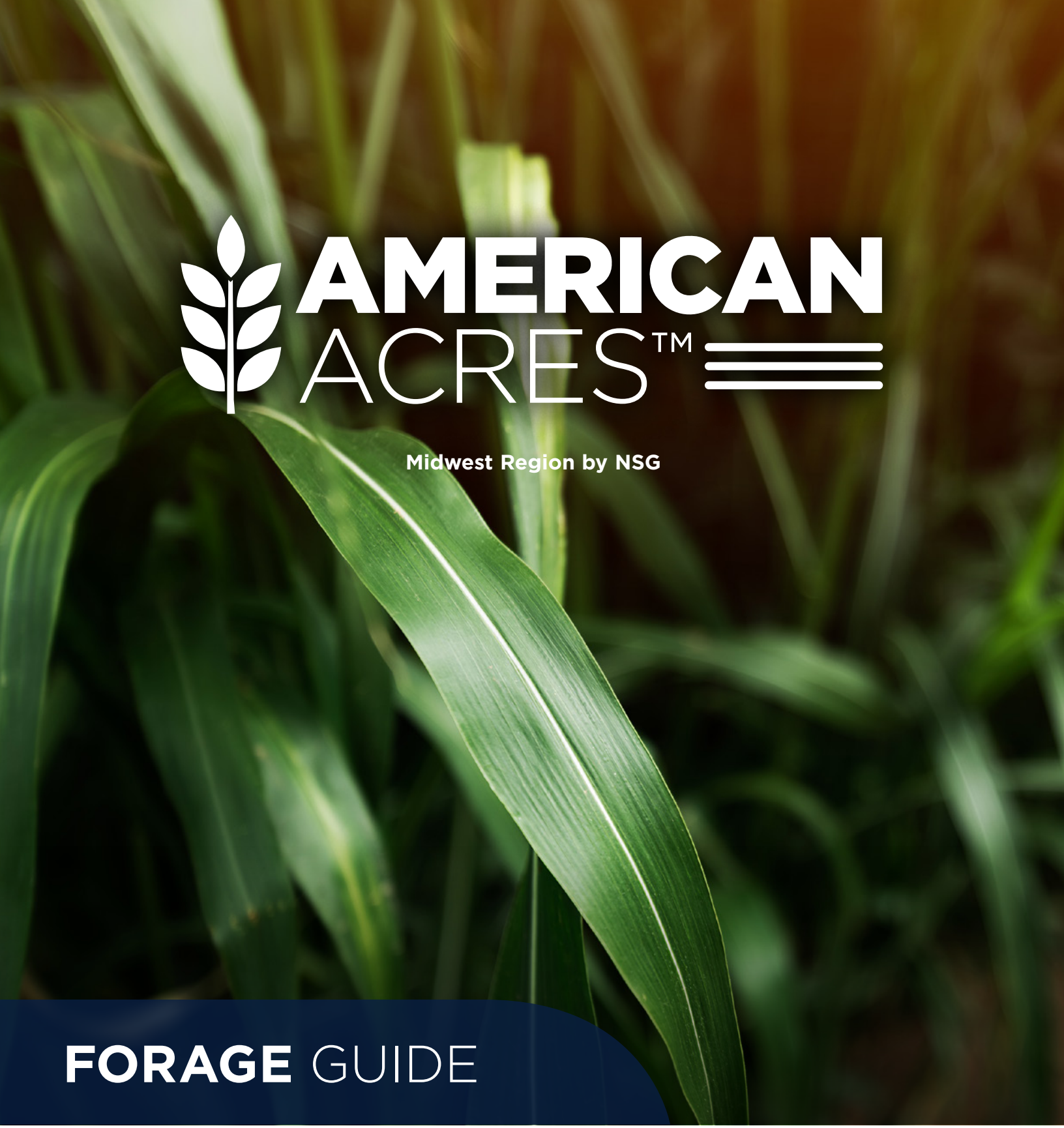

AMERICAN ACRES™

Midwest Region by NSG

FORAGE GUIDE

American-Acres.com

FORAGE GUIDE

CONTENTS

AMERICAN ACRES™

ALFALFA
FORAGE PRODUCTS

			WS	BW	FW	VW	ANTH	PRR	APH
DORMANCY 3	**OCTANE**	Octane is a high forage yielding alfalfa, with a dense dark green canopy. It's high forage dry matter yield, high forage milk per acre, high NDF and disease resistance make this an easy selection.	1.4	HR	HR	HR	HR	HR	HR
	SHIFT	Shift provides a high-quality feed value with its winter hardiness and durability. It is extremely resistant to all major alfalfa diseases, and has large, deep-set crowns allowing it to stand up to traffic pressure.	1.4	HR	HR	HR	HR	HR	R
DORMANCY 4	**DYNAMO**	Dynamo provides high forage quality, maximum tonnage, superior winterhardiness and outstanding disease resistance. This alfalfa has a rapid regrowth, making it suitable for 3, 4 and 5 cut harvest management systems.	1.9	HR	R	R	HR	HR	HR
	BARRICADE II	An alfalfa variety well suited to areas with increased salinity pressures.	2.0	HR	HR	HR	HR	HR	NR
	423TQ RR	High quality Traffic Tested® alfalfa with Ultracut™ alfalfa disease package and Roundup Ready® technology	1.0	HR	HR	HR	HR	HR	HR
DORMANCY 5	**SLINGSHOT**	High-yielding, high-quality, excellent digestibility. Exclusive genetics. Top production across a wide range of agronomic conditions.	2.0	R	HR	HR	HR	HR	HR

WS = Winter Survivability; BW = Bacterial Wilt; FW = Fusarium Wilt; VW = Verticillium Wilt; ANTH = Anthracnose; PRR = Phytophthora Root Rot; APH = Aphanomyces Root Rot

NR = Not Rated
R = Resistant; HR = Highly Resistant; MR = Moderately Resistant

ALFALFA
FORAGE PRODUCTS

OCTANE
ALFALFA

Supercharge your hay production with **Octane**, the high forage yielding leader that consistently produces more dry matter and milk per acre. Its stability and persistence deliver high performance year after year. Octane's dense, dark green canopy and 60% multifoliate expression is a standout in any field. Octane is selected for high forage dry matter yield, high forage milk per acre, high NDF and disease resistance.

