

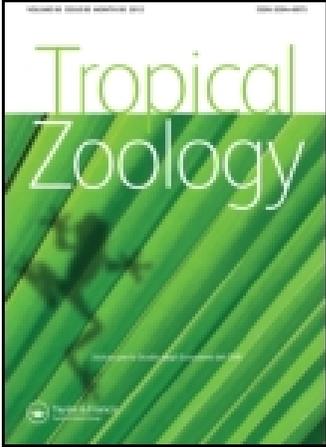
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Stenasellus simonsi n. sp. (Isopoda Asellota Stenasellidae) from the limestone outcrop of the Kenyan coast

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***Stenasellus simonsi* n. sp.**
(Isopoda Asellota Stenasellidae)
from the limestone outcrop of the Kenyan coast

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The author describes a new species of *Stenasellus*, collected from a spring on the Kenyan Limestone Outcrop near Vinagoni Village (Kilifi District). *S. simonsi* n. sp., the third species collected in the country, is similar to the other Kenyan species *S. ruffoi* Messana 1993, and especially to the Somali species *S. pardii* Lanza 1966.

KEY WORDS: Stenasellidae, Kenya, new species.

INTRODUCTION

The study of the fauna of the subterranean waters of Eastern Africa, although far from being completed, has produced much new knowledge of this peculiar environment in the last 30 years (MESSANA in press). Formerly focused on the Somali stygobites, the research has recently been extended to the Kenyan groundwater fauna.

In the course of a survey in the Kilifi District (Southern Kenya), the author visited several springs and wells on the limestone outcrop running parallel to the Kenyan coast. In a spring not far from Jaribuni Village, several specimens of stenasellid isopods were collected which on closer examination appeared to be a new species.

SYSTEMATICS

***Stenasellus simonsi* n. sp. (Figs 1-3)**

Material examined. Kenya, Vinagoni Village (Kilifi District), spring on the banks of the Nzowuni River near the old pumping station; G. Messana & S. Battini legit. Holotype, 1♂ NMK¹, allotype, 1♀ NMK; paratypes, 2 ♂♂ and 2 ♀♀ NMK, 15 ♂♂ and 8 ♀♀ MF².

¹ NMK = National Museums of Kenya, Nairobi.

² MF = Museo di Storia Naturale, Sezione di Zoologia, Università di Firenze.

