

IV SUMMARY AND CONCLUSIONS

Many parasitic forms of algae have been reported to infect diverse hosts in all parts of the world. A chlorophycean member, *Cephaleuros parasiticus* Karst, (Synonym : *Cephaleuros virescens* Kunze and *C. mycoidea* Karst.) belonging to order Chaetophorales of family Trentepohliaceae grow as epiphyte or parasite on the leaves of various phanerogams, and causes severe damage to leaves and fruits of many horticultural crops. Foliar spots vary from mere specks to big patches and they are numerous or few, crowded or scattered. The alga extends at first between the cuticle and epidermis and then penetrate the epidermal cells. Penetration of the leaf blade is complete and affected cells eventually die. Many dark brown blemishes are produced on the fruits also. *Cephaleuros* is a major causal organism of red rust of tea and cause serious economic loss. The obligate epiphytism and sub-cuticular habitat of *Cephaleuros* may indicate a physiological dependence on the host. Moreover, it has no host specificity and appears to grow on diverse hosts.

Looking to the damage caused by this alga to the horticultural plants, the work done on it is meager. Physiology of the plants infected by fungus, by virus and by bacteria has been worked out in detail. However, it seems that no or little work has been done on the physiology of alga infected plants.

With this view in mind, it is thought worthwhile to undertake physiological studies of alga infected host plants. The study include (a) survey of host plants for the occurrence of parasitic alga in Kolhapur region, (b) leaf anatomy, (c) stomatal regulation, (d) nutrient status, (e) organic constituents such as chlorophylls, carotenoid sugars, nitrogen,

polyphenols (f) composition of amino acids, organic acids and polyphenols (g) enzyme activity of polyphenol oxidase and phenylalanine ammonia lyase and (h) cultural aspects etc.

The methodology adopted for studying the above parameters is of standard nature and is scrupulously followed.

All the aspects have been studied and discussed in the light of recent and up-to-date literature. The dissertation has been splitted into three main chapters 1) Review of literature 2) Materials and methods and 3) Results and discussion. The extensive literature survey carried out is listed at the end of dissertation in the bibliography.

The conclusions based on the findings are listed below.

Conclusions :

1. Extensive survey for the occurrence of parasitic alga *Cephaleuros parasiticus* on different host carried out in Kolhapur and adjoining areas exhibit more than a dozen different host plants.
2. Leaf anatomical study indicate that the alga traverse the rhizoidal filament into host cuticle either for nutrient absorption or use it as a support.
3. Parasitic algae depends upon the host for water and minerals and the exhaustive utilization of water resulted in increasing the dry weight of alga infected leaf tissue.
4. Algal infection to the host tissue causes obstacle in stomatal regulation by reducing transpiration rate and enhancing diffusive resistance for water.

5. The increase in diffusive resistance for CO₂ due to algal infection indicates reduction in photoassimilation rate of CO₂. This effect is more in *Mangifera indica*.
6. Algal infection causes reduction in chlorophyll a/b ratio and the decrease or increase in a/b ratio is mainly due to change in the level of chlorophyll b.
7. Increase in carotenoid content due to algal infection may protect the photosynthetic apparatus from this biotic stress.
8. The parasitic alga *Cephaleuros* do not depend upon the host for its nitrogen nutrition or it may accumulate the nitrogen in algal thallus by absorbing through host tissue.
9. Algal infection enhances the level of polyphenol content, but whether the increased level of polyphenol in the alga infected leaf tissue develop disease resistance or not? is a matter of speculation.
10. Non reducing, and total sugars and starch and total carbohydrates are found more in alga infected leaf tissue of *Mangifera indica*, *Michelia champaca* and *Pothos scandens*. This indicates that parasitic alga contribute to some extent the enhancement of carbohydrate level in host tissue.
11. Increase or decrease in the mineral content of alga infected leaf tissue cannot be attributed only to the nutrition of the algae.
12. Among the three host plants healthy leaf tissue of *Pothos scandens* exhibit higher activity of polyphenol oxidase, followed by *Michelia champaca* and least in *Mangifera indica*, but the algal infection do not enhance the activity of this enzyme.

13. Phenylalanine ammonia lyase activity do not contribute towards polyphenol biosynthesis owing to algal infection as there is only slight stimulation in the activity in alga infected leaf tissue over healthy.
14. The amino acids, organic acids and phenolic compounds in all the host plants infected with green alga *Cephaleuros parasiticus* showed their higher concentration.
15. The depletion of amino acid due to algal infection can be correlated with utilization of these amino acids by *Cephaleuros parasiticus*.
16. Cultural study on Bold-Basal medium exhibit good growth of alga when it is kept along with host tissue, while it shows ill growth when cultured without host.
17. Copper sulphate (CuSO_4) appears to be inhibitory for algal growth.

Further studies by using radio tracer technique, and electron microscopy will certainly give complete idea about host-parasite relationship and may help in establishing the physiological dependence of the alga on host tissue. Similarly cultural study of alga on artificial medium with and without host needs to be carried out in detail to see the development of zoosporangium, which are normally do not develop in culture but are found when alga grow on host plant in natural condition. The control of this alga is equally important as it damages the horticultural plants and causes economic loss to tea plantation. The study in this direction will solve the major problem of this parasitic alga which is at present exerting a lurking danger on horticultural plants – which is in progress in this department.