AQUATIC AND OTHER PLANTS

India is the country where the most varied types of vegetation can be found. The Himalayas to the north show alpine vegetation; Western and Eastern Ghats with evergreen rain forests; scrub jungles in Rajasthan and Kutch and deciduous forests may be seen in other parts. In all these parts lakes, ponds are found with aquatic plants. Aquatic plants may be large, naked, flowering angiosperms or they may be some algae, bryophytes also.

Aquatic angiosperms are very remarkable forms of plant life present in aquatic habitat, in which they spend most of their lives. A very large number of plants found during monsoon, when the soil is not only water logged, but also often covered with a considerable layer of free water.

The present aspect deals with the description of plants, like angiosperms and algal species found in lakes, ponds, pools and stream, located in the study area. As the area is dry and hilly, only small ponds and ditches are found in these forests from where some algae and few angiosperms have been recorded. However, at the irrigation projects like Terna (Omerga), Chandani (Paranda), Manjra (Latur), Bori (Naldrug) etc. the aquatic flora and fauna is present throughout the year.

The present chapter also describes the bryophytes and pteridophytes found in the forests of Osmanabad and Latur districts. As this area is dry and deciduous,
these plant species are found only during rainy season; however, they are few in number.

Aquatic Angiosperms:

Eight angiospermic species have been found at various locations in these forests as shown in table 10. The description of these aquatic plants is also presented.

Table 10: Aquatic angiosperms found in the forests of Osmanabad and Latur districts.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the aquatic plant</th>
<th>Family</th>
<th>Location (Forest area)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Ceratophyllum demersum</em> L.</td>
<td>Ceratophyllaceae</td>
<td>Yedshi, Apsinga, Wadwal</td>
</tr>
<tr>
<td>2</td>
<td><em>Hydrilla verticillata</em> (L.f.) Royle</td>
<td>Hydrocharitaceae</td>
<td>Yedshi and in other dams.</td>
</tr>
<tr>
<td>6</td>
<td><em>Potamogeton nodosus</em> Pair</td>
<td>Potamogetonecaceae</td>
<td>Yedshi, Terna &amp; Manjra Dam.</td>
</tr>
<tr>
<td>7</td>
<td><em>Vallisneria natans</em> (Lour.) Hans.</td>
<td>Hydrocharitaceae</td>
<td>Yedshi and Chakur area</td>
</tr>
<tr>
<td>8</td>
<td><em>Wolffia globosa</em> (Roxb) Hartog &amp; Plas.</td>
<td>Lemnaceae</td>
<td>Yedshi, Apsinga</td>
</tr>
</tbody>
</table>

*CERATOPHYLUM DEMERSUM* L.

Family – Ceratophyllaceae.

Location – It is observed at Yedshi, Apsinga, and Wadwal in pond and tanks made in the forest to check soil erosion.
Morphology – Aquatic, submerged, fragile, alga like herb. Stem long, with nodes and internodes, forming a much-branched tangle of slender branches and leaves. Leaves whorled, 6-10 at a node, long, dichotomously dissected, tipped by two bristles. Flowers usually solitary in the axils of one leaf of a whorl, and minute. Fruits ellipsoid, slightly compressed, biconvex, with narrowly winged margins, with 3 spines.

Flowers from October to February and fruits later. The seeds are eaten by wild ducks.

HYDRILLA VERTICILLATA (L.f.) Royle.

Local name – Kendal.

Family – Hydrocharitaceae

Location – This plant is found at Yedshi forest in small ditches and small tanks made by the forest department. It is also found submerged in Bori dam (Naldurg), Terana project (Makni), Chandani project (Paranda) and also in small water storage tanks.

