

THE VEGETATION OF MARSHES AND SWAMPS IN THE POONA DISTRICT

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INTRODUCTION

Although other types of vegetation have been studied in this country to some extent, the study of the marshes and swamps has not attracted much attention from botanists. There is no account of this type in Champion's survey (1938). This type is of great interest botanically, besides possessing possibilities of their being put to some economic uses. *Typha*, *Trapa*, *Nelumbo*, and several grasses that are of considerable economic use occur in moist habitat. It was, therefore, considered necessary to make a study of this type of vegetation in our normal exploration work.

There are several areas in the Poona district, which receive a heavy rainfall but on account of the porous nature of the soil, ordinarily water does not collect and, therefore, large marshy or swampy areas do not exist in this district. In some places due to seepage of water from canals or the collection of water in low places swamps are created. Some of these dry up soon after the rains, but here and there permanent marshes and swamps are met with. The vegetation of these is described in this paper. The study was made according to the method suggested by Misra and Puri (1956).

LOCATION OF THE MARSHY AND SWAMPY HABITATS

On account of the reason explained above, marshes and swamps are not restricted to any particular areas or places. The studies were therefore conducted over a number of places scattered all over the district in different seasons.

1. *Vitthalwadi*: Vitthalwadi is a small village famous for the temple of 'Vitthal' or 'Pandurang', and it is situated at a distance of 6 miles from Poona on Poona-Sinhagad road. Near the 5th mile along the road, marshy areas are formed over the first and second terrace of the river Mutha. The marshes are formed by the seepage of water from the Khadakwasla canal running almost parallel to the road. There are marshy places along the river as well (Fig. 1). The soil is very shallow in most of the places and the marshes are restricted to small patches.

2. *Sholapur Road (Kunjarwadi)*: Along the Poona-Sholapur road, near the village Kunjarwadi, there is a marsh spread over a considerably large area. The water comes mostly from the canal, but a small amount of drainage water might be coming from the nearabout fields. The soil is deep black, clayey and mixed with a small amount of sand and gravel. 11 quadrats of 1/3 meter sq. were studied from this area.

3. *Sholapur Road (Saizpur)*: At the foot of a hillock, 21.6 miles from Poona along Poona-Sholapur Road is a small pool, which is surrounded by marshy vegetation. This marsh is restricted to a small area, and in all probability, it is only a seasonal marsh. 14 quadrats of 1/3 meter square were observed and recorded.

4. *Bhosari* : A fairly large swamp is met with along Bhosari lake, 5 miles from Kirkee on Poona-Nasik Road (Fig. 2). This is naturally a permanent swamp, and some parts of it form a water-logged condition. The soil is sticky, black and deep. Number of quadrats studied from this area was 10.

5. *Poona-Nasik Road* : About 4.2 miles from Kirkee, where Poona-Nasik road and the proposed railway line cross each other, one can see a dense *Typha* community growing in a swamp. The swamp is formed due to a water stream originating just nearby. 10 quadrats of 1/3 meter square were studied.

6. *Ghorwadi* : Just by the side of Ghorwadi Railway Station (about 20 miles from Poona, Bombay-Poona Railway Line), marshy type of vegetation is thriving along small pools. The soil is shallow, brownish and somewhat sticky, and the marshes dry up in summer.

7. *Talegaon* : A large and old lake is situated at Talegaon (Dabhade), on the border of which small patches of marshes are formed. 10 quadrats of 1/3 meter square were studied both at Ghorwadi and at Talegaon.

GENERAL DESCRIPTION OF VEGETATION

The marsh and swamp vegetation is formed of a number of communities, among which communities of *Typha*, *Asteracantha*, *Caesulia*, *Cyperus*, and grasses are prominent. In the *Typha* community, other plants are normally not present, but the grass communities are usually mixed. Communities of *Asteracantha*, *Caesulia*, *Cyperus* etc., may be pure or mixed.

