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## RESEARCH ARTICLE

### INVASIVE ALIEN AQUATIC WEEDS: THREAT TO LIMNETIC HABITAT

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#### ABSTRACT

The present paper deals with undesirable, obnoxious and troublesome nature of invasive alien aquatic weeds, which have also been regarded as exotic, introduced or non - indigenous plants causing loss or decline of aquatic biodiversity in a specific limnetic habitat due to higher accelerated rate of infestation. Invasive species can change or disturb aquatic biodiversity posing threat to aquatic ecosystem, which is considered to be of global concern. The present work is based on local survey of invasive aquatic weeds found in and around Jamtara district of Jharkhand state. The holistic approach mentioned in this work includes compilation and documentation of 7 invasive alien aquatic weeds belonging to 6 families along with their floristic study.

**Key words:** Invasive, Alien, Exotic, Aquatic biodiversity, Aquatic weeds, Jamtara, Jharkhand.

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#### INTRODUCTION

The plants introduced in an area outside its original distribution range either intentionally or unintentionally by human activities have been regarded as alien or invasive or exotic for that particular locality. The introduction and establishment of invasive aquatic weeds affect aquatic biodiversity posing serious threat to the entire limnetic habitat by interfering and disturbing the growth of original native and indigenous species (Nayar, 1977). Their infestation has caused danger of extinction to other plants in the specific area. Many of the aquatic plants become invasive only due to their higher rate of infestation (Richardson *et al*, 2000). Water hyacinth, the most troublesome and obnoxious weed covers the entire water surface restricting sunlight and space for all other flora and fauna. Their rate of infestation is very fast and accelerated resulting in loss of aquatic biodiversity and imbalance of ecosystem functioning. This most troublesome weed had been brought to India during English rule to beautify the outskirts area of ponds due to its attractive flowers. Invasive alien species are non-native or non-indigenous plants, the spread and impact of which are trans-boundary, across the country. It has long been recognized that the introduction, establishment and infestation of aquatic alien species may be related to development of global markets and pathways of trade. They have also been regarded as one of the causes of environmental pollution resulting eutrophication (Hiremath and Agrawal, 2010). Rapid and uncontrolled infestation of invasive species is homogenizing the flora and fauna and has been recorded as primary cause of loss of global biodiversity (Mooney and Hobbs, 2000). As per as study of invasive species at global level is concerned, Almeilla and Freitas (2001), Cox (1999),

Drake *et al*. (1989), Mooney and Drake (1987) and Lonsdale (1999) have discussed about ecology, invasion and other aspects of alien species. The introduction of alien or exotic or exogenous species has threatened aquatic ecosystem in general and native species in particular. Their impact is negative both on limnetic habitat and socio-economic status of common mass of people who depend on water bodies for their livelihood, like fishing, food and fodder and many more economic activities. Invasive alien species can harm aquatic biodiversity with reference to genetics, species and ecosystems in addition to communities by affecting their structure and function. They may threaten native species by altering native species and loss of biodiversity (Dutta and Mukherjee, 2015). They affect composition of ecosystem by altering cycling of minerals (Mc Neely *et al*, 2001) in addition to affecting geomorphic processes. The present work deals about 7 major alien aquatic plants in and around Jamtara district of Jharkhand state, out of which *Eichhorniacrassipes* Mart. and *Alternanthera philoxeroides* (Mart.) Griseb. are most common and seem to be an economic drain.

#### MATERIALS AND METHODS

Jamtara district lies between 23°10' – 24°05' north latitudes and 86°30' – 87°15' east longitude, lying at the lower altitude of Chhotanagpur plateau. It is fabulous treasure of aquatic vegetation being dominated by tribal communities. The present work includes regular visit of the sampling sites for collection and identification of plants during 2015 – 2018. Samples were collected from eight ponds located in and around Jamtara i.e. Rajabandh pond, Sarkarbandh pond, Taalpokhar, Sarkhelditalab, Kishoritalab, duladih pond, Chhathtalab, Sahna and Shatabdi Park pond. The samples were collected and identified as per BSI guidelines and their taxonomic study

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was done. Taxonomic study includes citation of botanical names, local names, families and important vegetative and floral characters. Identification of plants was done with the help of local flora and monograms like, Hains (1921 – 1925), Jha (1965), Naskar (1990) and Cook (1996).

**Observation:** The list of invasive alien species can be seen in table I. The common observation marked was occurrence of water hyacinth at Sarkarbandh pond, Rajabandh pond, kishoritalab, Shatabdipark and Sarkheldih pond out of which Sarkarbandh pond was badly affected by its massive growth and dense population. Other dominant species were *Alternanthera philoxeroides*, *Oxalis corniculata* and *Cyperusdifformis* found in most of the water habitat. It has been observed that most of the collected alien species have migrated to India from USA.

## RESULT AND DISCUSSION

The present work is based on collection, identification and floristic study of the under mentioned samples.