Morphology – It is submerged, aquatic herb. It forms tangled masses. Stem slender with nodes and internodes, roots emerge from the nodes. Leaves sessile in whorl, linear or linear oblong with entire margin and obtuse or acute apex. Flowers regular, solitary, axillary, subtended by spathes; monoecious or dioecious; male flowers minute, shortly pedicelled; female flowers sessile, solitary
in a cylindrical, top bifid, membranous spathe. Fruits ovoid, smooth or
muriculate. Seeds 2-3 oblong, minute, dark brown and smooth.

It flowers during the cold season from december to February. It grows very
fast during favourable conditions. It serves as food for fishes.

**LEMNA PERPUSILLA** Torr.

Family – Lemnaceae.

Location – Found during rainy season in ditches, ponds at Kunthalgiri, Wadwal,
Apsinga and some other places in the forest area.

Morphology – It is a small, scale like floating aquatic plant. Fronds solitary
or in groups of 2-5 each, obovate, oblong or ellipsoid, slightly convex above, flat
beneath, 1-3 nerved. Flowers unisexual, fruits ellipsoid and compressed.

**NAJAS GRAMINEA** Del.

Family – Najadaceae.

Location – Common in small ponds, ditches, check dams in forest area at Yedshi,
Apsinga, and Ghatangri.

Morphology – Slender, submerged, fresh water herb. Stem rooting from
the nodes; branched. Leaves alternate, opposite, narrowly linear, with many
spinous teeth on either margins, acute at apex; sheaths 3-6 mm long with spines on
either sides, auricles triangular, spinous margined. Flowers minute, unisexual,
solitary or 2-4 together in the upper axils of leaves. Seeds oblong or ellipsoid; with areolate testa, testa thin.

It flowers and fruits from September to May.

**OTTELIA ALISMODES (L) Pers.**

Family – Hydrocharitaceae.

Location – A common submerged annual found in slow streams and stagnant pools. During rainy season it is observed at Yedshi, Apsinga, Wadwal, Udgir in forest ponds and pools.

Morphology – Submerged, flaccid, glabrous fresh water herb with fibrous roots. Leaves all radical, submerged leaves are shortly petioled and usually narrow or oblong and tapering to the base; the floating ones are oblong, cordate or rounded at the base and narrowed into the angled petiole. Flowers solitary, axillary, uni or bisexual, females sessile, male ones pedicelled. Fruit oblong; seeds many, minute, oblong or fusiform.

**POTAMOGETON NODUSUS** Poir. Encycl. (Plate 19, fig.1)

Family – Potamogetonaceae.

Location – It is found at Yedshi in check dams (small dams made by forest department). Also observed in large number at Terna and Manjara dams.

Morphology – It is aquatic, submerged, rooted herb with upper leaves floating. The floating leaves petiolate, elliptic-lanceolate, rounded at base, entire margin
1. **Potamogeton nodusus**

2. **Riccia sp.**

3. **Equisetum**

4. **Marsilea**

5. **Actinopteris dichotoma**
and acute apex; they are shining green above and brownish-purple beneath; Petioles variable in length; stipules free. Submerged leaves very narrowly linear, without distinct petiole or petioles variable; stipules free. Flowers in axillary, long, dense spikes. Druplets oblong with a short beak.

Flowering and fruiting occurs from August to February.

**VALLISNERIA NATANS** (Lour.). **Hara.**

Family – Hydrocharitaceae.

Location – Found as a common weed rooting at the bottom of pools, tanks, canals are found at Yedshi and Chakur in forest check dams.

Morphology – Submerged, tufted, stemless, stoloniferous, glabrous, dioecious fresh water herb with fibrous roots. Leaves, linear ribbon-shaped; apex obtuse, margin faintly entire. Flowers dioecious on long or short scaps; male spathe shortly peduncled, ovoid, near the base of the leaves. Female flowers solitary; spathe 3-toothed, on a long, coiled peduncle. Fruits linear, included in spathe; seeds numerous, oblong, imbedded in a gelatinous mass.

**WOLFFIA GLOBOSA** (Roxb.) **Hartog and Plas.**

Family – Lemnaceae.

