout; three females and one nymph from *Citrus* sp., Zandamela Primary School, Zandamela (24°47.4′S, 34°18.7′E), 26 July 2003, T. G. Grout. KwaZulu-Natal: five females from *Citrus* sp., Nkwaleni Valley, Freeman farm, 30 January 2003, P. R. Stephen.

Accession numbers: AcY: 03/30, 03/263, 03/264, 03/266, 03/273, 03/274.

Diagnosis

Adults. This species is the only one of the three known species (*P. acaciae* Baker, *P. citri* Salviejo, and *P. geminus*) with seta *ve* present on propodosoma.

Genus *Pronematus* Canestrini

Pronematus Canestrini 1886, p 698; Baker 1965, p 114; Baker 1968b, p 1091; Salviejo 1969, p 272; Kuznetzov 1972, p 11–16; André 1980, p 148.

Type species. Pronematus bonatii Canestrini, 1886.

Adults. This genus exhibits the following characteristics: prodorsum with four pairs of setae, *vi* posteromedially to *sci*, opisthosoma with 10 pairs of setae; setal formulae of tarsi 8-6-5-5, genua 3-3-2-1, and trochantera 0-0-1-0, tarsus I with apotele absent; femur IV undivided.

Pronematus ubiquitus (McGregor)

Tydeus ubiquitus McGregor 1932, p 62.
Pronematus ubiquitus (McGregor); Thor 1933, p 46; Baker 1939, p 273; Baker 1946, p 255; Baker 1965, p 115; Meyer and Rodrigues 1966, p 19; Salviejo 1969, p 273.

Material examined

South Africa: North-West Province: one female and one nymph from *Citrus limon*, farm Mooidoring near Brits, 10 October 2002, E. A. Ueckermann. Mpumalanga Province: 23 females and one nymph from *Citrus* sp., TSB Whiskey Farm, Komatipoort, 30 September 2002, T. G. Grout; 22 females and one nymph from *Citrus* sp., Lowveld Agricultural College, Nelspruit, 14 August 2002, T. G. Grout; 67 females and three nymphs from *Citrus* sp., Schoeman Boerdery near Groblersdal (25°02.8′S, 29°22.1′E), 16–27 January 2003, P. R. Stephen; 42 females and three nymphs from *Citrus* sp., Lisbon Estate (24°58.8′S, 31°27.1′E), 21 February 2003, P. R. Stephen. Limpopo Province: five females from *Citrus limon*, T-Bar farm near Bela Bela, March 2003, E. A. Ueckermann; 37 females and one male from *Citrus* sp., Blydevallei near Hoedspruit (24°29.4′S, 30°50.3′E), 21 February 2003, P. R. Stephen; 37 females from *Citrus* sp., Vleiland near Hoedspruit (24°23.9′S, 30°49.8′E), 21 February 2003, P. R. Stephen; 49 females and one nymph from *Citrus* sp., Bosveld Sitrus near Letsitele (23°50.6′S, 30°27.6′E). KwaZulu-Natal Province: 30 females from *Citrus* sp., Pobane farm, Nkwaleni Valley (28°46′S, 31°28′E), 30 January 2003, P. R. Stephen; six females from *Citrus* sp., Latham and Chiazari farm, Nkwaleni Valley (28°48′S, 31°29′E), 30 January 2003, P. R. Stephen; 39 females, one male and one nymph from *Citrus* sp., Crookes Brothers, Nkwaleni Valley (28°47′S, 31°34′E), 30 January 2003, P. R. Stephen; 10 females, one male, and one nymph from *Citrus* sp., Freeman farm, Nkwaleni Valley (28°42′S, 31°37′E). Northern Cape Province: five females, one male, and two nymphs from *Citrus sinensis* (Delta Valencias), Iconos farm near Upington (28°23.6′S, 21°24.2′E), 13 May 2003, T. G. Grout; 40 females from *Citrus sinensis* (Star Ruby), Kromhout Boerdery near Kakamas (28°47.2′S, 20°39.2′E), 13 May 2003, T. G. Grout; 35 females and one nymph from *Citrus limon* (Eureka), Zwartbosberg near Kakamas (28°45.2′S, 20°42.3′E), 14 May 2003, T. G. Grout; 16 females from *Citrus sinensis* (Delta Valencias), Augrabies near Kakamas (28°39.9S, 20°27.5′E), 14 May 2003, T. G. Grout; 21 females, three males, and one nymph from *Citrus sinensis* (Star Ruby), Zeekoeisteek near Blouputz (28°27.9′S, 20°05.4′E), 14 May 2003, T. G. Grout; 27 females from *Citrus sinensis* (Delta Valencias), Rooiduin near Kakamas (28°42.1′S, 20°28′E), 14 May 2003, T. G. Grout; seven females from *Citrus limon* (Eureka), J. H. Retief Orchard near Kakamas (28°45.4′S, 20°31.9′E), 14 May 2003, T. G. Grout; 88

