THE HOW & WHY OF HIGH MOISTURE HAY

By BERNARD ADAM

HIGH MOISTURE HAY

ADVANTAGE OF HAYLAGE

What is high moisture hay?

High moisture hay can be referred to as haylage, baleage, and silage. It is <60% moisture hay that has been wrapped air tight and allowed to ferment. There are numerous reasons to produce high moisture hay these include:

- Minimize harvest loss
- Reduced harvest time
- Increase ADG (Average Daily Gain)
- Minimize storage loss
- Reduce feed cost
- Reduce weather risk

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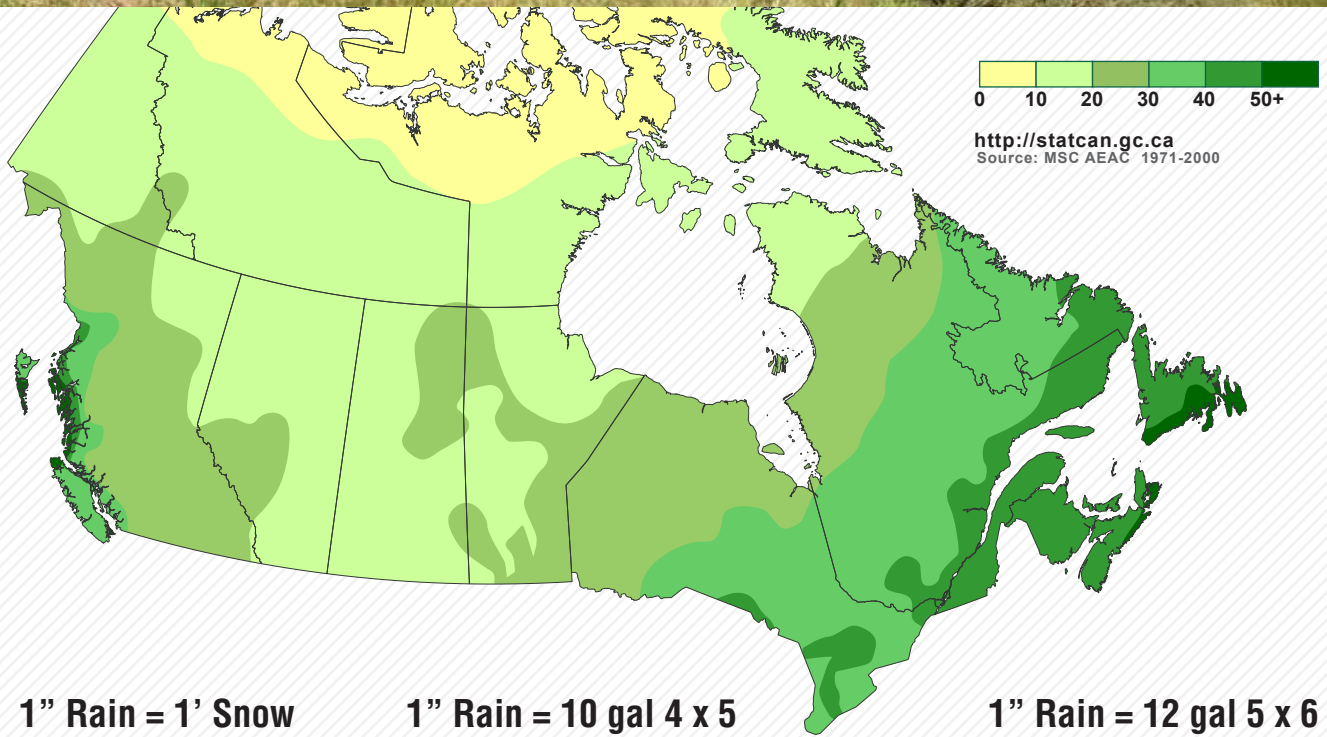
Precipitation 4
Time & Efficiency 6
It's Your Money 7
Dry Hay vs. Haylage 8
When to Mow 9
How to Mow 11
Moisture Test 12
Making Silage 14
Bale Movers 16
Wrappers. 17
Compression. 18
Silage Film. 19
Crop Management 22

Bernard Adam *is one of the most recognized figures in the history of haylage production. Since 1989 he has performed over 1,000 haylage seminars worldwide. He has been very influential in the current production and products we use for the haylage process, and participates in many private and university studies involving haylage.*

PRECIPITATION

ANNUAL AVERAGES (IN.)



