

## **2008 PROGRESS REPORT: ORGANIC CROPPING RESEARCH FOR THE NORTHWEST**

**TITLE:** Growing nitrogen in the organic orchard.

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**DATE (period which report covers):** March – December 2008

**KEYWORDS:** nitrogen, legume, direct seeding

### **ABSTRACT:**

Two on-farm trials were established in 2008 to test different approaches to growing nitrogen within an orchard. The trial at Warren Morgan Orchard (WMO) compared four perennial legume species (ladino white clover, alfalfa, birdsfoot trefoil, kura clover) direct seeded into the existing alley vegetation with or without suppression. All species were successfully established, with better growth in the suppressed areas. A single mowing was done pre-harvest (late August) but total biomass was low. Ladino clover and alfalfa performed best in this initial season. The legumes will be managed for 'mow and blow' in 2009 and their N contribution monitored. The trial at Cloud Mountain Farm (CMF) focused on annual legumes planted into the tilled edges of the tree weed strip. A good planting device was not available and seedling establishment was poor. The tillage led to severe weed infestation and little legume biomass was produced. The trial will not be continued in 2009.

### **OBJECTIVES:**

1. Field test four legume species for potential to provide N when grown in the orchard drive alley.
2. Compare cover crop seeding method using a no-till drill with and without a pre-plant burndown.
3. Develop simple spreadsheet calculator for estimating potential N contribution from legume cover crops depending on species, orchard spacing, and width of legume strip.

### **PROCEDURES:**

**1.)** Four legume species (alfalfa, ladino clover, birdsfoot trefoil, kura clover) were direct seeded into grass alleys (either suppressed or not) on May 17, 2008, at WMO in a mature block of Gala/M26 apple, using a randomized complete block design. Seedling establishment, weed competition, and legume growth were monitored throughout the season, using a point intersect, a tape measure, and growth staging. The alleys received a 'mow and blow' treatment in late August just prior to apple harvest. Soil nitrate was measured at planting, at mowing, and 10 and 20 days post mowing. A second trial was planted in late May at CMF, using five annual legumes (soybean, cowpea, chickling vetch, berseem clover, crimson clover) and an untreated control.

Seeds were broadcast on the tilled tree row and packed in with a cultipacker. Seedling establishment, weed competition, and legume growth were monitored throughout the season.

2.) Each seeded alley had an unsprayed 50' on the north end of the planting for comparison with the sprayed area. Three different herbicide treatments were compared: glyphosate lethal, glyphosate sublethal, and paraquat burndown. A Great Western no-till drill was used to plant all the seed in a single 4' swath in the center of the drive alley. Seedling establishment, weed competition, and legume growth were monitored throughout the season

3.) No work has been started on the cover crop spreadsheet.

**PROGRESS TOWARDS OBJECTIVES (Comparison of actual results with the original goals):**

Seedling establishment was excellent and the lack of tillage limited weed competition at WMO. Legumes performed better in the sprayed areas (Fig 1-4). Legume biomass was limited during this establishment year, and perhaps lower than expected due to late planting date, shade, and tractor traffic. Biomass was too low to justify extensive soil nitrogen testing. As expected, Kura clover grew the least as it puts most of its energy into root production in the first year. More biomass is expected from all species in Year 2. The ability to provide a significant N contribution will be influenced by the potential width of the legume planting; tractor traffic clearly reduces plant performance, but less so in ladino clover.

Seedling establishment was poor at CMF. A good planting device was not available and the approach used proved unsatisfactory. The tillage led to severe weed infestation and little legume biomass was produced. The berseem clover and crimson clover had better establishment than the other species and overtopped weeds in some areas, indicating some potential for use. The trial will not be continued in 2009.

**OUTPUTS (Publications including newsletter articles, workshops and meetings, presentations, web sites or pages, field days):**

Presentations at Wash St. Hort. Assoc. Annual Meeting, FiBL seminar, FarWest Agribusiness Assoc. conference.

**IMPACT (In what way has your work influenced organic agricultural practices, economics/marketing and environmental stewardship):**

This was the establishment year, and significant N contributions were not achieved. However, the success at direct seeding has led WMO staff to plan to expand plantings into another orchard block in 2009.

