

SUCCEED

WINNING WITH SUNFLOWERS

Volume 4 Annual 2020

Sunflower Breeding Priorities

Anticipating Growers' Needs



+ PLUS

- Next Frontier in Crop Protection
- New Weed Enemies
- Size 4 Advantage: Not Just for Air Seeders
- Smude Farms: Meal and Tips

GLOBAL GENETICS, LOCALLY-PROVEN SUNFLOWER HYBRIDS

These are exciting times at Nuseed.

To U.S. and Canadian farmers, we are best known for our sunflower portfolio—for having the right hybrid for every field's weed and disease management or crop maturity needs and for every sunflower market: confection, dehull, oil crush or bird food.

In 2020, after five years of local field trials, we are adding canola to our Legend Seeds distributor line-up for growers in North Dakota (visit LegendSeeds.net for more information) and through select distribution in Canada (visit nuseed.com). Plus, we're partnering directly with select canola growers in North Dakota and Montana to grow our proprietary Omega-3 Canola under an exclusive 2020 production contract dependent on their locations and farming operations.

Our investment to bring the best global genetics and continuous development of locally-proven sunflower hybrids for every sunflower market continues to expand at our nursery near Breckenridge, Minn. We've used the same R&D approach for canola and Omega-3 Canola, we have accessed the best germplasm from around the world to develop top hybrids with locally-proven performance.

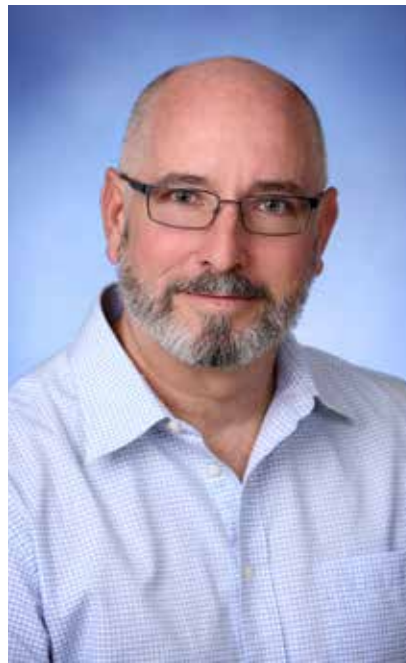
Our team is working to deliver even more value BEYOND YIELD by taking our top hybrids and combining them with output traits for added market value and new market opportunities. Our Omega-3 Canola is a prime example — it provides a sustainable source of omega-3 for aquafeed and human nutrition uses, creating completely new value-added markets and value chains to supply them.

Growers interested in becoming part of the Nuseed Value Chain through a 2020 Omega-3 Canola Production Contract can email Omega3Canola@nuseed.com.

Wishing you every success in 2020!



Mark Jackson
Nuseed General Manager,
North America



2020 marks the introduction of Nuseed canola hybrids to the Legend Seeds portfolio.

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NEW WEED ENEMIES REQUIRE NEW WEAPONS IN 2020

As herbicide-resistant weeds become more prominent, sunflower growers have tools at their disposal to help combat their onslaught.

Marestail (horseweed) can be difficult to control without multiple modes of action and a soil-applied residual herbicide early in the season.

Bob Weigelt remembers the Golden Age of post-emergent weed control.

“Ten years ago, in most crops I could go out post-emergence, scout a field, and put a recipe together to clean that mess up. In one shot, we could get rid of whatever weeds were coming up,” says the Retail Market Manager for FMC based in Minot, N.D.

“That’s in our rear-view mirror now. Over the years we, as an industry, spent so much money on seed and traits. Diverting research dollars away from basic chemistry is coming back to bite us.”

The newest mode of action used by growers was introduced in the early 1990s, he points out.



Bob Weigelt is a Retail Market Manager for FMC.



Ken Deibert is a Technical Services Manager for BASF.

“As all our other technologies have progressed, we haven’t put a new mode of action on the market in a quarter-century. It’s hard to fathom, but it’s the reality we have to deal with.”

As several herbicide-resistant weeds creep toward states like North Dakota and threaten to affect sunflower growers, those same growers need to know three things about weed control as 2020 and the years beyond it approach.

According to Weigelt, weed control is about to get:

- More complicated. The days of using a single active to wipe out a variety of weeds are over.
- Less reliable. Growers can no longer rest easy knowing that a certain active is guaranteed to take care of their weed issues.
- More expensive. Cheap herbicide products that used to clean up fields with little effort have become less and less effective in doing so.

“New modes of action are in the queue, but they’re five to 10 years away. My piece of advice is to start mixing and matching some of the currently available modes of action to preserve the actives we have.”

Thankfully, products exist that do just this. To understand exactly how and why they work, we need to understand what weeds threaten growers.

Pigweed Invasion

Pigweed encompasses both Palmer amaranth and waterhemp. According to Weigelt,

growers and applicators should remain vigilant against the coming invasion of herbicide-resistant pigweed. They should prepare herbicide strategies to address the issue as if this is the year it will show up, especially if either species of pigweed has been found in the vicinity.

The growth rate and seed production of Palmer amaranth, combined with its pro-

pensity to develop resistance to herbicides, raises the threat level for this weed to the top, according to FMC.

Glyphosate-resistant waterhemp has been confirmed in Richland County, N.D., and is highly suspected in Cass and Ransom Counties and may also be present in Barnes, Dickey, Lamoure, Sargent, and Traill Counties.