1” Rain = 1’ Snow

1” Rain = 10 gal 4 x 5

1” Rain = 12 gal 5 x 6

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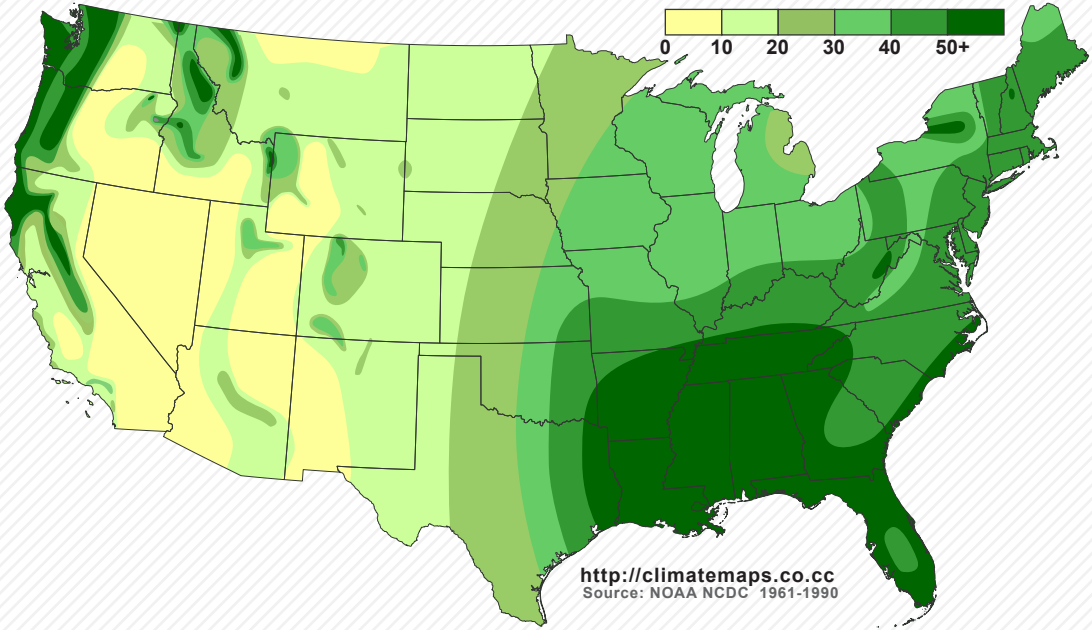


