Acarologia is proudly non-profit, with no page charges and free open access

Please help us maintain this system by encouraging your institutes to subscribe to the print version of the journal and by sending us your high quality research on the Acari.

Subscriptions: Year 2021 (Volume 61): 450 €
http://www1.montpellier.inra.fr/CBGP/acarologia/subscribe.php
Previous volumes (2010-2020): 250 € / year (4 issues)
Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d’avenir » programme (Labex Agro: ANR-10-LABX-0001-01)

Acarologia is under free license and distributed under the terms of the Creative Commons-BY-NC-ND which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are credited.

BY A. FAIN and F. S. LUKOSCHUS

**INTRODUCTION**

*Criokeron quintus* (Domrow & Baker, 1963) has been described from a female specimen collected from *Tupaia glis* in Malaysia. We describe herein for the first time the male and the immatures of this species. They were collected, mixed with females, from the nest box of a *Tupaia glis* originating from Thailand and reared in the laboratory of a German Primate Center. In addition we describe here a new species of *Criokeron*, *C. thailandicus*, collected from *Tupaia glis* in Thailand.

**ABSTRACT**: A new species, *Criokeron thailandicus*, is described from *Tupaia glis* from Thailand. The male and the immatures of *Criokeron quintus* (Domrow & Baker, 1963) (Acari, Cheyletidae) are described for the first time. The males are either homeomorphic or heteromorphic; they develop within protonymphs whilst the females develop within tritonymphs.

**RESUMÉ**: *Criokeron thailandicus* sp. n. est décrit de *Tupaia glis* de la Thaïlande. Le mâle et les immatures sont décrits pour la première fois chez *Criokeron quintus* (Domrow & Baker, 1963) (Acari, Cheyletidae). Les deux types de mâles, homéomorphe et hétéromorphe ont été rencontrés. Le mâle se développe dans une protonyme alors que la femelle prend naissance dans une tritonymphe.
REMARKS ON THE SUBFAMILIES CRIOKERONTINAE AND NIHELIINAE

LAWRENCE (1954) created the genus *Hemicheyletus* for two species, *Cheletiella lemuricola* (from a Primate) and *Ch. curvidens* (from a Mongoose), that he had described in 1948. This genus was not valid because the author omitted to designate a type species.

In 1960, DOMROW and BAKER created the genus *Nihelia* for *Nihelia calcarata* sp. n. from a Carnivore. As this species appeared to be congeneric with *H. curvidens*, this new genus replaced the genus of LAWRENCE for this group of species. In 1963, DOMROW and BAKER described two new species in this genus: *N. squamosa* from a squirrel and *N. quinta* from *Tupaia glis*.

VOLGIN (1966) rejected the name *Nihelia* and erected for *N. quinta* a new genus *Criokeron*. In 1969, he created for *N. squamosa* a new subgenus *Sciurocheyla* in the genus *Hemicheyletus*, the latter being revalidated by this author. Both genera were included in the subfamily Cheyletiellinae Volgin, 1961.

SMILEY (1970) elevated the Cheyletiellinae to the family rank. In 1977 he created several new subfamilies in this new taxon including the Crio­kerontinae (type genus *Criokeron*) and the Niheliinae (type genus *Nihelia*).

FAIN (1979 a) proposed to restrict the family Cheyletiellidae to the two most evolved genera of the group (*Cheletiella* and *Eucheyletiella*) and to maintain the other genera in this Cheyletiidae. He created two new genera: *galagocheles* (type species *Hemicheyletus lemuricola*) and *Smileycheles* (type species *Smileycheles camerounensis* sp. n.) and described a new species *Nihelia cynictis* from a Carnivore.

In the present paper we follow SMILEY (1977) who includes the genus *Criokeron* into the subfamily Crio­kerontinae and the other genera in the Niheliinae. These two subfamilies present clear affinities with the subfamily Chelonotinae which contains several genera specialized for primitive rodents (see FAIN, 1979 b).

