# SUMMER ALTERNATE FORAGE PRODUCTION

Glenn E. Shewmaker, Steve Salisbury,
Ron Thaemert, Matt Schuster,
And Cindy Kinder[1]

## INTRODUCTION

Annual forage crop production has increased in Idaho. Annual forages include traditional production of corn for silage and small grains, as well as less traditional forages and fodders, such as Sudan grass and turnip. There is increasing interest and growth in the direct harvest of these less traditional forages by livestock through grazing. Use of annual forages also may fit comfortably in crop rotations, especially in years when irrigation water is in short supply, or the profitability of traditional cash crops such as wheat and barley grains are low. Annual forages can also be used as "double crops" either for harvesting or direct consumption by livestock to extend the grazing season. While these crops have been grown successfully in other locations, there is little data from Idaho on growing, harvesting, preserving or grazing annual forages. More non-proprietary information is needed to help growers do an effective job of variety selection, crop production, harvesting (including grazing), preservation (including ensilage), and nutrient management with crops.

The objectives are to 1) determine forage yield in a double-crop situation, 2) simulate timing of taking a first crop of alfalfa then rotating to annual forages, and 3) measure forage quality at September 15 harvest date, and at end of possible grazing period, February 1. The study was funded by University of Idaho Cooperative Extension and Specialty Crops Grants through the Idaho State Department of Agriculture.

**Keywords: alfalfa, barley, brassicas, corn, oats, sorghum, triticale, turnips, wheat, forage**

### Annual Forage Crops

Annual forages are often used as emergency crops during droughts. However, they should be a planned part of the forage system and not simply grown in response to dry conditions. Most annual forage crops are more satisfactory for pasture or silage than for hay. Annual forages have the following benefits:

- Quick source of forage—within one season.
- Rapid payback on production costs.
- Breaks disease and pest cycles in crop rotations.
- Allows quick response to changing economic and production conditions.
- Good nutrient uptake potential.
- Potential to double crop.

Annual forage crops include cool-season forages, such as cereals; forage brassicas such as canola (rape), kale, turnips, and Swedes; and warm-season annual forages such as corn and sorghum x Sudan

[1] G. Shewmaker, Univ. of Idaho Twin Falls R&E Center, P.O. Box 1827, Twin Falls, ID 83303-1827; and Extension Educators: Steve Salisbury, Twin Falls County; Ron Thaemert, Blaine Co.; Matt Schuster, Minidoka Co.; and Cindy Kinder, Camas Co. pg. 59-66 *In*: Proceedings, Idaho Alfalfa and Forage Conference 23-24 February 2004, Twin Falls, ID, University of Idaho Cooperative Extension.

grass hybrids.

## METHODS

Entries were planted in 4 replications in a randomized complete block design during July 10-11, 2003. Cereals, sorghum-hybrids, brassicas, and legumes were planted with a press-wheel drill in 6-inch rows. Corn was planted in 30-inch rows with a unit planter. Planting depth was 1 inch except for alfalfa and clover which was planted at ½ inch depth. Forage crop, cultivar, seeding rate, and supplier are listed in Table 1. The 10 x 20 feet plots were furrow irrigated at 30-inch centers.

The center 2 rows of corn at 30 inch rows, or center 5 ft of other forages were harvested to a 3-inch stubble height for forage dry matter yield, dry matter content, forage quality (ADF, NDF, CP) during Sept. 16-19, 2003. Forage quality on Feb 1 will be determined by grab sampling from plot remnants.

## RESULTS AND DISCUSSION

Planting of plots occurred 10 days later then planned. However, growing season was still 67 days which is typical of production agriculture in this area. Forage yields are expressed on a dry matter basis in figures 1-3. Spring cereals generally yielded from 2 to 3.5 tons/acre, significantly more than winter cereals. Oats grew the fastest and were headed out at harvest, whereas wheat and triticale were still in the vegetative stage. Barley was generally in the boot stage at harvest. The corn and sorghum hybrids yielded 7 to 12.5 tons dry matter /acre. Sweet Leaf II, a sorghum x Sudan hybrid yielded significantly more than all other forages. The brassicas tops yielded 2.2 to 3 tons dry matter/acre. Purple top turnip beets yielded 1.4 tons dry matter/acre.