1” Rain = 1’ Snow

1” Rain = 10 gal 4 x 5

1” Rain = 12 gal 5 x 6

TIME & EFFICIENCY

SAVE TIME AND INCREASE BENEFITS

FROM CONSUMPTION

DRY HAY

25 LBS Required for 1 lb of weight gain.*

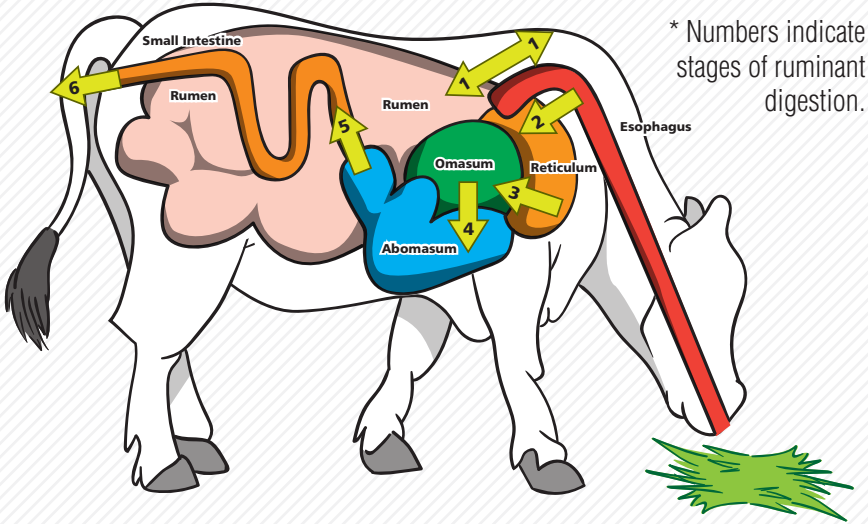
HAYLAGE

8 LBS Required for 1 lb of weight gain.*

* on a dry matter basis

3 TIMES FASTER

Dry hay is regurgitated, chewed and partially absorbed repeatedly until it is completely digested. Haylage is digested 3 times faster due to the fermentation process haylage undergoes.



* Numbers indicate stages of ruminant digestion.

IT IS YOUR MONEY

IT IS YOUR CHOICE

Baled June 15, 2014

Photographed February 8, 2015

UNWRAPPED BALE

Unwrapped bales absorb moisture from the ground as well as precipitation causing unwanted spoilage.

WRAPPED BALE

The plastic film on wrapped bales provides a barrier against moisture and promotes fermentation.

YOU CAN SAVE IT ALL!

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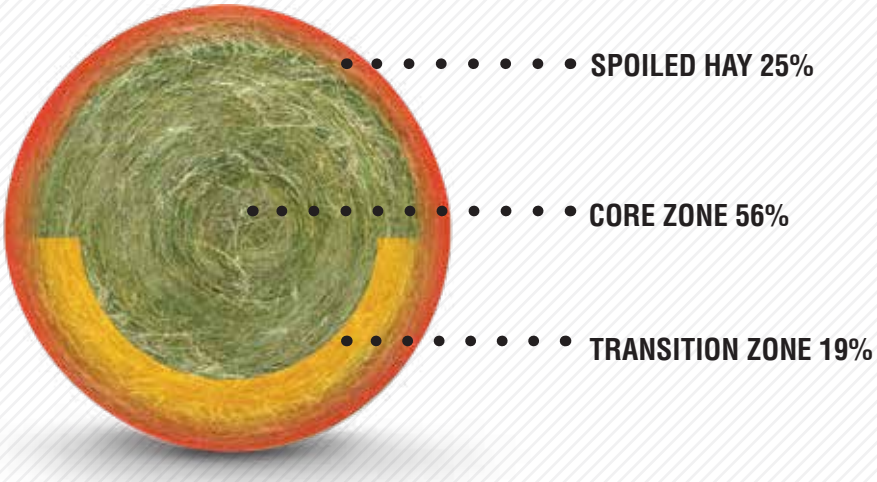
DRY HAY VS. HAYLAGE

VALUE REDUCTION

ASSUMING YOU LOSE THE MINIMUM AMOUNT POSSIBLE IN NORTH AMERICA (25%)



- For every 100 bales of dry hay feed value, you need to make 133 bales due to spoilage.
  (100 bales ÷ 75% = 133 bales)
- If you put $3/bale worth of silage film on those 100 bales, you will save 33 bales at approximately $40 each*
- 33 bales x $40 = $1,320 minimum savings

* Assuming average cost of $40/bale

$ EACH DOLLAR INVESTED IN SILAGE FILM IN SPRING WILL SAVE $4.00 OR MORE IN WINTER.

