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VIRENXIA

ALFALFA INSIGHTS

VIRENXIA'S NEWSLETTER ON ALFALFA, THE QUEEN OF FORAGES

SEED TECHNOLOGIES SPECIAL

Seeds are the foundation of Agriculture. Technology has modernized much of farming's day-to-day operations, but without the use of good variety and high-quality seeds, yields and crop quality would be greatly compromised. Variety selection and seed quality play an important role in the production of Agricultural and fodder crops. Characteristics such as trueness to variety, germination percentage, purity, vigor, and appearance are important to growers.

VIRENXIA is in continuous research to evaluate different innovative Alfalfa varieties developed across the globe to maximize Alfalfa production and quality.

In this issue you will find basic facts about innovative Alfalfa varieties and tips on how to select a good seed variety and relevant seed technologies.

SEED SELECTION

HOW TO CHOOSE A GOOD ALFALFA VARIETY

Growers sometimes choose varieties based on promotion, price or habit. It is important to choose varieties carefully since this choice can have a large impact upon yield, and growers must live with their choice for many years. Since a large number of varieties are now available, growers should use a systematic method for variety selection. Price and company promotion should have a very small influence on variety choice. A method is proposed by which growers can determine in sequence the appropriate fall dormancy, a group of high yielding varieties from research data, the need for disease and insect resistance, and the need for stand persistence and quality. Price and company promotion should have a very small influence on variety choice. Certified seeds should be chosen since the source of the material is guaranteed, and seed quality is assured. Using this process, growers can improve the likelihood of selecting a well-adapted variety.

Recommended steps for choosing an alfalfa variety:

1. **Determine the fall dormancy range of interest.**
2. **Restrict your selection to certified varieties.**
3. **Select a group of high yielding varieties within this group from University or industry trials.**
4. **Review on-farm trials, experiences of neighbors, or conduct your own small trial.**
5. **Determine the most important pest resistance characteristics.**
6. **Review data on forage quality, if available.**
7. **Determine relative price and availability.**

Price and company promotion should have a very small influence on variety choice.

CHARACTERISTICS OF A GOOD VARIETY

Fall dormancy

Fall dormancy in alfalfa is one of the most important traits in determining the adaptation of an alfalfa variety; it is defined as a reduction in plant height in response to reductions in day length and temperature. Fall dormancy is rated 1 to 10, 1 being the most dormant. Recent progress in research have lead to cultivars with dormancy ratings up to 11. Less dormant varieties generally have higher yield potential, earlier maturity and increased rates of recovery after harvest.

Winter hardiness protection

Defined as plant survival and rated 1 to 6, 1 being the most hardy, 6 the least. Historically closely related to fall dormancy: least dormantcultivars having a low winter hardiness and a reduced stand life. It has become possible the selection of high yielding varieties (low dormancy) with a good winter survival.

Restrict your choice to Certified Varieties

It is important to choose certified varieties. Certification enables growers to **1)** know the true identity of the seed they are planting, **2)** be assured that they are not planting excessive weeds, and **3)** know that the seed is of excellent germination and vigor. Note that' certifiable' is not the same as certified. Planting blends or brands, or 'Variety not Stated' significantly increases the risk of planting an inferior variety, which may result in hundreds of dollars' loss per acre.

Planting blends or brands may result in hundreds of dollars' loss per acre.

Select a Group of High-Yielding Varieties

Yield is the clearly the most important economic factor for alfalfa profitability. It also integrates a great many different aspects of alfalfa performance and thus is the major criteria for variety selection. Average yield performance over several years of testing tells us not only about the potential economic return, but also something about disease resistance and stand persistence.

Multi-year data important. Do not accept data from a single harvest or a single year as a guide for choosing varieties. Many shifts can occur over time. Search for as much multiple-year data as possible. Data from numerous locations is also helpful, but rely most heavily on variety tests from the area(s) that most resemble your region.

Do not accept data from a single harvest or a single year as a guide for choosing varieties.

Use information from On-Farm Trials

After looking through relevant University and seed industry research trials, and reviewing the pest resistance characteristics, it may be helpful to search for information from localized on-farm trials or demonstrations.

