In the present investigation three different climatic conditions were selected to study the microclimatic influence on the distribution and florestic composition of the blue-green algae. A total of 112 samples from 18 places covering Dharwad, Belgaum and North Kanara districts of Karnataka State have been collected. These samples were from sugarcane fields, paddy fields, banana fields, lake water, running water, bark of trees, tunnel walls and rock walls. The soil samples include Alluvial, Black, Red and Lateritic soils.

A total of 128 blue-green algal species have been recorded from different habitats by enrichment cultures. These include heterocystous (75), non-heterocystous (34) and unicellular (19). The different substrates in which these blue-greens were growing have been analysed for pH, electrical conductivity, nitrogen, sodium, organic carbon, phosphate, calcium, magnesium, potassium, iron, zinc, cobalt and copper and correlated to find out the relationship between occurrence of these different groups of blue-green algae and also total productivity status of these different habitats with the above factors. A comparison of blue-green algal flora of different habitats has also been made.

*Calothrix membranacea, Anabaena fertilissima, Nostoc entophytum, Hapalosiphon stuhlmannii, Anabaena oryzae* and *Nostoc rivulare* have been isolated from paddy field soils, sugar-cane field soils and tunnel walls for the present
investigation. The effect of certain Insecticides, Fungicides, Antibiotics, Growth promoters and Mutagenic compounds on growth, optical density, Chlorophyll-a, heterocyst frequency and morpho-
logical variations on above said blue-green algae have been studied. The effect of these nitrogen fixing blue-green algae using them individually and in combinations on the yield and growth of paddy, chilli, cluster beans and tomato crops have also been made.

PHYSICO-CHEMICAL COMPLEXES OF DIFFERENT HABITATS

1. pH: All the samples show either moderately acidic or moderately alkaline pH. In general the pH of samples varies from a minimum of 5.1 in Kittur to a maximum of 9.1 in Castle rock.

2. Electrical conductivity: Electrical conductivity values vary from 23017.8 at M.K. Hubli to 961027.2 at Dharwad.

3. Phosphate: Samples of Munawalli, Belavadi, Londa, Nuggi-
keri and Sogal have high phosphate content with 0.014 to 0.034%. In general most of the samples are poor in phosphate.

4. Organic carbon: The organic carbon content of individual samples varies from a minimum of 0.97% in Ambargatti to 8.04% in Kittur. All other samples were below 2.01%.
5. Sodium: The average values of different places varies from 0.038% at Nuggikeri and Ambargatti to 0.768% at Castle rock. Low range of sodium content (0.011%) is present in the sample of Dharwad.

6. Nitrogen: Nitrogen of the samples vary from a minimum 0.0002% in Castle rock to 0.3400% in Londa. The average values varies from 0.0986 to 0.1008%.

7. Calcium: Calcium content in individual samples varies from 0.0100 to 1.8100%. Samples collected at Ambargatti, Anigol, Munavalli, Nayanagar and Kanavihonnapur have low calcium content with 0.0060 to 0.0180%.

8. Magnesium: In these different samples the only place that showed their absence was Belavadi samples. The maximum magnesium content (0.2200%) was at Castle rock.

9. Potassium: Potassium values for the individual samples vary from 0.0140 to 2.800% and the average values for different places vary from 0.0345% at Belavadi to 0.6000% at Castle rock.

10. Iron: Samples collected at Dharwad, Kanavihonnapur, M.K. Hubli and Castle rock have ranging between 1.078% to 4.313%, while all other samples had a value with moderately low Iron content.
11. **Cobalt**: Cobalt value is highest in samples of Castle rock (0.0032%), while lowest in Kittur (0.0003%).

12. **Copper**: Copper content of the individual samples vary from nil (Londa) to 0.0039% (Kittur).

13. **Zinc**: Zinc value varies from 0.003 to 0.0512% and the average values for different places ranging between 0.0019% at Kittur to 0.0040% at M.K. Hubli.

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**BLUE-GREEN ALGAL FLORA OF THE HABITATS**

1. It is a well established fact that heterocystous BGA predominate over non-heterocystous and unicellular in samples examined. Heterocystous BGA vary from 38% to 79% at Dharwad and Sogal.

2. Average number of heterocystous BGA per sample vary from 3 at Dharwad and Kurgund to 51 at Castle rock. Lower number of heterocystous are also observed in samples of Munavalli, Hosur, Nayanagar and Kanavi-honnnapur. Most other soils have a slight higher number of heterocystous species.

