



ISSN: 0976-3376

Available Online at <http://www.journalajst.com>

ASIAN JOURNAL OF
SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology
Vol.07, Issue, 04, pp.2725-2730, April, 2016

RESEARCH ARTICLE

SURVEY OF AQUATIC BEETLES WITH SOME NEW RECORDS FROM THE HAZARA PUKHURI, SONITPUR, ASSAM, NORTH EAST INDIA

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ARTICLE INFO

Article History:

Received 06th January, 2015

Received in revised form

14th February, 2016

Accepted 28th March, 2016

Published online 27th April, 2016

Key words:

Aquatic beetle, Ecosystem,
Diversity, Dytiscidae,
Hazara Pukhuri.

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ABSTRACT

The present paper is based on a preliminary survey of aquatic beetles in a manmade aquatic ecosystem 'Hazara Pukhuri', a large perennial pond in Sonitpur district, Assam, India. The survey carried out during 2014-2015 could contribute altogether 18 species of aquatic beetles belonging to 13 genera and only 4 families, viz Dytiscidae, Hydrophilidae, Noteridae and Gyrinidae. Family Dytiscidae presents the highest number of 9 species under 4 subfamilies. Habitat heterogeneity in terms of aquatic macrophytes is found to be the major factor in rich species diversity of aquatic beetles in the studied ecosystem.

INTRODUCTION

Representing the Order Coleoptera, the aquatic beetles form an important component of the freshwater ecosystem. Completing their all life stages in the aquatic habitat, they represent almost all the functional feeding groups including predators, shredders, grazers (or scrapers), filter feeders, gatherers and piercers (Mackie, 2001). The trophic link with terrestrial consumers like insectivorous birds (Danforth, 1926), give them a higher consideration for the management of the freshwater wetland as wildlife refuge. While most of the aquatic beetle species constitute the food of many commercially important fishes; but prevalence of these insects in pond can be highly injurious as they act as competitors of fishes for nutrients, oxygen and space. A number of them are voracious feeders, which attack young spawn, fry and fingerlings, smaller fishes, immature mollusks and several economically important flora and fauna and thereby interfere in the food chain of pond ecosystem. It is therefore necessary to study the ecological and biological status of these insects in freshwater ecosystem. In spite of their critical role in the aquatic food chain, a large number of freshwater habitats still to be assessed in terms of aquatic beetles in Northeastern region of India in general and Assam in particular.

Recently attempt has been made to record the aquatic beetles in two Ramsar sites of Northeast India namely the Loktak Lake, Manipur by Devi *et al.* (2014) and the Deepor Beel, Assam by Chetri *et al.* (1997), Kalita (2008) and Choudhry & Gupta (2015). Survey on aquatic beetles in Assam mainly pertains to the work of Hazarika and Goswami, 2010 in Kamrup (Metro) district, Barman and Baruah (2015) in Barpeta district, Purkayastha and Gupta (2015) in Cachar district and Barman and Gupta (2015) in Dhubri and Kokrajhar District. The aquatic insect diversity in Sonitpur district is still to be documented, hence the present preliminary survey has been conducted in the historic pond 'Hazara Pukhuri' of the district.

MATERIALS AND METHODS

Hazara Pukhuri is located within the geographical range of 26°37'37" N - 26°37'58" N and 92°46'54" E - 92°46'47" E at an elevation of 245 ft (Figure 1 & 2). Covering an area of 28.5 ha, it is the largest perennial pond in the city Tezpur of Sonitpur District (about 175 kms from Guwahati), Assam. The pond was constructed during the day of Ahom King Harjjar Barman (ruled Assam during 815 AD - 835 AD) after whom it was named (Harjjar = Hazara; Pukhuri = Pond). The pond attracts tourists from different places for its historic background and an important habitat for migratory and residential aquatic birds. The pond is maintained by the District Fishery Department, Sonitpur, Assam.

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The survey of aquatic coleopterans were carried out during 2014-2015 selecting four sampling sites of the pond. In the present study, insects from the littoral zones are collected both qualitatively and quantitatively with the help of simple hand operated nets of varying sizes by netting different areas within the selected sampling sites of the pond. Circular nets of coarsely made cotton cloths and finely meshed polyester mosquito curtain cloths are used to collect the floating/swimming insects. A dip net of D-shape with nylon netting and 500µm mesh is used to collect the insects associated with macrophytes.

