

# Five new epigean species of *Toxocnema* Fåhraeus (Coleoptera: Tenebrionidae) from arboreal habitats in South Africa and Swaziland<sup>1</sup>

WOLFGANG SCHAWALLER

## Abstract

Five new species of the tenebrionid genus *Toxocnema* Fåhraeus, 1870 (subfamily Stenochiinae Kirby, 1837, tribe Cnodalonini Gistel, 1856, type species *rufitarsis* Fåhraeus, 1870) from South Africa and Swaziland are described (*T. fungicola* n. sp., *T. kochi* n. sp., *T. leleupi* n. sp., *T. minima* n. sp. and *T. ruthmuelleriae* n. sp.). An identification key for the six species of the genus is presented. The species of *Toxocnema* are obligatory inhabitants of the soil litter in mature forest habitats, being distributed in the eastern and southern parts in South Africa, north up to KwaZulu-Natal and Swaziland.

**Key words:** Coleoptera, Tenebrionidae, *Toxocnema*, new species, South Africa.

## Zusammenfassung

Fünf neue Arten der Tenebrioniden-Gattung *Toxocnema* Fåhraeus, 1870 (Unterfamilie Stenochiinae Kirby, 1837, Tribus Cnodalonini Gistel, 1856, Typusart *rufitarsis* Fåhraeus, 1870) aus Südafrika werden beschrieben (*T. fungicola* n. sp., *T. kochi* n. sp., *T. leleupi* n. sp., *T. minima* n. sp. und *T. ruthmuelleriae* n. sp.). Ein Bestimmungsschlüssel für die sechs Arten der Gattung wird beigelegt. Die *Toxocnema*-Arten sind obligatorische Bewohner der Bodenstreu in ursprünglichen Waldhabitaten, verbreitet in den östlichen und südlichen Teilen Südafrikas und nordwärts bis nach KwaZulu-Natal und Swaziland.

## Contents

1	Introduction .....	363
2	Taxonomy .....	364
3	Key to the species of <i>Toxocnema</i> .....	369
4	References .....	369

## 1 Introduction

The tenebrionid genus *Toxocnema* was described by FÅHRAEUS (1870), based on the type species *rufitarsis* from “Caffraria”. Subsequently, for more than a hundred years, nothing else was published about this taxon. During my visits for comparative studies in the Transvaal Museum in Pretoria, I found several recently collected specimens from South Africa among extensive unidentified materials, which represent four new species of this genus. Additionally, I found a few older specimens, which the late Dr. C. KOCH obviously already recognized and named as new according to the labels, but which he could not publish before his death in 1970. C. KOCH also studied and dissected the type species *T. rufitarsis*, deposited in the Naturhistoriska Riksmuseet Stockholm, being a further evidence for his projected study of that genus, which was unfortunately unfinished. An additional fifth new species was discovered in the Museum in Berlin among unidentified African tenebrionids.

In the world catalogue of Tenebrionidae, GEBIEN (1942) placed the genus *Toxocnema* Fåhraeus, 1870 in the tribe Misolampini Reitter, 1917. Following the recent family classification (BOUCHARD et al. 2005), *Toxocnema* possesses all characters of the subfamily Stenochiinae Kirby, 1837, tribe Cnodalonini Gistel, 1856. However, at present state of knowledge I feel unable to name any related genus or even sister group. Either my knowledge about the South African tenebrionid fauna is too poor or (already) the sister group of *Toxocnema* does not occur on the African continent. It cannot be ruled out that it might be found on Madagascar (where several genera of Cnodolanini are present, in contrast to South Africa).

According to my own experiences during field work, and to information on the labels, the species of *Toxocnema* are obligatory inhabitants of the soil litter in mature forest habitats. They are endemic in the eastern and southern parts in South Africa occurring northwards up to KwaZulu-Natal and Swaziland (see map Fig. 1). Recent field work in adjacent Mozambique by RUTH MÜLLER and other expe-

<sup>1</sup> Contributions to Tenebrionidae, no. 75. – For no. 74 see: Stuttgarter Beiträge zur Naturkunde A, Neue Serie 2 (2009).



