

ASCARIDOID NEMATODES OF AMPHIBIANS AND REPTILES : *SEURATASCARIS* N. G.

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SUMMARY. A new genus is proposed for species with interlabial ridge, without ornate preloacal cuticle on the male tail, and with short, coarse spicules, occurring in anuran amphibians. The genus contains : *Porrocaecum numidicum* Seurat, 1917, from frogs in the Mediterranean region, successively relegated by previous workers to *Angusticaecum*, *Amplicaeum*, and *Orneoascaris* and three species from South East Asia namely, *Amplicaeum cacopi* Chatterji, 1936 from Burma, *Amplicaeum ranae* Gupta, 1959 from Bangladesh, and *Amplicaeum communis* Yuen, 1963 from Malaya. As a result of examination of specimens from anurans in France and from Bangladesh, Burma, Malaya, North Borneo, Bali, West Irian, New Guinea and Queensland, it is concluded that all belong in the single species *Seuratascaris numidica*, though considerable variation in the form of the interlabial region was evident.

Ascarides d'Amphibiens et de Reptiles : *Seuratascaris* n. g.

RÉSUMÉ. Un nouveau genre, *Seuratascaris*, n. g. est proposé pour les espèces parasites d'Amphibiens anoures présentant les caractères suivants :

Présence d'un rebord interlabial, absence d'ornementation cuticulaire pré-cloacale sur la queue du mâle, spicules courts et trapus.

Le genre comprend l'espèce *Porrocaecum numidicum* Seurat 1917. parasite de grenouilles dans la région méditerranéenne, espèce placée successivement par les auteurs précédents dans les genre *Angusticaecum*, *Amplicaeum* et *Orneoascaris* et 3 espèces décrites dans le Sud-Est asiatique : *Amplicaeum cacopi* Chatterji, 1936 de Burma, *Amplicaeum ranae* Gupta, 1959 du Bangladesh, et *Amplicaeum communis*, Yuen, 1963 de Malaisie.

L'examen de spécimens parasites d'anoures provenant de France, du Bangladesh, de Burma, de Malaisie, du Bornéo du Nord, de Bali, de l'Irian occidental, de Nouvelle-Guinée et du Queensland mène à la conclusion qu'il n'existe qu'une seule espèce dans le genre : *Seuratascaris numidica*, malgré des variations considérables dans la forme de la région interlabiale.

Introduction

It was noted in previous publications (Sprent, in press), that Le Van Hoa (1960) transferred 10 *Amplicaeum* spp. (in addition to *A. involutum*) to *Orneoascaris*. The present writer has proposed (Sprent, 1983) that one of these species, i.e. *alatum*, be placed in a separate genus, *Freitasascaris*. It has also been proposed (Sprent, in

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press), that three species be allocated to *Orneoascaris* i.e. *chrysanthemoides* (= *involuta*, = *colura*), *schoutedeni*, and *sandoshami*. In the present paper three other species listed by Le Van Hoa (1960), namely *cacopi* Chatterji, 1936, *numidicum* Seurat, 1917 and *ranae* Gupta, 1959 as well as *Amplicaecum communis* Yuen, 1963, are considered. The specimens examined were listed previously (Sprent, in press,) and comprised specimens in Category B. They were found to comprise a single genus defined below. Additional specimens collected from *Rana perezii* (= *R. ridibunda* ?) were sent to the writer by Professor C. Combes, Perpignan, France.

It was concluded that these species belong in a single genus and are combined in a single species.

Seuratascaris new genus

Small to medium sized ascaridoids with characters of *Ascaridoidea sensu* Chabaud (1965). Body of even width, tapering at each end. Lips slightly narrower than body, with wide isthmus (attachment to body), with denticerous ridge all round margin, with cleft in anterior margin. Pulp not deeply divided anteriorly, median lobe absent. Interlabial region forming interlabial ridge of variable form. Cervical alae absent. Excretory pore and cervical papillae slightly behind nerve ring. Excretory nucleus relatively large, situated on left side in commissural part of excretory cell. Excretory system bilateral. Ventriculus absent. Intestinal caecum present. Rectal glands present. Male with relatively short, stout spicules. Gubernaculum absent. Ventral cuticular precloacal ornamentation not present. Cuticle in lateral region of male tail slightly expanded. Female with vulva anterior to middle of body. Uterus didelphic, opisthodelphic. Parasites of Old World anurans.

Type species : Seuratascaris numidica

The above definition closely resembles the definition of *Orneoascaris sensu* Sprent (in press). The features differentiating *Seuratascaris* from *Orneoascaris* are : 1) labial region narrower than cervical region, with broader isthmus joining lips with body ; 2) interlabial space forming a straight or curved ridge enclosing the posterior angles of the lips (ridge of variable prominence, sometimes absent) ; 3) anterior part of labial pulp less deeply cleft ; 4) in female, vagina shorter ; 5) in male, tail without cuticular ornamentation with fewer precloacal papillae, median papilla at some distance from cloacal rim, and spicules stout and rod-like, only about 1/6 ejaculatory duct ; 6) excretory commissure and nucleus relatively larger and usually in front of tip of caecum.

Seuratascaris numidica (Seurat, 1917) new combination

Synonyms : *Porrocaecum numidicum* Seurat, 1917

Angusticaecum numidicum (Seurat, 1917) Baylis, 1920

Amplicaecum numidicum (Seurat, 1917) Chabaud & Campana-Rouget, 1955

Orneoascaris numidicum (Seurat, 1917) Le Van Hoa, 1960

Amplicaecum brumpti Khalil, 1926

- ? *Amplicaecum cacopi* Chatterji, 1936
 ? *Amplicaecum cacopi* Chatterji, of Gupta (1960)
 ? *Orneoascaris cacopi* (Chatterji, 1936) Le Van Hoa, 1960
Amplicaecum ranae Gupta, 1959
Orneoascaris ranae (Gupta, 1959) Le Van Hoa, 1960
Amplicaecum communis Yuen, 1963

(Plates I, II, III et IV; fig. 1-25)

The type species was named and described as *Porrocaecum numidicum* by Seurat (1917) from specimens collected from *Rana ridibunda* in Algeria. Apart from the presence of an intestinal caecum (which Skrjabin had evidently not noticed in *O. chrysanthemoides*), Seurat differentiated *P. numidicum* from *O. chrysanthemoides*, a tropical African species, by its short spicules. Seurat (1917) stated that interlabia were absent and accordingly Baylis (1920) transferred *numidicum* to *Angusticaecum*. Khalil (1926) described *Amplicaecum brumpti* from *R. esculenta* in Corsica without comparison with Seurat's species, but Chabaud & Campana-Rouget (1955) on examination of further specimens from Southern France, considered *A. brumpti* to be the same as Seurat's species and transferred *numidicum* to *Amplicaecum*, because they considered that interlabia were present, not only in their own, but also in Seurat's and Khalil's specimens.

