

ON THE GENUS *ANISOPS* (HETEROPTERA : NEPOMORPHA : NOTONECTIDAE) FROM ANDAMAN AND NICOBAR ISLANDS, WITH A NEW RECORD TO INDIA

E. EYARIN JEHAMALAR AND KAILASH CHANDRA
Zoological Survey of India, M- Block,
New Alipore, Kolkata - 700 053

INTRODUCTION

Notonectidae are back-swimmers characterized by body convex dorsally, having large eyes, hidden antennae, four segmented rostrum, abdominal venter with a median longitudinal keel and fore and mid legs are raptorial and the hind legs are adapted for swimming. The Notonectidae is one of the larger Nepomorphan families with about 370 described species, well represented in both temperate and tropical areas of the World (Nieser, 2004). The genus *Anisops* Spinola, 1837 is characterized by the presence of hair-lined pit on the hemelytral commissure, stridulatory comb on a stridulatory ridge of fore tibia of males and one segmented fore tarsus and male rostrum with lateral prong. Most of the *Anisops* can fly, so that they migrate to various lentic water bodies and very few species to lotic ecosystems. Chandra *et al.* (2012) recorded seven species of *Anisops* including two new record *Anisops barbatus* Brooks and *A. naustus* (Fieber) with the earlier record by Polhemus and Starmühlner (1990) and Thirumalai (2007). In the present study *A. breddini* Kirkaldy, *A. exiguus* Horvath, *A. occipitalis* Breddin, are newly recorded to the Union Territory and the later species is a new record to India. A total of 9 species of *Anisops* are recorded in the present study, but *A. sardeus sardeus* Herrich-Shaffer has not encountered in the surveys made by the authors. So far, there is no endemic species from the genus recorded from Andaman and Nicobar islands. All the materials examined in the present study were

collected by the first author from the freshwater bodies of South Andaman and Great Nicobar Biosphere Reserve during March 2012 and April 2012 and all the studied materials were deposited in the National Zoological Collection, Zoological Survey of India, Kolkata.

Infraorder NEPOMORPHA
Family NOTONECTIDAE
Subfamily NOTONECTINAE

Anisops barbatus Brooks, 1951

1951. *Anisops barbata* Brooks, *Kan. Univ. Sci. Bull.*, **34**: 387.

2012. *Anisops barbatus* Brooks: Chandra, Jehamalar & Ragunathan, *Rec. zool. surv. India*, **112** (Part-2): 82.

Material examined: South Andaman, Wandoor, 5.iii.2012, (3 , 2 exs.).

Diagnosis: (Fig. 1A) *Male*: Length, 7.9-9.3 rostral prong of males originating on the proximal third of third rostral segment and slightly longer than the third segment; head width seven to eight times the anterior width of vertex; tylus swollen, with a pair tufts of hairs, reaches base of labrum; stridulatory comb on foretibia with 20-25 teeth; scutellum milky white; clavus yellowish white. *Female*: Length, 8.0-9.1; tylus slightly swollen, without hair tufts; head width five to six times the anterior width of vertex.

Distribution: Andaman and Nicobar Islands, Bihar, Chandigarh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere*: China, Java, Perak, Singapore and Sumatra.

Remarks: Collected from pond and this is the largest species from the genus so far known from India.

***Anisops bouvieri* Kirkaldy, 1904**

1904. *Anisops bouvieri* Kirkaldy, *Wiener Ent. Zeit.*, **23**: 116.
2007. *Anisops bouvieri* Kirkaldy: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **273**: 37.

Material examined: South Andaman, Wandoor, 5.iii.2012, (1 ♂, 2 ♀).

Diagnosis: (Fig. 1B) *Male:* Length, 7.03-7.1, head has a long cephalic projection with acute apex; synthlipsis narrow; tylus excavated medially, lateral rim having groove reaching upto apex of cephalic projection; labrum with three hair tufts; rostral prong originating on the proximal third of third rostral segment and the prong slightly shorter than the third segment; stridulatory comb on foretibia with about 12 teeth. *Female:* Length, 6.22-6.97, head without cephalic projection and rounded anteriorly in dorsal view; synthlipsis wide; labrum with short hairs, but not forms a tuft.

