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**LOHMANNIIDAE SPECIES (ACARI, ORIBATIDA) FROM THE  
HOLOCENE DEPOSITS AT FLORISBAD,  
SOUTH AFRICA**

by

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**ABSTRACT**

Coetzee, Louise. 2001. Lohmanniidae species (Acari, Oribatida) from the Holocene deposits at Florisbad, South Africa. *Navors. nas. Mus., Bloemfontein* 17(5): 125-134. Three species of Lohmanniidae (*Papillacarus brinki* **spec. nov.**; *Cryptacarus promecus* Grandjean, 1950; *Torpacarus cf. omittens* Grandjean, 1950) were collected from the Holocene deposits of Florisbad Quaternary Research Station, South Africa. The new species is described and the two known species are briefly discussed. (**Lohmanniidae, Fossil oribatids, Holocene, Florisbad**)

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## INTRODUCTION

Florisbad is a Quaternary Research Station 45 km NNW of Bloemfontein in central South Africa. The Florisbad spring sequence is a well-studied fossiliferous Quaternary deposit (Rubidge & Brink 1985; Grobler & Loock 1988; Loock & Grobler 1988; Visser & Joubert 1991) which became known for an archaic human skull fragment discovered in 1935 (Dreyer 1935). Intensive studies were carried out on the mammalian fossils (Brink 1987, 1988), fossil pollen (Scott & Brink 1992; Nyakale 1999) and the Middle Stone Age archaeological material (Dreyer 1938; Kuman & Clark 1986; Henderson 1995; Brink & Henderson 2001).

Recently the oribatid remains from these deposits were investigated and reported on in Coetzee (in press). Three species of Lohmanniidae were encountered in the Holocene deposits and are discussed in this paper.

## MATERIAL AND METHODS

### Sampling

The Florisbad fossil site (28°46'S, 26°04'E) (Figure 1) consists of a sequence of Quaternary deposits associated with a thermal spring. Due to disturbances by spring action, sedimentary intrusions in the horizontal or sub-horizontal deposits were formed, contributing to a complex depositional history. In order to clarify the stratigraphy of the deposits and for dating purposes, a test pit was excavated down to the solid rock (8 m) on what is known as the Florisbad spring mound. These deposits were dated by Electron Spin Resonance (ESR) and Optically Stimulated Luminescence (OSL) by Grün, Brink, Spooner, Taylor, Stringer, Franciscus & Murray (1996). Samples were taken at 20 cm intervals from

the top to the base and tested for oribatid remains. Larger samples (400 – 500g) were taken from the deposits which showed signs of oribatid remains.

The spring section (70 m south of the test pit) is a localized feature not represented in the test pit and dated by radiocarbon (see Nyakale 1999). This section (previously known as Peat IV) consists of sediments with a high organic content. Nine samples (100g each) were taken from this section.

Seven modern soil samples were taken randomly from natural vegetation in the vicinity of the Holocene deposits to sample the extant fauna.

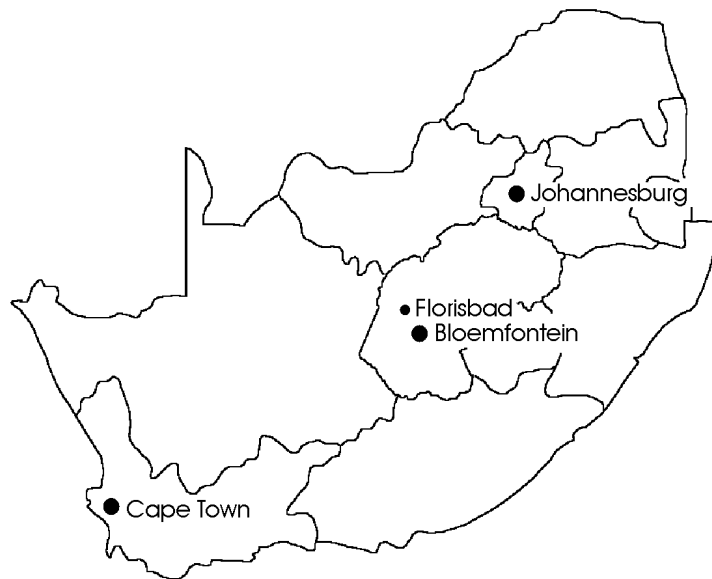


Figure 1: South Africa

## Extraction

Fossil mites were extracted by the hyper saline flotation method described by Fain & Hart (1986). Extant mites were extracted by Berlese-Tullgren funnels.