From examination of these and other specimens from the Mediterranean region, it was evident to the present writer that this confusion was caused by an interlabial ridge forming a slit-like interlabial aperture enclosing the posterior angles of the lips (Plate I, 3). This ridge was in some specimens convex (Plate I, 1), in others it was concave (fig. 2) or straight (Plate I, 3) or asymmetrical (Plate I, 4).

a) Mediterranean specimens

Small to medium-sized, slender worms, of even width, tapering at each end. Coiled in flat spiral. Lips with rounded anterior margin and alate lobe on each side (fig. 1-3). Notch in anterior edge continuous with oral groove (Plate I, 1). Conspicuous denticles all round free margins. Pulp divided into two anterior lobes, symmetrical in dorsal lip (fig. 2), asymmetrical in subventral lips, with slightly larger lobe bearing amphid (fig. 1). Anterior prolongations of pulp lobate; median lobe absent. Interlabial region forming transverse slit-like aperture, bounded posteriorly by straight, concave, or slightly convex ridge (Plate I, 1-4) forming anterior margin of membranous collar, enclosing posterior angles of lips and connecting the edge of the isthmus of each lip (Plate I, 1-4; fig. 3). Isthmus joining lip to body much wider than in *O. chrysanthemoides*. Cuticle of anterior region of body behind lips swollen and transparent, surface connected to hypodermis by fine threads similar to cervical papillae (as described by Seurat). Cervical papillae pit-like, at level of excretory pore (fig. 5). Œsophagus 7-17% of body length, terminating posteriorly with smooth posterior region containing nuclei of Œsophageal glands (fig. 6). Nuclei of subventral glands irregular, with variable position in subventral sectors (fig. 4); dorsal gland nucleus larger, lobate, confined to right side of dorsal sector. Excretory nucleus relatively large, situated in capacious commissure anterior to tip of caecum (fig. 7).

Conspicuous intestino-oesophageal valve present. Intestinal caecum about half length (43-58 %) of oesophagus (*fig. 7*). Rectal glands prominent.

Tail of female conical, rounded, with button-like mucron; phasmids about one fifth distance from tip of tail to anus (*fig. 8*). Vulva with small lips, at slight constriction of body, situated at a point 30-41 % of body length from anterior end. Vagina comprising short, globular thick-walled region near vulva and cylindrical region, extending posteriorly to undivided uterus of variable length, usually longer than vagina, dividing into two uterine branches (*fig. 9*). Eggs oval, with finely pitted shell, slightly thickened at poles, measuring 0.100 — 0.142 × 0.070 — 0.090 mm. In a specimen 48 mm in length the vagina was 0.61 mm long.

Male tail tapering smoothly, with conical mucron (*fig. 10*). Cuticle thickened in lateral region of body wall in caudal region, forming expansion near cloaca. On each side, four or five subventral postcloacal papillae (*Plate I, 5-6*). Phasmids lateral, about 1/5th distance from tip of tail to cloaca. Precloacal papillae variable in number, sessile, or pedunculate depending on extent of caudal expansion, usually seven, but up to nine sometimes present. Median precloacal papilla some distance anterior to cloaca (*Plate I, 5*). Spicules subequal, short, cylindrical, with 'handle' of variable length relative to shaft, length 0.6-1.0 % of body length 16-33 % of ejaculatory duct (*fig. 11*). Body measurements of *S. numidica* from France are shown in *Table I*.

Type material : MNHN Jar N CXII
 Other material : MNHN 507, 1107 JJ ; DPUQ 1958, 1959, 2036, 4324
 Type host : « Grenouille » (*Rana ridibunda* ?)
 Other hosts : *R. esculenta*
 Type locality : Algeria
 Other localities : France, Spain, Corsica
 Location in host : Stomach and intestine

TABLE I. — Measurements (mm) of male and female specimens of *S. numidica* from France.

	Males	Females
No. of specimens	4	8
Length	13.3-46.9	10.6-78.4
Width (maximum)	0.19-0.46	0.13-1.2
Width (at 0/1 junction)	0.16-0.43	0.12-0.66
Subventral lip (length)	0.05-0.15	0.07-0.19
Interlabia	0.015-0.040	0.019-0.052
Nerve ring	0.32-0.89	0.25-1.0
Excretory pore	0.36-0.92	0.59-1.0
Oesophagus (length)	2.4-6.1	1.5-6.1
Caecum	1.0-2.7	0.6-3.5
Vulva (from anterior end)		4.5-24.6
Tail	0.17-0.42	0.15-0.37
Spicules	0.14-0.34	—
Ejaculatory duct	0.42-1.9	—

