

## STUDY OF AQUATIC AND ASSOCIATED MACROPHYTES FROM THE MAJOR RIVERS OF THE CHANDRAPUR DISTRICT, MAHARASHTRA

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**Abstract:** Present manuscript deals with the diversity of hydrophytes and other macrophytes generally found in and along the rivers of the Chandrapur district. The major rivers Wardha, Painganga and Waineganga of the district were studied for a period of two years from 2013-2015. During study, 16 hydrophytes and 56 other macrophytes were recorded from 21 selected sites of the rivers. Among the enlisted macrophytes two are Algae, two are Pteridophytes and 68 are Angiosperms.

**Keywords:** Hydrophytes, Macrophytes, Painganga, Waineganga, Wardha.

### Introduction

Aquatic macrophytes (Hydrophytes) are one of the important biotic entities in aquatic ecosystem, as they provide food, oxygen and shelter to the other aquatic organisms. They also influence the water quality by using nutrients and by accumulating heavy metals (Devlin, 1967). Hydrophytes respond to the environmental conditions of their habitat, hence can be used as pollution indicators. Whereas, the marshy plants form the best breeding ground for aquatic Birds and Amphibians.

There are certain macrophytes which are not hydrophytes but mostly prefer the river habitat. Among them some are found exclusively in rivers, and some may grow in other habitats but mostly prefers river beds. These macrophytes, particularly shrubs and trees provide shelter for the birds.

Several workers studied the macrophytes from different parts of the state and the country (Unni, 1971; Thangadurai, 2004; Adhikari, 2008; Mishra and Narain, 2010; Muttulingam et al., 2010; Udaikumar and Ajithadoss, 2010; Tijare, 2011; Nath, 2012; Pawar and Sonwane, 2012; Rohankar et al., 2012; Purshuramkar et al., 2013; Kshirsagar, 2013; Jagdishprasad, 2014; Manohar, 2014; Patil, 2015). Specifically from the district, several hydrophytes have been reported by Sitre (2013 & 2014), Sitre et al. (2014 a & b) and Harney (2014). All of these reports are from ponds and lakes, and till today no hydrophyte is reported from the

rivers of the district. Present work is the first study of hydrophytes from the rivers of the district.

### Material and Methods

Study area: Chandrapur is the easternmost district of the Maharashtra state (Fig. 1), located between 18° 41' to 20° 50' north latitudes and 78° 48' to 80° 55' east longitudes. Physiographically it is situated in the Wainganga and Wardha river basin. The entire area of the district falls in the Godavari basin. The area is drained by major tributaries Wardha, Wainganga and Painganga rivers of the river Godavari. And the rivers of the district are never explored for their biological wealth.

So, present work is undertaken to explore the macrophytes of major rivers Wardha, Painganga and Waineganga of the Chandrapur district.

Sampling and Identification: Hydrophytes and other macrophytes were observed and collected from selected 21 sites (Table 1) during May, August, November and February months of period 2013 to 2015. Then identified with the help of standard floras (Ugemuge 1986; Sharma et al., 1996).

**Table 1:** Study sites along with their coordinates.

Sr.No	Site	Location	Coordinates
1	S1	Pardi	19.74116, 78.91294
2	S2	Bori	19.806521, 78.999683
3	S3	Gadegaon Wirur	19.86346, 79.12374
4	S4	Dhanora	19.90364, 79.18398
5	S5	Kadoli	19.87521, 79.28792
6	S6	Sasti	19.83374, 79.33524
7	S7	Rajura	19.81348, 79.37489
8	S8	Koipara	19.76654, 79.49025
9	S9	Arvi	19.633623, 79.489308
10	S10	Polsa	19.508021, 79.588534
11	S11	Tatepalli	19.581930, 79.703676
12	S12	Gugus	19.955476, 79.099068
13	S13	Patala	20.127590, 78.996672
14	S14	Soit	20.279169, 78.818192

15	S15	Gondpipri - Ashti	19.677346, 79.785461
16	S16	Gangapur	19.841112, 79.753918
17	S17	Saoli – Chamorshi	20.008005, 79.786234
18	S18	Saoli – Gadhiroli	20.134877, 79.923606
19	S19	Kudesawali	20.323513, 79.949483
20	S20	Brahmapuri - Armori	20.483042, 79.946445
21	S21	Brahmapuri - Wadsa	20.619367, 79.940179



**Fig. 1:** Location of Chandrapur district.

### Observation and results:

In present study total 16 hydrophytes (Table 2) and 56 other macrophytes (Table 3) were recorded.

