



ISSN 0974-7907 (Online)  
ISSN 0974-7893 (Print)

## DISTRIBUTION NOTES ON THE ENDANGERED FRESHWATER CRAB *CEYLONTHELPHUSA ARMATA* NG (1995) (CRUSTACEA: BRACHYURA: GECARCINUCIDAE) IN SRI LANKA

U.S.C. Udagedera<sup>1</sup>, Dinesh E. Gabadage<sup>2</sup> & M.M.M. Najim<sup>3</sup>

<sup>1</sup> Graduate Student, Faculty of Graduate Studies (FGS), University of Colombo, Sri Lanka

<sup>2</sup> Biodiversity Conservation Society, Number 150/6, Stanly Thilakaratne Mawatha, Nugedoda, Sri Lanka

<sup>3</sup> Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Kelaniya, Sri Lanka

<sup>1</sup>uscudagedara@gmail.com (corresponding author), <sup>2</sup>degabadage@gmail.com, <sup>3</sup>mnajim@kln.ac.lk

OPEN ACCESS

**Abstract:** There are 52 species of freshwater crabs in Sri Lanka and 51 of them are endemic. There are several species that are known only from a single locality. *Ceylonthelphusa armata* is such a species, and we have initiated a study to record the distribution of this species as its typical locality is heavily polluted at Kadugannawa. At present *C. armata* is known from six localities, and this information will be useful to facilitate the conservation of the species by assessing the Red List.

**Keywords:** Conservation, endemic, invertebrates, pollution, threatened taxa.

There are 52 species of freshwater crabs known from the island of Sri Lanka with 51 endemics, many of which are threatened taxa (Bahir et al. 2005; Ng et al. 2008; Beenaerts et al. 2010). As restricted endemism has been the main criterion for categorizing them as threatened (Bahir et al. 2005), it is important to have accurate records of the distribution of the species. The endemic

freshwater crab genus *Ceylonthelphusa* is represented by 17 species with 12 categorized as Critically Endangered, three as Endangered and one Near Threatened (MOE 2012). More than 50% of freshwater crabs of the island are known from very restricted localities. More than half of the *Ceylonthelphusa* species is also known from a single locality each and these are categorized as Critically Endangered. The habitat of *Ceylonthelphusa armata* (Ng 1995) is being exploited by human activities (Images 1a–c) such as washing vehicles, garbage dumping and burning, and commercial activities such as installation of fruit stalls. Therefore, a study was initiated to document the distribution of *Ceylonthelphusa armata* (Ng, 1995), which was common two decades ago at its type locality, Galavidaputhena, Kadugannawa (07°15'N & 80°28'E altitude 300m), beside the Kandy-Colombo main road.

*Ceylonthelphusa armata* (Image 2a–c) was described



*Ceylonthelphusa armata*



**DOI:** <http://dx.doi.org/10.11609/JoTT.o3949.7791-4> | **ZooBank:** <urn:lsid:zoobank.org:pub:14667660-C269-4428-8619-EB5A04F1524B>

**Editor:** Raymond Henry, Auburn University, Auburn, USA.

**Date of publication:** 26 September 2015 (online & print)

**Manuscript details:** Ms # o3949 | Received 24 February 2014 | Final received 21 August 2015 | Finally accepted 30 August 2015

**Citation:** Udagedera, U.S.C., D.E. Gabadage & M.M.M. Najim (2015). Distribution notes on the Endangered freshwater crab *Ceylonthelphusa armata* Ng (1995) (Crustacea: Brachyura: Gecarcinucidae) in Sri Lanka. *Journal of Threatened Taxa* 7(11): 7791–7794; <http://dx.doi.org/10.11609/JoTT.o3949.7791-4>

**Copyright:** © Udagedera et al. 2015. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

**Funding:** None.

**Conflict of Interest:** The authors declare no competing interests.

**Acknowledgements** The authors thank M.M. Bahir (Researcher at Biodiversity Conservation Society & Biodiversity Education and Exploration Society) for confirming the identity of the crabs in the field, providing literature, reviewing this note and encouraging this study. The authors also thank Prof. U. S. Amarasinghe and Thasun Amarasinghe for reviewing this article. We thank Madhava Bothejue for the photographs.

in a revision (Ng 1995) of the genus *Perbrinckia* (Bott 1969). Initially there was a single species in that genus, and in the revision (Ng 1995) added nine more new species to the genus, bringing the total number of species within the genus up to 10. Subsequently, (Ng & Tay 2001) studied the Sri Lankan freshwater crabs and redefined the genera *Ceylonthelphusa* (Bott 1970) and *Perbrinckia* based on the characteristics of the second male pleopod. The key character separating these two genera is the length of the distal segment of the second pleopod of the male; in *Perbrinckia* the distal segment is about 0.2–0.3 times the length of the basal segment while in *Ceylonthelphusa* it is relatively longer (Ng & Tay 2001; Bahir & Ng 2005).