Forage dry matter coefficients are given in figures 4-5. The dry matter coefficient is the proportion of the dry matter to fresh weight. Fresh forage yield multiplied by the dry matter coefficient equals the forage dry matter yield. Dry matter coefficients varied from 0.1 to 0.23 for cereals, 0.15 to 0.2 for corn and sorghums, and less than 0.1 for brassicas.

Example: The dry matter coefficient for Sweetleaf II was 0.21. This means the forage was 21% dry matter concentration or 79 % moisture. This demonstrates the necessity for producers to test the forage dry matter prior to ensiling, especially. Sweetleaf II and most of the other forages were too wet to ensile. The desired moisture level would be 60 to 65% moisture for most forages, so most of these would have to be wilted somewhat before chopping.

A killing frost about September 15 ceased all growth of the corn and sorghum hybrids. The cereal forages and brassicas continued growth well into October. Visual appraisal of growth and regrowth showed dry matter yield may have doubled in some of the triticales, wheats, and barleys. Forage quality of the cereals and brassicas should also have been maintained based on other studies in contrast to the warm season crops.

**Table 1.** Forage crop, cultivar, seed characteristics, supplier, and marketer of annual forage study in Kimberly R&E Center 2003.

| Entry No. | Crop/Variety | Entry | Seeding rate | Seeds/ pound | Supplier | Marketer |
|---|---|---|---|---|---|---|
| | **Winter Cereals** | | (lbs/ac) | | | |
| 1 | Barley | Schuyler | 80 | 14,300 | Kimberly R&E | |
| 2 | Italian ryegrass | Greenspirit | 20 | 227,000 | | John Wiersema |
| 3 | Triticale | L815 | 75 | 15,000 | Davenport | |
| 4 | | 356 | 75 | 15,000 | Davenport | |
| 5 | | 102 | 75 | 15,000 | Davenport | |
| 6 | | 2700 | 75 | 15,000 | Davenport | |
| 7 | | xxx Triticale | 75 | 15,000 | | Gooding/Oregon Trail Seed |
| 8 | Wheat | Stephens | 80 | 15,000 | Kimberly R&E | |
| 9 | | Brundage | 80 | 15,000 | Kimberly R&E | |
| | **Spring Cereals** | | | | | |
| 10 | Barley | Washford | 80 | 14,300 | Wash. Crop. Imp. | |
| 11 | | Belford | 80 | 14,300 | Wash. Crop. Imp. | |
