

Living Mulches in Minnesota Wheat

Final Report for FNC95-091

Project Type: Farmer/Rancher

Funds awarded in 1995: \$1,373.00

Projected End Date: 12/31/1996

Region: North Central

State: Minnesota

Project Coordinator:

[Dave Birong](#)

Project Information

Summary:

PROJECT BACKGROUND

My 40 acre family farm has been organic for several years now. The crops consist of oats, wheat (spring and winter), soybeans, alfalfa, clover and medic. All are used in a rotation to maximize their potential in a sustainable farming operation. Before receiving this grant, I did some experimental work with spring and winter wheat interseeded with legumes with the Minnesota Department of Agriculture for three years. After this SARE grant, I will definitely use the medic as a primary source for nutrients and weed smothering in wheat.

PROJECT DESCRIPTION AND RESULTS

Five acres of farmland on my 40 acre farm was selected for this demonstration. A randomized complete block design as plotted out on the 5 acres and initial soil sampling was done. The previous year's crop was wheat. The land was chisel-plowed and prepared with a disk and field cultivator before planting the certified "Seward" hard red winter wheat September 1995. The plot overwintered well and "Caliph" medic was broadcast with a spreader at the rate of 15 pounds/acre as soon as the plot was dry enough to drive on (May 11, 1996). The medic plots were dragged after seeding to slightly incorporate the small medic seed. I also noticed that the light dragging helped eliminate some of the small weeds that were starting to emerge.

The control with fertilizer plots were foliar fed two times: May 31, when the wheat was 4-6" tall and June 29, when the wheat was at "boot" stage. Each time the 2 gallon/acre rate of fertilizer was used. 20 gallon/acre nozzles are used to prevent plugging and insure good coverage of the product. Also, all spraying is done between day break and mid-morning for best results. The wheat was harvested on July 31, 1996 and yield data obtained. Medic was sub sampled and a dry matter per acre basis determined. End of season soil sampling was done at this time also.

Results:

The initial soil testing showed the condition of the soil before the growing season (table 1). The end of the season soil testing showed the condition of the soil after the growing season (table 2). The nitrate-nitrogen and percent organic matter have increased, thereby building up the land in the medic plots. Fertilizer is generally

maintaining the land at a status quo and the control is degrading the land. The yield results are given in table 3. as you can see, the fertilized plots out yielded the control plots by over 10 bushels per acre, and the living mulch plots (Caliph medic) were in-between. I believe if the weather in the spring would not have been so rainy and cool (April and May) the medic and fertilized plots would have been even higher yielding than the control. The medic is an excellent choice for the farmer who wants a low-growing nitrogen-fixer that establishes very fast and also is capable of smothering weeds.

The dry matter contributed by the medic "Caliph" was 0.49 tons dry matter per acre (table 4). The medic will decompose and add additional organic matter and nutrients back to the soil.

Table 1. The organic matter and nitrate/nitrogen is for the initial soil.

Plot averages (0-6"), Organic Matter %, Nitrate/nitrogen lbs/acre

Control with no fertilizer , 3.2, 39.0

Caliph medic , 3.6 , 31.5

Control with fertilizer , 3.3 , 31.8

Table 2. The organic matter and nitrate/nitrogen is for the end of season.

Plot acres (0-6") , Organic Matter %, Nitrate/nitrogen lbs/acre

Control with no fertilizer , 3.3, 31.2

Caliph medic , 3.9 , 40.5

Control with fertilizer , 3.5 , 30.0

Table 3.

Plot Averages (Yield) , Bushels/acre

Control with no fertilizer, 24.6

Caliph medic , 31.5

Control with fertilizer , 34.9

Table 4.

Plot Averages , Dry Matter ton/acre,

Caliph medic , 0.49

The medic proved to be an asset compared to the conventional system, and every year I use it, the soil's condition should improve. Soil organic matter should rise every year and hopefully return to virgin levels or higher. I expected to see some differences, but these results are real encouraging and really make a cost-effective statement to the sustainable practice of living mulch. Perhaps in the future I would mix alfalfa and medic half and half to lower the cost of the living mulch even more while still providing all of the benefits of the medic: smothering weeds, nutrient contributions, ground cover for erosion and water loss and improving the soil's tilth.

I learned that a farmer must plan the mulch into the winter wheat as soon as it is possible to drive on the land. This way, the mulch germinates before too many weeds get the change to germinate. In the conventional way, dragging off is done anyway to reduce weeds, so dragging the medics accomplishes two things: reducing germinating weeds and lightly covering the seed of the medic. From now on, we will definitely be doing this crucial first step in the spring. Overcoming the weed barrier is quite difficult, and this method does a good job in controlling weeds when they start - in the spring. The only other effective method of weed control is to follow the land using mechanical means to rid it of weeds.

Implementing a project like this requires innovation and the willingness to put some of your land "at risk" for experimentation. A person never knows what can ultimately happen, even though everything is well-planned. The advantage is that a new practice can be developed with SARE helping, thereby reducing the risk for the

farmer.

I would tell producers that you have to start small; once you get the hang of it, then expand your acres. Whatever the practice, don't go "whole hog", every farm is unique and not every practice works all the time on every farm.

The medic is an environmentally safe way of adding nutrients to the soil. This sustainable practice is cost-effective and good for the environment. The small cost of medic rewards the farmer in organic matter, nitrogen and other nutrients. The medic lowers the cost of production for wheat by not having to buy expensive fertilizer. Chisel plowing reduces consumption while reducing wind and water erosion of topsoil.

I hope this report will help many farmers involved with sustainable farming.

OUTREACH

The field day was Saturday July 6, 1996 at 1:00 pm. I discussed my past experiences using legumes as living mulches. I also talked about the importance of soil testing and how to obtain a representative soil sample. I displayed our sprayer that can be used on wheat and soybeans using the drip nozzles. Everyone who has been to see the plot this year has been interested in seeing this "medic": what it looks like, how it grows, what it does. Basically, it is a very environmentally friendly plant that is beneficial to growing crops. I plan on discussing my results with persons who would like to know more about this aspect of sustainable farming.

I used newspaper, extension and state personnel, plus a local radio station to get the word out about this demonstration plot:

- 1) Tim Pdoyne, Hutchinson, MN did a radio report/interview with me on the living mulch in wheat.
- 2) Dave Schwartz, Meeker City Extension, Litchfield, MN wrote an article in this weekly column.
- 3) Wayne Monsen, Minnesota Department of Ag, St. Paul, MN wrote an article in the state's newsletter
- 4) I also purchased an advertisement in the local paper.

Research

Participation Summary

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or SARE.



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