

Cone Collecting Problems and Equipment

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According to Matusz, "The collection of seeds from standing trees is perhaps one of the most dangerous and labor-intensive of all forestry operations. However, this highly complex and costly work ensures that seeds are collected from fine trees and from the best part of their crown" (Matusz, 1964). Probably the biggest engineering and mechanical problem we in the seed orchard and tree improvement business are faced with is that of collecting cones in a suitable and economic manner. Even now we have thousands of acres of seed orchards which are ready to be harvested. Each year this problem will grow larger as we put more and more acres into production as seed orchards. In many cases our funds are limited, but there is one thing we all possess in unlimited amounts which will help us overcome this and several

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other problems. That one thing is imagination. I think we will need all the imagination we can muster to lick this problem. After all, cone collecting is one way of obtaining the end result which we all desire.

First of all, lets break the problem down into its two logical divisions. The first division will be collection from the seed production areas. The second, and probably the most important in the long run, is collection from the seed orchards. Many of the problems will be inherent to both the seed production area and the seed orchards. Usually, if we lick the problem in one area it will be solved in the other.

I once heard a forester comment that all seed production areas looked alike. This may be true until you get to working in them. All of our seed production areas were picked strictly on the quality of the stand. This certainly is an important factor. But now that we have the areas selected, cut and ready for harvest, we find that many are on rocky ground, hills, and mountain sides. Others are on swampy and unstable soil. Like people, seed production areas possess individual traits, and each must be handled as an individual. I am sure many of you have found this out already.

One of the first considerations in harvesting cones from a seed production area is topography and soil conditions of the area. These considerations will effect the method used in getting tree climbers into the trees. Depending upon the area, you may want to use Swedish ladders, rope ladders, climbing irons of various types, climbing spurs, cable hoisting equipment, nets or a variety of other equipment. On the advise of entomologists, we do not use climbing spurs on the National Forests. They state that using them is just asking for trouble. Many people prefer truck mounted ladders of various shapes and forms. Some have even used hydraulic truck mounted extension buckets. Reports are that these hydraulic buckets are too expensive unless you have an abundance of tree climbers. They are expensive to use and must be kept busy to be economical. I have reports that some have made sizable collections and prefer to use ropes to allow the climber to pull himself into the crown of the tree. The ropes are secured over limbs with a bow and arrow or fishing tackle (Thompson, 1965). Whatever the method worked out for each seed production area it must be economical, relatively fast, and safe for the tree climber.

I have seen many home-made rigs using trucks and ladders. Somehow I feel many of these outfits are not as safe as they should be. Some have taken ladders and made them fit a job for which they were never intended. Many were made under the supervision of foresters who have no idea of the different stresses and strains placed on metal fatigue after long and heavy use. I think we should take another look at some of our home-made rigs and ask advice of engineers who know just what problems are involved in this type construction.

The tree climbing business has enough risks without our helping it along.

The next consideration is the tree climbers. This falls into two categories - your own men, trained and physically able to climb, or contract professional tree climbers. This type work should be undertaken by men in good health and physical condition, 18 to 35 years of age. They should certainly want to climb and be thoroughly trained in climbing, rope handling, safety and first aid. The big problem in training your own climbers is having enough men to do the job between the time the cones ripen and the time they open and the seed falls. Unless there is enough climbing work to keep your men in good physical and mental condition, the work should be left to professional tree climbers.

The answer would seem to lay in contracting the work of tree climbing. On the surface this sounds good. Reports are that the "tree expert" companies engaged in this type of work seem to have a habit of promising more than they can deliver. I think the work is as new to them in many cases as it is to us. I hope experience and time will solve this problem to a great extent.

Another minor problem in contracting tree climbing is the method of payment. I prefer payment on a per tree basis rather than per hour or per bushel of cones collected. Costs seem to be in line with all methods used. It will just depend on which method you prefer to use. Costs for contracting tree climbing on seed production areas have varied from \$3.00 per tree to \$5.00 per tree. In all cases costs ran an average of one to three dollars per bushel higher for seed from the seed production areas than for seed purchased from wild collections. One important way to keep the cost per bushel of cones collected from seed production areas at a relatively low figure is to be selective in picking trees to be climbed. This is a must if we are to hold costs down. A good cone count made several months prior to collection will pay for itself several times over. We must decide how many bushels of cones we want from any one tree before we go to all the trouble of climbing it to harvest the

cones. It costs almost as much to collect cones from a tree containing one bushel as it does from a tree containing five bushels. Personal experience has shown that a tree must have at least one bushel of cones to be economical for climbing. Also, along this line, "Identifying the good cone producers in an area will allow cultural operations to be concentrated on these trees and should result in a reduction in the proportional cost of such operations." (Cole, 1963).

