

Survey of alien invasive aquatic and semi aquatic plant species of Santhal Pargana, Jharkhand

P. Mukherjee and ¹Jyoti Kumar

Plant Taxonomy and Ecology Research Lab, Department of Botany, KKM College, Pakur-816107,

¹University Department of Botany, Ranchi University, Ranchi

ABSTRACT

Alien invasive plants are an exotic, introduced, foreign, non-indigenous or non-native plant, which has been introduced by humans intentionally or otherwise through human agency or accidentally from one region to another. Aquatic and semi aquatic angiosperms are very important forms of plant life and they find a more or less precious footing in pond ecosystem. The studies of invasive aquatic and semi aquatic plant species of Santhal Pargana from the year 2011 to 2016 has revealed that these plants are responsible for the loss of native aquatic biodiversity. Some of these plants have great source of food. Aesthetic importance of these plants cannot be ignored. The current paper is an endeavor to compile the list of invasive aquatic and semi aquatic plant species of Santhal Pargana. A survey conducted in the Dumka district reveals the occurrence of 30 species of invasive aquatic and semi aquatic medicinal plant representing 26 genera and 17 families.

Key words: Alien, invasive, exotic, introduced, foreign, non-indigenous, human agency, accidentally, aquatic, semi aquatic.

***Corresponding author:** prasanjitmukherjee701@gmail.com

INTRODUCTION

Santhal Paraganas is the "Paraganas" (meaning District or area) being provided to the Santhals and other tribal communities by the British government. Major portion of the area constitute with the Archean gneiss and Gondwana group of rocks formation. The Baraker group of rocks contains some local coal seams. Pebbles and boulders of various size and shapes are also found. It is now one of the divisions or commissionaires of Jharkhand. Its headquarters is at Dumka. Sathal Pargana administrative division comprises six districts namely Godda, Deoghar, Dumka, Jamtara, Sahibganj and Pakur.

Santhal Pargana division covers a geographical area of 14,206 sq.km and occupies a transitional position between humid Bengal plains to the east and the sub-humid Jharkhand plains to the south-east. The division stretches from 23°40' – 25°18' N latitude and

86°28' – 87°57' E longitude.

Soil types varies from sandy loam to clay loams, non-calcareous, slightly to moderately acidic and have location exchange capacity. The soils are generally shallow on the ridges and plateaus and deep in the valleys. The soil is more or less fertile with mixture of red clays and sandy soil with acidic character and low water retaining capacity. Yet, it is suitable for agriculture and crops production. Black soil is also found in some areas of the district. The soil is rich in quartz, feldspar, stone and other minerals.

The introduction and naturalized of foreign weeds on Indian soil has greatly influenced the pattern of Indian flora. Though India has got a flora of her own (Chatterjee 1940), nevertheless, immigration provides a continual source of new diversity for region. How important it is depends on the balance between the number of propagules that come from outside and the number produced by resident

individuals. In most cases, such introductions are unsuccessful, but when they do become established as an invasive exotic species (defined by IUCN (2000) as “an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity”, the consequences can be catastrophic. The special dispersal devices on seeds of some plant ensure long-distance dispersal through wind. Man is greatly responsible for the introduction and subsequent spread of these weeds through important of food grains, seeds of foreign garden plants and fodder, imported packing material, vehicles and living animals although migratory birds in some case are also responsible. Distribution of notorious weeds has placed a strong effect on the native flora, since many of these have replaced much of the indigenous species, probably because of their strong harmful effect (Nayar 1977).

Aquatic plants are the plants which spend at least a part of their life cycle in water. The majority of the aquatic plants are considered as weeds. Aquatic habitats, especially lakes and wetlands, being resource rich, are highly vulnerable to invasion. More-over, many aquatic plants are characteristically invasive due to their immense potential of rapidly increasing their spatial distribution (Richardson *et al.* 2000). Many correlates can be drawn between a suite of environmental conditions and aquatic invasions (Ehrenfeld 2008), with promising implications for management of invasive species in the context of growing urbanization and anthropogenic disturbances. Recently, attempts have been made to link plant invasion to environmental pollution

(Hiremath & Agrawal 2010) and, in view of the growing water pollution, e.g., eutrophication, incidence of plant invasions is likely to increase as well.

Few literatures are available related to the aquatic and semi aquatic flora from the Jharkhand state important among them are Haines (1921-1925), Mooney (1950), Ghosh (1971), Jha (1965), Singh (1990), Mukherjee (2001), Mukherjee, Ghosh and Sinha (2006) and Mukherjee (2011). So far scientific literature on aquatic and semi aquatic alien invasive plants are concerned nothing is available.

