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JUTE RETTING-SERIOUS THREAT TO AQUATIC BODIES & PHYTODIVERSITY IN BERHAMPORE BLOCK (W. B.)

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ABSTRACT

Water is indispensible for all forms of life. Globally, its demand is increasing, exponentially, due to increase in the population growth and economic development. This demand of water, for various anthropogenic activities is met, to a large extent, by the local water bodies. A study was carried out for last three years i.e.2008-2011, in the Berhampore block, situated in the Berhampore subdivisional town of the Murshidabad district, in the Indian state of West Bengal. There are large numbers of local water bodies, harbouring, invaluable varieties of aquatic plant species, belonging to different families, maintaining the plant's genetic diversity. *Jute* (*Corchorus capsularis* and *C. olitorius*), is a highly economic crop of this region. But the conventional retting process, in the production of Jute fibre, in these water bodies is causing serious threats' to their existence, along with these invaluable aquatic plant species. The present paper documents some of the invaluable plant species therein & highlights the adverse effects of Jute retting in these water bodies, of this region.

Key Words: Anthropogenic activities, water bodies, jute retting.

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Introduction

Water, another name of life, is being over exploited to meet our thirst, receding its level by 2-4 m in many areas of India including, West Bengal- Murshidabad, Purulia, Parts of Malda, Hugli (Roy *et.al*., 2008; Central Ground water Board's Annual report, 2009). The demand of water for various anthropogenic activities is met, to a large extent, by the local water bodies, of the study area. These water bodies also harbour invaluable aquatic plant species, belonging to different families, maintaining the plant's genetic diversity. *Jute* (Golden Fibre) industry, in this area, occupies an important place both in terms of value of annual foreign exchange and the number of people employed. *Jute* (*Corchorus capsularis* and *C. olitorius*), is a highly economic crop of this district along with the some adjacent areas, like Malda district of West Bengal, Pakur district of Jharkhand state etc. But, the conventional process of jute retting, to extract the fibre, is posing a serious threat to the prevailing biodiversity in this region. This has raised a question mark on the sustainability of these freshwater bodies.

The present paper documents some of the invaluable plant species therein & highlights the adverse effects of the conventional method of jute retting in these local water bodies. No other previous work is available except the work of Das and Mukherjee, 2012, which is a pioneer work of the study area. The important literatures referred are

Christopher, 2006; Guha, 1984; Gupta, 1987; Hains, 1921-24; Mooney, 1950; Mukherjee, 2001, Mukherjee and Kumar, 2003; Mukherjee *et al.,* 2006; Mukherjee *et al.,* 2007; Mukhopadhyay, 1987; Naskar, 1990; Subramanyam, 1962 and Alam, 1993 etc.

Materials and Methods

For this purpose, field survey has been conducted during 2008-2011 in Berhampore block of Murshidabad district. Urban area, under this block consists of three census towns: Kasimbazar, Goaljan and Gora Bazar.

Water bodies in this study area, were visited several times, especially during the stem retting of *Jute* & its fibre harvesting period. The aquatic plants species were collected from different water bodies, serving this purpose and dissected for proper identification. The local available herbaria were also referred for the effective identification of the plant species. The latter, were visited several times in each season to trap them in their flowering and fruiting period, for the phenological studies. Utmost care has been taken, while nurturing the aquatic phyto-diversity of local water bodies.

Jute Profile:

Jute is a bast fibre obtained from the secondary phloem. The bast fibre is obtained from *C. capsularis*, a species with round pods which is grown in lowland areas subjected to inundation. Fibres from *C. olitorius,* an upland species with long pods, is, but little inferior. The crop is harvested within three months after planting, while the flowers are still in bloom, in the months of June to October.

Separation of fibre by Retting:

The fibre is separated from the stems, by a traditional and most common, process of retting, in pools of stagnant water bodies. This method of retting is known as `stem retting', in which the complete plant stem is immersed in water in bundles of multiple layers termed `rets'. The bundles are made to sink in the water by placing sods and mud, on the top of them. The retting period varies from two to twenty-five days.