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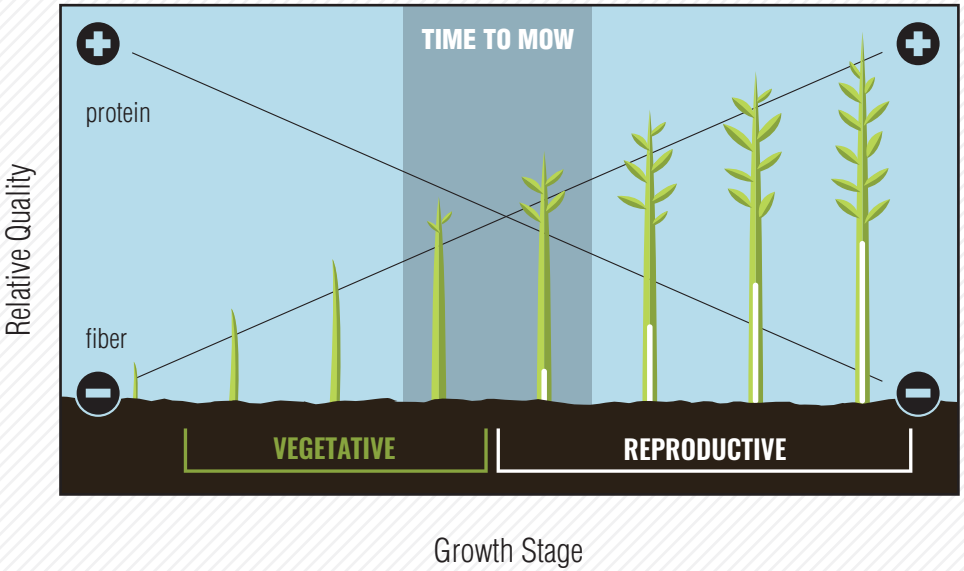
WHEN TO MOW

HARVEST PERIOD



As the plant moves through the different stages of growth the stem becomes more fibrous to support the additional height of the plant.

This is similar to a retractable antenna. As each section is pulled outward it empties the previous section leaving a hollow tube.

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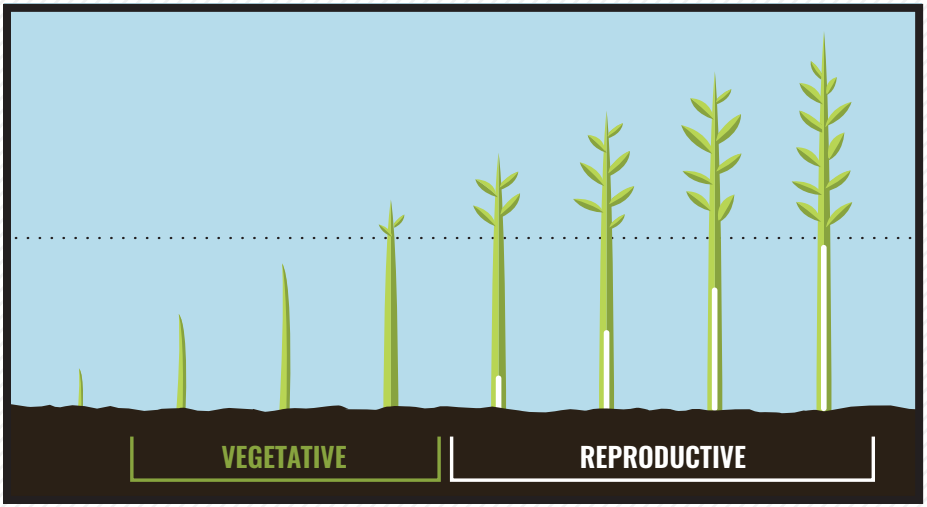
WHEN TO MOW

HARVEST DURING THE VEGETATIVE STAGE

RELATIVE FEED VALUE



150 130 100 90 60

Relative Feed Value

VEGETATIVE STAGE

RFV 101 - 124
Average Daily Gain (ADG) on ryegrass 2.5 lb

REPRODUCTIVE STAGE

Reproductive Stage
Relative Feed Value (RFV) Less than 77
ADG on ryegrass 0.34 lb

