ADVENTITIOUS ROOTS: A KEY TO SUCCESSFUL ARTIFICIAL REGENERATION

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Adventitious roots form on seedlings grown in nurseries and after outplanting. By identifying these roots, root development in seedlings can be better understood. A knowledge of root morphology is essential in the extraction of bareroot or container seedlings during the study of the growth, stability and root development of jack pine and black spruce in plantations. Roots that are pruned mechanically, chemically or by exposure to air produce adventitious roots, known also as replacement roots. These roots, which are important part of the plunging or vertical root system, are much more developed in the jack pine (*Pinus banksiana* Lamb.) than in the black spruce (*Picea mariana* [Mill.]B.S.P.). In contrast with the jack pine, planting black spruce deep in the ground promotes the formation of adventitious roots on the stem above the root ball in the case of container seedlings and above the root collar in the case of bareroot seedings. This increases the number of roots that grow horizontally, thereby improving the radial spread of the root system.

Applications:

To increase the number of roots growing horizontally and thus improve the radial spread of the root system of black spruce, it is advisable to plant seedlings deeper in the ground than usual. This promotes the formation of adventitious roots above the root ball of container seedlings and above the root collar of bareroot seedlings. This method should not be used with jack pine.

It is advisable to air or chemically prune container seedlings and mechanically prune bareroot seedlings. This induces the formation of adventitious or replacement roots which are an important part of the plunging or vertical root system of jack pine but not of black spruce. Air pruning of container seedlings prevents roots from growing through the drainage hole or permeable walls of the container when grown in a greenhouse or nursery. Mechanical pruning of bareroot seedlings involves using and instrument to cut not only the taproot but also the overdeveloped lateral roots of the root system and promote the development of replacement roots.

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