Once a small group of candidate varieties are selected, consider planting test strips, 1-5 acres in size, on your farm to test the performance of those varieties under your conditions. Do not plant on the edge of the field or inisolated or poor areas of the field. Replicate the strips across the field if possible to observe performance over a range of conditions. Some informal comparisons based on observations, bale counts, and stand persistence under your field conditions can be useful. Once a group of high-yielding varieties has been chosen from research trials, the disease and insect resistance of the variety should be considered.

Choose Varieties with Good Disease and Insect resistance

Often, varietal resistance is the only economically-viable defense against an insect or disease. It can make a difference in stand survival or may determine whether treatment is needed.

Growers should take advantage of the many modem varieties which have a broad base of pest resistance characteristics.

Resistance Ratings of Alfalfa Varieties

% Resistance Plants	Resistance Class
0-5%	Susceptible (S)
0-5%	Low Resistance (LR)
15-30%	Moderate Resistance (MR)
31-50%	Resistance (R)

Forage Quality

Although differences in forage quality between alfalfa cultivars exist, these differences are not always significant statistically. Forage quality is not the most important criteria for choosing an alfalfa variety.

Time of year (cutting), plant maturity at harvest and agronomic practices (irrigation and weeds) have a much larger effect on forage quality than does variety.

Availability and Price

The last criteria for selection is availability and price. Of course, seed must be available for a variety to be of consideration.
A relatively small number of varieties may be marketed in your region, which simplifies the decision. Price should not be a major consideration. However, if several varieties appear to be of very similar characteristics, price, become more important.
Varieties that meet all of the above criteria at the lowest price should be chosen.

Source: Dan Putnam & Steve Orlofl, U C Davis

INNOVATIVE ALFALFA VARIETIES FOR HIGHER PRODUCTIVITY

Today, researchers and scientists continue to pursue new technologies to deliver more and better genetics and technologies. The breeding, research and production capabilities have resulted in several breakthrough technologies for alfalfa with superior varieties.

Hi-Gest® Alfalfa Technology – for improved digestibility, high yields and management flexibility

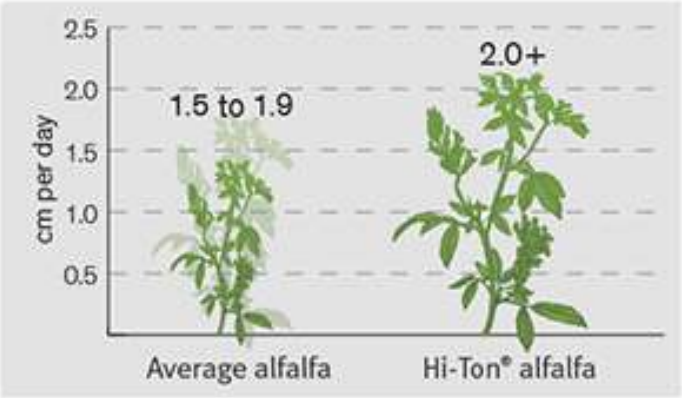
Using conventional breeding techniques and screening hundreds of thousands of plants, breeders began the long process of selecting elite parental material that expressed both strong agronomic traits and improved fiber digestibility. After years of testing, Alforex Seeds now offers varieties with Hi-Gest® Alfalfa Technology. Hi-Gest's elite genetics improve the rate of digestion in ruminant livestock, which translates to increased forage intake and increased milk and/or meat production. In addition, Hi-Gest delivers:

- **High quality that can help produce an estimated 2.5 more pounds of milk per cow per day.**
- **Management flexibility and good winter survival.**
- **Superior disease and pest resistance.**
- **Good agronomics.**
- **High yield.**

Hi-Ton® high-yield alfalfa – fast recovery for more tonnage

To earn the Hi-Ton® designation, varieties must average at least 2 cm of growth per day, starting with spring green-up. Most commercial varieties range from 1.5 to 1.9 cm per day. Designated varieties AFX 579, AFX 469 and AFX 429 have exceeded the yield of peer experimental and commercial alfalfa varieties by 5%, the minimum threshold for Hi-Ton® alfalfa.