DIVISION OF THE CRIOKERONTINAE AND THE NIHELIINAE

The subfamily Crio­kerontinae contains only the type genus *Criokeron*. The female in this genus is clearly characterized by the shape of the gnat­hosoma which is strongly modified. Its base is prolonged laterally by a pair of enormous hooks, the palps are reduced, straight, situated not far from the midline and with most of the segments (tarsus, tibia genu and femur) fused and ending apically by a comb. The palptibial spine is absent. The coxa I bears a large flat attaching organ. There are no hooks or spurs on palps, legs, and on dorsal and ventral surfaces of the gnat­hosoma. In the male that we describe below the palps are strongly developed, all the segments are free and normal in shape and the palptarsus bears a large comb, two sickle-setae, a barbed seta and a solenidion. There are no spurs or hooks on the palp (except for two strongly pedunculate setae on the palpfemora, on the legs and on the gnat­hosoma. The copulatory orifice is terminal.

The subfamily Niheliinae contains four genera characterized as follows: In the female the palps have at least the tibia and the genu fused and these two segments, including the apical spine of tibia, are strongly recurved ventrally acting as a hook. Palptarsus always reduced and lacking a comb, or completely absent. Spurs or hooks always present on the palps, inconstant on legs and on base of gnat­hosoma. The idiosoma bears variable retrorse or spurlike processes. The males are known in the genera *Galagocheles* and *Nihelia*. In *Galagocheles* the palps resemble those of genus *Criokeron* except for the following characters: palptarsus smaller and without comb, palpfemur with a strong retrorse ventral hook, coxa I with a strong ventral hook, genua I and II with small ventral spurs, gnat­hosomal base with one pair of ventral hooks and one pair of transverse crests, the copulatory orifice is dorsal. In *Nihelia* the palp resembles that of *Galagocheles* but the palptarsus is fused with the tibia and vestigial, the
palpfemur bears more hooks or spurs, the gnathosomal base bears hooks dorsally, the peritremes are more posterior, the genua I and II are devoid of spurs and the setae \(ve\) are situated on prominent sclerotized processes. The genital aperture is dorsal as in Galagocheles.

The Niheliinae contain four genera forming two distinct groups: In the group Galagocheles-Nihelia the peritremes are strongly developed and have large cells and the gnathosomal base bears ventral or dorsal spurs or hooks. In the group Sciurocheyla-Smithycheles the peritreme are less developed and narrow with small regular cells and the gnathosomal base is devoid of sclerotized processes.

**KEY TO THE GENERA OF THE CRIOKERONTINAE AND NIHELINAe**

**FEMALES**

1. Base of gnathosoma prolonged laterally by a pair of enormous hooks directed postero-ventrally. Palps relatively very small, straight, close to the midline, with tarsus, tibia, genu and femur fused and bearing an apical comb; apical tibial spine absent. Absence of spurs or hooks on the palps, the dorsal and ventral surface of gnathosoma, and the legs, except the coxae I which bear a flat hooklike process ........ Criokerontinae. One genus: Criokeron, Volgin, 1966

2. Peritremes strongly developed with large cells. Gnathosomal base with spurs or hooks ventrally or dorsally .................. 3

3. Hooks or spurs present on legs I and II (ventral surface of tarsus, genu and femur and laterally on coxae I and II); a pair of rounded retrorse processes on ventral surface of gnathosoma; dorsal surface of gnathosoma without retrorse processes; absence of processes on dorsal surface of idiosoma. Palptarsus relatively large. Peritreme situated in the anterior half of the gnathosomal base. Palpfemur, legfemora and legtrochanters with setae either bare or with a very few barbs .................. genus Galagocheles, Fain, 1979

   Legs I and II without hooks or spurs. Ventral surface of gnathosoma with a pair of rounded processes along its posterior margin; dorsal surface with a pair of large hooks and one or two pairs of lateral spurs. Dorsal surface of idiosoma with a pair of triangular processes bearing setae \(ve\) and a pair of rounded and flat processes behind setae \(h\). Palptarsus very small. Peritreme situated in the posterior half of the gnathosoma. Palpfemur legfemora and legtrochanters with densely barbed setae ............

   genus Nihelia (Domrow & Baker, 1960)

4. All dorsal setae piliform. Palptarsus completely lacking ................. genus Smileycheles, Fain, 1979

   Some dorsal setae are squamose. Palptarsus completely lacking ......... genus Smileycheles, Fain, 1979

   Some dorsal setae are squamose. Palptarsus present ... genus Sciurocheyla, Volgin, 1969, stat. nov.

