

Storage with the Use of Plastic Bags

By Jim Augenstein

" Two years ago we stored some trees over the winter by various methods and by using these plastic turkey bags. That was the only solid plastic bag we could get, and we had very poor results with it. In every case the trees in the bags were moist. Several had some tow (shingle tow) in for moisture. The others had nothing.

In every **case** they molded **very badly**, in fact most of the stock was very soupy in the spring. We didn't run **a lot of** tests, as I say, it **was** only four stall bales that we **put** in these turkey bags and sealed up. The thing I wanted **to** report on mostly, and I think Rex should be up here instead of myself, was the use of polyethylene coated paper bags that **hes** been using for **quite** awhile. We tried them this year--in fact I 'sent there to get some. We had very good **luck with them**. **Now we didn't store over** winter, we used them for shipping more than anything else. We set up several tests with different species. Douglas-fir was one of our tougher **species to hold**. **It almost** always molds over winter; spruce, also. We sealed them and wrapped them with this reinforced tape. We used a bag for each species, Ponderosa pine, Douglas-fir, and spruce just in the warehouse, about the 15th of April. That was freshly dug stock. I think it **may have** been in storage a day or so before we got it **in** the bag with no ta^g **at** all. We laid them in the warehouse and we opened them three different times to see when **mold** might be setting in. What we were most **interested in** with these bags, and I think DeJarnette and maybe some more **of you were concerned about** it **too**; was this: If we **shipped** them to the field, how soon would the mold set in sealed up completely? It was four weeks **before we saw** the first **mold at all**, then just a very little. At the end of 5.5 weeks we opened them and **they** **did have quite a** little mold forming then. The trees were still quite moist **and in nice shape**. **We didn't** ever get mold in the ones in **storage in** the **same** period. They were nice, very green and lush looking, just like a head of lettuce, more so than you would get when the tops were out. Now, **if that's good or bad, I don't know**. **We did ship one small ship-merit** to Region 6 and two bales, I believe, to Culp Creek, Oregon for experimental work on white pine. We asked them to report back, and they said the trees were in excellent shape. We **sent one sack** to Upjohn Co. in Chicago for an Acti-dione experiment they're carrying on. They **reported** the trees came through in **excellent** shape. We were trying to find out whether the bag would break or puncture **and** lose trees on the way. They said as far as **they** were concerned, it was the real way to ship trees. We also shipped various shipments to the forests in the region and asked **them .to plant** these trees last and to leave them in the bag, because they were not heeling-in. They were coning their trees or throwing the sna^g **over the bales, and in** every case, I think, but one, they came through good. One set, they believed, **had a little mold starting to form**, but the trees did keep moist. No tow of any kind was used. The **roots** were **moistened and put** in the bags. We did find out you can't wet them too much because of **the seam** at the bottom. The water drips out and gets the other bags wet, and the paper on the outside gets wet. It could deteriorate. We haven't had **any trouble**, but we could. And that's about all I have to report on."

"I think that it is Rex's thunder we are stealing this evening, because he's the one who pioneered this and he's had very good luck with it. He used a little different system in some cases than we used, but we're going to try it again next year."

Discussion on the Foregoing Panel

McDaniel: "Thank you, Jim. At this time I'd like to make a little comment on this if I could. Probably, at least 90 percent of our stock is shipped with a rabbit repellent treatment on it at the present time **or** in the last three years. In the rabbit repellent **treatment** the chemical **that is** used to repel the rabbits is Arasan. We haven't **had any** experience with mold at all. Maybe the reason we haven't had is because of the use of repellent. **We've had very good** results with the bags.

"As most of you know, **the** older **nurserymen** especially, probably our packaging is a little more expensive than the conventional type, but **is** the way our customers want it. The money spent in packaging the trees is **well** spent toward the actual survival of trees in the field. Before you leave, I want to thank this **panel**. We've learned quite a bit from this, and I think we could have some time for questions **later**."

DeJarnette: "I **think** everybody's here, and there were some questions on that last panel. Well **take** just a *few* minutes for that now."

Question: "What moisture content is your critical level, and when **you get that**, what do you do about it?"

Answer: "We watch it and keep our trees moist in the bundles. We use this rod that has holes in it and a control nozzle which all of you use, and we just spray **them inside**."

Question: "Yes, but when?"

Answer: "Well, we unpack it. We just don't have the scientific data on this. Maybe Frosty or some of these other nurserymen do, but I don't. If it looks like it needs water, we never let **it dry** at all even though **the** roots still may be moist, we add a little water."