Waterhemp, Palmer Amaranth, Marestalk and Kochia: Management Strategy Summary

Management of Waterhemp:

Waterhemp control is best done using a combination of pre- followed by post-herbicides. Due to a late-season emergence pattern, two post-herbicide applications may be necessary even following a pre-herbicide. Use full pre-herbicide rates for full herbicide activity during waterhemp germination and to extend residual herbicide control.

The frequency of herbicide-resistant biotypes requires full rates of pre-herbicides. Apply post-herbicides to small (1 to 3”) plants. Waterhemp biotypes resistant to glyphosate usually have a higher level of resistance compared to common or giant ragweed, causing glyphosate to be less effective. The most important goal of managing waterhemp is to nearly eliminate seed production using all available tools, including hand-weeding.

Management of Palmer Amaranth:

Palmer amaranth’s ability to emerge throughout the growing season, rapid growth rate, prolific seed production, and propensity to evolve herbicide resistance quickly makes this the biggest weed threat that North Dakota farmers have ever faced. Always use a pre-herbicide. Effective post-herbicides must be applied before Palmer amaranth is three inches tall. Full rates and high spray

coverage is essential for all contact herbicides. Plants over three inches tall will survive these herbicides. Add residual herbicides with the post-herbicides. The residual pre-product is essential to reduce other flushes after weed kill from the post-herbicide. Successive post-herbicide applications may be needed. Apply to plants three inches or less.

Management of Marestalk (Horseweed):

It is important to use multiple modes of action to control horseweed and not rely on one herbicide year after year. It is critical that growers not rely on glyphosate alone to control horseweed. Horseweed is most easily controlled in the fall. Therefore, control efforts should always begin in the fall. Consider rotation restrictions when selecting fall or spring herbicides.

Management of Kochia:

The most effective chemical control strategy for kochia includes pre- followed by post-herbicides. Sunflowers have very few post-herbicides to effectively control kochia and timely post-applications to small plants are required for maximum activity.

Source: North Dakota State University

Waterhemp can easily produce 300,000 seeds per plant and produce 1.5 times more seed than other pigweed species of similar size. A waterhemp plant in Iowa was documented to produce almost five million seeds per plant. Seed can remain viable in the soil for at least four years and high seed production can cause rapid changes in population density.

Marestail

According to Weigelt, past reliance on herbicide-tolerant crops promoting use of a single mode of action for post-emergence control of weed species was a driver for resistance in glyphosate-tolerant crops. Marestail is no

“AS ALL OUR OTHER TECHNOLOGIES HAVE PROGRESSED, WE HAVEN’T PUT A NEW MODE OF ACTION ON THE MARKET IN A QUARTER-CENTURY. IT’S HARD TO FATHOM, BUT IT’S THE REALITY WE HAVE TO DEAL WITH.”

—BOB WEIGELT

exception. Like waterhemp, marestail (horseweed) can be difficult to control without multiple modes of action and a soil-applied residual herbicide early in the season.

According to data from Michigan State University, marestail emerges in fall or early spring as a rosette. Fall-emerged marestail becomes dormant over the winter, plants start to bolt in April/May, begin to flower in July, set and disperse seed from August to October and die. Fifty-nine to 91% of fall-emerging plants survive the winter.

An average of 200,000 seeds are produced per horseweed plant, according to MSU research. Seeds can be dispersed long distances by wind. There have been reports of 12,500 and 125 seeds per square yard at 20 and 400 feet, respectively, away from the seed source.

Kochia

According to North Dakota State University’s Crop and Pest Report, kochia has been a

weed control challenge for North Dakota growers for decades. Kochia is extremely competitive, creating significant yield losses when only a few weed escapes occur in crop fields. In North Dakota, kochia populations have shown resistance to 2,4-D, MCPA and the ALS inhibitor herbicides (SOA 2). Consider all biotypes resistant to these herbicides or herbicide families when planning a weed management program, the university’s website states.

Solutions

Thankfully, growers have a number of practices at their disposal to tackle these three weed threats.

According to Weigelt and FMC, a number of strategies exist to ensure herbicide-resistant weeds don’t get established.

- Sanitation of “new” used equipment. Used equipment purchases need to be treated as though they came from infested fields. Pressure washing and complete teardown to clean every crack and crevice as well as possible is best before use on the farm.
 - ▶ Purchase certified seed, both crop and cover crop seeds, to avoid introduction in the seed bag.
 - ▶ Manure, cotton seed or chicken litter: Any of these may also be an avenue to spread pigweed seeds across the farm.
- Crop rotation. The biggest factor influencing sunflower crop success can often be rotation. A minimum three-year rotation to reduce disease risk and weed pressure is necessary, says Alison Pokrzywinski, Nuseed’s Sunflower Product Development Manager for North America. Rotate out of crops, such as canola, rapeseed, dry edible

beans, and soybeans. This allows the use of different actives in the rotation, which can cut down on the establishment of herbicide-resistant weeds.