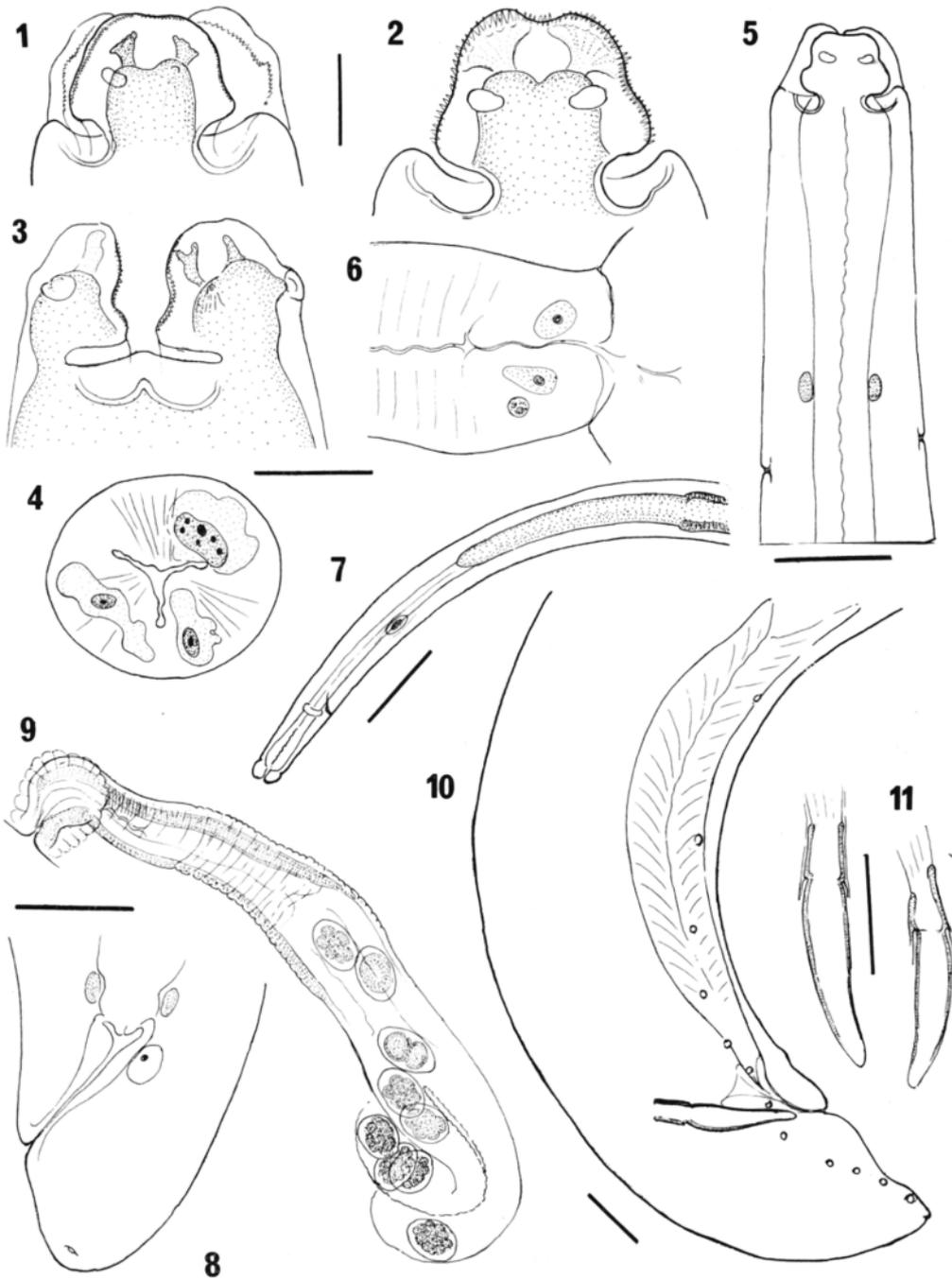


FIG. 1 TO 11.

- 1 : Subventral lip (0.05).
 2 : Dorsal lip (same scale as 1).
 3 : Lateral view of lips showing interlabial ridge (same scale as 1).
 4 : Oesophageal gland nuclei (0.1).
 5 : Anterior region showing nerve ring and cervical papillae (0.25).
 6 : Posterior end of oesophagus showing oesophageal gland nuclei (same scale as 4).
 7 : Oesophageal region showing caecum and excretory nucleus (0.5).
 8 : Tail of female (0.25).
 9 : Vagina and undivided uterus (same scale as 8).
 10 : Tail of male showing spicule and ejaculatory duct (0.1).
 11 : Right and left spicules (0.1).

(Scale bar values (mm) in brackets).

N.B. : Fig. 1-11 are drawn from Mediterranean specimens.

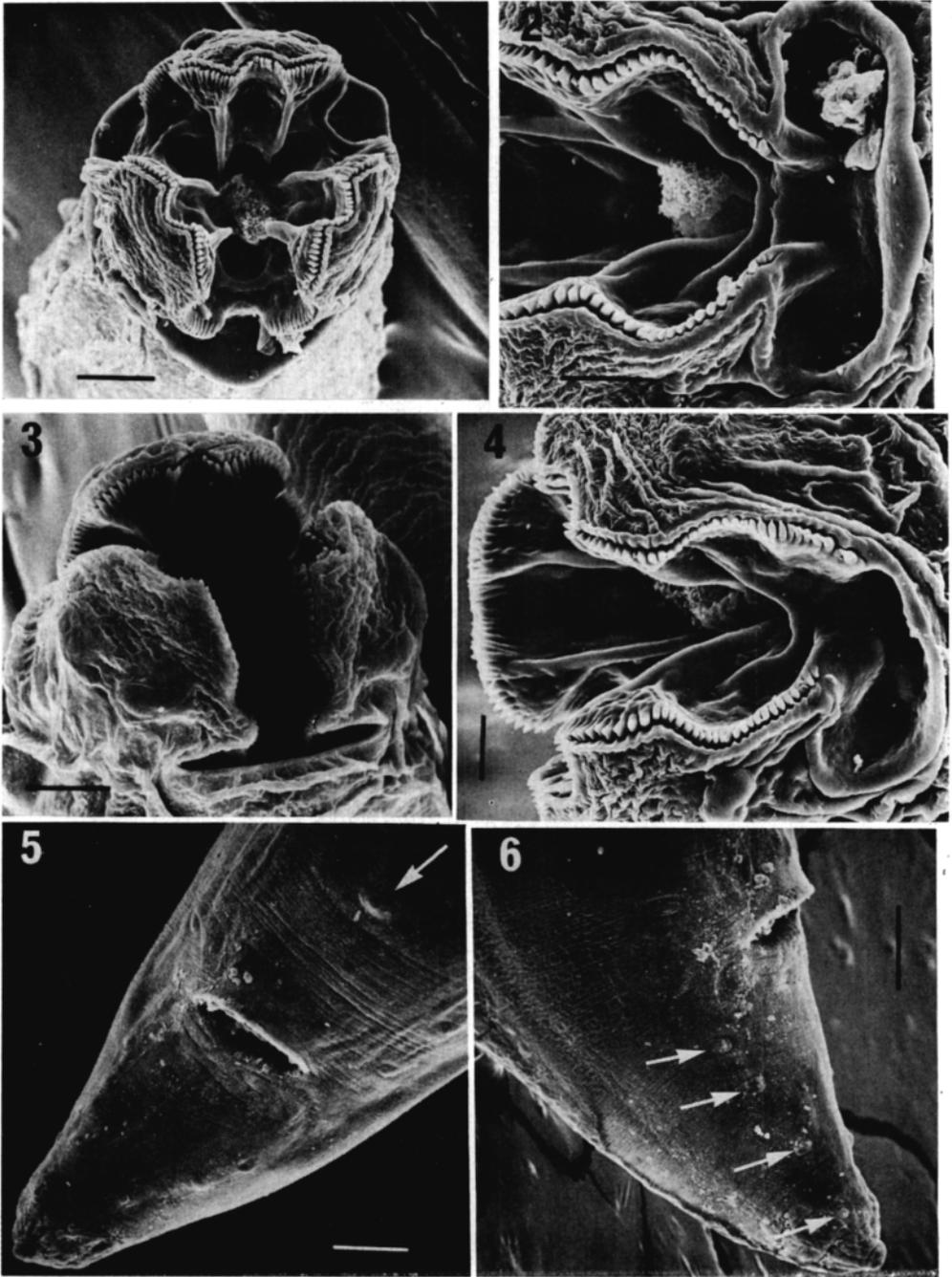


PLATE I.