Location – It is found in dirty water ponds at Yedshi. At Apsinga it is present in check dam and old wells in the forest area.
Morphology – It is smallest and simplest flowering plant, resembling small
dots or grains floating on standing water to form a thick, green, granular mass.

Fronds are minute, solitary or in pairs, globose or ellipsoid, without roots.
It has a single, funnel shaped, basal vegetative pouch from which arise the young
fronds which soon become detached. Flowers and fruits not observed.
ALGAE

Many algae are found in the forest areas of Osmanabad and Latur districts. They are common during rainy season in small streams, streamlets, pools, ponds, puddles etc. They are also found at marshy places, on moist soil and on submerged rock surfaces.

The algal flora is variable, generally it is tropical algal flora. The members belong to Chlorophyta, Cyanophyta, Euglenophyta, Charophyta etc (Table 11). It is, rather difficult to find out the exact frequency of the algae, especially so in the case of filamentous algae growing in natural habitats.

The present aspect deals with the discription of algae found in this forest area, with note on their location.
Table 11: Algae found in the forests of Osmanabad and Latur districts during rainy season.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the algae</th>
<th>Division</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Chlamydomonas</em> sp. Ehrenberg.</td>
<td>Chlorophyta</td>
<td>Chlamydomadaceae</td>
</tr>
<tr>
<td>2</td>
<td><em>Ulothrix</em> sp. Kutzinger.</td>
<td>Chlorophyta</td>
<td>Ulotrichiaceae</td>
</tr>
<tr>
<td>3</td>
<td><em>Stigeoclonium</em> sp. Kutzinger.</td>
<td>Chlorophyta</td>
<td>Chaetophoraceae</td>
</tr>
<tr>
<td>4</td>
<td><em>Oedogonium</em> sp. Stahl.</td>
<td>Chlorophyta</td>
<td>Oedogoniacae</td>
</tr>
<tr>
<td>5</td>
<td><em>Cladophora</em> sp. Kutzinger.</td>
<td>Chlorophyta</td>
<td>Cladophoraceae</td>
</tr>
<tr>
<td>6</td>
<td><em>Rhizoclonium</em> sp. Kutzinger.</td>
<td>Chlorophyta</td>
<td>Cladophoraceae</td>
</tr>
<tr>
<td>7</td>
<td><em>Pithophora</em> sp. Wittrock.</td>
<td>Chlorophyta</td>
<td>Cladophoraceae</td>
</tr>
<tr>
<td>8</td>
<td><em>Protosiphon</em> sp. Klebs.</td>
<td>Chlorophyta</td>
<td>Protosiphonaceae</td>
</tr>
<tr>
<td>9</td>
<td><em>Pediastrum</em> sp. Meyen.</td>
<td>Chlorophyta</td>
<td>Hydrodictyaceae</td>
</tr>
<tr>
<td>10</td>
<td><em>Hydrodictyon</em> sp. Roth.</td>
<td>Chlorophyta</td>
<td>Hydrodictyaceae</td>
</tr>
<tr>
<td>11</td>
<td><em>Oocystis</em> sp. Nageli.</td>
<td>Chlorophyta</td>
<td>Hydrodictyaceae</td>
</tr>
<tr>
<td>12</td>
<td><em>Chlorella</em> sp. Beijerinck.</td>
<td>Chlorophyta</td>
<td>Hydrodictyaceae</td>
</tr>
<tr>
<td>13</td>