- Plant clean. Do not plant into existing weed infestations. Use narrow row spacing and bushy cultivars to quickly establish row closure. Pigweed and kochia germination are decreased under low light conditions. The best ally you can have for weed control is “darkness” under a crop canopy.
- Plant population. Increase plant population as practical to increase competition with pigweed and kochia for resources.
- Tillage. Pigweed seeds’ longevity is relatively short. Turning the soil over to bury pigweed seeds can be employed as a last resort if no-till and soil conservation on rolling land is a priority.
- Removal. Employ a zero-tolerance strategy. Do not allow pigweed to remain in the field and go to seed. Chop or pull the pigweed plants and remove from the field and field edges. Pigweed left in the field will often produce roots at the nodes and produce many clones that can produce seed.
- Cover crops. Dense mats of cover crops may be effective in suppressing weed germination or may at least reduce weed populations.
- Post-harvest pigweed control. Once the crop is harvested, care must be taken to ensure escapes and late-emerging weeds do not go to seed.

Pre-Emergent Herbicides and Effective Modes of Action

According to data from the University of Missouri, some waterhemp populations have evolved resistance to six herbicide classes, including Groups 4, 5, 9, 14, and 27. Palmer amaranth has developed resistance to Groups 2, 5, 9 and 27.

Kochia has developed resistance to Groups 2, 4, 5 and 9 herbicides.

As for marestail, it has developed resistance to Groups 2, 5 and 9.

“My biggest piece of advice is to start mixing and matching different effective modes of action,” Weigelt says. “In sunflowers, we use Group 1 for grass, a Group 2 for broad-leaves, and a Group 14 for kochia. Those are

the three groups sunflower growers have traditionally used continuously.”

A variety of new tools exist to fight against these weeds. FMC’s Authority Supreme product combines Group 14 and 15 chemistry and helps to deter the development of resistant weeds, including Group 2, 5 and 9 resistant weeds like pigweed species, kochia and marestail. In sunflower, it can be applied at a use rate of 5.8 to 15.4 ounces per acre, depending on soil type. Make sure to check the label.

The Anthem Flex herbicide from FMC provides residual control of grasses and broadleaf weeds with known resistance to glyphosate and ALS herbicides like waterhemp, Palmer amaranth, and pigweed species. It also suppresses kochia. A sunflower label for this additional Group 15 product is now pending.

“Growers need to do something proactive to head off these problems, especially when it comes to the pigweed invasion that’s coming,” Weigelt adds.

Ken Deibert, Technical Services Manager for BASF based in West Fargo, N.D., says the fight against pigweed is especially concerning and requires new ways of thinking in order to combat it.

Offering both waterhemp and pigweed control, Zidua SC (based on Group 15 chemistry) also suppresses kochia.

“GROWERS NEED TO DO SOMETHING PROACTIVE TO HEAD OFF THESE PROBLEMS, ESPECIALLY WHEN IT COMES TO THE PIGWEED INVASION THAT’S COMING.”
—BOB WEIGELT

BASF’s Beyond herbicide (active ingredient imazamox) is a member of the imidazolinone chemical family. Members of this herbicide family control susceptible weeds by inhibiting the acetohydroxyacid synthase enzyme and are commonly known as AHAS or ALS inhibitors. It may be used with a Clearfield sunflower hybrid to control broadleaf weeds and grasses. At a use rate of 4 fluid oz/acre, it may be applied with an additional grass herbicide if needed. 🌱



The growth rate and seed production of Palmer amaranth, combined with its propensity to develop resistance to herbicides, raises the threat level of this weed to the top.



In North Dakota, kochia populations have shown resistance to 2,4-D, MCPA and the ALS inhibitor herbicides (SOA 2).



A waterhemp plant in Iowa was documented to produce almost five million seeds per plant.

HERBICIDE RATINGS FOR COMMON WEEDS IN SUNFLOWERS

WEED SPECIES	ZIDUA®	SPARTAN CHARGE®**	SPARTAN ELITE®	AIM®	BEYOND®	EXPRESS®
BARNYARDGRASS	E	N	P-E	N	E	N
DOWNY BROME	F-G	F-G	P-F	N	G-E	N
GREEN FOXTAIL	G-E	P	F-E	N	E	N
QUACKGRASS	N	N	N	N	F	N
VOLUNTEER CEREALS	N	N	P-F	N	G-E	N
WILD OAT	F-E	N	P-F	N	E*	N
YELLOW FOXTAIL	G-E	P	F-E	N	G-E	N
BIENNIAL WORMWOOD	F	G	F-G	-	P	P-F
CANADA THISTLE	N	N	N	N	N-P	G
COCKLEBUR	P	P	P	P	G-E	N-F
COMMON MALLOW	-	-	-	-	P	P-F
COMMON RAGWEED	P-F	N	N	N	N	N
EASTERN BLACK NIGHTSHADE	F-G	E	G-E	G	E	P-F
HAIRY NIGHTSHADE	F-G	F-G	F-G	G	E	-
KOCHIA	F	F-E	E	F-E	E*	E*
LAMBSQUARTER	P	G-E	E	F-G	F	P-F
LANCELEAF SAGE	-	N	N	N	E	N
MARESTAIL (HORSEWEED)	N-P	F	F-G	N	P*	N
MARSHELDER	P	P-G	P-G	P	G-E	E
PRICKLY LETTUCE	-	P	P	P	E*	G*
REDROOT PIGWEED	G	F-E	G-E	G	E	F-E
RUSSIAN THISTLE	F	G-E	G-E	F	G-E*	E*
SMARTWEED	F	G-E	G-E	N	G-E	F-G
WATERHEMP (ALS-RES)	G	F-E	G-E	F-G	N	N
WILD BUCKWHEAT	P	P-F	P-G	P	P	P
WILD MUSTARD	P	P	P	P	E	E
WILD SUNFLOWER	N	N	N	P	E	F

* Will not control resistant biotypes. ** Spartan Charge and Spartan have the same weed control ratings, the difference is that Spartan alone will not control anything already emerged.

