Improving Crop Yield and Soil Quality with Mulches and Cover Crops

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Objectives

- Evaluate availability and efficacy of locally available mulch materials.
- Generate mulch materials in the orchard.
- Improve spray-on mulch for multi-year weed control.
- Evaluate plant species for in-row living mulch.

Locally available wood waste mulch in new planting

In a recent survey (Kuchta and Hogue, 2002) wood waste products were found to be one of the most readily available mulch materials in BC. A trial in a grower orchard, therefore, was initiated in 2003 to evaluate the efficacy of two commonly available wood wastes (Figure 1).

A trial was conducted in an orchard established in 2002 with a 3.5 m row spacing, a full 2 m wide alley cover crop, and a biomass productivity equivalent to that of the Summerland site of 0.78 kg/m² could, therefore, provide the required 1.5 kg/m² mulch material for a one metre row width (2.1 factor).

Generating mulch materials in the orchard

Three trials were conducted, two in Summerland and one in Wenatchee, to measure biomass production in orchard alleys that could serve as tree row mulch material.

Multiple harvests were difficult to obtain in 2 sites because of interference of other management practices. At one site (Summerland A) biomass measurements from 4 of 5 mowings provided 0.38 kg/m² (2.47 tons/A) yield of dry matter (Figure 2).

Spray-on mulch technology for multi-year weed control

Modifications to a trial to evaluate underlays initiated in 2002 were made in spring 2003 by substituting polyethylene vegetable mulch in 2 treatments with a very economical polypropylene landscape fabric fully permeable to water. Thress, and all other underlay treatments provided excellent full season weed control (Figure 4).

Spray-on mulch trials in grower orchards

Three grower orchard spray-on mulch trials initiated in 2001 were continued in 2003. As in 2002, after controlling weed escapes resulting from overwintering effects on the mulch, spray-on mulch was re-applied at all three locations.

At all sites weed control was improved each year in the spray-on mulch plots and weed growth was minimal throughout the 2003 season. At the Peachland site spray-on treatments implemented in a newly planted orchard in 2001, in addition to providing season-long weed control (Figure 5), also significantly increased tree vigour.

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Plant material for in row living mulches

A. Equisetum arvense as a living mulch. A trial was conducted in an established grower orchard (Bradburn/M9 and Gala/M9), in Summerland with established stands of Equisetum arvense (field horsetail). Plots with E. arvense and plots without were either kept free of weeds with glyphosate application or allowed to grow weeds until late summer. Weed pressure in all plots was low. Plots with E. arvense were essentially free of all annual weeds for the entire growing season (Figure 6).

Tree vigour and crop yield data could not be obtained but leaf N measurements in plots with and without E. arvense supported observations that competition of this cover crop is, if anything, minimal.

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Summary and Conclusions

1. Locally available wood waste mulches can provide season-long weed control in new plantings, with spot treatments of escapes, particularly at match edges.

2. Preliminary trials indicated that growing sufficient biomass in the alleys for in-row mulching is possible providing there is a) a good stand of a suitable cover crop, b) management practices to promote cover crop growth and c) a method of harvesting and delivering the biomass on the tree row efficiently.

3. Yearly re-application of spray-on mulch increased its weed controlling efficacy appreciably.

4. Various underlays, including a light landscape fabric or a compost layer, increased the long term efficacy of spray-on mulch and replaced the need for yearly re-applications.

5. A strong stand of Equisetum arvense greatly reduced the annual weed populations in the tree row without significant competition to established apples in a high density planting.

6. Several dwarf creeping ornamental species established rapidly, providing complete ground cover and preventing annual weed growth.

References