2022 ALFALFA VARIETY DISEASE RESISTANCE

CROPLAN®

By WINFIELD UNITED

Data Backed. Farmer Approved.

"CROPLAN® AA alfalfa varieties have allowed our farm to plant alfalfa in fields that in previous years we wouldn't have considered. Its high level of disease resistance gives us the confidence that planting new AA varieties will produce high yield potential, even in less than ideal field conditions."

-Shawn Wagner, *Wagner Farms in Oconto Falls, WI*

NEW AA varieties from CROPLAN offer one of the most advanced disease resistance packages with multi-pathogen resistance to Aphanomyces and Anthracnose. Visit your local CROPLAN dealer or croplan.com for more information.

ALFALFA

Going the extra mile isn't extra to us.

Our dedication goes way beyond a handshake or a pat on the back. We're fully committed to you and the success of your alfalfa crop from day one.

That means we'll work closely with you to help you select the best genetics for your field — pairing new traits with the latest technologies to give you your very best chance to produce higher-quality feed and optimize tonnage.

Meeting your expectations? Heck, we're more interested in beating them.

ENHANCED MULTI-PATHOGEN DISEASE RESISTANCE IN ALFALFA[1,2]

NEW CROPLAN "AA" ALFALFA VARIETIES PROVIDE MULTI-PATHOGEN PROTECTION FOR ALFALFA ESTABLISHMENT IN "KILLER SOILS"

A strong start to your alfalfa stand is important. The soil environment that alfalfa is seeded into can mean success or failure for the stand. Management practices like seedbed preparation and soil fertility, can influence stand establishment. Soil borne diseases in the upper Midwest and Eastern U.S. like Aphanomyces root rot and Anthracnose can also have a serious impact on your stand establishment and alfalfa productivity.

The enhanced multi-pathogen disease resistance package built into the newly launched varieties of CROPLAN alfalfa, designated with the "AA" in their variety name, ensures protection from an entire complex of aggressive diseases. New AA products have high resistant to multiple races of Aphanomyces root rot and Anthracnose plant disease.

Symptoms of poor disease resistance to Aphanomyces include stunted or slow to establish growth, thin stands, even potential death of the alfalfa seedlings. As the plants reach production age, disease resistance is important to keep roots healthy. This means greater water and nutrient extraction and healthy root hairs for nitrogen fixation.

In addition to the underground disease protection, the new AA varieties resist aboveground pathogen symptoms of Anthracnose plant disease. Anthracnose is a fungus that lives in the soil and can infect the alfalfa crown and spread by spores to the stems. It typically appears in alfalfa stands that are two or more years old. However, newly identified Race 5[2] can occur during the first season of growth. Key symptoms are stem lesions that may ultimately lead to crown rot and plant death, most common in warm, wet weather. Wet areas of fields often exhibit the dark "spore" stage spreading anthracnose.

With built-in disease protection for both below and above ground, the genetic yield potential is maximized. The AA varieties are higher in both yield potential and quality potential due to increased plant health, resulting in a higher ROI potential. For additional protection during seedling establishment, GroZone® Plus Advanced® Coating Zn + Stamina® fungicide seed treatment provides two fungicide modes of action, rhizobium for maximum N fixation, and Ascend® growth promoter.

Open your phone's camera and hold it over the smart code below to scan and watch our AA video to learn more.

WHY DISEASE RESISTANCE MATTERS

STRONGER SEEDLINGS

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HEALTHIER ROOTS

↓

BIGGER PLANTS

↓

HIGHER YIELD POTENTIAL & HIGHER FEED QUALITY POTENTIAL

↓

INCREASED STAND PERSISTANCE

↓

INCREASED NET RETURN PER ACRE

[1]Includes race 1 and race 2 protection. In addition, Forage Genetics International, LLC (FGI) has identified a novel source of Aphanomyces resistance in the greenhouse and field that visibly outperforms unrelated varieties on the market when grown under natural or artificial disease pressure. FGI researchers have been working cooperatively with universities collecting and testing the most virulent strains of Aphanomyces to help determine the level of resistance to this novel source.