E = Excellent = 90 - 99% control

G = Good = 80 - 90% control

F = Fair = 65 - 80% control

P = Poor = 40 - 65% control

N = None = no control

"-" = insufficient information

Reference: 2019 North Dakota
Weed Control Guide

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WORKHORSE HYBRIDS

The experts offer their choices for the best sunflower hybrids that perform consistently well, even when growing conditions aren't ideal.



The terms “racehorse” and “workhorse” are often used to describe different types of corn hybrids.

A racehorse is a hybrid you can count on to perform exceptionally well under the best conditions in a really good year, while the

workhorse is a tried-and-true hybrid that may not necessarily be your top yielder, but will likely do well no matter what the weather has in store.

Just like with corn, there are racehorse and workhorse hybrids sunflower producers rely

on to produce the best results. We asked four Legend Seeds employees for their top workhorse sunflower hybrids growers can count on to perform under any conditions.

INDUSTRY EXPERT	WHY GROW A WORKHORSE HYBRID?	TOP 3 WORKHORSE HYBRIDS	WHAT MAKES THEM A GOOD CHOICE?
 <p>Colby Brink Sales Agronomist, Legend Seeds, Pierre, South Dakota</p>	<p>Growers are very optimistic in thinking every year is going to be that year they hit the jackpot, but the reality is there's always one variable they can't control: Mother Nature. A good workhorse variety is one that performs consistently across ideal and less-than-ideal growing conditions, which is why we always plant a certain percentage of our acres to these types of varieties. This way, we know no matter what Mother Nature throws at us, we'll have something to harvest that is consistently going to be within our farm averages.</p>	<p>Camaro II medium maturity NuSun oil</p> <p>Falcon medium-early maturity NuSun oil</p> <p>N4H521 CL medium-late maturity high oleic oil</p>	<p>Camaro II Camaro II has consistently strong yields with an average plant height and good late-season plant health. This helps reduce the chances of lodging caused by high winds that typically occur late in our season. Camaro II also has more of a hanging head type, which naturally deters birds from sitting on the heads and feeding on the seeds, which can cause yield loss.</p> <p>Falcon Falcon features average plant height and good late-season plant health and dry down for ease of harvesting. The seed is treated with Plenaris fungicide, which provides good early-season downy mildew control.</p> <p>N4H521 CL N4H521 CL features excellent emergence, which enables it to be planted into cooler or wetter soils, reducing the risk of stand loss early on. In addition to excellent drought tolerance and strong resistance to multiple races of downy mildew, N4H521 CL has excellent late-season plant health, which enhances standability strength for ease of harvesting.</p>
 <p>Dave Olson Account Manager, Legend Seeds, Bloomfield, Nebraska</p>	<p>Because of the wide variety of soil types and unpredictable environmental conditions, growers need varieties that offer predictability and consistency. Top yielding varieties usually have a number of vulnerabilities that can make them susceptible to a disappointing performance the following year.</p>	<p>Camaro II medium maturity NuSun oil</p> <p>Hornet medium maturity high oleic oil</p> <p>Falcon medium-early maturity NuSun oil</p>	<p>Camaro II Camaro II offers strong resistance to multiple races of downy mildew as well as good sclerotinia head rot tolerance. This variety holds its plant height very consistently across varied soil types and soil fertility levels, and it also has a reputation for excellent test weight, even for years that are short on rain. In addition, the strong stalk quality of Camaro II enables you to harvest in difficult conditions when some racehorse-type varieties will lodge and leave heads in the field.</p> <p>Hornet Hornet resists multiple races of downy mildew, and its excellent late-season plant health helps it make the most of any growing season by reducing losses during harvest caused by head shatter.</p> <p>Falcon Falcon is a medium-early maturity variety that provides consistency even if one end of the growing season has stressful conditions. Whether it's a normal season, a short season with lots of cloud cover, or a growing season that's unusually long, Falcon will usually produce excellent yields.</p>