Fig. 1. Idealized distributional patterns of *Toxocnema* spp. in arboreal habitats of South Africa and Swaziland.

rienced collectors yielded no specimens of *Toxocnema*. The epigeal congeners can be collected successfully by sifting soil litter mixed with rotten tree branches in coastal forests as well as in mountainous forests of that area. The adult beetles and/or larvae are probably somehow associated with soil fungi. In some localities, at least two species live syntopically.

#### Acronyms of depositories

BMNH	The Natural History Museum, London, United Kingdom
MNHUB	Museum für Naturkunde der Humboldt Universität, Berlin, Germany
SMNH	Naturhistoriska Riksmuseet, Stockholm, Sweden
SMNS	Staatliches Museum für Naturkunde, Stuttgart, Germany
TMSA	Transvaal Museum, Pretoria, South Africa

#### Acknowledgements

For the trustful loan of material, for kind hospitality during my visits in the Transvaal Museum in Pretoria, and for various support during joint field work in southern Africa I thank RUTH MÜLLER (Transvaal Museum Pretoria). South African authorities

kindly provided collecting permits of own travels in cooperation with the Transvaal Museum. MAX BARCLAY (The Natural History Museum London) and BERND JÄGER and Dr. MANFRED UHLIG (both Museum für Naturkunde Berlin) kindly loaned specimens from the collection under their care. Immediately upon request, JULIO FERRER (Naturhistoriska Riksmuseet Stockholm) sent photographs of the holotype of *Toxocnema rufitarsis*. JOHANNES REIBNITZ (Staatliches Museum für Naturkunde Stuttgart) prepared the photographs of the present paper by using a Leica DFC 480 digital camera on a Leica MZ16 APO microscope. The digital photographs were subsequently processed by him using Leica LAS software. Thanks are also due to the referees Dr. KIYOSHI ANDO (Osaka) and Dr. OTTÓ MERKL (Budapest) for their comments and corrections.

## 2 Taxonomy

### *Toxocnema fungicola* n. sp. (Figs. 2, 8)

Holotype (♂): RSA [= Republic of South Africa], Eastern Cape (Transkei), Ntsubane Forest, 1.–6.XII.1988, leg. S. ENDRÖDY-YOUNG, TMSA.

**Paratypes:** Same data as holotype, 2 ex. TMSA, 2 ex. SMNS. – RSA, Eastern Cape (Transkei), Silaka Forest Reserve, 30.XI.–2.XII.1987, leg. S. ENDRÖDY-YOUNGA, 4 ex. TMSA. – RSA, Eastern Cape (Transkei), Dwesa Forest, 11.XII.1979, leg. S. ENDRÖDY-YOUNGA, 1 ex. TMSA. – RSA, Eastern Cape (Transkei), Dwesa Forest Reserve (The Haven), 4.–6.XII.2003, leg. W. SCHAWALLER, 1 ex. SMNS. – RSA, Eastern Cape (Transkei), Mbotyi Coastal Forest, 29.XI.–3.XII.2003, leg. W. SCHAWALLER, 3 ex. SMNS. – RSA, Eastern Cape (Ciskei), Amatole, Pirie Forest, 8.XII.1987, leg. S. ENDRÖDY-YOUNGA, 6 ex. TMSA, 3 ex. SMNS, 1 ex. BMNH. – RSA, Eastern Cape, N Fort Beaufort, Fort Fordyce Nature Reserve, 1000 m, 3.–5.XII.2007, leg. R. MÜLLER & W. SCHAWALLER, 5 ex. TMSA, 3 ex. SMNS. – RSA, Eastern Cape, Port St. Johns, Nxolweni Forest, XII.1961, leg. N. LELEUP, 1 ex. TMSA.

