

INTRODUCTION

The algal members belonging to class chlorophyceae are very widespread occurring in all types of habitat, marine, fresh water, soil and subaerial. Only about 10% are marine and are mainly represented by Ulvaceae, Siphonocladales, Dasycladales and Siphonales. Many of the marine species have a definite geographical distribution whereas most of the fresh water and soil algae are cosmopolitan. A few genera, e.g. *Entocladia* (*Endoderma*), *Chlorochytrium*, *Cephaleuros* Phyllosiphon, contain parasitic species, whilst species of other genera participate in symbiotic association, e.g. *Certeria*, *Zoochlorella*, *Trebouxia*.

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The genus *Cephaleuros* belong to the sub-aerial family Trentepohliaceae of Chaetophorales (Fritsch, 1965), a family which also includes the genera *Trentepohlia*, *Phycopeltis*, *Stomatochrooa* and *Physolinum* (Printz 1939, 1964). The genus *Cephaleuros* was first established by Kunze (1927). Karsten (1891) first compiled the work on taxonomy of this genus and recognized six species. Later Printz revised and recognized 14 species (Printz, 1964). The *Cephaleuros* alga has a wide distribution in tropical as well as sub-tropical regions. The geographic distribution of the genus host range and economic importance have been summarized in the review article of Joubert and Rijkenberg (1971).

In India *Cephaleuros* was reported by Cunningham (1879) as mycoidea parasitic on tea plantation from Assam. The same author (1897) re-recognised the same alga as *Cephaleuros virescens* Kunze in a paper "on the bark blight by *Cephaleuros virescens*". The disease caused by this alga

on tea plant is commonly known as 'real rust of tea' which is more prevalent ^{red} in North-East India and Assam (Tunstall, 1928, 1942).

The exact climatic condition for *Cephaleuros* has not been ascertained so far, but [?]high temperature and humidity seem to be the ideal condition for its growth and reproduction (Joubert and Rijkenberg, 1971).

Many parasitic forms of algae have been reported to grow on diverse hosts in all parts of the world. A chlorophycean member, *Cephaleuros* belonging to order chaetophorales of family Trentepohliaceae grow as epiphyte or parasite on the leaves of various phanerogams. The alga grow on leaves, fruit or young stem (Marlatt and Alfieri, 1981) and so often orange red in colour. On the leaves it forms velvet-like circular spot. Thus, *Cephaleuros* can often be easily observed and recognized with the naked eye.

The obligate epiphytism and subcuticular habitat of *Cephaleuros* may indicate physiological dependence on the host and raises the question, "is *Cephaleuros* a parasite?" Although necrosis of the subtending host tissue can occur in response to the presence of *Cephaleuros* (Chapman and Good, 1976), some phycologists have also stated that in most instances there was no host response. Furthermore, they indicated that those species of *Cephaleuros* that grow into the leaf tissue do so only because other infections (e.g. fungal) have disrupted the tissue. In the late 1800s and early 1900s, however, *Cephaleuros* was specifically studied because of its destructive effects as a pathogen of coffee and tea plants (Mann and Hutchinson, 1907) and has been studied also because of its pathogenicity (Wellman, 1972). Thus it is appropriate to expand the ideas of some phycologists who considered the destructive infections by *Cephaleuros* to be

merely opportunistic growth facilitated by poor host nutrition or previous infection by other organisms. Very little is known about the exact mode of infection by *Cephaleuros*, but it is likely that a broken or disrupted host cuticle is a prerequisite to establishment of the thallus. Despite some physiological aspects there is no clear evidence of a nutritional dependence on the host. Moreover, it has no host specificity and appears to grow on diverse hosts. With this view in mind it is thought worthwhile to undertake this study. This study includes, survey of host plants for the occurrence of parasitic alga in Kolhapur region, leaf anatomical study to observe epiphytism/parasitism, inorganic constituents to know the nutrient status, organic constituents, such as photosynthetic pigments, polyphenol and sugar content. An effort has also been made to culture the alga on artificial medium and on leaf decoction of healthy host to ascertain production of zoosporangium. Coupled with it the suppression of algal growth in culture by using CuSO_4 has also been studied. Similarly, unidimensional paper chromatography of amino acids, organic acids and polyphenols has been carried out. The enzymes viz. polyphenol oxidase and phenylalanine ammonia-lyase have also been assayed.

The dissertation has been divided into - Introduction, Review of Literature, Materials and Methods, Results and Discussion and Summary and conclusions. The extensive literature survey cited at the end of the dissertation has been carried out by referring the recent journals, review articles, books and monographs etc.