



A NEW SPECIES OF THE GENUS *ACANTHOCEPHALUS* (KOELRUTHER, 1771) RECOVERED FROM THE INTESTINE OF *CLARIAS MAGUR* FROM IMPHAL-EAST MANIPUR (INDIA)

¹Pengki Devi, N. and ²Gambhir, R.K.

¹Research scholar & ²Professor, Department of Zoology

^{1,2}Parasitology Laboratory, Centre of Advanced Studies in Life Sciences, Manipur University,
CANCHIPUR-795003, IMPHAL, MANIPUR. (INDIA)

ABSTRACT

Acanthocephalus probirum n. sp. (Palaeacanthocephala: Echinorhynchidae) is describe from the intestine of *Clarias magur* (Hamilton, 1822) collected from Sekmai river. The new species is distinguished from other members of *Acanthocephalus* by features of its trunk which is small clavate, slightly expanded medially and bluntly pointed posteriorly. It is further distinguished by having a cylindrical proboscis armed with 12-15 longitudinal rows of 6-10 stout hooks, the anterior half regularly uniform in size and shape, decreasing in size toward the base. Furthermore, the leminisci are saccate and shorter than the proboscis receptacle and the testes are in the middle third of trunk, diagonal, spherical and small relative to the body. This is the first record of the genus *Acanthocephalus* from freshwater fish in Manipur.

KEYWORDS: *Acanthocephalus*, *Clarias magur*, Imphal-east, Sekmai river, trunk.

1. INTRODUCTION

India is known for its vast fish resources and occupy second position in Inland fish production and third in overall fish production in the world. The state of Manipur with a high resources in fishery has a great diversification of Ichthyofauna producing 30,000 tons of fishes per year. Many workers studied the fish fauna hydrobiology and productivity of rivers from Manipur like- Vishwanath and Singh (1986), Vishwanath *et al.* (1987, 1998), Vishwanath and Sarojnialini (1988). They made valuable contributions to the knowledge of Ichthyofauna of Manipur.

Considerable work also has been done on the systematics of helminth parasites of fishes by many Indian workers. Bhalerao 1942 and Gupta 1962 made substantial work on the taxonomy of digenetic trematode parasites. Further contributions on Acanthocephalan fauna of India were made by Podder (1938), S.B.Bhattacharya (2007), etc.

In north-east India also the limnology and Ichthyofauna have been studied by many workers (Kar 2005, 2010). The genus *Acanthocephalus* was erected by Koelruther, 1771 with *A. anguillae* as its type species. Amin 2013 recognised 53 species of the Acanthocephalan under the genus *Acanthocephalus*, Koelreuther 1771 mostly from freshwater fishes and amphibians.

II MATERIALS AND METHODS

Fishes were collected from Sekmai river, Imphal-east, Manipur. They were brought to the laboratory, dissected and examined for any parasites. The acanthocephalan parasites recovered were kept in refrigerator before fixing for complete eversion of the proboscis. The parasite were flattened under slight pressure of cover glass and fixed in A.F.A (alcohol-formal-acetate). The parasites were stained in Acetoalum carmine and dehydrated through ascending series of alcohol grades, cleared in xylene and mounted in DPX. Then covered with coverslips and sealed with nail polish. After preparation of permanent slide, specimens were examined under light microscope-Olympus CH20i light binocular research microscope for examination and identified upto genus consulting the literature of S.B. Bhattacharya, 2007 and Omar M. Amin, 2013. Diagrams were drawn with the help of Camera Lucida and measurements are expressed in millimetres unless otherwise indicated. Photomicrographs were taken by Nikon Stereo Zoom Microscope SMZ 1270. Parasite specimens (Holotype and paratype) were deposited in the Parasitology Section, Department of Life Sciences, Manipur University, Canchipur, Imphal, Manipur. Prevalence, Abundance and mean density, Index of infection were determined according to Margolis *et.al* 1982.

III RESULT

Twenty-four middle size *Clarias magur* were examined during the study and three were found infected with *Acanthocephalus* sp. (13.06 % Prevalence). All the specimen were recovered from the intestine of the fish.

Acanthocephalus probirum n.sp. Figure.1(A-C), Figure.2(A-D).