**MALES**

(N.B. The males of Sciurocheyla and Smithycheles are unknown)

1. Palptarsus with a comb, genital opening terminal, absence of retrorse spur on palpfemur ............ Criokerontinae

   Palptarsus without a comb, genital opening dorsal, presence of a retrorse spur on palpfemur .............

   Niheliinae (2)

2. Setae \(ve\) and dorsal setae of palpfemur and genu setiform .......... Galagocheles, Fain, 1979

   Setae \(ve\) and palpal setae barbed ..............

   Nihelia (Domrow & Baker, 1960)

**LIST OF THE SPECIES IN THE CRIOKERONTINAE AND THE NIHELINAe**

These interesting mites live on Afrotropical and Oriental mammals. They have been found so far on African Lorisidae (Primates), on Oriental Tupaiidae (Scandentia), on Oriental Sciuridae and African Anomaluridae (Rodentia) and on Mongooses (Viverridae, Carnivora) from both regions.

Here is a list of the known species:
Genus *Criokeron* Volgin, 1966


Genus *Nihelia* Domrow and Baker, 1960

2. *N. curvidens* (Lawrence, 1948) : from *H. sanguineus punctulatus* in South Africa and *H. sanguineus bocagei* in Angola.

Genus *Galagocheles* Fain, 1979


Genus *Smileycheles* Fain, 1979


---

We describe herein the male and the immatures, so far unknown. The males are either homeomorphic or heteromorphic. The degree of heteromorphism varies according to the specimens. The organs that are the most involved by heteromorphism are the gnathosoma, the palps and the legs, especially the legs I.

**Homeomorphic male** (figs 1-2) : Idiosoma devoid of spurs or hooks. Idiosoma 300 μm long and 240 μm wide. Total length including gnathosoma 380 μm (midline). Propodonotal shield bearing 5 pairs of barbed setae of which one pair (d) very short. Hysteronotal shield with 4 pairs of barbed setae (30-50 μm) and 7 pairs of very small setae. Penis very long, curved. Gnathosoma : base partly covered by the idiosoma, its total length in midline is 120 μm (ventrally). The part visible dorsally is 80 μm long. The base is devoid of spurs or hooks. Peritreme strongly developed, D-shaped. Palpfemur 60 μm long with an internal rounded process bearing a thin seta, but without hooks ; it bears in addition a ventral bare seta and a dorsal barbed seta. 

**Tritonymph** : Total length 350 μm, width 210 μm. It resembles the female except for the following characters : absence of lateral hooks on the gnathosoma, palps as in female but relatively larger and with a comb bearing 12-13 thinner teeth ; the peritreme is narrower ans very sinuous ; hysteronotum with two small parame-
Figs. 1-6: *Criokeron quintus* (Domrow & Baker).

1-2. — Homeomorphic male; dorsum (1); leg I in dorsal view (2).

3-6. — Heteromorphic male; leg I in dorsal view (3); gnathosoma in dorsal view (4); tibia and tarsus of palp in ventral view (5); the same in dorsal view (6).
University at Giessen).

The gnathosoma of a German Primate Center (Justus-Liebig

480 /Lm were collected in a nest box of a

nating from Thailand and reared in the laboratory

developing within a tritonymph. This type of

stage contained a male. Five females were

setae.