MATERIALS AND METHODS

The plants species were collected from the pond, river, dam and dissected for proper identification, the local available herbaria was also referred for the effective identification of the plant species. The study areas were visited twice or thrice in every season to collect the maximum plants in their flowering and fruiting periods for the phonological studies.

RESULT AND DISCUSSION

A total of 42 invasive aquatic and semi aquatic plant species of Santhal Pargana, belonging to 18 families and 32 genera were reported from this region. Out of those 12 families belong to dicotyledons having 21 genera and 26 species whereas 6 families belong to monocotyledons, having 11 genera and 16 species. The plants were identified and herbarium of all the reported specimens were made for further reference. All the reported plant species are enumerated below.

Habit wise analysis shows herbs covering a highest of 33 species followed by shrubs (3 species), sedges (3 species) and under shrubs (3 species).

ENUMERATION

| Sl. No. | Species | Family | Habit | Nativity | Monocot / Dicot |
|---------|--------------------------------------|---------------|-------|-----------------------|-----------------|
| 1 | <i>Ranunculus sceleratus</i> L. | Ranunculaceae | Herb | Trop. America | Dicot |
| 2 | <i>Portulaca oleracea</i> L. | Portulacaceae | Herb | Trop. Central America | Dicot |
| 3 | <i>Urena lobata</i> L. | Malvaceae | Herb | Trop. Africa | Dicot |
| 4 | <i>Corchorus aestuans</i> L. | Malvaceae | Herb | Trop. Africa | Dicot |
| 5 | <i>Biophytum sensitivum</i> (L.) DC. | Oxalidaceae | Herb | Trop. Africa | Dicot |
| 6 | <i>Oxalis corniculata</i> L. | Oxalidaceae | Herb | Europe | Dicot |
| 7 | <i>Mimosa pudica</i> L. | Fabaceae | Herb | Brazil | Dicot |
| 8 | <i>Aeschynomene americana</i> L. | Fabaceae | Herb | Trop. America | Dicot |