<td><em>Scenedesmus</em> sp. Meyen.</td>
<td>Chlorophyta</td>
<td>Hydrodictyaceae</td>
</tr>
<tr>
<td>14</td>
<td><em>Zygmena</em> sp. gardh.</td>
<td>Chlorophyta</td>
<td>Zygmenataceae</td>
</tr>
<tr>
<td>15</td>
<td><em>Spirogyra</em> sp. Link.</td>
<td>Chlorophyta</td>
<td>Zygmenataceae</td>
</tr>
<tr>
<td>16</td>
<td><em>Closterium</em> sp. Nitzsch.</td>
<td>Chlorophyta</td>
<td>Zygmenataceae</td>
</tr>
<tr>
<td>17</td>
<td><em>Cosmarium</em> sp. Corda.</td>
<td>Chlorophyta</td>
<td>Zygmenataceae</td>
</tr>
<tr>
<td>18</td>
<td><em>Nitella</em> sp. Agardh.</td>
<td>Charophyta</td>
<td>Characeae</td>
</tr>
<tr>
<td>19</td>
<td><em>Chara</em> sp. Valliant</td>
<td>Chlorophyta</td>
<td>Characeae</td>
</tr>
<tr>
<td>20</td>
<td><em>Euglena</em> sp. Ehrenberg</td>
<td>Euglenophyta</td>
<td>Euglenaceae</td>
</tr>
<tr>
<td>21</td>
<td><em>Botrydiunm</em> sp. Wallroth.</td>
<td>Xanthophyta</td>
<td>Botryidiaeae</td>
</tr>
<tr>
<td>22</td>
<td><em>Vaucheria</em> sp. De Candolle</td>
<td>Xanthophyta</td>
<td>Vaucheriaceae</td>
</tr>
<tr>
<td>23</td>
<td><em>Microcystis</em> sp. Kutzinger.</td>
<td>Cyanophyta</td>
<td>Chroococcaceae</td>
</tr>
<tr>
<td>24</td>
<td><em>Chroococcus</em> sp. Nageli</td>
<td>Cyanophyta</td>
<td>Chroococcaceae</td>
</tr>
<tr>
<td>25</td>
<td><em>Gloeocapsa</em> sp. Kutzinger.</td>
<td>Cyanophyta</td>
<td>Chroococcaceae</td>
</tr>
<tr>
<td>26</td>
<td>*Aphanothecace sp. Nageli</td>
<td>Cyanophyta</td>
<td>Chroococcaceae</td>
</tr>
<tr>
<td>27</td>
<td><em>Spirulina</em> sp. Turpin.</td>
<td>Cyanophyta</td>
<td>Oscillatoriaceae</td>
</tr>
<tr>
<td>28</td>
<td><em>Oscillatoria</em> sp. Vaucher.</td>
<td>Cyanophyta</td>
<td>Oscillatoriaceae</td>
</tr>
<tr>
<td>29</td>
<td><em>Lyngbya</em> sp. Agardh.</td>
<td>Cyanophyta</td>
<td>Nostocaceae</td>
</tr>
<tr>
<td>30</td>
<td><em>Nostoc</em> sp. Vaucher.</td>
<td>Cyanophyta</td>
<td>Nostocaceae</td>
</tr>
<tr>
<td>31</td>
<td><em>Anabaena</em> sp. Bory.</td>
<td>Cyanophyta</td>
<td>Nostocaceae</td>
</tr>
<tr>
<td>32</td>
<td><em>Calothrix</em> sp. Agardh.</td>
<td>Cyanophyta</td>
<td>Nostocaceae</td>
</tr>
<tr>
<td>33</td>
<td><em>Pinnularia</em> sp. Ehrenberg.</td>
<td>Bacillariophyta</td>
<td>Pinnulariaceae</td>
</tr>
<tr>
<td>34</td>
<td><em>Navicula</em> sp. Bory.</td>
<td>Bacillariophyta</td>
<td>Pinnulariaceae</td>
</tr>
<tr>
<td>35</td>
<td><em>Fragilaria</em> sp. Lyngbye.</td>
<td>Bacillariophyta</td>
<td>Fragilariaceae</td>
</tr>
</tbody>
</table>
A) Chlorophyta

1) Chlamydomonas

Chlorophyceae

Volvocales

Chlamydomonadaceae

Chlamydomonas

Cells broadly ovoid to cylindrical, with anterior papilla; flagellated, often surrounded by a gelatinous, hyaline sheath, green, chloroplast parietal cup like, with a pyrenoid at the base, uninucleate.