The data for the communities from the various places mentioned above are summarized in Table 1, and detailed descriptions of communities are given separately.

1. *Fimbristylis-Cyperus* Community

This community (Fig. 3) is formed mainly by two species of the *Cyperaceae*, namely *Fimbristylis diphylla* Vahl which occurs in 53.0 per cent of the quadrats and *Cyperus globosus* All. which has a percentage occurrence of 35.4. *Fimbristylis diphylla* Vahl is dominant both in distribution as well as in height, reaching upto 60 cms.; while the maximum height of *Cyperus globosus* All. is 50 cms. The third important element of the community is *Fimbristylis woodrowii* Clke., having the percentage occurrence of 23.5, and occurring in almost all the parts of the community. It is a low glabrous slender herb, hardly reaching upto 12 cms. Other plants which are present only frequently are as follows :—

<i>Asteracantha longifolia</i> Nees.	12	per cent.
<i>Caesulia axillaris</i> R.	23.5	per cent.
<i>Cyperus leucocephalus</i> Retz.	12	per cent.
<i>Habenaria marginata</i> Coleb.	12	per cent.
<i>Heylandia latebrosa</i> DC.	6	per cent.
<i>Sopubia delphinifolia</i> Don.	10	per cent.
<i>Leucas linifolia</i> Spr.	6	per cent.
<i>Utricularia</i> sp.	6	per cent.

2. *Typha-Asteracantha* community

This community is met with in good marshy places with clayey soil and is composed of *Typha angustata* Bory and *Asteracantha longifolia* Nees; the percentage number of quadrats in which they occur being 90 and 80, respectively. In the 10 quadrats of 1/3 meter square each which were studied from this particular community, the total number of *Typha* plants was found to be 30, while that of *Asteracantha* was 27. But the *Typha* is so prominent, that at first sight,