**Table 2:** List and occurrence of total available Hydrophytes

Group	Family	Genera	Species	Occurrence
Algae	Characeae	<i>Chara</i>	1. <i>C. zeylanica</i> Willd.	S1-S4, S9-S11
		<i>Nitella</i>	2. <i>N. furcatus</i> (Roxb.) C. Agardh	S1 & S2
Pteridophyta	Azollaceae	<i>Azolla</i>	3. <i>A. pinnata</i> R.Br.	S6-S9, S11-S21
	Salviniaceae	<i>Salvinia</i>	4. <i>S. molesta</i> D.S.Mitch.	S6-S9

Angiosperms	Alismataceae	<i>Sagittaria</i>	5. <i>S. trifolia</i> L.	S18 & S19
	Amaryllidaceae	<i>Crinum</i>	6. <i>C. viviparum</i> (Lam.) R. Ansari & V.J. Nair	Present in all sites
	Araceae	<i>Pistia</i>	7. <i>P. stratiotes</i> L.	S6-S10, S12-S14, S16-S20
	Hydrocharitaceae	<i>Hydrilla</i>	8. <i>H. verticillata</i> ((L.f.) Royle	S1-S12, S15-S21
		<i>Vallisneria</i>	9. <i>V. spiralis</i> L.	Present in all sites
	Lemnaceae	<i>Lemna</i>	10. <i>L. minor</i> L.	S6-S8, S16, S17, S19, S20
		<i>Spirodela</i>	11. <i>S. polyrrhiza</i> ((L.) Schleid.	S6-S8, S14, S15, S18-S21
	Najadaceae	<i>Najas</i>	12. <i>N. indica</i> ((Willd.) Cham.	S1-S3, S16, S18, S19, S21
			13. <i>N. marina</i> L.	S1, S2, S6-S8
	Pontederiaceae	<i>Eichhornia</i>	14. <i>E. crassipes</i> ((Mart.) Solms	S6-S9
Potamogetonaceae	<i>Potamogeton</i>	15. <i>P. crispus</i> L.	S6-S9	
Typhaceae	<i>Typha</i>	16. <i>T. angustata</i> Chaubard & Bory et al.	S1	

**Table 3:** List and habitat of recorded non-hydrophytic Macrophytes.

Sr.no	Plant name	Family	Habitat
1	<i>Hygrophila auriculata</i> Schumach.	Acanthaceae	B
2	<i>Aerva lanata</i> (L.) Juss. ex Schult.	Amaranthaceae	B
3	<i>Alternanthera sessilis</i> (L.)R.Br.ex DC	Amaranthaceae	B
4	<i>Celosia argentea</i> L.	Amaranthaceae	S & B
5	<i>Eclipta alba</i> (L) Hassk.	Asteraceae	B
6	<i>Parthenium hysterophorus</i> L .	Asteraceae	S & B
7	<i>Sonchus sp.</i>	Asteraceae	B
8	<i>Sphaeranthus indicus</i> L.	Asteraceae	B
9	<i>Spilanthus paniculata</i> Wall. Ex DC.	Asteraceae	B
10	<i>Xanthium indicum</i> Koen.	Asteraceae	S & B
11	<i>Heliotropium ovalifolium</i> Forsk.	Boraginaceae	B

