

Results of the Austrian-Ceylonese Hydrobiological Mission 1970 of the 1st Zoological Institute of the University of Vienna (Austria) and the Department of Zoology of the Vidyalkankara University of Ceylon, Kelaniya

PART V—DECAPODA CARIDEA

By

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The first comprehensive study to be made on the freshwater Caridea of Ceylon was by Arudpragasm and Costa in 1961. Although it was the intention of these authors to continue this study no opportunity was available to them. The present faunal survey however has afforded the present writer to make a detailed study of the distribution of these shrimps specially in the mountain streams of the South West of Ceylon.

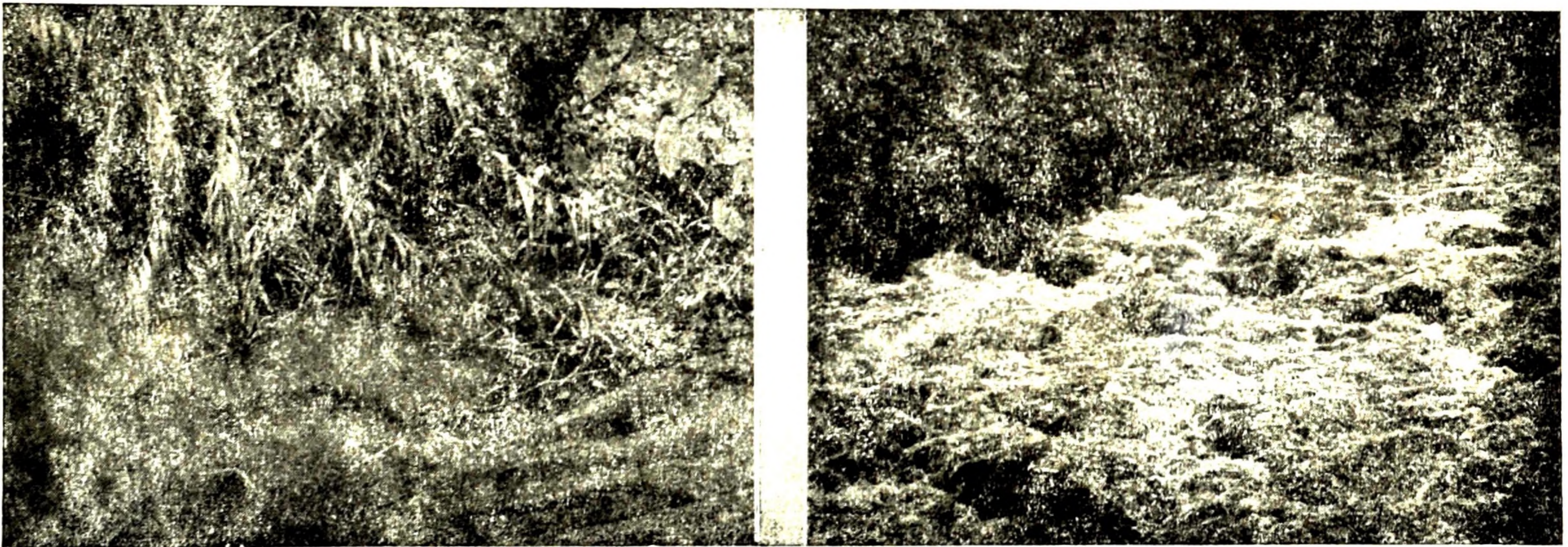


Fig. 1 Atypical habitat of atyid shrimps

Fig. 2 Belihul Oya after a shower of rain

The Caridea collected show two ecological habitats. The habitat of the atyid shrimps is usually the edge of the stream, where the intensity of the water current is rather low, and are found swimming or resting among the overhanging grasses and plants such as *Cryptocoryne* sp. *Aponogeton* sp. (Fig. 1) or among the washed out debris. Sometimes they are found in algae covered pools, but are never found under the stones. The adult palaemonid shrimps on the other hand are found usually under rocks and boulders at the centre of the stream, where the intensity of the water current is the maximum, while the young like the atyid shrimps are found at the edges of the streams.

