Rec. zool. Surv. India, **68** : 297-303, 1975

RESULTS OF FIFTY YEARS OF FAUNISTIC SURVEY ON INDIAN ISOPODS

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INTRODUCTION

The present paper is based mostly on the results of fifty years of field surveys undertaken by the Zoological Survey of India, specially on the Isopod fauna of India.

The study of Crustaceans has been carried on continuously in the Zoological Survey of India for well over 50 years. Workers like Wood-Mason, Alcock, Annandale, Kemp, Sewell and Chopra made a critical study of different orders of this group and have made the Zoological Survey of India as a centre of research on Indian Carcinology. In recent years, this trend has been maintained by Tiwari, Ramakrishna, Daniel, Reddiah, Ummerkutty, Biswas, and others.

As a result of the work carried out in the Zoological Survey of India for over fifty years, the Department possesses very rich collection of these animals. These collections have been accumulated from various sources, but most of the material has been collected by the officers of the Indian Museum prior to 1916 and the staff of the Zoological Survey of India, since then. The various military and political expeditions, on which zoological specimens were obtained, have enriched very considerably the collections of the Survey. Another important source from which Crustacea collections have been coming in the past is the R.I.M.S. "Investigator" and the Surgeon Naturalists that have successively worked on board the ship. Among the names of Surgeon Naturalists, Alcock and Sewell stand out significantly as having enriched the Crustacea collections of the Survey. Two important surveys undertaken for the collection of zoological specimens with special reference to crustaceans are enumerated, in brief, below.

ABOR EXPEDITION

Of the expeditions that went to the eastern parts of the Himalayas, the Abor Expedition (1911-12) on which permission was given for the first time for a zoologist from the Museum—Dr. S. W. Kemp—to accompany the force in the capacity of a naturalist, must be referred to specially. The collections, including those of crustaceans, brought back by Dr. Kemp were very extensive and of an exceptional interest. Though this expedition was conducted prior to the establishment of the Survey, this has been enumerated here, since most of the crustacea collections with special reference to the Isopods were worked out in later years and the results published during 1912–22 *i.e.*, after the establishment of the Zoological Survey of India in 1916.

Dr. Kemp was accompanied on the Abor Expedition by Mr. R. Hodgart, Zoological Collector in the Indian Museum. The party left

Calcutta on November 13, 1911 and returned to the headquarters on April 3, 1912 after spending about four months in the Abor country.

Abor country lies in the North-East corner of India and bounded on the east by the Mishmi country on the North by Tibet and on the west by the land inhabited by the Miris and on the South by the Brahmaputra river. In a North to South direction, the Abor country extends for about 128 kms. Between the base camp at Kobo and Janakmukh, it consists of an alluvial plain situated at a height of 400 to 600 ft. above sea level, covered with dense jungles interspersed with patches of grass. To the north of this lie hills, often precipitous, and intersected by the boulder-strewn courses of the small streams that drain into the Dihang river.

Majority of the specimens obtained were found comparatively at low altitudes between 400 to 2500 ft. but some were collected at great heights upto about 5000 ft. No lakes or pools of standing water were met with in the Abor country and practically all the aquatic animals obtained were collected from small streams and rivers draining into Dihang or its tributaries. Among the crustaceans, Brachyura (crabs) were not uncommon here, but Macrura (prawns, etc.) appeared to be represented only by a single species of *Macrobrachium*.

Eight species of Isopods pertaining to five genera were collected from the Abor country of which two new genera viz. *Burmoniscus* and *Rotungus* stand out significant. While the former was collected from the caves near Moulmein, the latter was part of the collection made from Kobo at an altitude of 400 ft.

Siju Cave

Before going into the details of the results of the surveys during the past fifty years, mention is made here of yet another important survey undertaken jointly by Drs. Kemp and Chopra to Siju Cave, Garo Hills, Assam. This survey was carried out during January-February, 1922, at a period when the underground streams to which the cave owes its origin was at its lowest and the party spent three weeks examining the cave fauna and also its topography. In general, the character of the Siju Cave may be described as an underground water course running in a tunnel of nummulitic stones with caverns of considerable dimensions at various points in its course. The direction of the cave, speaking generally, is north-west. It extends to a depth of about three-quarters of a mile and admits light only at the entrance as far as the discovery goes. The mouth of the cave is situated in a cliff on the right bank of the Someswari river, between the villages of Upper and Lower Siju, in latitude 25°21′ N. and long. 90°41′ E. The entrance is a passage of about 350 ft. in length, 28 to 35 ft. in breadth and 22 to 25 ft. in height. The floor which is nearly horizontal is composed of fine gravel with occasional stones. The end of the cave system appears to be reached at 3,900 ft. from the entrance in a low, more or less circular chamber, partly filled with limestone boulders. From the walls of this chamber two streams emerge, the larger coming from a passage scarcely 3 ft. broad and containing a considerable depth of water.