**Table 1. List of Invasive Alien Species recorded**

Sl. No.	Name of the Plant	Family	Native Place
1.	<i>Alternantheraphiloxeroides</i> (Mart.) Griseb.	Amaranthaceae	Tropical America
2.	<i>Cyperusdifformis</i> L.	Cyperaceae	-do-
3.	<i>Cyperusiria</i> L.	Cyperaceae	-do-
4.	<i>Ecliptaprostrata</i> L.	Asteraceae	-do-
5.	<i>Oxalis corniculata</i> L.	Oxalidaceae	Europe
6.	<i>Typhaangustata</i> Chaub.	Typhaceae	Trop. America
7.	<i>Eichhorniacrassipes</i> Mart.	Pontederiaceae	-do-

***Oxalis corniculata*:** Linn. Haines, BBO. rep. ed. 2: 157. 1925; Naskar, ASPLG. 110. 1990. Small prostrate or sub - erect trailing herb, rooting at the nodes, leaves trifoliate, petiolate, leaflets obovate, emarginated, sparsely hairy, flowers solitary, yellow, in simple umbel, stamens 10, alternately long and short, connate at the base.

**Local name:** Tinpatta

**Field notes:** Commonly found along shallow ponds and marshy places.

**Fls. and Frts.:** October – July.

***Alternantheraphiloxeroides*:** (Mart.),Naskar, ASPLG. 212. 1990.; Cook, AWPI. 42. 1996. Aquatic or marshy perennial herbs having roots at the nodes; stem rhizomatous and decumbent; leaves opposite, lanceolate, acute to rounded; inflorescence solitary axillary or terminal; flowers dense with equal bracts and bracteoles; tepals 5, shining white; stamens 5, united below into a tube; ovary globose.

**Local name:**Danta, Murchi.

**Field notes:**Commonly found in ditches and ponds.

**Fls. and Frts.:** Mostly throughout the year.

***Ecliptaprostrata*:** Linn.,Naskar, ASPLG. 153. 1990; Cook, AWPI. 69. 1996.

***E.alba*** L. Naskar, ASPLG. 152. 1990. Prostrate or ascending annual herb; often rooting at nodes; stem hairy; leaves opposite, sessile, oblong – lanceolate or linear – lanceolate, entire or serrate; heads white, heterogamous; pappus usually absent.

**Local name:** Kesul or Bhingraj.

**Field notes:** Commonly found along drains and in moist places.

**Fls. and Frts.:** Throughout the year.

***Cyperusdifformis*:** Linn. Haines, BBO. rep. ed. 5: 893. 1978; Naskar, ASPLG. 291. 1990.

Annual, tufted herb; roots filiform; leaves few, much shorter than the stem, acuminate; umbel compound or contracted into a head, bracts 2 – 3, leaf like; spikelets many, rachilla slender, winged; glumes closely imbricate, obovate; nut long, triangular and minute.

**Local name:**Behuaghas.

**Field notes:**At the embankments of paddy fields, ponds, pools, ditches etc.

**Fls. and Frts.:** August – January.

***Cyperusiria*:** Linn. Haines, BBO. rep. ed. 5: 895. 1978; Naskar, ASPLG. 294. 1990.

Erect and annual herb; roots fibrous; stem erect, tufted; umbel decomposed; glumes loosely or scarcely imbricate; nut brown, ovate, triquetrous.

**Local name:** Bara chuncha.

**Field notes:**Commonly found near the paddy fields, ponds, pools, ditches etc.

**Fls. and Frts.:** August - January

***Typhaangustata*** Chaub. Haines, BBO. rep. ed. 5: 876. 1978.

Tall herb; leaves long narrow above and plane below, plano-convex, acute; inflorescence spike, male and female zone separated; perianth hairy, pollen simple.

**Local name:** Hugla.

**Field notes:** Common at shallow water ponds, tanks, and road side canals.

**Fls. and Frts.:** April – June.

***Eichhorniacrassipes*** (Mart.), Haines, BBO. rep. ed. 6: 1102. 1924; Naskar, ASPLG. 238. 1990. Abundantly found perennial, floating herb with sympodial rhizome creeping in mud; leaf spoon shaped with spongy, bulbous base; flowers in racemes, sessile, bisexual, violet-blue, zygomorphic with tubinately swollen petioles; stamens 6; fruits 3 – celled, seeds small and ovoid.

**Local name:**Jalkumbhi.

**Field notes:**Commonly found in unused ponds, canals, ditches and pools.

**Fls. and Frts.:**April – October.

## Conclusion

The introduction and establishment of invasive alien species is serious threat to aquatic ecosystem and is a global concern now a day. They settle and migrate from their native place to other area due to suitable conditions of successful settlement and

suppress growth of the native plants. There is need of much more research in this field to conserve aquatic biodiversity and original form of limnetic habitat.

#### Abbreviations Used

**BBO:** Botany of Bihar and Orissa

**ASPLG:** Aquatic and Semi-Aquatic plant of lower Ganga delta.

**AWPI:** Aquatic and Wetland Plants of India.

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