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Most of the hill country streams are subjected to severe floods after torrential down pours (Fig. 2). It is possible that some of the atyid shrimps could get washed downstream while the palaemonid shrimps are more or less protected as they could creep under boulders, rocks and crevices, etc.

The important ecological and hydro chemical data for the collecting streams have been extensively discussed by Costa and Starmuhlner in the Part I of the series and by Weninger in the Part II of the series.

SYSTEMATIC ACCOUNT

The Caridean specimens collected by the Austrian Ceylonese mission from the hill streams of Ceylon fall into two families. Atyidae and Palaemonidae.

FAMILY ATYIDAE

1. First and second pereopods equal or subequal with chaelae cleft to or almost to the base and the carpus short and deeply excavated—*Atya*.

2. First and second pereopods differing both in size and structure. Chaelae less deeply cleft ; carpus of second pereopods elongate and scarcely excavated—*Caridina*.

Genus *Atya*

Only one species of *Atya*—*Atya spinipes* is represented in the collections.

Atya spinipes Newport 1847

Material examined : Kuda oya, near Wellawaya—2 specimens ; Kelani ganga, near Kitulgala—2 specimens ; Arudpragasm and Costa have recorded these specimens earlier from Deduru oya, Maha oya and Menik ganga.

The various proportions of the body are as follows :—

Length of the largest female—62mm.

a/c	—	0.53 - 0.54
6s/c	—	0.42 - 0.44
p3/c	—	0.30 - 0.32
p5/c	—	0.38 - 0.40

Genus *Caridina*

Key to the Ceylonese species of *Caridina* H. Milne Edwards, 1837

1. Antennular peduncle with a distinct keel ; preorbital length of sixth abdominal equal to or less than half the post-orbital length of the carapace.....2
- Antennular peduncle without keel ; preorbital length of the antennular peduncle and dorsal length of sixth abdominal segment considerably more than half the post-orbital length of the carapace4
2. Rostrum short, unarmed extending slightly beyond the posterior edge of the cornea of the eye.....*C. singhalensis*, Ortmann, 1894
- Rostrum armed extending beyond the cornea of the eye3
3. Rostrum extends little beyond the 1st antennular segment ; rostral formula $\frac{11-14}{1-3}$ Spines on telson with tooth like spinules.....*C. pristis*, Roux, 1931
- Rostrum extends to the distal end of the 2nd antennular segment, rostral formula $\frac{16-20}{4-6}$ Spines on telson without tooth like spinules.....*C. fernandoi*, Arud and Costa, 1961

4. Rostrum long more than twice the post-orbital length of the carapace:.....
C. gracilirostris, De man, 1892
- . Rostrum long less than twice the post-orbital length of the carapace5
5. Rostrum provided with one or two sub-apical teeth ; telson bears three pairs of spines....
*C. nilotica zeylanica*, Arud and Costā, 1961
- . Rostrum without sub-apical teeth, telson bears 4-5 pairs of spines.....
 .. *C. nilotica simoni*, Bouvier, 1904

Two species and two sub-species of another species of *Caridina* are represented in the collections.

C. pristis, Roux 1931

Material examined : Pasumale dola coming from the Singharaja forest, Deniyaya—10 specimens (4♀♀, ovigerous) ; Upper Kalu ganga, Carney Estate near Adam's Peak—2 specimens (1♀ ovigerous) ; Hal oya near Kitulgala—8 specimens (1♀, ovigerous).

Measurements : The body length of the largest female collected was 22mm. from Deniyaya. The various proportions of the body are as follows :—

*a/c	0.57—0.59mm.
6s/c	0.48—0.49mm.
p3/c	0.43—0.45mm.
p5/c	0.53—0.54mm.
d/5/p5	0.20—0.22mm.

Remarks

This species was originally described by Roux (1931) from Peradeniya and Kandy. Arudpragram and Costa in 1961 added Ratnapura and Balangoda to the known locality records. Since then the writer has also collected these specimens from Galaha, Madugoda and from streams coming from the Hunnasgiriya range.

Caridina fernandoi, Arudpragram and Costa, 1961.

