

LESSONS FROM ONE GENERATION OF PROGENY TESTING  
OR  
ROBERTS RULES OF DISORDER\*

by

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The authors have worked many years with large progeny testing programs and have accumulated a half-vast storehouse of knowledge concerning ways to wreck progeny tests plots beyond salvage. It is our sincere intent to share this valuable experience with you. We elected to summarize our experience in the form of recommendations. The researcher then needs only to decide the type of catastrophe desired in his or her progeny tests, locate the appropriate procedure (e.g. 2a, 3b, etc.) and instruct research technicians accordingly. It is hoped that in this way this document will serve as a foolproof guide to guaranteed disaster.

1. Design and Scheduling

- a) Don't think too much about statistical design and analysis until the study has been established. Things never go exactly as planned anyway, and it is much better to take your data to a statistician after you have collected them. A good statistician armed with a modern computer can analyze anything.
- b) An efficient researcher plans work well in advance and sticks to the schedule. If your schedule is to plant a progeny test on December 16, the lack of any rain since September 2 is a minor circumstance and no reason to alter the schedule. Never in any case resort to an alternative to the original plan.
- c) If a and b appear contradictory, they are! So what.

2. Nursery Phase - This has very little to do with progeny testing, don't bother with minor details.

- a) Variable bed density has little effect on anything, you can always cull the runts at lifting time.
- b) Do not leave space or use dividers between seedlots, bed space is too valuable. Besides, undercutting hardly ever mixes lots and genetic differences allow you to sort them out if it does.

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The authors wish to recognize numerous irrelevant contributions by William J. Lowe, Director of WGTIP.

- c) If the nursery crew slips up and lifts and sells your progeny t seedlings to private landowners, it is O.K. You may need a very map on which to locate all plantings, but the extra precision gain from planting seedlings in many locations makes the trouble worthwhile.
- d) When lifting, counting and sorting seedlings prior to planting, ju get the job done. A bit of extra root drying is not too serious, it is bothersome to keep them protected at all times.
- e) When preparing to plant your test (lifting, sorting, etc.), do not despair if certain families are minus a few trees. Simply choose enough to balance the test from families that have extra. Be sure to select these extra seedlings in a random manner to maintain the integrity of your statistical analysis.

### 3. Layout and Planting

- a) Lay out a progeny test as much as possible in a perfectly square blo to conserve space.
- b) In order to further conserve space be sure to plant through areas formerly occupied by windrows. Depending on the sophistication of the experiment one has the following options:
  - 1) Ignore windrows altogether.
  - 2) Plant the rows perpendicular to the windrows, while the rep straddles the windrow.
  - 3) Plant the rows parallel to the windrows, with the replications at right angles to the windrow.
  - 4) Arrange reps as well as rows at 45° angles with the windrows.
- c) In hilly terrain always orient the family rows parallel to the contours to preserve uniformity within plots, unless, of course, it interferes with maintaining a perfectly square layout.
- d) Never plant a test in the path of an ice storm, tornado, hurricane or flood. To locate the desired "safe" areas for testing, consultation with the Almighty is required. Your local weatherman or Corps of Engineers Officer can make these contacts for you.
- e) It is not a problem to plant trees next to train tracks, particularly if unscheduled control burns are periodically desired. Trains have on occasion wrecked and trees close to the track have been prematurely sheared. Out of control freight cars rolling through progeny tests are known to leave very high stumps which are a problem.
- f) Be sure to plant the trees at exactly regular spacings. It is better to put trees in potholes or in stumps than to disrupt the spacing. If there is water in the pothole be sure that at least a tiny bud sticks up above the water.

- g) The person who establishes a progeny test will always be the one to measure the test. Therefore, detailed notes and establishment reports are not necessary. Don't bother with a North arrow or date on the map. Marking position and number of borderrows is also superfluous. After all the bloody work you did planting the test you will remember those details forever.
- h) Randomization within replications is a time consuming process and can be made optional depending on the planter. If a randomization plan must be used, remember Super Seedlings are extra tough so it is O.K. to lay the bundles out in the sun while you are trying to figure out where in the hell they go.
- i) Plant trees on fresh clearcuts when possible. Pales Weevil is a figment of the imagination.

#### 4. Maintenance

- a) Progeny tests need mowing the first few years, but it is best to do this when there is no other job pressing for your attention.
- b) The best time to mow the first year is August. The weeds may be a bit taller than the trees, but after mowing once, the rows that are left will be much easier to see.
- c) Leave some hardwood sprouts near each tree to give them some shade and help mark the rows when the trees are small.
- d) If you want to cut down on mowing, progeny tests are an ideal place to experiment with herbicides. Be sure to put out enough. Too little will give no control and just waste your time.
- e) Be sure to put firebreaks around your tests, but leave an opening for your car to get through.
- f) Detailed instructions to tractor operators are not necessary. When told to mow a progeny test, they probably will!
- g) First year mortality can be easily handled by replanting at any time during the first five years of the test.
- h) If tags are needed be sure to snug wires tightly around test seedlings. Girdling of tagged trees will slow growth only slightly and promote early pollen production. If tag wires are not tightly wrapped they may be lost.
- i) Designate areas within tests for cattle to graze. They will destroy only a few trees and reduce mowing costs substantially.
- j) Erect signs around the perimeter of all test plots reading as follows: Beavers, Deer and Pulpwooders Keep Out!! Since all of these pests can follow instructions equally well, the instructions are certain to be heeded.

## 5. Measurements

- a) When taking measurements be sure to use your map for orientation. If the tags don't agree with the map, the map takes precedence. Not checking the tags saves much confusion and time.
- b) Don't bother to write down location, date and measurement units. Even if you don't remember you will be able to tell from the plot layout and magnitude of the numbers.
- c) There is no need to always measure a row the same way or use a fixed convention in measuring block plots. You can always match new measurements with old measurements by checking where the missing trees are located. Besides, there are only two ways to measure a row plot and sixteen ways to measure a block plot.
- d) Diameter measurements should always be made at DBH regardless of branch whorls forking or fusiform rust galls to avoid biasing data.
- e) When measuring tests, speed is the most important thing to concentrate on. If haste causes some measurement error, don't worry, every Analysis of Variance needs an estimate of error for use in significance testing. Transformations can often be useful if Error is too large.

Good luck with your own personal catastrophes!