[2]Includes race 1 protection, along with FGI patented resistance to Anthracnose Race 5, which was recently confirmed by USDA's Agricultural Research Service.

COMPETITOR **AA VARIETY** **COMPETITOR**

Above photo: Plants dug from West Salem, WI 2017 seeded demo on 9/19/2020.

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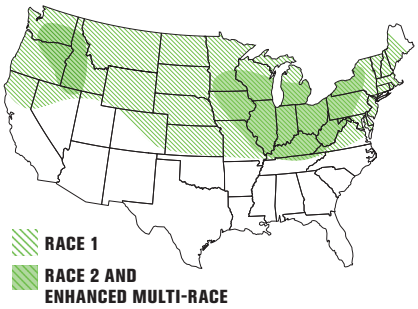
ALFALFA



STRONGER SEEDLINGS AND HEALTHIER ROOTS

Bigger roots mean bigger yield potential. The combination of genetics in the AA products have exceptional protection for healthy root establishment, especially in wet soils. Healthy roots lead to a strong and extensive root system allowing for more water and nutrient uptake to support high yield potential, stand longevity, and a better chance of surviving during wet stress and tough winters.

APHANOMYCES ROOT ROT

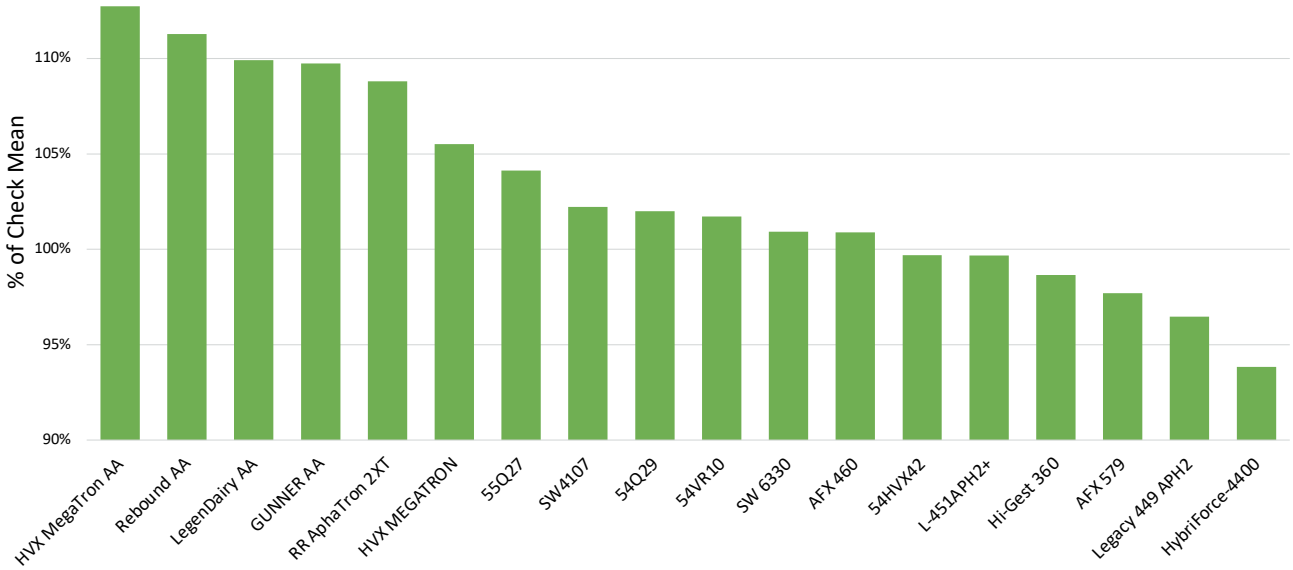
Infects roots; causes stunting, reduced nodulation, and poor root development in seedlings.