Discussion by Bamford and McDaniel

"Well, you mentioned something about weighing. You ~~take~~ weight?"

"Yes, we tried and we're trying to work up something by it."

"**You weigh, these check bundles** when they go in and then you take **them out a couple times a month**. **We don't have to do it, but were** trying. We started on 2,000 trees per bundle, a thousand each side. Then along come the supervisors, and they say they want bigger stock. Last year we had **a 5-inch minimum up to 10-, 12-, 13-inch**. **Beautiful** stuff, with heavy roots, large diameter, and we could only get 1,000 trees per bundle. Therefore, we've cut down in the capacity of our rooms."

McDaniel: "If the governor doesn't frown **on it too much, our rehabilitation section** headquarters will remain at Forest Grove for the time being, and I think they are going to build another cold storage building up there at Forest Grove. One thing not mentioned that I think **was** mentioned before--the day is coming when a certain amount of our trees are going out in refrigerated trailers. They **are going to stay in the woods, but I think that's going to be a long way off.** Right from the cold room **right into** the refrigerator trailers. We have a portable one that slides on the back of the truck and you can pick it up and slide it off."

Question: "Have you checked the temperature inside any of those bales at all?"

McDaniel: "Yes. They run about 1.5 to 2 degrees higher **in our:** small bundles. The large bundles run higher, don't they, *Frosty?* I imagine it would be from 12 to 3 degrees.

"We're using a little soil thermometer now. We use it in the nursery in the summertime. **We stick it down into** the bundles. We build it out with a little **way on the outside, we** waterproof it, air-proof it, too, and then we watch it. I think its about a degree and a half warmer on the **inside.**"

Question:

"How long do you leave the trees in the bundles **in** the cooler?"

McDaniel: "Well, es I mentioned before, we are rather lucky, because we only go from fifteen to not over ninety days refrigeration, not like some nurseries that go from five to six months. I think Wind River, Bend, and Shasta do, also. I imagine some of you *fellows* do, too."

Questions by Lyle Baker: "How quickly do they get dry? We held **some** trees over in bundles in the storeroom, **and** we found that after three months we had to start watering. After three months they started getting **dry.**"

Question: I'd also like to ask Swede when you have to hold.: trees five or **six** months in storage, do you wet them down **or** do they hold in good condition **for** that length of time?"

Answer by Landguist: "The last two years we haven't wet down any of our trees at all. We did it before. We thought maybe it would be a good idea because they did lose a considerable' amount of water."

There was discussion here regarding packing materials used in storage, "shingle taw, vermiculate, etc. The consensus was that additional wetting is not usually required.

Homer Ward: It depends a lot on the relative timidity of the room in the addition of more moisture. We had to take the hose and wet down the floor as a source of **additional** moisture."

Augenstein: "In the test we ran all winter on the polyethylene bags we also had some regular bales and we had a circular pile like we use mostly on a pallet. We never **put any water in** the bale, we just let it go to see what would happen. It was a **pretty good sized** bale of ponderosa pine **and I** think we had Douglas-fir, too. They **both dried out. They didn't** get to the point that they were in the crackling stage, but they were too dry to be shipped or **anything like** that. We planted them **and** they grew for awhile **and** eventually some of them died in the summer where we had them **so** dry in storage. We gave them no water. We had piles about 30 inches tall, and we have circular piles with a hole in the middle' and fill that with tow that's damp but **not wet. We don't** put the trees in wet, just get the roots well moistened. No water on the tops at all. Then we put a **wet burlap over** the tow on top around the edge of the rim of the green so that there is no green covered at all. We wet the sacks about every two weeks, about **once or** twice during the winter we have to put a little moisture on the tow."

Question: "And your trees are all in one pile?"

Answer: "Yes. Just **in** a circular pile, tops out."

Question by McDaniel: "No air in between these at all?"

Answer by Augenstein: "No, the roots against roots. The bottom of the tow will stay moist, but the tops start drying a little bit about halfway down."