females and one male from *Citrus sinensis* (Navels), Warmzand near Kakamas (28°44.4′S, 20°48.7′E), 13 May 2003, T. G. Grout. Mozambique: one female from *Citrus* sp., Mapinhane north of Cheline (22°16.9′S, 35°06.9′E), 29 July 2003, T. G. Grout; three females and one nymph from *Citrus* sp., Zandamela Primary School, Zandamela (24 47.4′S, 34 18.7′E), 26 July 2003, T. G. Grout.

Accession numbers: AcY: 02/59, 03/27–30, 03/32, 03/34–36, 03/38–40, 03/226, 03/228, 03/231–232, 03/239–240, 03/242–245, 03/247–249, 03/253, 03/264, 03/273.

Diagnosis

Adults. This species can be distinguished by the following combination of characters: tarsus I as long as or longer than tibia I, two of terminal setae on tarsus I longer than segment and all terminal setae serrated along entire length; members of ventral setae half as long as distance between them and longitudinally aligned.

Remarks

The identification of the South African specimens as *P. ubiquitus* was based on reference material identified as such by the late Dr Smith Meyer. She studied the type specimens of *P. ubiquitus* in 1970 and identified the South African specimens accordingly. At present the condition of the type material renders an examination impossible (Dr Ron Ochoa, personal communication). This species appears to be the dominant species in citrus orchards in southern Africa.

Genus *Lourus* gen. nov.

Type species. Lourus testatus (Kuznetzov, 1972).

Diagnosis

Adults. This new genus is closely related to *Neopronematus* Panou et al. but differs from the latter in that setae h_2 and ps_2 are present. The leg chaetotaxy of both genera is the same.

Panou et al. (2000) based *Neopronematus* on two of Kuznetzov's (1972) species, namely *Pronematus rapidus* and *P. neglectus*, with the former as type species, and a new species they described from Greece. They ignored *P. testatus* Kuznetzov which, along with *L. citricolus* sp. n., differs from *Neopronematus* in bearing dorsal seta h_2 and anal seta ps_2.

This new genus can be defined as follows: propodosoma with four pairs of setae, including trichobothria (*sci*), opisthosoma with 10 pairs of setae (including $ps_{1–2}$), posterior margin with a lobe; this lobe is also present in the type species *L. testatus* (Dr A. Khaustov, personal communication); poroidotaxy: 4; genital organotaxy: 0-0-4; solenidiotaxy: 3; epimeral formula 3-1-4-1 or 2, palp chaetotaxy 5-1-1 or 2; chaetotaxy of trochantera 1-1-1-0. Differences in setation of coxae IV and the palp femur are regarded as significant at species level.