- 1* : En face view of lips showing interlabial ridges (0.05).
2-4 : Ventral view of interlabial ridge in three different specimens (0.025).
5 : Ventral view of tail of male showing median precloacal papilla (0.05).
6 : Lateral view of tail of male showing four postcloacal papillae (0.05).
 (Scale bar measurements (mm) in brackets).
N.B. : Fig. 1-6 are specimens from France.

Combes and his co-workers have found this species to be present in 14.6 % of *Rana ridibunda perezi* in the coastal region of the Eastern Pyrenees, on the border of France and Spain (Combes & Gerbeaux, 1970) but it was not found in *R. temporaria* which occurs mainly further west at higher altitudes. In Spain, *S. numidica* was found near Soria by Combes and Sarrouy (1971) and near Granada by Lopez-Neyra (1947) in *R. esculenta*. It was found in *R. esculenta* in the coastal regions of Corsica by Combes, Leger and Vidal (1974). From this distribution, it would seem likely that this species is of North African origin with a somewhat tenuous foothold in Europe. It has not been reported from any other part of Europe or Africa.

b) Specimens from South East Asia

Amplicaecum ranae Gupta, 1959 appears to have been the first ascaridoid from anurans in the Indo-Malaysian region to be described as having no interlabia. According to Baylis' classification (Baylis, 1920) it should for this reason have been placed in *Angusticaecum*. What appear to be the type specimens of *A. ranae* collected from *Rana tigrina* in Bangladesh are in the U.S. National Helminth Collection (67049). It is evident that they are very similar to specimens Yuen (1963) described and named *Amplicaecum communis* from *Kaloula pulchra*, *Bufo melanostictus*, *B. asper* and *Rana cancrivora* in Malaya. Yuen differentiated this species from *A. ranae* by unstated details of spicule structure and in the number of caudal papillae in the male.

Myers and Kuntz (1969) reported *A. ranae* from several frogs in North Borneo, namely *Rana cancrivora*, *R. erythraea*, and *R. kuhli*, and *Amplicaecum* sp. from *Kaloula baleata*, *R. blythi*, *R. glandulosa* and *R. macrodon*, from which only female worms were collected.

The present writer has examined the type specimens of *A. ranae* and *A. communis* as well as specimens collected from frogs and toads in Burma, Malaya, North Borneo, and Bali, and specimens removed from preserved frogs in the Queensland Museum, collected from New Guinea and northern Queensland. All these specimens form a uniform series in most of their morphological features, corresponding with the description and type specimens of *S. numidica*. Text figures 16, 17 and 18 show the œsophageal gland nuclei and the excretory nucleus in Asian specimens.

Variation occurred in the relative prominence of the cuticular ridge between the lips, as well as in the extent to which the posterior angles of the lips are constricted to form postlabial grooves (*Plate IV*, 20-25). In specimens from Bangladesh and North Borneo, the interlabial space and ridge was found to be small or absent (*ranae* pattern, *Plate II*, 9-10; *fig. 12*), whereas in specimens from Malaya, the postlabial grooves were more prominent (*communis* pattern) and a distinct interlabial ridge was present (*Plate II*, 7-8; *fig. 13-15*). No specimens in Asian hosts showed as conspicuous a ridge between the lips as occurs in *S. numidica* from France (*numidica* pattern, *fig. 1-3*; *Plate I*, 1-4). Specimens which are probably fourth stage larvae possessed a convex interlabial ridge between the subventral lips, forming a ridge resembling an interlabium, but the ridges in the lateral position were continuous with the margin of the subventral lips (*Plate II*, 11-13).

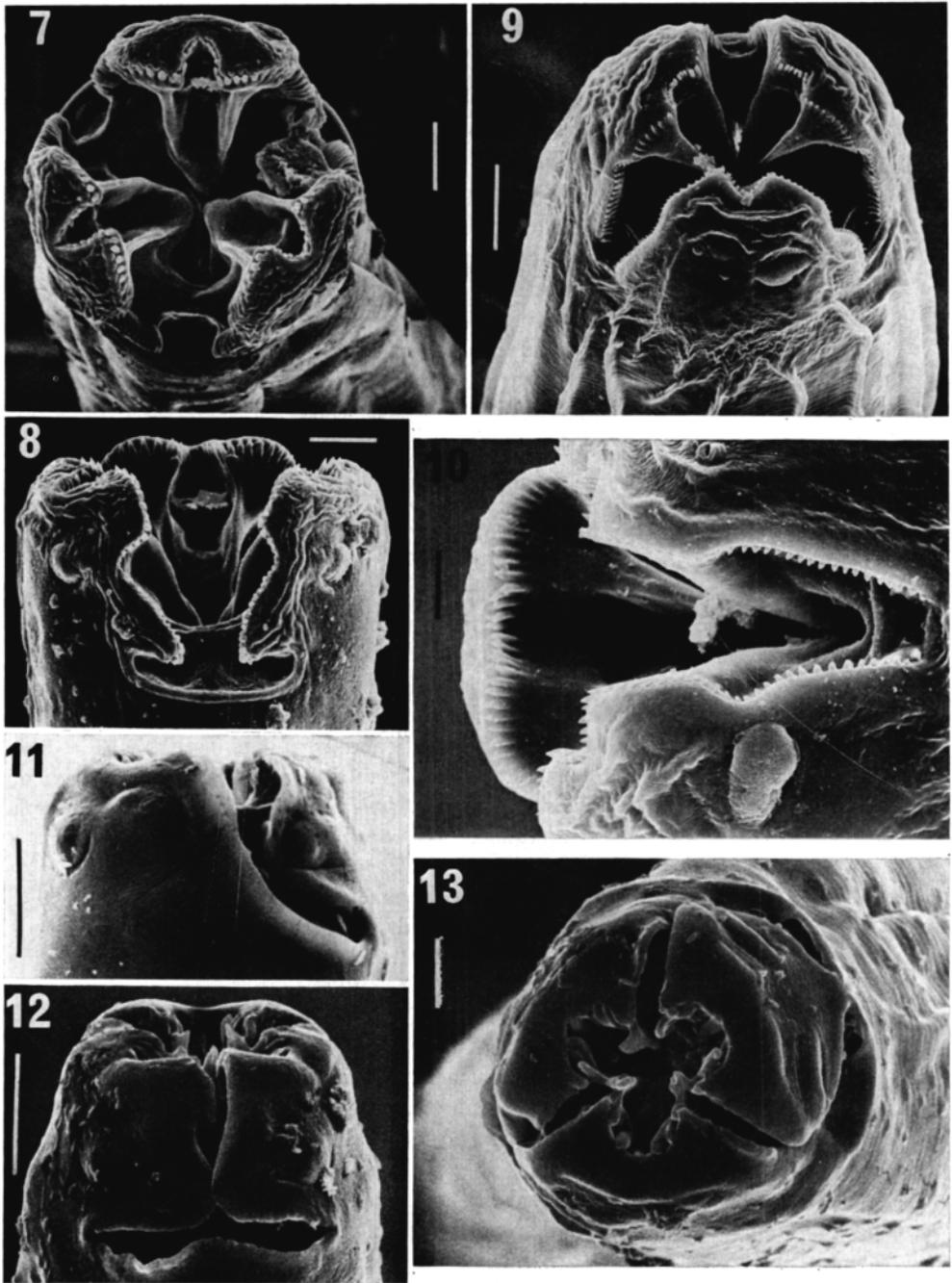


PLATE II.