## RESULTS

From the Holocene oribatid mite assemblages, three species of Lohmanniidae were recovered. An unknown species of *Papillacarus* Kunst, 1959 (described below) was collected in the organic-rich spring section and in the upper layers of the brown aeolian sand of the test pit. A single specimen of *Cryptacarus promecus* Grandjean, 1950 was recovered from the spring section and two live specimens from the modern soil samples. One deutonymph and one adult *Torpacarus cf. omittens* Grandjean, 1950 were recovered from the brown aeolian sand deposit of the test pit (Table 1).

Table 1: Numbers of fossil and extant Lohmanniidae.

Species	Organic rich sediment Spring Section	Brown aeolian sand Test pit	Modern soil
Depth below surface	0,2 – 1,7 m	0,2 – 1,0 m	0,1 m
Age	1700 – 6500 years BP	< 2000 years BP	modern
<i>Papillacarus brinki</i> <b>spec. nov.</b>	24	64	
<i>Cryptacarus promecus</i>	1		2
<i>Torpacarus cf. omittens</i>		2	

### *Papillacarus* Kunst, 1959

The genus *Papillacarus* was instituted by Kunst (1959) to accommodate Berlese's subspecies *Lohmannia murcioides aciculata* (1905). The occurrence of neutrichy necessitated a separate genus diagnosed as 1) genital plates transversely divided, 2) anal- and adanal plates separate, 3) pre-anal plate forming a small wedge, 4) ventral blades on all femora, 5) rostrum wide and not indented, 6) weak neutrichy posteriorly on notogaster.

#### *Papillacarus brinki* **spec. nov.**

**Size:** Average body length: 484  $\mu\text{m}$  (range: 473  $\mu\text{m}$  – 509  $\mu\text{m}$ ) Holotype: 509  $\mu\text{m}$ .  
Average body width: 217  $\mu\text{m}$  (range: 209  $\mu\text{m}$  – 227  $\mu\text{m}$ ) Holotype: 226  $\mu\text{m}$ .

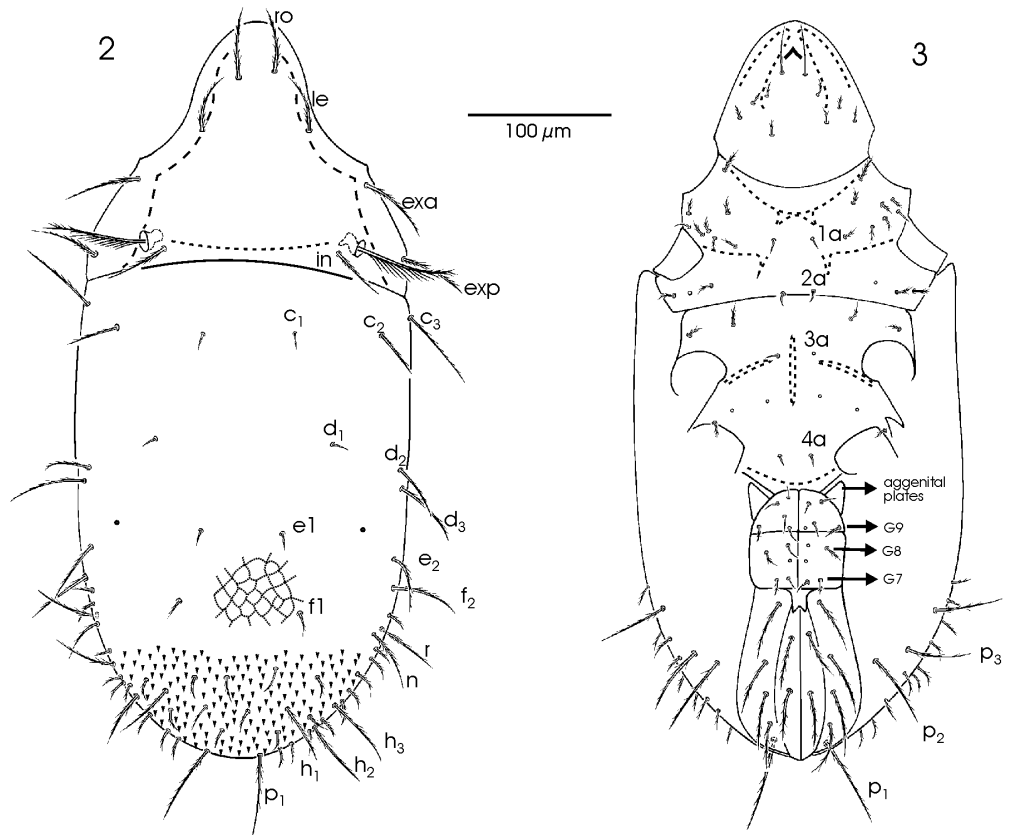
**Colour:** Yellowish brown.