| 12 | Oats | Provina | 80 | 16,200 | Kimberly R&E | |
| 13 | | Monida | 80 | 16,200 | Kimberly R&E | |
| 14 | | Stampede | 80 | 16,200 | | Gooding/Oregon Trail Seed |
| 15 | Wheat | Dirkwin | 80 | 15,000 | Kimberly R&E | |
| | **Warm-season grasses** | | | | | |
| 19 | Field corn | ST7624RR | 20 | 1,334 | | Northwest Seeds |
| 20 | | ST7141 | 20 | 1,400 | | Northwest Seeds |
| 21 | | HLS 009 | 20 | 1,400 | Hyland Seeds | KeyAg |
| 22 | | HLS 058 | 20 | 1,400 | Hyland Seeds | KeyAg |
| 23 | Grazing corn | Amaizing Graze 75 | 20 | 1,400 | Baldridge Hybrids | |
| 24 | | Amaizing Graze 100 | 20 | 1,400 | Baldridge Hybrids | |
| 25 | | Amaizing Graze 105gt | 20 | 1,400 | Baldridge Hybrids | |
| 26 | | Amaizing Graze 112 | 20 | 1,400 | Baldridge Hybrids | |
| 27 | Sorghum x sudan | Sweetleaf II | 25 | 20,000 | | Gooding/Oregon Trail Seed |
| 28 | Forage sorghum | NC+ BMR | 25 | 15,000 | | Gooding/Oregon Trail Seed |
| 29 | | Greentreat+ | 25 | 15,000 | Forage Genetics | Rick Speicher |
| 30 | | Sweeter-N-Honey BMR | 25 | 15,000 | Richardson Seeds | |
| 31 | | Bundle King BMR | 25 | 15,000 | Richardson Seeds | |
| 32 | | BMR 100 | 25 | 12,000 | | Northwest Seeds |
| 33 | ? | Dairymaster BMR | 25 | 15,000 | | Northwest Seeds |
| 34 | Grain sorghum | 371 | 25 | 15,000 | | Northwest Seeds |
| | **Legumes** | | | | | |
| 37 | Alfalfa | Rampage | 12 | 199,000 | | Gooding Seed |
| 38 | Red clover | Red clover | 10 | 252,000 | | Gooding Seed |
| 39 | Spring peas | Yellow pea | 100 | | Kimberly R&E | |
| | **Brassicas** | | | | | |
| 40 | Turnips | Purple top | 4 | 190,000 | | Gooding Seed |
| 41 | | Appin | 4 | | | Barenbrug |
| 42 | Kale | Maris Kestral Kale | 4 | | | Barenbrug |
| 43 | Rape | Bonar | 4 | 145,000 | | Barenbrug |
| 44 | Hybrid forage brassica | Pasja | 4 | | | Barenbrug |
| | **Mixes** | | | | | |
| 16 | Oats&peas | Monida/yellow pea | 1/2 rates | | | |
| 17 | Barley&turnips | Washford & purple top | 1/2 rates | | | |
| 18 | Triticale&red clover | 102 Triticale & Red clover | 1/2 rates | | | |
| 35 | Corn&turnips | HLS058 & purple top | 1/2 rates | | | |
| 36 | SxS&rape | Sweetleaf II & Bonar | 1/2 rates | | | |

