

XVI NOTES ON ASIATIC SPECIES OF
CRUSTACEA ANOSTRACA IN
THE INDIAN MUSEUM.

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The publication of Prof. E. von Daday's valuable monograph on the Branchiopoda Anostraca¹ has enabled me to determine the unnamed specimens of this group in the Indian Museum without difficulty. Prof. von Daday was kind enough to examine the majority of species in the collection at the time when he was working at the group and the number of specimens which have since accumulated is not large.

No additions to the comparatively small number of species found in India were included in the material awaiting identification; but an enumeration of the forms at present known from India and the countries adjacent to it, with such details of their occurrence as are known, will perhaps be of some assistance to those interested in the freshwater crustacea of this region.

Owing to an unfortunate mistake the real types of Alcock's *Branchipus bobrinski* were not sent to von Daday when he was preparing his monograph. The species is here identified with *Chirocephalus altaicus*, von Daday.

Six species of Anostraca, belonging to five genera, are now known from India, from the countries abutting on its northern frontier and from Ceylon.

Branchinecta orientalis, G. O. Sars.

1910. *Branchinecta orientalis*, E. v. Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 156, fig. 12, a-o.

This species is known from Hungary and Russia and extends eastwards as far as the Pamirs, Tibet and Mongolia. The Tibetan specimens, which are preserved in the Indian Museum, were presented by Capt. R. E. Lloyd who obtained them in August, 1904. They were taken in a large muddy pond, evidently not permanent in nature, at the foot of Gyantse fort at an elevation of about 13,000 feet. Though they were found in August von Daday refers these specimens to the seasonal phase called 'forma *vernalis*' which differs from the 'forma *aestivalis*' only in its larger size.

¹ Von Daday, "Monographie systématique des Phyllopo des Anostracés," *Ann. Sci. Nat. Zool.* (9), xi, 1910, pp. 91-492.

It seems probable that *B. orientalis* only occurs at great altitudes in the eastern part of its distributional range; the Pamir specimens were found at an elevation of about 13,000 ft.

Pristicephalus priscus, von Daday.

1910. *Pristicephalus priscus*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 224, fig. 29, a-k.

This species is known only from the Western Himalayas. It has been found on the following occasions: --

1. Suka Tal,¹ Kumaon, ca. 7,000 ft., Oct. 3rd. 1906, and May, 1909. N. Annandale, R. E. Lloyd.
2. Bhowali Bazar, Kumaon, ca. 5,500 ft., May, 1909. A. D. Imms, R. E. Lloyd.
3. Phagu, Simla Hills, ca. 9,000 ft., May 3rd, 1907. N. Annandale.
4. Theog, Simla Hills, ca. 8,000 ft., April 27th and May 3rd, 1907. N. Annandale.

Suka Tal and the ponds at Phagu and Theog were found quite dry on subsequent occasions.

The Phagu specimens, living in a pool of rain-water at a height of 9,000 ft. were considerably smaller than those obtained 1,000 ft. below in the village pond at Theog. At the latter place on the 27th of May, Dr. Annandale found both males and females in abundance; but five days later, although males were still numerous, not a single female could be discovered.

In May of the present year *P. priscus* appeared to be wholly absent from small pools in the neighbourhood of the Kumaon lakes.

Chirocephalus bobrinskii, Alcock.

1898. *Branchipus (Chirocephalus) bobrinskii*, Alcock, *Rep. Nat. Hist. Results Pamir Boundary Comm.*, p. 17, pl. iii, figs. 1, 1a.

1910. *Chirocephalus altaicus*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 191, fig. 22, a-i.

1910. *Chirocephalus bobrinskii*, von Daday, *ibid.*, p. 212.

It seems that two species of Anostraca were found by Alcock in the Chakmaktin Lake, Little Pamir, and were separated into two bottles; but by an unfortunate mistake both were labelled *Branchipus bobrinskii*. One bottle labelled 'types' is in the Indian Museum; the other was sent to von Daday who remarks that "par un hasard inexplicable au lieu de *Chirocephalus*, j'ai reçu *Branchinecta orientalis*, G. O. Sars."

An examination of the types shows that Alcock's species is unquestionably the same as that which von Daday has recently described under the name of *C. altaicus* from two males found in a

¹ The specimens which von Daday records from Naini Tal were in reality found in this temporary sheet of water.

valley of the Altai Mountains and from the vicinity of Sinjucha in the same range.

The only differences that I am able to detect between male *C. bobrinskii* and the figures and description which von Daday has given of *C. altaicus* are as follows:--

The large spine-like process on the under surface of the proximal segment of the second antennae, near its base, is longer, considerably more than half the length of the segment. In the trilobate process at the base of the second antennae the edge of the triangular emargination between the two basal laminae is entire—not denticulate as shown in von Daday's fig. 22 c. Von Daday states that in the apex of the ultimate antennal segment is truncate or bilobate: in the types of *C. bobrinskii* it is truncate. The penis, when everted, has the same form as in *C. altaicus*, but the spinulose process at the base is distinctly broader.