It is found in small streamlet, in small ponds at Yedshi, Wadwal, Apsinga etc.

2) Ulothrix

Ulotrichales

Ulotrichaceae

Ulothrix

Filaments very long green; cells cylindrical, as long as broad, without constrictions at cross walls, chloroplast broad, parietal girdle shaped, with a pyrinoid; uninucleate.

Found in streamlets. Small chanales, small guly of the study area during rainy season. Found in large number at the end of rainy season in October.
3) **Stigeoclonium**

*Chaetophorale*

*Chaetophoraceae*

**Stigeoclonium**

Filaments elongated, slender, freely branched; branches mostly opposite, tapering to a blunt point green; cells cylindric or barral shaped, constricted at nodal region, uninucleate.

Found in small chanales of running water, adhering to the submerged rocks at Yedshi, Gadh and Wadwal.

4) **Oedogonium**

*Oedogoniales*

*Oedogoniaceae*

**Oedogonium**

Dioecious, long green filaments; cells cylindrical, uninucleate, macrandrous; with solitary oogonia, obovoid; oospores ellipsoid, male plants are not observed.

Found in small ponds, check bunds, nalas at Yedshi and Ghatangri.

5) **Cladophora**

*Cladophorales*

*Cladophoraceae*

**Cladophora**
Tufts of branched filaments, plants attached to substratum main filament stout; green cells cylindrical, multinucleate, longer than the broad; branch cell smaller than the axis, branch tip cells are mostly bluntly rounded.

Found attached to cement walls of small check dams at Yedshi, Kalwaldara, Khandala and in small ‘mati’ dams in social forestry areas.

6) *Rhizoclonium*

Filaments long, wiry, unbranched or branched, composed of long, cylindrical cells, cell wall thickness variable; branch cells and main filament cells are about the same diameter; chloroplast diffused, parietal, reticulate with many pyrenoids.

It is commonly found in small earth bunds, check dams etc. at Yedshi, Chakur, and Tirth.

7) *Pithophora*

Filaments long, slender; green, freely branched, branching mostly solitary; cells long, cylindrical; multinucleate, akinetes terminal as well as intercalary, cylindrical, ellipsoidal, single or in pairs.

Found in small streams, puddles at Ghatangri and Apsinga.

8) *Protosiphon*

**Chlorococcales**

**Protosiphonaceae**

*Protosiphon*
Terrestrial green alga, unicellular thallus, coenocytic, with simple, hyaline rhizoids; aerial part green; globose to ovoid. Chloroplast solitary, parietal, reticulate with many pyrenoids.

Found on moist water logged soil at the bottom of hills, at the border of small nalas, pools etc. at Khandala, Donja, Yedshi etc.

9) *Pediastrum*

*Hydrodictyaceae*

*Pediastrum*

Many celled colony; non molite coenobium; cells more or less sickle or H shaped with sides of processes, marginal cells nearly parallel; green; intercellular space large and oval, multinucleate.

Found in free floating condition in the ponds at the end of rainy season, observed only at Gad.

10) *Hydrodictyon*

Colonical form, free floating, green, colony macroscopic with cylindrical cells joined at their ends to form a net like appearance, cells elongated with parietal chloroplast; single pyrenoid, multinucleate.

Common in rivulets slow flowing streams and rivers at Yedshi.
11) *Oocytis*

Colonial alga; colonies consisting of 2-8 cells; cells broadly ellipsoidal with rounded ends, chloroplasts one to many in number, parietal with pyrenoides.

Found in small streamlets at Yedshi and Kunthalgiri.

12) *Chlorella*

Very small, microscopic, unicellular green alga. Cells sometimes in small colonies, free living. Cells with a thin cell membrane; chloroplast parietal, cupshaped, with a pyrenoid uninucleate.

