CRITERIA. FOR JUDGING 'PLUS" LARCH TREES

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The larches are among the finest and most beautiful of forest trees - tall, straight, clean-limbed, fast-growing, resistant to natural hazards, long lived and of high aesthetic and commercial value. At their best, they delight the eye and warm the heart of the practicing forester. And while the forest manager will not try to carry as heavy a stocking per acre as he would with pine or spruce, he can -- with larch -- get bigger and better trees faster and cheaper. With genetically superior larch on a good site, he can get truly merchantable trees on a surprisingly short rotation.

Fortunately for those interested in tree improvement, there are considerable differences between the several species of larch, between geographic races within species and even between the individuals of rather small groups. The best trees in a population are often conspicuously better than the average of their fellows -- certainly of the magnitude of three to two and sometimes as much as two to one. Most plantations show a scattering of these trees of exceptionally good form and vigor, to the number of perhaps one to five or six per thousand. Intensive examination of a stand of European larch recently indicated that three trees out of 2,500 might qualify; one lot of Dunkeld hybrid has six or seven out of a thousand. Other stands have one or two per thousand or sometimes none at all. As the superiority of these trees has no reasonable ecological explanation, it. nay be assumed that the "giants are genetically superior individuals. Whether they will transmit their superiority to their progeny only time and trial can tell but there is much reason to think that they will. So, it will be these giants or plus trees to which we may logically look for material wherewith to accomplish genetic improvement among our larches.

For greatest usefulness in tree improvement, we must have trees that can be readily grown from seed in the nursery, that can be satisfactorily field-planted and that will grow vigorously after planting. We in the Northeast will be most interested in selections from European larch (Larix decidua), Japanese larch (L. leptolepis), the Dunkeld hybrid larch L. x eurolepis) and other hybrids and perhaps, for special situations, the Dahurian larch (L. Gmelini).

Because planted larches of unknown provenance and undeterminable ancestry are now widely scattered over the Northeast and because the sites on which they grow vary from Class III up to Class +II, it is imperative that we develop some sound and workable criteria for assessing the merits of better trees. Obviously, the first comparison must be between the selected tree and other larches on the same site and with equal opportunity for growth. This is a matter of direct measurement, contrasting the dimensions and characteristics of the selected tree with the stand averages. Its validity is highest in relatively young stands that have not yet closed tightly. Once competition for crown space becomes keen, the feebler larches quickly drop out, which raises the average dimensions of those that remain and reduces the spread between the giant and the average tree.

Comparisons between plus trees on different sites are both difficult and hazardous. As site quality for larch is usually stated in terms of average height of dominants at fifty years, it does not accurately express variations in heights of individual trees. Lacking a really objective measure of site quality for larch, the appraisal must always contain a considerable element of human judgment. We will be on safest grounds if we select as giants only those trees which are conspicuously superior, both absolutely and relatively. This means choosing only the very best trees from the best sites.

Also, we must be sure that the giants have real competitive ability and are not just lucky individuals that have had less than normal competition. Where they are mixed with less rapidly growing species or where the plantation stocking is low, larches may develop very deep crowns, resulting in swollen butts and excessive taper. Let us confine our selection of plus trees to those of good forest form, growing in normal forest stands.

The second consideration will be stem form, for it is the stem that ultimately goes to market and we are here considering selection for commercial value poles, piling, veneer logs and sawlogs. The ideal form of tree trunk will be straight at all ages, vertical, springing straight up from the ground, of minimum taper and circular in cross-section. Straightness is impaired by two malformations -- the "saber" and the "wobble". From what I have observed here in the Northeast, the saber form is the result of the snow-bending of relatively young trees, perhaps up to fifteen or twenty feet tall. A fall or wet snow accompanied by wind produces an unbalanced load on the stem. It is most apt to happen when the surface soil is unfrozen. Most trees will subsequently straighten the upper part of the tipped stem and will grow vertically thereafter. While the saber seems not to be genetic, the plus trees for which we are searching will be the ones that, for whatever reason, have successfully resisted tipping.