7 : En face view of lips (0.01).

8 : Interlabial ridge of same specimen as in Plate Fig. 7 (0.01).

9 : En face view of lips (0.025).

10 : Interlabial ridge from same specimen as in Plate Fig. 9 (0.01).

11 : Left lateral view of lips of fourth stage larva (0.01).

12 : Ventral view of lips of fourth stage larva (0.01).

13 : En face view of lips of fourth stage larva (0.005).

(Scale bar measurements (mm) in brackets).

N.B. : Fig. 7-8 and 11-13 are specimens from Bali ; Fig. 9-10 from N. Borneo.

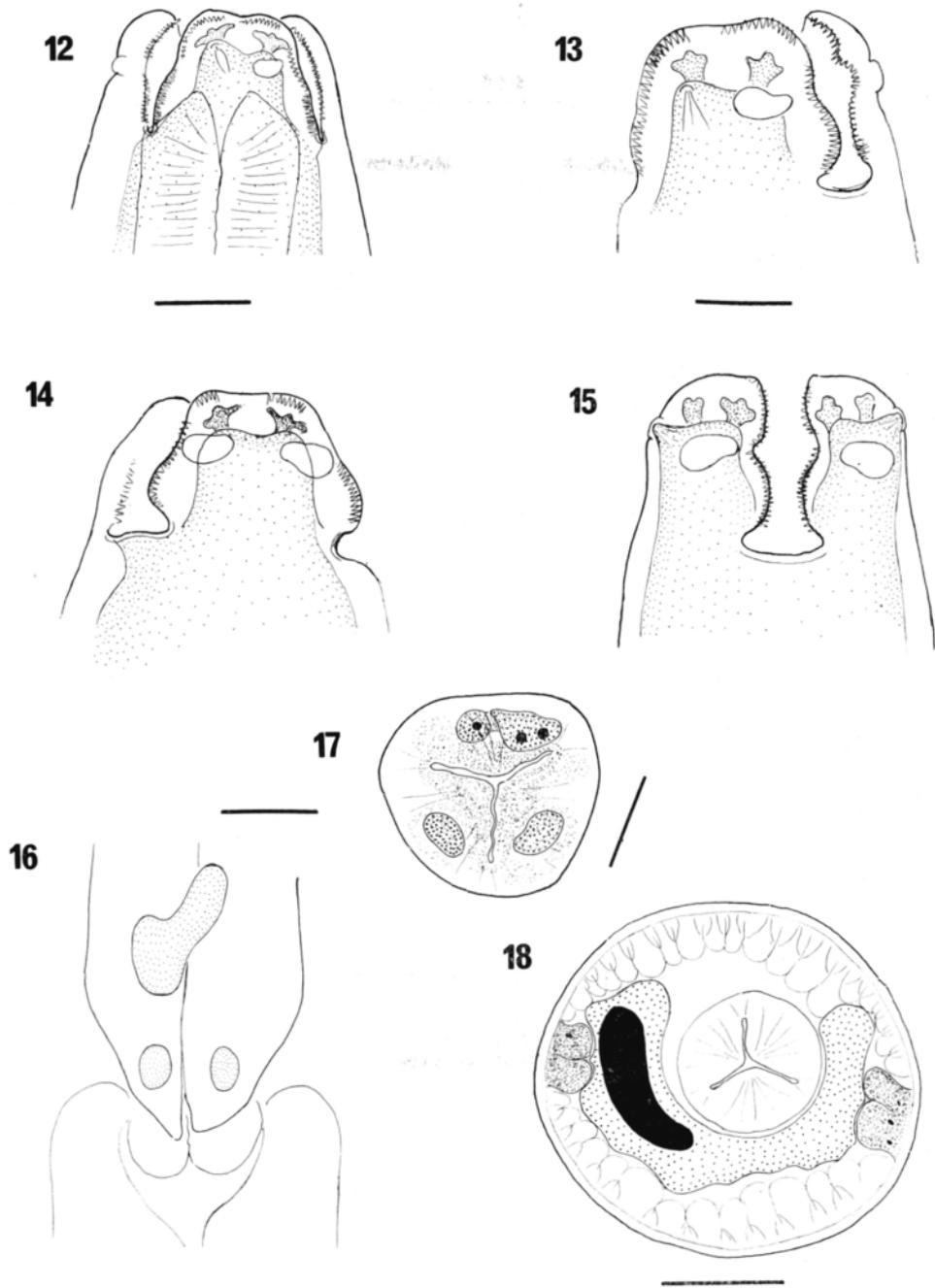


FIG. 12 TO 18.

- 12 : Subventral lips showing small interlabial groove (0.05).
 13 : Subventral lip with wider interlabial ridge (same scale as 12).
 14 : Dorsal lip (same scale as 12).
 15 : Ventral view of lips (same scale as 12).
 16 : Posterior end of oesophagus showing oesophageal gland nuclei (0.05).
 17 : Section of oesophagus showing oesophageal gland nuclei (semi-diagrammatic to include 6 sections (0.05)).
 18 : Section showing excretory nucleus in commissure (0.1).

(Scale bar values (mm) in brackets).

N.B. : Fig. 16 is drawn from Mediterranean specimen ; Fig. 12 from Bali ; Fig. 13-15, 17-18 from Malaya specimens.

TABLE II. — Measurements (mm) of male specimens of *S. numidica* from South East Asia.

	Burma	Malaya	Bali	Borneo	West Irian New Guinea	Queensland
No. of specimens	6	6	14	5	1	1
Length	16.9-23.1	13.8-19.2	4.9-20.4	11.5-18.5	11.3	7.4
Width (maximum) (at 0/I junction)	0.32-0.49	0.30-0.42	0.26-0.42	0.22-0.45	0.27	0.16
Subventral lip (length)	0.27-0.41	0.26-0.39	0.10-0.34	0.21-0.41	0.23	0.13
Nerve ring	0.10-0.12	0.06-0.09	0.03-0.08	0.05-0.07	0.07	0.05
Excretory pore	0.47-0.65	0.41-0.60	0.23-0.56	0.39-0.54	—	0.28
Œsophagus (length)	0.50-0.69	0.43-0.62	0.25-0.62	0.39-0.52	—	0.25
Caecum	2.1-3.2	1.9-2.7	0.85-2.9	2.1-3.8	2.3	1.2
Tail	1.1-1.5	0.92-1.3	0.44-1.6	1.1-1.9	1.5	0.73
Spicules	0.31-0.40	0.19-0.28	0.11-0.33	0.15-0.29	0.16	0.14
Ejaculatory duct	0.17-0.26	0.09-0.23	0.09-0.23	0.14-0.20	0.13	0.08
	0.85-1.2	0.58-1.0	0.58-1.0	0.50-0.88	—	0.43
						0.37-0.88

TABLE III. — Measurements (mm) of female specimens of *S. numidica* from South East Asia.

