

INTRODUCTION

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Blue green algae the first prokaryotic autotrophic group of thallophytes initiated the process of oxygenic photosynthesis, enriched the early earth with oxygen and removed CO₂ from the atmosphere. They transformed the reduced atmosphere into an oxidized one and caused adaptation of organisms with nearly extinct, oxygen-intolerant cells adjusting to aerobic life. Blue green algae still perform the most abundant photosynthesis on earth and provide global amount of biomass. Their products serve as sources for primary food production and have a future as biofuel.

The blue green algae provide energy to their hosts. They evolved into algae and higher plants. It has also been assumed that they were evolutionary source of chloroplast. It is also assumed that chloroplast of algae and land plants were previously blue green algal cells which via endosymbiotic evolution penetrated into heterotrophic host cells and finally converted into green organelle. The fossil record for blue green algae dates back to billions of years ago (the Stromatolites are composed of blue green algal cellular stratified layer which have been dated around to 2×10^9 years ago).

Blue green algae occupy anomalous position in biological world. They are treated by Botanists as a division or class of algae because they are photo-autotrophs that use water as electron donor and contain two pigments, chlorophyll a and β carotene that are hallmarks of plant photosynthesis. However, it has long been recognized that in cellular and organismal respect they resemble the bacteria. This was noted by Cohn F. long back in 1853 who subsequently proposed to place two groups in common division. The problem of defining in positive terms the properties that are shared by bacteria and blue green algae remained intractable for many decades (Copeland H. F. 1938, Pringsheim, E. G. 1949, Stanier R. Y. and C. B. Van Niel 1941, and Van Niel, C. B. 1953) and was solved only when the structure of cell in these two groups studied at electron microscope level. Electron microscopic observations together with analytical data on cell wall composition and ribosomal structure, have now recommended common denominations which are fundamental to bacteria and blue green algae. These are only organisms with cells of the prokaryotic type (Allosopp A. 1969, Carr N. G. and I. W. Craig 1970, Echlin P. and I. Morris 1965, Murray R. G. E. 1962, Stanier et al 1962)

According to some biologists (Stanier R. Y. 1971) "The designation blue green algae is therefore misleading although this common name is now so firmly established that its use can probably never be eradicated." As Stanier has aptly quoted "In view of their cellular structure blue green algae can now be recognized as major group of bacteria, distinguished from other cellular bacteria by the nature of their pigment system and by their performance of aerobic photosynthesis". Their properties are still very poorly known. Much of the available information about them lies in the domain of natural history, not biology.

As these are ubiquitous in distribution, there is no any place on the earth, where life is possible and blue green algae do not occur. These are the sole organisms which have developed the ability to grow where life is possible. These are such organisms which not only grow but help to ameliorate the growing surrounding. This is best seen in the soil where blue green algae grow as initial colonizers and add number of compounds which help to enrich the soil.

Taking into account the occurrence of the blue green algae or cyanobacteria at numerous places study of their distribution has become a point of discussion by many phycologists as well as bacteriologists. Their association with other organisms and utility in various fields has also attracted biologists for the research work. The blue green algal soil flora as a matter of fact has attracted attention of number of microbiologists, agronomists as well as phycologists world over. Association of blue green algae with other crops either commercial or food has also been investigated by number of workers in this field. The nitrogen fixing ability of these organisms has isolated them from the rest of microbes and has given a special status in research priorities. The increasing demand for nitrogenous fertilizers in agriculture during the past decades has become an international issue in agriculture. Day by day the production cost of these fertilizers is reaching at its peak. Though use of nitrogenous fertilizers has added dimensions to green revolution the other side of the story is not sufficiently promising. The excessive use of such fertilizers is not only detrimental to crops but also to the soil health. The soils are becoming usar as well as sterile. Scientists, since long time have initiated attempt to face these problems. The possible solution to this problem is to use alternative sources of fertilizers which will provide nutritive elements as well as improve the health of soil.

When such discussions are held in this regard the priority goes to nitrogen fixing organisms in the biological world. Only probable candidates there remain are

some bacteria and of course the Blue – Green Algae or Cyanobacteria! Hence most of the researches in biofertilizer revolve around blue green algae. The main reason behind selection of this problem lies in this unique point. Association of blue green algae with paddy field is not new. Number of workers world over have probed in this problem. Indian paddy field soils from various regions have also been investigated by many researchers. Initially the attempts were to investigate the floristic accounts. After words the nitrogen fixing ability was given priority and now the trend is to characterize these organisms for their biochemical and molecular aspects.

Western Maharashtra comprises Sahyadri ranges. Due to hilly contours the agricultural practices are restricted mainly to crops like paddy, rye, oats etc. Review of literature on this topic concerned with western Maharashtra region however, revealed insignificant information. Besides few reports (Sardeshpande and Goyal 1981, Ghadge and Karande 2008 and Karande 2009) not much information on blue green algal flora is known to us. In order to update the knowledge of these organisms from paddy field soils from this region present problem was selected.