



# Small Scale Nursery: Collection and Starting Seedlings

Presentation and all material by: Shaun Scott and Jackie MacDonald, Scott & Stewart Forestry Consultants Ltd.

## SCOTT & STEWART FORESTRY CONSULTANTS LTD.

<https://www.scottandstewart.com/>

- Since 1985, Scott & Stewart has provided forestry services to woodlot owners, included silviculture, harvesting, etc.,
- 200 acres in Christmas tree production, with the nursery growing Balsam Fir and other types of Fir,
- 1993, Produced 3-4 Million seedlings annually – mostly spruce,
- Jackie MacDonald has 25 years' experience growing seeds at Scott & Stewart with a Diploma in Agriculture (Plant Science),
- Shaun Scott has a Bachelor of Science in Forestry (RPF).

### Experience in growing fir:

- 25+ years of experience,
- Small amounts in early years (cycle)
- 700,000 grown in 2021 (shortage)
- Mostly Balsam, others:
  - Fraser, Douglas, Grand, Nordman, Korean



## SOME CONSIDERATIONS BEFORE DIVING IN TO GROWING SEEDLINGS:

1. Do you have time to dedicate to the crop?
2. Patience (things do not always work)
3. If growing under cover (greenhouse) things happen fast, outside is a bit more forgiving
4. Up front investment (everything has become more expensive)
5. You certainly can grow seedlings to assist the stocking on your Christmas tree lot

## WHERE TO START? It all starts with the seed.

1. Purchase from Provincial seed bank (Nova Scotia, New Brunswick, & Prince Edward Island)
  - a. Orchard seed
  - b. Better germination rate than wild seed
  - c. Price by the kilogram
  - d. Comes very clean
2. Collect your own seed



## CONE COLLECTION

### Where?

- Your selections (select good mother trees) – not all seed is the same
- Don't collect seed from harvesting operations

### How?

- Need to climb to collect balsam fir cones (ladder, pole cutters, bucket truck)
- Pull cone off the branches
- Plant bags to collect off trees
- Burlap bags (transfer)

### When?

- Mid-August
- Cones starting to open-up (slight colour change)
- Not too early, cones won't open
- Some growers collect late



## SEED CLEANING

### Outsource

- Kingsclear Seed Center – a lot of seed (very good job)



### Cleaning it yourself

- Hang burlap bags to dry (outside seed sheds, barn fans, a few weeks)
- Take out of bags after all break up
- Sift out seed
  1. Clean out stems and scales (larger screen) – Jiffy Tray
  2. Strainer – Clean out dirt small particles (pieces of wings, dirt, etc.)
  3. Left with seed – Some wings on it

### Mechanical Seeder (very clean seed needed) & hand seeding (not so much)

## SEED STORAGE

If not stratifying set in freezer over the winter.

- Fridge
- Freezer
- No moisture in bag
- Take out from freezer a couple of months before starting Stratification

## STRATIFICATION

- Process of subjecting seeds to both cold and moist conditions to improve germination
- **Our process:**
  1. Take out of fridge/freezer,
  2. Wet seed – take off excess water,
  3. Fridge/freezer alternating process 60 days (freeze it and thaw it over several cycles),
  4. Dry it out before seeding (easier to seed).

*Note: Viability of fir seed low relative to some seed we work with (50%). Can improve this by trying to replicate nature.*

## SYSTEMS?

### Bare Roots System

- Seed beds & Transplant beds
- Germinating & growing in seed beds have challenges
- Challenges: Many challenges with pests
- More information in the 2021 Atlantic Canada Christmas Tree Growers Manual, Third Edition

### Containerized System

- Greenhouse, heated, or cold frames
- Must more controlled-finished in container

### Hybrid System

- Start in a container – transfer to transplant beds



## CONTAINERIZED SYSTEM INFRASTRUCTURE

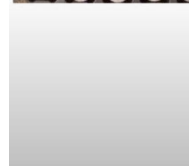
1. Greenhouse (protected agriculture)
2. Watering system (overhead)
3. Pallets
4. Gravel (drainage)
5. Electricity



### Containers

Many different sizes and types.

- Open (Jiffy plugs)
- Closed (multipot)



### Soiless Media

- Pro-mix (Mycorrhizae)
- Peat Moss
- Jiffy Pellet
- Vermiculite
- Mycorrhizae



## SEEDING & GERMINATION

### Seeding

- February to June
- In a heated greenhouse
- Viability 50% - lower is harder to manage
  - Best germination rate for Balsam Fir: 50-55%
  - Germination rates vary widely. A test for viability of germination can be done prior to seeding.
- 3-4 seeds per container
- Cover with vermiculite or some types of grit (silica or calcium)
- Water – holds seed down



### Germination

- Put in greenhouse
- Keep top of container where seed lies moist with some heat
- The seed will begin to crack in a couple weeks
- Third week start to see germination

*Note: At this time, measures to keep out pests (birds and other critters).*



## THINNING & TRANSPLANTING

- Balsam Fir seed can lag germinating over a longer period of time
- Goal: Thin down to one seedling per container.
- Transplant extras into empty plugs
- Thinning and transplanting should be completed before seedling put on lateral roots.

## CROP NUTRITION

- Water until seed caps come off
- Starter fertilizer (high in phosphorus) – 11-41-8 (~one month)
- Growth phase (Nitrogen & potassium after 4 weeks) - Most of the season until the trees are ready to be conditioned for Autumn/Winter
- Finisher Fertilizer (phosphorous) – Start in Autumn into winter
- Pumps & Injectors – Fertigation
- Soil tests

*Do I need an injector to fertilize my seedlings? No, fertilizer can probably be done by hand (in granular form) but a Fertigation or injecting system provides a more even and uniform spread.*

## WEEDING

- One crew weeding all the time, get them as early as you can.
- All types of weeds and grasses
- Liver wort (may come from water if plugs are too wet)

## DISEASES & INSECTS

**Integrated Pest Management** – Do every cultural practice to try to keep insects and diseases at bay. Worst case scenario, use a pesticide to control a disease or insect.

*Air flow and moisture control*

- Diseases
- Stem Rot
- Root rot
- Grey Mold
- Insects
  - Leather jacket (Larvae of marsh green fly)



## LIGHTING

- Fir likes light
- Supplemental lights to prevent bud set
- Extend the day or break the night
  - Keep them in active growth phase as long as possible.



## CUTTING & GRADING

- If growing in Jiffy plugs:
  - All crops will need to be cut before shipping – Root prune
  - You want to grade your crop if you are paying someone to plant
- Different customers have different needs

## OVER WINTERING

- Have to protected (winter burn) – Keeps roots and seedlings from freezing and thawing damage.
- In a green house or under fabric.
- Our climate is changing!

## TRANSPORATION

- Keep seedling under cover when moving them

## PLANTING

- Time of year – Autumn (September) OR Early Spring (Watch for frost) OR Late Spring (June)
- Equipment – Spade, bag, trays
- Shallow or deep
  - Bottom Organic Matter to Top Mineral soil
- Spacing – 3ft. X3ft. OR 4ft. X 4ft. OR 6ft. X6ft. OR sporadic
- Watering
- Microsites – No shallow spot in lot