	Bangladesh	Burma	Malaya	Bali	Borneo	West Irian	Queensland
No. of specimens	1	2	5	8	7	1	4
Length	24.6	16.1-16.7	23.5-39.2	10.2-39.6	14.7-28.1	29.2	14.4-37.2
Width (maximum) (at 0/I junction)	0.42	0.31	0.54-0.75	0.27-0.64	0.29-0.66	0.56	0.32-0.58
Subventral lip (length)	0.34	0.24-0.26	0.35-0.56	0.14-0.55	0.25-0.57	0.49	0.29
Nerve ring	0.05	0.10	0.08-0.11	0.06-0.11	0.05-0.10	0.11	0.06-0.07
Excretory pore	0.45	0.43-0.47	0.49-0.68	0.25-0.70	0.42-0.63	0.37	—
Œsophagus (length)	0.48	0.48-0.54	0.49-0.70	0.27-0.74	0.42-0.63	0.48	0.42-0.45
Caecum	2.8	2.1-2.4	2.5-4.2	1.3-4.5	2.3-5.0	3.5	2.5-3.0
Vulva (from anterior end)	1.2	1.3-1.6	0.8-1.9	0.82-2.7	1.3-2.5	2.4	1.7
Tail	8.5	5.4-5.5	6.9-11.5	4.2-12.3	4.8-9.2	7.5	4.4-9.2
	0.14	0.23	0.18-0.27	0.12-0.27	0.14-0.21	0.19	0.19-0.22

The number of preloacal papillae in South East Asian specimens (*fig. 19-22*) manifested variation among individual specimens in the same host and on different sides of the same specimen, but there were also variations in different localities. All specimens from North Borneo irrespective of host species possessed 2-3 preloacal papillae, specimens from Malaya had 5-6 (*Plate III, 18; fig. 23*), whereas specimens from other parts of S.E. Asia possessed 3-5. This is compared with 5-9 preloacals in specimens from France. The tail region of males from Asian hosts are shown in *figures 19-23*; they possess the characteristic, short, solid spicules and the lateral thickening of the cuticle of the tail in this species throughout its range. Many Asian specimens had double para-loacal papillae (*Plate III, 16*).

Female tail and vagina are shown in *figures 24-25*. Body measurements of specimens from various localities in South East Asia are shown in *Tables II and III*. Apart from the features outlined above, no other differences from Mediterranean specimens were observed.

- Material Examined : USNHC 67049 (*A. ranae*).
 USHNC 64041, 64047, 64048, 64051, 64054, 64056, 64059, 64060,
 64061, 64064, 64070; BMNH 1938.11.4.617;
 1963.822-851 (*A. communis*); DPUQ 1860, 1963, 1864, 1867,
 1875, 2017-20, 2023, 2815-18, 2925-56, 3064-81, 3813-14
- Hosts : *Rana tigrina*, *R. blythi* (new host record), *R. erythraea*, *R. kuhli*,
R. cancrivora, *R. leucoplax* (new host record), *R. limnocharis* (new
 host record), *R. novaeguineae* (new host record), *R. daemeli* (new
 host record), *Bufo asper*, *Bufo melanostictus*, *Kaloula pulchra*,
K. baleata (new host record), *Polyypedetes leucomystax* (new host
 record), *Megophrys nasicornis* (new host record).
- Distribution : Bangladesh, Burma, Malaya, North Borneo, Bali, West Irian,
 New Guinea, Queensland (Australia).
- Location in host : Stomach and anterior part of intestine, occasionally large intestine.

The status of *Amplicaeum cacopi* described by Chatterji (1936) from the stomach of *Cacopus systoma* in Burma must remain in doubt because there are no specimens available and the description states that small interlabia were present. The spicules were 0.21-0.28 mm which is slightly larger than the range for *S. numidica* in Asia, but in other respects the description closely corresponds with *S. numidica* as described above. Gupta (1960) described specimens identified as *A. cacopi* from *R. tigrina* in East Pakistan, also stating that interlabia were present. A vial containing a specimen identified by S. P. Gupta as *Amplicaeum cacopi* was found among the Kuntz Collection in the U.S. National Helminth Collection (67130). Unfortunately the specimen was without anterior or posterior end, but, judging from the posterior end of the oesophagus and the length of the caecum, it appeared to be identical with *S. numidica*.

Discussion

The specimens described above comprise a species manifesting characteristic features in the interlabial region and in the structures of the male tail, especially the spicules, indicating generic separation from species in *Orneoscaris*. *Seuratascaris* spp.

