

Fertilizer Trials Update:

Abstract:

Seedlings of jack pine (*Pinus banksiana*), white spruce (*Picea glauca*) and black spruce (*Picea mariana*) were grown using three types of fertilizers (slow-release, water soluble and organic). Seedlings grown in the organic fertilizer had significantly greater root collar diameter, and shoot and root dry weights compared to seedlings grown in the chemical based slow-release and water soluble fertilizers. The levels of nitrogen, phosphorous, calcium, magnesium, zinc, boron, iron and molybdenum were significantly greater in the plant tissue of jack pine, white spruce, and black spruce seedlings when grown in organic fertilizer.

Materials and Methods

Three types of fertilizers were used: chemical slow-release (N:P:K, 17:6:10), chemical water soluble (N:P:K, 20:20,20), and organic fertilizer (N:P:K, 6:2:4). Slow-release fertilizer was mixed with rooting substrate at a rate of 300 grams per 0.028 m³. Organic fertilizer was mixed with the same rooting substrate at a rate of 500 grams per 0.028 m³. For the water-soluble fertilizer, 5 grams was mixed with one liter of water and watered onto the seedlings once a week.

Seeds of jack pine, black spruce, and white spruce were surface sterilized with 30% hydrogen peroxide for 30 minutes, washed ten times with sterile distilled water, and sown in 5 inch plastic pots containing a sterile mixture of peat moss and vermiculite (1:3 vol:vol). After sowing the seeds, surfaces of the pots were covered with sterile sand plus gravel. The pots were kept in the growth chamber at 16 hours daylight (25°C day: 20°C night). After germination, seedlings were thinned to one per pot. There were ten replicates per treatment.

Pots were arranged in the growth chamber in a completely randomized factorial design. Seedlings were watered twice weekly. For the water-soluble fertilizer treatment, seedlings were fertilized once weekly. Eighteen weeks later, seedlings were harvested and evaluated.

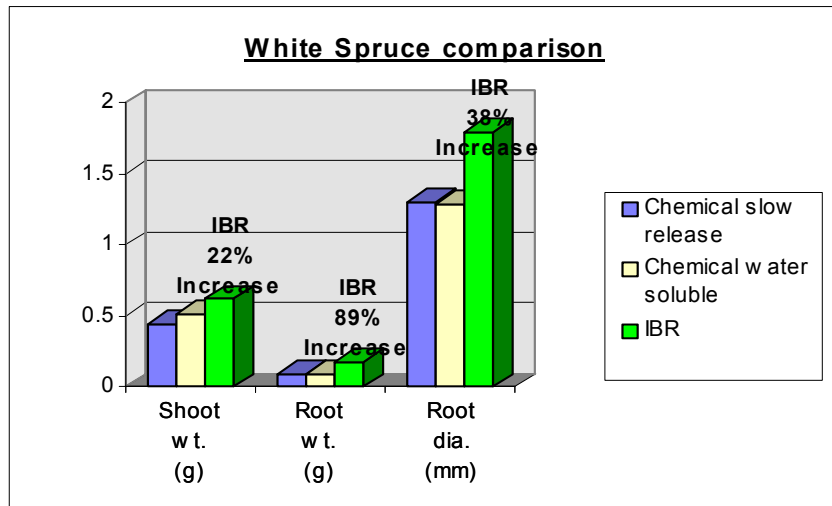
Shoot and root length, root collar diameter, shoot and root dry weights, and shoot:root ratio were determined. The amount of nitrogen, phosphorus, potassium, sulfur, calcium, magnesium, sodium, zinc, manganese, iron, boron, molybdenum, and copper in the plant tissues (shoots and roots) was also determined (Kalra 1998).

Data were subjected to analysis of variance. The individual means were compared using Scheffe's test for multiple comparison using SAS software (SAS Institute Inc. 1990).