McDaniel: "Cold storage is **a funny** thing. I know when we first started that **before we Got** this cold room, we just had a basement, an average of 40° to 42 and we put our trees six layers root to root on racks, on wheels. We put two layers, and then we put a layer of shingle tow, about an inch, on top. They stayed in there as long as three months. We were covered up with trees during the war, with no demand, so we gave the Siuslaw Forest quite a few hundred thousand trees. They took those trees out, probably two hundred thousand at a time.. Then they went into a deep canyon and put poles down on the **ground. They** put tree moss on top of the poles and they did the same thing that we did and kept those trees for a month or more while they were planting them, and they ran from 90 percent to 99 **percent survival. A** conscientious objector crew was planting them. You don't know what you **will run** into. Maybe, if you tried the same thing again you'd lost most of them."

Landquist: "In spite of the advances we have made in cold storage, there are still problems and you fellows are not going to store trees unless you absolutely have to."

McDaniel: I think if you can keep from it, you fellows **are not going to** dig your trees too soon. I got *my* foot in it many times because I squalled and yelled around about our department planting our trees too soon. We had to take our heavy Olympic and Akin clay loam and start watering that darn... around the first part of October. It would take us from ten to fourteen days to get a good saturation and ground settling before we could start digging. We'd dig and then we would have to water again before we could pull. Of course, plant genetics teaches that the best time to plant a tree is just before it starts to grow **in** the spring. That's impossible, because we don't have enough labor to put in the hills to do that job.. That's what these gentlemen are working on. Dr. Wright and one of his coworkers are working on something similar and they have produced some startling results which you will hear about tomorrow.

"I'd like to **ask**. Monk DeJarnette to tell us something about the work he did a number of years ago in handling seedlings from the nursery to the planting site and also the effect of planting **on** survival in the field. I think Monk has done a lot of work **on** that, back in --well I won't say when."

DeJarnette: "Actually that was back in the 30's. A young fellow we had working with us at that time, named Cushman, did the actual field work. There was a good deal of question, of course, as to just what happened to the trees in the process of lifting them and also the heel-in bed and in planting. So we fixed him up with a refrigerated truck, a pick-up. In those days we used ice and he maintained a pretty cool temperature in his pick-up. He would lift the trees himself in the nursery, carefully, then place them in the refrigeration. He then took them to the field where we were planting what we call comparative rows. He would go on *a* planting job with his trees, and usually he would plant 150 to 200 trees out of his stock of the same species and age class that the crew was using, and from the same nursery beds, as a rule. He would take **an** equal number of trees from the heel-in beds and after the crew had planted he would start out and follow across their planting, not up one man's row, of course, but across their planting, putting **in** one of the heel-in bed trees and one of his carefully lifted, carefully handled trees, right alongside, within three feet, of the crew-planted trees. He marked them with stakes which would maintain the **identity** of the trees. We did that for several years. We covered all our species and we covered all our sites, both severe and good sites. We had **an** average resulting from five or six seasons' installations of comparative rows. The final results, when we added it all up, were that we gained an average of twenty-five percent better survival than the crew-planted trees. It so happened that about half of that was apparently in **the lifting** and handling at the nursery, and from the nursery to the planting site, and about half of it was in the planting itself. His results showed that he gained about twelve or thirteen percent advantage over trees **that** he took from

the heel-in beds, about a total of 25 percent from the nursery there. Of course, that was **an average and he gained a great deal more on severe sites and in severe seasons.** The maximum was about 65 percent. On one **occasion the crew beat him.** That was a matter of frustration for Bill for a good **many years.** He couldn't figure that out, but it was just one of those things. It **was very conclusive evidence at that time that with** our sites, our planting methods, and our method of handling trees **all** the way through, we could gain an average of at least 25 percent. I heard this evening that some of you are planning to use **refrigeration** to take the **trees out to the planting site.** That was a dream of mine about **that time as a result of that work.** The war came on, of course, **and our planting activity came to a grinding halt, but I did go so far as to get a** surplus truck refrigerated unit after the war. I **put it into** service hauling perishables to CCC camps, hoping we'd get a break in the **planting program and** would later be able to use that to try refrigerated hauling to the planting sites. I had hoped to develop these smaller units that we could slide off at the planting site and leave there. I'm firmly convinced that we've lost, I don't know how many, but many thousands of trees in heel-in beds. I think that anything **we can do to get away** from that **is certainly a forward step."**

Ward: "Before we get off the subject of plastic bags, Jack Gill made a very noteworthy suggestion during a discussion around **dinner time. I think it would prove to** be worthwhile, and that's the use of a medium sized **plastic bag** as a liner in the planting **bag--in** the big one. That would provide the means of keeping the roots very moist, and the planting bags **also would be in a lot** better condition at the **end of the season."**

End of panel.