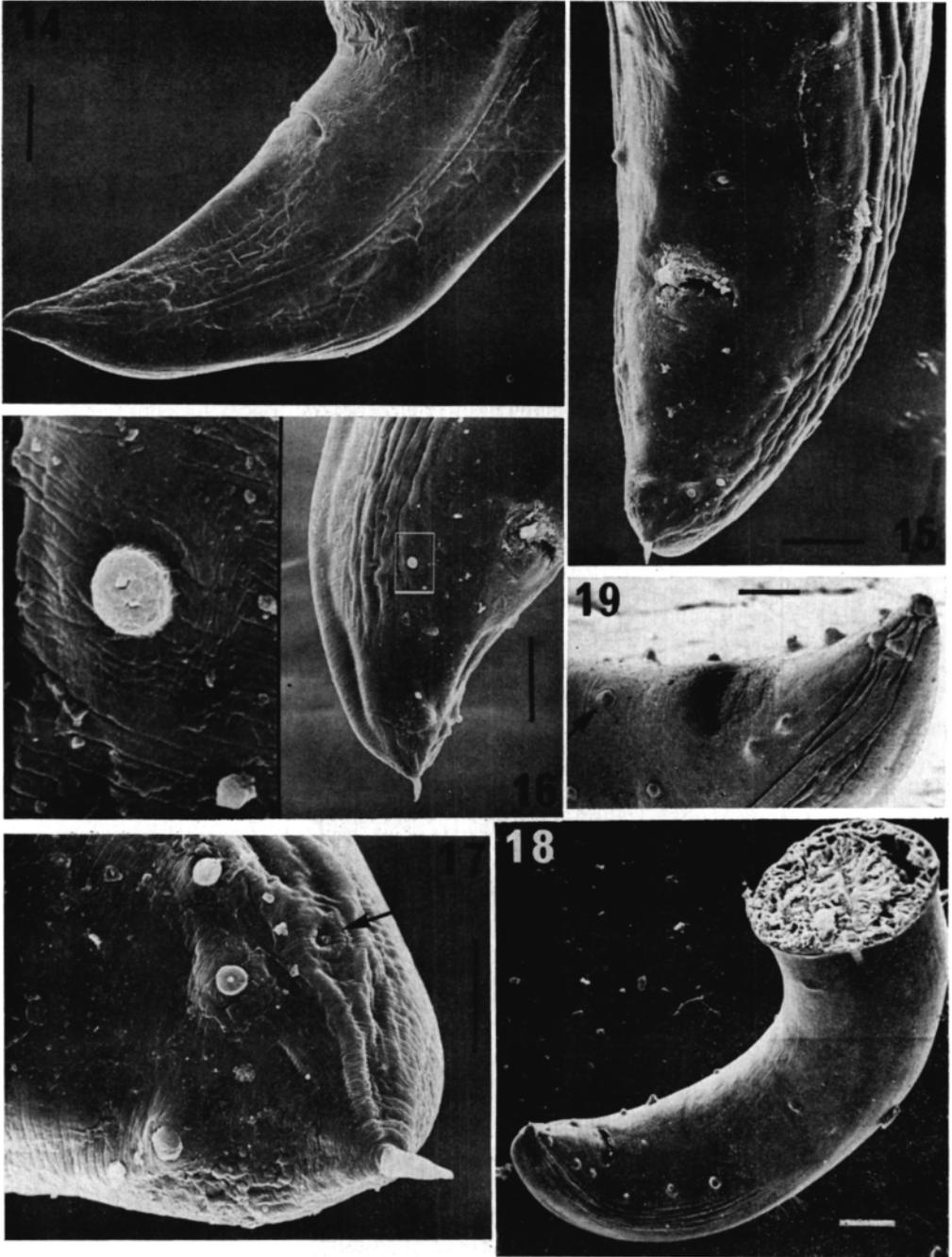


PLATE III.

14 : Tail of female (0.025).

15 : Ventral view of tail of male (0.05).

16 : Lateral view of tail of male with double paraocloacal papilla at higher magnification (0.05).

17 : Tip of tail of male showing phasmid (0.01).

18 : Tail region of male showing 5 precloacal papillae (0.1).

(Scale bar measurements (mm) in brackets).

N.B. : Fig. 14 is a specimen from Bali ; Fig. 15-17 from N. Borneo ; Fig. 18 from Malaya.

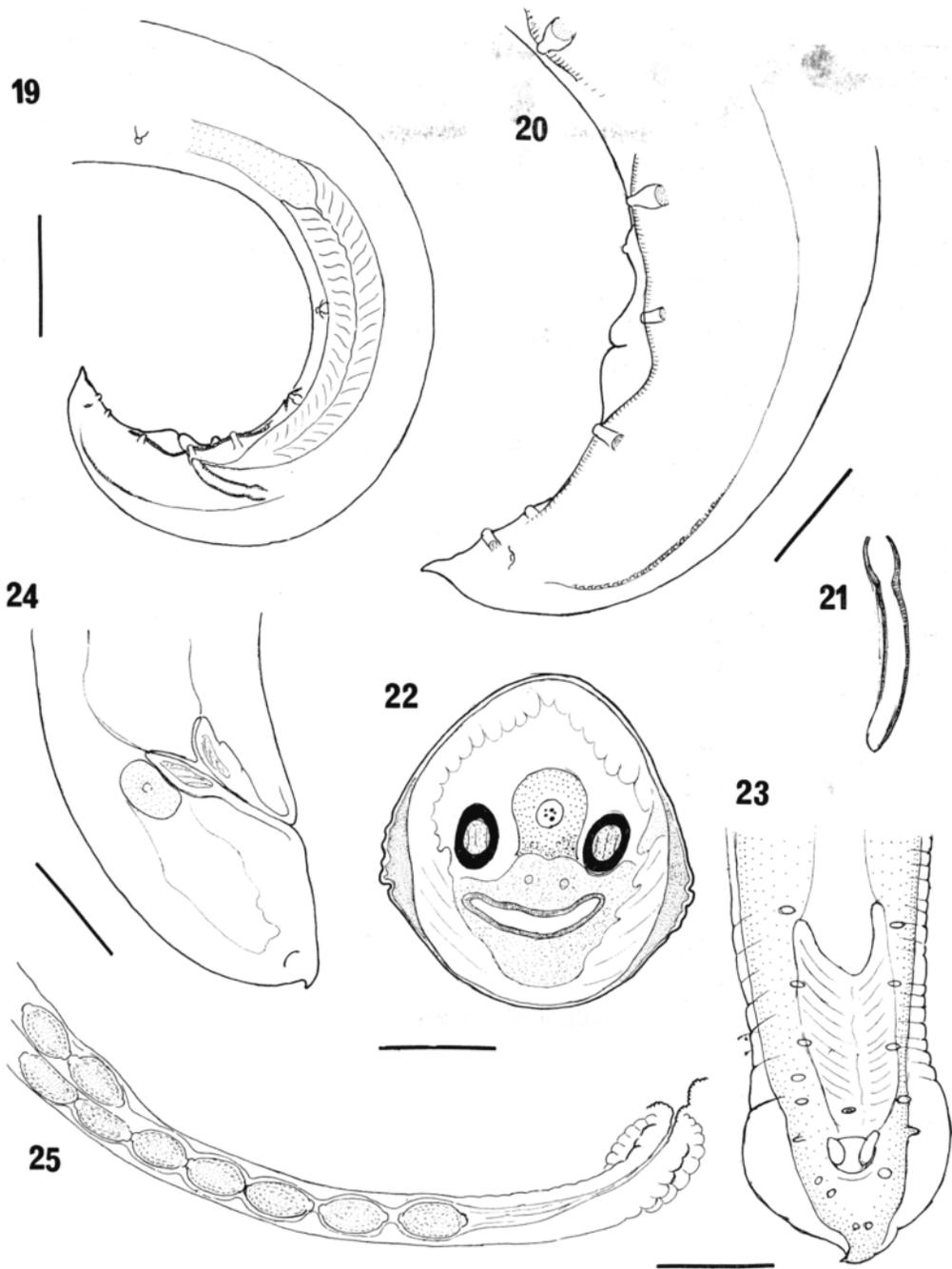


FIG. 19 to 25.

19 : Lateral view of caudal region of male showing spicule and ejaculatory duct (0.25).

20 : Lateral view of tip of tail of male (0.1).