- **Grow up to 30% faster than conventional alfalfas.**
- **Increase the number of productive harvests each season.**
- **Provide bigger second, third and fourth crops.**
- **Enable harvesting of the first crop sooner.**



Demonstrates 30% faster growth and ready for late bud or one-tenth flower 3-5 days sooner.

- ✓ **Shorten harvest intervals by three to five days.**
- ✓ **Suppress weeds.**

Salinity tolerance – an improved option for yield and quality in saline soils

New Alforex alfalfa varieties with enhanced salinity tolerance, when combined with proactive field monitoring and remediation practices, are the alfalfa grower's front line of defense against salinity losses. Salt-tolerant alfalfa varieties, like PGI 427, PGI 908S, CISCO II and Rugged offer growers a new tool for production regions affected by salinity by raising the salinity threshold over unimproved varieties to maximize seasonal forage yield.

- ✓ **Reduces seedling loss at establishment.**
- ✓ **Protects and maximizes hay yield.**
- ✓ **Superior disease and pest resistance.**

Source: Alforex seeds, USA

ML99 Multi-leaf Alfalfa Highly Winter Active

Dormancy 10 – ML99 Multi-leaf Lucerne has been developed to incorporate a new level of quality and production in winter active Lucerne driven by high expression of multi-foliate leaves which yields 40% more than conventional tri-foliate varieties plus all the qualities currently required by Australian Lucerne growers.
ML99 Multileaf Lucerne has been tested under intensively irrigated and dryland conditions to meet Australian Lucerne growers' expectations. ML99 is the best and safest Lucerne variety bred by using only classic traditional plant breeding methods.

- ✓ Highly winter active cultivar (rating = 10).
- ✓ Near to 100% true to type multifoliate.
- ✓ 40% more leaflets than conventional Lucerne.
- ✓ Superior stand life.
- ✓ Frost tolerant.

Strengths

- ✓ Perennial, year-round production.
- ✓ Dual purpose (grazing and hay).
- ✓ Responds quickly to spring and summer rainfall (or irrigation).
- ✓ Highly productive.
- ✓ High nutritive value.
- ✓ Moderate tolerance of soil salinity and sodicity.
- ✓ Deep rooting, extracts water and nutrients from depth, restricts water table recharge.

Animal Production

Feeding value:
It is highly digestible (60 - 75%), is a good source of crude protein (15 - 25%), and has high levels of metabolisable (8 - 11 MJ/ kg DM).

Palatability:
Very palatable.

Production potential:
Daily live weight gains for beef cattle range between 0.7 kg/head/day from stemmy lucerne to 1.5 kg/head/day from young, leafy regrowth. Live weight gains of 300 - 400 g/head/day are achievable with lambs.

Source: Pasture genetics, Australia

SEED GERMINATION TESTS

A seed germination test can be conducted to observe the percentage of germination of a seed variety before seeding. 100 seed of Alfalfa variety selected for seeding should be placed on blotting paper or moisture absorbing mat in a Petri dish, sprinkle water on mat and seed. Count the germinated seed after 2-4 days. **A seed with more than 70% germination is ideal for seeding.** Decide the seed rate based on seed germination percentage.

ENHANCING SEED GERMINATION - VIRENXIA's Experiment

Seed germination can be enhanced by soaking the seed in Humic acid solution for 2 hours. Laboratory experiments conducted by VIRENXIA showed that **there is a 5-7 percent increase in seed germination by soaking in Humic acid solution and the length of shoot and root is double compared with control.**

Observations on seedling shoot and root length:

Treatment	Shoot Length (cm)	Root Length (cm)
Humic Acid	3.9	10
Control	1.7	5

Observations on shoot and root length after germination of Alfalfa seedlings shows that almost double length of shoot and root in Humic acid treated seedlings compared to control.