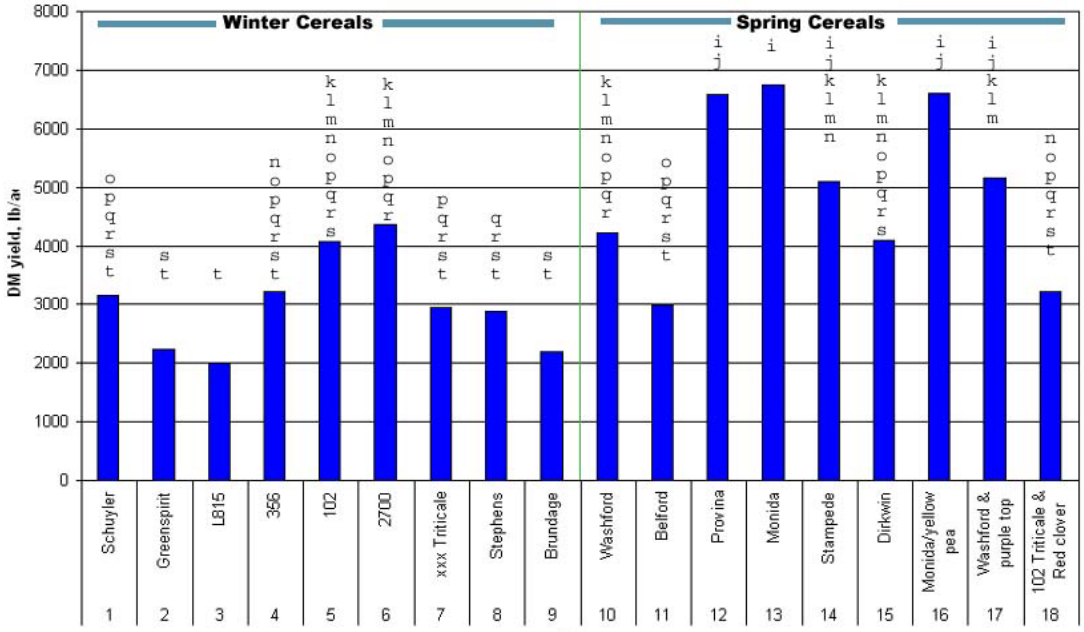


**Figure 1.** Forage dry matter yields of winter and spring cereals and mixes from July 10 to September 16-19, 2003. Forages with a common letter above the bar are not different (P=0.05).

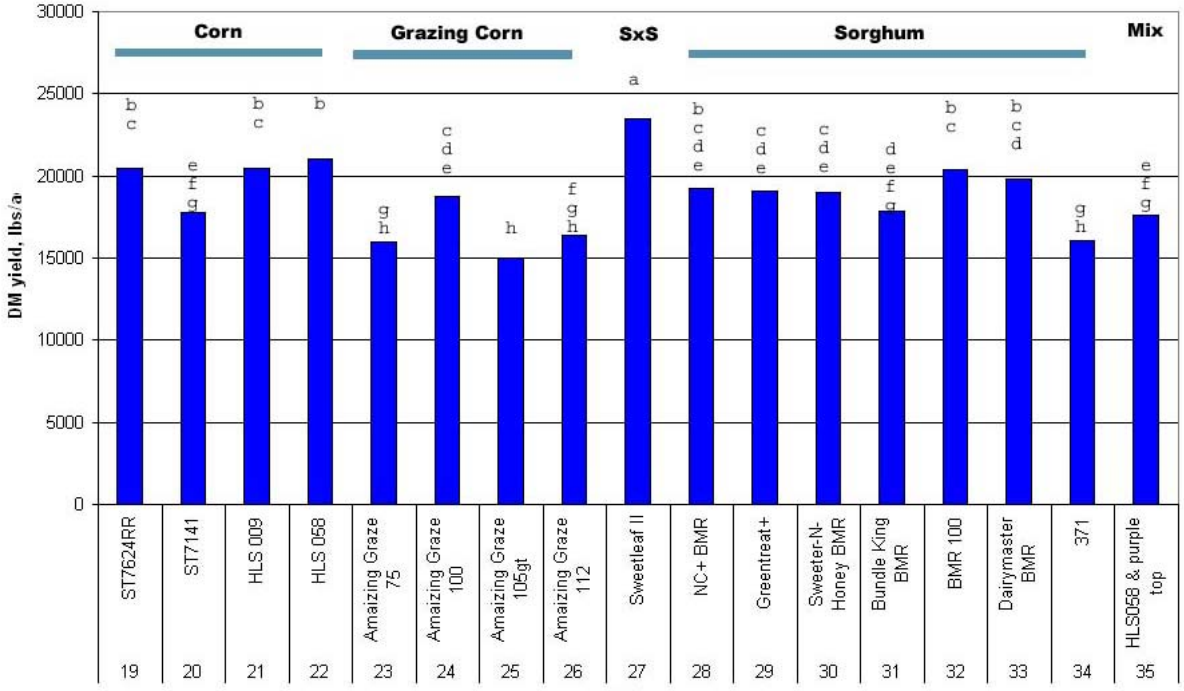


**Figure 2.** Forage dry matter yields of corn, sorghum, & Sudan hybrids and mixes from July 10 to September 16-19, 2003. Forages with a common letter above the bar are not different (P=0.05).