INDUSTRY EXPERT	WHY GROW A WORKHORSE HYBRID?	TOP 3 WORKHORSE HYBRIDS	WHAT MAKES THEM A GOOD CHOICE?
 <p>Maria Harvey Account Manager, Legend Seeds, Bismarck, North Dakota</p>	<p>In my area, we look for hybrids that are consistent from year to year because we are never quite sure what the weather may bring. Typically, we run on the drier side, so we look for hybrids that are higher in test weight and oil so that even if we get really dry, we still have a high-quality crop. We also look for hybrids that will produce above-average yields year in and year out with good standability.</p>	<p>Falcon medium-early maturity NuSun oil</p> <p>N4H470 CL Plus medium maturity high oleic oil</p> <p>Tie: Camaro II medium maturity NuSun oil</p> <p>and</p> <p>N4HM354 medium-early maturity NuSun oil</p>	<p>Falcon Falcon is a very consistent NuSun Express hybrid that we love due to its very nice standability, solid yield and oil content, and nice test weight. It is very flexible on marketing for NuSun crush or bird food, and it has done well year in and year out.</p> <p>N4H470 CL Plus N4H470 CL Plus has nice plant health, stands well and has excellent yield, oil and test weight. The option of using a methylated seed oil surfactant (MSO) with this Clearfield Plus hybrid gives it stronger weed control, and if growers want the flexibility of having a very good high oleic hybrid that maintains a bird food option, this is an excellent choice.</p> <p>Camaro II For areas where soybeans or canola are in the rotation, I have great success with Camaro II. It has some of the best sclerotinia white mold tolerance in the industry, its oil content is hard to beat, and the yield and test weight are there. It is consistently a very good yielding product.</p> <p>N4HM354 For those growers who don't have soybeans or canola in their rotation, the N4HM354 has proven to be an excellent companion and I often sell them together. The hybrid is a little earlier in maturity but does really well in drier climates and has very good oil, yield and test weight.</p>
 <p>Jed Wall Sunflower Business Development Lead, Legend Seeds, Wahpeton, North Dakota</p>	<p>A workhorse hybrid is very important for producers because they need hybrids that can handle diverse weather conditions and diverse field conditions. On a year like this with all the excess moisture, wind and disease pressure we've had, the workhorse hybrids are what help producers pay the bills.</p>	<p>Camaro II medium maturity NuSun oil</p> <p>Hornet medium maturity high oleic oil</p> <p>Falcon medium-early maturity NuSun oil</p>	<p>Camaro II Camaro II has an excellent disease resistance package, it performs well in all soil types, and it features excellent emergence in tough planting situations.</p> <p>Hornet Hornet has excellent stalk strength as well as exceptional late-season plant health.</p> <p>Falcon Falcon features fast emergence, great drought tolerance, and excellent stalk and root strength. 🌻</p>

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HARVEST WOES REDUCE SUNFLOWER STOCKS

Will lower fall sunflower stocks lead to higher prices in 2020?



A cold, wet end to the 2019 sunflower season meant growers had to contend with difficult harvesting conditions in North and South Dakota, the main sunflower producing area in the United States.

John Sandbakken, Executive Director of the North Dakota-based National Sunflower Association said in early October that in the Dakotas, as well as in Minnesota, sunflower producers saw a lot more rain than usual throughout September. This was followed

by a blizzard which dumped a considerable amount of wet snow the first week of October.

“It is so wet here, it’s unbelievable,” said Sandbakken. “You can’t even get a combine out in the field if you tried. You’d bury it.”

Sandbakken added because of the soggy field conditions, the sunflower harvest in the region was delayed by several weeks.

Mark Jackson, General Manager of Nuseed Americas, said in early October another con-



**“THERE IS EXCELLENT DEMAND FOR OIL PRODUCTS RIGHT NOW, FOR BOTH HIGH AND MID OLEIC.”
—JOHN SANDBAKKEN**

tributing factor to the late harvest was the crop had been planted later than normal due to weather issues at the start of the season.

“In the Dakotas, where the majority of the sunflower acres are this year, we got off to a late start. We had a late winter and we had too much rain early, so we got in probably two weeks later than expected,” he said.

“Through the growing season, again in the Dakotas, we had some very good weather.

But what we’re seeing now is with the early snows and the drops in temperatures and the overcast skies, we’re having a hard time getting the crop finished. We’re not exactly sure where the numbers are going to come in.”

Sandbakken said prior to the late season weather challenges in North and South Dakota, the sunflower crop had been shaping up quite well.

“Before all the issues we had, I would have guessed we would have had above-trend yields this year. The crop was rated around 75% good to excellent,” he said.

“As long as people can get into the field and get it off, there is a nice crop out there. It’s just a matter of whether or not they’re going to be able to get the crop off and what kind of loss they’re going to see here in the coming weeks.”

Jackson said he expects sunflower yields in North and South Dakota will be lower this year than last. “Strictly because we’re going to struggle to get the full season and the weather looks like it’s going to stop it early.”

Jackson said sunflower harvest in the High Plains states of Nebraska, Kansas, Colorado and Texas was delayed in some areas due to rain issues but not nearly to the extent that it was in the Dakotas. Generally, he said, the crop was looking good in that region.

Sunflower Stocks Down

On the bright side, Sandbakken said, U.S. sunflower stocks were considerably lower in October than the same time a year previously, which would add upward pressure for prices.

“Stocks are very tight right now,” he stated. “When you have a situation like that, it’s usually very positive for fall pricing. I think there is going to be some good opportunities for producers to make some really good money.”

Jackson said if there is a substantial dip in sunflower supply due to the difficult harvesting conditions, this would likely lead to higher prices and possibly an increase in sunflower acres for the coming season as a result.

“When you look at pricing, sunflower always



John Sandbakken is the Executive Director of the National Sunflower Association.

pencils out to be one of the best crops out there for the dollar,” he said, adding sunflowers have also fared better than some other crops like soybeans, which have been hit hard in recent months.

According to Sandbakken, the outlook for sunflower oil products continues to be bright, thanks in part to the U.S. Food and Drug Administration’s 2018 endorsement of high oleic oil and its heart health benefits as well as the FDA’s ban on partially hydrogenated oils in the United States.

The sunflower oil market hit its highest point in August as a result of very strong demand, both domestically and in Canada and Mexico, added Sandbakken.

“There is excellent demand for oil products right now, for both high and mid oleic,” he said, adding that sunflower oil consumption in the United States has grown 5 to 10% in each of the last three years and he doesn’t see any signs of the trend slowing down in 2020.