Distribution: Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Bangladesh, China, Indonesia, Malaysia, Myanmar, New Guinea, Singapore, Thailand and Vietnam.

Remarks: This species was collected from stream and this species is the third largest species so far known from India.

***Anisops breddini* Kirkaldy, 1901**

1901. *Anisops breddini* Kirkaldy, *Entomologist*, London, **34**: 5.
2007. *Anisops breddini* Kirkaldy: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **273**: 37-38.

Material examined: South Andaman, Wandoor, 3.iii.2012, (10 ♂, 15 ♀ exs.), 5.iii.2012, (4 ♂, 12 ♀ exs.), Mongulton, 6.iii.2012, (2 ♂, 10 ♀ exs.).

Diagnosis: (Fig. 1C) *Male:* Length, 5.7-6.6, This species can be easily identified by holoptic eyes; in lateral aspect head seems triangular; rostral prong

slightly longer than third rostral segment; second rostral segment with a distal outgrowth reaches the tip of rostrum posteriorly; stridulatory comb with few irregular teeth; lateral pronotal margin parallel. *Female:* Length, 5.4-6.8 distal outgrowth on the second rostral segment short, not reaching tip of rostrum.

Distribution: Andaman and Nicobar Islands, Andhra Pradesh, Assam, Bihar, Delhi, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere:* Indonesia, Malaysia, Myanmar, New Guinea, Singapore, Sri Lanka, Thailand and Vietnam.

Remarks: Collected from Pond and also recorded from brackish waters (Thirumalai, 2001). It is the first time record from the Union Territory.

***Anisops exiguus* Horvath, 1919**

1919. *Anisops exigua* Horvath, *Abhandl. Senckenberg. Naturf. Gesell.*, **35**: 314.

2007. *Anisops exiguus* Horvath: Thirumalai, *Rec. zool. Surv. India, Occ. Paper No.*, **273**: 38-39.

Material examined: South Andaman, Manjery, 3.iii.2012, (42 ♂, 59 ♀ exs.).

Diagnosis: (Fig. 1D) *Male:* Length, 4.3-4.8 vertex of head slightly indented; synthlipsis very narrow; rostral prong slightly shorter than the third rostral segment and originating from its proximal third; stridulatory comb of fore tibia with 9-11 teeth; tylus slightly swollen. *Female:* Length, 4.3-5.2; tylus flat.

Distribution: Andaman and Nicobar Islands, Andhra Pradesh, Chandigarh, Kerala, Himachal Pradesh, Madhya Pradesh, Maharashtra, Punjab and Tamil Nadu. *Elsewhere:* China, Malaysia, New Guinea, Singapore and Vietnam.

Remarks: It is the first time record from the Union Territory.

***Anisops naustus* Fieber, 1851**

1851. *Anisops nausta* Fieber, *Abhandl. Konigl. Bohm. Ges. Wiss.*, **7**: 484-485.
2012. *Anisops naustus* Fieber: Chandra, Jehamalar & Ragunathan, *Rec. zool. Surv. India*, **112** (Part-2): 82.

Material examined: Recorded from literature Chandra *et al.* (2012).

Distribution: Andaman and Nicobar Islands (GNBR), Andhra Pradesh, Assam, Madhya Pradesh, Odisha, West Bengal. *Elsewhere:* Australia, Indonesia, Melaka, Pacific Islands, Singapore, Southern China and West Malaysia.

***Anisops niveus* (Fabricius, 1775)**

1775. *Notonecta nivea* Fabricius, *Systema Entomologiae Flensburgi et Lipsiae*, 690.

2012. *Anisops niveus* (Fabricius): Chandra, Jehamalar & Raganathan, *Rec. zool. surv. India*, **112** (Part-2): 82.

Material examined: South Andaman, Manjery, 3.iii.2012, (1 ♂, 4 exs.), Wandoor, 5.iii.2012, (2 ♂, 4 exs.), GNBR, Johinder Nagar, 20.iii.2012, (15 ♂, 13 exs.), GNBR, Govind Nagar 7th km, 7.iv.2012, (2 ♂, 5 exs.).