Once we get the cones off the trees and onto the ground there are still problems. Many seed production areas have good accumulations of brush and grass. Those areas that were fertilized are an even bigger problem. Intensive efforts should be made to keep brush and grass cover as low as possible. Many cones are left on the ground because crews picking them up could not find them. After we have spent considerable time and money getting cones off the trees, we should be able to collect all the cones on the ground. In many areas prescribed burning will solve this problem with little trouble. Other areas will need mowing or mist blowing at regular intervals. This is another reason why we should pick our trees to be climbed and harvested. Only those trees from which we expect to pick cones need be mowed around.

A problem that should not exist, but apparently does, is that of identifying each and every container of cones. When the cones arrive at the seed extractory, they usually are not processed immediately. Shipments of cones from several areas and sources may become mixed. To say the least, it is confusing to the nurseryman to have hundreds of bags of cones at his disposal and not know for sure from where they all came. Each bag of cones should be identified with an aluminum tag stating, at least, the seed source and species. The aluminum tags can then be transferred to the seed containers, which are usually placed in storage (King, 1965).

The biggest and most serious problem in many of our seed production areas and also in our orchards is that of taking the cone from the branch. Collection of longleaf and slash is relatively easy along these lines. Cones can be knocked from the branch with a good lick from a cone hook, pruning pole, or often shaking the limb will send them flying. It is loblolly and Virginia pine that give us the most trouble. I have reports that several individuals are working on various types of equipment to help this problem. Usually in loblolly we resort to cutting the entire branch ends in order to get the cones from the branch. In most cases this is disastrous for next year's crop. One idea is to develop a battery operated circular saw small enough for the tree climber to take into the tree. The principle is to saw as much of the cone off as possible without cutting the branch. The big disadvantage with this equipment is that it is too heavy and awkward to work with in the tree. Another idea centers around pneumatic clippers. The principle will be the same, get as much of the cone as possible without cutting the branch. Long air hoses or compressed air containers make this equipment awkward to use. Another idea is to have two or three times the area in seed production as you require for any one year. Cut the branch tips off with the cones and conelets. Then give the trees a couple of years to recover. Cole indicates that two successive crops of cones may be collected from loblolly seed production area even when branch tips are clipped off (Cole, 1963). Others felled the trees from which cones were collected. This, of course, necessitates the selection and release of a new area each year for harvesting three years later (Easley, 1954).

As we move into the area of collecting cones from seed orchards, the problem changes its aspect a good deal. We will have our problems with topography and soil stability, but these should be partially solved for each orchard by the time we get into seed collection. In general, maximum flotation should be obtained for all equipment used in the orchards to minimize soil compaction.

Climbing should not be a problem, if we leave the trees with limbs close to the ground and don't prune them heavily. Most kinds of mechanized equipment and ladders can be put to full advantage when necessary. The big problem will be that of having enough people trained and ready to collect the cones in the short period of time after cones ripen and before they open.

The same problem for loblolly and Virginia pine are present in the orchard as in the seed production area - how to gather cones without "plucking" the tree. This problem reaches a more serious level in the seed orchard since we cannot afford to lose every other cone crop because of our inability to collect the cones.

One idea is to spread tarps on the ground under the trees in the seed orchards, let the seed fall, and then collecting them when they are free of the cones. Another idea is to use

industrial vacuum cleaners and sweep the seed up after they fall. Foresters in Czechoslovakia and the USSR tried using a vacuum device for the collection of seed from standing trees by suction. As a rule, the methods used have not proven satisfactory. The problem lies in the fact that the seed adhere more firmly than the needles, so that suction detaches more needles than seed. As I said earlier, imagination is our biggest asset in this business.

TEN COMMANDMENTS OF CLIMBING SAFELY

1. Inspect your equipment -- take care of it -- be prepared.
2. Inspect the tree to be climbed -- plan your work.
3. Work deliberately.
4. Work in pairs.
5. Be aware of climatic conditions.
6. Use safety equipment properly.
7. Don't trust a dead limb.
8. Don't drop equipment.
9. Don't work beyond your endurance.
10. No horseplay.

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