21 : Spicule (0.1).

22 : Section of male in tail region showing lateral caudal thickenings and spicules (0.1).

23 : Ventral view of caudal region of male (0.25).

24 : Female tail (0.1).

25 : Vagina and undivided uterus (0.25).

(Scale bar values (mm) in brackets).

N.B. : Fig. 19-21, 24-25 are drawn from Bali specimens ; Fig. 22-23 from Malaya specimens.

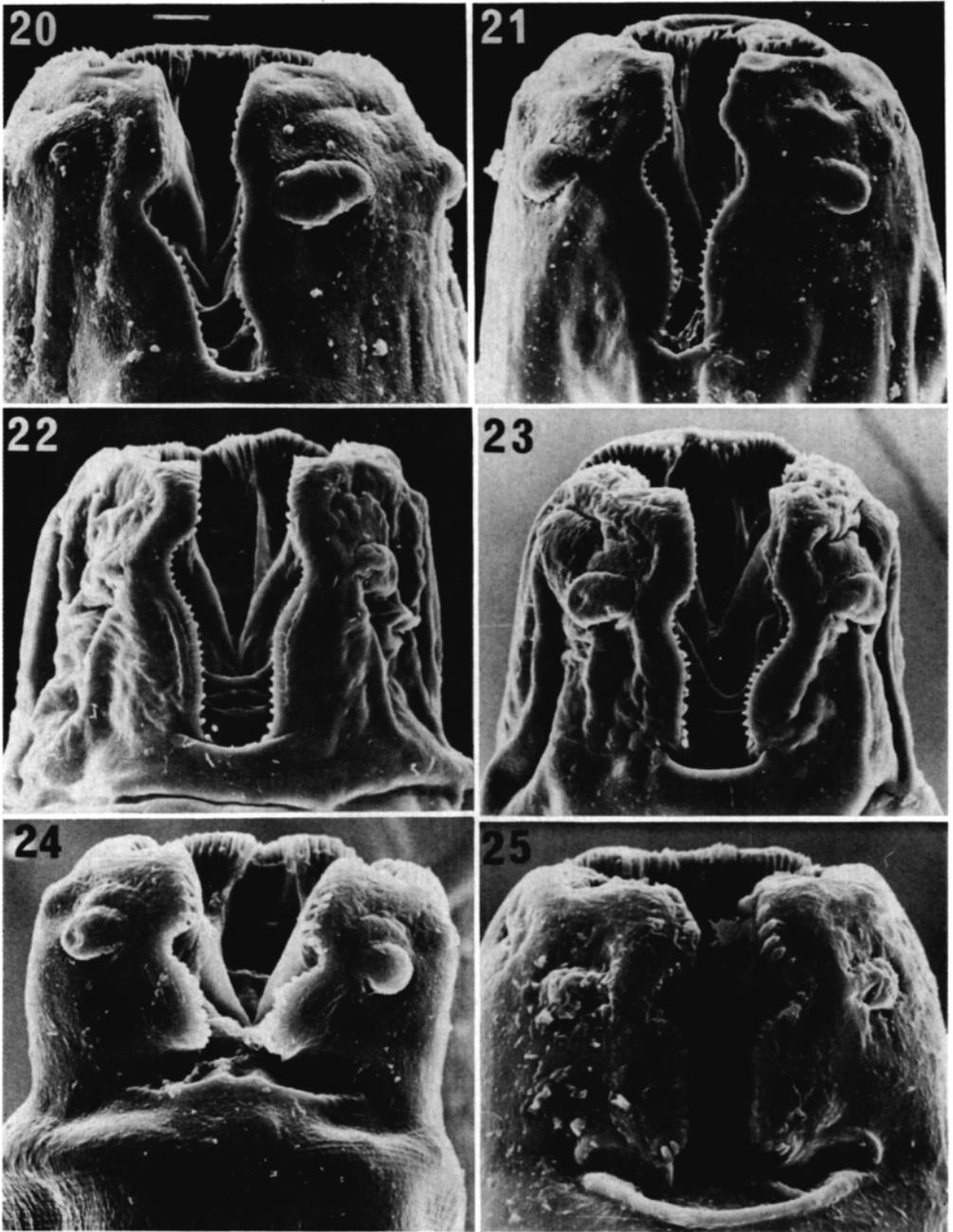


PLATE IV.

19 : Cloacal region of male showing median precloacal papilla and two single paracloacal papillae (0.05).

20-25 : Interlabial region of six specimens from *Bufo melanostictus* in Bali showing 'ranae-type' (Fig. 20-21) merging into 'communis-type' (Fig. 22-23) and 'numidica-type' Fig. 25 (all same scale as Fig. 20 (0.01).

(Scale bar measurements (mm) in brackets).

N.B. : Fig. 19 is a specimen from Malaya ; Fig. 20-25 from Bali.

have a wide range of anuran hosts, but as far as is known, unlike *Orneoascaris* spp. they do not extend their range to reptiles.

Whereas the validity of the genus *Seuratascaris* appears to be beyond question, there is less certainty about the extent of differentiation within the genus. Specimens from Malayan anurans (*communis* pattern) could not be differentiated from specimens from Mediterranean frogs, except by the shorter interlabial ridge of the former (compare *Plate I*, 1-4 and *Plate II*, 7-8). In specimens from anurans in Bangladesh and North Borneo (*ranae* pattern) differentiation was more clearcut, because the interlabial ridge was hardly discernible (*Plate II*, 9-10). In specimens from North Borneo there was the added difference of only 2-3 preloacal papillae. On the other hand, in Bali, West Irian, New Guinea, and Queensland frogs, both *communis* and *ranae* patterns occurred, and the specimens depicted in *Plate IV*, 20-25 show a continuous series in the same host (*B. melanostictus*) and locality (Bali).

It is possible that comparative observations on fresh specimens, coupled with life history studies may detect more clearcut differences among the forms from different localities, so that more than a single species in *Seuratascaris* may eventually be recognized. Nevertheless on present evidence the distinction between Mediterranean and South East Asian specimens was not considered to be of sufficient magnitude to justify recognition of more than one species, despite the wide gap between the Mediterranean and the South East Asian forms. Accordingly *Seuratascaris* was regarded as comprising a single species, *S. numidica*, manifesting polymorphism with regard to the form of interlabial region and the number of preloacal papillae.

This polymorphism of the interlabial region may be of interest in indicating interrelationships, the 'ranae' pattern resembling *Angusticaecum holopterum*, and the 'communis' pattern resembling *Polydelphis anoura*. The 'numidica' pattern with the cuticular collar may anticipate the pattern seen in related species in *Varanus* in which the interlabia are visible within the collar in the adult stage, but are not present in the fourth stage larva in the lateral region (Sprent, in preparation).

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