Apart from the details mentioned above the second antenna with its curious pedicled digitate process at the base of the ultimate segment agrees precisely with von Daday's account; the trunk-limbs correspond closely with his figures and the characters which distinguish *C. altaicus* from its near allies *C. turkestanicus* and *C. sinensis* are well shown.

Von Daday was unable to examine any females of this species and the single female specimen from the Chakmaktin Lake is unfortunately in very poor condition. It is, however, clear that this sex shows much affinity with Thiele's *C. sinensis*. On each of the first two abdominal somites there is a stout outstanding spine on either side and on each of the succeeding somites except the last there is a pair of spines on the hinder margin, directed posteriorly and diminishing in size from before backwards. The egg-sac is as long as the first five abdominal somites combined and its aperture is terminal, transverse and V-shaped in lateral view.

The specimens are so contorted that accurate measurement is an impossibility. It seems, however, that they could not have exceeded 12-13 mm. in length. Von Daday's two specimens measured 12 and 19 mm. respectively.

C. bobrinskii is known only from the Pamir and Little Pamir. Those from the latter region were found at an elevation of about 13,000 ft.

Branchipus stagnalis (Linn.).

1910. *Branchipus stagnalis*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 312, fig. 54, a-h.

This widely-distributed species occurs in Europe, N. Africa and Asia, extending eastwards as far as Sind. The specimens from Sind, the only locality in the Oriental region from which the species has been recorded, were collected by Mr. A. W. Murray and are preserved in the Indian Museum; the precise date and circumstances of their capture are not available. Gurney in 1907¹ recorded these examples under the name of *B. pisciformis*, Schaeffer.

¹ Gurney, *Journ. A. S. B.* (n s.), ii, 1907, p. 275.

Streptocephalus dichotomus, Baird.

Chirocephalus stoliczkac, Wood-Mason, MS. (= var. *simplex*, Gurney).

1896. *Branchipus (Streptocephalus) bengalensis*, Alcock, *Journ. A. S. B.*, lxx, p. 538, pl. x.

1910. *Streptocephalus dichotomus*, E. v. Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 349, figs. 63, 64.

This species is found only in India. It appears to be the common representative of the Anostraca in the plains; but, in the north-west and south, has been found at considerable elevations.

The precise locality of Baird's type specimen is unknown; it is stated to have been found alive in a pail of milk. The other records are as follows:—

1. Near Bangalore, Mysore, *ca.* 3,000 ft., Oct. 13th, 1910. N. Annandale and M. Travers.
2. Marikuppam, Mysore, *ca.* 2,500 ft., Oct. 21st, 1910. Mus. Collr.
3. Shevaroy Hills, Madras Pres., *ca.* 5,000 ft. J. R. Henderson.
4. Spur Tank, Madras (city), March, 1911. J. R. Henderson.
5. Near Calcutta, in flooded rice-fields, 1896, probably June or July. (Types of *B. bengalensis*, Alcock.) Mus. Collr.
6. Cutch, Sind. (Types of var. *simplex*, Gurney.) F. Stoliczka.
7. Dhurampur Kooa, base of Simla Hills, 2,500–3,000 ft., July 21st, 1911. Mus. Collr.

Gurney's var. *simplex*¹ is distinguishable only in the case of the male: the type specimens from Cutch all belong to this sex. Of twenty-four males from Dhurampur Kooa, ten are typical, while fourteen exhibit the characters of the variety. Forty females were found in the same locality, but it does not seem possible to distinguish two forms among them.

Although the two forms of male certainly occur together, there is a complete absence of intermediates and, in consequence, the retention of the varietal name appears to be justified. In several male examples the process characteristic of the typical form, near the apex of the upper ramus of the second antennae, is shorter than is shown in the figures given by Sars and von Daday; but the distinction in this respect between the typical form and the variety is always clear and is correlated with the number of cirriform appendages at the distal end of the proximal antennal segment (four in the typical form: three in the var. *simplex*).

A single male from the Shevaroy Hills, one of those determined by Sars, accords with the typical form. But von Daday notes that he received an example of the variety from the Norwegian carcinologist and it is probable therefore that both forms

¹ Gurney, *Journ. A. S. B.* (n.s.), ii, 1907, p. 276, pl. v, fig. 11.

occurred together in the Shevaroy Hills, for it does not appear that Sars examined specimens from any other locality. Von Daday records the var. *simplex* from Calcutta, but this is, I believe, due to an error.

The var. *simplex* has been obtained at Cutch unassociated with typical examples, the two forms have occurred together in the Shevaroy Hills and at the base of the W. Himalayas, and the typical form without any admixture of the variety has been found at Bangalore, Marikuppam. Madras and Calcutta.

***Streptocephalus spinifer*, Gurney.**

1906. *Streptocephalus spinifer*, Gurney, *Spolia Zeylanica*, iv, p. 126, pl. i.

1910. *Streptocephalus spinifer*, von Daday, *Ann. Sci. Nat. Zool.* (9), xi, p. 403, fig. 83, a-e.

This species is known only from the original specimens, found by Mr. E. E. Green in a stagnant pool at Maha Ilupalama, Ceylon. There are no examples in the Indian Museum.