- Commonly found in soils that are saturated, poorly drained, compacted or have limited water dispersal.
- Visual symptoms can include gray, water-soaked roots, yellowed cotyledons, and stunted growth that can result in limited yield production or stand failure.
- Multiple races have been identified in the Midwest, East and areas of the Pacific Northwest.
- The dark green areas of the map indicate soils that are more likely to cause a significant economic impact.
- **Gunner AA, HVX MegaTron AA, HVX MegaTron, RR AphaTron 2XT, Rebound AA, and LegenDairy AA** have high resistance to Aphanomyces Race 1, Race 2, and enhanced multi-race[1] (previously known as Race 2/3) root rot disease - a unique new industry leading disease package.

Above photo: Plants dug from West Salem, WI 2017 seeded demo on 9/19/2020.

Leading competitor variety-left; CROPLAN REBOUND AA alfalfa-right. Genetic yield potential can be maximized when the variety has built-in disease protection.

YIELD BY VARIETY - MULTI-YEAR, ACROSS ALL LOCATIONS
CHECK VARIETIES AVERAGE = 100%, VALUES GIVEN AS A % OF CHECK



[1]Includes race 1 and race 2 protection. In addition, Forage Genetics International, LLC (FGI) has identified a novel source of Aphanomyces resistance in the greenhouse and field that visibly outperforms unrelated varieties on the market when grown under natural or artificial disease pressure. FGI researchers have been working cooperatively with universities collecting and testing the most virulent strains of Aphanomyces to help determine the level of resistance to this novel source.

*Percent check: A combination of check variety entries are included in each trial to compare performance of different varieties to each other. Performance of the check varieties is standardized at 100%. Yield and quality parameters with values over 100% are "better" than the standardized checks. Similar with values less than 100% have lower yield and/or quality than check.

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ALFALFA

SEVERE ANTHRACNOSE PRESSURE

HEALTHIER PLANTS, HIGHER YIELD, HIGHER FEED QUALITY

The combination of healthy roots and healthy stems lead to higher alfalfa yield potential. Below ground, alfalfa roots gather water and nutrients. Above ground, stems and leaves produce and transport plant energy to make valuable forage. Diseases can limit these plant processes. An enhanced multi-pathogen disease package helps protect alfalfa stems and crowns that transport valuable plant energy. In addition, fungicides can help protect the leaves from numerous foliar pathogens.

ANTHRACNOSE

A severe stem and crown fungal disease that causes defoliation.

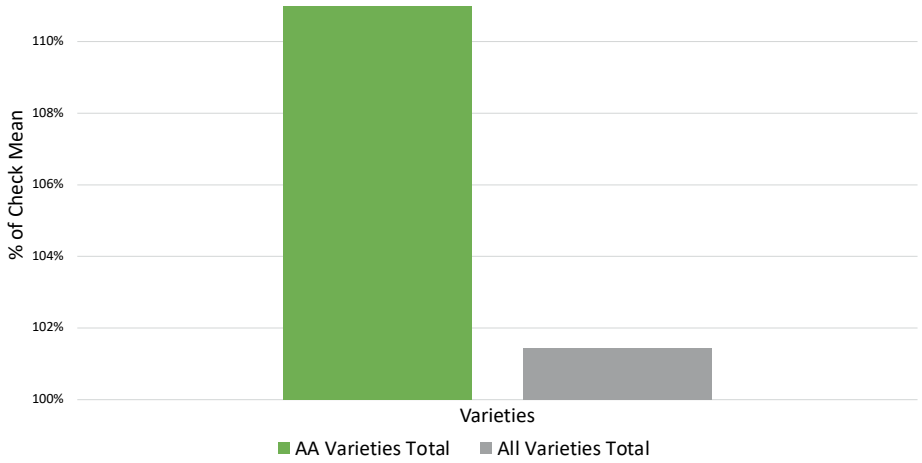
- Multiple races can be present in late season and occurs aggressively during warm, moist conditions.
- Race 1 is commonly found and many commercial varieties have resistance to them.
- In severe situations, Anthracnose can cause yield losses of up to 25%.
- On susceptible plants, stems have large, sunken, oval to diamond-shaped lesions. Large lesions are tan colored with brown borders.
- Lesions can enlarge and join together to gridle and kill stems on a plant. Girdled stems may wilt suddenly and exhibit a “shepherd’s crook”.
- Dead stems are often scattered in the field with straw-colored to pearly white dead shoots. Infected crowns turn blue-black, produce fewer stems per plant, and the plant eventually dies.
- A new race of this disease has been identified in the Midwest, race 5[2], that overcomes standard variety resistances.
- **Gunner AA, HVX MegaTron AA, HVX MegaTron, new Rebound AA, and new LegenDairy AA** were developed for high resistance to multi-race Anthracnose disease including new Race 5.

