Rocky Mountain Juniper Production at the Colorado State Forest Service

Randy D. Moench [1]

Moench, R. 1995. Rocky Mountain Juniper Production at the Colorado State Forest Service. In: Landis, T.D.; Cregg, B., tech. coords. National Proceedings, Forest and Conservation Nursery Associations. Gen. Tech. Rep. PNW-GTR-365. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 52-53. Available at: http://www.fcnanet.org/proceedings/1995/moench.pdf

Abstract-Seed dormancy limits Rocky Mountain juniper production. The Colorado State Forest Service has found summer sowing and "natural stratification" to be beneficial. Seed stratified in this way follows a "natural" soil temperature regime over a seven month period. Seventy percent or better germination is achieved using this method from Great Plains and Northern Colorado seed sources.

INTRODUCTION

Rocky Mountain Juniper (Juniperus scopulorum Sarg.) is Colorado's most important evergreen for conservation plantings. Rarely do Great Plains' nurseries produce adequate numbers to meet customer demand. Problems with consistent production of Rocky Mountain juniper include: overcoming seed dormancy, uniform and predictable germination, and frost damage to new seedbeds.

Production of juniper at the Colorado State Forest Service Nursery consists of 2-0 bareroot production, 2-1 container transplants and greenhouse grown stock. The addition of greenhouse production is new. The success is due to using "natural stratification"- following the temperature range achieved with a summer sow date used for bareroot stock.

BAREROOT PRODUCTION

2-0 bareroot production method for conifers is not unique. An unusual factor at Colorado State is the summer sowing date. We sow bareroot seedbeds the last week of July. Soil temperatures are around 70'F, and remain quite warm until late September (Figure 1).

Goal 1.6E herbicide is used for pre-emergent weed control. We apply mulch to the seedbeds. In the last few years a "frost fabric" has been used instead of our traditional straw mulch (Moench, 1994). This fabric raises the soil surface temperatures by 5'F, increasing frost protection for newly emergent seedlings.

Another unique factor in our bareroot production is winter irrigation. Colorado's arid and windy climate frequently requires that we irrigate established crops and new seedbeds in the dead of winter, without this irrigation, seedlings can suffer from extreme moisture stress during Chinook wind events. Seedlings emerge in April. Production follows common bareroot nursery practice from then on.

CONTAINER PRODUCTION

Traditional container production of Rocky Mountain juniper at this nursery is transplanting 2-

0 seedlings into a tarpaper container for one growing season. Container seedlings are preferred in the Rocky Mountain region for its improved survival over bareroot.

Greenhouse production was always limited due to poor germination. That all changed after Allen Hackleman of our staff suggested a more "natural" approach. Seed for greenhouse production is stratified in a way duplicating our practice of summer sowing. We bag and bury seed lots in a newly sown summer juniper seedbed. We then extract the seed in February for greenhouse sowing. The seed undergoes the same soil temperature regime as the bareroot (Figure 1).

Of the extracted seed, 70% of the seedcoats are cracked, and the tip of the radical is evident. Upon sowing, germination is rapid and uniform.

The growing regime is the same one we use for all of our conifer production. With the February cycle, the seedlings are moved outdoors in late July for finishing. The Rocky Mountain juniper continues to grow, particularly during the cool months of September and October.

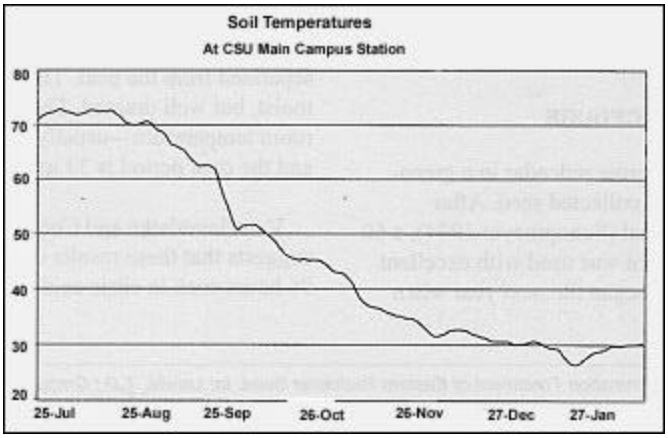

Figure 1. Four inch depth soil temperatures recorded at the Colorado State University weather station. This data should approximate temperatures experienced in summer sown seedbeds.

CONCLUSION

A long "natural stratification" period works best in overcoming juniper seed dormancy in Colorado. The warm soil temperatures of summer may be a critical factor. This procedure has allowed the nursery to begin efficient and consistent greenhouse production of Rocky Mountain juniper.

Seed testing before any treatment is essential. We use tetrazoliurn staining to show viability.

Finally, using frost fabric mulch can reduce the damaging effects of spring frost. Application and removal are much more efficient than hay mulches.

[1] *Colorado State Forest Service Nursery, Colorado State University, Foothills Campus, Bldg. 1060, Fort Collins, CO 80523; Tel: 9701491-8429; Fax: 9701491-8645.*

LITERATURE CITED

Moench, R.D. 1994. Use of Frost Fabric as a Seedbed Mulch and Frost Protection Method. IN: Landis, T.D.,Dumroese, R.K., tech. Coords. Nation Proceedings, Forest and Conservation Nursery Associations. Gen. Tech. Rep. RM-257. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station.