Etymology

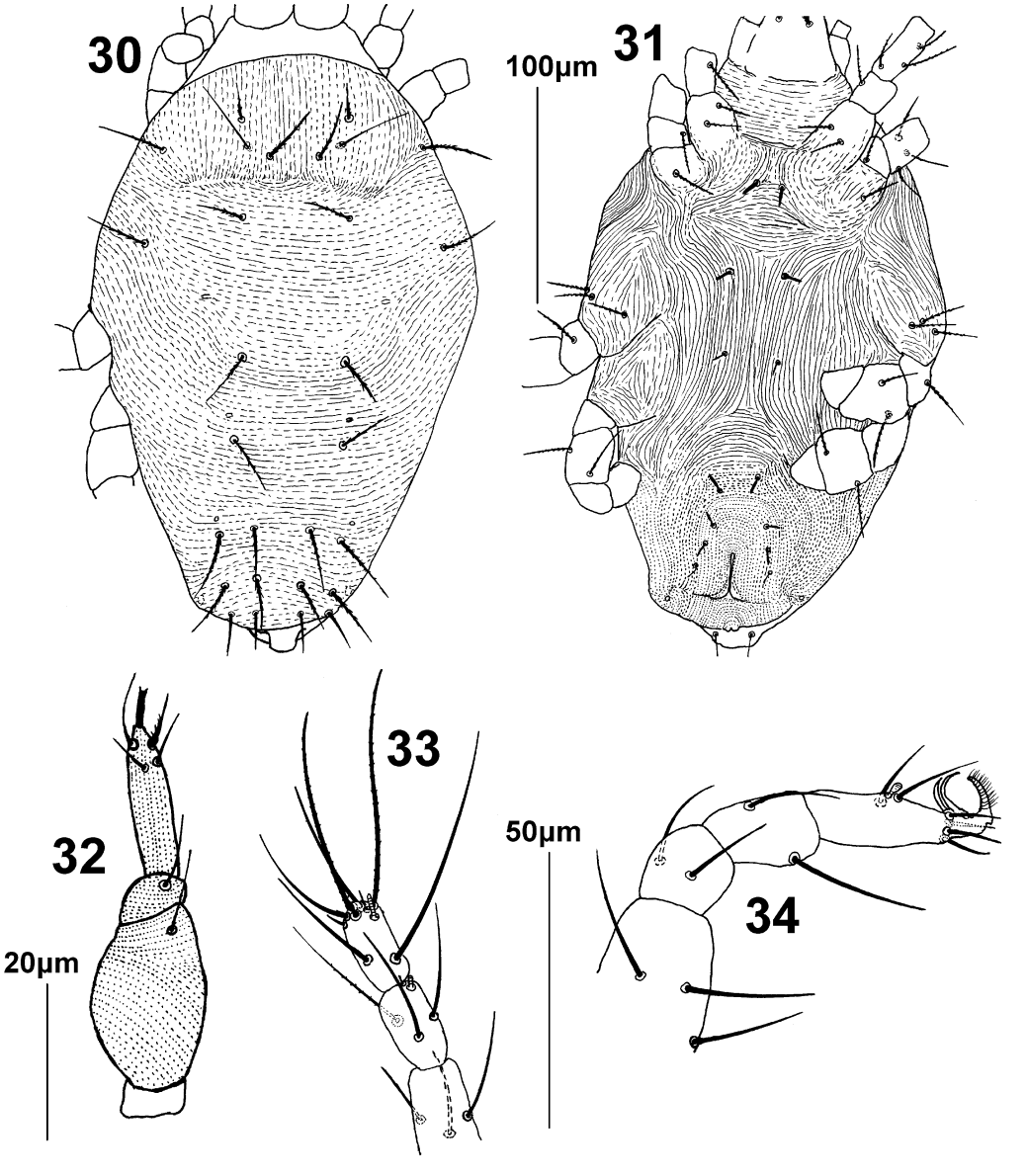
The genus name is derived from the Latin word *lobus* meaning lobe and the Greek word *oura* meaning *tail* and refers to the posterior lobe of the opisthosoma of *L. citricolus*; *L. testatus* also have a small lobe. The gender is masculine.