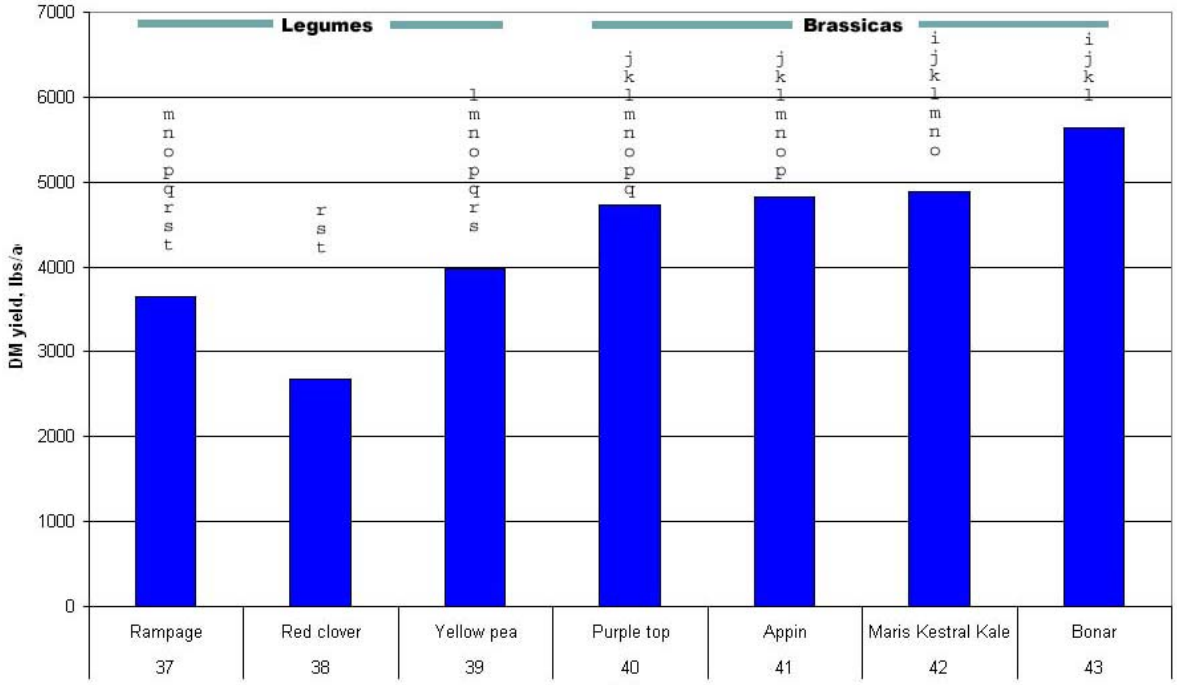


**Figure 3.** Forage dry matter yields of legumes & brassicas from July 10 to September 16-19, 2003. Forages with a common letter above the bar are not different (P=0.05).

