FOREST GENETICS PROBLEMS IN GROWING HARDIER TREES: ANIMAL FACTORS

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The animal factors to consider in planning tree improvement can be divided into two classes: (1) animal injury, and (2) wildlife benefits. Animal injury can be an important factor in growing trees, and successful efforts to reduce it would have definite value. Wildlife interests can expect to benefit directly from tree improvement by emphasizing desirable characteristics for wildlife, and indirectly by the improved conditions for game which will result from other improvement programs.

Animal injury to trees is a special animal-plant coaction that varies greatly in importance with time and location. The most significant damage occurs as the result of a browsing animal feeding on young trees. Deer, rabbits, and hares if present in high enough density can kill or injure many commercial tree species. Porcupines, squirrels, and other rodents also cause local problems.

Three possible ways are available in which animal injury can be reduced by tree improvement: (1) reduce palatability, (2) increase early growth rate, and (3) increase tolerance to browsing. (Palatability as used here refers to the qualities of a plant that affect its selection by grazing or browsing animals.) We know from experience that the palatability of individual trees varies, but we need to know more about how much of the variation is due to the genotype. Porcupine damage in northern hardwood stands often demonstrates this point. Some trees are damaged severely year after year while other nearby trees of the same species, size, age, and condition are untouched. The same apparent variation in palatability is more difficult to see in connection with deer and rabbit damage to young trees. However, a study of browse utilization would probably indicate that certain individual food plants are more highly preferred than others where food supplies are adequate to offer a free choice.

Faster early growth can reduce animal injury by getting the tree above the rabbit and deer browsing zone in less time. The more winters the young tree is exposed to browsing, the more likely it is to be injured. If black ash sprouts can grow out of reach of deer in two growing seasons they are only exposed to serious damage during one winter. It is unfortunately true that fast early growth is usually associated with high palatability. Thus selecting stock for increased growth rate would tend to increase danger of animal injury in one way while decreasing it in another.

An increase in the tolerance to browsing would tend to reduce animal injury by reducing its importance. Few foresters would begrudge the deer and hares their rations, if the young trees recovered from browsing and showed no permanent effects. Here again we are faced with the question, "How much does this tolerance to browsing depend on the genotype?" It is logical to assume that a program designed to improve general vigor will probably produce stock that will tolerate more browsing, but experimental work will be needed to test this.

The potential benefits to wildlife from tree improvement are limited only by the imagination of the person considering them. Direct efforts could seek to increase the palatability of poor browse plants that are otherwise weed species. Selection for seed production should result in trees that will produce heavier crops of mast. If flowering dates are influenced by the genotype, mast crops could be insured by spreading out the period when different stocks are susceptible to post damage. Efforts to breed hardier stock for planting on poor sites where drouth resistance, frost hardiness, and resistance to other unfavorable environmental factors is increased, will be watched carefully by game managers. Very often, the sites considered too poor for forest growth are the areas on which the game manager must work. Habitat improvement operations on farms would be made more effective if a wider choice of trees and shrubs were available that could thrive under these planting conditions and produce the type of cover needed. Low scrubby growth form and resistance to grazing, trampling and other disturbance would be sought for on this job.

Indirect benefits to wildlife from tree improvement would also be many. If breeding for disease resistance succeeds in saving chestnut from the chestnut blight, and the oaks from the oak wilt, many game species will eat better. These are just two examples; many could be found. Another indirect benefit to wildlife would accrue as a result of faster tree growth. Since less time would then be required for a tree to reach the necessary size, rotations and cutting cycles could be shortened, or a smaller area could supply the minimum volume needed for an economic cut with a given cutting cycle. This would increase the interspersion of age classes and improve conditions for wildlife. Time does rot permit a more detailed listing of potential benefits.

Little factual knowledge is available on the subject of animal factors as they would influence the production of hardier trees. It is reasonable to assume that variations in genotypes within the species can result in reduced palatability, faster growth, and higher tolerance to browsing. If combined in a given stock, these qualities could reduce animal injury to the desired level.

The subject of wildlife benefits from tree improvement is a wide-open field for an active imagination, but even less is known about this subject than animal injury.