The operation of the net is roughly based on those described by Merritt and Cummins (1996). Insects are sorted and stored in 70% ethyl alcohol and are identified to the lowest possible tax a using microscope. Aquatic taxonomic keys such as Merritt and Cummins (1996), Pennak (1978), Biswas *et al.* (1995b), Biswas and Mukhopadhyay (1993), Ghosh and Nilsson (2012), Nilsson (2013) and Deepa *et al.* (2014) were consulted to identify the collected specimens. Identification is mainly based on the adults collected and preservation was done by following both dry and wet preservation.

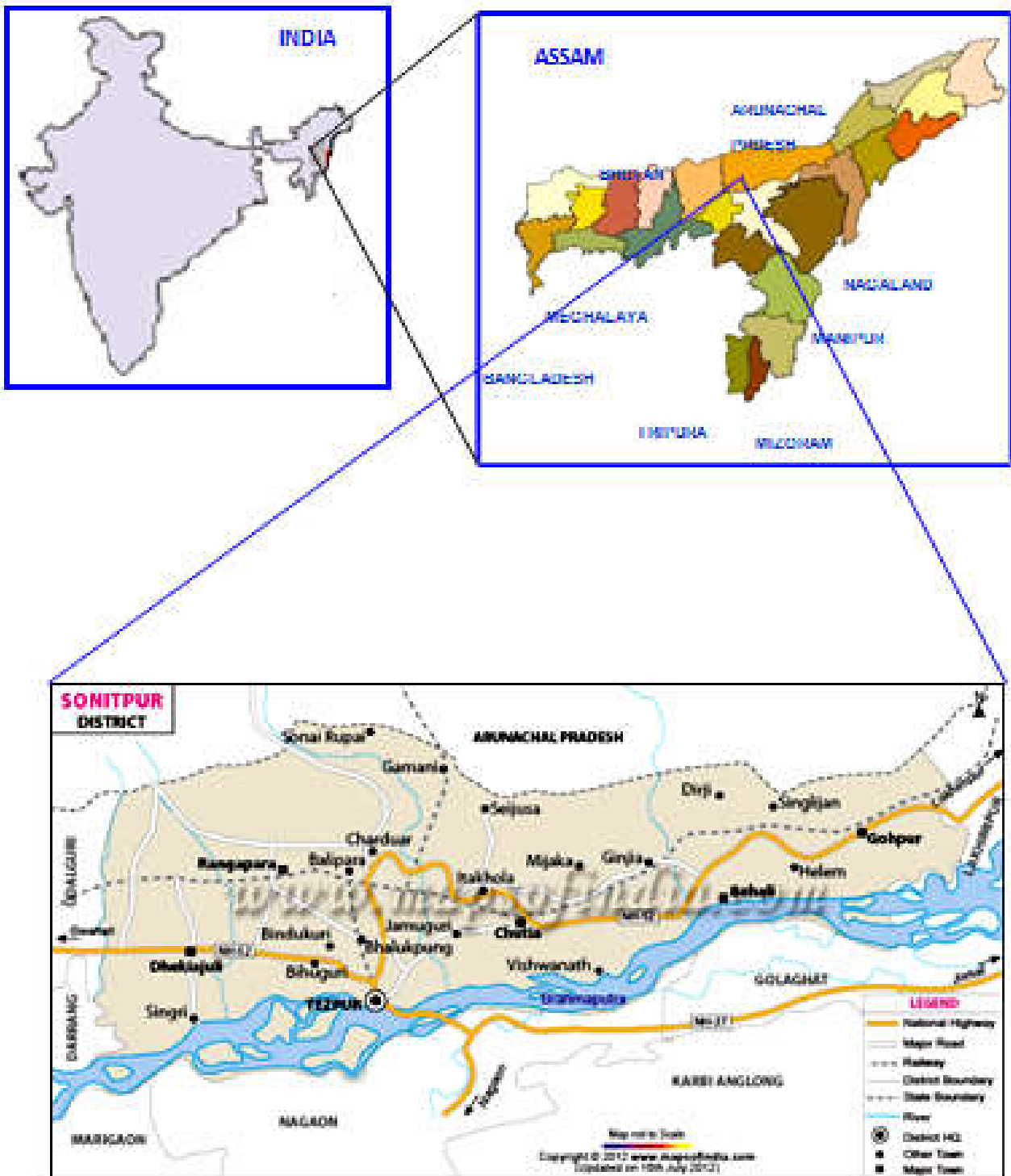


Figure 1. Location map of the study area

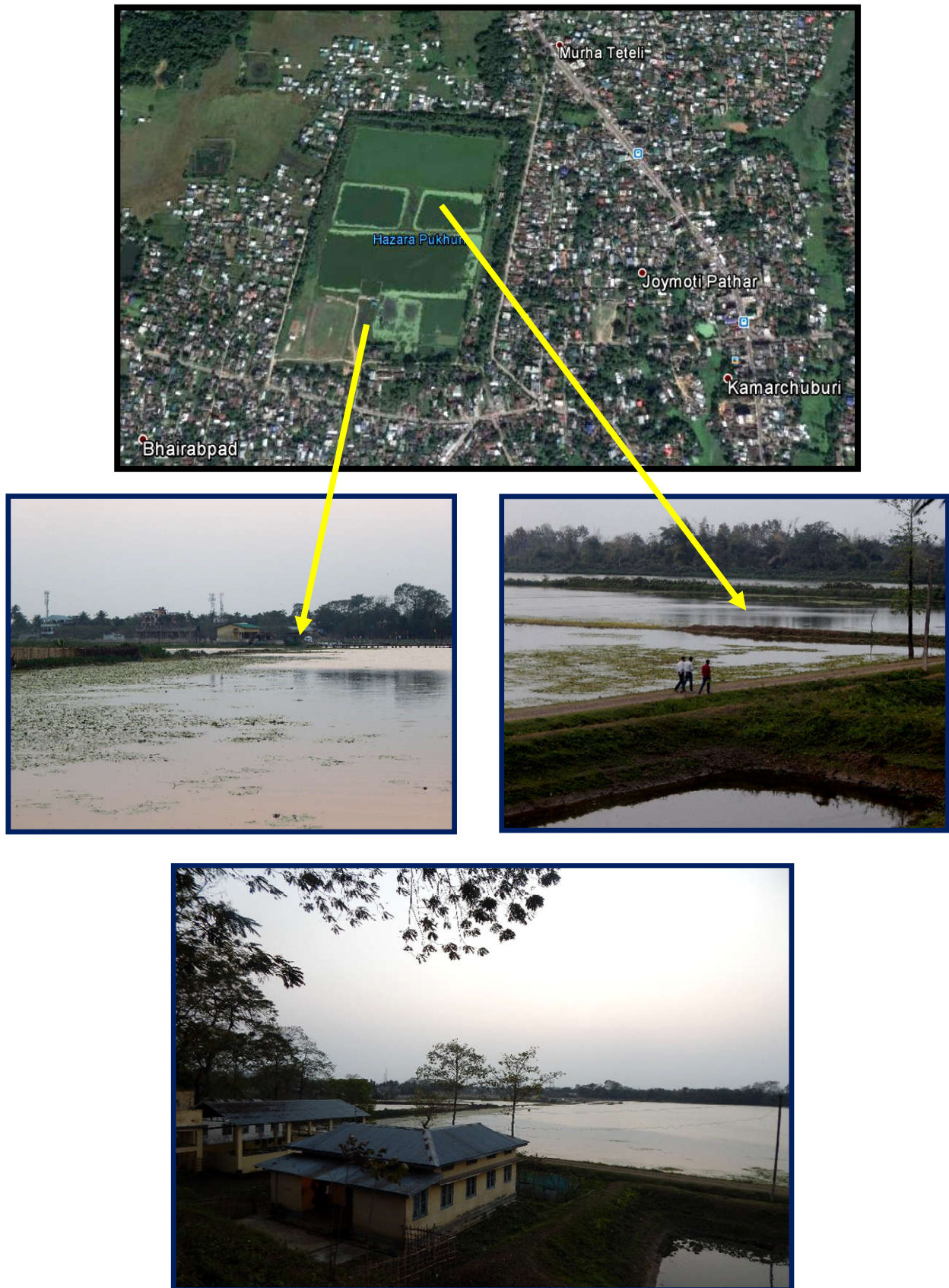


Figure 2. Satellite Imagery and Photographs of the study area ($26^{\circ}37'58''$ N- $92^{\circ}46'54''$)

The current valid names of all the collected taxa are given following Vazirani (1984), Nilsson (2012), Nilsson (2013), Ghosh and Nilsson (2012), Short and Fikacek (2011) and Deepa *et al.* (2014). All the paratypes are deposited in the taxonomic and biodiversity study laboratory of the P.G. Department of Zoology, Darrang College, Tezpur, Assam.