Lourus citricolus sp. n.
(Figures 30–34)

Type material

Mozambique: holotype female and one paratype female from *Citrus* sp., Homoine Agricultural College between Maxixe and Homoine (23°52.9′S, 35°13.7′E), 28 July 2003, T. G. Grout; two paratype females from *Citrus* sp., Zandamela Primary School, Zandamela (24°47.4′S, 34°18.7′E), 26 July 2003, T. G. Grout.

Accession numbers: AcY 03/269 and 03/264.



Figures 30–34. *Lourus citricolus* sp. n., female. (30) Dorsum. (31) Venter. (32) Palp. (33) Leg I. (34) Leg II.

Diagnosis

Same characters as genus except for coxae IV without setae and palp femur with only one seta.

Female (n=4). Dimensions of holotype with paratype variations in parentheses: length 315 (284–315), width 142 (148); legs: I 126 (126–131), II 116 (117), III 141 (126–142), IV 145 (142): setae: *vi* 16 (16), *ve* 25 (22–25), *sci* 35 (32–35), *sce* 28 (28), c_1 25 (22–25), c_2 25 (24–25), *d* 25 (22–25), *e* 25 (25–28), f_1 28 (28–30), f_2 50 (44–47), h_1 25 (25), h_2 28 (28); ps_1 16(16), ps_2 16(16), ps_3 13 (13); cheliceral stylet 16 (16); palp tarsus 19 (16–19).

Dorsum (Figure 30): prodorsum with four pairs of setae, *sci* a trichobothrium, opisthosoma with 10 pairs of setae and three cupules. All setae slightly setose. Striae very fine, longitudinal on propodosoma, transverse medially on opisthosoma. Posterior margin of opisthosoma with a distinct lobe.

Venter (Figure 31): epimeral formula 3-1-4-1. Genital area with only four pairs of aggenital setae. Three pairs of anal setae, $ps_{1–2}$ dorsally situated. Cupule *ih* mediolaterally located on an imaginary line connecting fourth pair of aggenital setae and ps_3. All ventral setae and aggenital setae stout, except for the slender ag_4.

Gnathosoma (Figure 32): palp chaetotaxy (tarsus to trochanter) 5-1-1-0. A solenidion may be present but could not be detected. Palp tibiotarsus with seta $p\zeta$ stout and apparently forked distally, seta *d* setose.

Legs (Figures 33, 34): chaetotaxy of leg segments: tarsi 8(ω)-6(ω)-5-5, tibiae 4(ϕ)-2-2-2, genua 3-3-2-1, femora 3-2-2-2, trochantera 1-1-1-0. Tarsus I without apotele, tarsi II–IV terminate in two claws and a hairy empodium. Solenidion ω_1 proximally on tarsus II. Coxa I without coxal gland. All leg setae, including four long terminal setae on tarsus I, slightly setose.

Etymology

The species name is derived from the Latin words *Citrea* for *Citrus* and *colus* meaning *dwelling in*.

Key to tydeoids found in citrus orchards in southern Africa

1. Tarsus I with 10 setae; genua II, III, and IV with two setae each—*Triophtydeus* Thor . . . . . *T. immanis* Kuznetzov
– Tarsus I with 12 or eight setae 2

2. Tarsus I with 12 setae; genua II, III, and IV with setae; tibia I with four setae—*Tetratriophtydeus* gen. nov. (monotypic) . . . . *T. myacanthus* (Ueckermann)
– Tarsus I with eight setae; genua II, III, and IV with or without setae; tibia I with three or four setae. 3

3. Genua II, III, and IV with setae; trochanter II with or without setae 4
– Genua II, III, and IV without setae, trochanter II with setae—*Pretydeus* André. Dorsum reticulated; dorsal and setae *ps* serrated; empodial claw at base of empodium *P. curiosa* (Ueckermann and Meyer)

