

Non-chemical weed control with mulches and disks for nursery container production

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Experimental set-up

From 2003 to 2005, trials were conducted at four locations across Canada to test alternative weed control options for efficacy on weed control and impact on plant fertilisation.

This poster is a summary of results from trials at Byland's Nurseries, Kelowna, B.C. Funding came from the Canadian Nursery Landscape Association.



Picture: Experimental set-up was a controlled, full randomization design of 11 treatments, 20 replicates, 1 host plant (*Hydrangea arborescens*).

Results on weed control

Six commercially-available products, no weeding and herbicide Ronstar (oxadiazon), were compared to monthly hand-weeding. Number of weeds removed over one year was significantly lower ($p=0.01$) with woven coco-fiber disk, moulded plastic lid, crumb rubber, Biotop (starch-based product), sawdust, and herbicide Ronstar, with 95 to 98% weed reduction for the top 3 treatments.



Picture: Plastic lid with groundsel (*Senecio v.*). The disk gives excellent weed control, but weed seedlings grow in the opening around the plant stem.

Trial with fertiliser placement

Nursery growers make a surface application of granular slow-release fertiliser in the spring for plants grown 2 years in the same container, as residual soil fertility is low after one year.

A trial was conducted with fertiliser prills placed over or under the mulch or disk, to verify impact on plant nutrition. Placing fertiliser under the mulch requires more time during application.



Picture: Slow-release fertiliser prills placed over crumb rubber mulch. A similar trial was conducted at the same time at Oregon State University.

Results of fertiliser placement

After one growing season, top growth was significantly higher where fertiliser prills were placed under the mulch or disk. Results were not different between control (no mulch, fertiliser on surface) and treatments with the prills placed over the mulch.

Media analysis indicated significantly higher soluble salts for treatments where prills were placed under the mulch or disk.



Picture: Plant on left had fertiliser placed under coco-fiber disk. Plant on right had fertiliser placed over. Plant on left had higher leaf nitrogen (2.1%) than plant on right (1.8%).



Commercial use of non-chemical weed control

Mulches and disks offer effective control of specific troublesome weeds.

Liverwort, a moss-like plant, is common in container production where it is supplied with regular irrigation and fertilisation. It is a major nursery weed across North America as currently-registered herbicides offer poor control.

Picture: The liverwort (*Marchantia polymorpha*) covering the surface was controlled after the grower placed a coco-fiber disk on top of it.



Commercial use of weed control mulches

Mulches and disks are cost-effective for production of high-value plants inside greenhouses and covered buildings.

Most herbicides are not registered for closed structures, as the vapor fumes can result in serious phytotoxicity damage to the crop.

Mulches applied on top of growing media create a fast-drying surface that prevents growth of water-loving weeds.

Picture: Container-grown *Quercus* (oaks) in a commercial greenhouse near Kelowna, B.C. Note the mulched container surface.



Commercial use of weed control disks

Mulches and disks offer season-long weed control residual.

In regions receiving extensive rainfall, such as the B.C. Coast, weed growth is rapid, especially at the base of slow-growing plants such as *Buxus* (boxwood), *Quercus* (oak) and *Picea* (spruce).

Picture: Commercial nursery near Chilliwack, B.C. Coco-fiber disks were applied on the left, a slow-growing shrub, but not on the right, a plant which rapidly fills the container surface.



Cost of mulches and disks

- For a standard 1-gallon container, per year:
- Sawdust mulch is \$0.01 (for 240 ml / pot);
 - Biotop mulch is \$0.04 (for 90 ml / pot);
 - Crumb rubber mulch is \$0.08 (240 ml / pot);
 - Plastic lid disk is \$0.09 (1 disk per pot);
 - Cocofiber disk is \$0.14 (1 disk per pot);
 - Ronstar herbicide is \$0.03 (3 applications);
 - Hand-weeding is \$0.10 to \$0.25 (2 passes).

Picture: Left to right: disk is newly-installed, 1-year old, 2-year old and 3-year old. The product degrades over time. Note the bittercress weeds (*Cardamine h.*) growing in 3-year old.

References:

- Alltand J 2006 "Management considerations for using container mulches" The Digger Magazine (Oregon). April: 26-34.
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