OCTANE CHARACTERISTICS	
Fall Dormancy	3.0
WSI	1.4
DRI	35/35

OCTANE DISEASE AND PEST RESISTANCE	
Bacterial Wilt	HR
Fusarium Wilt	HR
Anthracnose	HR
Phytophthora Root Rot	HR
Aphanomyces Root Rot (Race 1)	HR
Aphanomyces Root Rot (Race 2)	HR
Verticillium Root Rot	HR
Blue Alfalfa Aphid	R
Stem Nematode	HR

NR = Not Rated
R = Resistant; HR = Highly Resistant; MR = Moderately Resistant

SHIFT
ALFALFA

Shift provides a high level of winter hardiness and durability for profitable hay production over the life of the stand. Large, deep-set crowns allow this variety to stand up to traffic pressure and persist in northern climates. Shift features a dense, dark green canopy with high multifoliate leaf expression providing high quality feed value. It is highly resistant to all major alfalfa diseases, including Aphanomyces Race 1 and Race 2 root rot, contributing to Shift's long stand life and outstanding persistence.

SHIFT CHARACTERISTICS	
Fall Dormancy	3.0
WSI	1.4
DRI	35/35

SHIFT DISEASE AND PEST RESISTANCE	
Bacterial Wilt	HR
Fusarium Wilt	HR
Anthracnose	HR
Phytophthora Root Rot	HR
Aphanomyces Root Rot	HR
Verticillium Root Rot	HR
Stem Nematode	R

NR = Not Rated
R = Resistant; HR = Highly Resistant; MR = Moderately Resistant

ALFALFA
FORAGE PRODUCTS

DYNAMO
ALFALFA

Dynamo delivers explosive forage quality and maximum tonnage in a fall dormancy class 4 variety. Its rapid regrowth is well suited for 3, 4 and 5 cut harvest management systems. High multifoliate leaf expression, improved crude protein content and exceptional feed value are table stakes for this top performer. Dynamo's unparalleled combination of high yield and improved Relative Feed Quality (RFQ) will produce more milk per acre guaranteed Complimented by superior winterhardiness and outstanding disease resistance index scores, including Aphanomyces Race 1 and Race 2 resistance, Dynamo will generate high-flying forage production and more milk.

DYNAMO CHARACTERISTICS	
Fall Dormancy	4.0
WSI	1.9
DRI	34/35

DYNAMO DISEASE AND PEST RESISTANCE	
Bacterial Wilt	HR
Fusarium Wilt	HR
Anthracnose	HR
Phytophthora Root Rot	HR
Aphanomyces Root Rot (Race 1)	HR
Aphanomyces Root Rot (Race 2)	R
Verticillium Root Rot	HR
Pea Aphid	R
Blue Aphid	R
Spotted Alfalfa Aphid	R
Stem Nematode	R
Northern Root Knot Nematode	MR

NR = Not Rated
R = Resistant; HR = Highly Resistant; MR = Moderately Resistant

BARRICADE II
ALFALFA

Barricade II is an alfalfa variety well suited to areas with increased salinity pressures. Selected from parents that endured repeated irrigation under a 100mM NaCl solution in the greenhouse, and endured field soils with >8 EC, Barricade II has demonstrated improved germination under saline conditions as well as improved forage production. This increased saline tolerance, when combined with high yield potential and an excellent disease and pest resistance package, gives Barricade II excellent overall performance and hardiness.

BARRICADE II CHARACTERISTICS	
Fall Dormancy	4.0
WSI	2.0
DRI	35/35
Cut Per Season	4-5

BARRICADE II DISEASE AND PEST RESISTANCE	
Bacterial Wilt Fusarium	HR
Verticillium Wilt	HR
Fusarium Wilt	HR
Phytophthora Root Rot	HR
Anthracnose	HR
Aphanomyces Root Rot	HR
Pea Aphid	HR
Spotted Alfalfa Aphid	MR

NR = Not Rated
R = Resistant; HR = Highly Resistant; MR = Moderately Resistant

ALFALFA
FORAGE PRODUCTS

423TQ RR ULTRACUT™
ALFALFA

High quality Traffic Tested® alfalfa with UltraCut™ alfalfa disease package with Roundup Ready™ technology. Top choice for heavy, compacted and saturated soils. The UltraCut™ alfalfa disease package helps you grow a healthy alfalfa crop even in fields susceptible to Anthracnose and Aphanomyces. Its protection can help deliver an advantage through improved agronomic performance and yield potential.

423TQ RR ULTRACUT™ CHARACTERISTICS	
Fall Dormancy	4.0
WSI	1.0
DRI	34/35
Forage Quality	Excellent
Persistence	Excellent
Recovery After Cutting	Very Fast

423TQ RR ULTRACUT™ DISEASE AND PEST RESISTANCE	
Bacterial Wilt	HR
Fusarium Wilt	HR
Anthracnose	HR
Phytophthora Root Rot	HR
Aphanomyces Root Rot	HR
Verticillium Root Rot	HR
Pea Aphid	R
Spotted Aphid	R
Stem Nematode	R

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SLINGSHOT
ALFALFA

Slingshot is a high yielding FD 5 alfalfa with a tough winter dormancy. With its early dormancy break in the spring and fast re-growth after cutting, Slingshot's ability to handle an aggressive multi-cut regiment takes this alfalfa to the next level. This alfalfa also has a high expression of multi-foliates giving it 4-5 leaflets per leaf.

