

## **The Profitability of Grass-forages in Western New York**

### **by James Barney, Dan Steward**

In the past 50 years the main source of dairy forage in the Northeast has been corn silage and alfalfa. Due to its requirement for well-drained, highly fertile soils, this traditional corn/alfalfa rotation is not well suited to the soil resources on the majority of the soils in the southern tier of western New York. A large percentage of the area's soils are poorly drained upland hill ground. The promising alternative to this type of cropping system is to seed perennial grasses that help prevent erosion and should require fewer "off-farm" inputs such as pesticides, annual seed costs, and perhaps fertilizer, than corn and alfalfa would. In 1997 we applied for funding through the Northeast Region Sustainable Agriculture Research and Education Program's Farmer/Grower Grant program. The purpose of our study was to carry out a comprehensive on-site study of the economics of growing and feeding perennial grasses versus corn and alfalfa on an actual farm for the purpose of demonstration. The farm this project was carried out on was in Sherman, NY in Chautauqua County

Our original intention for this project was to carry out our analysis for the 1995 and 1996 crop years. Unfortunately, due to the poor early season weather that made time and field work a challenge, and a change in employees on the farm we ran into difficulties with the data collection on the farm in 1996. We did not feel that the data we collected in 1996 was complete or accurate. Subsequently, the economic data used for this summary will come from 1995. Also an analysis of 1993 yields is shown for demonstration purposes.

### **Description of the Farm and Procedures**

The farm that this project was carried out on was a 420 milking cow dairy that has historically grown between 300 and 350 acres of corn and harvested approximately 600-700 acres of hay crop. The farm has followed Cornell Recommends for field crops for years. The following is a breakdown of the drainage ratings on the fields farmed in 1995:

<b>Soil Class</b>	<b>Acreage</b>	<b>Typical Soil Series</b>
Well Drained:	435 acres	Allard, Chenango, Valois
Moderately Well Drained:	114 acres	Chautauqua
Poorly and Somewhat Poorly Drained:	494 acres	Busti, Fremont, Swormsville

As you can see, almost half of the land farmed is poorly or somewhat poorly drained soils. For sake of analysis we broke the farm's production up into four categories. *Corn Silage* is self-explanatory. *Mixed legume* included any stands that were mostly legume be it clover or alfalfa. *Intensive Grass* are fields that have been seeded back into high producing grasses like Reed Canarygrass or Orchardgrass, fertilized with a lot of nitrogen either from manure or commercial fertilizer, and harvested intensively on a three or four cutting system. *Old Grass* stands are those fields that used traditional low intensity grass management. Most of these were originally seeded with timothy or rye grass, much of which has long since been "cut out" with bluegrass, quackgrass, sweet vernal, or poverty grass taking their place.

### Economic Analysis

1995 was a dry year in this particular region which decreased the overall tonnage per acre on the grass as well as on the corn silage. All of the farm's harvested forages had drymatters checked and were weighed on a set of fixed scales as they went into the bunk. Costs of inputs were recorded and allocated accordingly. Direct or annual costs included fertilizer, seed, lime- which was allocated over three years; chemicals, custom operations, and fuel- which was allocated according to field operations performed. Fixed or added costs per acre included labor which was allocated according to the crop harvested and the yield per acre, machinery repair and ownership, buildings for machinery storage, and the cost for the use of the land, i.e. rent or taxes.

The following is a summary of the overall 1995 Crop Costs by crop group:

Crop	Acres	direct\$ / acre	Fixed\$ / acre	Total\$ / acre	TonsDM/ac	\$ / ton DM
Corn Silage	298	\$79	\$163	\$242	4.60	\$52.14
Mixed Leg.	36	\$27	\$141	\$168	2.70	\$61.39
Int. Grass	184	\$26	\$126	\$152	2.50	\$60.22
Old Grass	450	\$16	\$103	\$119	1.60	\$74.38
Total	968					

To further analyze the cost of growing the forages for the farm, we broke out what the costs of growing the different group of crops on soils of different drainage classes.

### 1995 Crop Costs Split by Soil Drainage

Crop and Soil Drainage Grown On	Acres	TonsDM/ac	\$ / ton DM	\$ / 32% ton
Corn Silage on Better Drained Soil	286	4.6	\$51.70	\$16.55
Corn Silage on Poorer Drained Soil	12	3.7	\$64.80	\$20.74
Mixed Legume on Better Drained Soil	36	2.7	\$61.39	\$19.64
Mixed Legume on Poorer Drained Soil	0	NA	NA	NA
Intensive Grass on Better Drained Soil	66	2.4	\$62.33	\$19.95
Intensive. Grass on Poorer Drained Soil	118	2.6	\$59.16	\$18.93
Old Grass on Better Drained Soil	24	2.1	\$68.54	\$21.93
Old Grass on Poorer Drained Soil	426	1.6	\$74.95	\$23.98
Total or Average	968			