The topography of the Siju cave has no doubt exercised a great influence on the fauna which inhabit it.

Among the Crustaceans two species of prawns *viz.*, *Macrobrachium hendersoni* (de Man) and *Macrobrachium cavernicola*, a new species, were collected from 0 to 3,600 ft. One species of freshwater crab *viz.*, *Paratelphusa* (*Barytelphusa*) *falcidigitis* Alcock was also collected at a distance of about 2,400 ft. from the entrance of the cave.

Of the four species of Isopods collected from the Siju cave, two were described as new to science *viz.*, *Porcellio assamensis* and *Philoscia dobakholi*. These were collected at 450 ft. and between 800 to 3,600 ft. from the entrance of the cave respectively. *Cubaris cavernosus* Collinge was obtained between 300 to 3,800 ft. and *Philoscia* sp. from 800 to 1,200 ft. from the entrance of the cave.

The true cave fauna consists of 86 species and of these only 33 penetrate beyond a depth of 600 ft. A considerable part of the collection consists of species which are known to occur in day light and most of the hitherto undescribed forms resemble their outdoor relatives and are not modified in response to their peculiar environment. The number of species showing definite adaptation to cavernicolous conditions is extremely small. The only animals, in cavern which exhibits any modifications which can be correlated with life in total darkness are the Isopod *Cubaris cavernosus* and the mollusc, *Opeas cavernicola*. Among the aquatic fauna the only one species that show any sign of modification is the prawn, *Macrobrachium cavernicola*. No trace of aquatic Isopods or Amphipods were there in the cave.

The Isopod *viz. Philoscia dobakholi* appeared almost white in colour with greatly reduced eyes and found between 600 to 3,600 ft. In *Cubaris cavernosus* Collinge, the eyes are reduced but the colour was not abnormal.

Apart from these two surveys, the officers and staff of the Department carried out other surveys notably of Andaman and Nicobar group of Islands and other areas, though not mainly for the study and collection of Isopods. The accumulated Isopod material has been worked out by various zoologists and the results published.

RESULTS ACHIEVED

Very little was known about the Isopod fauna of India prior to the establishment of the Zoological Survey of India in 1916. It was Stebbing (1907) who initiated the study on Indian Isopods by publishing an account of the genus *Tachaea* and described a new species of the genus from Calcutta. He later (1911) gave a detailed account of Indian Isopods and dealt with two genera of the Tribe Flabellifera and five genera of the tribe Oniscoidea (Terrestrial). Two new genera *viz.*, *Parapericyphis* and *Exalloniscus* were described by him as new to science, based on the material collected from different parts of the country.

It was, however, not until Collinge entered the field and made several contributions that the work received adequate attention. Collinge (1914) published an account of three species pertaining to

three genera *viz.*, *Philoscia*, *Parapericyphis* and *Cubaris* collected from Port Blair, Andamans and from the Annamalai Hills about 4000 ft. above sea level. He again (1912–22) contributed two papers on the terrestrial Isopods obtained from the Abor Expedition. While working out the material, he came across two genera new to science *viz.*, *Rotungus* and *Burmoniscus*, the former obtained from Kobo, Abor country at an altitude of 400 ft. and the latter from the caves near Moulmein. Apart from these two genera, he also described six other species of which three happened to be new to science.

His next contribution to our knowledge of terrestrial Isopods of India dates back to 1914, when he worked out the collection received from Madras Province. Of the ten species dealt with nine species were new to science. *Ennurensis hispidus* and *Hemiporcellio carinatus* stand significant among this collection. Collinge (1916) published another article on the same subject and described 13 species all of them being new to science, pertaining to the genera *Parapericyphis, Cubaris* and *Burmoniscus*. *Burmoniscus kempi* was collected from Maosmai cave near Cherrapunji at an altitude of 4,000 ft. This was the second species of the genus *Burmoniscus* found in a cave, the other being *B. moulmeinus*. He, later, (1917) described another new species of the genus *Synidotea* from the Gulf of Mannar.

Subsequently, Chopra (1923) contributed a monumental monograph on the Bopyrid Isopods of Indian Decapod Macrura. Till then, nothing was known on the Bopyrid Isopod parasites of India and also of the neighbouring countries. These were, however, common in Indian waters since almost all the species of Caridean prawns generally available in Calcutta markets were infested with them. The fauna of Bopyrids is rich in the number of species and also in the number of some individual species. 33 species pertaining to 13 genera were described by him, collected mostly from the Andamans Islands, Delta of Ganges, Madras and other areas.