**Etymology:** Named after the mode of life being very probably associated with soil fungi.

**Description:** Dorsal side (Fig. 2) dark ferrugineous without colour pattern, elytra sometimes somewhat lighter, without any metallic shine, surface shining and without setation, appendages also dark ferrugineous. Head with large, partly confluent punctation, frons behind eyes with a transverse impression. Eyes feebly excavated by the genae. Antennae without separated club, shape of the antennomeres see Fig. 2. Pronotum (Fig. 2) conical, anterior corners rounded, lateral margins not sinuate before hind corners; surface with punctation distinctly finer than on head, disc distinctly convex without any impressions and shining; anterior margin unborded in the middle, lateral and basal margins completely bordered, without subbasal impressions; propleura shining, without punctation or other microstructure; prosternal apophysis conical, pointing posteriorly. Elytra (Fig. 2) short oval, elytron with 8 complete striae, without punctural rows, with traces of scutellar striolae; internal intervals feebly and external intervals distinctly convex in both sexes, without punctation; shoulders pronounced; epipleura extremely broad at the base and somewhat diminishing before apex, shining and nearly without punctation. Abdominal ventrites without setation, intersegmental membranes visible between ventrites 3 and 4 and between 4 and 5, last visible ventrite 5 unborded. Legs without modifications, tibiae rounded in cross section, without any keel. Aedeagus (Fig. 8) with finger-like sinuate apicale, not sinuate in lateral view, basale feebly bent and narrow in lateral view. Body length 2.8–4.0 mm.

**Diagnosis:** This new species is characterized by small body size, shining dorsal surface, conical pronotum with the lateral margins not sinuate before the posterior corners and with disc distinctly convex, pronotal punctation distinctly finer than on head, propleura without microstructure, the short oval, nearly round elytra, and the shape of the aedeagus. For taxonomic separation from the other species of the genus see identification key and Figs. 2–12.

*Toxocnema kochi* n. sp.  
(Figs. 3, 9)

**Holotype** (♂): RSA, Eastern Cape (Transkei), Ntsubane Forest, 1.XII.1988, leg. S. ENDRÖDY-YOUNGA, TMSA.

**Paratypes:** Same data as holotype, 5 ex. TMSA, 3 ex. SMNS, 1 ex. BMNH. – RSA, Eastern Cape (Transkei), Silaka Forest Reserve, 24.–30.XI.1987, leg. S. ENDRÖDY-YOUNGA, 4 ex. TMSA, 2 ex. SMNS. – RSA, Eastern Cape, Port St. Johns, Nxolweni Forest, XII.1961, leg. N. LELEUP, 1 ex. TMSA. – RSA, Eastern Cape, Alexandria Forest Station, 4.–6.XII.1987, leg. S. ENDRÖDY-YOUNGA, 6 ex. TMSA, 2 ex. SMNS. – RSA, KwaZulu-Natal, Alfred Distr., Oribi Gorge, X.1961, leg. N. LELEUP, 1 ex. TMSA.

**Etymology:** Named in honour of the late Dr. CARLO KOCH (1904–1970), former curator of Coleoptera in the Transvaal Museum in Pretoria, founder of the Gobabeb Research Station in the Namib desert (1962), and productive monographer of the South African (and Mediterranean) tenebrionid fauna.