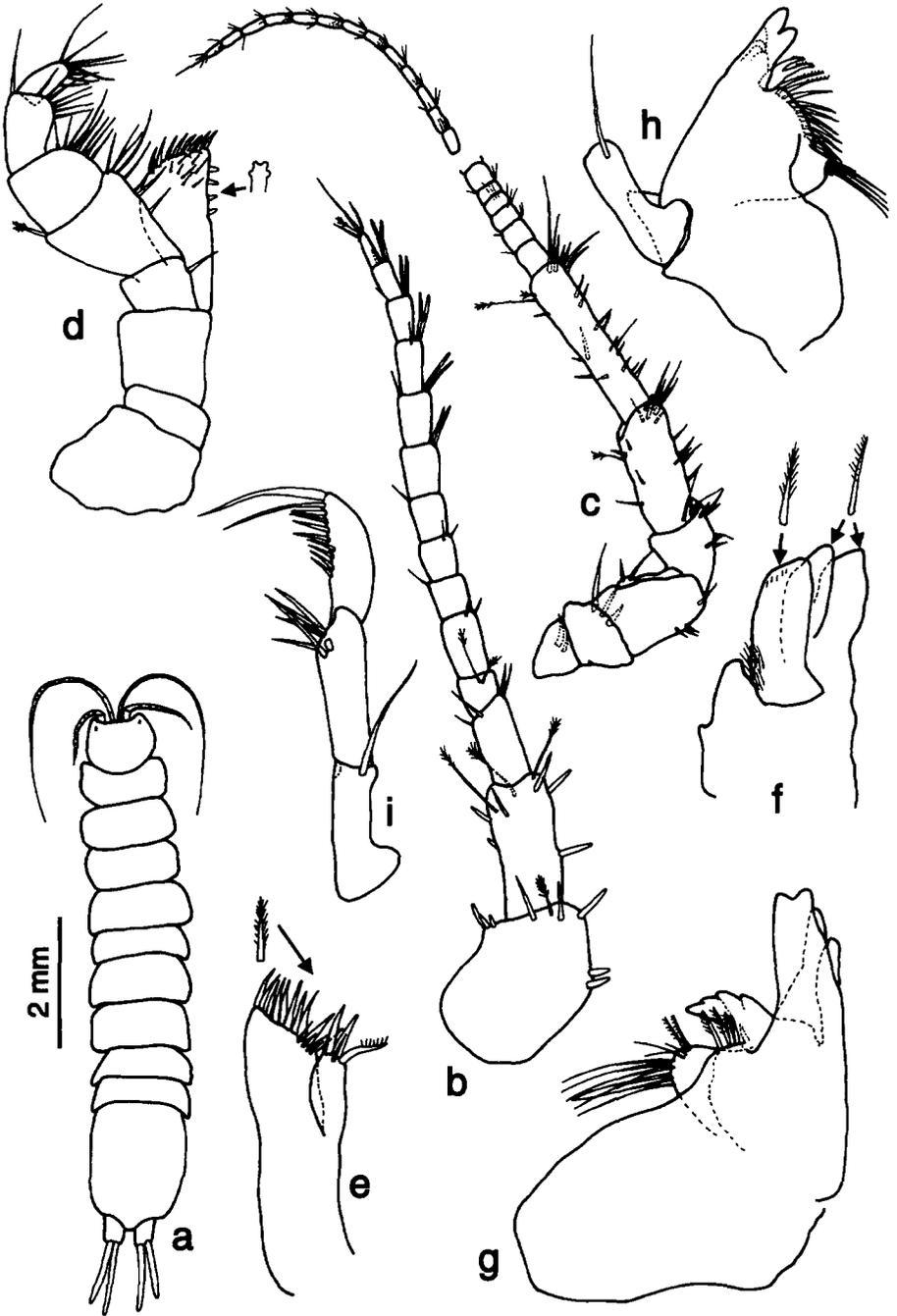


Fig. 1. — *Stenasellus simonsi* n. sp., allotype: a, body dorsal view; b, first antenna; c, second antenna; d, maxilliped; e, first maxilla; f, second maxilla; g, left mandible; h, right mandible; i, palp of mandible.