The following are the yield results from the 1993 crop year:

Soil Class	acres	DM/acre
Corn Silage-Well Drained	289	4.7
Corn Silage-Poorer Drained	47	4.3
Legume/Grass-Well Drained	82	3.5
Legume/Grass-Poorer Drained	0	NA
Intensive Grass-Well Drained	38	3.0
Intensive Grass-Poorer Drained	127	2.8
Old Grass-Well Drained	14	1.3
Old Grass- Poorer Drained	92	0.9
Overall	689	4.6



### **Profitability of Corn Silage on Differently Drained Soils**

In 1995 the best yielding and most economical crop to grow on this farm was corn silage. As you can see the farm in this study had already come to the conclusion that corn silage on hill ground was not a very economical way to go. The majority of the farm's corn silage was being grown on the better soils. In 1993, 289 of the farm's 336 corn acres were on better drained soils. In 1995 286 of the farm's 298 total acres of corn were planted on better soil. As a comparison of yield in 1993, the better drained soil yielded 4.7 DM tons per acre (14.7 tons of 32% DM) versus 4.3 (13.4) tons per acre on the heavier soil. In 1995 the corn on the better drained ground went 4.6 (14.4) tons per acre and cost \$51.70 per DM ton (\$16.54 per wet ton) vs. 3.7 (11.5) tons per acres on the heavier soil costing \$64.80 per DM ton (\$20.74).

In 1995 the next most economical crop was the intensively managed grass with an average cost of \$60.22 per DM ton. The breakdown showed little difference in the cost of intensively managed grass on heavy soils at \$59.16 per DM ton versus the better drained soils at \$62.33 per ton. Growing intensively managed grass on the heavy soil was more profitable than growing corn silage (\$59.16 for the grass vs. \$64.80 per ton for the corn silage.)

The big loser in the whole analysis was the "old" management grass. As this farm expanded it picked up a significant number of acres that had years before been seeded down to legume-grass mixtures. . The farm attempted to increase the production on these fields through fertilization (mainly nitrogen), but found that because of the naturally lower yield potential of these grasses, only one or two cuttings a year were attainable, even if the first cutting was taken in the last week of May or the first week of June. The majority of these acres were on heavier ground with the 1995 yield being 1.6 tons DM per acre and the cost of growing this forage being \$74.38 per acre.

### **CONCLUSIONS**

In our analysis corn silage was the most profitable crop to grow on well drained soils. Although it costs more per acre to grow corn than the grass crops due to variable expenses such as pesticides and seeds, the yield per acre makes it the most economical crop to grow per ton. On heavier soils the cost per acre to grow corn is the same or more than on better drained soils. Unfortunately these soils have a significantly lower yield potential resulting in a higher per ton cost. A crop failure, be it inability to harvest or low yield due to any number of reasons, results in very expensive feed.

In our study, a ton of intensively managed grass forage cost less to produce on these heavier soils than a ton of corn silage did. It stands to reason that intensive grass is less risky than corn silage not only because it had a lower per acreage cost, but also because there is very little chance of crop failure. Non-intensively managed grass was the most expensive way to produce forages on these fields, regardless of soil type. Although, the cost per acre of growing this feed was quite low, this lower cost could not overcome the low yields. In most cases corn silage can be grown profitably on marginal soils, the key is to not plant more acres than can be managed properly. Increasing production of grass can reduce the amount of corn acres needed to supply a

farm's forage needs and decrease risk of a crop failure. Intensively managed grass *can* be a profitable alternative to the traditional corn-alfalfa rotation.

**From our observations, to get the most production from grass you should:**

1. Establish hardy species of grasses that can be intensively managed. From our demonstration plots Reed Canarygrass and Tall Fescue are the best for the wettest fields that will be kept in long-term grass production. Orchardgrass does better on slightly better drained soils. Avoid cutting-sensitive grasses like Bromegrass and Timothy.
2. Apply a lot of nitrogen. Economic returns on Nitrogen on these more aggressive species of grasses can usually be achieved with an application of 150 pounds of actual N per acre per year, split at least three times during the year. Nitrogen applications have also been shown to increase crude protein and delay maturity in grasses. Be sure to credit the nitrogen from manure applications.
3. Cut early, cut often. For this area, look to start cutting from May 20 to May 25 to get good quality. Timely harvested first cutting grass has excellent quality and will make a lot of milk; late cut grass will make for a large feed bill. Research has shown that grasses will quickly put on fiber and lose quality during the hot, long days of mid-summer. You may have to cut on a 28-35 day interval to get dairy quality feed on straight grasses.