#### MATERIAL AND METHODS

The type locality of *Ceylonthelphusa armata* is Kadugannawa located within Maha Oya catchment (Ng 1995). In this study *C. armata*'s distribution was examined at several locations upstream and downstream to the type locality. These sites were selected within the Maha Oya catchment. Twelve locations at which streamlets of Maha Oya originate were selected as the sampling sites, which were: Miyanagolla (07°06'N & 80°29'E; 1000m); Udahenthenna (07°06'N & 80°32'E; 850m); Selawa (07°09'N & 80°31'E; 300m); Deiyawala (07°08'N & 80°28'E; 400m); Kehelpannala (07°10'N & 80°32'E; 400m); Duldeniya (07°10'N & 80°28'E; 350m); Ambadeniya (07°12'N & 80°29'E; 300m); Mahantheagama (07°13'N & 80°31'E; 400m); Urakanda (07°12'N & 80°25'E; 500m); Bathalegala (07°11'N & 80°26'E; 798m); Welimanna Village (07°09'N & 80°27'E; 400m); Hulankaduwa (07°05'N & 80°26'E; 500m).

The crabs were hand collected with minimum disturbance to their microhabitats by slowly removing rocks, pebbles and root outcrops on wet rocks, and the external characters of the animals were observed by using hand lenses. Live photographs were taken to study the dorsal, frontal and ventral views, and the crabs

were then released back into their habitats (Image 2a–c). Species identifications and nomenclature were followed based on Ng (1995), Ng & Tay (2001), Bahir & Ng (2005), Klaus et al. (2009) and Beenaerts et al. (2010).

#### OBSERVATIONS

In this study *C. armata* from five more localities (Table 1) were recorded within Kegalle District (Fig. 1) assuming that the present distribution of the species will be useful to facilitate its conservation towards assisting the Sri Lankan Red Listing of carcinofauna according to IUCN criteria (IUCN 2001).

1. We found that *C. armata* was common (authors termed it common when an individual spotted five or more adult crabs within 30 minutes of search from a particular location) in Urakanda (07°12'N & 80°25'E; 500m) near Asmadala. The crabs were found under stones and under root outcrops on wet rocks adjacent to a small stream in a shady area.

2. We found that *C. armata* was uncommon (authors termed it uncommon when an individual spotted three or four adult crabs within 30 minutes) in Bathalegala (07°11'N & 80°26'E; 798m). The crabs were observed from a small cave, under stones in wet soil.

3. We also found *C. armata* which was uncommon from Welimanna Village (07°09'N & 80°27'E; 400m) near Aranayake. The crabs were observed from a wet rock, and in crevices with root outcrop and leaf litter.

4. We found *C. armata* which was common from Hulankaduwa (07°05'N & 80°26'E; 500m) near Ambalakanda. The crabs were observed under stones and rocks in a moist, shady area.

5. We found that *C. armata* was common in Deiyawala near Aranayake (07°08'N & 80°28'E; 400m). The crabs were found under stones and under root outcrops on wet rocks adjacent to a small stream in a shady area.

It is interesting to note that this species was observed from Welimanna and Bathalegala only in the wet