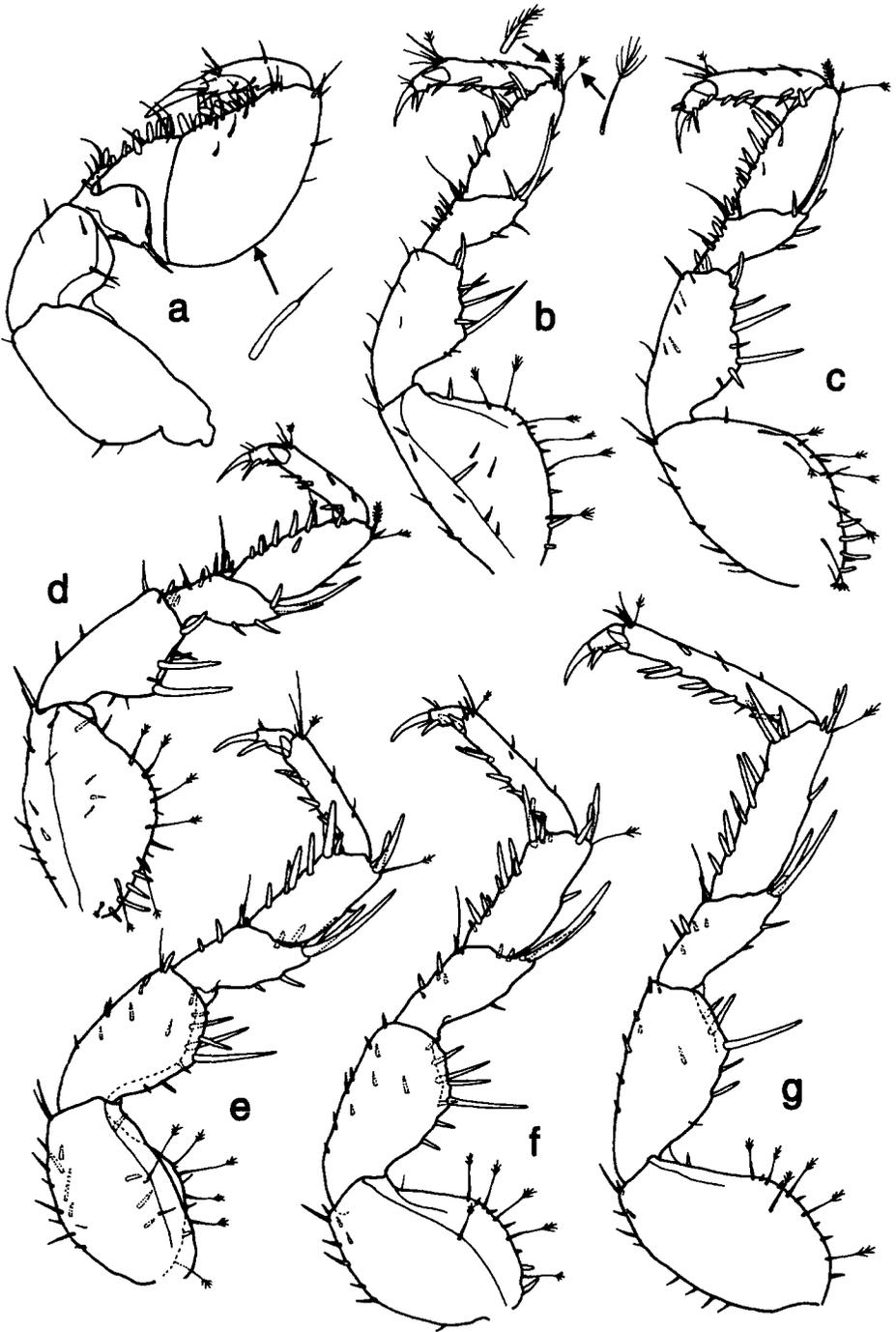


Fig. 2. — *Stenasellus simonsi* n. sp., allotype: a-g, pereopods 1-7.

