

A new *Xenopacarus* (Acari, Ereyinetidae) from the nasal cavities of *Xenopus* sp. (*fraseri* group), with a discussion on the evolution host-parasite

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Xenopacarus kivuensis n. sp. (Acari, Ereyinetidae) is described from the nasal cavities of *Xenopus* sp., *fraseri* group, from the Kivu province, Zaire. Evolutionary relationships within the genus *Xenopus* are discussed.

Xenopacarus kivuensis n. sp. (Acari, Ereyinetidae) est décrit des fosses nasales de *Xenopus* sp., groupe *fraseri*, de la Province du Kivu au Zaïre. Les relations phylogénétiques au sein du genre *Xenopus* sont discutées.

Key words: Systematics, new species, Ereyinetidae, *Xenopus*, Zaire, Coevolution, host-parasite relationship.

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INTRODUCTION

The genus *Xenopacarus* Fain, Baker & Tinsley, 1969, was represented, until now, by two species, both found in the nasal cavities of African clawed frogs: *Xenopacarus africanus* Fain, Baker & Tinsley, 1969 from *Xenopus laevis*, from South Africa and *X. kenyensis* Fain & Tinsley, 1975 from *Xenopus borealis* from Kenya. A third species is now added to this genus. It was found by R. T. C. in the nasal cavities of a *Xenopus* species of the *fraseri* group, in Zaire.

MATERIAL AND METHODS

Specimens of the new species were filled with blood and very dark before mounting. They were mounted in

Hoyer's medium and left for three weeks at 55° C. The mites still remain dark but are now clear to allow a detailed study.

XENOPACARUS KIVUENSIS NOV. SPEC.

Family Ereyinetidae Oudemans, 1931
Subfamily Lawrencarinae Fain, 1957
Tribe Xenopacarini Fain, Baker & Tinsley, 1969
Genus *Xenopacarus* Fain, Baker & Tinsley, 1969

Description

Female (figs 1-4). - The holotype idiosoma is 520 µm long and 400 µm wide (idiosoma), and that of the paratype is 500 µm long and about 375 µm wide. Both specimens are strongly flattened. Cuticle striate-punctate. All the setae of idiosoma, gnathosoma and legs are barbed, except for the specialized setae (solenidia) which are smooth. Coxae, legs and parts of gnathosoma