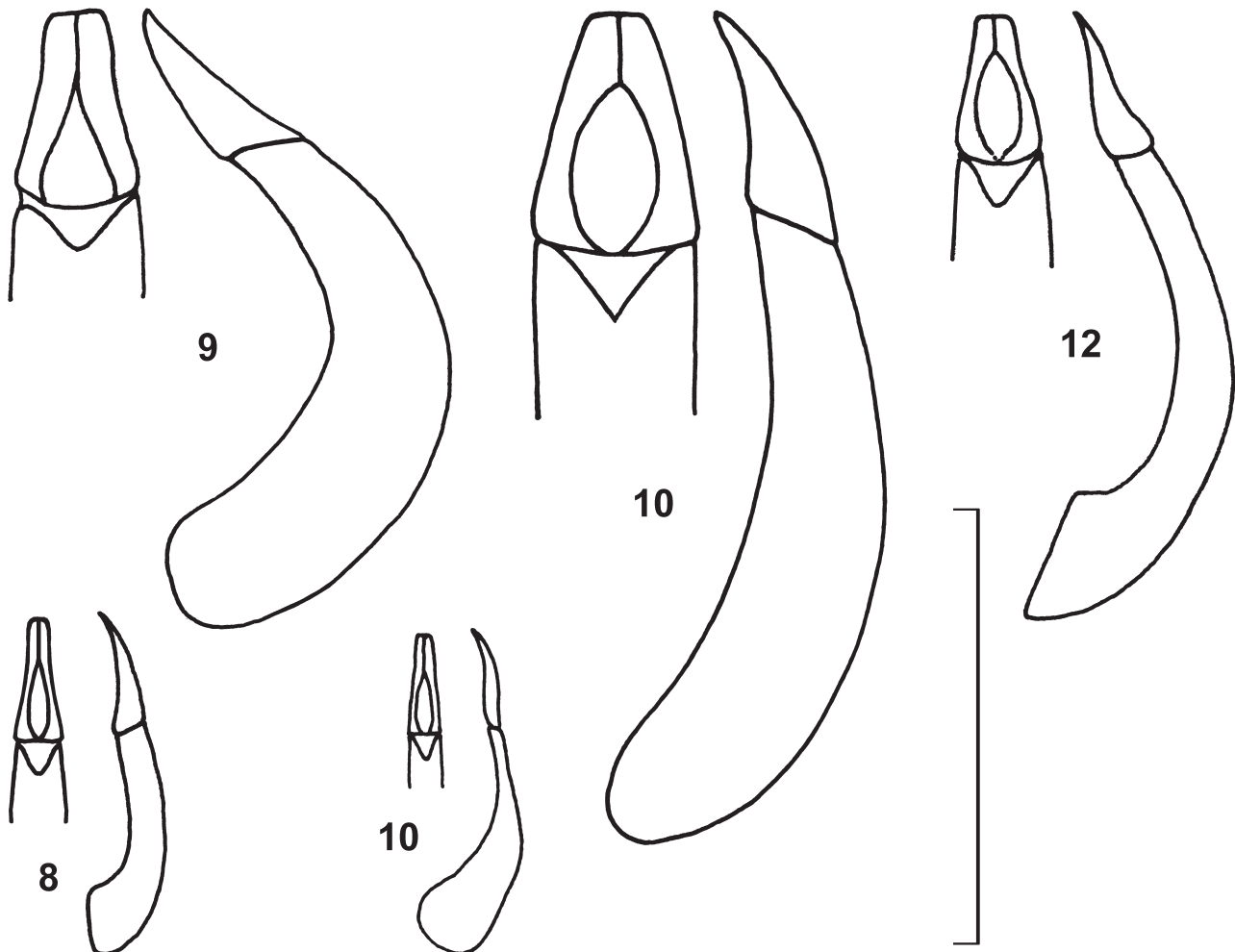
**Description:** Dorsal side (Fig. 3) dark ferrugineous without colour pattern, without any metallic shine, surface shining and without setation, appendages light ferrugineous. Head with larger, partly confluent punctation, frons behind eyes with a transverse impression. Eyes feebly excavated by the genae. Antennae without separated club, shape of the antennomeres see Fig. 3. Pronotum (Fig. 3) subquadrate, anterior corners rounded, posterior corners rectangular, lateral margins parallel before hind corners and not sinuate; surface with dense punctation distinctly finer than on head, disc slightly convex without any impressions and shining; anterior margin unborded in the middle, lateral and basal margins completely bordered, without subbasal impressions; propleura shining, without punctation or other microstructure; prosternal apophysis conical, pointing posteriorly. Elytra (Fig. 3) elongate oval, elytron with 8 complete striae, without punctural rows, without scutellar striolae; intervals feebly convex (♂) or nearly flat (♀), with scattered punctation distinctly finer than on pronotum; shoulders pronounced; epipleura extremely broad at the base and somewhat diminishing before apex, shining and with punctation as on elytral intervals. Abdominal ventrites without setation, intersegmental membranes visible between ventrites 3 and 4 and between 4 and 5, last visible ventrite 5 unborded. Legs without modifications, tibiae rounded in cross section, without any keel. Aedeagus (Fig. 9) with spade-like apicale, basale strongly bent and broad in lateral view. Body length 3.0–5.2 mm.