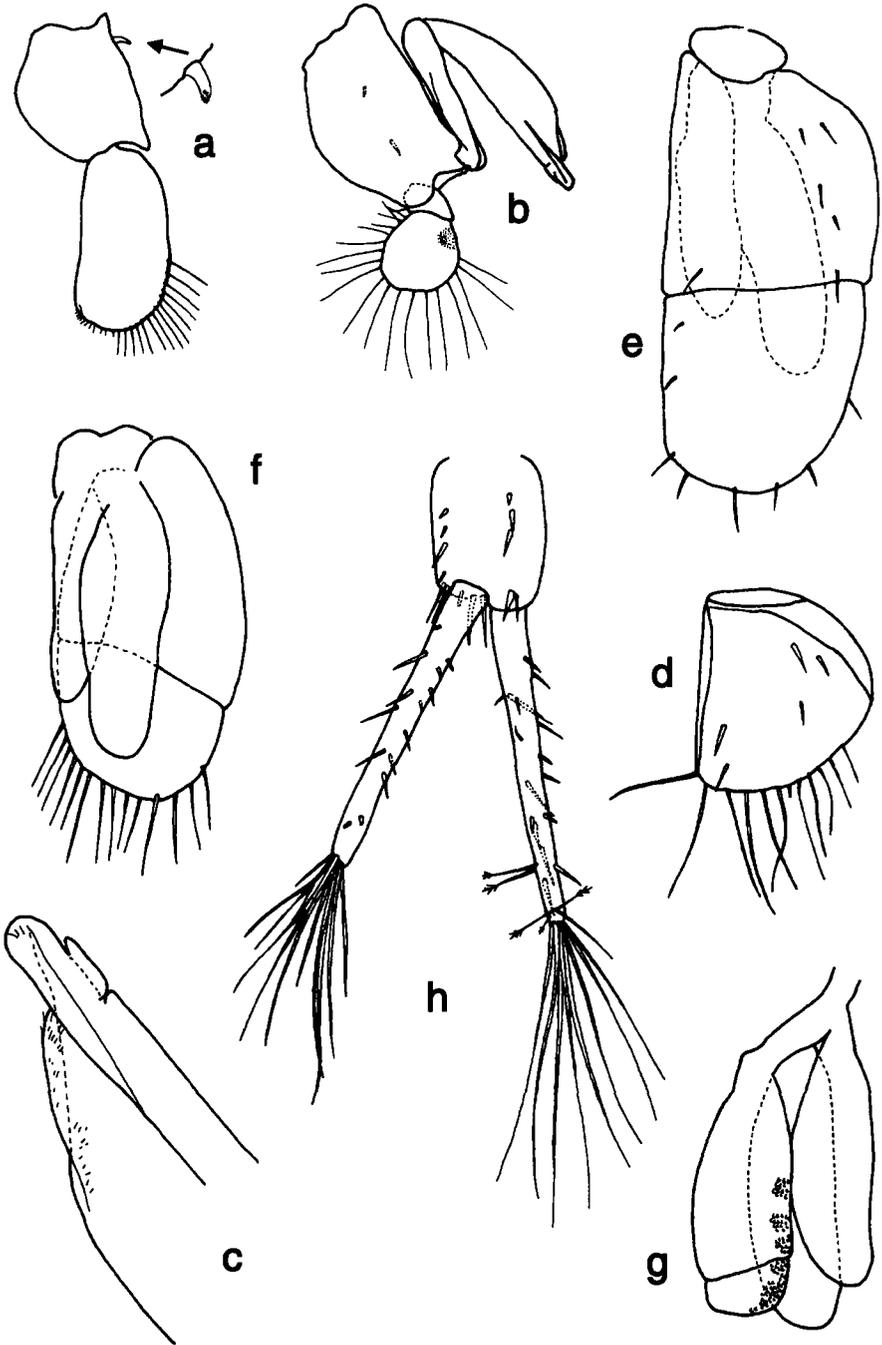


Fig. 3. — *Stenasellus simonsi* n. sp., allotype: *a*, first male pleopod; *b*, second male pleopod and *c*, distal part of second article of endopodite; *d*, second female pleopod; *e*, third pleopod; *f*, fourth pleopod; *g*, fifth pleopod; *h*, uropod.

Description. A small *Stenasellus* (8.2 mm maximum observed length) with short antennae and rather short uropods; anterior corner of cephalon bearing the typical black spot of the Bellonci Organ.

First antennae short, reaching first pereonite, peduncle of three articles, the second one bearing three plumose setae on the distal margin; two of such setae, shorter, on distal margin of first flagellar article. A couple of aestetasc are present on the distal external corner of each of the last five segments before the last one, on which no aestetasc can be observed.

Second antennae reaching third pereonite, peduncle of six segments, the third one bearing a medial squama with two spines on caudal margin, fifth and sixth articles with a plumose seta on distal caudal corner.

Maxilliped with four 4-toothed coupling hooks on endite, palp five-segmented bearing a plumose seta on distal outer corner of second article.

First maxilla: exite with 12 spinulate setae and four glabrous setae ventral on inner corner; endite with three strong setae (two plumose and the innermost one falciform and spinulate) and two setae ventral, thin and glabrous.

Second maxilla with 17 plumose setae in two rows on inner endite, and 9-10 spinulate setae on each of the other endites.

Left mandible pars incisiva 4-toothed, lacinia mobilis strong, 4-toothed, 4-7 denticulate lifting spines. Pars molaris with 6-8 long setae and two denticulate setae. Right mandible pars incisiva 5-toothed, 11-14 lifting spines, the first one bifid, stronger than the others and denticulate like the two subsequent ones. Pars molaris with 14 long setae and three short ones. Mandibular palp triarticulate, first article with a long spine on distal margin, second article with six setae on internal distal corner and terminal article with 13 setae, the two distal ones 3 times longer than the others.

First pereopod strong and subchelate. Dactylus with four teeth on sternal margin, propus with five strong spines and several long setae with an apical accessory seta on the same margin.

Pereopods 2-7 progressively increasing, dactylus with distal accessory spine on sternal margin, propus and carpus with a single plumose seta on distal tergal corner. Pereopods 2-4 also bear a bipectinate seta in the same position, bases with 6-7 plumose setae.

First ♂ pleopod with a single 4-toothed coupling hook on inner margin of sympodite, exopodite with several long plumose setae on inner and distal margin and several short distal naked ones.

