

5. Shelterbelt maintenance

5.1 Weed removal

The key factor in successfully establishing a shelterbelt is the removal of weeds that grow on either side of the plastic mulch and deprive the plants in the hedge of water, light and nutrients. Weed removal is imperative at least during the first 3 years following plantation and should continue until the trees and shrubs are firmly established, which depends on growth rates. Mechanical weeding, mowing and chemical control are all commonly-used methods to remove weeds from a shelterbelt. Weeding should be done 2 or 3 times during the growing season, in warm weather and when the soil is dry, before weeds reach the height of the plants within the shelterbelt. Care must be taken to avoid dislodging the plastic mulch or damaging roots.

Mowing is generally less effective than weeding because the plants in the shelterbelt still need to compete with weeds for water and nutrients. However, the plastic mulch helps ease this competition, and, in these conditions, mowing can render acceptable results. The operation however needs to be repeated frequently to prevent weeds from exceeding the height of the shelterbelt. Mowing can be done using a brush cutter, a lawn mower or a tractor-pulled mower.

When using herbicides, it is important to ensure that the trees and shrubs in the shelterbelt will not be affected by the selected product.

5.2 Protection from rodents

Rodents such as meadow voles scrape the bark of trees close to the ground and can cause extensive damages. Most high-quality timber-producing hardwoods are susceptible to rodent attacks. To avoid damages, mechanical barriers such as plastic or metal wire fences should be installed. They can be removed once the bark on the trees is sufficiently thick and loses its appeal to rodents. A repellent coating can also be applied over the base of tree trunks at the end of the summer. Although less costly and less cumbersome than fencing, this method is also less effective in case of an infestation.

Removal of weeds around the edges of the plastic mulch, at the end of the summer, will prevent rodents from using this area as a shelter and constitutes an adequate preventive measure. Shelterbelts also need protection from grazing livestock; fences and electrical wiring, for example, provide good protection in this case.

5.3 Protection from insects and disease

If the selected trees are well adapted to the climate and soil conditions and are well cared for, they will be more resistant to disease and insects. Despite these precautions, however, insects and disease can still be a problem in a shelterbelt. This is why shelterbelts need to be inspected thoroughly and measures need to be taken when a problem arises. Shelterbelts made of a variety of species are better protected since it is very rare that all species are targeted at once.

5.4 Pruning shelterbelts

Shelterbelts can be pruned to produce high-quality timber, to promote bloom or fruits or simply to control lateral development of the hedge. Hardwoods that produce quality timber will require more care than conifers. In fact, certain hardwoods used in shelterbelts, such as oak, sugar maple, white ash, walnut and yellow birch, can produce quality timber if shearing and pruning are done properly.

Shearing is done mainly to ensure plants grow upright and to make sure crotches are as high as possible. Crotches constitute weaker sections in the tree and can often lead to breaks. Shearing starts one year after planting and continues until trunks are well established, this can take 10 to 20 years, depending on the species and the desired trunk height (Bourgerie and Castaner, 1988).

It is easier to visualize a tree's structure when it is out of leaf. The first characteristic to be defined is the axis of the tree, from base to top. Any branch with a diameter close to that of the main axis at the trunk should be eliminated flush to the main stem while keeping the branch bark ridge (Figure 12). Close attention must be given in particular to branches that stem from the main axis at a closed angle. If the terminal bud is damaged or absent, the branch must be cut after the next viable bud within the axis. If the leading shoot is no longer viable, it must be replaced by a lateral branch that can be straightened, if need be, with wiring. This operation is necessary mostly in the case of trees with opposing buds such as ash and maple trees. After a year, once the branch has properly straightened, the portion of the branch supporting the wiring can be eliminated. In the case of forks (several branches growing in a same vertical axis), the strongest, most upright and well-adapted branch is retained, and the others are removed.