12	<i>Brassica juncea</i> L.(Czern.)	Brassicaceae	S & B
13	<i>Cassia occidentalis</i> L.	Caesalpinaceae	B
14	<i>Cassia uniflora</i> Mill.	Caesalpinaceae	B
15	<i>Cleome viscosa</i> L.	Cleomaceae	B
16	<i>Commelina benghalensis</i> L.	Commelinaceae	B
17	<i>Ipomea carnea</i> Jacq.	Convolvulaceae	S
18	<i>Merremia emarginata</i> (Burm.) Hall.	Convolvulaceae	S
19	<i>Cyperus rotundus</i> L.	Cyperaceae	B
20	<i>Rotula aquatica</i> Lour.	Ehretiaceae	S & B
21	<i>Chrozophora prostrata</i> Dalz.	Euphorbiaceae	S & B
22	<i>Cleistanthus collinus</i> Benth.	Euphorbiaceae	B
23	<i>Phyllanthus reticulatus</i> Poir.	Euphorbiaceae	B
24	<i>Ricinus communis</i> L .	Euphorbiaceae	S & B
25	<i>Melilotus alba</i> Desr.	Fabaceae	B
26	<i>Pongamia pinnata</i> L.	Fabaceae	B
27	<i>Leucas biflora</i> (vahl)R.Br.	Lamiaceae	B
28	<i>Nepeta hindostana</i> (Roth.) Haines	Lamiaceae	B
29	<i>Ocimum americanum</i> L.	Lamiaceae	B
30	<i>Ocimum sanctum</i> L.	Lamiaceae	S
31	<i>Ammania baccifera</i> L.	Lythraceae	B
32	<i>Abitulon hirtum</i> (Lamk.) Sweet,	Malvaceae	B
33	<i>Acacia nilotica</i> Lam. Wild	Mimosaceae	B
34	<i>Albizia lebbek</i> L.	Mimosaceae	B
35	<i>Neptunia oleracea</i> Lour.	Mimosaceae	B
36	<i>Ludwigia parviflora</i> Roxb.	Onagraceae	B
37	<i>Oxalis corniculata</i> L.	Oxalidaceae	B
38	<i>Argemone Maxicana</i> L.	Papaveraceae	S & B
39	<i>Cyanodon Sp.</i>	Poaceae	B
40	<i>Cynodon dactylon</i> (L.)Pers.	Poaceae	B
41	<i>Polygonum glabrum</i> Willd.	Polygonaceae	B
42	<i>Portulaca oleracea</i> L .	Protulaceae	B
43	<i>Ziziphus jujube</i> Mill.	Rhamnaceae	B

44	<i>Dentella repens</i> (L.) J.R. & J.G.A. Forst.	Rubiaceae	B
45	<i>Ixora arborea</i> Roxb. Ex Smith	Rubiaceae	B
46	<i>Mitragyna parvifolia</i> (Roxb.) Korth.	Rubiaceae	B
47	<i>Oldenlandia corymbosa</i> L.	Rubiaceae	B
48	<i>Sopubia delphinifolia</i> (L.)G.Don	Scrophulariaceae	S & B
49	<i>Verbascum chinense</i> (L.) Sant	Scrophulariaceae	B
50	<i>Datura inoxia</i> Mill.	Solanaceae	B
51	<i>Datura metal</i> L.	Solanaceae	B
52	<i>Solanum surattense</i> Burm.	Solanaceae	S & B
53	<i>Tamarix ericoides</i> Rottl.	Tamariaceae	S & B
54	<i>Lantana indica</i> Roxb.	Verbanaceae	B
55	<i>Phyla nodiflora</i> (L.) Greene.	Verbanaceae	B
56	<i>Vitex nigundo</i> L.	verbanaceae	B
<b>B- Along the river bank, S- In sand</b>			

## Conclusion

Hydrophytes are the plants which modify themselves to survive in aquatic environments. Their distribution is specific and depends up on the water quality and environmental conditions.

In present study total 16 hydrophytes are recorded from different sites of the rivers. Among them two are algae, two are pteridophytes and 12 are angiosperms. Among the angiosperms taxa, all are monocots and belongs to nine families. Among the available taxa seven are submerged, six are floating and three are marshy plants.

In present study a list of 56 non hydrophytic macrophytic plants is prepared. Some of these plants such as *Tamarix ericoides* grow exclusively in rivers and not found at any other habitats. And some plants like *Argemone maxicana* are commonly distributed in other habitats but mostly prefer river habitat.