Material examined : Campden Hill dola—Deniyaya 7 specimens (1♀ ovigerous) ; Kiriwel dola, Deniyaya—6 specimens (1♀ ovigerous) ; Rajanawa ella, Ratnapura—9 specimens (2♀♀ ovigerous) ; Ira handha ella, Ratnapura—1 specimen ; Kalu ganga near Ratnapura town—2 specimens ; Bibili oya, Kitulgala—2 specimens ; Rambukpotha oya, Kitulgala—6 specimens (2♀♀ ovigerous ; Belihuloya 3 specimens ; Diyaluma falls—two specimens ; Katugas ella, Ratnapura—3 specimens (1♀ ovigerous).

Measurements : the largest female collected measured 27.0mm.; the various proportions of body are as follows :—

a/c	0.54—0.55mm.
6s/c	0.40—0.42mm.
p3/c	0.37—0.39mm.
p5/c	0.49—0.50mm.
p5/d5	0.19—0.20mm.
p3/d3	0.19—0.20mm.

*a, pre-orbital length of antennular peduncle ; c, post-orbital length of the carapace 6s, dorsal length of sixth abdominal segment ; d3, d5, the dorsal length of the dactylus of respectively the third and fifth period ; p3, p5, the dorsal length of the propodus of respectively the third and fifth period.

Remarks

This species was described for the first time by Arudpragasm and Costa in 1961 from specimens collected from streamlets at Mawanella, Kurunegala, Warakapola and Seelagama. Since then the writer has collected specimens of this species from the Kandy lake, Tangalla and from some irrigation tanks in the North Central province.

***C. nilotica simoni*, Bouvier 1904**

Material examined : Campden Hill dola, Deniyaya—4 specimens ; Thanipita dola, Deniyaya—7 specimens (3 ♀♀ ovigerous) ; Nagahaketa dola, Deniyaya—6 specimens (1 ♀ ovigerous) ; Bodathpitiya ella, Ratnapura—13 specimens (3 ♀♀ ovigerous) ; Katugas ella, Ratnapura—2 specimens ; Rajanawa ella, Ratnapura—10 individuals (2 ♀♀ ovigerous) ; Ira handa ella, Ratnapura 2 specimens ; Kaluganga, Malwala, Ratnapura—10 specimens (2 ♀♀ ovigerous) ; Kelaniganga, near Kitulgala—3 specimens ; Kuda oya near Wellawaya—3 specimens ; Wetakei oya near Wellawaya—10 specimens (3 ♀♀ ovigerous) ; Kelani ganga near Hanwella—2 specimens.

Measurements : The largest female collected was 24.0 mm.

a/c	0.80—0.90mm.
6s/c	0.68—0.70mm.
p3/c	0.45—0.50mm.
ps/c	0.58—0.68mm.
p5/d5	0.19—0.20mm.
p3/d3	0.24—0.26mm.

Remarks

This species was described from specimens collected at Kandy by Bouvier in 1925. Arudpragasm and Costa (1961) have recorded this species from Nawalapitiya. Since then the present writer has collected this sub species from Matara, Tangalla, Gampaha, Amparai, Batticaloa and Polonnaruwa. It is also widely distributed in the irrigation tanks of the North Central Province.

***C. nilotica zeylanica*, Arudpragasm and Costa, 1961**

Material examined : Kuda oya near Wellawaya—2 specimens (1 ♀ ovigerous). This sub species differ from the above sub species in the features of the rostrum and the telson ; the rostrum being provided with sub apical teeth.

Remarks

This sub species was originally described from specimens collected from Nawala, Kotte, Attidiya and Beira lake.

FAMILY PALAEMONIDAE

Only four species of *Macrobrachium* are represented in the Collections. Of these one species *M. australe* is new to the fauna of Ceylon. A key to the identification of these species and other species of *Macrobrachium* found in Ceylon will be given in another paper (Costa, 1973, in preparation).

***Macrobrachium latimanus* (Von Martens)**

Material examined : Campden estate dola, Deniyaya—one large male specimen ; Thanipita ella, Deniyaya—two adult males (1 female ovigerous, 1 young) ; Nagahaketa oya, Deniyaya—four specimens (2 ♀♀ ovigerous) ; Kiriwel dola, Deniyaya—one young specimen ; Hal oya, Kitulgala—2 specimens ; Rambukpotha oya, Kitulgala—6 specimens (2 ♀♀ ovigerous) ; Kaluganga before Ratnapura—4 specimens ; Katugas ella fall—2 specimens.