The cultivator has, therefore, to visit the tank daily and ascertain by means of his nail, if the fibre has begun to separate from the stem. The cultivator then standing up to the waist in the water starts to remove small portion of the bark from the ends, next to the roots. Grasping them together, he then, strips off the whole with a little management from end to end without breaking either stem or fibre. Thereafter, the washing is done to remove the impurities. It is now wrung out to remove as much water as possible, and then hung up on lines prepared on the spot, to dry in the sun. And, thus, six to ten feet long, "The Golden Fibre", title earned by this fibre, due to the presence of natural pale-yellow, silky lusture, is obtained (Fig. a.-g.).

Observations

Adverse effects on the local water bodies

Innumerable local water bodies, which have been serving this conventional process of stem retting & *Jute* fibre harvesting, have either extinct or are on the verge of their extinction. This is mainly due to, a large amount of, the biomass decomposition, as a result of the aforesaid processes. Following are the adverse effects of these processes on the local water bodies of this region:

1. As a result of retting, the quality of water gets deteriorated. It becomes unfit for normal use.
2. It also results in a large amount of biomasses, decomposing in these bodies, lowering their vertical stratification, which in turn changes the physical and climatic conditions, affecting worse, on the biotic communities prevailing there.
3. The prevailing conditions, gets modulated, forcing their biotic communities to adapt to the new, changed environment; leading to ecological succession, excluding the unfit individuals, maintaining the theory of Darwin, the survival of the fittest.
4. And, thus these processes enhances, the rate of ecological succession, to a great extent,

thereby, threatening the existence of these water bodies.

5. Retting process, in these water bodies, emits unpleasant odour. The surrounding locality becomes intolerable & suffocating, to live in.

6. Many people living beside these water bodies suffer from various skin diseases when they use the water for bathing and other purposes.

Different Aquatic plant species

The lists of plants enumerated here are given in the alphabetical order along with their Family, availability and flowering and fruiting time (Fl /Fr.Tm.) in Table-1. For the arrangement of plant species Bentham and Hooker's system of classification has been followed.

Results and Discussions

Jute (*Corchorus capsularis* and *C. olitorius*) fibre, is one of the least expensive and most versatile of textile fibres. These fibres are biodegradable, environmentally benign and renewable, and their productions provide reliable employment in many rural areas. But, the conventional stem retting and fibre harvesting processes have a profound effect, on the existence of

Fig. a. Stems harvested from field..

Fig. b. "Rets" in water

Fig.c. Rets made to sink by placing mud.

Fig.d. Rets ready for fibre separation.

Fig.e. Fibres being separated with care.

Fig. f. Washed harvested fibres.

Fig. g. Fibres hung up on lines to dry.

Table 1. Record of different aquatic plant species from these water bodies.

Sl.No.	**Plant Name,** [Family]; Voucher specimen	**Availability**	**Fl /Fr.Tm.**
1.	***Actinoscirpus grossus*** (L.f.) Goetghebeur, [Cyperaceae]; *Anuradha Das - 311*	Very common	July -Dec.
2.	***Aeschynomene aspera*** (L.), [Fabaceae]; *Anuradha Das - 601*	Common	May-Sept.
3.	***Alternanthera philoxeroides*** (Mart.) Griseb., [Amaranthaceae]; *Anuradha Das - 172*	Abundant	April-Aug.
4.	***Aponogeton natans*** Engl. & Krause, [Aponogetonaceae]; *Anuradha Das - 262*	Common	July-Dec.
5.	***Ceretophyllum demersum*** L., [Ceratophyllaceae]; *Anuradha Das - 183*	Very common	Sept.-Dec.
6.	***Colocasia esculenta*** (L.) Schott, [Araceae]; *Anuradha Das - 132*	Abundant	July-Nov.
7.	***Commelina benghalensis*** L., [Commelinaceae]; *Anuradha Das - 177*	Common	Nov.-Feb.
8.	***Cyperus difformis*** L., [Cyperaceae]; *Anuradha Das - 280*	Very common	Aug.-Dec.
9.	***Cyperus iria*** L., [Cyperaceae]; *Anuradha Das - 272*	Common	Aug.-Jan.
10.	***Cyperus rotundus*** L., [Cyperaceae]; *Anuradha Das - 289*	Abundant	June-Jan.
11.	***Dryopteris chrysocoma,*** [Polypodiaceae]; *Anuradha Das - 104*	Abundant	April-July
12.	***Eichhornia crassipes*** (Mart.) Solms, [Pontederiaceae]; *Anuradha Das - 202*	Abundant	Apr-Nov.