The wobble is a slight to considerable waviness or corkscrew form in the stem, most conspicuous in the current year's growth. It seems to be more common in Japanese larch than in either European or Dahurian, although it is present in all populations. Slight waviness is soon smoothed out by added rings of wood but some exaggerated cases persist for years. This seems to be an inherited characteristic and not the result of external forces such as weather or insect activity. Certainly, any tree that shows any tendency toward the wobble would be rejected as a possible giant.

In the continental climate of the Northeast, an early frost may catch small larches with the tips of their leaders still unlignified, resulting in the death of the distal two or three inches. This may cause a slight crook when new growth starts from the first live lateral bud. Or, it may result in twinning or in a bushy top with no pronounced leader. Such injuries happen to trees whose tops have not yet reached above the level of ground frosts-- perhaps ten or twelve feet. If satisfactorily outgrown, frost injuries should not be a cause for disqualification.

Eccentric cross-section may be caused by a leaning stem or by a one-sided crown. Even though not inherent, a stem that is noticeably out-of-round should cause the tree to be rejected.

The best form of larch stem springs straight from the roots, with a minimum of butt swell and with no strongly buttressed roots, at least up to age 30 years Our plus tree will, then, have a straight, vertical stem at all ages, circular in cross-section and springing up from its roots.

Thirdly, the size and shape of the crown is important, not only to the growth of the tree but to the ultimate product. The optimum crown will be made up of relatively short, fine branches coming out horizontally or with only a moderately ascending habit. In this respect European larch is usually but not always superior to Jap. The Japs often have long, heavy, ascending branches that grow almost as much as the leader, so that the crowns may assume the form of blunt cones. In our climate, the more narrowly conical form is not only less liable to storm damage but also permits denser stocking. And relatively small branches will be easier, cheaper, and safer to prune.

Larch is generally classified as very intolerant but this is certainly not true of Jap, European or Dahurian on our better larch sites. Under some circumstances, Jap can be quite tolerant, particularly of high shade, provided its other requirements are adequately met. In order to carry the large mass of foliage needed to grow a wide annual ring, a relatively deep live crown -- perhaps fifty percent -- is desirable and this means that our plus trees should tend toward shade tolerance.

In Europe, the bane of the larch growers existence is the canker -- a combination of unsuitable provenance, frost susceptibility and fungus attack. While we have plenty of larch of "unsuitable provenance", our ruggedly continental climate, where the transition from bleak and bitter winter to broiling hot summer is abrupt, is not characterized by late frosts. And, if present at all, the causal organism Dasyscyp ha willkommii is of very limited occurrence. So, larch canker is not a problem in the Northeast. But we have others.

The larch sawfly (Prisiphora erichsonii) has been exceedingly destructive to our native tamarack (Larix laricina) but has seldom been serious on the exotics. The same is true of the case-bearer (Coleophora laricella) and the wooly larch aphid (Chermes stroblobius). Certainly, some larches are more susceptible to attack by porcupines (Erithizon) and red squirrels (Tamiasciurus) than are others. But generally, heavy or repeated attack by any of these enemies would be reflected in lessened growth or poorer form and our plus trees will be those that, for whatever reason, exhibit the least effect.

The plus larches for which we are searching will be conspicuously bigger than their associates, with the height in feet being at least 2 1/2 times the age from planting and the breast high diameter after that figure becomes significant - 1/2 inch per year. They will be characterized by straight, round stems with minimum taper, springing straight from the roots and by a deep, conical crown made up of numerous fine, relatively short branches. Superior form and exceptional vigor mark the giants among the larches, There may not be very many such trees, but somewhere there must be an occasional one that combines all the outstanding merits and it is for them that we must search. We urgently need to locate, appraise and report these giants, so that the Tree Improvers can get along with their part of the work.