4. Femur IV divided; tarsus I without an apotele 5
– Femur IV not divided; tarsus I with or without an apotele 6

5. Idiosoma with a caudal lobe; tarsus II with six setae and a solenidion, femur IV with one seta—*Kakamasia* gen. nov. (monotypic) . . . . . *K. cataracta* sp. n.
– Idiosoma without a caudal lobe; tarsus II with seven setae and a solenidion, femur IV with two setae—*Pseudopronematulus* Fan and Li . . . . *P. augrabiensis* sp. n.

6. Tarsus I without an apotele 7
– Tarsus I with an apotele 9

7. Femora III and IV each with a long forked seta; setae *vi* posteromedially to *sci*; with three pairs of *ag* setae; at least trochanter I with a seta; genua I and II each with two setae—*Parapronematus* Baker. Setae *ve* present (absent in other species) . . . . . *P. geminus* Meyer and Rodrigues
– Femora III and IV without forked setae 8

8. Prodorsum with both setae *vi* and *ve* always present, with *vi* posteromedially to *sci*, with four pairs of aggenital setae; palp chaetotaxy 5-1-2; trochanters I and II without setae; genua I and II each with three setae; epimeral formula 3-1-4-2; posterior margin of idiosoma without a lobe—*Pronematus* Canestrini. Tarsus I as long as or longer than tibia I, two of terminal setae on tarsus I longer than segment and all terminal setae serrated along entire length; ventral setae half as long as distance between them and longitudinally aligned . . . . . *P. ubiquitus* (McGregor)
– Chaetotaxy of prodorsum and number of aggenital setae same as that of *Pronematus*; palp chaetotaxy 5-1-1 (or 2); trochanters I and II each with a seta; epimeral formula 3-1-4-1 (or 2); posterior margin of idiosoma with a lobe—*Lourus* gen. nov. . . . . *L. citricolus* sp. n.

9. Six pairs of genital setae present; setal formula of trochanters 1-0-1-0 . . . 11
– Four pairs of genital setae present; setal formula of trochanters 1-0-0-0 . . 10

10. Setal formula of femora 2-1-0-0; most dorsal setae smooth and spatulate—*Orfareptydeus* gen. nov. (monotypic) . . . . . *O. stepheni* sp. n.
– Setal formula of femora 3-1-1-0; all dorsal setae, except *ve* and *sci* lanceolate and finely serrated . . . . . *Perafrotydeus meyerae* Baker

11. Femur II with three setae, III with two setae, and IV with one seta—*Brachytydeus* Thor. Small reticulate area on anterior margin of propodosoma and small reticulate areas scattered randomly on dorsum, all dorsal setae lanceolate, faintly serrated and curved . . . . . *B. monticola* (Ueckermann and Meyer)
– Femur II with two setae, femora III and IV each with one seta—*Tydeus* Koch 12

12. All opisthosomal setae short and spatulate . . . . *T. munsteri* Meyer and Ryke
– Only some dorsal setae spatulate 13

13. Setae e_2, f_{1-2}, and h_1 spatulate distally, setae *sci* simple *T. grabouwi* Meyer and Ryke
– Setae e_{1-2}, f_{1-2}, and h_1 spatulate . . . . . *T. spathulatus* Oudemans
– Setae c_2, e_2, f_{1-2}, and h_1 spatulate; setae *sci* short and blunt distally *T. spathatus* Meyer and Rodrigues

Acknowledgements

We are grateful to J. H. Hofmeyr, P. R. Stephen, and W. Kirkman for collecting some of the tydeoids and to Citrus Research International for funding this research. The authors also wish to thank Prof. Uri Gerson of the Hebrew University, Rehovot, Israel and Dr Henri André of the Musée Royal de l'Afrique centrale, Belgium for their critical review of the manuscript.

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