



Western SARE

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Western SARE Grant Categories

- Research & Education
- Professional Development
- Farmer/Rancher
- Professional + Producer
- Graduate Student
- Sustainable Farm Tours

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LIVESTOCK-CROP INTEGRATION

Introduction

Mixed crop-livestock farming systems—aka integrated crop-livestock systems—consist of crops and livestock incorporated in spatially and/or temporally overlapping ways on individual farms, or between nearby farms.

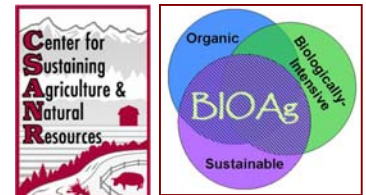
Basic Types

1. Single-year alternation between harvested annual crop (usually grain) and grazed annual crop

2. Longer rotations of 3-12 or more years of perennial grasses, legumes, or mixes followed by an equal or lesser duration of annual crops (phase systems), and
3. Grazing and resource-sharing collaborations between separate crop and livestock producers in close proximity (ex: stubble grazing)

Common Benefits of Integration

- Efficient use of natural



- resources
- Utilize natural pest control mechanisms
- Make use of 'waste' resources
- livestock manure
- crop residues

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Research & Education Grant

Title: No-Till Livestock-Grain Rotation for Diversified Farms

Project Number: SW06-066

Principal Investigator:
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Amount Funded: \$125,122



Undercutting sweep Moldboard plow Control alfalfa

	Triticale grain yield (kg ha-2)	Biomass (g m-2)	Alfalfa crowns (# m-2)	Weed Index (0-5)
Plow	4200a	383a	5.5a	0.38a
Sweep	1630b	601b	8.25b	1.13b
Alfalfa	-	668c	11c	3.81c

Table 1. Triticale grain yield, aboveground biomass, surviving alfalfa crowns, and weed index July 12, 2007.



Western SARE, a USDA organization, funds grants for research and education that develop or promote some aspect of agricultural sustainability, which embraces

- profitable farms and ranches
- a healthy environment
- strong families and communities.

The Western Region, one of four SARE regions nationwide, is administered through Utah State University.

Western SARE:
<http://wsare.usu.edu>

National SARE
www.sare.org

LIVESTOCK-CROP INTEGRATION

- Improve soil quality and productivity

Disadvantages and Barriers to Integration

- Knowledge-intensive systems
- Changes in management and labor costs/ demands
- Infrastructure: watering systems, livestock processing
- Difficulty balancing year-round forage supplies
- Other wintering issues: compaction, livestock facilities/location
- Marketing costs
- Livestock less profitable than wheat some years
- Possible water depletion under deep-rooted perennials
- New, complicated N loss pathways
- New weeds, transfer of weeds

Trials at Thundering Hooves

Can conservation tillage be applied to perennial-annual transitions in mixed crop-livestock systems?

What is the impact of till-



Table 2. Average annual variable costs, fixed costs and returns for three organic crop rotation options.

	Grazed alfalfa-wheat rotation	Hayed alfalfa-wheat rotation	Continuously grazed alfalfa
Revenue	\$ 696.20	\$ 1,448.20	\$ 548.60
Seed	\$ 13.99	\$ 13.99	\$ 5.50
Amendments	\$ -	\$ 70.00	\$ -
Irrigation	\$ 157.00	\$ 160.30	\$ 175.00
Labor	\$ 71.29	\$ 254.35	\$ 92.18
Other:	\$ 46.22	\$ 225.64	\$ 50.28
Overhead	\$ 14.43	\$ 36.21	\$ 16.15
Operating Interest	\$ 6.72	\$ 16.88	\$ 7.53
Ownership			
Costs	\$ 218.61	\$ 329.74	\$ 162.24
Net return	\$ 167.94	\$ 341.08	\$ 39.72

age on soil N?

Does more tillage mineralize more N?

What is most profitable, grazed alfalfa, a grazed alfalfa-wheat rotation, or a hayed alfalfa-wheat rotation?

Is N fixed by pasture sufficient to produce competitive grain yield?

Conclusions

- Conservation tillage (sweeps): 61% yield



penalty

- More work needed for minimum-till pasture eradication
- Very little effect of tillage on nitrogen mineralization
- Grain yield after moldboard: 82% of County conventional avg
- Considerable reduction of inputs is possible
- Integrated more profitable than non-integrated

Livestock integration promises significant economic and environmental benefits in the Palouse.