WHAT HAVE YOU NURSERYMEN GOT TO LOSE?

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Introduction

In this era of rapidly changing scientific know-how, it's rare to hear a nurseryman say: "All you've got to do is throw the seeds down, water em and they'll, come up." That kind of thinking was obsolete long before grandpa's time - but; some nurserymen today use the same logic to select the seed they plan to sow,.

Seed samples received at the Eastern. Tree Seed Laboratory point out what you may have to lose, A summary of 40 white pine (Pinus strobus) samples received in the 1972 and 1973 testing seasons indicated that the average lot for that season. contained 347 pounds, had a mean purity of 93% and contained 24,200 seed per pound. A cutting test showed that 42% of these lots were completely full. The rest averaged 96% full but included some lots as low as 65% full, Let's look further to see how you the seedling producer are affected.

Purchasing

Purchasing seed blindly can be terribly expensive,. Let's assume you purchase two lots of white pine seed. Lot 'A' cost $12 per pound and lot 'B' $9 per Pounds Both lots are reported to yield 100% full seed germination. It would seem logical to buy lot B and save money. However, haste without test results may prove costly. Although all full seed are reported to germinate, the percentage of empty seed or the purity are not reported.

Let's pursue this problem further with more assumptions, It's found that Lot B has 65% full seed with 93% purity while Lot A has 100% full seed with 98% purity, Now we can compute that Lot A will provide 23,700 viable seed per pound and Lot B 14 600 viable seed. Or in cost terms it would take 38% more of Lot B $\frac{(23700-14600)}{23699}$ than Lot A to get desired number of seedlings. Considering that Lot B is only 25% cheaper it might cost you 13% more per pound for the seedlings of Lot B than. those of Lot A, This points up the fact that the nurseryman should buy on contract, have the seed tested before purchase, and then compare sources.

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Storing Seed

Intensive cleaning prior to storage should be considered whether the seed is collected or purchased, Empty white pine seeds weigh 1/3 as much as full seed but take up the same volume, Thus, 347 pounds of seed 65% full means that approximately 30 gallons of space is occupied by useless trash (empty seed), Lots like this increase storage costs. This also applies to actual trash in the seed. In lots only 93% pure the remaining 7% (by weight) is trash! This trash **is close** to the same weight as the seed and removed only by conscientious effort. The average lot, mentioned earlier, would contain about 24 pounds of trash, Unlike empty seed, trash is solid in nature; composed of pieces of cone scales, needles, resin and dirt. Such material is often hygroscopic, i,e., can act as a sponge and hold considerable moisture. It usually absorbs moisture faster than the seed, When sealed in a container with apparently dry seed, a moisture equilibrium is eventually reached, This usually involves the **loss** of moisture by **solid** trash and the absorption of this moisture by the apparently dry seed, Seed stored near the critical moisture level (10-11%) can lose viability due to an increase of 1 or 2 percent in seed moisture content during storage.

Sowing Seed

Even more important are losses that can occur in the field, For computing the sowing rate let's aim at a field density of 45 seedlings per square foot, a 70% survival factor, and 77% germination. Using the sowing formula:

$$\text{lbs of seed to sow per 100' of bed} = \frac{\text{(desired density) (area)}}{\text{(seed/lb)(purity)(germination)(survival)}} = 1{,}48 \text{ lbs}$$

If this lot is cleaned to 100% purity and all empty and weak seed removed, the germination will be raised to 83% and the sowing rate (1,32 pounds/100 linear feet) is reduced by 11%. Not only would this mean more uniform sowing but most likely a reduction in labor cost also.

Another consideration is seed weight, Look what happens to those sowing rate computations made on dry seed when we sow stratified seed!

White pine seed increases about 48% in weight due to water uptake during stratification. Thus a lot with 24,200 seed per pound would become only 16,360 seed per pound after stratification. Sowing for 45 seedlings/sq. ft. with dry seed that requires 1,48 pounds per 100 ft. of bed would require 2,19 pounds per 100 ft, to achieve the same density using stratified seed. Neglecting to account for this will reduce the density by 1/3 producing 30% fewer seedlings than desired. Adjustment must also be made for the added weight of chemical treatments applied to the seed,

Finally, what about that survival factor? Have you kept records on it? Many nurserymen estimate a survival of 80% when in reality it is closer to 65%, The effect of such an error is a further reduction, density and seedlings 19% lower than anticipated.

It should be emphasized that this information comes from tests, These tests should be of great value to you, A 1% loss of viability in the sample (and the seed lot) represents the expense of 45 moisture tests or 10 germination tests. A complete seed test adds less than 3 cents per thousand seedlings to a seed lot as small as 25 pounds. As the lot increases in size, the cost becomes less. Compared to other possible losses through lack of this information, the cost is negligible.