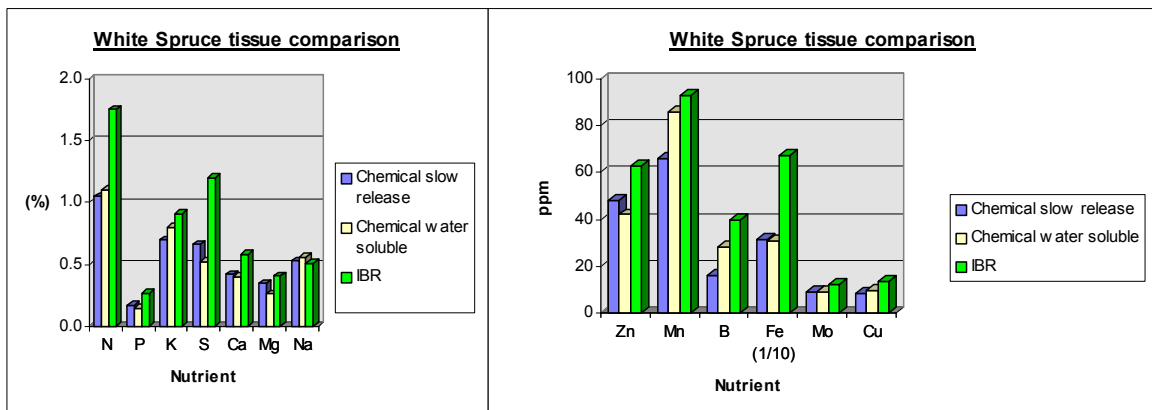
Effect of chemical fertilizers vs. Organic fertilizer on growth and nutrient uptake of white spruce seedlings

In this study, white spruce seedlings were grown under three fertilizer regimes: two chemical fertilizers (slow-release and water soluble) and IBR organic fertilizer. The IBR fertilizer was applied at a nitrogen application rate that was 60% of the slow release fertilizer. The seedlings were grown for 18 weeks before being harvested and evaluated.

As shown below, IBR fertilizer produced white spruce seedlings with a greater shoot weight, root weight, and root diameter.



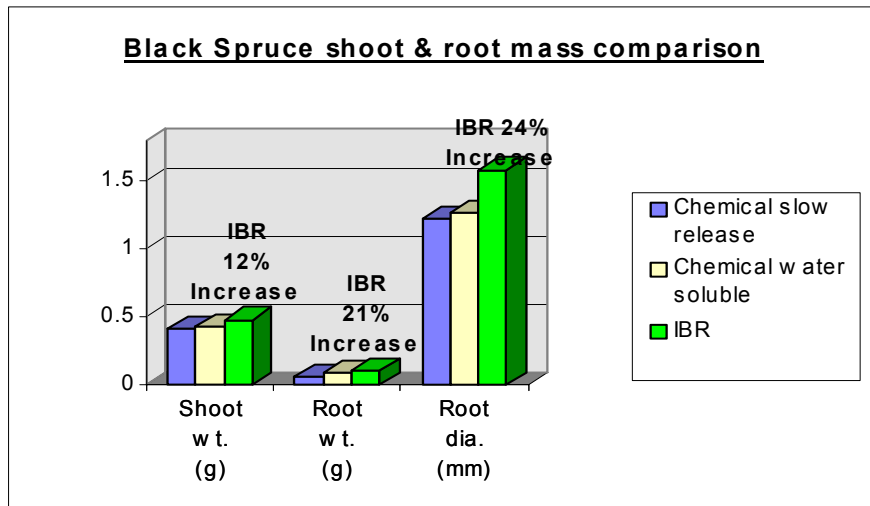
As well, the uptake of both macro- and micro-nutrients were significantly increased when using IBR fertilizer.



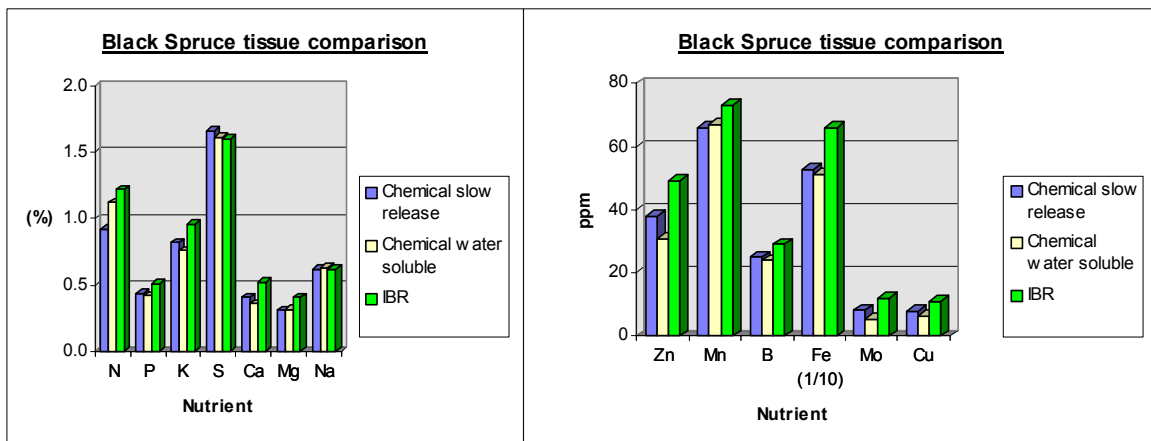
Effect of chemical fertilizers vs. Organic fertilizer on growth and nutrient uptake of black spruce seedlings