FIGURE 1: ANTHRACNOSE LESIONS

ANTHRACNOSE RACE 5 SUSCEPTIBLE

HVX MEGATRON ANTHRACNOSE RACE 5 RESISTANCE

CROPLAN AA VARIETIES VS. ALL VARIETIES
MULTI-YEAR, ALL LOCATIONS, TOTAL YIELD %CHECK
CHECK VARIETIES AVERAGE = 100%, VALUES GIVEN AS A % OF CHECK



Above photo shows CROPLAN AA variety with the enhanced multi-pathogen versus CROPLAN basic disease resistance package when under intense Anthracnose pressure from West Salem, WI demo in 2018. *Note: Summer 2018 Anthracnose race 5 severely impacted large areas of the upper Midwest.

[2]Includes race 1 protection, along with FGI patented resistance to Anthracnose Race 5, which was recently confirmed by USDA’s Agricultural Research Service.

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ALFALFA

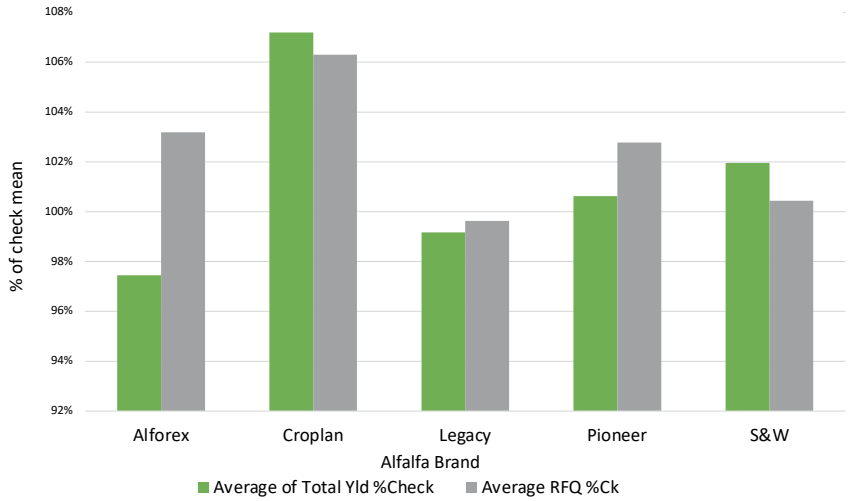
INCREASED STAND PERSISTENCE

Alfalfa plants with increased disease resistance have healthier roots. Healthy plants establish, produce, and persist better when compared to plants lacking the new enhanced multi-pathogen disease resistance features. Extensive root systems allow for the alfalfa plant to optimize water use especially when plants transition from too wet to too dry conditions. The established extensive root system will be more efficient at capturing necessary nutrients and converting it into plant growth for increased yield potential. In addition, healthy plants have great ability to store carbohydrates to prepare for winter.