Benefits of Seed Treatment with Humic Acid

Humic acids come into direct contact with the seeds, before they are coated with several nutritious layers. This has the following effects:

1. *The cell membrane as well as metabolism activities are stimulated and therefore increases the germination rate.*
2. *The nutrient uptake capacity is increased and therefore promotes the growth of the seedling.*
3. *Raises sugar and vitamin content.*
4. *Speeds germination.*
5. *Promotes a quicker establishment.*
6. *Promotes root development of the seedling.*
7. *Reduces vulnerability to pests and diseases.*

VIRENXIA produces a pure and organic form of Humic acid engineered by its scientific team from ancient peat.

Source: VIRENXIA (Global Innovation Investments LLC, Dubai)

ALFALFA SEED TREATMENT & COATINGS

A successful crop begins with good stand establishment. Seed treatments and seed coatings are applied to most premium alfalfa seed to get plants off to a strong start, as it assists with maximizing germination and seedling survival, and helps mitigate early season threats to germination and stand establishment.

Seed treatment and coating technology has improved over the years, and research shows more sophisticated seed coatings.

Understanding the technology

Seed treatments are not the same as seed coatings; understanding the distinction is important. An alfalfa seed treatment generally consists of, at least, an inoculant with a specific strain of Rhizobium bacteria for alfalfa, along with a base fungicide to manage early season soil diseases.

Rhizobium bacteria helps ensure proper nodulation.

Alfalfa seed inoculated with Rhizobium bacteria helps ensure proper nodulation so the plant is able to fix nitrogen for its growth and development. In addition to Rhizobium, a base fungicide like Metalaxyl or Mefenoxam in a standard seed treatment helps protect germinating seed from early season fungal diseases, including Phytophthora and Pythium. In organic farming bio-fungicide like Trichogramme viridae are used instead of chemical fungicides.

A seed coating provides more protection than a standard seed treatment. The seed coating only consists of calcium carbonate and an inert polymer to keep nutrients and other active ingredients close to the seed to help prevent leaching during germination. Seed coatings may also add weight to small alfalfa seeds, helping improve plant ability for more even emergence.

A Rhizobium inoculant and fungicide (similar to what is in the standard treatment), along with additional specialized components like growth promoters, micronutrients, mycorrhizae, biopesticides and bio-enhancers, could also be added to the coating as additional treatments.

A seed coating may also include hydration polymers that draw moisture to the seed to aid in germination even in shallow, dry soil. A major benefit of seed treatments and coatings is: Most carry a two-year inoculant shelf life, and the Rhizobium inoculant strains applied are specifically chosen and may provide better nodulation than strains found naturally in soil.

Insurance for uncertain conditions

There is hardly ever a time when a farmer has ideal conditions for plant establishment or an ideal period for seedling growth. Weather often limits planting windows, and early season pests can inhibit germination and plant establishment.

The value of a seed coating and treatment is: It helps mitigate against these conditions at a small cost relative to the price of the seed. This extra protection can mean the difference between a good crop and a great crop because alfalfa that has a more vigorous start has a better chance to meet its yield potential.

Research done over the years shows a traditional seed coating can convert 50 to 75 percent of alfalfa seeds to healthy plants. When planting uncoated or lightly coated seeds, growers can expect 20 to 40 percent to germinate into healthy plants.

One can see benefit from a seed coating during the first 30 to 60 days after planting, when the stand is being established. Research has shown the number of replanted alfalfa acres also declines when a seed coating is added.

Source: Jeremy Hayward, Brand Manager, W-L Alfalfas

Alfalfa Exports have Tripled

Over the course of the last two decades, the value of US alfalfa hay exports from the US has tripled, increasing from around $200 million to over 600 million. All hay (alfalfa and grasses have approximately doubled, increasing to $1.2 billion (Figure 2).

On the world stage, the sum of world hay trade quantities has approximately doubled over the past 16 years, increasing at the average rate of about 266,000 MT/year each year (Figure 3), with strong increases in exports into Asia and the Middle East.

