CHAPTER 17

ENVIRONMENTAL STUDIES

Doctoral Theses

173. ANIKET KUMAR
Diversity and distribution of Diatoms of High Altitude Himalayan Lakes and Streams.
Supervisor : Prof. Maharaj K. Pandit
Th 22380

Contents

1. Introduction 2. Materials and methods 3. Results. 4. Discussion 5. Summary. References. Annexures.

174. BAJPAI (Devika)
Impacts of Ageratina Adenophora, a Neotropical invader, on Aboveground Patterns and Belowground Processes.
Supervisor : Prof. Inderjit Singh
Th 22378

Contents

1. Introduction 2. Impact of A. adenophora on plant diversity 3. Impact of A. adenophora on soil properties 4. Plant-soil feedbacks 5. Impact of A. adenophora soil and its foliar leachate on soil properties and plant growth 6. Impact of Ageratina adenophora litter on its invasion success 7. Other projects. Summary. Abstract. References. List of publications.

175. SHABNAM NISHA
Ecophysiological Adaptations in Leaves of Potamogeton Nodosus to Counter Photodamage and Metal Toxicity.
Supervisor : Prof. P. Pardha Saradhi
Th 22379

Abstract

Evolution is an incessant process pivotal for survival of living systems under changing environmental conditions. Owing to negative impacts on health of living beings (including humans) and ecosystems, researchers across the globe are elucidating strategies to counter heavy metal pollution, whose levels rose at alarming rate due to anthropogenic activities. In spite of being more evolved than homophyllous, least attention has been paid toward understanding potential utility of heterophyllous plant species for remediating sites contaminated with heavy metals. Therefore, present investigations were initiated with an aim to understand variations in adaptive strategies prevailing in floating and submerged leaves of Potamogeton nodosus (which comprise of floating and submerged leaves) to (i) harness light energy and build carbon skeletons; and (ii) withstand high light and heavy metal stress through physiological, biochemical

and ultrastructural investigations. Present investigations carried with heterophyllous Potamogeton nodosus revealed for the first time that (i) floating leaves possess superior photosynthetic efficiency than submerged leaves in terms of both light reactions and dark reactions; (ii) chloroplast-mitochondrial interactions play a pivotal role in protecting photosynthetic machinery of floating leaves against high light; (iii) mitochondria of floating leaves possess cyanide resistant alternative oxidase pathway besides cyanide sensitive pathway, while submerged leaves possess only later pathway; (iv) floating leaves possess superior antioxidant system compared to submerged leaves, which enables former to withstand high light stress more effectively compared to latter; (v) both floating and submerged leaves possess potential to generate Au and Ag nanoparticles, although floating leaves possess higher potential than submerged leaves; (vi) floating leaves besides promoting generation of Au nanoparticles also possess potential to float Au^0 on surface of incubation medium; (vii) floating leaves possess superior potential to withstand Au^{3+} and Ag^+ induced stress compared to submerged leaves; (viii) light mediated photosynthetic electron transport promotes generation of Au and Ag nanoparticles.

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