**Diagnosis:** This species is distinguished by small body size, shining dorsal surface, subquadrate pronotum with the lateral margins not sinuate before the posterior corners and with disc feebly convex, pronotal punctation dense but distinctly finer than on head, propleura without microstructure, long and nearly parallel-sided elytra, and the shape of the aedeagus. For taxonomic separation from





**Figs. 2–7.** *Toxocnema* spp., dorsal views. – 2. *T. fungicola* n. sp., ♂ holotype. 3. *T. kochi* n. sp., ♂ holotype. 4. *T. ruthmuelleriae* n. sp., ♂ holotype. 5. *T. rufitarsis*, non-type ♀. 6. *T. minima* n. sp., ♂ holotype. 7. *T. leleupi* n. sp., ♀ holotype. – Scale: 4 mm.



**Figs. 8–12.** *Toxocnema* spp., aedeagi. – 8. *T. fungicola* n. sp., ♂ holotype. 9. *T. kochi* n. sp., ♂ holotype. 10. *T. minima* n. sp., ♂ holotype. 11. *T. rufitarsis*, non-type ♂. 12. *T. ruthmuelleri* n. sp., ♂ holotype. – Scale: 1 mm.

the other species of the genus see identification key and Figs. 2–12.

*Toxocnema leleupi* n. sp.  
(Fig. 7)

**Holotype** (♀): NW Swaziland, Piggs Peak, X.1961, leg. N. LELEUP, TMSA.

**Paratypes**: Same data as holotype, 1 ♀ TMSA, 1 ♀ SMNS. – RSA, KwaZulu-Natal, Ingwavuma Distr., Gwaliweni Forest, X.1961, leg. N. LELEUP, 1 ♀ TMSA.

**Etymology**: Named in honour of the late NARCISSE LELEUP (1912–2001), former collaborator of the Royal Museum for Central Africa in Tervuren (Belgium), collector of the type series and several other epigeal Coleoptera in tropical Africa.

**Description**: Dorsal side (Fig. 7) dark ferrugineous without colour pattern, without any metallic shine,

surface shining and without setation, appendages also dark ferrugineous. Head with larger, partly confluent punctation, frons behind eyes with a transverse impression. Eyes feebly excavated by the genae. Antennae without separated club, shape of the antennomeres see Fig. 7. Pronotum (Fig. 7) subquadrate, anterior corners rounded, posterior corners rectangular, lateral margins before hind corners sinuate; surface with dense but not confluent punctation, punctures only slightly smaller than on head, disc slightly convex without any impressions and shining; anterior margin unbordered in the middle, lateral and basal margins completely bordered, without subbasal impressions; propleura shining and with longitudinal wrinkles; prosternal apophysis conical, pointing posteriorly. Elytra (Fig. 7) broad oval, elytron with 8 complete striae, without punctural rows, with traces of scutellar striolae; internal intervals flat, external intervals feebly convex, with scat-



tered punctation distinctly finer than on pronotum; shoulders pronounced; epipleura extremely broad at the base and somewhat diminishing before apex, shining and without punctation. Abdominal ventrites without setation, intersegmental membranes visible between ventrites 3 and 4 and between 4 and 5, last visible ventrite 5 unbordered. Legs without modifications, tibiae rounded in cross section, without any keel. Aedeagus unknown (only females available). Body length 4.5–5.5 mm.