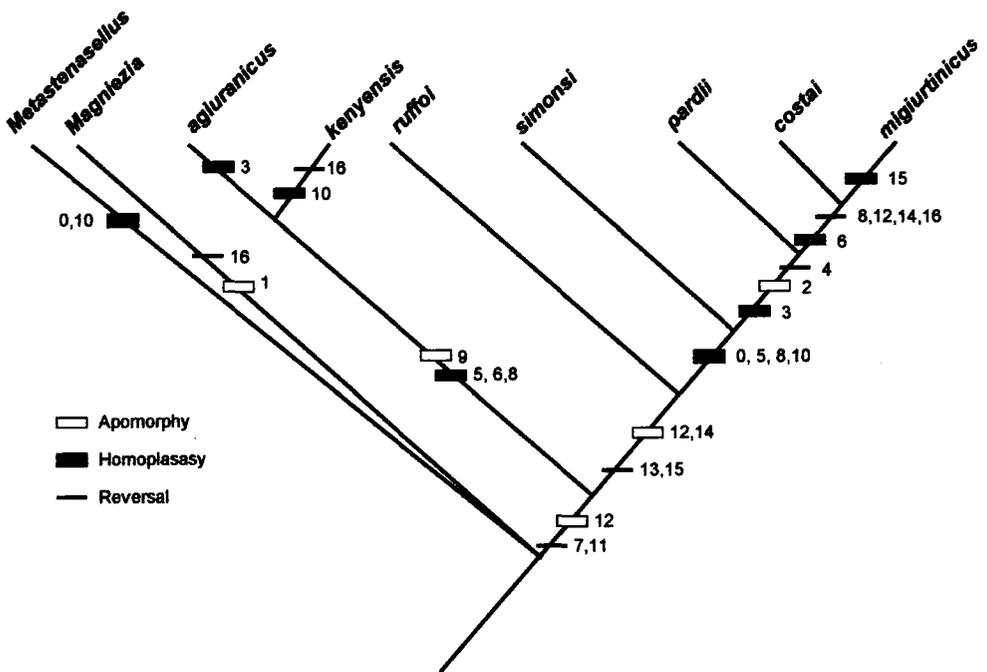
Second ♂ pleopod, basipodite subrectangular with two paramedial spines; exopodite biarticulate, second article suboval with several plumose setae on margin and a small proximal depression on inner margin; endopodite biarticulate with second article longer and stronger than the first, with 3-4 apical setae and a subterminal spine on external margin.

Second ♀ pleopod subtriangular, with five spines on sternal side and several long marginal setae.

Pleopods 3-5 endopodite bifid, exopodite divided by a transverse suture. Distal margin of pleopod 3 with a few naked setae, which are plumose and more numerous in pleopod 4. Fifth pleopod without setae and with internal margin covered by numerous scale-spines.

Uropods short, about 1/6th of total length, endopodite longer than exopodite and bearing five plumose setae, three terminal and two paraterminal ones.

Remarks. The general aspect of the examined specimens, small, with short first antennae and rather short uropods, closely resembles *Stenasellus ruffoi* Messina 1993 from the Chalbi Desert (Northern Kenya). The two species also have a similar pleopod 5 exopodite but differ strongly in the shape of the terminal article of the endopodite of the second ♂ pleopod, which in *S. simonsi* is much stronger and bears a terminal tooth. This character is also present in other East African species (i.e., *S. agiuranicus* Chelazzi & Messina 1987, *S. kenyensis* Magniez 1975 and *S. pardii* Lanza 1966). The species most similar in this respect is the Somali *S. pardii*, from which *S. simonsi* can be distinguished by the shape of the apical part of the endopodite of the second ♂ pleopod. By the presence on the second article of a much stronger distal external tooth. By a different body length/width ratio and by a generally less "interstitial" aspect. *S. kenyensis* has a completely different and more complex apex of the second article of the second ♂ pleopod, while *S. agiuranicus* differs by the much larger distal part of the same article and by a reduced terminal tooth. A very reduced apical tooth ("sprone apicale") is present also in *S. costai* Lanza, Chelazzi & Messina 1970.



character	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
steps	2	1	1	2	1	2	2	1	3	1	3	1	4	1	2	2	3
ci	50	100	100	50	100	50	50	100	33	100	33	100	50	100	50	50	33
ri	66	100	100	66	100	50	66	100	33	100	0	100	60	100	50	66	33

Fig. 4. — Cladogram showing the phylogenetic relationships between the east African *Stenasellus* species. Tree length 120, consistency index = 0.78, retention index = 0.84.