**Dorsal side:** (Figure 2)

**Prodorsum:** Prodorsal surface densely punctate with faint, indistinct reticulation; rostral tectum rounded; sclerotized angular processions on lateral borders; rostral setae (*ro*) bilaterally barbed, other prodorsal setae slender, distally unilaterally finely barbed, proximally bilaterally barbed (ornamentation variable); bothridium (*bo*) as for the genus; sensillus (*ss*) with more or less 20 closely situated branches on posterior side of sensillus and few small barbs distally on anterior side.

**Notogaster:** Notogastral surface densely punctate, with faint reticulation, spiculate papillae on posterior third; setae *c*<sub>1</sub>, *d*<sub>1</sub>, *e*<sub>1</sub> short, smooth; *f*<sub>1</sub> short, barbed; setae *c*<sub>2</sub>, *d*<sub>2</sub> twice as long

as  $c_1$ ,  $d_1$ , barbed; setae  $c_3$  about twice as long as  $c_2$ ; pygidial neotrichal setae mostly unilaterally barbed, rarely bilaterally barbed; posterior normal setae proximally bilaterally barbed, distally unilaterally finely barbed.



Figures 2 - 3: *Papillacarus brinki* spec. nov. (2) Dorsal side (3) Ventral side.

**Ventral side:** (Figure 3)

**Gnathosoma:** Five pairs of subcapitular setae present; subcapitular surface densely punctate.

**Epimeral region:** Number of setae on epimeres I – IV: 9/8-4-3-4; setae of *a*-series short, fine, smooth, seta *lc* short and smooth, others bilaterally barbed; surface densely punctate.

**Ano-genital region:** Genital plates transversely divided, each section with five setae; antiaxial setae ( $G_{7, 8, 9}$ ) barbed, paraxial setae smooth; aggenital plates small, triangular, situated antero-laterally of genital plates; anal and adanal plates separate; two pairs of anal

setae, barbed; four pairs of adanal setae, longer than anal setae, barbed; pre-anal plate very narrow, small, posteriorly bifid; surface of genital-, anal- and adanal plates densely punctate.

**Appendages:** Legs and gnathosomal appendages absent or badly damaged on most specimens.

**Collection data:** Fossil specimens were collected in the Holocene deposits of the spring section (samples A1 – A9; 1700 – 6500 years BP) (see Nyakale 1999) and the brown aeolian sand of the test pit (samples B1, B2, B3, B4; < 2000 years BP) (Grün *et al.* 1996) at Florisbad. So far, no live specimens were found.

The Holotype (NMB 4117.1), a specimen from the deepest sample of the spring section (sample A9) and two paratypes (NMB 4103.4) from the upper layer (sample B1) and two paratypes (NMB 4104.3) from the second layer (sample B2) of the test pit are deposited in the Acarology collection of the National Museum, Bloemfontein, South Africa.

**Discussion:** The species of this genus can be distinguished by the shape of the notogastral setae and are divided into two groups by the characters of setae  $c_1$ ,  $d_1$  and  $e_1$ . This new species belongs to the group of species with notogastral setae  $c_1$ ,  $d_1$ , and  $e_1$  short and smooth, comprising *P. chamartinensis* Pérez-Iñigo, 1967, *P. simplirostratus* Bhattacharya, Bhaduri & Raychaudhuri, 1974 and *P. undirostratus* Aoki, 1965. *P. chamartinensis* and *P. brinki* **spec. nov.** are unique in having spiculate (aciculate) papillae only on the posterior third of the notogaster. Thus, *P. brinki* is closest to *P. chamartinensis*, known from Spain, but can be distinguished from it by the shape of the notogastral and genital setae, sensillae and degree of pygidial and epimeral neotrichy (see Table 2).

