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Optimum seeding depth for seedling emergence and root growth in North American Ginseng

What is this research about?

North American Ginseng (scientific name *Panax quinquefolius*) is a slow-growing, perennial herb that requires shaded growing conditions. In North America, where it is grown commercially for its highly valued root, plant propagation is by seed. Seeding depth is known to impact seedling growth and health. Deep seed sowing may increase the time it takes for seedlings to emerge and may put seedlings at higher risk for plant diseases. Shallow seed sowing, however, can result in low-quality "spider" roots. Little research has examined the effects of ginseng seeding depth on measures of plant performance, including seedling germination, growth, and development.

Keywords:

North American Ginseng, *Panax quinquefolius*, seeding depth, seedling emergence, root weight

What did the researchers do?

In the greenhouse, ginseng was seeded in several pot and container types at depths of 10, 40, 70, and 100 mm, and then in a second experiment at 20, 40, 60, and 80 mm. In the field, ginseng was planted at various depths between 10 and 100 mm according to normal commercial methods. Seedling emergence was measured every 5 to 10 days, and then seedlings were harvested after 100 days. Stem length, leaf area, and plant dry weight (separated into root, stem, and leaves) was measured for each seedling sample. Based on these measurements, a mathematical model was created to determine the optimum seeding depth for both seedling emergence and seedling root yield.

What you need to know:

In North American Ginseng, seeding depth has significant effects on seedling emergence, seedling growth, and root weight. A mathematical model using data from these experiments found an optimum seeding depth of approximately 30 mm.

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What did the researchers find?

Seedlings emerged rapidly in the first 20 days in the greenhouse and the first 30 days in the field. Optimal time to emergence occurred when the seeding depth was 40 mm, while maximum percent seedling emergence was calculated to occur at 29.9 mm. Maximum root yield was achieved at intermediate depths, and calculated to be 30.6 mm (corresponding to a dry root weight of 120.1 mg). As seeding depth increased, the plants put more energy into the growth of the leaves and stem, and less into the growth of the roots.

How can you use this research?

Ginseng producers can use this research to determine the optimum seeding depth in terms of seedling emergence and root weight.

Plant scientists can further this research by using similar methods to determine the optimum seeding depth for other agriculturally important plants.

About the University of Guelph researchers:

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