SLINGSHOT CHARACTERISTICS	
Fall Dormancy	5.2
WSI	2.0
DRI	34/35
Cut Per Season	4-5

SLINGSHOT DISEASE AND PEST RESISTANCE	
Bacterial Wilt	R
Fusarium Wilt	HR
Anthracnose	HR
Phytophthora Root Rot	HR
Aphanomyces Root Rot (Race 1)	HR
Aphanomyces Root Rot (Race 2)	NR
Verticillium Root Rot	HR
Pea Aphid	HR
Potato Leafhopper	NR

NR = Not Rated
R = Resistant; HR = Highly Resistant; MR = Moderately Resistant

SORGHUM FORAGES
PRODUCT SELECTION GUIDE

MANAGING PRUSSIC ACID & NITRATES WITH SORGHUM FORAGES

Prussic acid occurs when a compound in the leaf epidermis combines with a compound in the leaf mesophyll cells to release prussic acid (cyanide).

Crushing, chewing, or freezing can burst cells and allow these compounds to come in contact with each other; **do not graze during frost risk.**

Prussic acid is most concentrated in new re-growth therefore, sorghum forages **should not be grazed until more than 18" tall.**

Prussic acid is not generally a concern in well-cured hay, silage that has been stored more than 30 days, or in foliage that has been frosted and dried out.

Pearl Millet is the forage choice when prussic acid is a major concern.

Toxic levels of **nitrate** can develop in sorghum forages, especially when excessive nitrogen combined with drought conditions occur at or near the time of harvest. High levels of nitrate in sorghum forage is dangerous and can be fatal to livestock if not managed properly. To prevent and manage nitrate concerns, follow these general guidelines...

- Wait 7 to 10 days after a drought breaking rain before harvesting; test before harvesting during extended periods of stress.
- Balanced fertility reduces risks for nitrate problems. Split applications of N on multi-cuts is a constructive management practice, half at planting, and the rest after each hay harvest.

SUDANGRASS & FORAGE
SORGHUM PRODUCTS

PACKER HGY
A CONVENTIONAL HYBRID FORAGE SORGHUM FOR HIGH PRODUCTION SILAGE

Packer HGY produces a high grain yield and is a strong standing forage sorghum. Packer HGY is consistently one of the highest tonnage forage sorghums we see in testing in trialing. Packer HGY is the top choice for high tonnage full season silage.

PACKER HGY CHARACTERISTICS	
Plant Height	6-7 feet
Grain	Yes
Days to Pollination	85-90
Typical Seeds / lb	16,000
Dryland Seeding Rate	5-6 lbs row planted
Irrigated Seeding Rate	6-8 lbs row planted
Advanced Genetics	Conventional Hybrid

PACKER HGY PRODUCT INFORMATION	
Hay	N/A
Silage	Excellent
Continuous Grazing	N/A
Rotational Grazing	N/A
Palatability	Very Good

SUDANGRASS & FORAGE
SORGHUM PRODUCTS

PACKER BMR
A BMR HYBRID FORAGE SORGHUM FOR HIGH PRODUCTION SILAGE

Packer BMR offers great tonnage in a BMR package. This Hybrid has a high grain stover ratio increasing silage energy.

PACKER BMR CHARACTERISTICS	
Plant Height	7-8 feet
Grain	Yes
Days to Pollination	90-95
Typical Seeds / lb	16,000
Dryland Seeding Rate	5-6 lbs row planted
Irrigated Seeding Rate	6-8 lbs row planted
Advanced Genetics	Brown Mid Rib (BMR)

PACKER BMR PRODUCT INFORMATION	
Hay	N/A
Silage	Excellent
Continuous Grazing	N/A
Rotational Grazing	N/A
Palatability	Very Good

QUICK CHOP

SHORT SEASON BMR FORAGE SORGHUM

Quick Chop is a medium maturity one cut silage with grain for maximizing tonnage and digestibility. This hybrid grows quickly making it suitable for double cropping after wheat harvest. It should be ready to harvest in 90 days or in the soft dough stage. Quick Chop has good stalk strength giving it excellent standability. Reduced lignin in the plant improves the digestibility significantly.

QUICK CHOP CHARACTERISTICS	
Plant Height	7-9 feet
Grain	Yes
Days to Pollination	75-80
Typical Seeds / lb	18,000
Dryland Seeding Rate	5-6 lbs row planted
Irrigated Seeding Rate	6-8 lbs row planted
Advanced Genetics	Brown Mid Rib (BMR)

QUICK CHOP PRODUCT INFORMATION	
Hay	N/A
Silage	Excellent
Continuous Grazing	N/A
Rotational Grazing	N/A
Palatability	Excellent

SUDANGRASS & FORAGE
SORGHUM PRODUCTS

BLUE RIBBON 3D
BMR HYBRID SUDANGRASS

Blue Ribbon 3D is a premium quality sudan forage with the dry stalk gene and quickness to cure for baling. This hybrid produces a fine stemmed sudan forage suitable for grazing or baling. With excellent regrowth, this sudangrass makes for exceptional multicut feed.

BLUE RIBBON 3D CHARACTERISTICS	
Plant Height	5-6 Feet
Grain	N/A
Days to Pollination	60-75
Typical Seeds / lb	22,500
Dryland Seeding Rate	13-19 lbs drilled
Irrigated Seeding Rate	22-32 lbs drilled
Advanced Genetics	Brown Mid Rib (BMR)

BLUE RIBBON 3D PRODUCT INFORMATION	
Hay	Excellent
Silage	Good
Continuous Grazing	Very Good
Rotational Grazing	Excellent
Palatability	Excellent

HAY N GRAZE

CONVENTIONAL SORGHUM SUDANGRASS

Hay N Graze is a very tough hybrid that performs well with a large footprint. Hay N Graze is a medium maturity conventional hybrid, that has quick early season growth.

HAY N GRAZE CHARACTERISTICS	
Plant Height	6-8 Feet
Grain	Yes
Days to Pollination	60-70
Typical Seeds / lb	19,000
Dryland Seeding Rate	15-24 lbs drilled
Irrigated Seeding Rate	24-40 lbs drilled
Advanced Genetics	Conventional Hybrid

HAY N GRAZE PRODUCT INFORMATION	
Hay	Very Good
Silage	Good
Continuous Grazing	Very Good
Rotational Grazing	Very Good
Palatability	Good

SUDANGRASS & FORAGE
SORGHUM PRODUCTS

EXCEL II
CONVENTIONAL SORGHUM SUDANGRASS

Excel II is a hybrid sorghum sudangrass that produces high-quality forage and has a quick regrowth. This variety produces tons of palatable forage. Excel II is a multicut hybrid that will perform over a wide range of environmental conditions.