In this study, black spruce seedlings were grown under three fertilizer regimes: two chemical fertilizers (slow-release and water soluble) and IBR organic fertilizer. The IBR fertilizer was applied at a nitrogen application rate that was 60% of the slow release fertilizer. The seedlings were grown for 18 weeks before being harvested and evaluated.

As shown below, IBR fertilizer produced black spruce seedlings with a greater shoot weight, root weight, and root diameter.



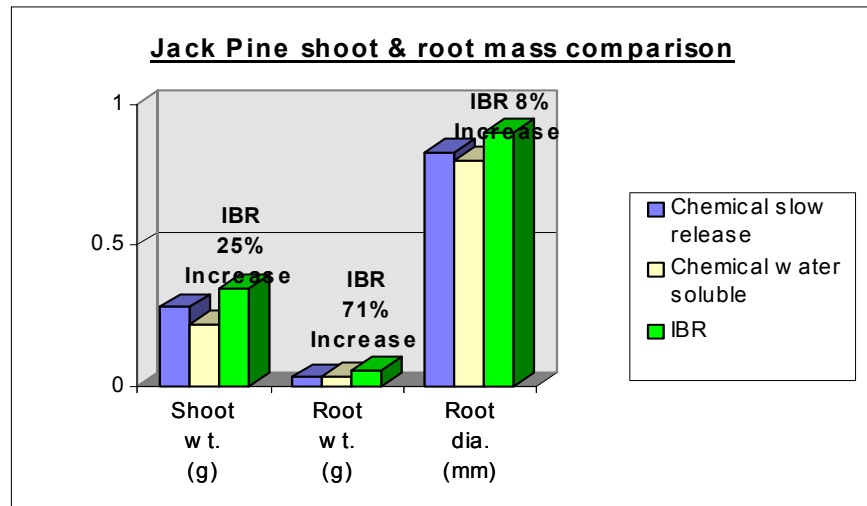
As well, the uptake of both macro- and micro-nutrients were significantly increased when using IBR fertilizer.



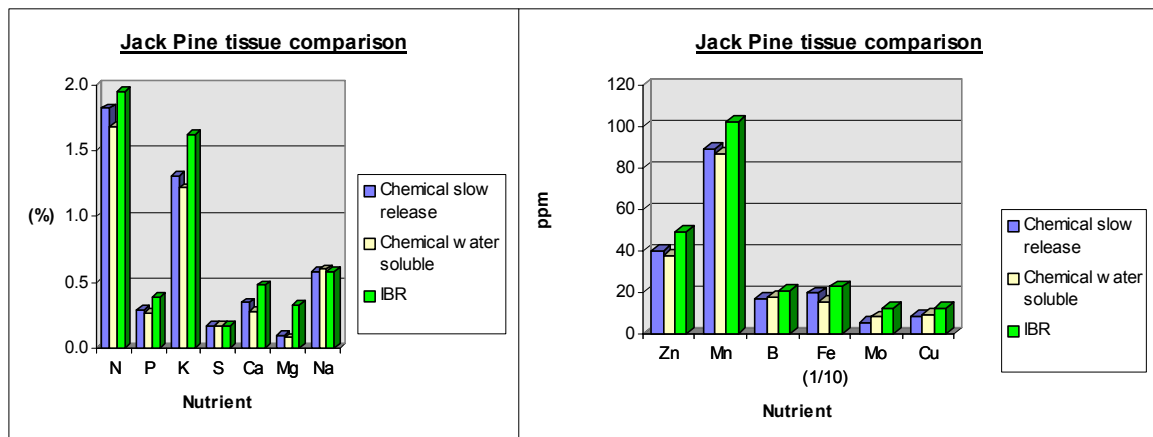
Effect of chemical fertilizers vs. Organic fertilizer on growth and nutrient uptake of jack pine seedlings

In this study, jack pine seedlings were grown under three fertilizer regimes: two chemical fertilizers (slow-release and water soluble) and IBR organic fertilizer. The IBR fertilizer was applied at a nitrogen application rate that was 60% of the slow release fertilizer. The seedlings were grown for 18 weeks before being harvested and evaluated.

