

MCB PLANT BIOLOGY SEMINAR SERIES F2009

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“Climatic shifts and symbioses: implications for the Blue-listed whitebark pine and mycoheterotrophic plants of western North America”

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ABSTRACT:

Most plants worldwide use chlorophyll to convert the sun's energy for growth and reproduction. There exist, however, plants that have gained independence (partial or full) from the sun by obtaining carbohydrates indirectly from other photosynthetic plants via shared symbiotic fungi. A question that arises is whether plants exhibiting this apparent “carbon budget deficit” may also be approaching an evolutionary dead-end. Two groups of plant-fungal interactions will be discussed: monotropoid (involved in mycoheterotrophic interactions) and pyroloid (involved in mixotrophic interactions). The presentation examines recent information on the biology of these plants, focusing on important morphological and cellular features that permit the transfer of metabolites from the donor (autotrophic) plant to the receiving (non-photosynthetic) plant. The possible ecological consequences of specialization in these tripartite continuums, with respect to conservation and survival, will be discussed.

Part two of this presentation will shift to focus on whitebark pine (WBP, *Pinus albicaulis*), a high elevation conifer currently Blue-listed in British Columbia. This 5-needle pine is limited to treeline habitats in western North America and is vital to slope stabilization, plant succession and watershed protection. WBP is experiencing dramatic declines due to many factors including the white pine blister rust, mountain pine beetle, and climate warming. Although autotrophic and capable of photosynthesis, WBP also forms obligate root-fungal symbiosis (ectomycorrhizas) for mineral and water acquisition. With respect to its conservation and survival, this species may need to expand naturally (or by intervention) into higher alpine areas, or north in latitude beyond its present range. Successful relocation should depend on both suitable soil microbial processes as well as abiotic factors. Some of the challenges encountered working with this species will be described.

Contact Annette Nassuth (anassuth@uoguelph.ca) should you wish to meet with the seminar speaker