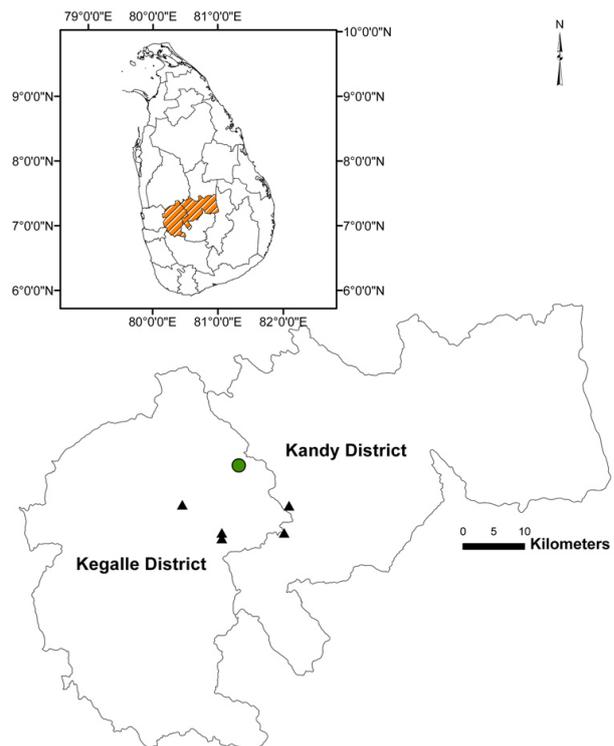
Image 1. Habitat of *Ceylonthelphusa armata* at its type locality. a - Habitat at Kadugannawa; b - Microhabitat; c - polluted type locality.



**Image 2.** *Ceylonthelphusa armata* living male from the type locality, 18.1mm carapace width and 14.2mm carapace length. a - dorsal view; b - ventral view; c - frontal view.

months, and our attempts to record the species in the dry months of January and February were unsuccessful. We hypothesize that this crab moves downstream to reach wet areas or goes underground until the rainy season, which is worth further investigation.

The type locality of *C. armata* is heavily polluted due to dumping of trash by local traders and local tourists. We found that many microhabitats of *C. armata* were



**Figure 1.** Present Distribution of *Ceylonthelphusa armata*. Circle indicates the type locality.

heavily polluted and as a result we failed to observe crabs (Image 1c) from some of the microhabitats where they were recorded two decades ago. One of us (DG) recorded this species as common from six moist areas/small stream banks at the type locality in 1994, but unfortunately now it is restricted to only a few sites and the species has become rare in its type locality. We assumed that *C. armata* cannot live in polluted water. We believe that conservation managers should take immediate action (e.g., control pollution and burning) to conserve the type locality and microhabitats of *C. armata* at Kadugannawa. In addition, we observed *Ceylonthelphusa rugosa* Kingsley (1880) to be sympatric with *C. armata* in all the six sampling localities that were observed. It is essential to record the known habitats of freshwater crabs like *C. armata* to assess their conservation status in the long run, because one of us (DG) is in the process of observing the freshwater crab populations in their type localities.

## CONCLUSION

At present, the distributions of *C. armata* include six localities with existing information and we believe it is important to record the extent of occurrence of the threatened species of freshwater crabs to evaluate during the Red Listing process. We found that the type locality

**Table 1. Material examined in the present study, the measurements (carapace width and carapace length respectively) of *C. armata***

	Location	Specimens availability	Measurements
1	Urakanda	Not Preserved	Adult male 17.6 by 13.4mm; adult male, 16.8 by 13.1mm; adult male, 18.2 by 14.2mm; juvenile male 10.1mm by 8.0mm; female 18.2 by 14.9mm; adult female 16.9 by 13.3mm; adult female 18.6 by 14.5mm
2	Bathalegala	Not Preserved	Adult male 17.9 by 14.0mm; adult male 18.6 by 14.6mm; adult male 15.5 by 10.1mm; adult female 17.1 by 13.8mm; sub adult female 13.6 by 8.9mm; sub adult male 14.2 by 9.2mm
3	Welimanna Village	Not Preserved	Adult male 18.8 by 14.5mm; adult male 19.0 by 14.8mm; sub adult male 12.5 by 8.8mm; ; adult female 17.9 by 14.1mm; adult female 18.8 by 14.6mm
4	Hulankaduwa	Not Preserved	Adult male 16.5 by 12.7mm; adult male 18.0 by 13.6mm; adult male 18.4 by 14.4mm; sub adult male 12.3 by 9.7mm; sub adult female 15.5 by 10.1mm; juvenile male 11.8 by 8.1mm; adult female 17.8 by 13.6mm; adult female 18.8 by 14.5mm; adult female 17.7 by 14.2mm
5	Deiyanwala	Not Preserved	Adult male 16.5 by 12.3mm; juvenile male 9.1mm by 7.0mm; adult male, 17.1 by 13.9mm; ; sub adult male 14.8 by 9.5mm; adult male, 18.7 by 14.3mm; female 18.2 by 14.7mm; adult female 18.2 by 14.3mm; adult female 17.9 by 14.3mm; adult male 18.7 by 14.5mm

of *C. armata* is threatened by pollution and economic activities. Immediate measures should be taken against pollution and fire. In the future, this information may facilitate conservation assessment of *C. armata* because at present the Red List is recognized as a conservation tool (Vié et al. 2008). Not many invertebrate groups of Sri Lankan taxa are assessed to produce the Red List, but it is important that the freshwater crabs of Sri Lanka are already assessed according to the IUCN criteria to prioritize freshwater crab conservation (Bahir et al. 2005; IUCN 2007; MOE 2012).

