Evaluation of Fodder Production Systems for Grazing Dairy Farms

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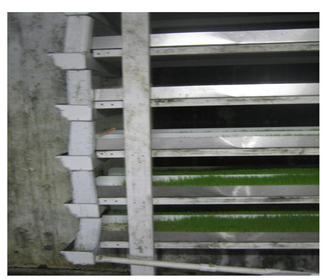
INTRODUCTION

Sprouting grain for livestock feed is an old technology that has gained renewed interest as a method to produce a continuous supply of fresh, high-quality forage regardless of environmental conditions. Furthermore, **increasing costs of corn**, a desire for some grazing dairies to **move away from grain supplements**, and interest in **alternative solutions** to producing high-quality pasture in challenging environmental conditions have been cited as reasons for dairy farmers to consider sprouting technology. Previous research conducted on the feeding value of sprouted barley, and other sprouted grain for ruminants indicate that **benefits of sprouting may be negated by a loss of DM yield** coupled with no significant improvement (or even a loss) in nutrient concentrations or digestibility. Currently no data is available regarding the feeding value of fodder with high quality forages such as the conserved forages and pastures found on well-managed grazing dairy farms. The objective of this study was to evaluate the **feasibility, effectiveness and challenges** of implementing sprouted barley systems on dairy farms. This study summarized a series of studies conducted to **evaluate the nutritional quality and yield, animal productivity and economics of implementing fodder systems on dairy farms.**

METHODS

- ✓ **Study 1 (Sprout Study)**: Five grains (barley, oats, wheat, rye, and triticale) were sprouted for 7 days in a fodder system and analyzed for yield and nutritional content (Univ. of MN)
- ✓ **Study 2 (Cow Study)**: Lactating dairy cows were fed a TMR (during the winter) containing either: 1) no fodder; or 2) 1.4 kg DM/cow/d sprouted barley fodder. Milk production, milk composition and income over feed costs (**IOFC**) were evaluated. (Univ. of MN)
- ✓ **Study 3 (Case Study)**: Three organic dairies that fed fodder were monitored monthly for 12 months to collect data on feed nutritional analysis, milk production/composition (including fatty acid profile), management and economic information. (USDA-ARS)
- ✓ Data for Studies 1 and 2 were analyzed using the MIXED procedure of SAS. The on-farm case study (Study 3) was summarized using Microsoft Excel.



RESULTS

Table 1. Study 1- Sprouting: Mean numerical nutritive quality and biomass production of five different grains used for fodder production in Minnesota.

Nutrient	Barley	Oats	Rye	Triticale	Wheat
DM, %	89.9	91.9	88.7	89.2	88.7
OM, % DM	96.8	96.2	96.8	97.3	97.2
CP, % DM	14.1	13.0	11.1	13.9	14.8
NDF, % DM	26.9	29.7	22.2	17.7	10.3
NE_L, Mcal/kg	1.65	1.72	1.72	1.72	1.80
Yield					
Weight, fresh kg	9.3^{a}	9.0^{a}	7.8^{b}	6.3^{c}	8.8^{b}
DM, %	15.4^{a}	$19.1^{b,d}$	19.8^{b}	24.2^{c}	18.9^{d}
DM yield, kg	1.5^{c}	1.7^{a}	1.6^{b}	1.5^{c}	1.7^{a}
Mold score (1= no mold) (6 = severe)	0.04^{a}	0.03^{a}	2.8^{b}	4.8^{c}	1.1^{d}

Table 2. Study 2- Cow study: Least square means for milk yield, milk composition and income over feed costs (IOFC) of lactating cows fed barley fodder in Minnesota

	No Fodder		Fodder	
	Mean	SE	Mean	SE
Dry matter intake, kg/d	17.5^{a}	0.35	14.5^{b}	0.34
Milk yield, kg/d	13.3	0.4	12.3	0.4
Milk fat, %	0.48	0.01	0.44	0.02
Milk fat, kg/d	3.75	0.09	3.68	0.07
Milk protein, %	0.39^{a}	0.001	0.35^{b}	0.001
Milk protein, kg/d	2.99	0.03	3.04	0.03
Milk urea N, mg/dl	13.5^{a}	0.8	16.45^{b}	0.8
IOFC, $/cow/d				
Current price ($11.71/bu)	$3.18	0.42	$2.96	0.42
25% ↑ corn price	$2.79	0.42	$2.86	0.42
50% ↑ corn price	$2.33	0.42	$2.77	0.42

Study 1 – Sprouting (Table 1)

- **Rye** was numerically 2-3 percentage points **lower in CP** while **wheat** was numerically **lower in NDF** than the other grains.
- **Barley and oats** had the greatest **fresh weight**, while **triticale** was lowest.
- **Barley** had the **lowest DM %** whereas **oats and wheat** had the greatest DM %.
- **Oats and wheat** had the **greatest DM yield**.
- **Barley** had the lowest mold score.

Study 2 - Cow Study (Table 2)

- **Dry matter intake** and **milk protein % were lower** for cows fed fodder; however, milk yield and fat were **similar** between treatments.
- Cows fed fodder had ↑ **milk urea N** which suggests **less efficient use of feed protein**.
- **IOFC** was **$0.22/cow/d higher** for cows NOT fed fodder. When **organic corn prices increased by 50%,** IOFC favored fodder by $0.44/cow/d.

Study 3 - Case Study

- Two farms **discontinued feeding fodder** during the study due to **labor, cost of production, barley supply and mold issues.**
- **No milk response** was noted on the above 2 farms when feeding fodder. Both farms produced **high-quality forages** which were more economical to feed than fodder and produced a better milk response. Other reasons (e.g., **forage quality, animal health**) were cited by farmers as the primary reasons for feeding fodder.
- One farm was small (20 cows) & used a low-input, home made system. **Home-grown forage quality was marginal,** therefore fodder may have provided better nutrition and better milk response.

CONCLUSIONS

Fodder systems may be a **costly method** of producing feed for dairy producers. However, fodder may have application in **small-scale livestock operations,** farms those with **high land values** where tillable acreage can produce high-value crops, or for producers experiencing severe, extended **drought**. Additionally, farms that have an **excess of labor** may benefit from a fodder system. Each farm must put **pencil to paper** to determine if implementing fodder in feeding management is economical, making sure to include **ALL** costs in deciding whether the money could be better spent growing or purchasing **higher-quality forage**.