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HOW TO MOW

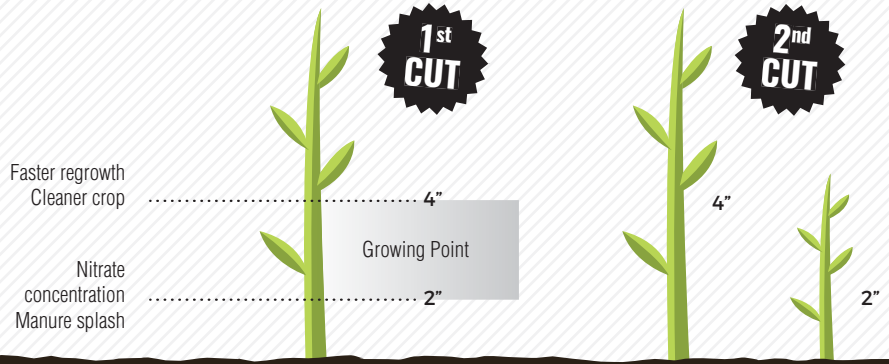
OPTIMUM CUT HEIGHT

1st Cut

4” **vs.** 2”
7 % less hay **vs.** mowing at 2”
ex. 93 bales **vs.** 100 bales

2nd Cut (28 days later)

4” **vs.** 2”
28 days later **vs.** 42 days later



OPTIMAL CUT HEIGHT IS NEEDED FOR MAX REGROWTH.

Mowing at 4” leaves a higher concentration of nitrates, helping to boost regrowth. The growing point is saved, and is able to immediately start growth.

Hay mowed at 2” includes a higher concentration of nitrates, manure splash, ashes and dirt, as well as increasing the fertilizer costs associated with nutrient replacement.

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MOISTURE TEST

THE BEST DECISION YOU MAKE THIS YEAR

1 WEIGH A SAMPLE OF HAY

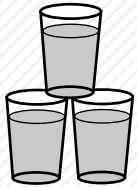
Take one handful from a representative windrow and put it into a plastic bag. Weigh sample on a digital scale, record the weight in grams. (50-60 grams of hay needed)

2 MICROWAVE FOR 15-20 MINUTES

Leaving the bag open, place the sample, along with a glass of cold water, inside the microwave and set it for 5 minutes.

3 REPLACE WATER AND WEIGH

When the water boils, replace the glass. Weigh your sample in between each glass. After 3-4 glasses of water, your sample SHOULD be dry.



4 MICROWAVE AND WEIGH

Run microwave one more time for 2 minutes and weigh. If there is no weight change then this is your final result. If not then repeat process until there is no weight change.

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MOISTURE TEST

THE BEST DECISION YOU MAKE THIS YEAR

THE MICROWAVE TEST - HOW TO CALCULATE THE RESULTS

For example, the original sample weight prior to testing is 60 grams. After completing the microwave test the final weight is 24 grams.

FINAL WEIGHT ÷ ORIGINAL WEIGHT = DRY MATTER % **24 ÷ 60 = .40** *or 40 percent Dry Matter*

To determine the moisture percentage you subtract the dry matter from 100.

100 - DRY MATTER = MOISTURE % **100 - 40 = 60** *or 60 percent Moisture*

Recommended 50-60 grams, 60 grams used for illustrative purposes only. Must use a scale with grams doesn't work with ounces.

When you reach 60% moisture, you are ready to start baling!
For legumes, you need 55% moisture.

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MAKING SILAGE

6 EASY STEPS

1 Mow
Wide windrows save time
Narrow windrows save raking

2 Moisture Test
Best decision you'll make all year

3 Rake
As needed

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4 Bale
As tight and uniform as possible

5 Haul
No further than necessary

6 Wrap
Within 4-8 hours of baling

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BALE MOVERS

WHAT ARE THE OPTIONS

960

980

TECHNOBALE STANDARD FEATURES

- 60% less mileage driven on your field
- 50% or more time savings
- Fastest loading on market
- Patented scissor style push back is the fastest on the market
- Low deck height provides high visibility and low center of gravity
- Non-stop working - Technobale runs all functions as it goes. Pick up bales while pushing back.