IV TAXONOMIC SUMMARY

Genus	:	<i>Acanthocephalus</i>
Species	:	<i>probirum</i> n. sp.
Type host	:	<i>Clarias magur</i> (Halminton,1822)
Site of infection	:	Intestine
Locality	:	Sekmai river, (24°54'56" N and 93°53'29" E) Imphal-east, Manipur.
Type specimen	:	Holotype - S ₁ A ₁ PMU. Deposited in the Section of Parasitology, Department of Life Sciences (Zoology), Manipur University, Canchipur, Imphal.
Etymology	:	The specific name is given after Prof. (Late) Probir Kumar Bandyopadhyay of Kalyani University, a well-known Parasitologist.

V DESCRIPTION

5.1 MALE: Acanthocephalan: Echinorhynchidae: *Acanthocephalus*.(Measurement based on five specimens)

Body elongated, anterior region of trunk broadest and curved at the anterior end and gradually tapering towards the posterior end of the body. Body measures 4.90 – 6.15 in length and 0.90 – 1.25 in width, proboscis elongated consisting of 12 – 15 rows of hooks containing 6 – 10 hooks in a row. The longer hook measures 0.09 – 0.12 in length and the smallest hook measures 0.08 – 0.10 in length. Proboscis receptacles double layered 2.90 – 3.70 in length and 0.20 – 1.35 in width. Testes oval or rounded, unequal in size, situated in tandem and located in middle third of the body. Anterior testis 0.22 – 0.69 in length and 0.23 – 0.38 in width, posterior testis 0.50 – 0.70 in length and 0.10 – 0.30 in width. Cement glands four in number, filiform and comprised of two groups each with two glands. Bursa protruded out, triangular shaped, measures 0.37 – 0.60 in length and 0.24 – 0.54 in width.

5.2 FEMALE (Measurement based on four specimens)

Body small, elongated, broadest at the anterior end and gradually tapers towards the posterior end, measures 6.46 – 10.28 in length and 0.74 – 1.14 in width. Proboscis elongated consisting 12-15 rows with 6 – 10 hooks per rows. The longest hook measures 0.17 – 0.19 in length and the shortest hook measures 0.11 – 0.1length

Lemnisci are not visible. Eggs elongated, fusiform, measures 0.03 – 0.06 in length and 0.01 – 0.02 in width. Genital pore situated at posterior end.

It is also observed from the study (Table-1) that male host fish were more parasitized by the *Acanthocephalus* species with 15.38% prevalence, mean intensity of 2.5, 0.38 abundance and 0.76 index of infection. However, female hosts shows lesser values 9.01% with prevalence, abundance 0.36, mean intensity of 4.0 and 0.36 index of infection. Overall rate of prevalence, mean intensity, abundance and index of infection were observed to be 12.50%, 3.0., 0.37 and 1.12 respectively.

Table-1 Occurrence of *Acanthocephalus probirum* n. sp. in relation to sex of *Clarias magur* from Imphal-east, Manipur.

Sex	Non-infected	Infected	Total no. of examined	Prevalence %	Total of parasite recovered	Mean intensity	Abundance	Index of infection
Male	11	2	13	15.38	5	2.5	0.38	0.76
Female	10	1	11	9.01	4	4.0	0.36	0.36
Total	21	3	24	12.5	9	3.0	0.37	1.12

Table 2. Comparison of the present specimen, *Acanthocephalus probirum* n.sp. with its closest relative *A. parallelcementglandatus* (Amin, Heckmann & Ha, 2014).

Characters	<i>Acanthocephalus probirum</i> n. sp.	<i>A.parallelcementglandatus</i> (Amin, Heckmann & Ha, 2014)
Body	6.23 – 7.99	3.88 – 5.27
Proboscis	Long	Short
Hooks	12 – 15 longitudinal rows	7 – 8 longitudinal rows
Proboscis sheath	Curved	Straight
Cement gland	Presence of 4 rounded cement glands	Presence of tubular cement glands
Shape of Bursa	Triangular	Rounded