Diagnosis: (Fig. 1E) *Male:* Length, 4.8 mm – 5.7 mm; labrum with long white hairs; tylus and frons are excavated; stridulatory comb with 13 teeth in equal length; rostral prong shorter than the 3rd rostral segment, originating near its proximal margin; wings surpassing the last abdominal segment. *Female:* Length, 5.4-6.5 mm; tylus flat; vertex of head slightly extending in front of eyes.

Distribution: Andaman and Nicobar Islands (GNBR), Assam, Bihar, Kerala, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Africa, Indonesia, Malaysia, Myanmar, Philippines, Seychelles, Sri Lanka, Thailand and Vietnam.

Remarks: Collected from pond.

***Anisops occipitalis* Breddin, 1905**

1905. *Anisops occipitalis* Breddin, *Mitteil. Naturh. Mus. Hamburg*, **20**: 152.

2004. *Anisops occipitalis* Breddin: Nieser, *Raff. Bull. Zoology*, **52**(1): 89.

Material examined: Nicobar, GNBR, Johinder Nagar, 20.iii.2012, (2 ♂, 1 ♀).

Diagnosis: (Fig. 1F) *Male:* Length, 7.6-7.7 mm, Colour yellow to grayish, head anteriorly truncate; synthlipsis wide; rostral prong medially sulcated and longer than third rostral segment, originating from distal margin of third rostral segment, which is slightly protruded posteriorly; tylus swollen; labrum covered with short hairs (Fig. 1G); dorsal margin of forefemur with a wide

shallow indentation in apical third portion, apex broadly rounded (Fig. 1K); fore tibia with four short stout pale spines adjacent to stridulatory comb, which has 20-25 teeth surrounded by broad ring-like structure (Fig. 1I); fore tibia with five minute denticles arranged longitudinally (Fig. 1J); *Female:* Length, 7.3 mm; tylus flat; labrum with short hairs.

Distribution: Andaman and Nicobar Islands (GNBR). *Elsewhere:* Australia, China, Indonesia, Japan, Malaysia, New Caledonia, Philippines, Singapore and Taiwan.

Remarks: Nieser (2004) mentioned that the labrum of female is bare, but the female example examined in the present study having short hairs. This species has been collected from pond. The present record is the new record to India. This species is the second largest species from the genus so far recorded from India.

***Anisops sardeus sardeus* Herrich-Shaffer, 1850**

1850. *Anisops sardeus* Herrich-Shaffer, *Die wanzenartigen Insecten*, **9**: 41.

2007. *Anisops sardeus sardeus* Herrich-Shaffer: Thirumalai, *Rec. zool. surv. India, Occ. Paper No.*, **273**: 41.

Material examined: Recorded from literature Thirumalai (2007).

Distribution: Andaman and Nicobar Islands, Andhra Pradesh, Bihar, Chandigarh, Delhi, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere: Afghanistan, Africa, Albania, Canary Islands, Myanmar, Syria and Turkey.

Remarks: This species has not been encountered in the surveys made during the years 2010 and 2012 by the authors. Results of Polhemus and Starmühlner (1990) on aquatic Heteroptera of Andaman Islands are also not recorded this species.

***Anisops tahitiensis* Lundblad, 1934**

1934. *Anisops tahitiensis* Lundblad, *Bull. Bishop. Mus. Honolulu*, **113**: 121.

2007. *Anisops tahitiensis* Lundblad: Thirumalai, *Rec. zool. surv. India, Occ. Paper No.*, **273**: 41.