EXCEL II CHARACTERISTICS	
Plant Height	6-9 Feet
Grain	Yes
Days to Pollination	90-95
Typical Seeds / lb	19,000
Dryland Seeding Rate	13-24 lbs drilled
Irrigated Seeding Rate	24-40 lbs drilled
Advanced Genetics	Conventional Hybrid

EXCEL II PRODUCT INFORMATION	
Hay	Very Good
Silage	Good
Continuous Grazing	Very Good
Rotational Grazing	Very Good
Palatability	Very Good

NUTRIMAXX BMR

LATE MATURING BMR SORGHUM SUDAN

Nutrimaxx BMR is a full season sorghum sudan alternative to Photoperiod Sensitive (PS) genetics. Nutrimaxx BMR hybrid features include a very high green leaf retention, aggressive tillering, re-growth and recovery, all packaged with excellent drought tolerance. This variety has a wide harvest window and produces full season forage.

NUTRIMAXX BMR CHARACTERISTICS	
Plant Height	7-9 Feet
Grain	Yes
Days to Pollination	85-90
Typical Seeds / lb	17,000
Dryland Seeding Rate	13-24 lbs drilled
Irrigated Seeding Rate	22-32 lbs drilled
Advanced Genetics	Brown Mid Rib (BMR)

NUTRIMAXX BMR PRODUCT INFORMATION	
Hay	Excellent
Silage	Good
Continuous Grazing	Excellent
Rotational Grazing	Excellent
Palatability	Excellent

SUDANGRASS & FORAGE
SORGHUM PRODUCTS

BRUISER
BRACHYTIC DWARF (BD) BMR SORGHUM SUDAN

Bruiser is a brachytic dwarf BMR sorghum sudan that overcomes many of the difficulties of grazing or haying older tall varieties. Brachytic Dwarf means a hybrid that has shortened internodes but additional leaves, so quality is enhanced without sacrificing yield. BRUISER has excellent grazing qualities with rapid and abundant regrowth after grazing or swathing. The BMR genetics coupled with the shortened internodes, makes this hybrid very palatable and nutritious, while at the same time leaving foliage accessible to livestock.

BRUISER CHARACTERISTICS	
Plant Height	5-6 Feet
Grain	Yes
Days to Pollination	70-85
Typical Seeds / lb	14,000
Dryland Seeding Rate	13-24 lbs drilled
Irrigated Seeding Rate	22-32 lbs drilled
Advanced Genetics	Brown Mid Rib (BMR) Brachytic Dwarf (BD)

BRUISER PRODUCT INFORMATION	
Hay	Excellent
Silage	Good
Continuous Grazing	Excellent
Rotational Grazing	Excellent
Palatability	Excellent

DRYLANDER

PHOTOPERIOD SENSITIVE (PS) BMR SORGHUM FOR UPLAND ACRES AND COVER CROPPING MIXES

Daylight rather than environmental condition triggers **Drylander** to switch from vegetative to the reproductive stage. This means environmental extremes have less impact on Drylander with better recovery and resumed vegetative growth after periods of drought and heat stress.

DRYLANDER CHARACTERISTICS	
Plant Height	8-9 Feet
Grain	No
Days to Pollination	Varies by Day Length; <12.5 hours daylight repro.
Typical Seeds / lb	17,000
Dryland Seeding Rate	13-24 lbs drilled
Irrigated Seeding Rate	22-32 lbs drilled
Advanced Genetics	Brown Mid Rib (BMR) Photoperiod Sensitive (PS)

DRYLANDER PRODUCT INFORMATION	
Hay	Excellent
Silage	N/A
Continuous Grazing	Excellent
Rotational Grazing	Excellent
Palatability	Excellent

MILLET
FORAGE PRODUCTS

ALL STAR
HYBRID PEARL MILLET

All Star is a high protein, very palatable, no prussic acid millet forage type for grazing or high quality hay. A forage choice for horses and other livestock sensitive to the prussic acid levels in other sorghum forage types.

ALL STAR CHARACTERISTICS	
Plant Height	5-6 feet
Grain	Yes
Days to 50% Anthesis	65-70
Typical Seeds / lb	80,000
Dryland Seeding Rate	10-20 lbs drilled
Irrigated Seeding Rate	20-28 lbs drilled
Advanced Genetics	Conventional Hybrid

ALL STAR BMR

HYBRID BMR PEARL MILLET

BMR All Star is a shorter Brachytic Dwarf hybrid pearl millet that produces high yields. It typically will reach boot stage in around 60 days. It has a short plant structure, therefore, the plant is mostly all leaves. This high leaf mass assures high concentrations of protein and TDN values. It may not yield as much as typical sudangrass but tolerance to sugar cane aphids can offset that tonnage difference.

BMR ALL STAR CHARACTERISTICS	
Plant Height	4-5 feet
Grain	Yes
Days to 50% Anthesis	55-60
Typical Seeds / lb	60,000
Dryland Seeding Rate	10-20 lbs drilled
Irrigated Seeding Rate	20-28 lbs drilled
Advanced Genetics	Brown Mid Rib (BMR); BD