Development : Total length 400 /μm, width

240 μm. Another contracted specimen is only

250 μm long and 140 μm wide. It differs from

the tritonymph by the shape of the palps whose segments are rather well separated, the smaller size of the propodonotal and of the two hysteronotal shields and the less developed chaetotaxy. Coxae with 2-1-2-0 setae, the trochanteral I, II and IV and genital setae are lacking; trochanter III with 1 seta. Genito-anal area with 4 pairs of setae.

Larva : Total length 210 μm, width 135 μm. Palps very short without apical comb; peritreme shorter than in protonymph; propodonotal shield smaller than in protonymph bearing only the vi and ve setae, the three other pairs being on the soft cuticle; hysteronotum without shield; coxae I-III with 1-0-0 setae; there are only two pairs of ic setae (ic 1 and ic 3). Other setae present : d 1, d 2, l 1 to l 5. The anus is surrounded by 3 pairs of anal setae.

Development : Seven protonymphs in the molting stage contained a male. Five females were developing within a tritonymph. This type of development has already been observed in the genus Ornithocheyletia Volgin, 1964 (see FAIN, 1981).

Origin of our specimen : All these specimens were collected in a nest box of a Tupaia glis originating from Thailand and reared in the laboratory of a German Primate Center (Justus-Liebig University at Giessen).

2. Criokeron thailandicus spec. nov.

This species is represented only by the female.

Female (figs 7-11) : Idiosoma in holotype 480 μm long and 380 μm wide. Length including the gnathosoma 630 μm (in midline). Total length and width in 3 paratypes : 650 × 360 μm; 665 × 300 μm and 678 μm × 400 μm. Average lengths of 10 specimens : idiosoma 524 μm, total length 710 μm (in C. quintus these measurements are, in 10 females : 444 μm and 609 μm respectively.) Dorsum bearing two large shields. Anterior shield with 6 pairs of thick barbed setae. Posterior shield with 5 pairs of barbed more unequal setae. Venter : Coxae with 2-1-2-2 thin and not barbed setae. Setae ic 1, ic 3, ic 4, the 5 pairs of genitals and the 3 pairs of anals are bare. Gnathosoma very large with a pair of very strong lateral hooks directed ventrally and posteriorly. Palps close to the midline, they are small and straight and their 4 apical segments are fused. Peritreme with many elongate cells. Chaetotaxy : The vi, ve, and sc i are 65-75 μm long; sc e 100 μm; d 1 and d 2 70 μm; D 3 90 μm; d 4 50 μm; d 5 105 μm; l 1 and l 2 100 μm; l 3 120 μm; h 105 μm. All these setae are dorsal, they are thick and shortly barbed. The l 4 and l 5 are ventral and 80 and 60 μm long respectively. Legs I-IV (number of setae) : Tarsi 9-7-7-7. Tibiae 5-4-4-4. Genua 2-2-2-2. Femora 2-2-2-1. Trochanters 1-1-2-1. Solenidiotaxy : Tarsi 1-1-0-0. Tibiae 1-0-0-0. The genu I bears a very short specialized seta. Palps : The fused segments bear 8 setae (5 thick and 1 small, all barbed, 1 thin not barbed and 1 short and thin not barbed). 1 solenidion and 1 comb bearing 7-8 teeth. Empodium as in C. quintus.


Remarks : This species differs from C. quintus by the following characters : peritremes much smaller, far apart in the midline and differently shaped, absence of a large spoonlike seta on the ventral surface of tibia I, propodonotal shield with 6 pairs of setae (5 pairs in C. quintus).
FIG. 7-11: *Criokeron thailandicus* sp. n. Female.
Dorsum (7); peritreme (8); palp in dorsal view (9); palp in ventral view (10); leg I in dorsal view (three apical segments) (11).
ACKNOWLEDGEMENTS

We thank Dipl. Biol. Karl BEVER, Institut für Neuropathologie des Klinikums des Justus-Liebig-Universität Giessen for the material.

REFERENCES


FAIN (A.), 1979 c. — Idiosomal and leg chaetotaxy in the Cheyletidae. — Int. J. Acarol. 5: 305-310.


