Site Preparation Prevents Re-opening of Planting Slits in Heavy-Textured Soils

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In early spring, when most trees are planted, clay and clay loam soils are generally moist to wet. The planting shoe of conventional planting machines can therefore slice easily through even highly compacted soils. After the tree roots have been inserted in the planting slit, the packing wheels of the machine close the slit tightly and planting appears to have been successful.

However, in late spring or early summer when evapotranspiration begins to draw moisture from the soil, the soil begins to contract and the sides of the planting slit pull apart because their resistance to the force created by soil shrinkage is low. Depending on the texture of the soil and the quantity of moisture withdrawn, a planting slit may open to a width of 5.5 cm (2.2 in.) and a depth of 15-20 cm (6-8 in.). When this happens, the newly

planted tree seedlings or transplants lose their support, they start to lean or fall over, their roots dry out, and mice feed on the exposed roots.

During afforestation studies with hardwood seedlings I found that mechanical site preparation eliminated the opening of the planting slit. The studies were carried out in a field near Hornby, Halton County, Ontario. The soil was an imperfectly drained clay loam 46-61 cm (18-24 in.) deep over compact clay. The pH of the plow layer was 6.4 and the organic matter content was 2.8%. The Ontario Soil Survey (Gillespie et al. 1972) places the soil in the Chinguacousy Series. All trees were planted between May 2 and May 5, 1976, with a light-weight, tractor-drawn Forest View tree planter.

Plowing in July and repeated disking in August

Fig. 1. Tightly closed planting slit on plowed and disked land.

Fig. 2. Open planting slit on land which received no mechanical site preparation.

and September of the year prior to planting produced an excellent planting bed of crumbly soil which showed no opening of the planting slit at any time (Fig. 1).

Fig. 3. Partially girdled root of white ash seedling exposed by opening of the planting slit.

Rototilling (four passes with a tractor-drawn rototiller in the autumn prior to planting) also prevented opening of the planting slit.

Plowing and two-pass disking in the same direction were less successful. Short sections of the planting slit opened. These openings were 2-3 cm (0.8-1.2 in.) wide and 5-8 cm (2-3 in.) deep; they were generally 30-60 cm (1-2 ft) long and spaced approximately 9-15 m (30-50 ft) along the strips.

In all areas receiving no mechanical site preparation, the planting slit opened along its entire length. Maximum width of the opening was 5.5 cm (2.2 in.) and maximum depth was 18 cm (7 in.) (Fig. 2).

Although 54% of the trees growing in the open slits survived the first summer, most produced no height growth and 70% of white ash (*Fraxinus americana* L.) and silver maple (*Acer saccharinum* L.) seedlings and 30% of basswood (*Tilia americana* L.) seedlings were partially girdled by mice below the root collar (Fig. 3).

The width of the slit opening varied slightly during the summer, depending on the moisture present in the soil. However, a slit, once opened, never closed completely through to the last inspection on October 22.

Reference:

- Gillespie, J. E., R. E. Wicklund and M. H. Miller. 1972. The soils of Halton County. Publ. jointly by Ont. Dep. Agric. Food and Can. Dep. Agric. Soil Surv. Rep. No. 43.

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