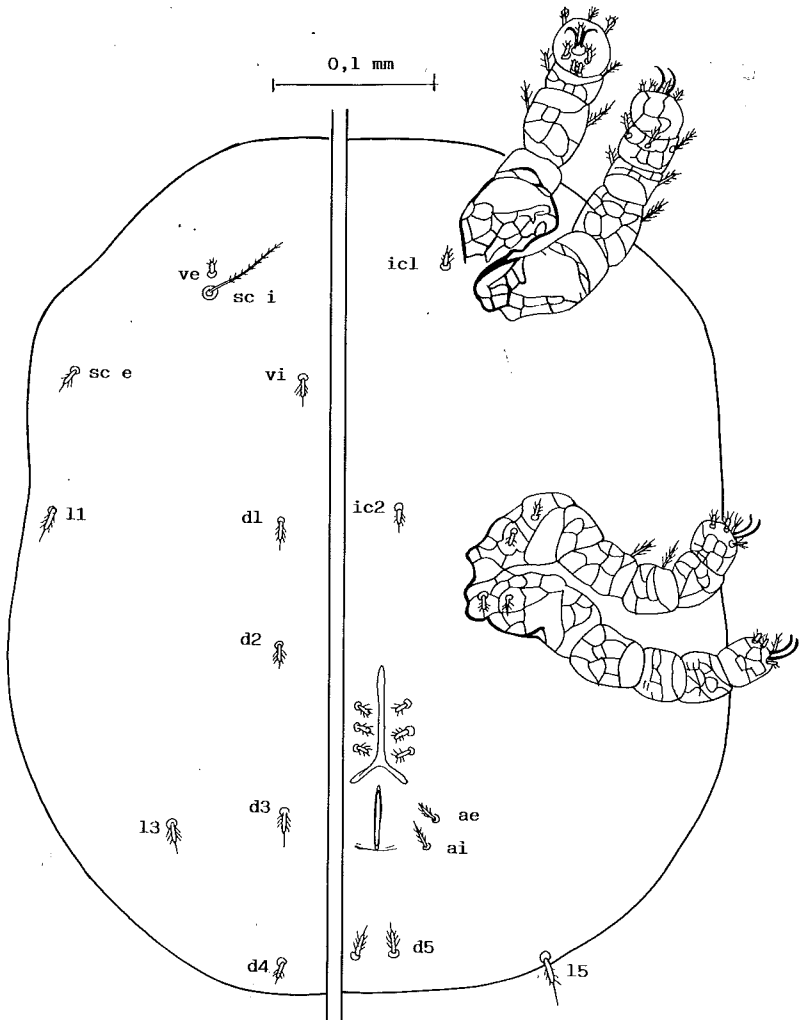
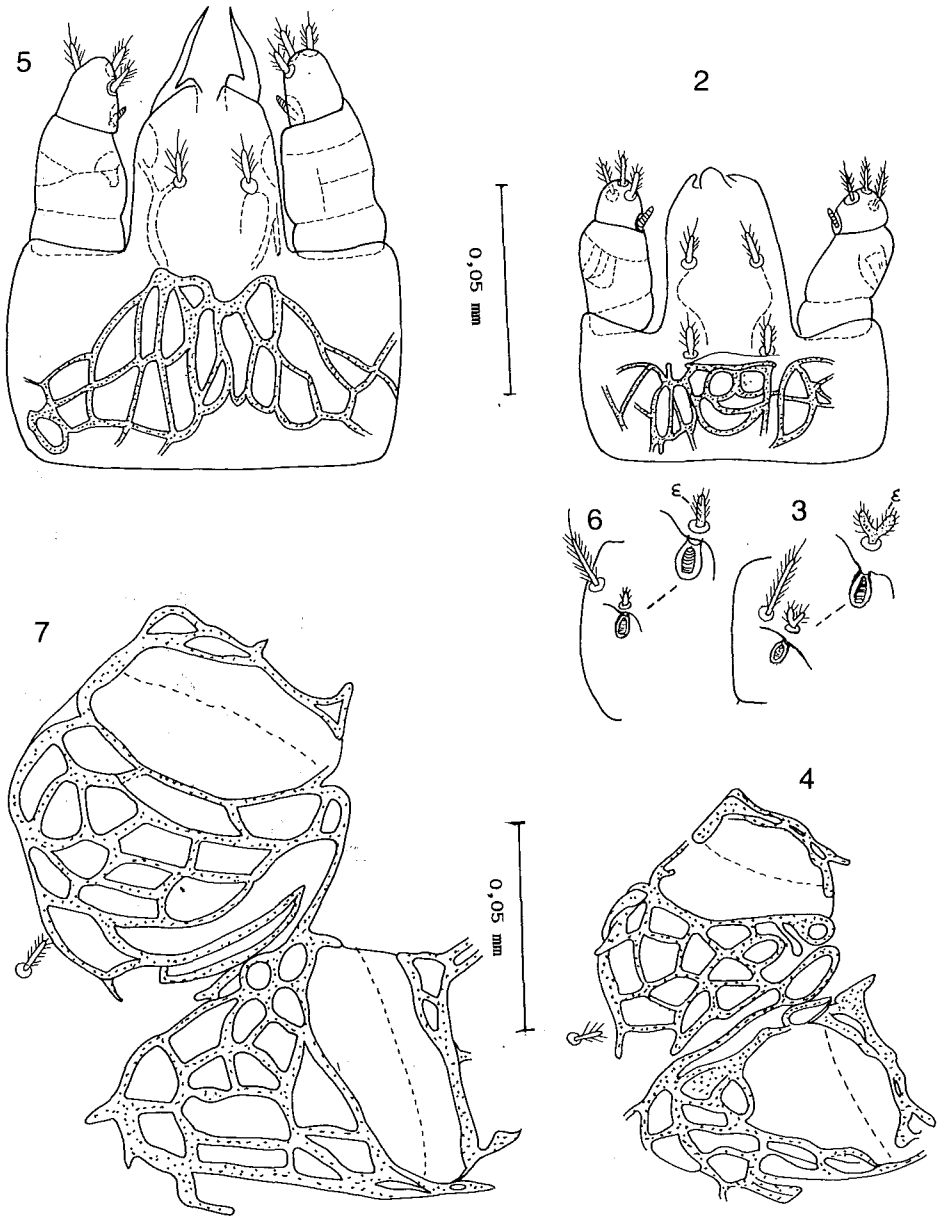


Fig 1. - *Xenopararus kiviensis* n. sp. Female. Dorsum (to the left) and venter (to the right).

with a well-developed pattern of dark lines. The anterolateral areas of coxae I-II and the lateral parts of coxae III-IV are devoid of lines (articulation areas). Palps with 3 free articles, but the two basal articles are partly fused. Ambulacra as in the two other species.

Dorsum.- Chaetotaxy as in *X. africanus* but setae *vi* and the *d* are shorter (9 to 10 μm). Setae *d3* are present as in the two other species, they had been overlooked in *X. kenyensis*. Sensillae completely barbed, 60 μm .

Venter.- With a strong network of lines on coxae I-IV and on gnathosoma. Intercoxals very short and barbed. There are 3 pairs of genital setae and 2 pairs of anal setae. Chaetotaxy of legs (I to IV) : coxae 0-0-2-2, trochanters 0-0-0-0, femora 3-3-1-0, genua 4-4-3-1, tibiae (ereynetal organ not included) 3-1-1-0, tarsi 12-8-7-7-. Gnathosoma 75 μm wide at its base, 66 μm long (palps included). Erynetal organ as in *X. kenyensis* but the famulus is distinctly bifid (figs 3 and 6).