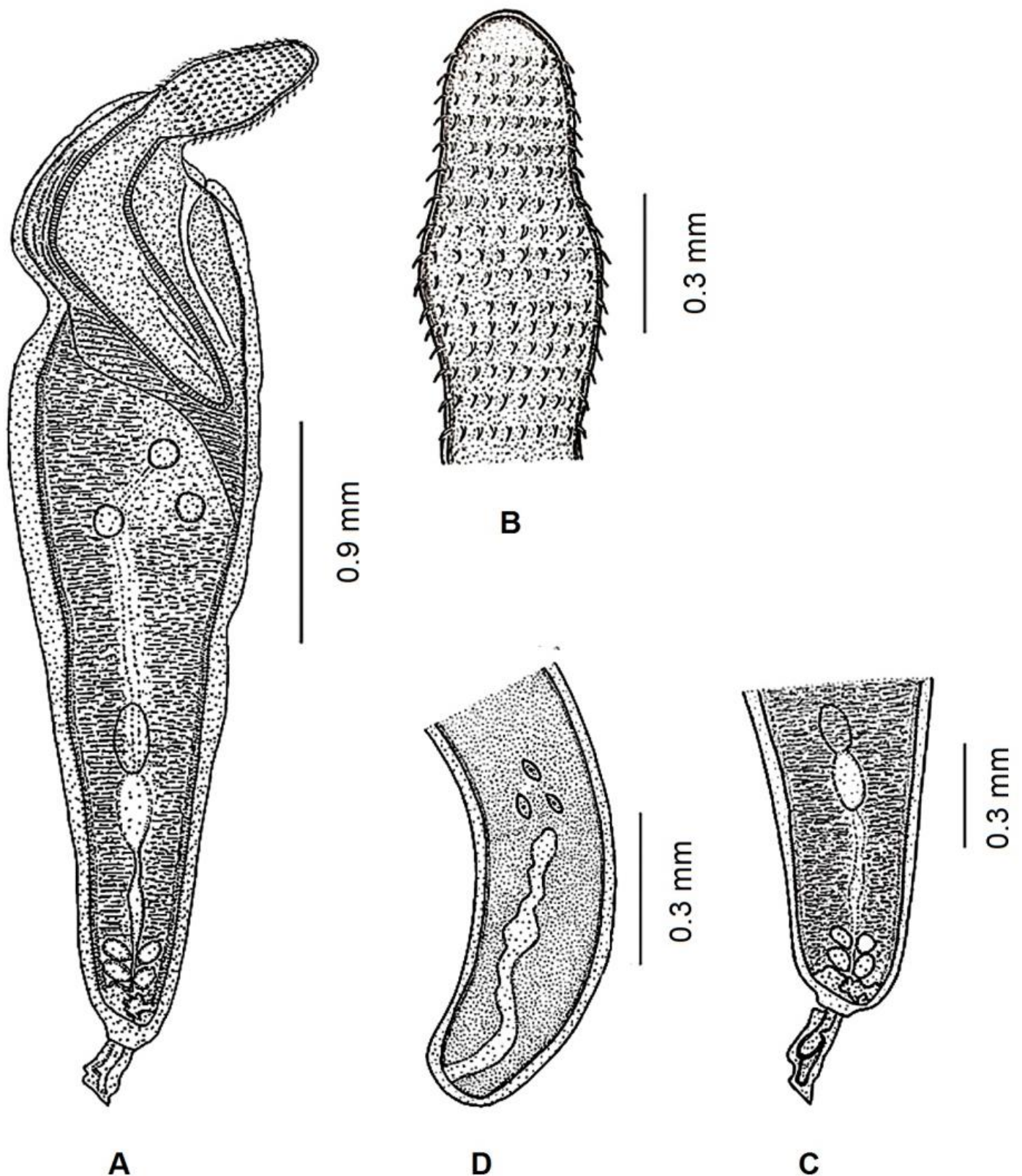


Fig.1: *Acanthocephalus probirum* n. sp. (Camera Lucida drawing): A. Whole body (Male), B. Proboscis hooks, C. Posterior end of male, D. Posterior end of female.