RESULTS AND DISCUSSION

The present survey could contribute altogether 18 species of aquatic beetles belonging to 13 genera and 4 families. Family Dytiscidae represents the highest number of 9 species under 4 subfamilies namely Hydroporinae, Laccophilinae, Copelatinae, and Dytiscinae. Family Hydrophilidae is represented by 6 species belonging to single subfamily Hydrophinae. Two species are found belonging to the Family Noteridae while the Family Gyrinidae is represented by only 1 species belonging to subfamily Enhydrinae. Among the 18 species recorded from the pond, 5 species are found to be the new record of occurrence from Assam. The species recorded for the first time from the state include 3 species belonging to family Dytiscidae namely *Laccophilus flexuosus* Aube, *Laccophilus guttalis* Régimbart, and *Copelatus oblitus* Sharp, and 2 species belonging family Hydrophilidae namely *Globaria leachi* Hope and *Helochares ancholaris* Sharp.

Systematic list of the collected species

Order: COLEOPTERA

I. Family: DYTISCIDAE

Subfamily HYDROPORINAE

Tribe HYDROVATINI

Genus: *Hydrovatus* Motschulsky 1855

1. *Hydrovatus confertus* Sharp, 1882

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 3exs.

Distribution: India (Andaman & Nicobar Islands, Assam, Delhi, Jharkhand, Kerala, Manipur, Pondicherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal), Bangladesh, Bhutan, Myanmar, Nepal, Pakistan, Sri Lanka; Cambodia, China, Indonesia, Laos, Malaysia, Thailand, Vietnam.

2. *Hydrovatus acuminatus* Motschulsky, 1859

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 25.IX.2013, 2exs.

Distribution: India (Andaman & Nicobar Islands, Assam, Delhi, Jharkhand, Kerala, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal), Myanmar, Nepal, Pakistan, Sri Lanka; Cambodia, China, Indonesia, Iran, Iraq, Japan, Laos, Madagascar, Malaysia, Oman, Philippines, Saudi Arabia, Singapore, Syria, Taiwan, Thailand, Turkey, Vietnam; African region, Australian region.

Subfamily LACCOPHILINAE

Tribe LACCOPHILINI

Genus: *Laccophilus* Leach, 1815

3. *Laccophilus flexuosus* Aube, 1838

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 25.IX.2013, 12exs

Distribution: India (Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Orissa, Pondicherry, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal), Bangladesh, Myanmar, Nepal, Pakistan, Sri Lanka; Cambodia, China, Hong Kong, Indonesia, Iran, Iraq, Japan, Taiwan, Vietnam.

Remark: The species is recorded for the first time in Assam.

4. *Laccophilus ellipticus* Régimbart, 1889

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 8exs.

Distribution: India (Andhra Pradesh, Assam, Bihar, Goa, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Pondicherry, Tamil Nadu, West Bengal), Myanmar, Sri Lanka; China, Cambodia, Indonesia, Thailand, Vietnam.

5. *Laccophilus guttalis* Régimbart, 1893

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 04.VI.2014, 3exs.

Distribution: India (Assam); Bangladesh, Sri Lanka

Remark: The species is recorded for the first time here in Hazara Pukhuri, Sonitpur, Assam.

Subfamily COPELATINAE

Tribe COPELATINI

Genus: *Copelatus* Erichson, 1832

6. *Copelatus oblitus* Sharp, 1882

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.V.2014, 2exs.

Distribution: India (Andaman & Nicobar Islands and Assam); China, Japan, Singapore

Remark: The species is recorded for the first time in Assam

7. *Copelatus assamensis* Vazirani, 1970

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 5exs.

Distribution: India (Assam and Meghalaya)

Subfamily DYTISCINAE

Tribe CYBERSTRINI

Genus: *Cybister* Curtis, 1827

8. *Cybister tripunctatus lateralis* Fabricius, 1798

Material examined: Assam, Sonitpur district, Hazara Pukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 5exs.

Distribution: India (Andaman & Nicobar Islands, Andhra Pradesh, Assam, Delhi, Gujarat, Himachal Pradesh, Jammu &

Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal), Afghanistan, Bangladesh, Bhutan, Myanmar, Nepal, Pakistan, Sri Lanka; China, Cyprus, Iran, Iraq, Japan, Kyrgyzstan, Mongolia, Russia, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan; Europe

9. *Cybisterconvexus* Sharp, 1882

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 5exs.

Distribution: India (Andhra Pradesh, Assam, Manipur, Meghalaya, Sikkim, Uttar Pradesh, West Bengal); China

II. Family HYDROPHILIDAE

Subfamily HYDROPHILINAE

Tribe Berosini

Genus: *Berosus* Leach, 1817

10. *Berosusfairmairei* Zaitzev

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 5exs.