As shown below, IBR fertilizer produced jack pine seedlings with a greater shoot weight, root weight, and root diameter.



As well, the uptake of both macro- and micro-nutrients were significantly increased when using IBR fertilizer.

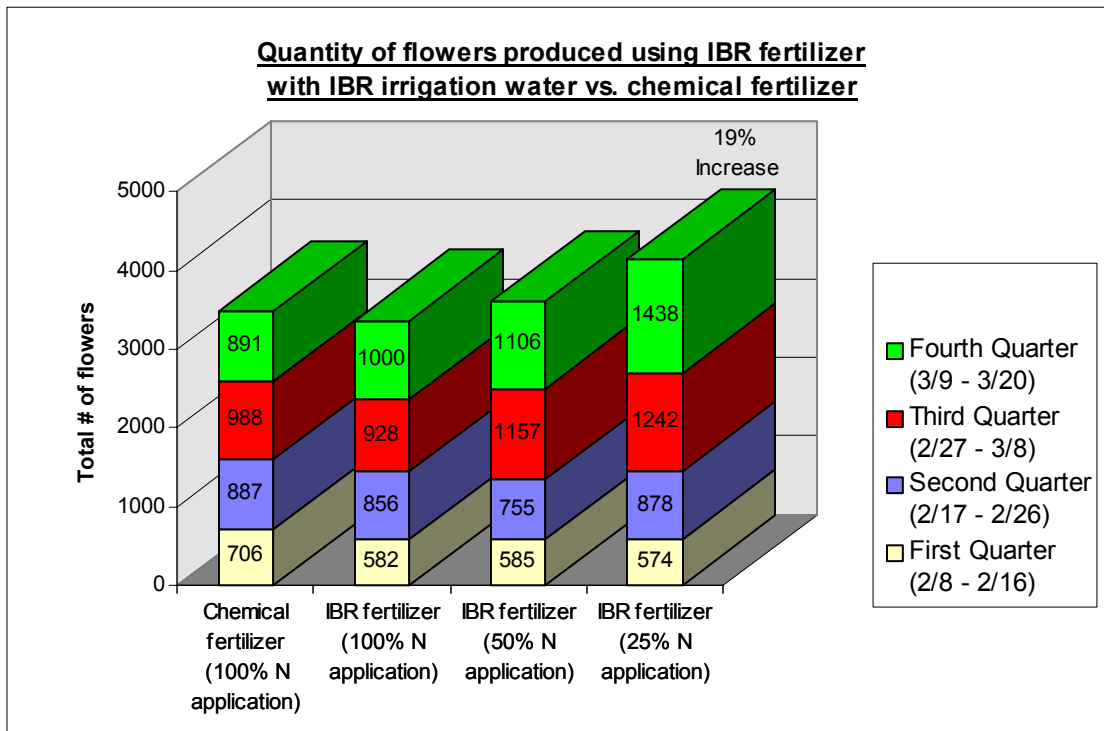


Visscher Greenhouse Study

Location: Chilliwack, B.C.

Crop: Freesia

The effect of using IBR fertilizer vs. chemical fertilizer on the growth of Freesia flowers was assessed at Visscher greenhouses over a 6 week period. Conclusions were drawn by the quantity of flowers produced and how resistant the crops were to disease. As the figure below illustrates, using IBR fertilizer at 25% of the recommended Nitrogen application rate of the chemical fertilizer, produced 20% more flowers. The figure also illustrates the positive effects of IBR fertilizer as time goes on. The first quarter and second quarter results show the IBR fertilizer at 25% N application to produce 19% and 1% less flowers respectively. But during the third and fourth quarter, the IBR fertilizers produced flowers at 25% and 60% higher levels than the chemical fertilizer.



As well, the flowers fertilized with the chemical fertilizer had a rate of disease affecting between 5-40% of the flowers. No disease was found on any of the flowers fertilized with the IBR fertilizer.