

# **RESULT AND DISCUSSION**

Present study envisages the charophyte flora from Kolhapur district. On the basis of geography and climate the district can be divided into two parts, the hilly region on the western side and the plain on the eastern side. Approximately two-third part of the district comprises hilly Ghats while one third area is occupied by plains. Different rivers drain the monsoon water towards the east making the banks and in turn the plains fertile. Collections were made between the period of August 2006 to March 2008. Table below shows the list of charophytes along with their respective localities of collection.

Table. List of charophytes along with their respective localities of collection.

Sr. No.	Name of Microspecies	Locality of collection
1.	<i>Chara globularis</i> var. <i>leptosperma</i> f. <i>leptosperma</i> (A.Br.) R.D.W., em	Rashiwade
2.	<i>Chara vulgaris</i> var. <i>vulgaris</i> f. <i>vulgaris</i> L., em	Jaisingh Lake, Kagal and Rajaram Lake, Kolhapur
3.	<i>Chara setosa</i> f. <i>setosa</i> Klein ex Willd.	Ichalkaranji and Kalamba Lake, Kolhapur
4.	<i>Chara zeylanica</i> var. <i>zeylanica</i> f. <i>elegans</i> Klein ex Willd., em.	Kurundwad
5.	<i>Chara zeylanica</i> var. <i>zeylanica</i> f. <i>filicaulis</i> Klein ex Willd., em.	Jaisingh Lake, Kagal and Kalamba Lake, Kolhapur
6.	<i>Chara zeylanica</i> var. <i>diaphana</i> f. <i>osterdiana</i> Klein ex Willd., em.	Malkapur
7.	<i>Chara socotrensis</i> f. <i>nuda</i> Nordst. in Kuhn, em.	Rashiwade
8.	<i>Nitella stuartii</i> A.Br.	Panhala
9.	<i>Nitella dualis</i> var. <i>pulchella</i> f. <i>pulchella</i> Nordst. in T.F.A., em.	Amboli
10.	<i>Nitella heteroteles</i> J. Gr. & Steph.	Malkapur
11.	<i>Nitella capillata</i> <i>Nitella capillata</i> A.Br.	Gadhinglaj

Our collections reveal five species of *Chara* and four species of *Nitella*. Out of the five species all were with incortication and only one was ecorticate. Our observation throughout the period of study showed that there is abundance of charophytes in the district. Generally the species occur in abundance after the showers of monsoons are over, usually after month of September and November onwards the occurrence of charophytes remains restricted to the permanent water bodies. There are nine permanent water reservoirs in the district. In addition to these newly constructed percolation tanks, and Kolhapur type weirs abound in the district. The distribution of *Chara* and *Nitella* species was of special notice that the *Nitella* species were restricted mainly to hilly region, while the species of *Chara* abundantly occur in the plains. The localities shown in the above table are the mere representative of the area, in addition to these localities the plants were also collected from near by areas.

Based on the work done in our country on taxonomy of charophytes Khan and Sarma, (1981) have given the phytogeographical classification of charophytes in India. According to them the Indian charophytes represent about 31% of world flora, of these 16 taxa have been considered endemic and equal representation of species of *Chara* and *Nitella*. On the basis of chromosome number and their occurrence Khan and Sarma grouped the Indian charophytes into cosmopolitan, sub - cosmopolitan, Indo - African, Indo - Australian, Indo - European, Indo - Pacific and endemic. As the distribution of charophyte is abundant in the northern side of the country primary centre of origin of charophytes has been considered to be the gangetic plain and parts of Madhya Pradesh. However over observations support the extension of this area towards the south including probably the Western Ghats of Maharashtra State.