| | | | | | |
|----|--|----------------|--------|-----------------------|---------|
| 9 | <i>Ludwigia adscendens</i> (L.) Hara. | Onagraceae | Herb | Trop. America | Dicot |
| 10 | <i>Ludwigia octovalvis</i> (Jacq.) Raven. | Onagraceae | Herb | Trop. Central America | Dicot |
| 11 | <i>Ludwigia perennis</i> L. | Onagraceae | Herb | Trop. Africa | Dicot |
| 12 | <i>Blumea lacera</i> (Burm.f.) DC. | Asteraceae | Herb | Trop. Africa | Dicot |
| 13 | <i>Eclipta prostrata</i> (L.) L., Mant. | Asteraceae | Herb | Trop. Africa | Dicot |
| 14 | <i>Grangea maderaspatana</i> (L.) Poir. | Asteraceae | Herb | Trop. Africa | Dicot |
| 15 | <i>Sphaeranthus indicus</i> L., | Asteraceae | Herb | Trop. Africa | Dicot |
| 16 | <i>Tridax procumbens</i> L. | Asteraceae | Herb | Trop. Africa | Dicot |
| 17 | <i>Ipomoea carnea</i> Jacq. | Convolvulaceae | Herb | Trop. America | Dicot |
| 18 | <i>Lindernia crustacea</i> (L.) F.V. Muell. | Linderniaceae | Herb | Trop. Asia | Dicot |
| 19 | <i>Hygrophila auriculata</i> (Schumach.) Heine | Acanthaceae | Herb | Trop. Africa | Dicot |
| 20 | <i>Ruellia tuberosa</i> L. | Acanthaceae | Herb | Trop. America | Dicot |
| 21 | <i>Alternanthera paronychioides</i> A.St.Hill | Amaranthaceae | Herb | Trop. America | Dicot |
| 22 | <i>Alternanthera philoxeroides</i> (Mart.) Griseb. | Amaranthaceae | Herb | Trop. America | Dicot |
| 23 | <i>Alternanthera sessilis</i> (L.) R. Br. | Amaranthaceae | Herb | Trop. America | Dicot |
| 24 | <i>Rumex dentatus</i> L. | Polygonaceae | Herb | Trop. North Africa | Dicot |
| 25 | <i>Peperomia pellucida</i> (L.) Kunth. | Piperaceae | Herb | Trop. South America | Dicot |
| 26 | <i>Asphodelus tenuifolius</i> Cav. | Liliaceae | Herb | Trop. America | Monocot |
| 27 | <i>Eichhornia crassipes</i> (C. Martius) Solms-Loub. | Pontederiaceae | Herb | Trop. America | Monocot |
| 28 | <i>Monochoria vaginalis</i> (Burm.f.) K. Presl. | Pontederiaceae | Herb | Trop. America | Monocot |
| 29 | <i>Monochoria hastata</i> (L.) Solms. | Pontederiaceae | Herb | SE Asia | Monocot |
| 30 | <i>Typha angustata</i> Bory. & Choub. | Typhaceae | Herb | Trop. America | Monocot |
| 31 | <i>Colocasia esculenta</i> (L.) Schott. | Araceae | Herb | Trop. Asia | Monocot |
| 32 | <i>Pistia stratiotes</i> L. | Araceae | Herb | Trop. America | Monocot |
| 33 | <i>Cyperus compressus</i> L. | Cyperaceae | Herb | Trop. Africa | Monocot |
| 34 | <i>Cyperus difformis</i> L. | Cyperaceae | Herb | Trop. America | Monocot |
| 35 | <i>Cyperus iria</i> L. | Cyperaceae | Herb | Trop. America | Monocot |
| 36 | <i>Cyperus michelianus</i> Rottb. | Cyperaceae | Sedges | Europe | Monocot |
| 37 | <i>Cyperus rotundus</i> L. | Cyperaceae | Sedges | Trop. Africa | Monocot |
| 38 | <i>Fuirena ciliaris</i> (L.) Roxb. | Cyperaceae | Sedges | Trop. America | Monocot |
| 39 | <i>Echinochloa colona</i> (L.) Link | Poaceae | Sedges | Trop. S. America | Monocot |
| 40 | <i>Echinochloa crus-galli</i> (L.) P. Beauv. | Poaceae | Sedges | Trop. S. America | Monocot |
| 41 | <i>Phragmites Karka</i> (Retz.) Trin. | Poaceae | Sedges | Trop. N. America | Monocot |
| 42 | <i>Saccharum spontaneum</i> L. | Poaceae | Sedges | Trop. W. Asia | Monocot |



Ranunculus sceleratus L.



Ludwigia adscendens (L.) Hara.



Ludwigia octovalvis (Jacq.) Raven



Ludwigia perennis L.



Ipomoea carnea Jacq.



Alternanthera philoxeroides (Mart.) Gris eb.



Eichhornia crassipes (Martius) Solms-Lob.



Monocharia hastata (L.) Solms



Typha angustata Bory & Choub



Colocasia esculenta (L.) Schott.



Pistia stratiotes L.



Cyperus difformis L.

REFERENCES

- Chatterjee, D. 1940. Studies on the endemic flora of India and Burma. J. Asiat. Soc. Bengal. 5: 19-67.
- Ghosh T. K. 1971. Studies on the flora of Ranchi district. Ph.D. thesis, Ranchi University.
- Haines, H. H. 1921-25. The Botany of Bihar and Orissa, Vol. 1-3. Adland & Sons, West Newman Ltd., London.
- Hiremath, A. J. and Agrawal, M. 2010. Plant invasion and environmental pollution: causes of concern Tropical Ecology 51(2S): 303-304.
- Mooney, H. F. A. 1950. Supplement to the Botany of Bihar & Orisha, Ranchi.
- Mukherjee, P, Ghosh T. K and Sinha Sudhanshu. 2006. Status of Economically important Plants of Lohardaga. Proceed XXIX Annual conference of India Botanical society.
- Mukherjee, P. 2001. The floristic and ecological studies of Aquatic Angiosperms of Lohardaga. Ph.D Thesis Ranchi University, Ranchi.
- Mukherjee, P. 2011. Studies on Weed Diversity in Pakur District of Jharkhand Recent studies in biodiversity and traditional Knowledge in India. 131–143.
- Nayar, M. P. 1977. Changing patterns of the Indian Flora. Bull. Bot. Surv. India. 19: 145- 155.
- Richardson, D. M., Bond, W. J., Dean, W. R. J. 2000. Invasive alien species and global change: a South African perspective. In: Mooney, H. A., Hobbs, R. J. (eds). Invasive Species in a Changing World. Washington, DC: Island 303–349.