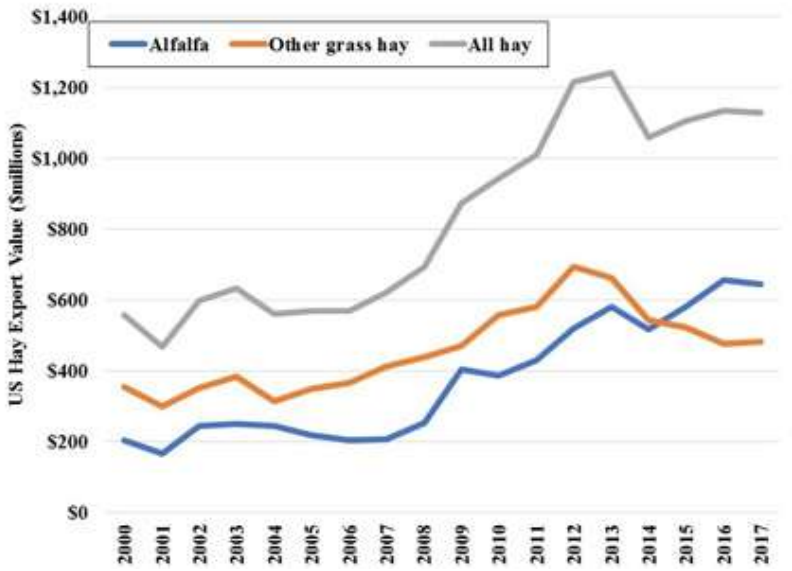


Figure 2. Inflation Adjusted Value of Annual US Hay Exports, 2000-2017 (Base Year = 2010)

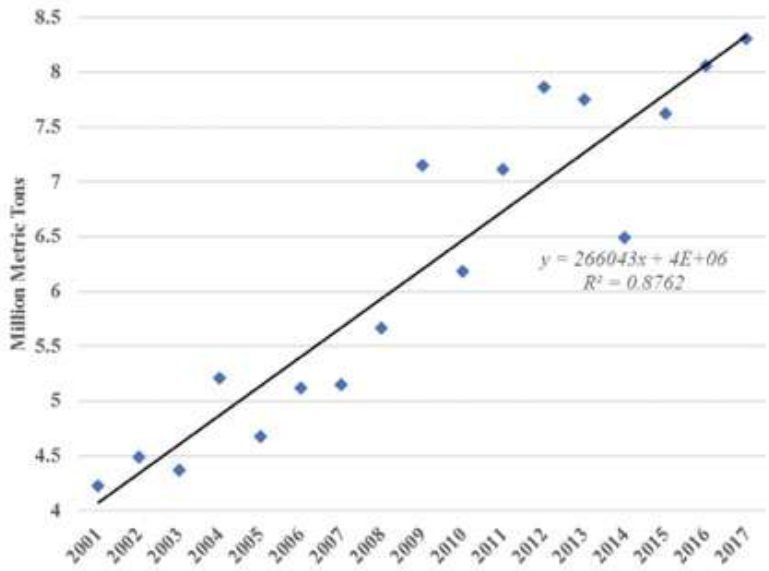


Figure 3. Global Trade in Alfalfa & Grass Hays, 2001-2017 (Source: ITC Trade Map).

Saudi Arabia purchases help offset loss of U.S. hay sales to China

Exports to Saudi Arabia have seen a 37% increase between January and October 2018.

In Saudi Arabia, a ban on cultivating green fodder became effective in November 2018 to preserve water resources.

The loss of China as a major hay export market has been largely offset by more exports to Saudi Arabia, Jon Paul Driver, a Northwest Farm Credit Services hay analyst, says.

Exports to China were "way off" from October to December but data on how much was delayed by the partial federal government shutdown, said Mark T. Anderson, president and CEO of Anderson Hay & Grain Co., a major exporter in Ellensburg, Wash. China has slapped a 33% tariff on U.S. hay as part of the trade war between the two superpowers.

"The market in China is very confused and waiting to see if tariffs are lifted. Supplies seem tight in general even with less China demand," Anderson said.

U.S. Census Bureau trade data shows the amount of U.S. alfalfa sold to China was down 22% between January and October in 2018 compared to the previous year, Driver said.

"But particularly offsetting that is Saudi Arabia coming into the market and up 37% in the same time frame. So the total exports, January through October, were only down 5.8%," he said. "It's unreasonable to think he tariff will last forever, which means when it goes away there is opportunity."

Source: Dan Wheat, Capital Press, Central Washington field reporter

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