## REFERENCES

- Bahir, M.M & P.K.L. Ng (2005).** Description of ten new species of freshwater crabs (Parathelphusidae: *Ceylonthelphusa*, *Mahatha*, *Perbrinckia*) from Sri Lanka, pp. 47–75. In: Yeo, D.C.J., P.K.L. Ng & R. Pethiyagoda (eds.). *Contributions to Biodiversity Exploration and Research in Sri Lanka*. The Raffles Bulletin of Zoology - 12.
- Bahir, M.M., P.K.L. Ng, K. Crandall & R. Pethiyagoda (2005).** A conservation assessment of the freshwater crabs (Crustacea: Brachyura: Parathelphusidae) of Sri Lanka, pp. 121–126. In: Yeo, D.C.J., P.K.L. Ng & R. Pethiyagoda (eds.). *Contributions to Biodiversity Exploration and Research in Sri Lanka*. The Raffles Bulletin of Zoology - 12.
- Beenaerts, N., R. Pethiyagoda, P.K.L. Ng, D.C.J. Yeo, G.J. Bex, M.M. Bahir & T. Artois (2010).** Phylogenetic diversity of Sri Lankan freshwater crabs and its implications for conservation. *Molecular Ecology* 19(1): 183–196; <http://dx.doi.org/10.1111/j.1365-294X.2009.04439.x>
- Bott, R. (1969).** Flusskrabben aus Asien und ihre Klassifikation (Crustacea, Decapoda). *Senckenbergiana Biologica* 50: 359–366.
- Bott, R. (1970).** Die Süßwasserkrabben von Ceylon. *Arkiv för Zoologi* 22: 627–640.
- IUCN (2001).** (International Union for the Conservation of Nature and Natural Resources). IUCN Red List, categories and criteria: version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK, ii+30pp.
- IUCN (2007)** IUCN Sri Lanka and The Ministry of Environment and Natural Resources. The Red List of Threatened Fauna and Flora of Sri Lanka, Colombo, Sri Lanka, XIII+148pp.
- Kingsley, J. S. (1880).** Carcinological notes No. 1. *Proceedings of the Academy of Natural Science of Philadelphia* 1880: 34–37.
- Klaus, S., D. Brandis, P.K.L. Ng, D.C.J. Yeo & C.D. Schubart (2009).** Phylogeny and Biogeography of Asian Freshwater Crabs of the family Gecarcinucidae (Brachyura: Potamoidea), pp. 509–531. In: Martin, J.W., K.A. Crandall & D.L. Felder (eds.). *Crustacean Issues 18: Decapod Crustacean Phylogenetics*. Taylor & Francis/CRC Press, Boca Raton, Florida.
- MOE (2012).** *The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora*. Ministry of Environment, Colombo, Sri Lanka, viii+476pp.
- Ng, P.K.L. (1995).** A revision of the Sri Lankan montane crabs of the genus *Perbrinckia* Bott, 1969 (Crustacea: Decapoda: Brachyura: Parathelphusidae). *Journal of South Asian Natural History* 1: 129–174.
- Ng, P.K.L., D. Guinot & P. Davie (2008).** Systema Brachyurorum: Part I. An annotated checklist of extant Brachyuran crabs of the world. *Raffles Bulletin of Zoology* 17: 1–286.
- Ng, P.K.L. & F.W.M. Tay (2001).** The freshwater crabs of Sri Lanka (Decapoda: Brachyura: Parathelphusidae). *Zeylanica* 6: 113–199.
- Vié, J.C., C. Hilton-Taylor, C. Pollock, J. Ragle, J. Smart, S.N. Stuart & R. Tong (2008).** The IUCN Red List: a key conservation tool. In: Vié, J.C., C. Hilton-Taylor & S.N. Stuart (eds.). *The 2008 Review of The IUCN Red List of Threatened Species*. IUCN Gland, Switzerland.