COVER CROP PRODUCTS

FEATURED MIXES DESIGNED FOR OUR DEALER NETWORK

MIX	PLANTING WINDOW	MIX DESCRIPTION & BEST USE
Green Spring	**SPRING COOL SEASON** Feb-Mar-Apr 65-100 lbs/a	Designed to be planted in March to produce an early hay or pasture crop, or simply left in place to convert the ordinarily abundant spring rain into a water-saving mulch, improving late-season drought tolerance. In areas with more abundant rain, it can precede soybeans or sorghum; in more droughty areas, it is used prior to wheat and is recommended to be terminated by mid-June to allow soil profile recharge. **OATS, SPRING PEAS**
60/40	**SPRING COOL SEASON** Feb-Mar-Apr 65-100 lbs/a	Green Up is similar in function to Green Spring but with five (5) species for increased diversity and better adaptability to variable soils. It is designed to be planted in spring to produce early hay or pasture or can remain undisturbed to convert spring rain into a water-saving mulch. In areas with more abundant rain, it can precede soybeans or sorghum; in more droughty areas, it is used prior to wheat and it should be terminated by mid-June to allow soil profile recharge. **OATS, SPRING PEAS**
Revive	**SPRING COOL SEASON** Feb-Mar-Apr 50-70 lbs/a	This diverse mix includes a mix of cool season grass species, brassicas, and legume to condition the soil, scavenge nutrients, and build soil organic matter. **OATS, SPRING TRITICALE, SPRING BARLEY, ANNUAL RYEGRASS, RAPESEED, COLLARDS, SPRING PEAS**
Chick Magnet	**SUMMER WARM SEASON** May-Jul 20-25 lbs/a	A combination of cool and warm season broad leaves designed primarily for providing brood cover to upland game birds, but it has legumes for nitrogen fixation and deep top rooted crops for benefit to succeeding crops. **COWPEAS, COOL SEASON PEAS, SWEET CLOVER, HYBRID BRASSICA, SUNFLOWER, BUCKWHEAT**
Greenfield	**SUMMER WARM SEASON** May-Jul 20-30 lbs/a	Seven (7) mixed species designed to agronomically contribute to organic matter, fix nitrogen, scavenge nutrients, and condition soil. Green Field also provides the option for supplemental grazing and later season hay potential. **SORGHUM SUDAN, COWPEAS, MUNG BEANS, HYBRID BRASSICA, SUNFLOWER, PEARL MILLET, RADISHES**
No-Vol	**SUMMER WARM SEASON** May-Jul 28-35 lbs/a	An all broadleaf blend designed to allow over-the-top use of grass herbicides to kill volunteer wheat and reduce risk of transmitting wheat streak mosaic. **COOL SEASON PEAS, COWPEAS, MUNG BEANS, RADISH, PURPLE TOP TURNIP**
Fall Shift	**FALL COOL SEASON** Aug-Sep 50-60 lbs/a	Fall Shift is designed for a fall cover crop preceding nitrogen hungry sorghum or corn next spring or summer. The legumes will fix nitrogen for the crop to follow while the other grass and mixed species provide quick fall cover to reduce erosion and increase snow catch through the winter. **OATS, PEAS, SPRING BARLEY, TURNIP, ANNUAL RYEGRASS, HYBRID BRASSICA, BALANSA CLOVER**
Winter Shift	**FALL COOL SEASON** Aug-Sep 50-70 lbs/a	Designed to overwinter and provide cover from fall planting to late spring termination. This mix has a mix of cool season cereals, brassica and diverse legumes. **WHEAT, TRITICALE, WINTER BARLEY, CEREAL RYE, CAMELINA, HAIRY VETCH, BALANSA CLOVER**
American Aerial	**FALL COOL SEASON** Aug-Sep 15-20 lbs/a	Designed to be aerial applied or broadcast. This small seeded blend can be applied to standing crop corn and sequester nitrogen to prevent N loss during the winter and then reduce weed pressure the following spring while the other components condition the soil and contribute to bio-diversity. **ANNUAL RYEGRASS, RAPESEED, TURNIP, RADISH, CRIMSON CLOVER, BALANSA, BERSEEM**

COVER SPECIES	WINTER HARDINESS	PURE STAND SEEDING RATE, LBS/ACRE	C/N RATIOS	SEEDING DEPTH, INCH	SEEDING SEASON
GRASSES					
Annual Ryegrass	0°	20-25	28	0-.5	Fall
Winter/Spring Barley	-5° / -20°	60-90	40	1-2	Spring, Fall
Spring/Winter Triticale	NA	60-120	41	1-1.5	Fall, Spring
Oats	25°	60-90	46	1	Spring, Fall
Cereal Rye	Winter Hardy	60-120	40	1-2	Fall
German Millet	32°	15-25	40	0-.5	Spring, Summer, Fall
Japanese Millet	32°	15-25	40	0-.5	Spring, Summer, Fall
Proso Millet	32°	15-25	40	.5	Spring, Summer, Fall
Pearl Millet	32°	12-15	54	.5-1	Spring, Fall
Sudan	32°	15-20	42	.5-1	Spring, Fall
BRASSICAS					
Appin, Purple Top Turnips	10°	3-5	31	0-.5	Fall, Spring
Daikan Radish	15°	6-8	20	.5-.75	Fall
Ethiopian Cabbage	10°	5	41	0-.5	Fall
Kale	5°	3-5	9	0-.5	Spring, Fall
Pajsa, Winfred	0°	5	10	0-.5	Spring, Fall, Summer
Rapeseed	10°	4-8	25	0-.5	Fall, Spring
BROADLEAFS					
Buckwheat	32°	40-60	42	1	Spring, Fall
Collards	5°	8	9	.5	Summer, Fall
Flax	25°	30-50	27	1	Spring, Fall, Summer
Phacelia	20°	5-10	12	.25	Spring, Fall
Safflower	25°	15-20	24	1	Summer
Sunflowers	32°	4-7	45	1-2	Summer
LEGUMES					
Austrian Winter Pea	10°	30-60	12	1-2	Fall
Berseem Clover	25°	10-12	20	0-.5	Spring
Chickling Vetch	25°	20-50	15	1-2	Spring, Fall
Hairy Vetch	Winter Hardy	20	5	.5-1	Fall
Cowpeas	32°	30-60	20	1	Summer
Mung Beans	32°	15-20	41	1	Summer
Crimson Clover	5°	10-20	20	0-.5	Fall
Spring Forage Peas	20°	60-100	12	1-2	Spring, Fall
Sunn Hemp	32°	20	42	.5-1	Summer
Sweet Clover Yellow/White Blossom	Winter Hardy	10-12	18	0-.5	Spring, Fall

MANY OTHER SPECIES AVAILABLE

COVER CROP PRODUCTS

CRITICAL DECISION MAKING CONSIDERATIONS

1. **PLANTING WINDOW:** WHAT IS THE PLANTING WINDOW FOR THE COVER CROP?