Later, he (1924) worked out the fauna of Siju cave and described four species of terrestrial Isopods belonging to three genera and two families *viz.*, Oniscidae and Armadillidae. The cave fauna between 300 to 500 ft. from the entrance had the richest fauna and this was true of Isopods too. So far as characters associated with cave-life go, the three species of Isopoda collected in the Siju cave do not show an advanced degree of adaptation to their environment. Of the three, *Philoscia dobakholi* Chopra shows the greatest modification; its colour is almost totally bleached and the eyes are partly reduced. In *Cubaris cavernosus* also the eyes are considerably reduced, but the colouration does not show any indication of a subterranean life. The species lives, however, almost upto the inner end of the cave. The third species (*Porecellio assamensis*) does not seem to have succeeded in penetrating to any great depth. It has well developed eyes and is dark coloured.

Two Myrmecophilous Isopods collected from Barkuda Islands, Chilka Lake were then described by Chopra (1924) brought by Annandale. Of the two, *Cubaris granulatus* was not known to be associated with ants earlier. The species is perhaps only a casual visitor in ants nests and may have taken this mode of life recently. *Platyarthrus aeropyga*

on the other hand shows some adaptations indicative of a subterranean existence. It is almost perfectly white in colour having only scanty pigmentation on the exterior and is totally blind. Chopra (1930) further contributed another interesting paper on the Bopyrid Isopods on Indian Decapod Macrura. The collections included 12 species pertaining to 7 genera collected mostly from Andaman and Nicobar group of Islands, Delta of Ganges, Gulf of Mannar and Bombay.

Chilton (1926) described several species of Isopods and Tanaidacea based on the collection obtained from a tour in the Far East.

Barnard (1935, 1936) reported on some Isopods Tanaidacea, and Amphipoda based on the collection obtained by the R.I.M.S. Investigator. The collections contained littoral, shallow-water and deep-water species from localities in the whole Indian region extending from the Mergui Archipelago in the east to the Arabian sea and mouth of Persian Gulf in the west. The collection contains 34 species of which seven were described as new to science, one of which is a littoral wood louse. Verhoeff (1936) also dealt with several species of terrestrial Isopods collected from Madras and other parts of South India. He further described a new species of the genus, *Protracheoniscus* from Ladakh.

Chopra (1947) gave an account of the first occurrence in India of the ancient suborder Phreatoicoidea (Crustacea: Isopoda), based on material received from Dr. M. Sharif of the Haffkine Institute in 1946 collected in a pucca well at Lohagara Railway station, eighteen miles from Allahabad. Later, several specimens pertaining to this group were collected from the wells at Banaras (U.P.). This suborder is known to have a very interesting distribution, being somewhat plentiful in Australia, Tasmania and New Zealand and having been found outside this region only in Cape Province of South Africa. Its occurrence in South Asia was, therefore, considered to be of particular significance. Chopra and Tiwari (1950) described a genus *Nichollsia kashiense* from the material collected from the well in the outer lawn of the Kaiser Castle, Banaras Cantt. Subsequently Tiwari (1952) dealt with in detail the morphology of *Nichollsia kashiense*. He (1953) described a new species of the rare Cymothoid genus *Agarna*, parasitic on the Clupeid fish *Nematolosa nasus* in the Bay of Bengal. Later, Tiwari (1955) described yet another new species of *Nichollsia*, *viz.*, *N. menoni* collected from an abandoned well at Monghyr (Bihar). Tiwari (1955) contributed yet another article erecting a new family Nichollsidae to accommodate the genus *Nichollsia* of the suborder Phreatoicoidea based on the preserved material.

In recent years, Ramakrishna contributed a paper on the terrestrial Isopods collected by Dr. Jayaramakrishnan in the Kameng Division of the North Eastern Frontier Agency. Although few in numbers, the collection includes fascinating forms. It consists of four species belonging to four genera *viz.*, *Porcellio*, *Philoscia*, *Porcellionides* and *Cubaris*. Of the three genera pertaining to the family Oniscidae, *Porcellio* and *Philoscia* were collected from a comparatively higher altitude *viz.*, 6,500 ft. and 6,600 ft. (1,982 and 2,013 metres), while *Porcellionides* was collected from 2,000 ft. (610 metres).

The family Armidillidae is represented by a single species *viz.*, *Cubaris marmoratus* Collinge in the collection and was collected from an altitude of 6,500 ft. Of these species, *Philoscia muscorum* is reported for the first time from the Kameng Division of NEFA and indeed from India.

Subsequently, Ramakrishna described a new species of *Philoscia* based on material received from Shri Azeez, Entomologist, Coal Mines Welfare Organisation, Dhanbad. The material consisted of four specimens (one male and three females) collected from a pit and the surrounding galleries of Lodna Colliery, 13 km. from Dhanbad, Bihar State.

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