Specifications	960	980
Auxiliary Outlets Required	2	2
Horsepower Requirement	60 HP min	120 HP min
Tires	12.5x15	15.0/55-14, IM36
Hub Ratings	6 Bolt, 6,000 lbs.	8 Stud, 12,000 lbs.
Shipping Length	20’	25’
Shipping Width	9’8”	10’
Operating Width	10’5”	12’
Shipping Weight	4,735 lbs.	8,100 lbs.
Bale Size	4’ x 4’ to 5’ x 5’	4’ x 4’ to 5’ x 6’
Number of Bales	8 Bales - 4' x 4' 6 Bales - 5' x 5'	10 Bales - 4' x 4' 8 Bales - 5' x 6'

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WRAPPERS

INDIVIDUAL VS INLINE

INLINE

- 80 - 120 bales per/hr
- Ideal for larger operations 400+ bales/year
- Custom harvesters
- 50% savings on plastic
- Various models and options available

Tubeline TL60 ECV

INDIVIDUAL

- 20 - 40 bales per/hr
- Ideal for smaller operations 50-400 bales/year
- Low entry cost
- Bales should be moved to storage site right away
- Ideally do not handle bales during fermentation
- Individual bales are an easy way to sell haylage

Tubeline TL1000R

BALE STORAGE

Below are some considerations that should be made when storing wrapped bales.

- On a level, smooth surface
- Free of coarse vegetation and trash
- A dry, well drained area
- Wrap uphill when possible
- Wrap within 4-8 hours
- Store individual bales on end where plastic is thicker

In addition you should also consider labeling bale tubes so you know the moisture content and the crop inside the plastic.

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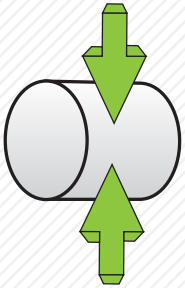
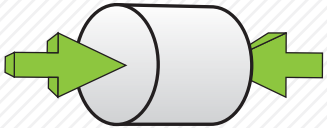
COMPRESSION

DRIVING OUT OXYGEN



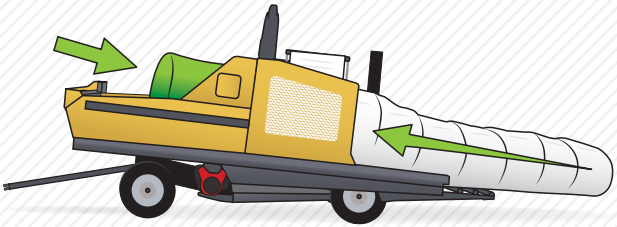
BALER COMPRESSION

As the hay is rolled the baler applies consistent pressure which keeps air pockets from forming when baling.

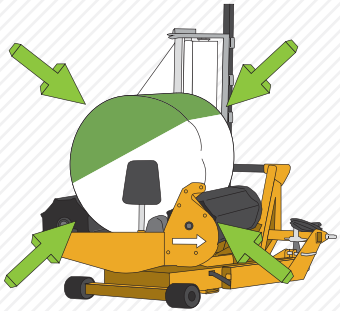


WRAPPER COMPRESSION

The bale wrapper further compresses the bale as it passes across the wrapper into the tube.



Inline wrappers use the combined weight of the bale tube and the machine to tightly pack bales together as they are being wrapped.



Individual wrappers pull the plastic around the bale as the platform spins. The weight of the bale and the tension on the plastic provide the pressure needed to seal the bale.

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SILAGE FILM

6 - 8 LAYERS

Depending on where you live, you'll need 6-8 layers of plastic. In warmer climates, 8 layers of wrap are recommended. The higher levels of UV exposure can break down the outer layers of plastic quicker.

INDIVIDUAL

Center plastic rolls on bale, count the numbers of rotations necessary to completely cover the bale. This equals 2 layers of plastic.

For example, if it requires 5 rotations for the 2 layers.

4 layers = 10 rotations
6 layers = 15 rotations
8 layers = 20 rotations

Add one additional rotation for proper overlap and an airtight seal.