Fig. 3 *Macrobrachium latimanus* male & female

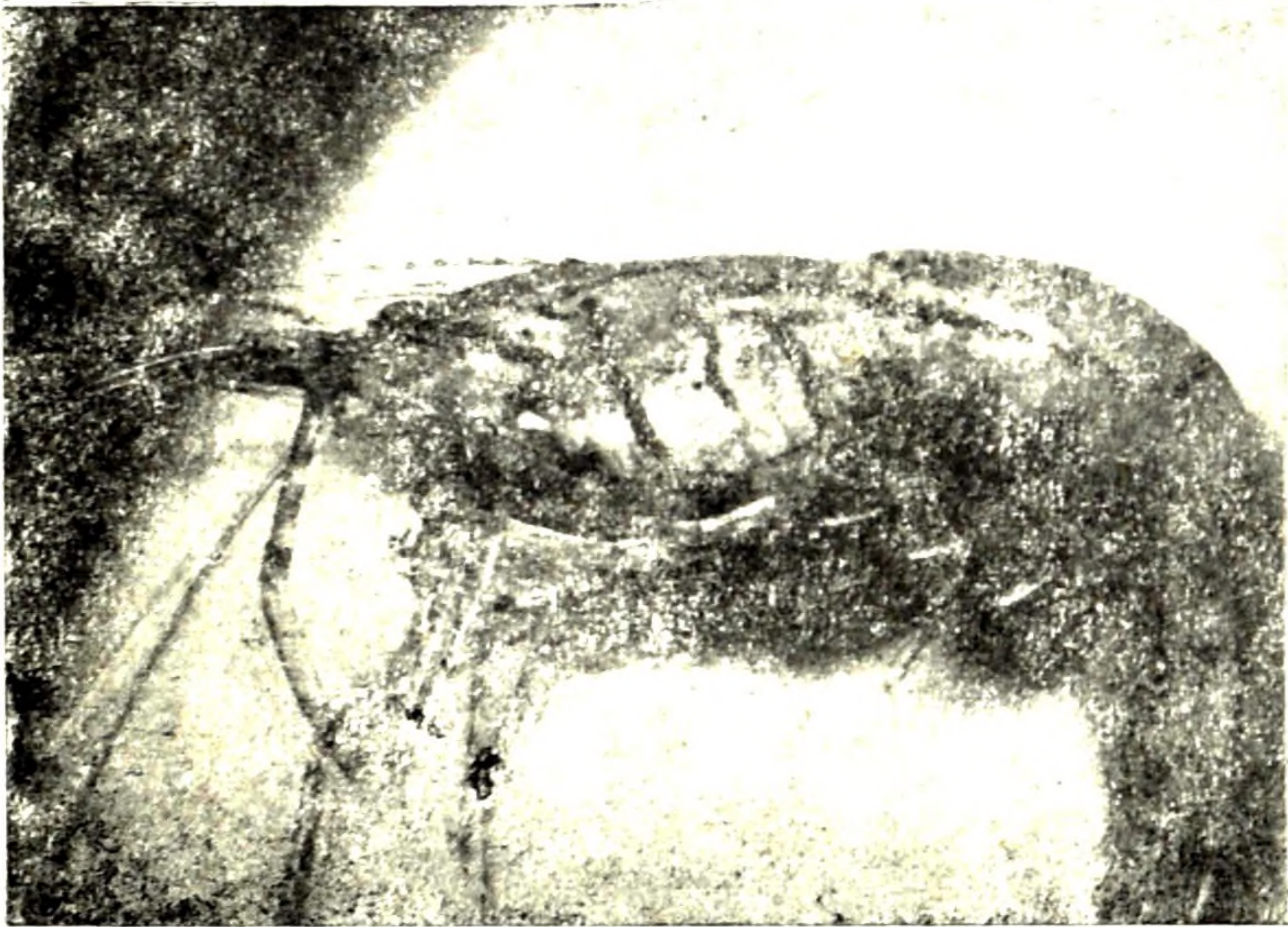


Fig. 4 *Macrobrachium austral* male



Fig. 5 *Macrobrachium scabriculum* male

TABLE I
Mean values for teeth on the upper and lower edge of the rostrum

Locality	No. of specimens	No. of teeth on upper edge	No. of teeth on lower edge	Length of the largest specimen
Deniyaya	9	6.5	2	11.5 mm.
Kitulgala	8	6	2	10.5 mm.
Ratnapura	6	7	2	4.5 mm.