3. Non-heterocystous BGA vary from 0 at Kurgund to 18.70% in Castle rock. In other samples like Belavadi, M.K. Hubli Nayanagar, Sogal and Holehosur have lower number of non-heterocystous species.
4. The relative abundance of unicellular BGA indicate that they are highest in samples of Castle rock (33.64%) while they are lowest in samples of Ambargatti, Kurgund, Holehosur, Sogal and Kanavihonnapur. Significant occurrence of these are seen in samples of Anigol, Kittur, M.K. Hubli, Londa and Nayanagar.

5. Common blue-green algae in the present study are Chroococcus, Gloeothecae, Aphanothecae, Oscillatoriae, Lyngbya, Nostoc, Anabaena, Scytonema, Tolypothrix and Calothrix in different habitats.

6. Microcystis, Gloeocapsa, Aphanocapsa, Cylindrospermum, and Aulosira seem to have a restricted distribution.

BLUE-GREEN ALGAL TAXA IN RELATION TO DIFFERENT FACTORS.

1. Heterocystous population, as usual, are favoured by all the alkaline samples, that are rich in phosphate, poor in nitrogen, potassium and sodium.

2. Lower values of phosphate support a higher average of non-heterocystous algae; while 1.54 to 1.89% of organic carbon seem to favour the growth of non-heterocystous population.

3. In the present study there is no clear correlation between cobalt and zinc with blue-green algal population.
4. Leteritic soils have rich blue-green algal flora (5.27 species) and Red and Black soils possess lower number of algae (3.86 species).

5. Blue-green algae dominate in soils where paddy, sugarcane and banana are grown compared to other habitats.

6. Soils manured with only chemical fertilizers and only cow dung have higher average of blue-green algae.

STUDIES ON THE PHYSIOLOGY OF SOME BLUE-GREEN ALGAE

1. Insecticides, Rogar and Dimecron enhance the growth of Calothrix membranacea at particular concentrations (like 0.2 and 0.3 ppm), the other concentrations have deleterious effect.

2. In Anabaena fertilissima and Hapalosiphon stuhlmannii the vegetative growth was inhibited by Diethyl sulphate at all time doses more so at 10 minutes dose and above.

3. Increasing time doses (5, 10 and 20 min) Ethyl Methane-sulfonate (EMS) on Anabaena oryzae and Nostoc entophytum a decrease in Chl-a, fresh weight and heterocyst frequency was seen.
4. 3-Indole butyric acid at 5 to 15 ppm concentrations enhance the growth and heterocyst frequency in *Nostoc rivilare* and *Hapalosiphon stuhlmannii*.

5. The growth of *Nostoc rivilare* and *Hapalosiphon stuhlmannii* is also stimulated by growth promoter Vipul. Increasing Vipul concentrations (5 to 15 ppm) enhance the heterocyst number and total nitrogen fixation.

6. Individual application of Hexathir and Blitox (Fungicides) on the fresh weight, Chl-a and heterocyst of *Calothrix membranacea* was antagonistic due to increasing the concentrations from 5 to 50 ppm.

7. Interaction of these fungicides on *Calothrix membranacea* had synergistic effect on fresh weight at lower concentrations (5 and 15 ppm), whereas it has antagonistic effect on Chl-a at all concentrations (except at 25 ppm on 14th and 5 ppm on 21st day) and also on the heterocyst frequency.

8. The combined effect of Gramicidin and Streptomycin sulfonate (antibiotics) on the fresh weight of *Anabaena fertilissima* was synergistic on all the days (except at 25 ppm on 14th day and 10 and 15 ppm on 28th day), on Chl-a it had antagonistic effect up to 14th day and on 21st day onwards it had synergistic effect at all concentrations and also on heterocyst frequency.
9. The Growth promoter Gibberllic acid has stimulatory effect on the fresh weight, Chl-a and heterocyst frequency on *Nostoc entophytum* on all the days. Whereas the effect of Kinetin on this alga showed decreased fresh weight and Chl-a upto 14th day and increased at all the concentrations on 21st day onwards.

10. The interaction of Endosulfan and Methylparathion had synergistic effect on fresh weight on *Hapalosiphon stuhlmannii* on all the days so also on heterocyst frequency, there was antagonistic effect on Chl-a content on all the days at all concentrations.

**ALGALIZATION EXPERIMENTS**

1. In combination *Nostoc entophytum* + *Nostoc rivulare* + *Anabaena oryzae* increased the growth and yield of 'Jaya' paddy as compared to individual treatments.

2. Algalization experiments on vegetable crops like cluster beans, tomato and chilli, treated with four different blue-green algae showed an increase in the growth and yield of these plants.

3. The height of the plant, breadth and length of leaf of chilli plant was induced in combined treatment of *Calothrix membranacea* + *Anabaena fertilissima* + *Nostoc entophytum* + *Hapalosiphon stuhlmannii*. 
4. The growth is more in tomato and cluster beans with the increase in the algal numbers as compared to control.