SPRING COVER COOL SEASON · FEB-MAR-APR	**SUMMER COVER** WARM SEASON · JUN-JUL	**FALL-WINTER COVER** COOL SEASON · AUG-MID SEP
Buckwheat, Oats, Cool Season Peas, Spring Barley, Spring Triticale	Sorghum Forages, Millets, Cowpeas, SunnHemp, Hybrid Brassica, Safflower, Flax, Buckwheat	Cool Season Peas, Lentils, Chickling Vetch, Crimson Clover, Tillage Radishes, Turnips, Ethiopian Cabbage, Oats, Triticale, Annual Ryegrass

2. **COVER CROP OBJECTIVES:** WHAT ARE THE PRIMARY GOALS OF THE COVER CROP?

OBJECTIVE	GENERAL PURPOSE	COVER CROP SPECIES
Nitrogen Fixing	To generate nitrogen credits beneficial for the next primary crop.	Cool Season Peas, Cowpeas, SunnHemp, Chickling Vetch, Hairy Vetch, Clovers, Alfalfa
Nutrient Scavenge	To consume and temporarily sequester (tie-up) nitrogen or to reclaim unreachable reservoirs of nutrients.	**N Scavenge:** Millets, Oats, Triticale, Annual Ryegrass. **P Scavenge:** Brassicas including Tillage Radish, Hybrid Brassicas, Sunflower.
Mulching and Organic Matter	To improve soil health (moisture retention and water holding capacity) as well as to reduce soil erosion.	Oats, Triticale, Annual Ryegrass, Millets, SunnHemp
Soil Conditioning	To reduce soil compaction, fracture hard-pan, and generally improve soil structure.	Tillage Radish, Annual Ryegrass, Hybrid Brassica
Soil Pest Management	To suppress nematodes and disrupt pest cycles.	SunnHemp (many species including soybean cyst), Annual Ryegrass (suppresses SCN), Sorghum Sudan (many species but not SCN), Ethiopian cabbage
Upland Birds	Creates brood rearing cover when planted in the spring through late summer.	Cowpeas, Cool Season Peas, Yellow Blossom Clove, Hybrid Brassica, Buckwheat, Sunflower, SunHemp

3. **CROP ROTATION:** WHAT IS THE INTENDED PRIMARY CROP FOLLOWING COVER?

CORN	Corn is best preceded by legumes (like SunnHemp, Cowpeas, Chickling Vetch, or Cool Season Peas) and brassicas (like Tillage Radish, Hybrid Brassica, and Turnip). These are plants that either produce nitrogen or decay quickly to release nitrogen and/or other nutrients they have scavenged and stored.
SORGHUM	Sorghum is best preceded by the same crops as corn. In addition, Crimson Clover and Hairy Vetch can also be included because the later sorghum planting date allows these species to bring value as well.
SOYBEANS	Soybeans are best preceded by crops that sequester nitrogen such as annual Ryegrass and Rye. These crops will tie up nitrogen the next spring, suppressing weed pressure in soybeans while slowly decaying to release nitrogen later in the soybean crop when beans are podding.
WHEAT	Wheat is best preceded by legume dominated mixtures. A cover crop can be utilized during traditional fallow periods such as spring seeded mix of Oats that produce a light colored, persistent mulch, as well as legumes to provide a slow release nitrogen source. It is recommended to terminate or harvest spring seeded covers by mid-June to allow time for a rain to recharge the profile prior to wheat planting. In areas suited to continuous wheat, a summer legume such as SunnHemp or Cowpeas planted immediately after harvest and terminated a month prior to wheat planting fixes nitrogen and produces a rapidly decaying mulch to release that nitrogen. SunnHemp also leaves a stiff-stalked residue that excels at trapping snow.

CONSIDERATIONS FOR COVER CROP MIXES

QUICK PICK Cover Crop Selection		Intended Primary Crop After Cover Crop		
		SOYBEANS	CORN/SORGHUM	WHEAT
Current Primary Crop Before Cover Crop	SOYBEANS	**Triticale/Rye Wintershift** Seed following soybean harvest. May be seeded as late as mid-November.	**American Aerial** Seed into standing beans when leaves yellow; a mix designed for aerial application. Requires irrigation or timely rainfall to initiate seed establishment.	**Revive/Greenspring/No-Vol** Fallow alternative: Seed in March and terminate by mid-June to recharge moisture before fall wheat planting.
	CORN/SORGHUM	**American Aerial** Seed into standing corn when corn matures and canopy opens; a mix designed for aerial application.	**Revive/Fall Shift** Seed into standing corn when corn matures and canopy opens; a mix designed for aerial application.	**Revive/Greenspring** Fallow alternative: Seed in March and terminate by mid-June to recharge moisture before fall wheat planting. **Chick Magnet** A combination of cool and warm season broad leaves designed primarily for providing brood cover to upland game birds, but it has legumes for nitrogen fixation and deep top rooted crops for benefit to succeeding crops.
	WHEAT	**Greenfield/Wintershift** These mixes, put in early will provide great biomass and potentially supplemental grazing.	**Fall Shift** Provides quick fall cover to prevent erosion and increase snow catch. **Chick Magnet** A combination of cool and warm season broad leaves designed primarily for providing brood cover to upland game birds, but it has legumes for nitrogen fixation and deep top rooted crops for benefit to succeeding crops. **No-Vol** An all broad leaf blend designed to allow over-the-top use of grass herbicides to kill volunteer wheat and reduce risk of transmitting wheat streak mosaic.	**Greenfield** For continuous wheat cropping, seed immediately following wheat harvest, terminate prior to fall wheat seeding. **No-Vol** An all broad leaf blend designed to allow over-the-top use of grass herbicides to kill volunteer wheat and reduce risk of transmitting wheat streak mosaic.