Mark Jackson is the General Manager of Nuseed Americas.



Darcelle Graham is the Executive Director of the National Sunflower Association of Canada.



Sandbakken said domestic demand in the sunflower confection market has been steadily growing by three to four percent a year and he expects that to continue next year as well. However, that's not the case when it comes to exports, he added.

"The strong dollar has affected our competitiveness in a lot of markets," said Sandbakken. "We need stronger demand here, domestically, in the foreseeable future until the dollar is weaker. There are certain markets, for example Spain, that are looking for a high-quality product and they remain really good markets for us, but generally on the export side, it's just been very difficult with the strong dollar," he added.

Jackson said there's been a steady decline in the number of acres planted for the in-shell sunflower market in the United States in recent years due to declining exports.

Nuseed has two new products specifically designed to meet the changing needs of the export confection market coming out this year, he said. There's been an upswing in the kernel or dehull market lately, he added.

"We're seeing a number of new products from the food industry coming out that have sunflower as part of their ingredients," Jackson said. "I think it's fantastic. Sunflower has a great nutritional profile and it's non-GM which makes it a very versatile ingredient."

Sunflower Situation in Canada

According to Darcelle Graham, Executive Director of the National Sunflower Association of Canada, weather has also been an issue this year for sunflower producers north of the border.

"It was extremely dry throughout the growing season, and we have had some challenges with uneven emergence," said Graham in early October. "Now we're currently dealing with excess moisture, and disease is popping up. Hopefully we can get some clear weather and we can get these sunflowers in the bin."

Graham said the harvest in Manitoba, where about 90% of Canadian sunflowers are grown, usually starts in mid-September, but as of the first week of October, most sunflower acres were still unharvested.

"With all the excess moisture we're seeing, people are delayed in terms of harvesting their cereals and their oilseeds. Sunflowers won't be the first thing they pull off," she added.

The average sunflower yield in Manitoba hit a record high of almost 2,300 pounds per acre in 2018. Graham believes the average yield in the province this year will likely be closer to the historical average of 2,000 pounds per acre.

"We were drier than last year, but I expect it will still be an average yield in general," she said. "We might see a little bit smaller seed sizing as well due to the lack of moisture."

Graham said indications were that sunflower stocks in Canada were down in October from the same period a year ago.

"That's a positive in terms of being able to drive demand for sunflower acres in 2020 and offering competitive pricing to other crop types," she said. "We're hoping, obviously, that we can grow the sunflower market share in 2020." 🌻

CATERING TO CATTLE

A Minnesota row crop and cattle farmer turns to sunflower meal as an alternative feedstuff for his livestock.

Tom Smude has been raising beef cattle near Pierz, Minn., for more than two decades, and for many years, he relied on soybeans, corn and hay grown on his farm to feed his livestock.

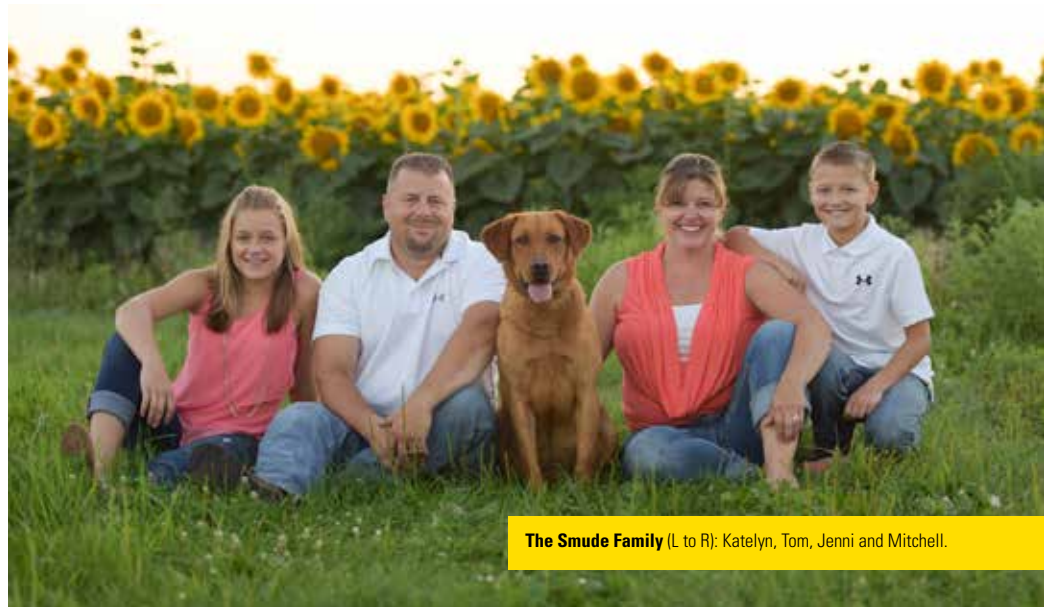
Ten years ago, he started looking for another crop to add to the mix after a couple of drought years caused his corn and soybean yields to tumble, which meant expensive cattle feed had to be trucked in to Smude Farms.

Smude settled on sunflowers—a crop that requires less water than soybeans or corn and when reduced to meal produces a feedstuff comparable to soybean meal in protein and energy content.