Found in streamlets, in standing water. It is found in old well at Yedshi. It is so abundant that it imparts green colour to the well water.

13) *Schedesmus*

Colonial form; colonies consisting of 2 to 4 cells; in linear series. Cells with smooth wall and spines.

Found submerged in streamlets at Yedshi, in rain water puddles, pond at Yedshi, Apsinga, Wadwal etc.

14) *Zygnema*

*Zygnematales*

*Zygnemataceae*

*Zygnema*
Filaments free floating, long, vegetative cells longer, chloroplast two, star shaped, with a conspicuous pyrenoid, uninucleate, conjugation scalariform; zygospores globose or oval, in the conjugation canal; zygospore wall thick and smooth.

Found in pools, ponds, streams at Wadwal, Kamtha, Kawaldara, Apsinga etc.

15) Spirogyra

Long filaments forming tufts, free floating and submerged, green; vegetative cells long, with ribbon shaped, spiral chloroplast, chloroplast number varies, uninucleate.

Found during rainy season at small streams, rivers, and channels forming a green mass of threads. Commonly occur throughout the forest area of both districts.

16) Closterium

Straight or slightly curved cells, cells large, narrowly fusiform, apices slightly rounded. Cell wall smooth, colourless, with one median girdle, chloroplast with ridges, pyrenoids many, uninucleate.

Found in rivers, streams, small water channels at Yedshi, Ghatangri, Bori etc.
17) *Cosmarium*

Unicellular uninucleate, alga, cells small, quite longer than broad, deeply constricted, sinus narrowly linear, semicells nearly elliptic, cell wall smooth; two chloroplast lobes, axile, with a central pyrenoid.

It is very common, found in streamlets, puddles, small pools at Yedshi, Kunthalgiri and Washi area.

*B) Charophyta*

18) *Nitella*

Charophyta
Charophyceae
Charales
Characeae
*Nitella*

Plants large, naked, many branched, attached to the substratum, submerged. Branches or branchlets on main axis, nodes and inter nodes both on main axis and branches, branchlets in a whorl; oogonia and antheridia on branchlets; oogonia long, solitary; antheridia oval or rounded.

Common in rain water ponds and found all over the forest.

19) *Chara*

Large, naked main axis with many branches, branches long and dwarf. Nodes and internodes present; internodes long, corticated cells cover the internodes; stipulodes may be one or two from base of short branch, colourless,
oogonia and antheridia on nodes of main axis and branches. Oogonia elongated with corona; antheridium oval or rounded. Rooted at the bottom, submerged.

Occur every where during rainy and winter season in ponds, puddles, pools, ditches etc.

C) Euglenophyta

20) Euglena
   Euglenophyta
   Euglenophyceae
   Euglenales
   Euglenaceae
   Euglena
   Unicell, cell long cylindric, posteriorly tapering, anterior end broad, chloroplasts discoid, many, periplast delicate, cells without flagella. Found in small pool, rock chanales, old well at Yedshi, Gadh, etc.

D) Xanthophyta

21) Botrydium
   Xanthophyta
   Xanthophyceae
   Heterosiphonales
   Botrydiaceae
   Botrydium
   Elongated, long body with aerial globose vesicle with many nuclei. Rhizoids much branched and rooted in mud. Cell wall thin; thallus yellow green coloured.
Common on moist soil in drying puddles, on bank of river, Yedshi, Arni, Kamtha and areas.

22) *Vaucheria*
*Vaucheriateae*
*Vaucheria*
Aerial filament green, erect and coenocytic with colourless, basal rhizoidal portion, cell wall thin; oogonium single, sessile ovoid, with the short beak; antheridium not observed.

Found in rain water ponds along with Chara, at Yedshi and Apsinga.

E) *Cyanophyta*

23) *Microcystis*
*Cyanophyta*
*Cyanophyceae*
*Chroococcales*
*Chroococcaceae*
*Microcystis*
Colonial form; colonies somewhat flat and expanding with pseudo-vacuoles; blue-green. Cells many, oblong, broad ellipsoid. Old colony shows daughter colonies.

