Journal of Algal Biomass Utilization
J. Algal Biomass Utln. - Copyright © PHYCOSPECTRUM
ISSN: 2229 – 6905

A study on Sub aerophytic algae from Visakhapatnam, a coastal city of Andhra Pradesh

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Abstract:

Present investigation deals with algae occur on the walls of the old buildings, damaged walls and on the permanent structures which regularly exposed to water source. Studies were made on distribution of sub aerial algal forms at Visakhapatnam city for a period of one year, from January, 2018 to December 2018. During this investigation 15 algal genera were identified, these algae were reported during monsoon season and few were observed in winter season. During the summer season black and brown crusts were observed with asexual propagules. Species of *Aphanothece, Calothrix, Chroococcus, Chlorella, Gleocapsa, Klebsormidium. Lyngbya, Nostoc, Oscillatoria, Plectonema, Phormidium, Stigonema, Scytonema, Tolypothrix, Trentipohlia* were reported during the period of investigation.

Key words: Sub aerial algae, Distribution, Visakhapatnam city, East coast of India.

Introduction

Visakhapatnam is a coastal city on the East coast of India with green hills along with beautiful wild and avenue plant species. Algae are basically aquatic habitat but some genera of algae able to grow, survive and successfully completed their life cycle on variety of terrestrial and sub aerophytic habitats (Hoffman, 1989; Adikary,1997 and 2000; Tripathy et al, 1999; Tirkey & Adikary, 2006). Little attention was paid on the aerophytic or sub aerial algal communities of east coast of India. Few investigators (Bhakta et al,2014; Narasimha Rao, 2016 and Narasimha Rao, 2017) studied the corticolous algae in tropical forests and Lampen flora from caves. In the present investigation an attempt was made on the algal flora present on the old building and other permanent structures in and around Visakhapatnam city.

Study sites and Methods

Visakhapatnam is a coastal city lies between latitudes 17º 14' 30" and 17º 45' N at longitudes 83º 16' 25" E on East coast of India. Five study sites (1. Andhra University campus 2. Steel plant quarters, Visakhapatnam 3. Railway quarters, Tadichattala palem 4. Madhurawada 5. BHPV quarters, Visakhapatnam) were selected in vicinity of Visakhapatnam for collection of samples for a period of one year (January 2018 to December 2018). Samples collections were made during the three seasons of the year. Algal samples were collected from old building surfaces and placed in eppendrof tubes using scalpel and needles then transported to the Botany department laboratory at Andhra University. Some of them were identified and further confirmation maintained them on solid agar medium. These pedri dishes with algal material were incubated in BOD chamber at 25ºC temperature with 2500 lux light intensity for 8 hours during 0900 to 1700 hours. Air samplings were conducted in three seasons such as monsoon, post monsoon and pre monsoon seasons. Hand held petri dishes with agarised medium (Allen, 1968) were exposed to the air while moving in a vehicle with speed of 60 to 70 KM per hour. The petri dishes were transported to the laboratory and incubated in BOD chamber as mentioned above. After two weeks algal samples were identified with the help of the monographs and keys (Desikachary,1959; Komarek and Anagnostidies,2005).

Results and Discussion

Visakhapatnam is a tropical city with moderate climatic conditions, information on air temperature, rain fall and humidity of the Visakhapatnam was collected from the Meteorological centre Visakhapatnam. Air temperature varied from 16 to 38ºC, humidity from 74 to 98% and rainfall from 25 to 214 mm during the period of study. Frequent rains in monsoon season, shaded environment and continuous wetted conditions on old buildings and other compound walls promote the growth of the blue green algal and other Chlorophyceae forms in the study sites. Table 1 shows the presence of sub aerophytic algal forms in the different study sites of the Visakhapatnam.

A total of 15 algal forms were reported, out of the 15 algal forms some of them were identified up to species level and remaining them were identified up to genus only. In this investigation 4 algae belongs to Nostocaceae and 2 algae belongs to Chroococaceae one algal form belongs to each family of Aphanothecaceae, Rivulariaceae, Chlorellace, Klebsormidiophyceae, Nostoceae, Scytonemataceae, Stigonemataceae, Tolypothrichaceae, Trentepohiliaceae.

Table 1 Sub aerial algae identified from the green patches on compound walls and other old structures of Visakhapatnam.

S.No	Name of the alga	Family
1	*Aphanothece naegelii*	Aphanothecaceae
2	*Calothrix* sps	Rivulariaceae
3	*Chroococcus bituminosus*	Chroococaceae
4	*Chlorella vulgaris*	Chlorellaceae
5	*Gloeocapsa turgid*	Chroococaceae
6	*Klebsormidium crenulatum*	Klebsormidiophyceae
7	*Lyngbya* sps	Oscillatoriaceae
8	*Nostoc* sps	Nostocaceae
9	*Oscillatoria chlorina*	Oscillatoriaceae
10	*Plectonema* sps	Oscillatoriaceae
11	*Phormidium* sps	Oscillatoriaceae
12	*Scytonema crispum*	Scytonemataceae
13	*Stigonema* sps	Stigonemataceae
14	*Tolypothrix distorta*	Tolypothrichaceae
15	*Trentipohlia* sps	Trentepohiliaceae

Table 2 Distribution of sub aerial algae in different seasons at Visakhapatnam

S.No	Name of the Alga	Pre monsoon	Monsoon	Post monsoon
1	*Aphanothece naegelii*	+	+	+
2	*Calothrix* sps	-	+	+
3	*Chroococcus bituminosus*	-	+	-
4	*Chlorella vulgaris*	-	+	+
5	*Gloeocapsa turgid*	-	+	-
6	*Klebsormidium crenulatum*	-	+	-
7	*Lyngbya* sps	-	+	+
8	*Nostoc* sps	+	+	+
9	*Oscillatoria chlorina*	+	+	+
10	*Plectonema* sps	-	+	+
11	*Phormidium* sps	-	+	-
12	*Scytonema crispum*	-	+	-
13	*Stigonema* sps	-	+	+
14	*Tolypothrix distorta*	-	+	-
15	*Trentipohlia* sps	+	+	+

Plate 1 Photographs shows the algal patches on the wall of the buildings and other structures in different stations of the Visakhapatnam

Plate 1 shows the photographs of the green patches with algal forms in different stations of the city. Table 2 shows the presence of algae in different seasons of the year during the period of investigation. During the monsoon season all reported algae (15 algal forms) were present in different parts of the city and in the post monsoon season 9 algae were observed and genera like *Chroococcus*, *Gloeocapsa, Klebsormidium, Phormidium, Scytonema, Tolypothrix* didn't present. And in the pre monsoon season only 4 algae such as *Aphanothece, Oscillatoria, Nostoc* and *Trentipohlia* were observed in two study sites of Visakhapatnam. Maximum numbers of species (15) were reported in monsoon season and minimum numbers of species (4) were observed in pre monsoon season (Table 2). The results of this present study agrees with the findings of Tripathy et al (1999), Tirkey and Adikary (2006),Bhakta et al (2014) and Narasimha Rao (2017).

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