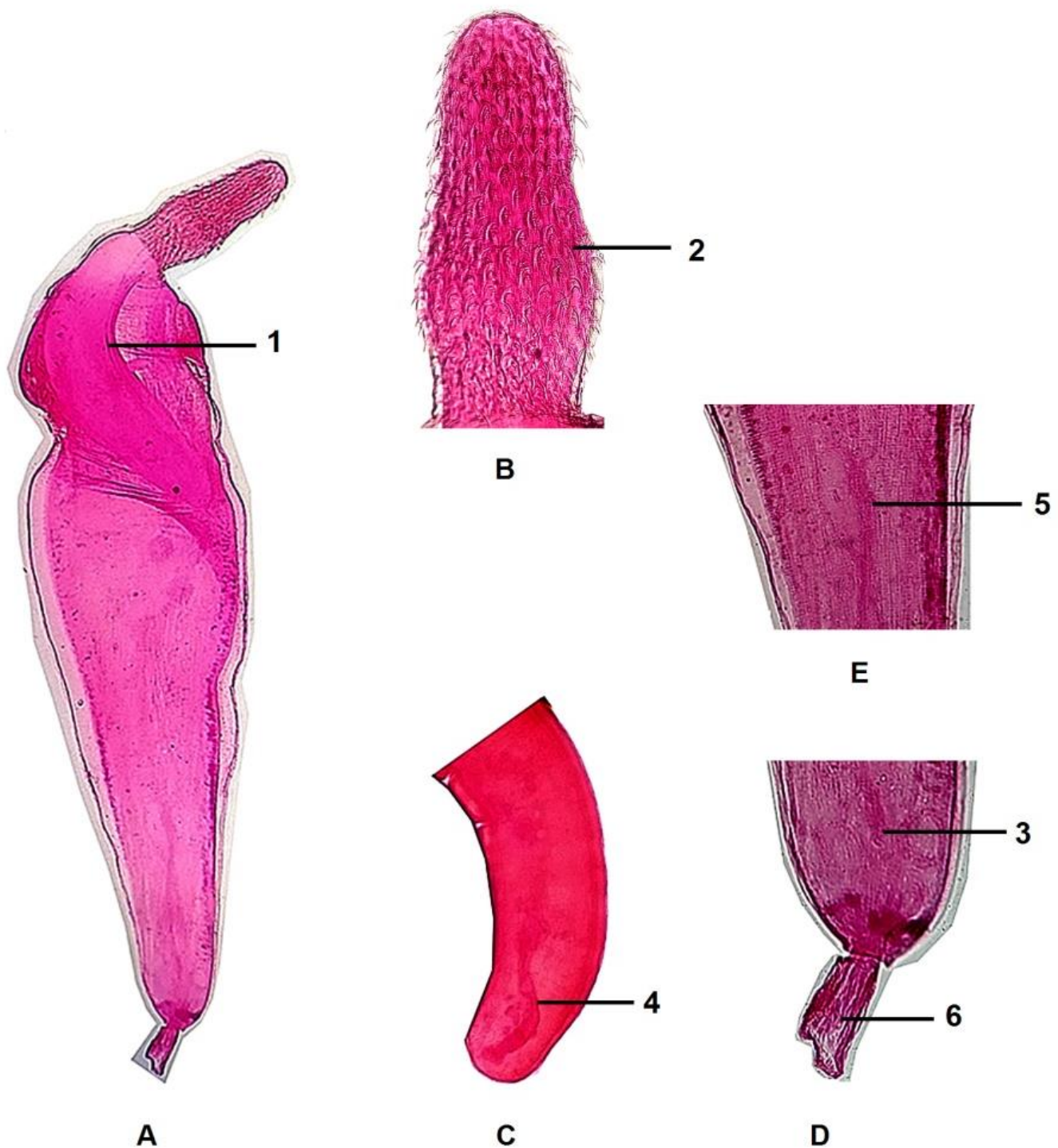


Fig.2 Photomicrograph of *Acanthocephalus probirum* n. sp. A. Whole male body (Male). B. Proboscis, C. Posterior end female, D. Posterior end of male, E. Showing testes.

1. Proboscis sheath, 2. Proboscis with hooks, 3. Cement glands, 4. Uterine tube, 5. Testes, 6. Bursa

V DISCUSSION

The present specimen is characterised by having a spineless region, broadest in width and curved at the anterior end, gradually tapering towards the posterior end of the body. Proboscis elongated consisting of 12 – 15 rows of hooks containing 6 – 10 hooks per row. The last hook in a row is smaller than the preceding ones which are unequal in size. Proboscis receptacles double layered. Testes oval or rounded, unequal in size situated in tandem and located in middle third of the body. Cement gland four in number and arrange in a quadrilateral manner. Eggs elongated and fusiform.