**INSTITUTION:** WSU

**STATE:** WA

**FUNDING SOURCE(S) (list matching funds if applicable):**

CSANR Organic Cropping Research grant

**FUNDING AMOUNT(S):** \$13,698

**ORGANIC RESEARCH LAND (indicate number of acres on all that apply):**

Station    \_\_\_ non-organic    \_\_\_ transitional    \_\_\_ certified  
 On-farm    12 non-organic    \_\_\_ transitional    8 certified

**FARMER COOPERATOR(S):** Number: 2

Name(s): Warren Morgan, Jim Baird

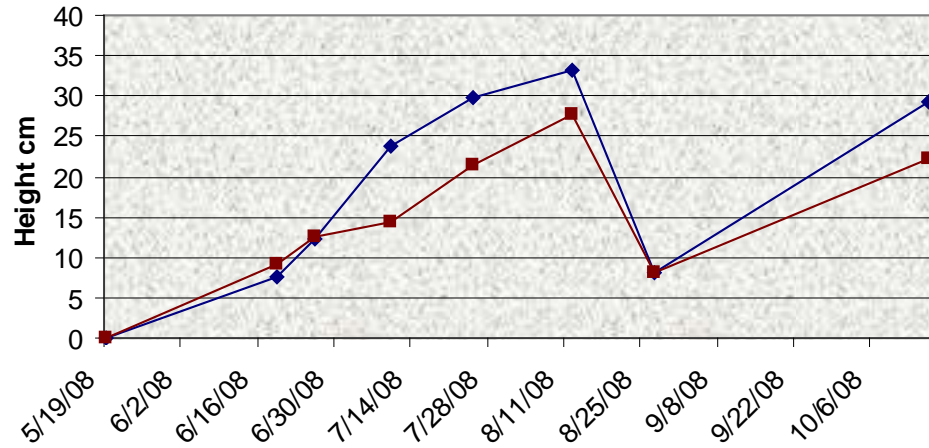


Figure 1. Alfalfa plant height during establishment year. (diamond=sprayed; square = unsprayed). Mowed in late August.

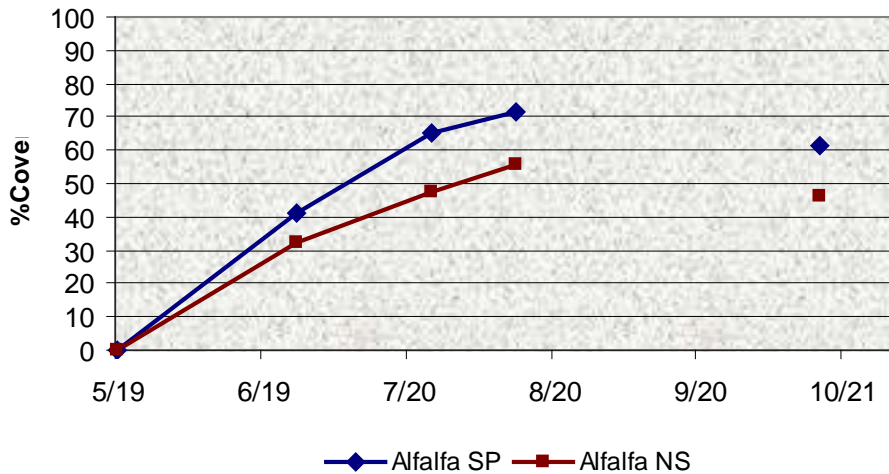


Figure 2. Percent cover in alfalfa plots, sprayed (SP) and unsprayed (NS).

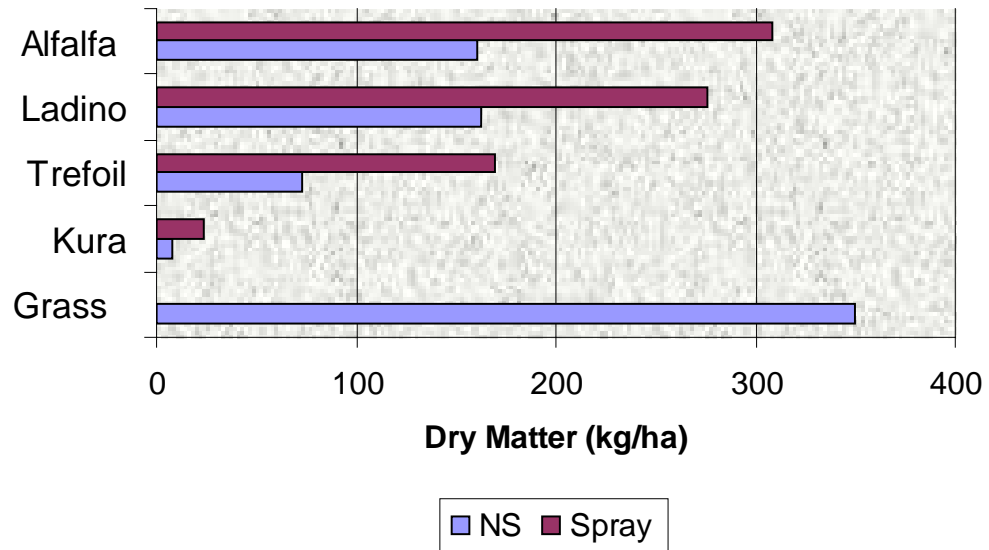


Figure 3. Legume biomass at mowing (late August), sprayed and unsprayed (NS), and compared to grass control.

Figure 4. Ladino clover establishment in sprayed alley.