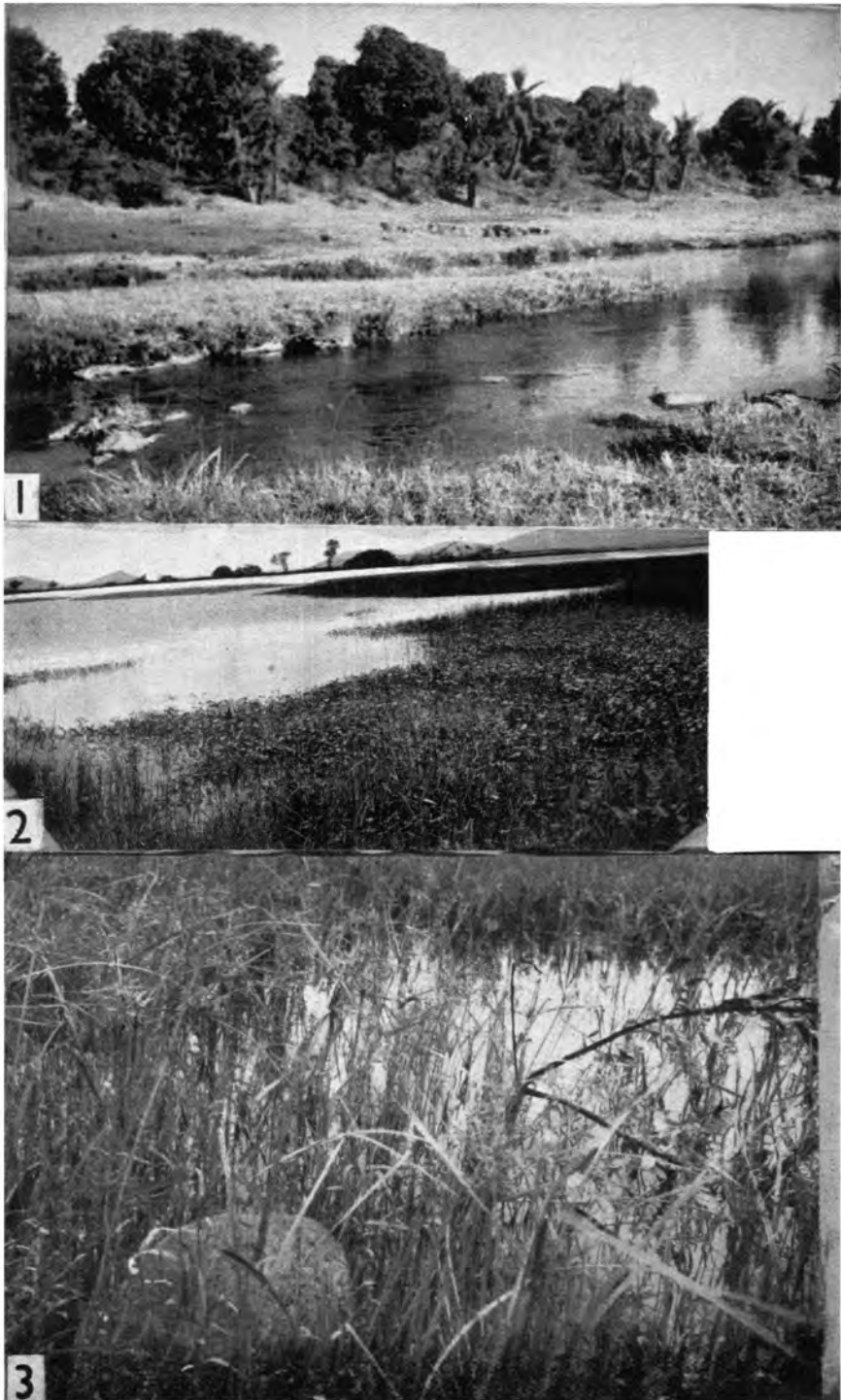


Fig. 1. Marshy places along the Mutha River at Vitthalwadi.

Fig. 2. Bhosari Lake along Poona-Nasik Road.

Fig. 3. Close-up of *Frimbristylis-Cyperus* community at Vitthalwadi.



Fig. 4. Pure community of *Caesulia axillaris* along Poona-Sholapur Road.
Fig. 5. Mixed community of *Caesulia axillaris* at Talegaon.

the community appears to be a pure *Typha* community. It is a robust plant, the height of which is generally between $1\frac{1}{2}$ and $3\frac{1}{2}$ meters. Other two species occurring in considerable frequency but with inconspicuous appearance are *Digitaria royleana* and *Cyperus fuscus*, their percentage number of quadrats being 50 and 30, respectively. Such communities are not common, and the authors have come across only one large community along Poona-Nasik road at about the 4th mile from Kirkee. The main reason for this rarity is that *Typha* requires good alluvial soil of considerable depth, and plenty of water.

3. *Caesulia axillaris* community

Almost pure communities of *Caesulia axillaris* R. are found in small shallow pools and water-logged areas. It is a succulent erect or suberect herb, 15 to 45 cms. high. The flowers are pale-blue or white and they are borne in sessile, axillary heads. In all 14 quadrats of $1/3$ meter square were studied and the total number of plants was 95. The percentage number of quadrats in which the species occur is 84. This community is generally restricted to small areas in which stagnant water is available (Fig. 4).

4. *Asteracantha*-*Caesulia* community

Asteracantha longifolia Nees.—*Caesulia axillaris*, R. community (Fig. 5) is found more frequently than pure communities of each of the two species. The percentage occurrence of the two species is nearly the same i.e., 70. Two other species occurring in this community are *Cyperus leucocephalus* (20 per cent) and *Apluda varia* (10 percent), and they are generally present along the borders of the community. *Asteracantha longifolia* is a stout spiny herb with usually unbranched erect stems 20 cms. to 100 cms. high. It can survive in comparatively drier areas for a longer time; so, after the monsoon is over, it naturally dominates *Caesulia axillaris*. *Asteracantha*-*Caesulia* community is extremely variable, ranging from pure community of these two species to a mixed community in which more than a dozen species occur in a good percentage. At Bhosari, for example, we have studied a community in which both *Caesulia* and *Asteracantha* are 40 per cent, and in addition are the following species with their respective percentage occurrences:—