In 2010, Smude set up a cold press on his farm to crush his sunflower harvest for oil, using the meal in livestock feed. He then began bottling his own premium brand of high-oleic oil called Smude's Sunflower Oil, which was originally sold to farmers' markets and some local stores but can now be found in a number of major retail outlets in the Midwest.

Smude's sunflower oil business—called Midwest Processors—now operates out of a production facility in Pierz. Smude says when necessary, he'll supplement the feedstock for the plant with sunflowers supplied by other local growers.

In addition to 300 head of Black Angus cattle, Smude Farms has about 700 acres of crop-



The Smude Family (L to R): Katelyn, Tom, Jenni and Mitchell.

land, of which 100 or so acres are planted to sunflowers. Smude relies on his wife, Jenni, and their teenage kids, 17-year-old Katelyn and 14-year-old Mitchell, to help run the farm. Smude's dad, John, helps out as well.

**“IF YOU OVERPLANT, THE HEADS GET TOO SMALL AND THEN YOU GET REALLY SMALL SEEDS AND YOUR YIELD WON'T BE THERE.”
—TOM SMUDE**

Smude believes the key to a good sunflower crop is starting with the right hybrid—next year, he's planning to plant Nuseed's N4H302 E hybrid—as well as a solid fertility program and getting the jump on weeds with a good pre-emergent herbicide application.

“We'll do a pre-emerge, and if that works out, we probably won't even come back with a post-emerge [spray],” he says.

Smude notes it's also important to have the right seeding practices at planting time. “If the seeds are planted too deep, they just

won't emerge or they'll take longer,” says Smude. “Some will come up and then all of a sudden there'll be another flush if it rains, and when that happens, you'll get two different plant heights and then it matures at two different times at the end of the year.”

Smude stresses growers also need to make sure they're planting the correct population for the sunflower variety that they're using.

“If you overplant, the heads get too small and then you get really small seeds and your yield won't be there,” he says. “If you go less [than the recommended seeding rate], well, then you'll get such big heads on the plants that they could tip over in the wind.”

Smude says sunflowers like drier ground but points out that certainly hasn't really been the case in central Minnesota in recent times, with wet growing seasons hampering the crop this year and last.

“That's why we chose sunflower, because it was a drought-tolerant crop. All of a sudden, you're dealing with seven inches of rain a month. It's just crazy,” says Smude, adding in 2018, he had to dry his sunflower harvest before processing the crop.

“The last couple of years have been pretty wet here,” he says. “But before that, our sunflower crop was always pretty decent, so we've had good luck with them.” ☀️

“BECAUSE YOU GET 25,000 MORE KERNELS PER BAG WITH SIZE 4S, YOU’RE SAVING 10% ON YOUR SEED BILL RIGHT OUT OF THE GATE.”
—JED WALL



SIZE 4 ADVANTAGE

Using row planters or air seeders, growers are realizing a substantial seed cost savings advantage—and getting great results—by planting size 4 sunflowers.

Jed Wall is a sunflower business development lead for Legend Seeds in Wahpeton, North Dakota.

Some sunflower producers are reluctant to plant size 4 seeds with their row planters because of fears they may run into problems planting the smaller-sized seed.

Jed Wall, sunflower business development lead for Legend Seeds in Wahpeton, N.D., says that may have been a concern with some older planters but that really isn’t the case anymore.

“I’d say there’s probably about 30 to 40% of growers that have the mindset it has to be size 3 seeds or nothing,” says Wall. “A lot of it is habit or what they’re used to, or they could have had a bad experience with size 4s using an older planter like a finger planter or something 10 years ago. Farmers don’t forget.”

Wall maintains the newer row planters available nowadays shouldn’t have any issues planting size 4 seeds, and the benefit for sunflower producers is more money in their pockets.

Wall points out Nuseed sells its size 2 and size 3 seeds in 200,000-count bags. Nuseed’s size 4 seeds, however, come in 225,000-count bags and are priced the same—meaning growers can plant more seeds for the same amount of money and they don’t have to buy as many bags.

“Because you get 25,000 more kernels per bag with size 4s, you’re saving 10% on your seed bill right out of the gate,” he says.

While it’s a common misconception among growers that size 4 seeds should be avoided, Wall says there are also lots of sunflower producers at the other end of the spectrum who will seek them out because of the significant cost savings.

Wall estimates that between 10 and 15% of producers use air seeders to plant their sunflowers rather than row planters. Typically, an air seeder best plants sizes 3, 4 and 5, he says, but what you might gain in planting speed you will likely lose in seed placement accuracy.



According to Wall, the most common row planters used to plant sunflowers in his region today are the John Deere ProMAX series, the Precision Planting E-set and V-set series, and the Case IH Early Riser planters. All of them, he says, can plant any size of sunflower seed as long as they're well maintained and set up properly to do it.

Wall says even older planters of different makes can be equipped with Precision Planting parts, which should eliminate any problems with size 4 seeds.

Proper Maintenance Key

The key to successfully planting smaller-sized sunflower seeds—or any seed size for that matter—is proper care and maintenance of the planter, says Wall.

"There are a lot of things that can wear out on a planter, but if growers stay on top of it and make sure everything's in good working order, there shouldn't be any issues with planting size 4s," he says.

"One of the things that often doesn't get replaced in a timely manner is the plates, which are kind of the heart of the planter. They can wear out quickly and they can warp—there's a lot that can go wrong with the plate. "The brushes are also hugely important. Sometimes they get grooves worn in them and then they don't work anymore. So that's another key thing to look at," Wall adds.

