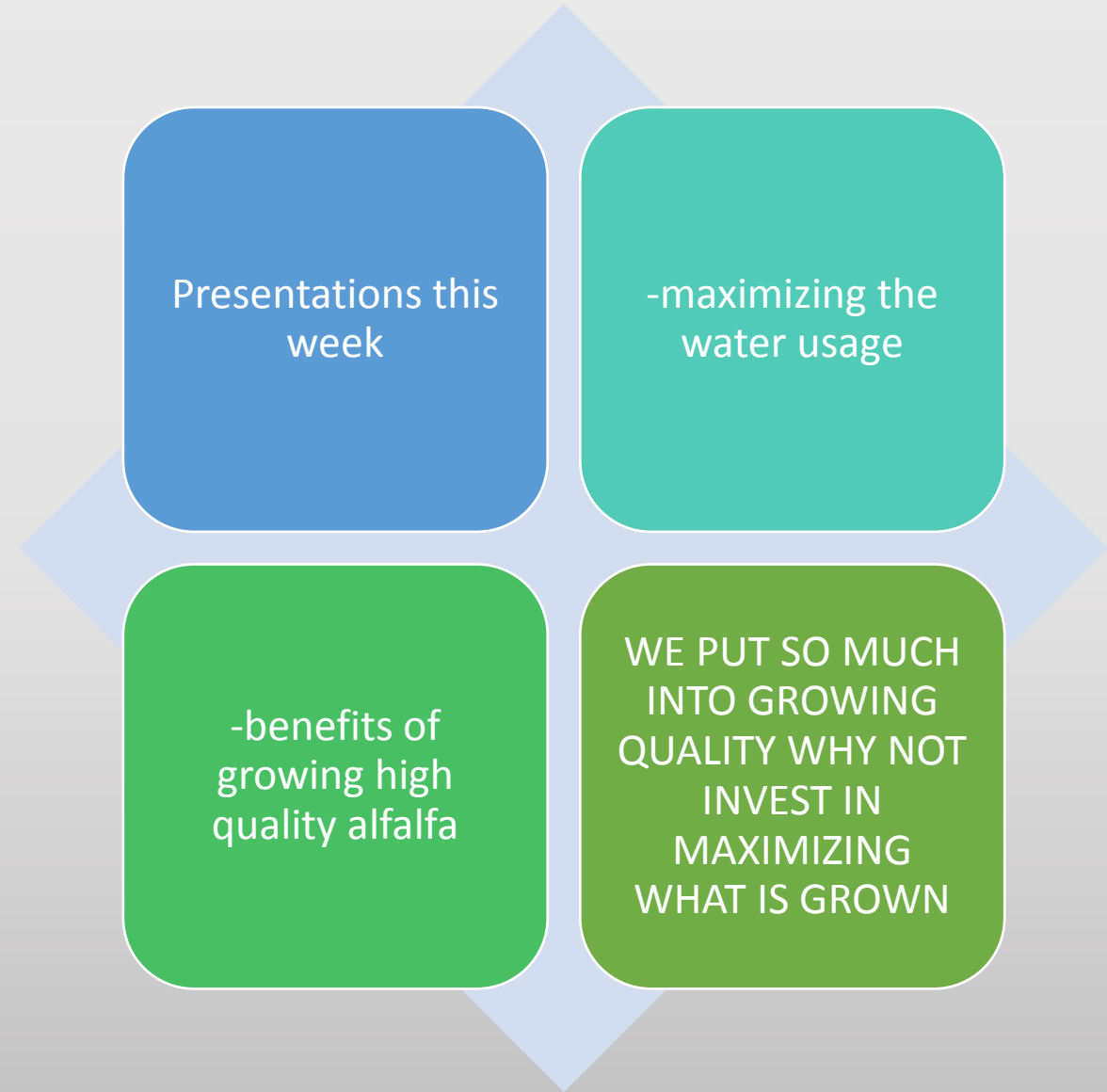




2022 World Alfalfa  
Congress  
San Diego  
Nov 16, 2022

- Edward J Shaw
- President/CEO I Q Forage Inc
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# Challenges with harvesting the quality that is grown





Challenges in  
harvesting  
quality alfalfa  
with weather  
conditions

Wet Weather

Dry Weather

# Wet Weather

Heavy Dews

High Humidity/Wet Weather

Short periods of drying conditions

Impossible to get last 5-10% moisture out in  
swath

**RESULT IN LOSS OF QUALITY AND COLOR  
AND DAIRY AND EXPORT MARKETS(haylage  
and silage is an option for domestic sales)**