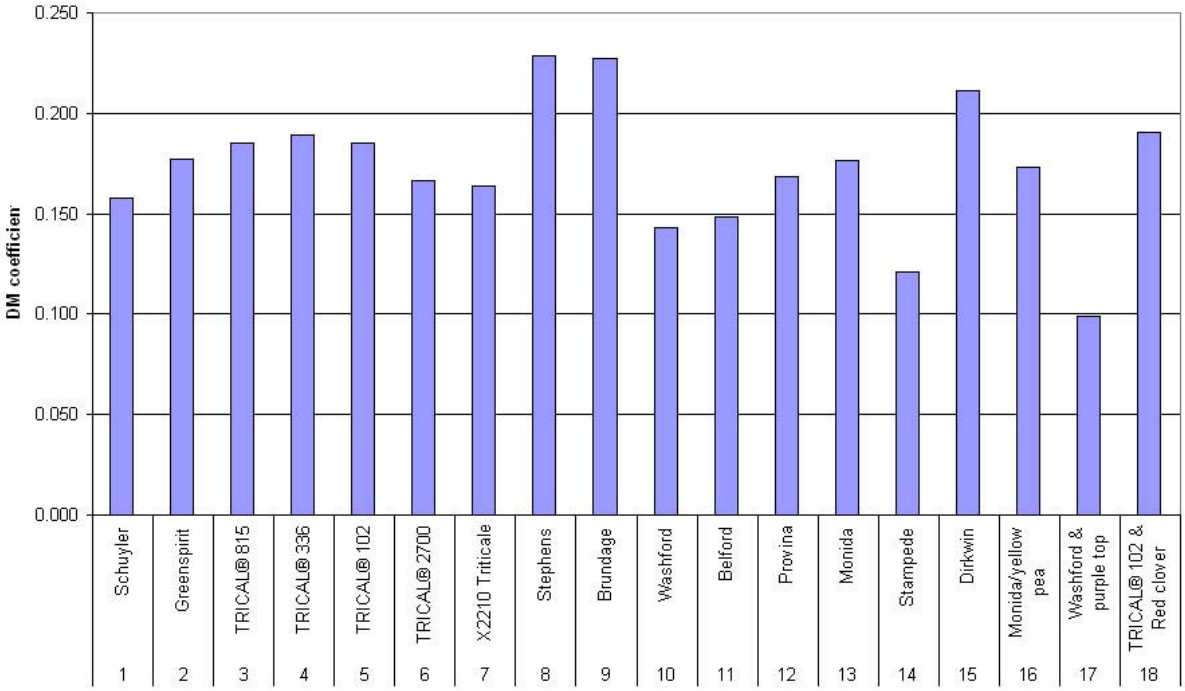


**Figure 4.** Dry matter coefficients for cereal forages and mixes on September 16-19, 2003.

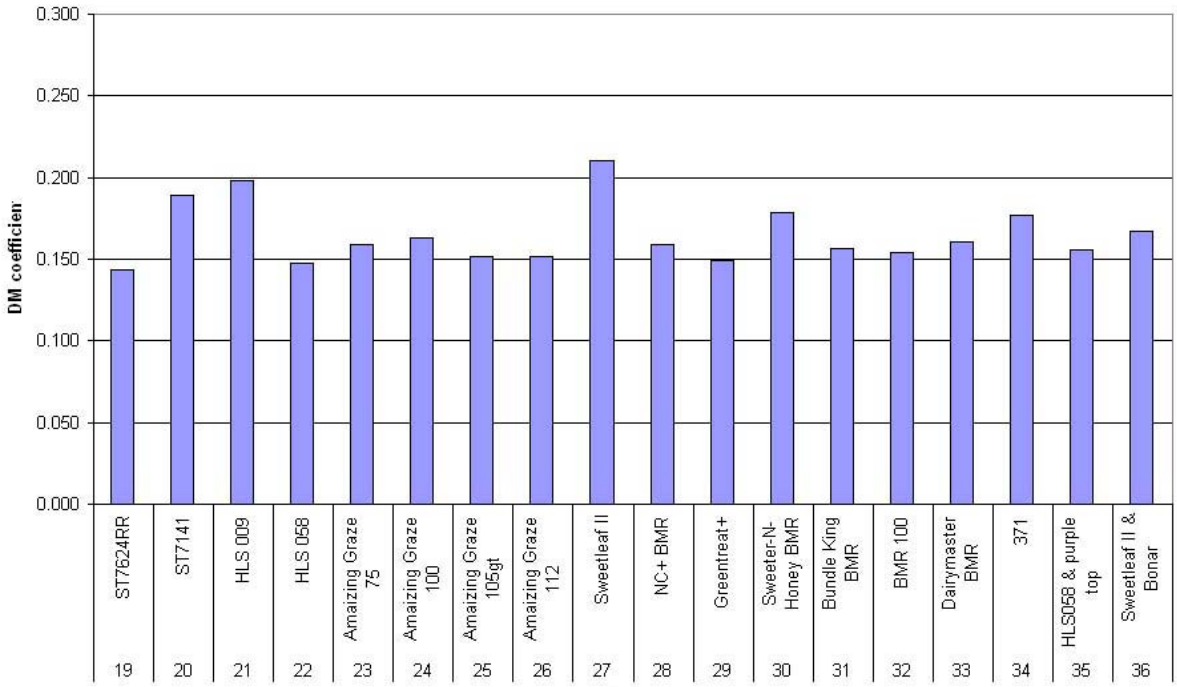


**Figure 5.** Dry matter coefficients for corn, sorghum, & Sudan hybrids and mixes on September 16-19, 2003.

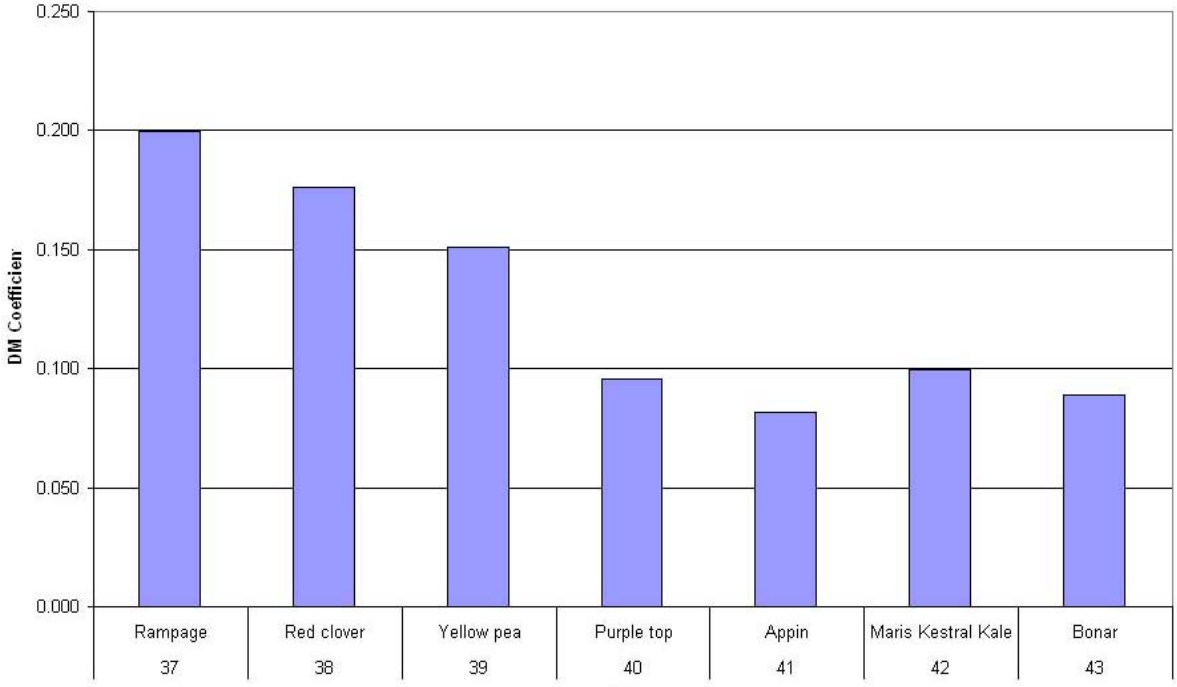


**Figure 6.** Dry matter coefficients for legumes and brassicas on September 16-19, 2003.

# GUIDELINES AND RECOMMENDATIONS

## Cool Season Annual Forages

**Benefits:**

- Efficient use of soil moisture because they grow in late fall or early spring when evapotranspiration rates are low.
- Less vulnerable to drought than warm season crops because they utilize early spring moisture.
- Double crop with warm-season crops.
- Complement warm-season crops in terms of workload, production inputs, and feed supply.
- Reduce soil erosion.
- Aid management of nitrogen and manure during cool season. Utilize nitrogen and prevent runoff and percolation into ground water.
- Produce high quality forage from vegetative or boot stage harvest.
- High forage yields, especially from soft dough harvest.
- They produce excellent pasture and are well adapted to grazing.