**Diagnosis:** Characterized by medium body size, shining dorsal surface, subquadrate pronotum with the lateral margins sinuate before the posterior corners, dense pronotal punctation similar to that on head, longitudinally wrinkled propleura, and oval elytra; aedeagus unknown. For taxonomic separation from the other species of the genus see identification key and Figs. 2–7.

**Remarks:** This species is recognized by its external characters, therefore it is here named as a new species without having males available. The specimens represent the northernmost records of the genus *Toxocnema* which are disjunct from the other species' distribution ranges (map Fig. 1).

*Toxocnema minima* n. sp.

(Figs. 6, 10)

**Holotype** (♂): RSA, Natal, Umhlanga near Durban, 27.VII.1997, leg. H. MEYBOHM, MNHUB.

**Paratypes:** Same data as holotype, 17 ex. MNHUB, 3 ex. SMNS, 2 ex. TMSA.

**Etymology:** The species is named after the small body size, as it is the smallest among its congeners.

**Description:** Dorsal side (Fig. 6) dark ferrugineous without colour pattern, elytra sometimes somewhat lighter, without any metallic shine, surface shining and without setation, appendages also dark ferrugineous. Head with large, partly confluent punctation, frons behind eyes with a transverse impression. Eyes feebly excavated by the genae. Antennae without separated club, shape of the antennomeres see Fig. 6. Pronotum (Fig. 6) conical, anterior corners rounded, lateral margins before hind corners not sinuate; surface with punctation distinctly finer than on head, disc distinctly convex without any impressions and shining; anterior margin unbordered in the middle, lateral margin completely bordered, basal margin unbordered, without subbasal impressions; propleura shining, without punctation or other microstructure; prosternal apophysis conical, pointing posteriorly. Elytra (Fig. 6) short oval, elytron with 8 complete striae, with traces of punctural rows, with traces of scutellar striolae; internal intervals feebly and external intervals distinctly convex in both sexes, with scattered punctation distinctly finer than on pronotum; shoulders pronounced; epipleura extremely broad at the base and somewhat diminishing before apex,

shining and with punctation as on elytral intervals. Abdominal ventrites without setation, intersegmental membranes visible between ventrites 3 and 4 and between 4 and 5, last visible ventrite 5 unbordered. Legs without modifications, tibiae rounded in cross section, without any keel. Aedeagus (Fig. 10) with finger-like parallel apicale, sinuate in lateral view, basale feebly bent and narrow in lateral view. Body length 2.0–2.7 mm.

**Diagnosis:** Distinguished by small body size, shining dorsal surface, conical pronotum with the lateral margins not sinuate before the posterior corners and with disc distinctly convex, pronotal punctation distinctly finer than on head, propleura without microstructure, short oval nearly round elytra, and the shape of the aedeagus. For taxonomic separation from the other species of the genus see identification key and Figs. 2–12.

*Toxocnema rufitarsis* Fähræus, 1870

(Figs. 5, 11)

**Studied type material** (photographs): Caffraria [= NE South Africa], leg. J. WAHLBERG, ♂ holotype SMNH, dissected by C. KOCH. – Photographs were used because the holotype is too fragile to be sent by mail.

**New material:** RSA, KwaZulu-Natal, Port Natal [= Durban], without date, 3 ex. BMNH (det. C. KOCH). – RSA, KwaZulu-Natal, Durban, without date, 1 ♀ TMSA (det. C. KOCH). – RSA, KwaZulu-Natal, mouth of Umkomaas River, IX.1897, leg. G. A. K. MARSHALL, 1 ♂, 1 ♀ BMNH. – RSA, KwaZulu-Natal, Alfred Distr., Oribi Gorge, X.1961, leg. N. LELEUP, 1 ♀ SMNS. – RSA, Eastern Cape (Transkei), Ntsubane Forest, 1.XII.1988, leg. S. ENDRÖDY-YOUNGA, 1 ♀ TMSA.