## Dry Weather

Summer hay

-large stems

-fine leaf

-leaves dry and are lost in baling

**RESULT LOSS OF QUALITY(RFV OR  
RFQ) AND QUANTITY SKELETON  
HAY(steamer is and option)**





# History of Dryers

**Bed Dryers**


**Rotary wet chop drum driers**

**Barn Driers**

**New spike driers first patented in Europe in 2010**

**Stationary dryer**

**Now fully portable dryer**



# History of Maximizer Hay Dryer

- -Geographic center of BC 54<sup>th</sup> parallel
- -limited dry days
- -limited heat units for final cut
- -great growing area
- -conventional sun cured resulted in lost quality, color and quantity
- Owner of press facility
- Explored options, including barn drying, bed dryers, and one spike company
- None had the capacity, flexibility for large scale farming
- Investigated all drying systems including wood industry



# History continued

- Developed prototype
- Took to Southern Alberta in Sept/Oct to test
- Built and sold first unit, demonstrated it in Alberta, Arizona and Idaho



# How it works

4 HP tier 4 final or stage 5 environment compliant

Captures all of the radiant heat from the radiator and engine 50 degrees F and 50 degrees from fan compressor (total 100 Degrees F or 38 degrees C over the ambient temperature)

Hot air is then channelled into 6 bales with 84 spikes per bale with slots, and this hot air is then forced from the inside of the bale to the outside

Initial dry down from 20 % to 15% in approx. 12 minutes

The bales are then stacked on edge, 3 high and 15 cm apart (residual holes facing out)

During the next few days as the heat escapes and equalized to ambient another 3 to 5 % will leave the bale so an end moisture is 10 to 12%

Fuel burn is approx. 4 liters of diesel per 550 kg bale

If moisture is higher than 20% then add 5 minutes for every 5 minutes for every 2 degrees above 20%

# Cost of operations

One operator

Initial dry down from 20 % to 15% in approx. 12 minutes one 3.78 liters(1 US gallon per 650 kg bale(1430 pounds)

One telehandler/skid steer or loader

# What can this do for the producer

- Bale earlier
- In Dry conditions
  - Retain color, retain quality, increase quantity and returns
  - By cutting baling earlier, can turn the water on faster, and in a year may get one more cutting
- In Wet conditions
  - When weather approaching, bale earlier
    - Keep quality, color and increase returns

# Michigan dried alfalfa

3<sup>rd</sup> cut

Dried from 30%

260 RFV/256 RFQ

Protein 23.37



509 Washington Street  
P.O. Box 221  
Gayville, SD 57031

PH: 605-267-3100

FAX: 605-267-3098

Strieter Hay Farms

Description: Sample 1 3rd cut Alf

Dry Matter: 90.08  
Moisture: 9.92

	DRY MATTER BASIS	AS FED BASIS
Neutral Detergent Fiber	25.94	23.37
Acid Detergent Fiber	20.76	18.70
Crude Fiber	16.61	14.96
Total Digestible Nutrients	76.46	68.88
Net Energy (gain)	0.55	0.49
Net Energy (lactation)	0.80	0.72
Net Energy (maintenance)	0.83	0.75
Metabolizable Energy	1.26	1.13
Crude Protein	24.29	21.88
Fat	2.96	2.67
Ash	9.37	8.44
Relative Feed Value	260.82	
Relative Forage Quality	256.68	
Phosphorus	0.29	0.27
Calcium	1.38	1.24
Potassium	2.10	1.90
Magnesium	0.32	0.29

Arrived in Lab: 09/19/2022  
Reported out: 09/19/2022

Lab #: 34641

National Forage Testing  
Association

**NFTA Certified**

Excellence in Forage Testing

Weather delayed cutting and loss of quality





# Baling in dry conditions Ethiopia

- Saudi Company
- 2 string bales
- Leaf retention issue
- Great color though
- Poor RFV

- hundred pounds per acre.
2. Round Bermuda bales (baled after second day of cutting) had 111 pounds of weight (water) removed by the AG Maximizer Hay Dryer from a 1300-pound bale.
  3. Grass and/or mixed hay bales dry faster than alfalfa.
  4. Lower density and very high-density bales dry slower than consistent dense bales.
  5. Some producers have been able to reduce one tractor and baler by starting earlier, going later, and having the balers bale sun cured hay in the middle of the day.
  6. One customer had a section pivot of timothy and he baled  $\frac{1}{2}$  the field with high moisture in the morning and processed it through the dryer. He waited for the rest to dry naturally and then baled. When a major pet food company looked at the hay, they bought all the hay processed through the Ag Maximizer hay dryer and not the sun-dried hay as the hay processed through the dryer was softer and not shattered and dusty.
  7. On two tests, one in Alberta and one in Arizona, 40% moisture hay was dried down to 25%. Several weeks later the hay still had the same color, no smell, and had kept. We are continuing research to verify and conclude what occurred.
  8. Our first client has his 17-year-old daughter load dry