13.	***Eleocharis atropurpurea*** (Retz.) Presler, [Cyperaceae]; *Anuradha Das - 299*	Common	Sept.-Dec.
14.	***Eleocharis dulcis*** Trin ex Henschel., [Cyperaceae]; *Anuradha Das - 277*	Common	Oct.-Dec.
15.	***Enydra fluctuans*** Lour., [Asteraceae]; *Anuradha Das - 372*	Abundant	Dec.March
16.	***Eriocaulon cinereum*** R. Br., [Eriocaulaceae]; *Anuradha Das - 396*	Common	Aug.-Nov.
17.	***Fimbristylis bisumbellata*** (Forssk.) Bubani, [Cyperaceae]; *Anuradha Das - 247*	Common	Oct.-Dec.
18.	***Fimbristylis falcata*** (Vahl) Kunth, [Cyperaceae]; *Anuradha Das - 211*	Very common	July-Sept.
19.	***Hydrilla verticillata*** (L.f.) Royle, [Hydrocharitaceae]; *Anuradha Das - 245*	Common	Nov.-Jan.
20.	***Hygroryza aristata*** Nees ex Wt. & Arn., [Poaceae]; *Anuradha Das - 109*	Common	Oct.-Dec.
21.	***Hygrophila auriculata*** (K. Schum.) Heine, [Acanthaceae]; *Anuradha Das -133*	Very Common	Sep.-Feb.
22.	***Ipomoea aquatica*** Forsskal, [Convolvulaceae]; *Anuradha Das - 389*	Abundant	Sept.-Feb.
23.	***Lemna perpusilla*** Torrey, [Lemnaceae]; *Anuradha Das - 192*	Common	May-Sept.
24.	***Ludwigia adscendens*** (L.) Hara, [Onagraceae]; *Anuradha Das - 325*	Common	Whole Year
25.	***Marsilea minuta*** L., [Marsileaceae]; *Anuradha Das - 103*	Very common	April-June
26.	***Monochoria hastata*** (L.) Solms, [Pontederiaceae]; *Anuradha Das - 140*	Very common	July-Nov.
27.	***Monochoria vaginalis*** (Burm. f.) Kunth, [Pontederiaceae]; *Anuradha Das - 313*	Common	July-Nov.
28.	***Nechamandra alternifolia*** Thw., [Hydrocharitaceae]; *Anuradha Das - 169*	Common	Aug.-Feb.
29.	***Nelumbo nucifera*** Gaertner, [Nelumbonaceae]; *Anuradha Das - 306*	Very common	July - Nov.
30.	***Nymphaea nouchali*** Burm.f., [Nymphaeaceae]; *Anuradha Das - 118*	Common	Aug.-Nov.
31.	***Nymphaea stellata*** F. Muell., [Nymphaeaceae]; *Anuradha Das - 105*	Common	Aug.-Nov.
32.	***Nymphoides indica*** (L.) Kuntze, [Menyanthaceae]; *Anuradha Das - 345*	Common	Whole Year
33.	***Nymphoides hydrophylla*** (Lour.) Kuntze, [Menyanthaceae]; *Anuradha Das - 400*	Very common	July- Nov.

