EXPERIENCE WITH BLACK POLYETHYLENE FILM FOR MULCHING HARDWOOD TRANSPLANTS

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Films of polyethylene plastic have been used successfully, though in a limited way, for some time for mulching vegetables and small fruits. Such film mulches have proved more effective than organic litter for controlling weeds. If black film--the color of most mulching films--is used, it has the effect of increasing soil temperatures, which in some circumstances may stimulate plant growth.

The experiences reported here resulted from using black polyethylene film as a mulch on two species of hardwood transplants in a forest tree nursery at Essex Junction, Vt. The film was 0.015 mm. thick. It was purchased in rolls 3 feet in width. The transplants were stock for use in genetics out-plantings;- they were to be grown to larger sizes in the nursery than is customary for ordinary field planting.

Our first use of the polyethylene film for mulching was on 18 two-year-old transplants of curly birch (Betula verrucosa) that had been lined out at 9-foot spacing in the nursery. Alternate plants in the row were individually mulched in April with 3-foot squares of the film. Each square was slit from one side to the center to permit placing in position around the plants. Since center holes were not cut for the stems, the slit film touched the stems on at least two sides. Soil moisture was at a high level when the mulching was done, and weed growth had not yet started.

Results after 2 years were very satisfactory in respect to survival, growth, and weed control. The mulched plants appeared more vigorous than the unmulched ones, although not any taller. However, the most striking difference was that nearly all the mulched plants produced multiple stems (fig. 1), whereas those without mulch remained singlestemmed (fig. 2).

The cause of this reaction to the mulch is not definitely known. However, since the black film would tend to increase surface soil temperatures, and further, since it was in contact with the tree stems, the root-collar region of the plants probably was subjected to higher-than-normal temperatures. There is evidence from studies of epicormic branching that dormant stem buds are stimulated into active growth by increased temperatures. So it is a reasonable speculation that increased temperatures caused dormant root-collar buds on the mulched trees to break dormancy and develop basal branches.

Film was applied in a different manner on some 2-year-old sugar maple transplants. One-year-old maple seedlings had been lined out in rows 2 feet apart, and then grown for 1 year under cultivation and irrigation. At the end of this season in the transplant bed, the 2-year-old plants were 3 to 6 inches tall (fig. 3). The next spring, continuous strips of film about 20 inches wide were laid between the rows of transplants. Thus, a 4-inch strip of uncovered soil was left along each row, and contact of film with plants, such as occurred among the mulched birches, was avoided. After the film was in place, the bare strips over the rows were mulched with 4 inches of sawdust.

This combination film-sawdust mulch was left intact through 2.5 growing seasons. There was no development of multiple-stemmed trees such as occurred among the birches. The mulched bed required neither weeding nor irrigation, although several drought periods lasting up to 20 days were experienced. The trees grew very well,

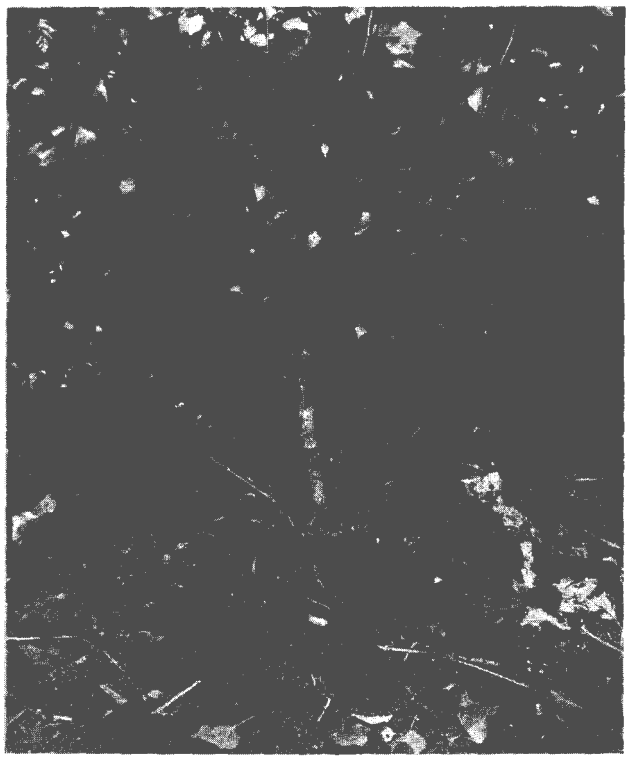

Figure 1.--Multiple stems of a 4-year-old birch transplant that was mulched with black polyethylene film. The film was in contact with the base of the stem.

Figure 2.--Typical single-stemmed birch transplant grown under the same conditions as the plant shown in Figure 1 except that no mulch was applied.

Figure 3.--Two-year-old sugar maple seedlings after 1 year in the transplant bed. These were cultivated and artificially watered.

attaining heights of 4 to 6 feet during their third season under the mulch treatment (fig.4).

Although these two experiences in mulching with polyethylene film neither exhaust the possibilities nor constitute a general recommendation for use of this material in forest tree nurseries, they do demonstrate that film mulching effectively controls weeds and promotes good tree growth. The multiple-stem development in the curly birch indicates that the film should not contact the tree stems (unless multiple stems are desired for ornamental purposes). For growing hardwoods, particularly where stock is lined out to grow for several years, nurserymen might do well to try film mulching as a labor-saving and growth-promoting cultural measure.

Figure 4.--The same bed shown in Figure 3 during the third growing season after mulching between the rows with black polyethylene film and along the rows with sawdust.