

CONE COLLECTION STRATEGIES

by Don R. Pigott
Yellow Point Propagation Ltd.

Tree seed is the principle means of perpetuation of most tree species from one generation to the next. Despite the fact that seed is such an essential component of almost all reforestation programs in B.C., it often does not receive as much consideration as other aspects of silviculture. We hope today to give you a brief overview to help plan and achieve the seed requirements for any reforestation program you may be involved with.

We will refer frequently to the Field Guide to Collecting Cones of British Columbia Conifers produced by the B.C. Tree Seed Dealers Association that we think you will find most useful. On behalf of the Association, we would encourage you to send any comments or suggestions to us to improve the guide.

Cone Collection or Seed Requirements

- How much seed do you want or need to collect?
 - A 5 year supply is probably the minimum considering the dynamic nature of forestry.
- Is orchard seed available or soon to come on line?
 - Even if it is, it is prudent to maintain a back-up supply of wild seed.
- Seed Transfer Guidelines - Know how far you can move the seed.
 - Divide your requirements into Seed Planning Zones and elevation bands or under CBST the appropriate BEC units.
- Determination of cone collection requirements to achieve seed needs.

CROP SURVEYS

Surveys should be conducted after cones are fully developed but with enough lead time to properly plan your collections.

- Surveys can be done in conjunction with regular field work or specifically for the purpose of identifying candidate stands.
- Ground surveys can also take advantage of cones on fresh felled and bucked trees, and from squirrel cuttings.
- Roadside observations are sometimes optimistic when estimating volumes as trees along openings tend to flower better.

Aerial surveys, when properly planned, can be both efficient and cost effective. They give an excellent overview of a crop within a stand and with a skillful pilot enable you to sample cones as well. It can be difficult however to see light to moderate crops of small cone species such as yellow cedar.

- Make a plan of where to look for each species elevation band and planning unit. After August 2018 it will be BEC unit for CBST.
- G.I.S. can be useful to identify target areas.
- Always have back-up stands for each requirement in case the preferred collection area does not work out.

- Inform all field personnel of your seed requirements and its importance.

CONE & SEED EVALUATION

Cones and seeds are evaluated to determine:

- which crops are worth picking (quality).
- when the crop is ready to pick (maturity).

Quality

Evaluations for quality include both external and internal inspections. Minimum numbers of filled seeds per cone usually based on slice of the cone is the most important indicator of seed potential (see table 3, page 7).

Absence or presence of insects or disease is also important.

Maturity

Premature collection is one of two main sources of poor seed quality. Cone maturity can vary dramatically within a stand depending on exposure or position of the trees within a stand, and even within a tree.

Tables 1 & 2 indicate characteristics of cone and seed maturity while Table 5 shows the relative period of maturity for different species.

Sampling

- A minimum of 6 trees per stand and 5 cones per tree is recommended; more trees are better.
- Sample from the stands, and parts of the tree that you ultimately will be collecting from.

If you are not comfortable with the assessment of cones and seeds, or would like another opinion, send samples to the facility where they are going to be processed.

COLLECTION PLANNING AND ORGANIZATION

Once suitable stands with good cone crops are identified, preparations for the collection should be made, well in advance of harvest.

These preparations include:

- Determination of collection method.
- Obtain permits and/or permission from landowner.
- Arrangements for Interim Storage.
- Labour to collect or pick the cones.
- Materials - sacks, tags, climbing and safety equipment, helicopter fuel, etc.
- Contingency Plans.
 - Be prepared for weather or equipment problems.
 - Do not rely on collecting from only one location.

Collection Method Determination

How you harvest the cones may be determined by the following:

- Amount of cones required.
- Size and distribution of the crop.
- Size of the trees that the cones will be harvested from.
- Nature of the stand.
- Species characteristics,
 - Locations and persistence of cones
 - Are they only at the top or scattered throughout the tree?
 - Do they stay closed for a long time or disintegrate upon maturity?
 - How long do you have to pick?
- Accessibility.

CONE COLLECTION METHODS

Climbing

- Requires, agile persons in good shape. Ensure that climbers are properly trained or certified if required.
- Use good condition climbing gear that is approved.
- Use good boots, long sleeve shirt and cap to keep pitch out of ears, or a hard hat with ear muffs, or a rock climbing helmet.
- A cone hook is a must, no longer than 1.5 m, or it gets in the way
- "S" hooks made of welding rod are great for hanging sacks on
- Start at top and pick down.
- Clipping of branches on small cone species works well.
- Good for crop tree selection.
- Avoid dropping sacks too far.
- No tree too tall for experienced climbers, but know your crew's limitations.

Felling

- Coordinate collections with current or pending logging, also to check for potential crops.
- Good for parent tree selection.
- Use experienced fallers or feller-buncher operators.
- Keep pickers well away from felling area.
- After felling, prior to picking, buck limbs and tops to minimize roll-overs.
- Pick systematically; don't pick the same branches twice.
- Cones that are picked have to be transported. Can you get them to road easily? FMC, ATV, helicopter, or hand packing?