**Redescription:** Dorsal side (Fig. 5) dark ferrugineous without colour pattern, without any metallic shine, surface shagreened and without setation, appendages also dark ferrugineous. Head with larger, partly confluent punctation, frons behind eyes with a transverse impression. Eyes feebly excavated by the genae. Antennae without separated club, shape of the antennomeres see Fig. 5. Pronotum (Fig. 5) trapezoid, anterior corners somewhat marked but not protruding, lateral margins distally irregularly narrowed, lateral sides before hind corners not sinuate; surface with punctation distinctly finer than on head, disc distinctly convex without any impressions and shagreened; anterior margin unbordered in the middle, lateral and basal margins completely bordered, with 2 feeble impressions before basal margin; propleura shagreened, without punctation or other microstructure; prosternal apophysis conical, pointing posteriorly. Elytra (Fig. 5) broad oval, elytron with 8 complete striae, without punctural rows, without scutellar striolae; intervals convex (in 1 ♀ distinctly, in 2 ♀♀ slightly), with scattered fine punctation as on pronotum; shoulders pronounced (in 1 ♀ only edged, in 2 ♀♀ nearly knob-like); epipleura extremely broad at the base and somewhat diminishing before apex,

shagreened and without punctation. Abdominal ventrites without setation, intersegmental membranes visible between ventrites 3 and 4 and between 4 and 5, last visible ventrite 5 unbordered. Legs without modifications, tibiae rounded in cross section, without any keel. Aedeagus (Fig. 11) with spade-like apicale, basale feebly bent and broad in lateral view. Body length 7.0–7.5 mm.

**Identification:** This species is characterized by large body size, shagreened dorsal surface, trapezoid pronotum with the lateral margins not sinuate before the posterior corners and with disc distinctly convex, pronotal punctation distinctly finer than on head, propleura without microstructure, broad oval elytra, and the shape of the aedeagus. For taxonomic separation from the other species of the genus see identification key and Figs. 2–12.

**Distribution:** South Africa (KwaZulu-Natal, Eastern Cape).

*Toxocnema ruthmuelleriae* n. sp.  
(Figs. 4, 12)

**Holotype** (♂): RSA, Western Cape, Lily Vlei NR, IX.1983–III.1984, leg. J. KOEN, TMSA.

**Paratypes:** Same data as holotype, 8 ex. TMSA, 4 ex. SMNS. – RSA, Western Cape, Knysna, 300 m, I.II.2004, leg. P. HLAVÁČ, 1 ex. SMNS. – RSA, Eastern Cape (Transkei), Mbotyi Coastal Forest, 29.XI.–3.XII.2003, leg. W. SCHAWALLER, 1 ex. SMNS.

**Etymology:** Named in honour of RUTH MÜLLER, collection manager for Coleoptera in the Transvaal Museum in Pretoria, for her hospitality and various support during my visits in the museum and during joint field work.

**Description:** Dorsal side (Fig. 4) dark ferrugineous without colour pattern, without any metallic shine, surface shining and without setation, appendages also dark ferrugineous. Head with larger, partly confluent punctation, frons behind eyes with a transverse impression. Eyes feebly excavated by the genae. Antennae without separated club, shape of the antennomeres see Fig. 4. Pronotum (Fig. 4) subquadrate, anterior corners rounded, posterior corners rectangular, lateral margins before hind corners parallel and not sinuate; surface with punctation distinctly finer than on head, disc slightly convex without any impressions and shining; anterior margin unbordered in the middle, lateral and basal margins completely bordered, without subbasal impressions; propleura shining, without punctation or other microstructure; prosternal apophysis conical, pointing posteriorly. Elytra (Fig. 4) broad oval, elytron with 8 complete striae, without punctural rows, without scutellar striolae; intervals feebly convex (♂) or nearly flat (♀), with scattered punctation distinctly finer than on pronotum; shoulders pronounced; epipleura extremely broad at the base and somewhat diminishing before apex, shining and with punctation as on

elytral intervals. Abdominal ventrites without setation, intersegmental membranes visible between ventrites 3 and 4 and between 4 and 5, last visible ventrite 5 unbordered. Legs without modifications, tibiae rounded in cross section, without any keel. Aedeagus (Fig. 12) with spade-like apicale, basale feebly bent and narrow in lateral view. Body length 5.0–5.5 mm.