## Fall-Planted Cereal Grains

- Can produce up to 1.5 to 4 tons dry matter per acre at boot to milk stage of maturity (fall planted, spring harvested)
- Most barley and triticale will have beards on the heads if allowed to mature—these will cause severe mouth problems (lump jaws)
  - Washford & Belford are hooded Barleys
- Need good N fertility levels
- Perform best when planted early in fall and harvested in spring
- Triticale is a fast growing cool-season grass, a cross between wheat and rye

## Benefits of Winter Cereal Forages

- Additional pasture
- Source of high quality forage that can easily be used for pasture.
- Winter cereals can be used to maintain the pasture base while perennial pasture is being rejuvenated or reseeded.
- High quality in the autumn extends cattle gains as perennial pastures become unproductive and deteriorate in quality.

## Brassica Forage Crops

- Forage Brassicas such as canola (rape), kale, turnips, and swedes are high-yielding, high quality, and fast growing crops
- Drought hardy and cold hardy
- Stems and leaves normally have 20-25% crude protein and 65-80% digestibility
- Roots of turnips and kale usually have 10-14% crude protein and 80-85% digestibility
- These crops maintain quality, if not headed, well into November

## Turnips

- Grow fast and can be grazed as early as 70 days after planting
- Maximum production is reached in 80-90 days
- Some hybrids have fibrous roots that are not readily grazed by livestock
- Seed at least 70 days prior to killing frost
- Promising varieties are Purple Top, Green Globe, York Globe, and Sirius

## Rape or Canola

- Works well for fattening lambs and flushing ewes
- Hybrids should grow for 60 days before first harvest and 30 days before 2nd harvest
- Varieties
  Bonar, Rangi, Fora, Wairoa, Tyfon

## Brassica Agronomic Mgt.

- Brassica species can furnish good quality forage in late fall and winter.
- 60-80 days of warm temperatures are required
- Seeding rates are 2-4 lbs/acre
- Seeding dates June 10- August 20
- Seeding depth ¼ inch
- Days for seeding to grazing: 60-90
- Fertilization: apply 75 lbs N/acre at establishment

## Establishment of Brassica Crops

- Require >50 degree soils temperature, good soil drainage and soil pH in the range of 5.3-6.8
- Can be no-tilled into a sod provided it has been killed with glyphosate
- 1.5 to 2 lbs seed/acre for turnips and swedes
- 3.5 to 4 lbs/acre for rape and kale
- Drill on 6-8" row spacing and place seed at no more than ½" deep (double seeding rate if broadcast)
- Fertilize with 75 lbs N/ac and apply P and K similar to small grains

## Brassica Conclusions

- Treat this forage crop like it was a concentrate feed –because of its high quality
- Do not allow livestock to gorge themselves
- Provide a lower quality hay to provide some fiber in the diet
- Do not grow brassicas in the same field for more than 2 years to prevent disease problems

## CONCLUSIONS

- Warm season forages will yield more than cool season forages when planted in mid summer
- Corns, sorghums, and Sudan hybrids will cease growth with the first frost
- Cool season forages continue to grow after the first frost in the fall and will grow again in early spring
- Strip grazing of alternative forages will usually provide for a more uniform plain of nutrition
- If the forage is low in dry matter (washy), you probably need to add another source of dry matter
- If you let the animals onto the whole field, they will have a declining plane of nutrition
  Too much energy at first, then too little protein and energy (too much fiber) at the end
- Use feed tests so you know what you have in the forage and what you need to balance the ration
- Test for nitrates in forage that is stressed by drought, hail, high fertilizer or manure rates, or frost.
- Avoid hays or straws with a lot of silt or clay.
- There is no such thing as cheap feed!