Helicopter Clipping

- Costly! Need a heavy, high quality crop
- Good for areas with poor access, big mature trees, trees with cones concentrated at top, scattered crop trees
- Must have competent, qualified pilot and clipper operator.
- Selection by clipper operator.
- Hard on helicopter upholstery.
- Keep pickers out of landing area.

Helicopter Raking

Costly, but effective for true firs, spruce, Douglas fir, Red cedar, and Yellow cypress. There are several types; toppers, branch collectors and power rakes.

- Some ability to select (pilot only).
- Good for areas with poor access, big mature trees, trees with cones concentrated at top, scattered crop trees.
- Landing site must have lots of room (central).
- There must be a designated entrance and exit path for the helicopter.
- Rake must be properly maintained.
- Pilot must be well instructed as to requirements. And the boundaries of the collection areas.
- Ground crew members assigned specific duties; clean-out, etc.
- Monitor crop quality each turn.
- If using tarp, make sure it's well anchored.
- As cones are collected ensure that they are well ventilated, and laid in an orderly fashion for tracking volumes, prior to transportation to interim storage.

With all helicopter collections, you must have a good working relationship with the pilot. Ensure he/she and ground crew understand each other's requirements and concerns. Do not put the pilot in a compromising situation; make sure he/she is happy with all factors affecting collection (dump site, location of crop trees, weather conditions, etc.).

Shooting

Excellent for small collections (less than 5 hl per day)

- Good for selection
- Requires good shot and patience
- 30-30 or heavier caliber, telescopic sights
- Work across stem.
- 15 cm dia. not difficult.
- Works best with species having cones concentrated at top
- Flat shots (small angle) work best
- Use extreme caution around homes, logging, etc.

Squirrel Caches and Cuttings

- Most maligned collection method
- Good quality, cheap seed
- Stand at cache and look at stand quality around you
- Squirrels don't cut heavy until crop matures
- Learn habits
- Avoid poorer condition cones deep in cache (*Calaschypha fulgens*).
- Best performed during drier weather. (less risk of *Calaschypha*.)
- Cones not carried great distances

Handling

- Cones are tree eggs! Appropriate care must be used from the time the cones leave the tree until the seed is extracted.
- Dropping sacks of cones from trees while climbing should be minimized.

- Cones collected from felled trees, by helicopter or from squirrel caches should be gathered as quickly as possible to avoid premature opening, molds, or fungal activity.
- Ensure that the cones are as free from debris as possible to minimize handling during extraction and risk damage to the seed.
- Excessive amounts of foliage may also encourage molds and create lethal temperatures within sacks due to higher moisture content.
- Every attempt should be made to keep cones well ventilated and dry at the collection site prior to delivery to interim storage.

Storage

Although interim storage is a minor component of seed collection costs, it is one of the most important, and often poorly addressed.

- Interim storage is often required for several weeks prior to shipment to the extractory.
- The first couple of weeks after collection are the most important.
- Adequate storage should be arranged prior to commencement of collection.
- Very simple, inexpensive structures are required to provide adequate shade and ventilation. Supplemental ventilation or air circulation is beneficial. Traps for mice or food alternatives for other rodents may be required.
- Turning of sacks periodically not only improves drying, but may expose other potential problems that also need to be addressed.

Transportation

- Transport from the collection site to interim storage must be done as quickly as possible.
- Open flat-decks with pallets to improve ventilation for longer hauls is advisable.
- Cones being transported to the extractory after interim storage are also best loaded with pallets every two layers of cones. Usually open flat-decks are used although reefers are sometimes used, particularly for cones that are still quite moist.
- Cargo nets work well for securing loads while still allowing ventilation. Tarps are not quite as good but may be necessary.
- Ensure that the extractory has been informed of the arrival.
- Ensure the driver understands the importance of minimal delays in delivery.

Safety

Safety is the number one priority for all aspects of cone collection and should not be compromised in any way.

- Ensure that all employees know and understand their responsibilities, and the Safe Work Practices for the job.
- Ensure all employees have the appropriate equipment for the job.
- Have a safety meeting before commencing work at each job site.

SUMMARY

Seed costs for even the most expensive improved seed rarely exceeds 5% of the total cost of reforestation. Seed doesn't cost –it pays!

When you consider the extreme importance and yet very low cost of collecting tree seed, it is important to do everything we can to provide the best quality seed to users.

OTHER SOURCES OF INFORMATION

A Field Guide to Collecting Cones of British Columbia Conifers

<https://www.for.gov.bc.ca/hfd/pubs/Docs/Frh/cones.pdf>

This field guide was produced by the BC Tree Seed Dealers Association in 1996.
Unfortunately there are limited hard cover copies available.

Contacts

Don Pigott – Yellow Point Propagation Ltd. ypprop@shaw.ca