1. Loss at Baling, Pick up and Chamber (*Source - Pitt. R.E 1990 Silage and Hay Preservation, Ithaca, NY*)
  - a. Yield and leaf loss at 25% moisture is 4% yield loss and 4% leaf loss
  - b. Yield and leaf loss at 20% moisture is 6% yield loss and 4% leaf loss
  - c. Yield and leaf loss at 12% moisture is 6% yield loss and 8% leaf loss

Yield and Leaf Loss	Moisture %	Yield Loss in %	Leaf Loss in %
	25	4	4
	20	6	4
	12	8	8

Both yield loss and leaf loss double when going from 25% to 12% moisture



1. A quick field test done in Tonapah in Nov/2020 – *(Source - Emil Gulbranson, AgriGreen Enterprises Inc)*

AgriGreen sent a test unit to Tonapah in 2020. The field was baled in two sections with the first section baled at over 25% moisture and dried with the Ag Maximizer dryer. The second section was left to sun cure and then baled without drying. The table below is an average of both types of bales evaluated. (Note - This test was for 21 high moisture bales dried and 21 bales sun cured.) Samples were sent out to an analytical lab for analysis. Unfortunately, we did not weigh the bales

	Moisture	Protein	ADF	NDF	RFV	RFQ	TDN
Average Sun Cured	9.43%	20.70%	27.35%	33.08%	190.00	182.00	61.83%
Average after drying with dryer	14.23%	23.05%	22.10%	28.03%	242.67	233.67	65.77%
% Change		11.35%	19.19%	15.26%	27.72%	33.33%	6.37%

1. Hay Loss Barn Dried to Field Cured (*Source - Michael Collins - Forage and Research Department of Agronomy, University of Kentucky, Lexington, KY*)
  - a. Barn Dried hay harvest loss is 10% to 18%
  - b. Sun Cured hay harvest loss is 18% to 24%

Barn Dried to Field Sun Cured losses	
Barn Dried	Sun Cured
10% to 18%	18% to 24%

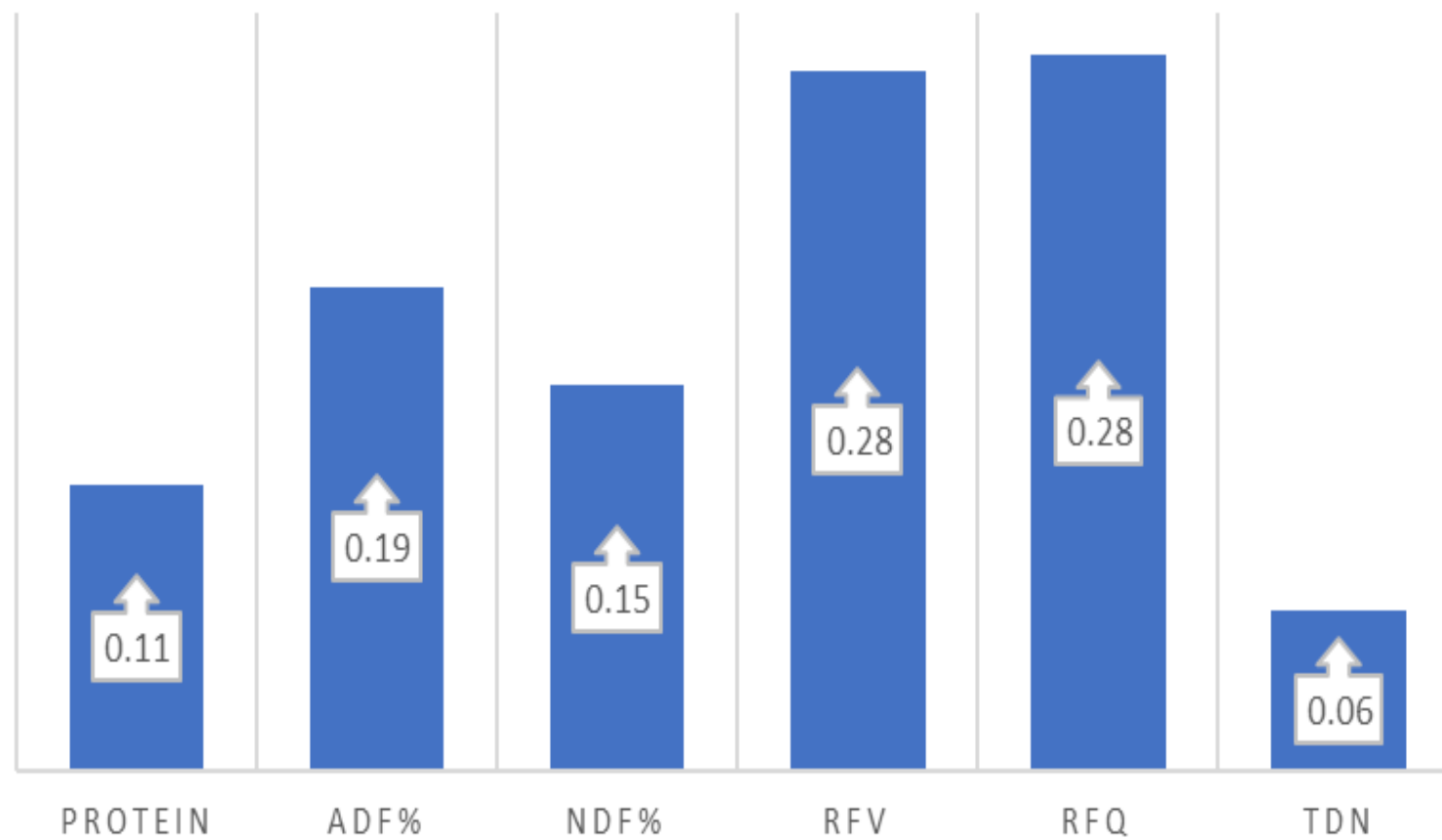
1. Potential Value from Leaf Loss (*Source - Dr. Dan Undersander University Madison Wisc. Emeritus, Retired*)