Etymology. The species is dedicated to Jim Simons, of the East Africa Caving Group, who kindly directed my attention to the area where the new species was discovered.

Ecology. The Kenyan Limestone Outcrop, running parallel to the present coast, is part of an ancient coral reef. The water is very hot and salty, with a temperature of 32 °C, pH 7.5, NH₄⁺ 0.15 ppm, NO₂²⁻ 0.01 ppm, NO₃³⁻ 50 ppm, O₂ 3.90 ppm, Cl⁻ 1600 ppm, total hardness 45 °d, temporary hardness 22.1 °d, Ca²⁺ 200 ppm, Mg²⁺ 601 ppm, alkalinity M 7.5 M/l. The specimens were collected on the mat of roots swelling in the spring. No associated fauna was found on the spring. It should be noted that to date the Kenyan groundwater has revealed the presence only of the stygobitic genus *Stenasellus*. No other isopods could be found, nor amphipods or other stygobitic crustaceans.

CLADISTICS

To clarify the phylogenetic relationships between the seven species of *Stenasellus* present in East Africa, a cladistic analysis (FARRIS 1988) was performed utilising 17 characters (Appendix). *Metastenasellus leleupi* (Chappuis 1951) and *Magniezia africana* (Monod 1945) two west African stenasellids were used as outgroups. The phylogenetic analysis of the existing relationships within the species, show (Fig. 4) the homogeneity of the genus in East Africa. Only *S. agiuranicus* and *S. kenyensis* establish a clade by themselves, thanks to a highly transformed II male pleopod endopodite. Apart from differences due to ecological adaptations (i.e., the "interstitial" habitus of *S. pardii*, *ruffoi* and *simonsi*), there are apparently no biogeographical differences between the species.

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APPENDIX

List of characters utilised to analyse the phylogenetic relationships between east African species of *Stenasellus*.

-
- 1 squama antenna II projecting (0) protruding (1), absent (2)
 - 2 maxilla I, endite with 4-1 long and 1-2 reduced (0) or 5 subequal (1) setae
 - 3 pereopod I, plumose seta on carpus not present (0), present (1)
 - 4 pereopod I, plumose seta on propus not present (0), present (1)
 - 5 I pleopod ♂, exopodite with internal margin concave (0), subparallel margins (1)
 - 6 I pleopod ♂, exopodite without (0) or with (1) coupling hooks
 - 7 shape of sympodite of II ♂ pleopod weakly convex (0), strongly convex (1)
 - 8 II pleopod ♂ endopodite biarticulate (0), single (1)
 - 9 II article of endopodite of II pleopod ♂, single terminal spine reduced or absent (0), present (1)
 - 10 II pleopod ♂, II article of endopodite pointed (0), expanded (1)
 - 11 II pleopod ♂ II segment without (0) or with (1) apical setae or spines
 - 12 II pleopod ♀ separate (0), coalescent or reduced (1)
 - 13 pleopod endopodite entire (0), incise (1), biphid (2)
 - 14 IV pleopod, exopodite suture, horizontal (0) oblique (1)
 - 15 V pleopod, exopodite normal (0), reduced (1)
 - 16 V pleopod, exopodite suture, horizontal (0), oblique (1)
 - 17 uropods long (0) reduced (1)
-

Matrix of characters: weight, state and distribution of characters in east African species of *Stenasellus*.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>M. leleupi</i>	1	0	?	?	1	0	0	1	0	0	1	1	0	1	0	1	1
<i>M. africana</i>	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0	1	0
<i>S. ruffoi</i>	0	0	0	0	1	0	0	0	0	0	0	0	2	0	1	0	1
<i>S. pardii</i>	1	0	1	1	0	1	0	0	1	0	1	0	2	0	1	0	1
<i>S. agiuranicus</i>	0	0	0	1	1	1	1	0	1	1	0	0	1	1	0	1	1
<i>S. simonsi</i>	1	0	0	0	1	1	0	0	1	0	1	0	2	0	1	0	1
<i>S. costai</i>	1	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0
<i>S. migiurtinicus</i>	1	0	1	1	0	1	1	0	0	0	1	0	0	0	0	1	0
<i>S. kenyanensis</i>	0	0	0	0	1	1	1	0	1	1	1	0	1	1	0	1	0