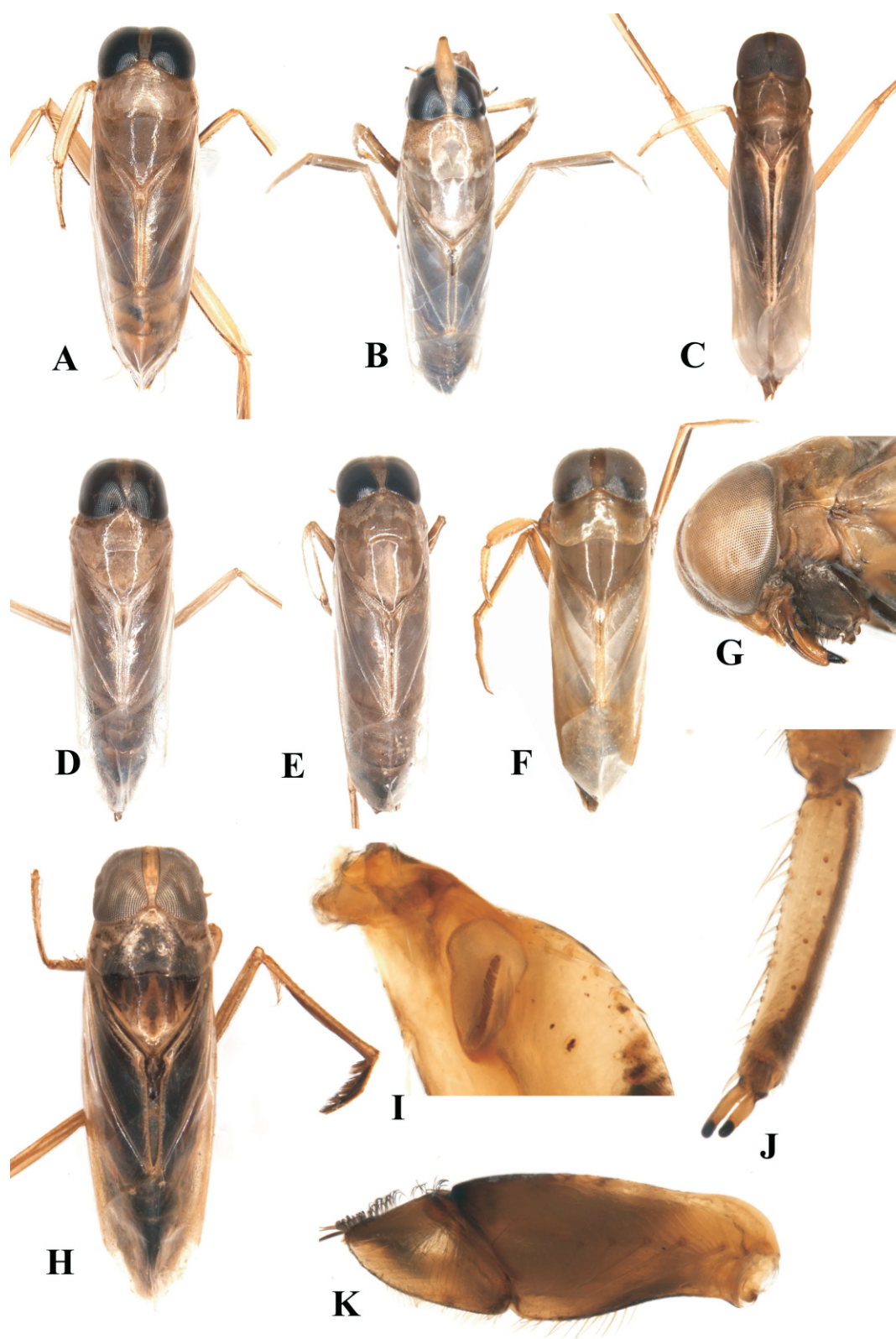


Fig. : 1. A-K Male *Anisops* spp. of Andaman and Nicobar Islands:
 A, *A. barbatus*; B, *A. bouvieri*; C, *A. breddini*; D, *A. exiguus*; E, *A. niveus*; F, *A. occipitalis*;
 G, *A. occipitalis* male head lateral view; H, *A. tahitiensis*. I-K, *A. occipitalis*:
 I, Base of fore tibia; J, fore tarsus; K, fore trochanter and fore femur.