LEGENDAIRY AA VARIETY **COMPETITOR**

Above photo: Photo taken on 8/06/20 in Marshfield, WI 2019 seeded demo.

VARIETY YIELD & RFQ BY BRAND
MULTI-YEAR, ACROSS ALL LOCATIONS
CHECK VARIETIES AVERAGE = 100%, VALUES GIVEN AS A % OF CHECK



MEGATRON AA VARIETY **COMPETITOR**

Above photo: Photo taken on 8/12/21 in West Salem, WI 2019 Cutting Management Demo. 33-day cutting schedule

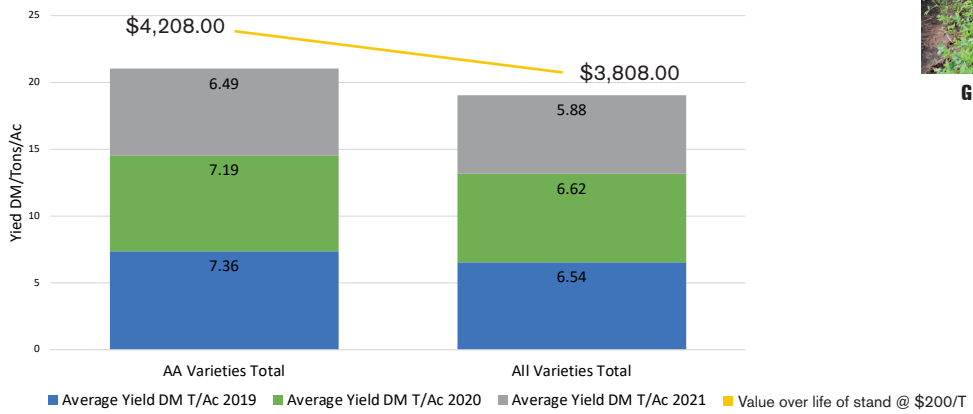
INCREASED VALUE AND NET RETURN PER ACRE

The CROPLAN AA product benefits provide a unique combination of disease resistance to multiple pathogens. These benefits can produce greater bottom line profit potential, or a greater net return per acre to the alfalfa grower. Example below of Increased Gross Revenue per Acre based on yield increase from AA product performance in these “Killer Soils”.

GUNNER AA VARIETY **COMPETITOR**

Above photo: Photo taken on 8/10/21 in West Salem, WI 2019 Spring Demo.

POTENTIAL VALUE/ACRE WITH AA VARIETIES ON “KILLER SOILS”
SEEDED 2018: YIELD/AC OVER LIFE OF STAND
UPPER MIDWEST & EAST LOCATIONS



Gross income per acre is calculated above by taking the current estimated alfalfa hay market value of $200 per ton multiplied by yield in tons per acre.

Because of factors outside of WinField United’s control, such as weather, product application, and any other factors, results to be obtained, including but not limited to yields, financial performance, or profits, cannot be predicted or guaranteed by WinField United. Results are based upon controlled tests and field trials; actual results may vary.

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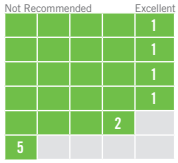
CROPLAN AA ALFALFA VARIETIES WITH ENHANCED MULTI-PATHOGEN DISEASE RESISTANCE PACKAGE

NEW

LegenDairy AA

Regions: **Central, East, North, West**
Fall Dormancy: **3.4**
Winter Hardiness: **1.1**

Characteristics



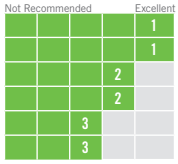
- The next generation of LegenDairy; the added AA disease resistance has advanced yield potential to new levels
- Highest resistance (HR+) rating to multi-race Aphanomyces root rot disease (races 1, 2, and EMR[1]); HR+ to multi-race anthracnose disease (including race 5[2])
- Excellent choice for producers in northern growing regions east to west; ideal for 3- to 4-cut baled hay or haylage harvest system
- Available with Apex™ Green Seed Coating; OMRI Listed® for organic use