34.	***Persicaria barbata*** (L.) Hara, [Polygonaceae]; *Anuradha Das - 176*	Common	Sept.-Feb.
35.	***Pistia stratiotes*** L., [Araceae]; *Anuradha Das - 167*	Very common	Aug.-Oct.
36.	***Polygonum plebeium*** R. Br., [Polygonaceae]; *Anuradha Das - 154*	Common	Nov. March.
37.	***Potamogeton nodosus*** Poiret, [Potamogetonaceae]; *Anuradha Das - 377*	Common	Oct.-March
38.	***Ranunculus sceleratus*** L., [Ranunculaceae]; *Anuradha Das -124*	Very common	Nov.-Feb.
39.	***Rumex dentatus*** L., [Polygonaceae]; *Anuradha Das - 187*	Very common	Dec.-June
40.	***Sagittaria sagittifolia*** L., [Alismataceae]; *Anuradha Das - 329*	Very common	Oct.-March
41.	***Schoenoplectus articulata*** (L.) Palla, [Cyperaceae]; *Anuradha Das - 143*	Common	Sept.-Dec.
42.	***Schoenoplectus grossus*** (L. f.) Palla, [Cyperaceae]; *Anuradha Das - 154*	Common	Sept.-Dec.
43.	***Spirodella polyrrhiza*** (L.) Schleid, [Lemnaceae]; *Anuradha Das - 200*	Abundant	April-Nov.
44.	***Trapa natans*** L., [Trapaceae]; *Anuradha Das - 333*	Common	Sept.-Jan.
45.	***Typha angustata*** Bory & Chaub., [Typhaceae]; *Anuradha Das - 150*	Common	April-June
46.	***Utricularia aurea*** Lour., [Lentibulariaceae]; *Anuradha Das - 398*	Common	Sept.-Nov.
47.	***Utricularia stellaris*** L.f., [Lentibulariaceae]; *Anuradha Das - 367*	Very common	Sept.-Feb.
48.	***Vallisneria spiralis*** L., [Hydrocharitaceae]; *Anuradha Das - 249*	Abundant	Nov.-March
49.	***Wolfia arrhiza*** (L.) Harkel ex Wimm., [Lemnaceae]; *Anuradha Das - 254*	Common	July-Oct.
50.	***Zannichellia palustris*** L., [Zannchelliaceae]; *Anuradha Das - 387*	Common	Oct.-March

these local water bodies, embodying invaluable aquatic phyto-diversity & also on the surrounding environment.

The water bodies of this region include a total of 50 aquatic plant species, belonging to 29 families and 33 genera. Eichhornia crassipes, Alternanthera philexoroides, Dryopteris chrysocoma, Nelumbo nucifera, Nymphea nouchalli, Marsilea minuta, Ipomoea aquatica, Pistia stratiotes, Spirodella polyrrhiza and Lemna perpusilla are very common species of the study area. Some species like Aeschynomene aspera, Cyperus iria are threatened species Gupta, 2011. Cyperaceae counts the maximum number of species 10, then Pontederiaceae with 3

species along with Lemnaceae also with 3 species.

These invaluable plant species have their own significance in maintaining ecological balance & nature's beauty. Some species like *Nelumbo nucifera, Marsilea minuta, Ipomoea aquatic, Persicaria barbata etc. have quiet medicinal properties. These water bodies need* utmost care to save diverse plant species therein.

On the other hand, these water resources can also be utilized for various anthropogenic activities, including crop production in off seasons. In order to sustain the balance, between, both, the *Jute* fibre production and preservation of these local water bodies, improved and better methods, for the process, like Bacterial cultures, Fungal cultures, Chemical retting, Bleaching treatment etc. should be employed, yielding better-quality *Jute* fibres. And, genuine efforts should be made, to popularize these promising methods, among the cultivators and *Jute* producers, in order to enable them to obtain higher returns, preserving these local water bodies.

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