Found generally in dirty water and in pools ponds, ditches. It is observed at Apsinga and Ghatangri.
24) *Chroococcus*

Uni or multicellular microscopic thallus or macroscopic colonies. Cells spherical, ovoid, or cylindrical with or without sheath, blue-green.

Very common on moist soil and also found attached to the plants present in ponds, ditches. It is observed at Mudguleshwar, Apsinga and Katri.

25) *Gloeocapsa*

Colonial form; colonies consisting of 4-12 cells; blue-green, cells rounded, oval, with or without sheath, sheath hyaline, unlamellated.

Common on moist soil, moist stones near ponds, streams at Yedshi and Gad.

26) *Aphanothece*

Colonial blue-green alga, forms gelatinious mass, colonies globose, yellowish, cells long, cylindrical or oblong; cells without individual envelope.

Very common on moist soil during rainy season. It is observed near hill slopes, on the banks of channels and streamlets of Yedshi forest.

27) *Spirulina*

Nostocales

Oscillatoriaceae

*Spirulina*
Trichomes long, blue-green, very loose or slimy, regularly spirally coiled. Common in pools and puddles at Yedshi and Apsinga and Wadwal area.

28) Oscillatoria

Thallus blue-green, trichomes stright, cells many, short, broader than long; apical cell rounded; cross walls slightly constricted separation discs present. Very common, forming bluish green mass on moist soil, marshy places on the sides of pool, ponds and hill slopes at Yedshi, Wadwal, Talmod etc.

29) Lyngbya

Thallus blue-green; filamentous, long, covered with thick sheath, yellow or hyline, apical cell rounded, cells shorter than broad.

Forms blue green masses adhering to the submerged stones in ponds, puddles, stream banks. Observed at many places of social forestry area at Kamtha, Tirth, Chakur and Gharni.

Nostocaceae

30) Nostoc

Colonies observed as small ball like structures containing many filaments, blue-green filaments are moniliform with individual hyaline or coloured sheath; cells short, globose; heterocysts intercalary, single or in series, globose; akinets in chains, globose, sub-globose with smooth, hyaline outer wall.
Found on moist soil. Common on bank of small chanales and gullies at Yedshi and on the banks of Bori river at Naldurg.

31) *Anabaena*

Thallus soft, mucilaginous, light green; trichomes single, usually enclosed in interrupted mucilaginous sheath, constricted at cross walls; end cells conical; cells barrel shaped, shorter than broad or as long as broad; heterocysts intercalary, short barrel shaped; akinetes globose; outer wall smooth and hyaline.

Found in puddles, river banks and gullies of hill slopes. It is observed only in Yedshi forest.

32) *Calothrix*

Filaments in groups; sheath very distinct, thin, hyaline, closely depressed to the trichome; trichomes constricted at the cross walls; tapering into long hair, terminal portion of hair with sheath; cells barrel shaped, as long as broad; cells of the hair very much elongated; heterocysts globose, basal, single.

Found on moist soil at hill slopes near streams, observed only at Yedshi and Ghat area.

*Bacillariophyta*

33) *Pinularia Gandhi*

*Bacillariophyta*

*Diatomatae*

*Pennales*

*Pinularia*
Cells solitary and free floating. Valves sublinear with weak but distinct triumulate sides and distinctly narrowed, actually wedge-shaped, capitate ends; raphe thin undulate with closely set central pores, unilaterally bent and terminal fissures slightly curved; axial area wide, central area large, striae slightly thick, radiate at the middle and convergent at the ends.

Found at Yedshi and Wadwal in ponds, small lakes, ditches etc.

34) *Navicula Bory.*

Cells generally solitary and free floating; frustules symmetrical in all three planes, rectangular in girdle view; valves elongate, usually attenuated towards the poles with rounded ends; raphe distinct, axial, straight with well defined but small central and polar nodules; axial area narrow; central area moderate, rounded, transverse striae perpendicular to the middle line.