Material examined: Nicobar, GNBR, Sastri Nagar, 24.iii.2012, (4 , 1 exs.), Johinder Nagar, 20.iii.2012, (1 , 1 exs.), GNBR, Afra Bay, 14.iv.2012, (1 , 2 exs.), Govind Nagar 6th km, 10.iv.2012, (25 , 20 exs.), GNBR, Chingen Village, 29.iii.2012, (1 ex.), Laxmi Nagar, 26.iii.2012, (1 ex.), Govind Nagar, Nature Trail, 30.iii.2012, (2 exs.).

Diagnosis: (Fig. 1H) *Male:* Length, 5.5 mm – 5.7 mm; colour: Yellowish white; synthlipsis about one third the anterior width of vertex; head anteriorly truncate; tylus swollen with blunt carina; rostral prong longer than third rostral segment, originating middle of the segment; stridulatory comb of males with 23-34 teeth; middle of last abdominal sternum of female with black longitudinal stripe; scutellum in wet condition seem three dark brown longitudinal rectangular bands. *Female:* Length, 5.5 mm – 6.1 mm; tylus slightly convex.

Distribution: Andaman and Nicobar Islands (GNBR).

Elsewhere: Australia, Guadalcanal, Johor, Malaysia, Okinawa, Pahang, Perak, Selangor, Singapore, Tahiti, Terengganu and Vietnam.

Remarks: This species found both in lentic and lotic ecosystems.

SUMMARY

A total of 270 specimens of *Anisops* belonging to the infraorder Nepomorpha and

family Notonectidae were examined, results the record of seven species. *A. tahitiensis* are widely distributed throughout GNBR, has not been recorded in the present study from South Andaman from where Polhemus and Starmühlner (1990) also had not been recorded this species. *A. barbatus* Brooks and *A. niveus* (Fabricius) are recorded both from Andaman and Nicobar Islands. The species *A. naustus* Fieber, *A. occipitalis* Breddin and *A. tahitiensis* Lundblad recorded from GNBR has not recorded from South Andaman and the species *A. bouvieri* Kirkaldy, *A. breddini* Kirkaldy and *A. exiguus* Horvath recorded from South Andaman has not recorded from GNBR. Through the work of Polhemus and Starmühlner (1990), Thirumalai (2007), Chandra *et al.* (2012) and by the present work a total of nine species of *Anisops* are recorded from Andaman and Nicobar Islands.

ACKNOWLEDGEMENTS

The authors are thankful to the Director, Dr. K. Venkataraman, Zoological Survey of India Kolkata for facilities and encouragements. Authors are thankful to MOEF, New Delhi for funding the project on Great Nicobar Biosphere Reserve. We are also thankful to Dr. C. Raghunathan, Officer-in-Charge, Andaman and Nicobar Regional Centre, ZSI for support given for field trips.

REFERENCES

- Chandra, K., Jehamalar, E.E. and Ragunathan, C. 2012. Aquatic and semi-aquatic Heteroptera (Hemiptera: Insecta) of Great Nicobar Biosphere Reserve, Andaman and Nicobar Islands, India. *Rec. zool. Surv. India*, **112**(Part-2): 79–89.
- Nieser, N. 2004. Guide to aquatic Heteroptera of Singapore and peninsular Malaysia III. Pleidae and Notonectidae. *Raff. Bull. Zoology*, **52**(1): 79–96.
- Polhemus, J. T. and Starmühlner, F. 1990. Results of the Austrian-Indian Hydrobiological Mission 1976 to the Andaman-Islands: Part X: List of Aquatic Hemiptera collected in the inland waters of the Andaman Islands. *Ann. Naturhist. Mus. Wien.*, **91**(B): 43–51.
- Thirumalai, G. 2001. Insecta: Aquatic and Semi-aquatic Heteroptera. *Fauna of Nilgiri Biosphere Reserve, Zool. surv. India, Fauna of Conservation Area Series*, **11**: 111–127.
- Thirumalai, G. 2007. A synoptic list of Nepomorpha (Hemiptera: Heteroptera) from India. *Rec. zool. Surv. India. Occ. Paper No.*, **273**: 1–84.