Consider hay at \$210 per ton and \$1 per point of RFV (relative feed value), for a 2 ton per acre yield, for every 1% leaf loss equals a loss of \$14 per acre.

1. Leaf Retention Loss (*Source - Doug Rich, High Plains Journal, updated 6/21/21, and Jeff Roberts, Farm Tec Inc, Hudson, WI*)
  - a. Baled alfalfa at 20% moisture had 20% leaf loss
  - b. Baled alfalfa at 10% moisture had up to 50% leaf loss

Baled alfalfa moisture levels	Leaf loss
20 %	20%
10%	50%

## PERCCENTAGE INCREASE



NOTE -- For both ADF and NDF, a lower number equates to a higher feed value

From the above research and test it is obvious that the higher moisture you can bale, the higher the yield and the higher the quality.

# Alfalfa - Large Square Bales

Moisture %	**10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	**20%	22%	24%	26%	28%	30%
				sun cured average baling range on our farm for safe storage preservation												
						*150-300 lbs leaf loss per acre										
						AG Maximizer drying range - optimizing return on crop input cost\$										
Min Leaf Loss%	25%	22%	19%	16%	14%	11%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Max Leaf loss%	**50%	40%	44%	41%	38%	35%	32%	29%	26%	23%	**20%	20%	20%	20%	20%	20%

## Moisture %

Safe preservation moisture levels
Caution
Probable heat damage
Danger zone - deterioration

## Leaf Loss %

Extensive profit loss
Moderate profit loss
Minimum profit loss

Leaf Loss percentages are combined losses due to cutting, merging and baling

\* Source - Dr. Dan Undersander

\*\* Source - Doug Rich, High Plains Journal, updated 6/21/21, and Jeff Roberts, Farm Tec Inc, Hudson, WI

**There are several types of hay dryers in the marketplace. These are drum, bed, barn, stationary spike, and totally portable spike dryers. Each type has its place, with its own advantages and disadvantages, but no matter what dryer is used they will all:**

1. Reduce weather risk
2. Allow farmers and producers to bale earlier to retain more yield and better quality which results in more dollars per ton and dollars per acre
3. Use in high humidity area
4. Use in dry desert conditions to reduce leaf loss

A hay dryer is another tool in the farmer's toolbox and, although it may not be used every year, many of the owners of hay dryers would not be without one. Some customers have paid for their dryers in one year and while this is not usual, many pay for their units within four years. Some customers have increased the value of their hay by 25% to 75% by harvesting higher quality, have higher yields, and add higher profits to the bottom line.



# Storms coming



For more information about the Agri Green AG Maximizer hay dryer please click on the QR code. Wait for it to load and then press the forward button.



Thank you for the opportunity to speak with you today.