Found in forest area in ponds, ditches, slow flowing streams etc.

*Fragilariaceae*

35) *Fragilaria Lyngbye.*

Cells rectangular in girdle view and usually with one or more intercalary bands between the girdles, united to form free floating colonies; colonies may be bandlike filaments with the cells joined valve to valve; valves linear to fusiform, bilaterally symmetrical, usually attenuated at the poles, transverse striae usually fine, pseudoraphe narrow and indistinct.
It is found at Wadwal, Udgir, Yedshi, Apsinga in freshwater ponds, pools etc. In addition to some aquatic angiosperms and algae, one species of Bryophyte and few species of Pteridophyte are observed in the forest area.

**BRYOPHYTE AND PTERIDOPHYTES**

**Bryophyte**

The Osmanabad and Latur forest area is of dry deciduous type. The rainy season is of about 3-4 months. One Bryophyte, *Riccia* is found during rainy season on moist soil on hill slopes, stream banks etc at Apsinga, Yedshi, Wadwal and Kunthalgiri.

The *Riccia* (Plate 19, fig. 2) thallus is flat, horizontal, linear or wedge-shaped and dichotomously branched. It forms rosette like gametophyte. On the dorsal surface of the thallus, there is a median longitudinal groove, on the lower surface i.e. on ventral surface there are rhizoids.

**Pteridophytes**

Like other plant group, some pteridophytes are also found in the forest area. They are few in number and are scattered. The pteridophytes observed are *Equisetum, Marsilia* and *Actinopteris*. *Marsilia* and *Actinopteris* are observed only during rainy season while *Equisetum* is perennial.

1) **Equisetum** (Plate 19, fig. 3)

Location – Many plants are found near Yedshi forest along stream banks, river bank etc.
The sporophyte of *Equisetum* has a horizontal much branched, perennial, subterranean rhizome, penetrating the soil surface. The rhizome is differentiated into nodes and internodes. At each node a whorl of small, scale like leaves is present.

From rhizome aerial branches arise, having nodes and internodes. These branches are green and have a whorl of lateral branches at each node. Each internode of an aerial branch is longitudinally ribbed and has the ribs alternate with the leaves of the subtending node. The aerial branches are fertile and sterile. Fertile shoot have a single strobilus at the branch apex.

2) *Marsilea* spp. (Plate 19, fig. 4)

Location – *Marsilea* is found during rainy season in ponds, ditches and small lakes. They are observed at Yedshi, Wadgaon and Bhansgaon area.

Morphology – The sporophyte looks like an aquatic four leaf clover. It has a creeping dichotomously branched rhizome. The leaves are borne on the upper side of a rhizome, from the nodes. Internodes between successive leaves may be long. The adventitious roots arise from each node and are present on the underside of the rhizome. Leaves have long, flexible petioles and large leaf blade which float on the surface of water. The leaf blade is divided into four obovate pinnae. The sporocarps are borne on short stalk, inserted a short distance above the base of the petiole.
3) *Actinopteris dichotoma* Forsk. (Plate 19, fig. 5)

Location – Found on moist rocks, hill slopes, at shady places in the forest area of Yedshi.

Morphology – A small fern, generally growing on shaded or even exposed rocky substrata, often on rocks. The rhizome is erect, short, creeping, and covered with tufts of strong, black, wiry roots. The leaves are densely clustered and often form rosettes. The greenish stipes are rough to touch, the leaf lamina is semicircular to reniform in outline, broad and dissected into narrow, 3 to 4 times dichotomous segments, spreading like a fan. The lamina is thick, leathery and rough to touch. It is nearly glabrous, glossy and shining on the upper surface and with small hairs on lower surface. Fertile leaves are somewhat larger than sterile and sporangia occur marginally on the leaf segments on the lowerside.