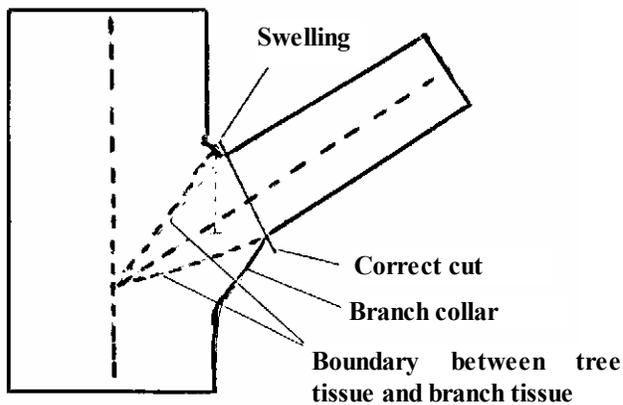


Figure 12 – Position where branch should be cut (adapted from Michau, 1985)

If it is not possible to clear the tree's main axis because of its overall profile, make sure the tree is healthy in that it produces strong annual shoots and well-developed foliage. If this is the case, the tree will withstand coppicing, an operation which consists in cutting down a tree at a height of approximately 10 cm from the ground. This operation is done in the spring, before growth resumes. If the tree lacks vigour, the source of the problem must be identified and the problem mitigated, if possible. The tree must then be allowed to recuperate before coppicing. Following this operation, the tree will typically generate one or several new strong, straight shoots. After selecting the best shoot, the others are eliminated to clear the desired axis.

Pinching green stubs is an operation that is performed at the beginning of summer and consists in pinching, between the thumb nail and the index finger young, small branches that need to be removed or whose growth needs to be slowed (Richard and Anctil, 1995).

Pruning consists in removing lower branches to clear the trunk of branches, which will ensure the wood is exempt of knots, thus increasing the tree's market value. Removing lower branches of fast-growing species such as poplars and larches will help slow-growing trees such as spruce to develop without weakening the leading shoot. When no shearing has been done, pruning can be used to remove dead, diseased or crisscrossed branches, or branches that exhibit an undesirable fork.

The first pruning operation must be done as soon as the tree reaches a total height of 3 or 4 metres in the case of hardwoods (7 or 8 metres in the particular case of poplars) and 5 or 6 metres in the case of evergreens (Bourgery and Castaner, 1988). Lower branches are removed gradually – no more than 1.5 to 2 metres are removed at a time – until the trunk is free of branches on one third of its total height.

5.5 Pruning evergreens

Spruce and pine trees used in shelterbelts usually do not require pruning, except in cases when the leading shoot is broken or diseased. As for cedars, up to 30% of their foliage can be pruned vertically to prevent desiccation and gaps at the base of the shelterbelt (Anonymous, 1981).

5.6 Pruning shrubs

Shrubs are used in shelterbelts to fill gaps resulting from tree pruning and to protect smaller areas. If the desired effect is a dense bush at the base of the hedge, shrubs should be pruned to half height or to a height of 15-20 cm on the second year following planting. However, a base that is too dense will not generate even snow distribution in the fields.

Spring-blooming shrubs should be trimmed after blossoming, and only the part of the branch that has bloomed should be removed. Summer-blooming shrubs have to be trimmed a few weeks before resumption of growth by removal of the small branches that have bloomed the previous year.

5.7 Pruning tools and schedule

By taking early and regular action with regards to the growth of a tree, we can avoid the use of harsh tools. Branches that need to be removed must be trimmed before their diameter exceeds 2 to 3 cm in order to promote healthy healing of the wound. When shearing or pruning lower branches, cuts should be done on the lower portion of trunks and should not include the branch bark ridge (small bulging measuring a few millimetres located at the base of the branch. Pruning shears are used to cut down branches that are not too high; for higher branches, a long-arm pruner can be used. As for larger branches – diameter should with a diameter not exceeding 5 cm if the tree has been well cared for – they can be pruned using a hand saw.

There is no consensus when it comes to pruning schedules. Generally speaking, pruning can be done at any time of the year with the exception of fruit- and flower-producing trees for which production criteria have to be taken into account (Michau, 1985). When pruning is done during the growing season, trees have a better chance at healing the branch bark ridge, scarification occurs more rapidly and wounds are better protected because of the plants' activity. Certain species such as birch and maple can loose quite a lot of sap if they are trimmed during the flowing season – i.e., from mid-March to mid-May and from mid-October to mid-November. Winter pruning has an added benefit in that the tree's structure is visible. It is recommend to avoid pruning during very cold weather to prevent exposed tissues from freezing.

References

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