

IMPROVED PROCESSING TECHNIQUES FOR WESTERN LARCH

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Refrigerating western larch seeds makes the resin in the seeds easier to remove, thus facilitating seed cleaning.

Western larch (*Larix occidentalis* Nutt.) is in great demand in the National Forests located in northern Idaho and western Montana, the most concentrated portion of its natural range (2). The seeds of western larch are valued at about \$50 per pound.¹ This high value reflects not only the rarity of the seed, but also the importance in obtaining clean seed.

Historically, the major difficulty encountered in processing western larch seed has been the removal of resin (pitch) from the seed (4). Western larch has a high proportion of resin, which causes several problems, the most obvious being the adhesive quality of the resin. This causes the seeds to stick together and form clumps. As most seed cleaning machines are designed to operate based upon the shape and/or weight of single seeds, clumps make the cleaning process arduous, complex, and dirty.

Materials

A total of 30 seed lots representing 248.25 bushels of western larch cones were received at the Coeur d'Alene Nursery in the fall of 1978. These lots were to be extracted early for spring

1979 sowing. They are listed with source data in table 1.

Techniques

At the Coeur d'Alene Nursery, western larch seeds are extracted from the cones after the usual drying (100° F, 8 to 16 hours). However, a few adjustments have been made in the usual extraction process. As stated previously, resin is the problem and becomes most troublesome after the seed has been extracted from the cones. Extraction involves heating, which increases the adhesiveness of the resin. We simply reverse the procedure. That is, after the seeds have been extracted, the seed lots are placed in refrigeration (33° to 36° F) for up to 48 hours. During this time the resin will ball up and lose its adhesive quality. It is thereafter much easier to remove. An added benefit of the refrigeration procedure is the fragility of these large resin particles.

Dewinging western larch is accomplished with the Missoula Dewinger (3). The action of this machine reduces most chilled resin particles to the consistency of powder. Moreover, a good portion of the resin is then drawn off by the dust collection system.

Following dewinging, the seedlots are again returned to the refrigeration units to recool

the resin. As the cleaning process continues, the seeds pass over a 2-screen fanning mill, which removes most of the remaining small and large resin particles. Once again the seed lot is returned to refrigeration.

The final cleaning is completed using a pneumatic separator. Seed lots that are especially "pitchy" are best cleaned at this point. The normal operating procedure with a pneumatic separator is to remove the light particles of debris and partially filled seeds by expelling them from the lot with air pressure. In order to remove the remaining resin, at Coeur d'Alene, the process is reversed. The filled seeds are expelled and the particles of resin, unaffected by the air pressure, fall out into a desirable separation. These resin particles are usually the most difficult to remove, as they tend to be of similar size and shape to the western larch seeds. However, due to the slightly different weight, they are easily removed using this procedure.

Results and Discussion

Minimum purity standards for each species grown at the Coeur d'Alene Nursery have been established. If these standards are not met during extraction, the lot is automatically returned to the extractory

¹Unpublished data from the 1978 nursery files, Coeur d'Alene Nursery, USDA Forest Service, Coeur d'Alene, Idaho.

from the seed lab, with yellow flagging indicating the need for further cleaning. Western larch has an established minimum purity standard of 80 percent, which was the standard suggested by the Western Forest Tree Seed Council (5). The procedures described in this paper provided a purity of 90 percent or better on 29 of the 30 seed lots processed (table 1) One lot had 89 percent purity upon completion of processing, so it was re-cleaned. This raised the purity to 95 percent. These results indicate that the 80 percent purity standard may be too low and should be raised. At Coeur d' Alene Nursery, the standard will be raised to 90 percent commencing with the 1979 cone crop.

One of the questions often raised regarding this procedure is what effect does refrigeration have on the moisture content of the seed? In some 15 random sample spot checks of moisture content before and after refrigeration, only three lots showed an increase in moisture content. These increases, while recorded as 1 percent, were actually less than 1 percent when sampling error of the moisture meter was considered. Regardless of this increase, the moisture content of the seed lots still remained within the acceptable range for seed storage—5 to 9 percent acceptable, 6 to 8 percent preferred.

Table 1.—Western larch processing data-Coeur d'Alene Nursery early extraction, 1978

Lot numbers ¹	Bushels	Pounds trash removed ²	Pounds clean seed	Percent purity
L-14-3.8-2,185	80	37.3 SR	45.9	94
L-14-3.0-2,186	5	0.67 R 2.5 D	0.79	98
L-14-3.5-2,187	22	11.16 DR	6.4	97
L-14-3.9-2,189	24	0.96 R	14.1	90
L-14-4.0-2,190	26	17.0 DR	11.3	93
L-14-4.6-2,191	11.25	8.7 DR	3.2	92
L-14-3.0-2,192	8.5	7.8 DR	3.1	91
L-16-3.8-2,193	6	—	1.7	93
L-14-4.4-2,194	6	0.29 SR	3.4	89 (95)
L-14-3.3-2,195	5	1.35 DR	3.8	97
L-16-4.0-2,196	3	4.4 DR	0.09	91
L-14-4.0-2,197	3.5	—	0.7	93
L-14-3.6-2,198	2.75	—	1.4	94
L-04-3.0-2,199	2	1.29 SR	0.87	97
L-14-5.0-2,200	2	0.41 SR	0.59	96
L-14-4.0-2,201	2	0.47 SR	0.63	94
L-14-3.0-2,202	6	2.0 DR	1.9	96
L-16-4.5-2,203	2	0.53 R	0.36	97
L-14-5.0-2,204	1.5	0.94 SR	0.2	94
L-14-5.0-2,205	1.25	—	0.64	95
L-14-3.8-2,206	1	0.28 R	0.27	99
L-04-3.0-2,207	1	0.56 S	0.56	98
L-14-3.9-2,208	1 -	0.09 R	0.46	96
L-04-3.0-2,209	2	0.69 SR	0.58	95
L-04-5.0-2,210	2	0.69 S	0.45	98
L-14-3.5-2,211	4	0.74 R	2.5	91
L-14-3.5-2,212	5	1.07 SR	1.0	93
L-14-4.8-2,223	2.5	0.37 R	0.47	97
L-14-2.0-2,224	7	0.08 R	1.7	97
L-14-4.0-2,225	3	0.94 R	0.97	98

¹Lot number designates species, forest, elevation, and nursery accession number.

²S—seed, R—resin, D—debris. More than one letter indicates a mixture of the predominant trash removed.

Another question concerns the effect upon germinative capacity. Belcher (1) has shown that short storage periods of up

to 30 days had no effect upon germination of loblolly pine with only a slight increase in moisture content.

The task of western larch extraction and cleaning has been rather frustrating in the past. By using these procedures, at the Coeur d'Alene Nursery, western larch has become one of the more rewarding species to clean.

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