Table 2: Distinguishing characters between *P. chamartinensis* Pérez-Iñigo, 1967 and *P. brinki* **spec. nov.**

Character	<i>P. chamartinensis</i>	<i>P. brinki</i>
Notogastral setae	All setae bilaterally well barbed “du type plumeux”	Proximal third of p-series, h-series, n, r bilaterally finely barbed, distal two-thirds unilaterally finely barbed; other setae unilaterally finely barbed.
Genital setae	Most genital setae (paraxial and antiaxial) barbed.	Only antiaxial setae ( $G_{7,8,9}$ ) barbed.
Sensillus	Bilaterally with short branches of equal length.	Posterior side with long branches, distal end of anterior side with few short barbs.
Pygidial neotrichy	Strong neotrichy	Weak neotrichy.
Epimeral neotrichy	Number of setae on epimere I = 7	Number of setae on epimere I = 9

**Etymology:** The species is named after James Brink, Quaternary Paleontologist at Florisbad.

### ***Cryptacarus* Grandjean, 1950**

Grandjean (1950) instituted the genus *Cryptacarus* for a species *C. promecus* collected from Algeria. The genus is characterized by 1) genital plates transversely divided, 2) pre-anal plate very narrow, 3) anal and adanal plates fused, 4) two pairs of anal setae, 5) four pairs of adanal setae, 6) neutrichal setae arboriform.

The genus *Cryptacarus* is represented by four species. Three of these viz. *C. dendrisetosus* Bhattacharya *et al.*, 1974; *C. schauenbergi* Mahunka, 1977 and *C. tuberculatus* Csiszar, 1961 occur in the Oriental Region (Aoki, Yamamoto, Wen, Wang & Hu 1997; Bhattacharya *et al.* 1974; Corpuz-Raros 1979; Corpuz-Raros 1992; Csiszar 1961; Hu & Wang 1990; Mahunka 1977; Mahunka 1988; Sanyal & Bhaduri 1986) while *C. promecus* Grandjean, 1950 has been recorded from the Palaearctic and Ethiopian Regions (Aoki 1971; Bayoumi & Al-Khalifa 1985; Bernini 1984; Karppinen, Krivolutsky, Tarba, Stanchaeva & Gordeeva 1987; Pérez-Iñigo 1967).

#### ***Cryptacarus promecus* Grandjean, 1950**

The specimens collected at Florisbad match the description of Grandjean (1950). This species has not been found elsewhere in South Africa yet.

**Collection data:** Two live specimens and one fossil specimen of *C. promecus* were collected at Florisbad. The fossil specimen (NMB 4110.2) was collected from the organic-rich Holocene sediment in the spring section, more or less 2180 years old (see Nyakale 1999) (sample A2). Two live specimens (NMB 3915.12) were collected from natural grassland at Florisbad, near the excavations.

### ***Torpacarus* Grandjean, 1950**

The genus *Torpacarus* Grandjean, 1950 is distributed mainly in the Neotropical and Afrotropical regions (see Stary 1998). It is characterized by 1) genital plates without transverse suture, 2) pre-anal plate wide, 3) anal and adanal plates fused, 4) anal setae absent, 5) five pairs of adanal setae present.

#### ***Torpacarus cf. omittens* Grandjean, 1950**

Only two specimens (one deutonymph and one adult) were collected from the upper layers of the aeolian sand deposit at Florisbad. The deutonymph is more or less intact, but the adult specimen is broken. It is possible that these specimens belong to a new subspecies because the rostral setae are much longer than those depicted by Grandjean (1950) and the lengths of notogastral setae  $c_2$  and  $f_1$  also differ from the nominate form. Due to the incomplete state of the specimens, I refrain from describing a new subspecies.

**Collection data:** Both specimens were collected from the aeolian sand deposit of the test pit. This is a Holocene deposit of which the age was determined at <2000 years BP (Grün *et al.* 1996). The deutonymph (NMB 4103.5) was recovered from the uppermost layer (sample B1) at a depth of 0,2 m below the modern surface and the adult (NMB 4104.4) at 0,5 m below the modern surface (sample B2).

## OPSOMMING

Drie Lohmanniidae-spesies, *Papillacarus brinki* **spec. nov.**; *Cryptacarus promecus* Grandjean, 1950; *Torpacarus cf. omittens* Grandjean, 1950, is in die Holocene-afsettings by Florisbad gevind. Die nuwe spesie word beskryf en die twee bekende spesies kortliks bespreek.

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