GENE CONSERVATION AND SELECTION OF BROAD-LEAVED TREE SPECIES IN ESTONIA

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The largest group of broadleaved tree stands in Estonia (the total area of approximately 100,000 ha) is composed of grove-like birch forests, alder forests, and mixed forests of birch and aspen with an admixture of spruce, which are growing on fertile woodlands all over the country. Estonia is located at the optimum of the aspen habitat. In accordance with the 1999 statistics there were more than 50,000 hectares of aspen forests in Estonia amounting to 2.5% of the total area of stands. The data from the Estonian Forest Management Center prove the annual average gain in aspen forests to be 6.40 cubic meters per hectare. Of the indigenous tree species the aspen is second only to the gray alder, whose annual gain on average is 7.57 m^3/ha. In researching the morphological diversity of the aspen in Estonia one of the goals was to find out what method could be used for a more detailed description of the bark colour. Although a number of methods were used the attempts to find a simple and adequately objective method for determining the bark colour of the aspen were made. For practical purposes, however, the colour of the bark is important in silviculture, since aspens with a different bark colour have been observed to have different resistance to heart rot (the aspen with the green bark is considered to be more rot-resistant than that with the grayish green bark). In 1968 the existence of the triploid aspen was ascertained in Estonia. The study of some anatomical and morphological properties in diploid and triploid aspens revealed that triploid aspens are characterized by organ gigantism. Apart from morphological gigantism the triploid aspen differs from its diploid counterpart by a higher growth rate and greater resistance to rot. It is known, that the resistance of the common aspen to heart rot is very weak. In older aspen forests the percentage of trees suffering from heart rot is fairly high, with some stands hardly having a tree without infection from the fruiting bodies of the aspen fungus. The attempts to

find possibilities of diagnosing heart rot in aspen by external features yielded the conclusion that a decisive factor in this respect is the presence of fruiting bodies of the aspen fungus. At the same time it appeared that the length of the stem infected by the fruiting bodies (that is, the distance from the lowermost fruiting body of the aspen fungus to the uppermost) is more informative with respect to the extent of heart rot than the number of fruiting bodies on the stem. It is probable that different aspen clones have different capacity of resistance to infection by the aspen fungus. Therefore it was necessary to establish starting points for the selective assessment of aspen forests. The main criterion in the assessment proved to be the share of trees in a stand that were infected with the fruiting bodies. The area of birch forests comes second after that of pine forests in Estonian state forests, constituting 29.2% of all stands. Of the deciduous tree forests in Estonia birch forests constitute more than 80%. In view of the current economic circumstances and the land property relationships in the country birch selection should be paid more attention in the future. Previously, 23 plus trees of birch had been selected in Estonia, of which a couple have dropped out. In the spring of 1996 an attempt was made to select new trees. After 17 new plus trees were selected on a private land in the vicinity of Järvselja we now have 38 plus trees of birch. To a certain extent we have researched birch forms. On the basis of stem bark the colour of two forms have been distinguished both in the silver birch and the dwarf birch: a light-bark form and a dark-bark form. Tree measurements on the experimental plot in 1962-1966 revealed that the light-bark silver birch showed the greatest gains in height and diameter, surpassing the respective dimensions of the dark-bark form by 16% and 32%. The growth rate of the light-bark dwarf birch on average was 20% lower than that of the silver birch with the respective measure for its dark-bark counterpart being 24%. Attempts have been made to examine the possibility of distinguishing between the silver birch and the dwarf birch by leaf measurements and their ratios in older trees. The natural renewal of birch in clear cut areas of drained swamp forests has been investigated by U. Valk and H. Seemen. Two species of alder are growing naturally in Estonia: the common alder (*Alnus glutinosa*) and the gray alder (*A. incana)*. Occasionally one may encounter the hybridized form of the two (*A. hybrida*). V. Hainla has studied the possibilities of using leaf morphology to more objectively distinguish the hybrid alder from the grey alder and the common alder. Common alder forests constitute 1.7% of the total area of Estonian forests. Since 1973 V. Hainla has also been dealing with the selection of the common alder in Estonia. First he tried to find out whether the generative offspring of the trees growing in the same stand display significant differences in growth and whether the growth rate of the offspring is linked with the corresponding property in the parent tree. If so, it allows us to choose appropriate parent trees as a seed source, if necessary. Another series of experiments was established for finding out the geographical diversity of the common alder in Estonia and the adaptability of common alder seed from certain regions of Estonia in other regions of the country. U. Tamm and A. Vares have conducted with the studies on the influence of common alder parent trees on their offspring. A. Vares has assessed the aboveground biomass of the 20-year-old cultivated common alders as well as the main nutrient content and the metabolism in different segments of the trees. Three plus trees have been selected among the black alder.