The species of *Chara* viz. *Chara zeylanica* has been considered as the species par excellence. The occurrence of *Chara zeylanica* in the district has supported the view. The distribution of *Chara zeylanica* in the permanent water bodies such as Kagal Lake, Kalamba Lake and Kurundwad Lake, revealed that this species remains permanent throughout the year unlike the other species. The high incrustations of the species indicate the presence of higher amount of carbonates and bicarbonates in the water bodies (Vaidya and Gonzalvis 1963). *Chara zeylanica* has been considered sub-

cosmopolitan taxon which is represented in our study area. Of the remaining categories. *Chara globularis* is cosmopolitan taxa. *Chara zeylanica* var. *zeylanica* f. *osterdiana* is considered to be sub- cosmopolitan taxon, *Nitella dualis* is also considered to be sub- cosmopolitan, *Chara setosa* f. *setosa* is an Indo-African taxa, *Chara globularis* f. *leptosperma* is an Indo – American taxon and *Nitella stuartii* is Indo- Australian

The survey of literature shows that except the reports of N.D. Kamat no charophytes have been reported since so far from Kolhapur district. The above mentioned species are being reported for the first time from the study area.

*Chara socotrensis* is an ecorticate species closely resembling to *Chara braunii*, *Chara corallina* and other ecorticate species. Four forma of the species have been recognized by Wood and Imahori (1965). In the monographic work by Pal et al. on charophytes of India they recorded *Chara pashani*, *Chara nuda* as individual species. However in the revision of Wood and Imahori both of these species have been recognized as the forma of *Chara socotrensis*. *Chara socotrensis* f. *pashani* and *Chara socotrensis* f. *nuda* are the only two forma reported from India [Dixit (1931, 1935, 1940a, 1940b, 1942 Chatterjee (1976a), Karande (1998, 2000), Patil S.R (1992) and Chaugule (1992) etc]. The occurrence of *Chara socotrensis* f. *nuda* has been reported by Pal et al. at Chennai and Madhya Pradesh. Sunderlingam described the form from Chennai which differed in its morphology from *Chara nuda* var. *kolhapurensis* described by Dixit (1940). It was N.D. Kamat who for the first time reported *Chara nuda* from Kolhapur. Our collections showed abundance of the species in various localities from hilly parts of Kolhapur district. The comparative account between the plants of *Chara socotrensis* f. *nuda* occurring at various places from hilly areas of the Kolhapur district has been discussed earlier. It clearly shows the resemblance between the plants with some exceptions. As discussed in their paper on *Chara socotrensis* f. *pashani* the plants were not observed from the study area but, occurrence of f. *nuda* reveals that further exploration of the axis is needed in future.

*Chara setosa* is another corticated species. The complex consists of microspecies differentiated on the basis of colorless corticated lowermost branchlet node as conceived by Wood and Imahori. The species consists of three forma viz. f. *setosa*, f. *pseudobrachypus* and f. *inermis*. Our collections reveal the occurrence of *Chara setosa* f. *setosa* in the district. It's a merger of two species *Chara setosa* and *Chara brachypus* by Wood and Imahori (1965). The *Chara brachypus* has remained an independent species since long time. Occurrence of *Chara setosa* f. *setosa* in our study area reveals the dominance of corticated incrustated species.

*Chara globularis* is a cosmopolitan group within the charophytes and is considered as heterogeneous assemblage of different varieties. In their world revision of Characeae Wood and Imahori recognized five varieties and twenty nine forma in the complex. Many of these forma were previously recognized as independent species. The complex is characterised by irregular nature of stipulodes, branchlet cortex and geminate or fasciculate spine-cells. The merger of various species into the complex has been challenged by many workers on the basis of cytological studies. However no report in this regard is seen from Maharashtra. Authors could locate the occurrence of *Chara globularis* var. and f. *leptosperma* in the area which seems to be the first record

In our search of charophyte for species of *Nitella* viz. *Nitella dualis* var. *pulchella* f. *pulchella*, *Nitella capillata*, *Nitella stuartii*, and *Nitella heteroteles* were collected from the study area. The occurrence of the *Nitella* species was mainly restricted to western part of the district along the hilly side. Of the four species *Nitella dualis* var. and f. *pulchella* was found at the origin of Hiranyakeshi river while, remaining three were found growing in pools and puddles. After the monsoon showers all the four species of *Nitella* were found at high altitudes. All of the *Nitella* show closely resemblance with those described by Wood and Imahori.

In conclusion it may be said that most of the soil strata within the district constitutes black and deep soil. The drainage system within the district formed by the

number of major and minor rivers make the soil fertile on the banks. The occurrence of charophytes within the district is located largely to the permanent as well as temporary water bodies. In order to understand the exact nature of distribution and ecology of this fascinating group of algae further studies are necessary.