INLINE

The size of overlap on an inline wrapper varies according to how many layers you apply and the length of the bale. In order to put 8 layers in a 26" section you will need an approximate 3.25" overlap.

Ex. 26 / 8 = 3.25"

In other words, the wrapper needs to advance the bale 3.25" for every rotation.

SILAGE FILM

55% STRETCH

STRETCH

Tubeline pretensioners are knurled to grab the plastic as it passes between the rollers. The pretensioners are geared to ensure consistent stretch of approximately 55%.

A 10” line drawn on the roll before being passed through the pretensioner *(top right)*. The same line after passing through the pretensioner, the new measurement is 15.5” *(middle right)*.

As the plastic film passes through the pretensioner it will deposit some residue. In order to maintain proper stretch and operation, the rollers should be cleaned as needed using WD-40 ® and wiped dry *(bottom right)*.

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WHAT TO LOOK FOR

1. A good silage film will provide an excellent oxygen barrier that will keep the CO_2 inside the bale. If you lose the CO_2, your haylage will develop molds.

2. You need the film to last at least one year outside in the sun. This requires good UV protection.

3. You need enough tack or cling on the film to seal the bale.

4. Plastic, exposed to heat and cold, will keep expanding and contracting when using a quality film product. Film storage is critical, film should not be exposed to extreme heat or sunlight for long periods of time.

5. This plastic SHOULD BE WHITE to reflect the heat. Any other color will ABSORB the heat instead of reflecting it. Too high a temperature inside the bale will bond the protein to the fiber and increase the time needed by cows to digest the fiber, thus reducing the space in the cows rumen for new forage intake. This is known as the “bonded protein” effect. This will result in a loss of profitability!

6. PRECAUTION. During periods of hot weather, you must clean the pretensioner rollers frequently to remove cling deposits. This will control the stretch to levels you need (55% to 75%). Overstretched plastic, 75% or greater, may result in premature film degradation and barrier properties. The lack of oxygen barrier allows the CO_2 inside the bale to escape.

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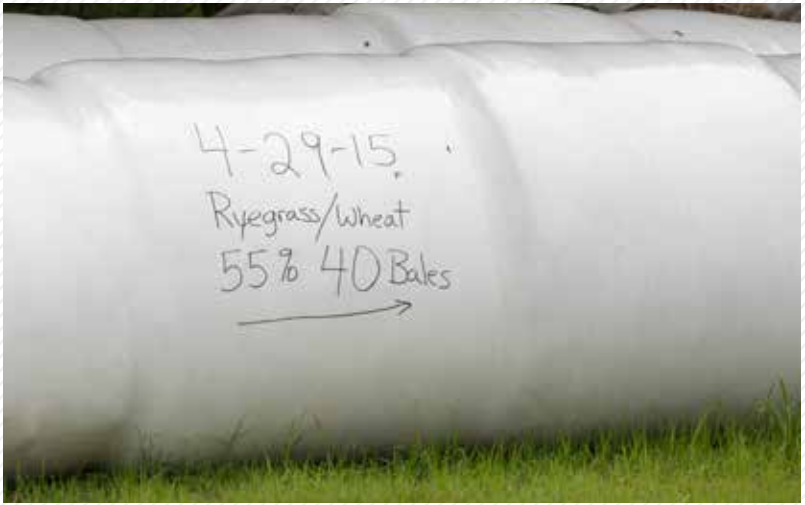
CROP MANAGEMENT

TIMING IS EVERYTHING

FEED VALUE

Every bale made on your farm has a different conservation period. You can know at time of wrapping the length of time that the feed value will be at 100%.



SUMMARY POINTS

- The ideal stage to mow is the vegetative stage i.e. just before it is all headed for grass and for legumes when you see about 10% flowers.
- Moisture level is 40% to 60% for grass and 40% to 55% for legumes. This haylage will maintain it's feed value for one year.
- If moisture level is greater than **60%, feed first.**
- If moisture level is less than **40%, feed second.**
- If moisture level is between **40-60%, feed last.**

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TUBE•LINE™

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