<i>Acanthospermum hispidum</i> DC.	20
<i>Andropogon pumilus</i> Roxb.	10
<i>Achyranthes aspera</i> Linn.	30
<i>Cymbopogon martini</i> Stapf.	10
<i>Cyperus eleusinoides</i> Kunth.	20
<i>Cyperus globosus</i> All.	10
<i>Cyperus leucocephalus</i> Retz.	10
<i>Cyperus nutans</i> Vahl.	10
<i>Fimbristylis aestivalis</i> Vahl.	30
<i>Fimbristylis diphylla</i> Vahl.	20
<i>Isachne australis</i> B.Rr.	20
<i>Sopubia delphinifolia</i> G. Don.	10

5. *Caesulia axillaris*-*Eleocharis capitata* community

This is a variable mixed community in which a number of other species are frequently present. The percentage occurrence of *Caesulia* and *Eleocharis* is 36.4 and 33 respectively. A good number of species belonging to Cyperaceae are present in this community; and the dominance of Cyperaceae over *Caesulia* is

TABLE I

Chart showing the percentage number of quadrats

Locality :	<i>Vithawadi</i> 5.2 miles from Poona.	<i>Sholapur Road</i> <i>Kunjarwadi</i> 14.3 miles from Poona.	<i>Sholapur Road</i> <i>Saizpur</i> 21.6 miles from Poona.
Condition of the soil :	Marshy area, shallow sticky brownish soil.	Marshy area, deep black soil mixed with sand and gravel.	Marshy area, shallow sticky block soil, small amount of sand and humus.
Other features :	Seepage water comes from the canal (Khadak- wasla canal.)	Mostly seepage water from canal. Small amount of drain- age water.	Small pool, marshy place restricted to a small area.
Number of quadrats studied and their size	17 quadrats 1 meter square each	11 quadrats 1/3 meter square each	14 quadrats 1/3 meter square each
<i>Name of the species:</i>	<i>Percentage number of quadrats</i>		
<i>Acanthospermum hispidum</i> DC.	—	—	—
<i>Achyranthes aspera</i> Linn.	—	—	—
<i>Andropogon pumilus</i> Roxb.	—	—	—
<i>Apluda varia</i> Hack.	—	9	—
<i>Asteracantha longifolia</i> Nees.	12	—	—
<i>Caesulia axillaris</i> R.	23.5	36.4	84
<i>Chloris barbata</i> Sw.	—	—	—
<i>Cyanotis fasciculata</i> Schult.	17.7	—	—
<i>Cymbopogon martini</i> Stapf.	—	—	—
<i>Cyperus eleusinoides</i> Kunth.	—	18	—
<i>Cyperus fuscus</i> Linn.	—	—	—
<i>Cyperus globosus</i> All.	35.4	18	—
<i>Cyperus leucocephalus</i> Retz.	12	—	—
<i>Cyperus nutans</i> Vahl.	—	9	—
<i>Digitaria royleana</i> Prain.	—	—	—
<i>Eleocharis capitata</i> Br.	—	33	—
<i>Eragrostis tenella</i> Beauv.	—	—	—
<i>Eriocaulon luzulaefolium</i> Mart.	—	9	—
<i>Fimbristylis aestivalis</i> Vahl.	—	9	—
<i>Fimbristylis diphylla</i> Vahl.	53	—	—
<i>Fimbristylis monostachya</i> Haesk.	—	18	—
<i>Fimbristylis spathacea</i> Roth.	—	18	—
<i>Fimbristylis woodrowii</i> Clke.	23.5	—	—
<i>Habenaria marginata</i> Coleb.	12	—	—
<i>Heylandia latebrosa</i> DC.	6	—	—
<i>Heteropogon contortus</i> Roem.	—	—	—
<i>Isachne australis</i> R.Br.	—	—	—
<i>Leucas tinifolia</i> Spreng.	6	—	—
<i>Portulaca</i> sp.	17.7	—	—
<i>Sopubia delphinifolia</i> G.Don.	10	—	—
<i>Typha angustata</i> Bory.	—	—	—
<i>Utricularia</i> sp.	6	—	—