Maximize Performance: A mix can accomplish multiple objectives at the same time, better than a single species. For example, a half-seeding rate of Tillage Radish may provide nearly as much compaction alleviation as a full rate, while a half seeding rate of field peas can fix nearly as much nitrogen as a full rate. Combining a half-seeding rate of each can accomplish both objectives at the same time.

Reduce Risk of Seeding Failure: Mix diversity reduces the risk of seeding failure, insect problems, diseases, variable soils, etc. A diverse mix will often exhibit the phenomenon of "over-yielding" in which the total yield far exceeds the weighted average of the components in the mix.

Mix Design: Many factors must be considered when developing cover crop mixes. For example, mixing species may reduce herbicide options in the event weed control is needed or may be limited dependent upon previous herbicide use. Species compatibility is important; some species during certain seasons may be so dominant that mixing other species brings little value (such as Rye in a very late fall planting). Conversely, some species may not compete well in a mix yet have great value when planted alone (such as Chickling Vetch).

COVER CROP PRODUCTS

COVER CROPS SOIL HEALTH

Soil health comes by understanding the microbial diversity and functional capabilities of soil. Prairie ecosystems should be used to guide your soil reconstruction efforts and assessment of the health of agricultural land. Your soil is alive—filled with microorganisms like bacteria, actinomycetes, fungi, protozoa, arthropods, plus a wide variety of larger soil fauna. These all work together to naturally cycle nutrients and develop soil and providing a perfect place for your crops to thrive. This microbial activity is fed by the roots of growing plants—and the longer these beneficial soil organisms are fed, the richer the soil becomes.

ORGANIC MATTER

- **INCREASED WATER HOLDING CAPACITY**
  Organic matter has a very high water holding capacity that can be utilized by plant roots as the soil dries out.
- **RELEASE OF NUTRIENTS**
  When organic matter is mineralized in the summer months, nutrients become available to the plant.
- **INCREASE WATER INFILTRATION**
  With improved soil structure and water holding capacity, the permeability of the soil can be greatly increased.
- **IMPROVE SOIL STRUCTURE**
  Abundance of organic matter along with soil biology can help form soil aggregates.

WHAT ARE THE BENEFITS OF ORGANIC MATTER?

- **NUTRIENT SUPPLY**
  Organic matter is a reservoir of nutrients that can be released to the soil. Each percent of organic matter in the soil releases 20 to 30 pounds of nitrogen, 4.5 to 6.6 pounds of P2O5, and 2 to 3 pounds of sulfur per year. The nutrient release occurs predominantly in the spring and summer, so summer crops benefit more from organic-matter mineralization than winter crops.
- **WATER-HOLDING CAPACITY**
  Organic matter behaves somewhat like a sponge, with the ability to absorb and hold up to 90 percent of its weight in water. A great advantage of the water-holding capacity of organic matter is that the matter will release most of the water that it absorbs to plants. In contrast, clay holds great quantities of water, but much of it is unavailable to plants.
- **SOIL STRUCTURE AGGREGATION**
  Organic matter causes soil to clump and form soil aggregates, which improves soil structure. With better soil structure, permeability (infiltration of water through the soil) improves, in turn improving the soil's ability to take up and hold water.
- **EROSION PREVENTION**
  This property of organic matter is not widely known. Data used in the universal soil loss equation indicate that increasing soil organic matter from 1 to 3 percent can reduce erosion 20 to 33 percent because of increased water infiltration and stable soil aggregate formation caused by organic matter.

KEYS TO COVER CROP SUCCESS

1. PLANNING CROP ROTATION

Look 3 to 5 years down the road and the possibility of cover crops to enhance flexibility and value.
Simple rotation rule... alternate grass and broadleaf crops.

GRASS CROPS
- Corn
- Sorghum
- Wheat
- Millets
- Triticale
- Oats
- Barley
- Rye

BROADLEAF CROPS
- Soybeans
- Sunflower
- Brassicas (turnips and radish)
- Cowpeas
- Winter Peas
- Chickling Vetch
- Alfalfa
- Clovers

2. LOOK AT THE BIG PICTURE AND CONSIDER THE MANAGEMENT IMPLICATIONS OF ONE CROP UPON THE NEXT

- Weed Control
- Growing Season
- Fertility Management
- Residue Management

3. PATIENCE AND REALISTIC EXPECTATIONS

Long-term challenges such as soil loss, low organic matter, soil structure, pest pressures, and fertility deficiencies require long-term management strategies to manage, correct, and then build upon.

COVER CROP PRODUCTS

CONSIDERATIONS CONCERNING NITROGEN AND COVER CROPS

Legume cover crops can be used to fix atmospheric nitrogen and incorporate it into their tissues, which is released upon decay of the residue. It is important to match the proper strain of rhizobia inoculant to the species of plant you intend to plant. Soybean inoculant will not nodulate alfalfa or any other legume. Refer to this table to match the correct bacteria to the plant you grow.

PLANT	INOCULANT
Alfalfa, Sweet Clover	Alfalfa
Red Clover, White Clover, Ladino Clover, Crimson	Clover
Peas, Vetch, Lentil	PVL
Soybeans	Soybean
Cowpeas, Peanut, Lespedeza, SunnHemp, Partidge Pea	Peanut
Field beans (navy, pinto), Green beans	Garden

Nitrogen is in plants in the form of protein. When the protein breaks down, it releases nitrogen. There is very little breakdown of legume residue below 50 F. Crops that do most of their growth during the cool weather, like wheat, will not respond as well to legume cover crops as well as warm season crops like sorghum and corn.

The “slow release” nature of nitrogen from cover crops can be advantageous in conditions in which readily available nitrogen sources can be lost. Nitrate nitrogen can be lost from either leaching or denitrification under conditions of standing water or high rainfall; ammonia sources of nitrogen are rapidly converted into nitrate nitrogen. Since nitrogen in cover crop residue is in the form of protein, it is not subject to loss until it is thoroughly decayed.