The present specimen closely resembles to *A. kashmirensis* and *A. manipurensis* on the presence of cylindrical proboscis, however, they all have specific characters with them which differentiated the new acanthocephalan from others such as number of hooks, position of testes, number of cement gland and also in posterior end with triangular shape of bursa of the new *Acanthocephalus* species.

A detail study shows some resemblances in the morphological characters with its closest relatives – *A. parallelcementglandatus* (Amin, Heckmann & Ha, 2014) in size of proboscis and size of hooks. However, the present specimen have distinct differences from *A. parallelcementglandatus* in its body size, size and number of proboscis hooks, shape of lemnisci, position of testes, size of egg, shape of bursa, number of cement glands and other morphometric dimensions.

Finally, by the differences in the compared specimens and with the congeners given in table -2 concerning the differences in proboscis hooks, lemnisci, size of testes, size and number of cement glands, shape of bursa, the authors suggest that the present specimen is a new species of the genus *Acanthocephalus* found in Imphal-east, Manipur. Hence, a new species is proposed and given the name as *A. probirum* n. sp. to accommodate the present species.

VI ACKNOWLEDGEMENT

The authors are thankful to the Head, Department of Life Sciences, Zoology Manipur University for providing necessary laboratory facilities. The co-operation and valuable support from colleagues and friends are also gratefully acknowledged.

REFERENCES

1. Amin, O.M. (1982). Description of larval *Acanthocephalus parksidei* Amin, 1975 (Acanthocephala: Echinorhynchidae) from its isopod intermediate host. *Proceeding of the Helminthological. Society of Washington*. 49: 235-245.
2. Amin, O.M, Richard A. Heckmann, Atif M. El Naggar (2011) Revisiting the morphology of *Acanthocephalus lucii* (Acanthocephala: Echinorhynchidae) in Europe, using SEM *Journal of Parasitology* 12(4):197-201.
3. Amin, O.M., (2013). Classification of the Acanthocephala *Folia Parasitologica* 60(4): 273-305.
4. Amin, O. M.; Heckmann, R. A.; Ha, N. V. (2014). Acanthocephalans from fishes and amphibians in Vietnam, with descriptions of five new species. *Parasite*. 21: 53.
5. Bhalerao, G.D (1942) Some metacercarial forms of Clinostomatidae (Trematoda) from India. *Proc Indian Acad Sci* 16:67–71.
6. Bhattacharya, S.B. (2007) Handbook on Indian Acanthocephala Zoological Survey of India Kolkata. p 1-225.
7. Gupta, R. (1962) Two new species of the rare genus *Schwartzitrema* (Vigueras, 1940) Vigueras, 1941 (Trematoda: Strigeidae). *Proc Nat Sci India* 32:387–392.

8. Kar, D. (2005) Fish Fauna of river Barak of Mizoram and Tripura with a note on Conservation. *Journal of Freshwater Biology* 1:16
9. Oetinger, D. F., Andr. L. Buckner. (1976). *Acanthocephalus tahlequahensis* sp. n. (Acanthocephala: Echinorhynchidae) from the stippled darter, *Etheostoma punctulatum* (Agassiz), in northeastern Oklahoma. *Journal of Parasitology*. 62: 237-241.
10. Petrochenko, V.I.(1956). Acanthocephala of domestic and wild animals. I. Akad. Nauk SSSR, Moskva [Engl. trans. by Israel Prog. Sci. Trans., 1971], 465 p.1963.
11. Podder (1937) Indian Acanthocephala, Zoological Survey of India, Culcutta, p. 1 – 247.
12. Vishwanath, W.(1993). On collected fishes of genus *Garra* Hamilton from Manipur, India, with description of a new species. *Journal of Freshwater Biology*. 5(1): 59-68.
13. Vishwanath, W. (2002). Fishes of North-East India: a field guide to species identification, Manipur University-NATP Publication, Manipur.
14. Vishwanath, W. and Sarojnalini, C. (1988). A new cyprinid fish, *Garra manipurensis* from Manipur, India. *Japanese. Journal Ichthyology*., 35(2): 124-126.
15. Yamaguti S. (1963). Systema Helminthum, Vol. 5 Acanthocephala,.Wiley Intersciences., New York, N.Y., p-423 .