Figs 2-7.- (2-4) *Xenopacarus kivuensis* n. sp. Female. (2) Gnathosoma in ventral view; (3) ereyretal organ; (4) coxae I-II. - (5-7) *Xenopacarus kenyensis* Fain & Tinsley. Female. (5) Gnathosoma in ventral view; (6) ereyretal organ; (7) coxae I-II. (Remark : all drawings are to the same scale).

Host and locality

In the nasal cavities of *Xenopus* sp. group *fraseri*, collected in November 1991 at Ebisha, about 8 km from the Research Station at Irangi, Kivu Province, Zaire. Holotype female in the British Museum (Natural History). One paratype female in the Musée royal de l'Afrique centrale, Tervuren.

Remarks

X. kivuensis is closer to *X. kenyensis* than *X. africanus*. It has the same type of ereynetal organ as in the former but it differs from it by the following characters: the chaetotaxy of hypostome, coxae and genua are more complete (i. e. more primitive) than in *X. kenyensis*. In addition it differs from *X. kenyensis* in the bifid aspect of the famulus of the ereynetal organ, the smaller size of the body, the gnathosoma and the legs, the different shape of the line pattern on coxae and hypostome (Table 1 and figs 2-7).

In *X. kenyensis* and *X. kivuensis*, the solenidion of the ereynetal organ is completely sunk into the integument of

the tibia, whilst in *X. africanus* the solenidion is partly external, which corresponds to a more primitive situation. As this character is more stable and therefore more important in this group of mites than the variations of the chaetotaxy, we may surmise that *X. africanus* is more primitive than the other two species.

EVOLUTIONARY RELATIONSHIP WITHIN THE GENUS *XENOPUS*

Evolutionary relationship within the genus *Xenopus* have been intensively studied (reviewed by Tymowska, 1991). There is a major division separating species with chromosome numbers which are multiples of $2n = 20$ from those with multiples of $2n = 36$. The 36 chromosome lineage forms the largest assemblage within the genus (currently 19 species and subspecies), and there is cytogenetic and biochemical evidence for the separation of three distinct subgroups: a) *laevis* and *gilli*, b) *muelleri*, *borealis* and *clivii*, c) *fraseri* and related species. The representatives so far discovered in the genus *Xenopacarus* are all from this $2n = 36$ group and one species has now been recovered in each

Table 1. - Principal characters separating the three species of *Xenopacarus* (females)

	<i>africanus</i>	<i>kenyensis</i>	<i>kivuensis</i>
<i>Chaetotaxy</i>			
Gnathosoma :			
hypostome (*)	2+2	1+1	2+2
palptarsus (*)	2+2	3+3	3(4)+3
Legs I-IV :			
coxae	0-0-1-0	0-0-1-2 (1)	0-0-2-2
trochanters	0-0-0-0	0-0-0-0	0-0-0-0
femora	1-1-1-0	3-3-1-0	3-3-1-0
genua	4-4-3(2)-1	4-4-3-0	4-4-3-1
tibiae	3-1-1-1	3-1-1-0	3-1-1-0
famulus (tibia I)	simple	simple	bifid
Genital area	3 to 6 pairs	3 to 6 pairs	3 pairs
<i>Dimensions</i>			
Length of			
<i>vi</i>	20 μ m	15 μ m	9 μ m
<i>dl</i> to <i>d5</i>	22 μ m	15-17 μ m	9-10 μ m
Length and width of gnathosoma	94 x 95 μ m	93 x 96 μ m	66 x 75 μ m
Length of leg I (**)	210 μ m	190 μ m	155 μ m

(*) left + right side - Numbers in parentheses refer to vertitions,

(**) coxa and ambulacrum not included

of the three host subgroups. All phylogenetic studies indicate that the *fraseri* sub-group, from which *X. kivuensis* is recorded, is relatively distant from the remaining 36 chromosome species including *laevis* and *borealis*. Some studies, including the evidence of cranial osteology (Reumer, 1985), indicate that the *laevis* sub-group is more advanced than the *fraseri* sub-group. However, this does not concur with the relationship of their acarine parasites which suggest that *X. africanus* in *laevis* is more primitive than the species infecting *borealis* and *fraseri*. More extensive studies are now required to establish the pattern of speciation within this distinctive acarine group parasitic in *Xenopus* species.

Recent studies show that *X. fraseri* forms a cryptic species assemblage. There are, currently, 6 species of very similar phenotype which are distinguished by chromosomal and other characteristics and occur in lowland tropical forest in West and Central Africa (Loumont, 1986). The hosts of *X. kivuensis* were collected near to the eastern margin of the Zaire rainforest, over 1600 km from previously studied representatives of *X. fraseri sensu stricto* in Cameroon and Gabon. Our specimens show the typical *fraseri* phenotype and a chromosome number of $2n = 36$ (Hayman, personal communication); however, until the taxonomy of this species group is better defined, it seems prudent to refer the host of *X. kivuensis* to *Xenopus* sp. within *fraseri* group.

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