Remarks

Tiwari recorded this species from Kaluganga in 1961.

Macrobrachium australe (Guerin-Meneville)

Material examined : Bibili oya, Kitulgala—4 specimens (2 ♀♀ ovigerous) ; Rajanawa ella—4 specimens (1 ♀ ovigerous) ; Kelani ganga near Hanwella—2 specimens ; Belihuloya near rest house—2 specimens.

TABLE II
Mean values for teeth on the upper and lower edge

Locality	No. of specimens	Teeth on the upper edge	Teeth on the lower edge	Length of the largest specimens
Kitulgala	4	9	3	8.9 mm.
Ratnapura	4	9	3	6.2 mm.
Hanwella	2	9	3	8.8 mm.

Remarks

This species is recorded for the first time from Ceylon.

Macrobrachium scabriculum (Heller)

Material examined : Bodathpitiya ella—2 specimens (1 ♀ ovigerous) ; Length of the adult male—58mm.; No. of teeth on the upper edge of the rostrum—13 ; No. of teeth on the lower edge of the rostrum—2.

Remarks

Mendis and Fernando (1964) reported that this species is prevalent in the low country but no localities are given, hence this is the first locality record.

Macrobrachium idella (Hilgendorf)

Material examined : Four specimens from Kelani ganga near Hanwella. Length of adult specimen—115mm., number of teeth on the upper edge of rostrum—12 ; number of teeth on the lower edge of rostrum—3.

Remarks

So far this species has been collected only from Dehiwela (Mendis and Fernando, 1962).

GENERAL COMMENTS

The summary of the distribution of *Caridina* and *Macrobrachium* species collected is given in tables III, IV, V and VI. *Macrobrachium* species With the results of this hydrobiological survey it is now possible to get a clearer pattern of the distribution of the atyid shrimps in Ceylon. It is surprising to note that the extensive collections made from the torrential streams of the Maskeliya area north of the Adam's Peak wilderness revealed the complete absence of atyid shrimps in the sampled streams. Collections made from the streams in the Nuwara Eliya area other than the Moon Plains also showed the absence of shrimps from those streams. It is now possible to conclude that the only shrimp present in this central hilly area (above 2,000 metres) is *C. singhalensis* with its distribution being very limited and confined only to the very slow flowing streamlets of the Moon Plains at Nuwara Eliya. *C. pristis* is confined exclusively to the hill streams and are present in streams that are situated between approximately 400m. to 1,000 metres. They have been found in streams in the northern flank as well as the southern flank of the second peneplain. *C. fernandoi* is found up to the same elevations as *C. pristis* but this species is more widely distributed and have been collected from numerous localities in the coastal plains. All these three species, *C. singhalensis*, *C. pristis*, *C. fernandoi*, are with a heavily built body. However of all the species and sub species of *Caridina*, *Caridina nilotica simoni* is the most widely distributed shrimp in Ceylon extending even to the brackish waters. This species which occurs in large numbers has been collected from all the parts of the low country and from many parts of the hill country. *G. nilotica zeylanica* appears to be restricted to certain localities although they are found in habitats similar to those of *G. nilotica simoni*.

Macrobrachium latimanus although occurring exclusively in hilly streams is not found in all the hill streams of Ceylon. Our extensive collections have shown that they occur in very large numbers in the Deniyaya area and certain other areas in Kitulgala, and Ratnapura. *Macrobrachium australe* is specially common in the hilly areas in certain parts of Kitulgala and Belihul oya and is much similar in size to *M. latimanus*. *M. scabriculum* was recorded only in one place near Ratnapura close to Bodathpitiya falls ; this species however, is a common inhabitant of the low country streams. *M. idella* is found in the low country and this was collected by us from Kelani ganga near Hanwella which in reality is not part of the hill country.