**Diagnosis:** Distinguished by medium body size, shining dorsal surface, subquadrate pronotum with the lateral margins not sinuate before the posterior corners and with disc slightly convex, pronotal punctation distinctly finer than on head, propleura without microstructure, oval elytra, and the shape of the aedeagus. For taxonomic separation from the other species of the genus see identification key and Figs. 2–12.

### 3 Key to the species of *Toxocnema*

- 1 Body length 7.0–7.5 mm; dorsal surface of pronotum and elytra dull shagreened. – Figs. 5, 11. . . . . *rufitarsis*
- Body length 2.0–5.5 mm; dorsal surface of pronotum and elytra shining. . . . . 2
- 2 Pronotal punctation dense and large, similar to that on head; lateral margins of pronotum sinuate before posterior corners; propleura with longitudinal wrinkles. – Fig. 7. . . . . *leleupi* n. sp.
- Pronotal punctation distinctly finer than on head; lateral margins of pronotum not sinuate before posterior corners; propleura without microstructure. . . . . 3
- 3 Body smaller in the average (2.0–4.0 mm), rounded; pronotum conical, with weak punctation. . . . . 4
- Body larger (3.0–5.5 mm), of oval shape; pronotum subquadrate, lateral margins parallel in the basal part. . . . . 5
- 4 Body length 2.0–2.7 mm; pronotum 1.8 times as wide as long; elytral striae with traces of punctural rows; apicale of aedeagus sinuate in lateral view. – Figs. 6, 10. . . . . *minima* n. sp.
- Body length 2.8–4.0 mm; pronotum 1.2 times as wide as long; elytral striae without punctural rows; apicale not sinuate in lateral view. – Figs. 2, 8. . . . . *fungicola* n. sp.
- 5 Body broader oval; body and legs dark ferrugineous; aedeagus narrow, feebly bent in lateral view. – Figs. 4, 12. . . . . *ruthmuelleriae* n. sp.
- Body more elongate oval; body dark ferrugineous, legs lighter; aedeagus broad, strongly bent in lateral view. – Figs. 3, 9. . . . . *kochi* n. sp.

### 4 References

- BOUCHARD, P., LAWRENCE, J. F., DAVIES, A. E. & NEWTON, A. F. (2005): Synoptic classification of the World Tenebrionidae (Insecta: Coleoptera) with a review of family-group names. – *Annales zoologici* **55**: 499–530.
- FÄHRÆUS, O. I. (1870): Coleoptera Caffrariae, annis 1838–1845 a J. A. WAHLBERG collecta. Heteromera descripsit. – *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar* **27**: 243–358.
- GEBIEN, H. (1942): Katalog der Tenebrioniden (Col. Heteromera). Teil 3 (part). – *Mitteilungen der Münchner entomologischen Gesellschaft* **32**: 729–760 [746–777].

Author's address:

Dr. WOLFGANG SCHAWALLER, Staatliches Museum für Naturkunde, Rosenstein 1, 70191 Stuttgart, Germany;  
e-mail: [schawaller.smns@naturkundemuseum-bw.de](mailto:schawaller.smns@naturkundemuseum-bw.de)

Manuscript received: 23.V.2008, accepted: 8.VII.2008.



# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Stuttgarter Beiträge Naturkunde Serie A \[Biologie\]](#)

Jahr/Year: 2009

Band/Volume: [NS\\_2\\_A](#)

Autor(en)/Author(s): Schawaller Wolfgang

Artikel/Article: [Five new epigeal species of \*Toxocnema\* Fåhraeus \(Coleoptera: Tenebrionidae\) from arboreal habitats in South Africa and Swaziland 363-370](#)