TABLE I (contd.)

in which the species occur in the various localities

<i>Bhosari</i> 5 miles from Kirkee on Poona-Nasik Road.	<i>Poona-Nasik Road</i> 4.2 miles from Kirkee.	<i>Talegaon</i> Near Ghorwadi Station.	<i>Talegaon</i> Near the lake.	<i>Poona-Nasik Road</i> 3 miles from Poona.
Marshy area, deep sticky black soil.	Marshy area, deep sticky brownish soil.	Marshy area, deep brownish gravelly soil.	Marshy area, shallow sticky and sandy soil.	Marshy area, brownish gravelly soil.
Marsh along a lake. Large area.	Marshy area along a water stream.	Small pools.	A large lake. Small patches of marshy area along the lake.	Small patches near shallow pools.
10 quadrats 1/3 meter square each	10 quadrats 1/3 meter square each	10 quadrats 1/3 meter square each	10 quadrats 1/3 meter square each	10 quadrats 1/3 meter square each

in which the species occur :—

20	—	—	—	—
30	—	—	—	—
10	—	—	—	90
—	—	10	10	—
40	80	70	20	20
40	—	70	30	60
—	—	—	—	—
—	—	—	—	—
10	—	—	—	—
20	—	—	—	—
—	30	—	—	—
10	—	—	—	20
—	—	—	—	—
10	—	20	—	—
10	—	—	—	—
20	50	—	20	—
—	—	—	—	—
—	—	—	20	—
—	—	—	—	—
30	—	—	—	30
20	—	—	—	—
—	—	—	—	20
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	60
20	—	—	—	—
—	—	—	—	—
—	—	—	—	—
10	—	—	10	20
—	90	—	—	—
—	—	—	—	—

well-marked. The following other species were observed in marshy area at Sholapur Road :—

1. <i>Cyperus globosus</i> All.	18 per cent.
2. <i>Fimbristylis monostachya</i> Hassk.	18 per cent.
3. <i>Fimbristylis aestivalis</i> Vahl.	9 per cent.
4. <i>Fimbristylis spathacea</i> Roth.	18 per cent.
5. <i>Cyperus nutans</i> Vahl.	9 per cent.
6. <i>Cyperus eleusinoides</i> Kunth.	18 per cent.

Besides these, grass namely *Apluda varia* and *Eriocaulon luzulaefolium* occur in small percentage.

6. *Andropogon*—*Caesulia*—*Heteropogon* community

The locality in which this community was studied is not strictly marshy or swampy. In some places near pools, it may attain marshy conditions; but the major part is just a moist grassland.

Andropogon pumilus is the most abundant and dominant feature in the vegetation, being present in 90 per cent of the total quadrats studied.

Caesulia axillaris and *Heteropogon contortus* both occur in the community in 60 per cent of the quadrats. *Caesulia axillaris* is more abundant in the wetter parts, while *Heteropogon* is prominent in the drier situations. The other species occurring in this community are given below with their respective percentages :—

<i>Asteracantha longifolia</i> Nees.	20
<i>Cyperus globosus</i> All.	20
<i>Fimbristylis aestivalis</i> Vahl.	30
<i>Fimbristylis monostachya</i> Hassk.	20
<i>Sopubia delphinifolia</i> G. Don.	20

7. *Ipomea aquatica* Forsk. community

In the shallow water and moist mud along the border of Bhosari lake (Poona-Nasik Road) extensive patches of *Ipomea* community are present. The plant is a runner forming a dense network of branches. It grows only in shallow water and where enough amount of soil is present.

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