TABLE III

Deniyaya area	Pasumale dola	Campden Hill dola	Kirivel dola	Thanipita ela	Nagahaketa dola
<i>Caridina pristis</i> ..	+	—	—	—	—
<i>C. fernandoi</i> ..	—	+	+	—	—
<i>C. nilotica simoni</i> ..	—	+	—	+	+
<i>C. nilotica zeylanica</i> ..	—	—	—	—	—
<i>Atya spinipes</i> ..	—	—	—	—	—
<i>Macrobrachium latimanus</i> ..	—	+	+	+	+
<i>M. australe</i> ..	—	—	—	—	—
<i>M. scabriculum</i> ..	—	—	—	—	—
<i>M. idella</i> ..	—	—	—	—	—

TABLE IV

Ratnapura area	Ira Handa Pana dola	Bodath- pitiya-ella fall	Katugas ella fall	Rajanawa fall	Kalu-ganga near Ratnapura	Kalu ganga near Malwala	Upper Kalu- ganga near Adam's peak
<i>Caridina Pristis</i> ..	—	—	—	—	—	—	+
<i>C. fernandoi</i> ..	+	—	+	+	+	+	—
<i>C. nilotica simoni</i> ..	+	+	+	+	+	+	—
<i>C. nilotica zeylanica</i> ..	—	—	—	—	—	—	—
<i>Atya spinipes</i> ..	—	—	—	—	—	—	—
<i>Macrobrachium latimanus</i> ..	—	—	+	—	+	+	—
<i>M. australe</i> ..	—	—	—	+	—	—	—
<i>M. scabriculum</i> ..	—	+	—	—	—	—	—
<i>M. idella</i> ..	—	—	—	—	—	—	—

TABLE V

Kitulgala Hanwella area	Bibili oya	Hal oya	Rambuk- potha oya	Kelani ganga near Kitulgala	Kelani ganga near Hanwella
<i>Caridina pristis</i> ..	—	+	—	—	—
<i>C. fernandoi</i> ..	+	—	+	—	—
<i>C. nilotica simoni</i> ..	—	—	—	+	+
<i>C. nilotica zeylanica</i> ..	—	—	—	—	—
<i>Atya spinipes</i> ..	—	—	—	+	—
<i>Macrobrachium latimanus</i> ..	—	+	+	—	—
<i>M. australe</i> ..	+	—	—	—	+
<i>M. scabriculum</i> ..	—	—	—	—	—
<i>M. idella</i> ..	—	—	—	—	+

TABLE VI

Belihuloya —Wellawaya area	Belihul oya	Diyaluma falls	Kuda oya (Kirindi ganga)	Watakei oya (Menik ganga)
<i>Caridina pristis</i> ..	—	—	—	—
<i>C. fernandoi</i> ..	+	+	—	—
<i>C. nilotica simoni</i> ..	—	—	+	+
<i>C. nilotica zeylanica</i> ..	—	—	+	—
<i>Atya spinipes</i> ..	—	—	+	—
<i>Macrobrachium latimanus</i> ..	—	—	—	—
<i>M. australe</i> ..	+	—	—	—
<i>M. scabriculum</i> ..	—	—	—	—
<i>M. idella</i> ..	—	—	—	—

— = Absent.

+ = Present.

None of the above atyid and Palaemonid species has been so far exploited commercially. *C. nilotica simoni*, because of its occurrence in large numbers both in the freshwaters and in the brackish waters is worthy of investigation in this connection. It has been noted by the present writer that in certain localities they are collected during certain seasons and sold in a dried form. *M. latimanus* which is fairly stoutly built occurs in exploitable numbers in the hilly streams of Deniyaya but has not been so far commercially exploited. It was observed by us that in some localities the villagers catch those prawns for domestic consumption. This is another species which shows promise for further investigation with a view to commercial exploitation.

SUMMARY

Two species and two sub species of another species of *Caridina*, one species of *Atya* and four species of *Macrobrachium* were collected by the Austrian-Ceylonese mission from the hill streams of Ceylon. *M. australe* is new to Ceylon.

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