

USE OF NATIVE MYCORRHIZAL FUNGI TO ENHANCE ESTABLISHMENT OF QUAKING ASPEN ON SMELTER-IMPACTED SITES (PRELIMINARY REPORT)¹

Christopher Mahony² and Cathy L. Cripps

Abstract. Aspen (*Populus tremuloides*) is an important colonizing tree on disturbed landscapes, and is declining in the intermountain west (USA). It is an early successional species in many habitats, and can be particularly important on fire and smelter-impacted sites in the region. In Montana, areas near Butte and Anaconda support little or no vegetation because of the impacts of (copper) mining in the last century. Negative impacts include heavy metal contamination, low pH, destruction of soil structure and ability to hold water, poor CEC ratios, and lack of organic matter. Aspen stands occur naturally in and around these areas, and rely heavily on mycorrhizal fungi to moderate below ground conditions. These fungi increase nutrient uptake (particularly phosphorus) in plants provide protection from drought, and some exclude heavy metals from plant tissue, all of which allow plants to establish and survive on harsh sites. Aspen associates with over 60 species of mycorrhizal fungi, but only a subset occur on acidic, low nutrient soils. Certain native mycorrhizal fungi from Butte-Anaconda aspen stands increased the growth of aspen 250-430% under laboratory conditions. These, and additional species collected under aspen from this area, are being used to develop soil- and liquid-based inocula which will be utilized to infect aspen seedlings in a greenhouse and plot study. Objectives include 1) development of an efficient method for inoculation and mycorrhization of aspen seedlings with native fungi 2) assessment of effects of various types of inocula on aspen seedlings in pot studies (in soils with high heavy metal content, low moisture conditions, and/or low fertility), and 3) evaluation of the use of mycorrhizal fungi for enhancing the establishment of aspen seedlings outplanted on smelter-impacted sites. Once established, aspen's clonal nature could be an advantage in revegetating large tracts of land. A progress report will be given.

Key words: aspen, mycorrhizal fungi, *Populus*, smelter sites, native species

¹Paper was presented at the 2003 National Meeting of the American Society of Mining and Reclamation and the 9th Billings Land Reclamation Symposium, Billings MT, June 3-6, 2003. Published by ASMR, 3134 Montavesta Rd., Lexington, KY 40502.

²Christopher Mahoney, graduate student, Plant Science and Plant Pathology Dept., AgBioscience Building, Montana State University, Bozeman, MT 59717 Tele: 406-586-1239 Fax: 406-994-7600 Email: dirtsmoga@hotmail.com. Cathy L. Cripps, Ph.D. is a Mycologist at Montana State University, Bozeman, MT, 59717.