Cover crops can also be used to reduce the amount of available nitrogen in the soil and convert it into protein. In areas where nitrate leaching into groundwater is a concern, high nitrogen uptake covers like Cereal Rye, Annual Ryegrass, Triticale, and Sudangrass are very effective at taking up excess nitrate and sequestering it for a long period of time. Brassica crops can take up nitrogen from deep in the soil profile and deposit it into their taproots. Since brassicas decay very rapidly their nitrogen taken in is available rather quickly.

HOW DO I SET MY DRILL
FOR THIS COVER CROP BLEND?

› **43,560 ft²/acre**
(wheel circumference ft x drill width ft) = Tire revolutions to cover 1 acre

Example: If you had a 12 ft drill with a drive tire that covers 8 ft, your equation would look like this:

› **43,560 ft²/acre** **43,560 ft²**

(8 ft x 12 ft) = 96 ft² = **453.75 tire rotations to reach 1 acre**

To make calibration a little easier, you can divide it down into a tenth of an acre, so you do not need to spin your tire as many times. This can be done by dividing your rotations by ten and then your pounds per acre by ten.

Example: If you need to rotate your tire 453.75 times to reach 1 acre, and you are wanting to plant 60 lbs per acre, your 1/10th equations would be as follows.

453.75 rotations **60 lbs/acre**

10 = **45.375 revolutions for .1 acre** 10 = **6.0 lbs/ .1 acre**

After spinning your tire slightly over 45 times, the weight of seed collected should be around 6.0 lbs., if it is not, adjust the drill setting and spin the tire again to see how close you are to the desired weight.

Now some of these are just arbitrary numbers, your numbers will most likely be different in some way than what is given in the examples. The only number that stays as a constant is the square feet within an acre, because that number will never change. As long as you follow the same basic steps as shown above, you should be able to reach the right calibration.

COVER CROP
PRODUCTS

MOST COVER CROPS CAN BE USED FOR GRAZING
AND CAN PROVIDE BOTH HIGH YIELDS AND HIGH QUALITY.

Doesn't grazing reduce the value of cover crops?
Since mulch is a major benefit of cover crops, it is often assumed that grazing will reduce the benefit of cover crops. While true that grazing to the point where the soil is left bare will reduce cover crop benefits, moderate grazing that leaves enough residue to provide full soil coverage can be used to realize immediate cash returns to cover cropping. It is becoming more evident that much of the improved drought tolerance seen following cover crops is due to enhanced microbial activity in the soil, and the deposition of manure pats creates a perfect growing medium for soil microbes. Although only a small percentage of the soil gets covered by manure pats during the grazing of a single cover crop, if cover cropping and grazing are continued over several years then a higher and higher amount of soil gets permanently improved by manure pats.

Doesn't grazing cause compaction?
Many landowners do not want cattle grazing on their land because they are afraid of compaction. The University of Nebraska has conducted over 100 grazing trials on corn stalks to see if grazing stalks has a negative effect on yields of subsequent crops. These trials encompassed both no-till and conventional tillage, both continuous corn and corn-soybean, both fall and spring grazing, and soil types ranging from sandy to heavy clay. In no trial was yield decreased from stalk grazing. The depth of compaction is directly related to the total weight of the compacting agent, in this case a cow. Compaction caused by cattle is relatively shallow and is usually alleviated through natural processes of freezing and thawing, wetting and drying and action of plant roots and soil organism (earthworms, fungi, bacteria, etc.). Compaction caused by vehicles, tractors, combines and grain carts is much deeper and less likely to be removed by natural processes. Since many of the cover crops that can be used for grazing have very aggressive root systems that can break up compaction, having a system of grazed cover crops can actually reduce compaction over time. Additionally, a soil with additional root mass, additional surface residue and additional organic matter is much less subject to compaction than unprotected soil.
A cover-cropped, no-till soil usually has a firm sod-like condition that resists compaction. If pugging during extreme mud is a concern, planning for a means by which livestock can be removed during wet conditions to a perennial pasture sod, a rocky area, or a fenced off sacrifice area can spare an entire field from pugging that can create planting issues.

Why should I plant cover crops for grazing if I have plenty of grass?
Perennial grass pastures are most productive and nutritious during the first half of the growing season. About 70% of total pasture production of cool-season pastures like brome and fescue is produced in April, May, and June, while 70% of native grass production is produced in May, June, and July. However, the nutrient demands of a typical spring calving cowherd are increasing as the season progresses at the same time the forage production is decreasing. Cover crops can be selected to provide grazing during times when perennial pastures are not productive or are not nutritious. Additionally, grazing cover crops rather than perennial grasses can allow for rest during critical times of grass growth, like late summer for native grass. This can result in better, deeper root formation and more drought tolerant pastures in future years.

COVER CROPS FOR LATE SUMMER GRAZING:

- Sorghum Sudangrass (Brown Mid Rib varieties most nutritious)
- Pearl Millet
- Greenfield
- Japanese Millet
- Teff Grass
- Cowpeas
- Forage Soybeans
- Annual Lespedeza

COVER CROPS FOR FALL GRAZING:

- Oats
- Spring Barley
- Winfred Hybrid Brassica
- Turnips
- Radish
- Spring Field Peas
- Chickling Vetch
- Spring Seeded Sweet Clover
- Winter Barley
- Rye
- Winter Triticale
- Wheat (varieties differ greatly)
- Annual Ryegrass
- Crimson Clover
- Greenfield
- Fall Shift

COVER CROPS FOR WINTER GRAZING:

- Stockpiled male-sterile BMR Forage Sorghum, or late-planted long maturity BMR Forage Sorghum
- Fall planted Oats
- Fall planted Spring Barley
- Rye (most active winter growth)
- Greenfield
- Fall Shift
- Winter Shift

COVER CROPS FOR SPRING GRAZING:

- Fall planted Rye (earliest to green up), Triticale (best total tonnage for mechanical harvest), Winter Barley, Wheat, Ryegrass (last to green up, but best quality and most regrowth)
- Fall planted Hairy Vetch or Crimson Clover
- Spring planted Oats or Spring Barley
- Spring planted Field Peas or Chickling Vetch
- Winter Shift
- Green Spring
- Revive


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