Distribution: India (Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Delhi, Kerala, Manipur, Rajasthan, West Bengal), Bangladesh, Burma, China, Cambodia, Formosa, Hong Kong, Indonesia, Laos, Myanmar, Malaysia, Nepal, Philippines, Pakistan, Thailand.

Genus: *Globaria* Latreille, 1829

11. *Globarialeachi* Hope, 1838

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.V.2014, 2exs.

Distribution: India (Assam, Meghalaya, Tamil Nadu, West Bengal), Annam, Cambodia, Indonesia, Sri Lanka, and Tonkin

Remark: The species is recorded for the first time in Assam.

Tribe Hydrobini

Genus: *Helochares* Mulsant, 1844

12. *Helocharesancharis* Sharp, 1890

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 5exs.

Distribution: India (Andhra Pradesh, Assam, Bihar, Madhya Pradesh, Maharashtra, West Bengal), Cambodia, Indochina, Indonesia, Philippines, Sri Lanka

Remark: The species is recorded for the first time in Assam

Tribe Hydrophilini

Genus: *Sternolophus* Solier, 1834

13. *Sternolophusrufipes* Fabricius, 1792

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 08.VI.2013, 7exs

Distribution: India (Andhra Pradesh, Assam, Bihar, Jammu & Kashmir, Maharashtra, Meghalaya, Manipur, Punjab, Sikkim, Tripura, Uttar Pradesh, West Bengal), China, Indonesia, Japan, Myanmar, Philippines and Sri Lanka.

Tribe Hydrophilini

Genus: *Hydrophilus* Muller, 1764

14. *Hydrophilusolivaceus* Fabricius, 1781

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 08.VI.2013, 7exs.

Distribution: India (Andhra Pradesh, Assam, Madhya Pradesh, Maharashtra, Manipur, West Bengal)

Tribe Amphipini

Genus: *Amphiops* Erichson, 1843

15. *Amphiopspedestris* Sharp, 1890

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 13exs.

Distribution: India (Assam, Himachal Pradesh, West Bengal), Sri Lanka

III. Family: Gyrinidae

Subfamily Enhydrinae

Tribe Hydaticini

Genus: *Dineutus* Macleay, 1825

16. *Dineutus(Protodineutus)indicus* Aube, 1938

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 18exs.

Distribution: India (Andhra Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Pondicherry, West Bengal), Pakistan.

IV. Family: Noteridae

Subfamily Noterinae

Tribe Noterini

Genus: *Canthydrus* Sharp, 1882

17. *Canthydruslaetabilis* Walker, 1858

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.III.2013, 28exs.

Distribution: India (Andhra Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Odisha, Punjab, Rajasthan, Uttar Pradesh, West Bengal), Philippines, Sri Lanka.

Tribe Neohydrocoptini

Genus: *Neohydrocoptus* Sato, 1972

18. *Neohydrocoptussubvittulus* Motschulsky, 1859

Material examined: Assam, Sonitpur district, HazaraPukhuri (Tezpur) 26°37'58" N, 92°46'54" E, 05.V.2014, 9exs.

Distribution: India (Andhra Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Odisha, Punjab, Rajasthan, Uttar Pradesh, West Bengal), China, Sri Lanka.

The aquatic beetles are more diverse and distributed over 30 families (Jaiswal, 2013), however, only a few families have been reported from the Northeastern part of Indian subcontinent. In Assam, the survey carried out by Choudhury and Gupta, 2015 in Deep or Beel revealed 7 species of aquatic coleopterans belonging to 5 families, while Devi *et al.* (2014) recorded 24 species of aquatic coleopterans under 7 families in the fresh water lake, Loktak, Manipur, North East India reporting highest number of 12 species under the family Dytiscidae. Habitat heterogeneity in terms of aquatic macrophytes is found to be the major factor in rich species diversity of aquatic beetles in the studied pond. The aquatic macrophytes are the home of aquatic insects. Majority of the species recorded in the present investigation are found in association with aquatic vegetation. The species belonging to Family Dytiscidae and Hydrophilidae are mostly found in association with the emergent vegetation of the pond. The pond is dominated by aquatic macrophytes namely *Eicchorniacressipes*, *Nymphaea sp.* and *Trapanatans* in the shallow area which are the preferred habitat of the aquatic beetles (Jaiswal, 2013). The present survey in the Hazara Pukhuri is the first preliminary attempt to record the aquatic insect fauna in Sonitpur district. Further exhaustive field survey in different freshwater bodies of the district covering all the season will clearly contribute more species of aquatic beetles and other aquatic insect fauna from the district to enrich the database of state macro-invertebrate fauna of Assam.

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