RR AphaTron 2XT

Regions: **Central, East, North, West**
Fall Dormancy: **4.0**
Winter Hardiness: **1.5**

Roundup Ready ALFALFA

Characteristics



- Excellent soil disease resistance to help improve root and plant health
- High resistance (HR) to Aphanomyces root rot disease races 1 and 2; resistant (R) to EMR[1]
- Provides high yield and excellent forage quality potential under a 4- to 5-cut haylage or aggressive hay management system

HVX MegaTron

Regions: **Central, East, North, West**
Fall Dormancy: **4.2**
Winter Hardiness: **1.7**

HARVXTRA with Roundup Ready® Technology

Characteristics

- H2 feed quality rating; exceptional soil disease resistance to help improve root and plant health
- Highest resistance (HR+) rating to multi-race Aphanomyces root rot disease (races 1, 2 and EMR[1]); resistant (R) to multi-race anthracnose (including new race 5[2])
- Excellent quality and yield potential with a 3- to 5-cut flexible harvest system based on geography

NEW

HVX MegaTron AA

Regions: **Central, East, North, West**
Fall Dormancy: **4.4**
Winter Hardiness: **1.4**

HARVXTRA with Roundup Ready® Technology

Characteristics

- H2 feed quality rating; exceptional root and plant health to support highest yield and quality potential
- Highest resistance (HR+) rating to multi-race Aphanomyces root rot disease (races 1, 2 and EMR[1]); HR+ to multi-race anthracnose disease (including race 5[2])
- Exceptional yield potential ideal with a 3- to 5-cut flexible harvest system based on geography

Rebound AA

Regions: **Central, East, North, West**
Fall Dormancy: **4.4**
Winter Hardiness: **1.7**

Characteristics

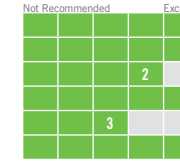
- Packs a punch with AA disease resistance providing exceptional yield potential
- Highest resistance (HR+) rating to multi-race Aphanomyces root rot disease (races 1, 2 and EMR[1]); HR+ to multi-race anthracnose disease (including race 5[2])
- Best-suited for 4- to 5-cut haylage or aggressive hay management systems in the Upper Midwest and East; great for baled hay in the West where pockets of Aphanomyces root rot disease is a problem
- Available with Apex™ Green Seed Coating; OMRI Listed® for organic use

NEW

Gunner AA

Regions: **Central, East, North, South, West**
Fall Dormancy: **4.8**
Winter Hardiness: **1.2**

Characteristics



- Outstanding AA disease resistance combined with maximum yield potential
- High resistance (HR+) to multi-race Aphanomyces root rot disease (races 1, 2, and EMR[1]); HR+ to multi-race anthracnose disease (including race 5[2])
- Very early spring growth, fast regrowth and late fall growth; ideal for aggressive 5- to optional 6-cut hay or haylage harvest schedule

KEY

Scale
1 = Excellent
2 = Strong
3 = Acceptable
4 = Manage
5 = Not Recommended

Product descriptions and ratings are generated from Answer Plot® trials and/or from the genetics supplier and may change as additional data is gathered.

Feed quality ratings for HarvXtra® Alfalfa are represented on a separate scale than Roundup Ready® and conventional alfalfa varieties and are signified with an "H." Because there is a significant improvement in forage quality, HarvXtra® Alfalfa products can only be compared to other HarvXtra® Alfalfa products.

[1]Includes race 1 and race 2 protection. In addition, Forage Genetics International, LLC (FGI) has identified a novel source of Aphanomyces resistance in the greenhouse and field that visibly outperforms unrelated varieties on the market when grown under natural or artificial disease pressure. FGI researchers have been working cooperatively with universities collecting and testing the most virulent strains of Aphanomyces to help determine the level of resistance to this novel source.

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