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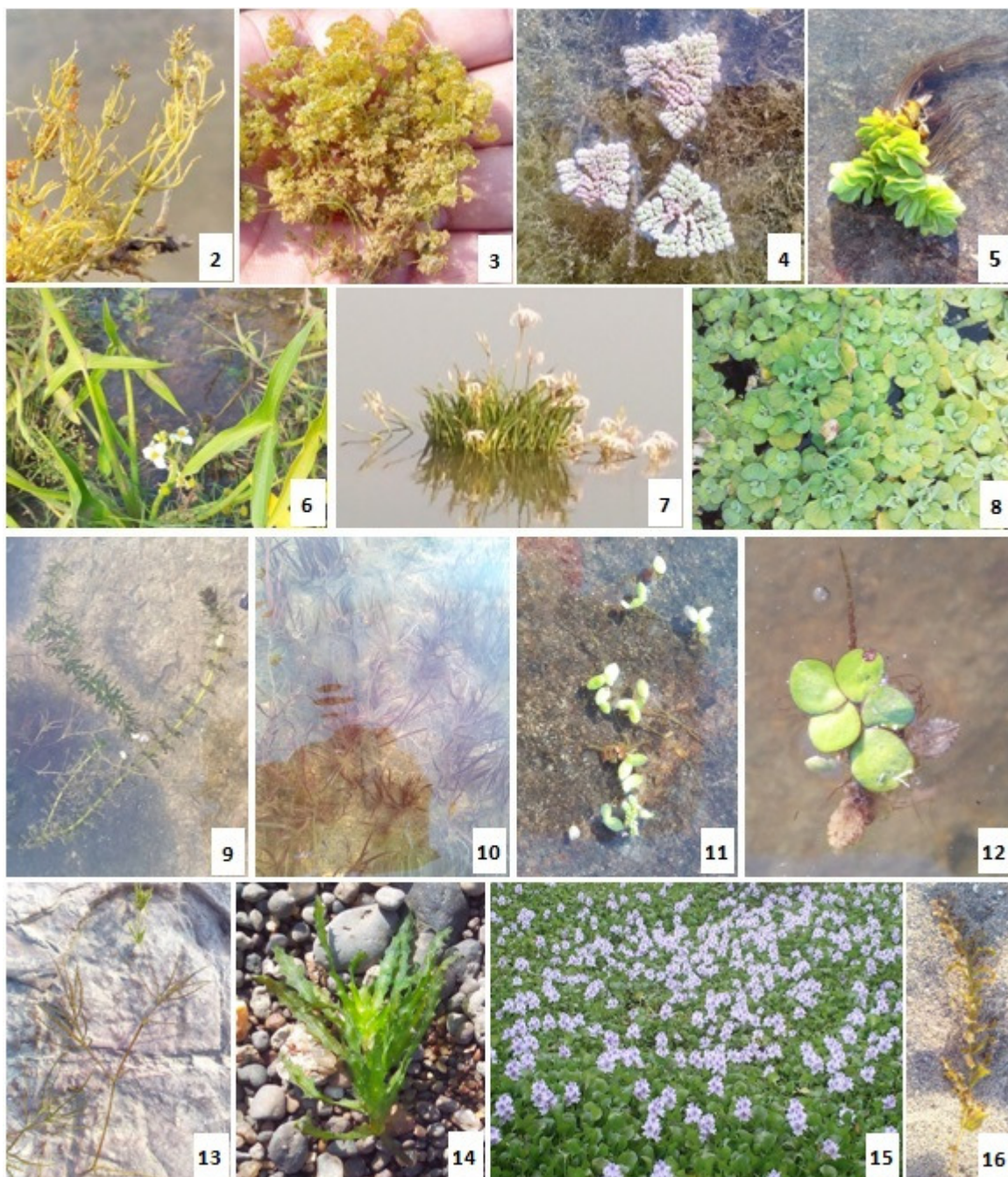


Fig.2: *Chara zeylanica*; Fig.3: *Nitella furcatus*; Fig.4: *Azolla pinnata*; Fig.5: *Salvinia molesta*; Fig.6: *Sagitaria trifolia*; Fig.7: *Crinum viviparum*; Fig. 8: *Pistia stratiotes*; Fig.9: *Hydrilla verticillata*; Fig.10: *Vallisneria spiralis*; Fig.11: *Lemna minor*; Fig.12: *Spirodela polyrrhiza*; Fig.13: *Najas indica*; Fig.14: *Najas marina*; Fig.15: *Eichhornia crassipes*; Fig.16: *Potamogeton crispus*.