"As well, you also always want to make sure you're covering the basics, like checking your bearings to make sure they're not wobbling and that housings aren't worn."

"THERE ARE A LOT OF THINGS THAT CAN WEAR OUT ON A PLANTER, BUT IF GROWERS STAY ON TOP OF IT AND MAKE SURE EVERYTHING'S IN GOOD WORKING ORDER, THERE SHOULDN'T BE ANY ISSUES WITH PLANTING SIZE 4S." —JED WALL

One thing many people miss is checking the gaskets on the planter doors, says Wall. "If they're not working properly, you're going to have variations in air pressure and that's going to create doubles and skips and things along that line."

Wall says it's important for growers to always ensure they're following the recommended settings for all the control mechanisms for things like vacuum pressure, ground speed and double eliminators that you'll find on a planter. And he stresses using the right plate while planting sunflowers is paramount.

"As long as you've got the right plate and the right settings, you can plant 4s all day long."

Those growers who take the time to do a little tweaking on their planters to optimize their capacity to plant size 4 seed can be in for a bit of a surprise if they go back to planting larger seed. Oftentimes, Wall says, they'll realize just how much better their planter works across the board for every seed size.

Wall says making adjustments to planters to account for seed size isn't something

sunflower producers should wait until the last moment to do.

"You want to make sure you're not doing it the day before you want to go out, in case you can't get certain parts. For some of the plates we recommend, the dealerships have to order them in," he says.

"It's a good idea to make sure you've got everything ready to go a month in advance in case there are any snags getting plates or anything along that line."

Wall says replacement parts on a planter are generally easy to install, so most producers will do it themselves. The way Wall looks at it, if a grower does end up having to buy replacement parts, they should consider it money well spent.

"If you don't start things off with a good stand, you're already starting behind," he says. "Probably one of the most important investments you can make in a year is to ensure your planter is doing a good job." 🌻

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7 HABITS FOR SUNFLOWER BUSINESS SUCCESS

The business of agriculture requires savvy management for financial success and sunflowers provide their own unique set of challenges.

“If a grower is in business today, they’re already doing something right,” says Gary Schnitkey, a University of Illinois Agriculture and Consumer Economics Professor. And the news only gets better.

Schnitkey and his research team have come up with a list of the key habits and on-farm practices of highly resilient and profitable farmers, based on a study funded by the

Illinois Soybean Association and the Illinois Soybean Checkoff Program.

Adoption of these habits would be good for all farmers, including sunflower growers, says Ross Hakes, Nuseed’s Sales and Strategic Marketing Manager. “They’re solid principles and good habits of profitable farming,” he says.

The most successful North American sunflower growers already incorporate these principles into their business practices, says Hakes; however, more growers could take advantage of these habits.

“There’s huge opportunity for sunflower growers who adopt these habits,” says Hakes. “Which means more money from their farming operations.”



“THERE’S HUGE OPPORTUNITY FOR SUNFLOWER GROWERS WHO ADOPT THESE HABITS. WHICH MEANS MORE MONEY FROM THEIR FARMING OPERATIONS.” —ROSS HAKES

Using data from the Illinois Farm Business Farm Management Association, Schnitkey’s study examined which on-farm practices led to healthier bottom lines for farmers, and the habits these farmers had in common. From that analysis of highly-resilient farmers, Schnitkey and his team devised the following seven habits.

Innovative Farmers

Resilient, profitable farmers are innovative and are always evaluating and adopting the latest technologies, says Schnitkey. “When we gave those farmers a list of all the latest technologies, they had at least evaluated most, and many were adopting them,” he says.

For example, these farmers bucked tradition and planted soybeans before corn due to the pronounced yield drag on soybeans when planted later in the season.

“Our more profitable farms adopted earlier soybean planting, and in some cases that involved two planters that started planting at the same time,” says Schnitkey. “Planting soybeans first is a total reversal of the way things were done even five or six years ago.”

Sunflower growers can also take advantage of yield boosts by changing up planting dates. Farmers who plant sunflowers earlier and harvest earlier can produce higher yields, says Hakes.

“Plant the crop in May instead of later in June—there’s a huge difference in what your return can be with yield and quality,” says Hakes.

Although sunflower growers are consistently adopting some technologies, others are being overlooked. For example, most growers are already using herbicide-tolerant traits for weed control on their farms, but those looking for increased profits would do well to evaluate new innovations in technology, such as digital ag, variable rate technologies and drones, says Hakes.

Improving agronomic practices through innovation also presents opportunities for sunflower growers. High on the list of sunflower yield limiters is plant stand establishment, says Hakes. Thus, minimizing skips and doubles and establishing consistent stands through innovations in planting equipment or seed treatment technologies will create more profitable crops, he says.

“Farmers really need to be looking at plant singulation and the importance of stand establishment, and all of those things that create the opportunity to build a better sunflower crop,” says Hakes.

One important point to note, says Schnitkey, is although the profitable farmers in the study were evaluating and adopting the newest technologies, they weren’t at the “bleeding edge” of innovation. “These people weren’t winning yield contests or trying things that were way out there,” he says.

New Technology Evaluation

Highly profitable farmers are always evaluating new production technologies and practices, and will assess these technologies through on-farm trials. “If something new was coming out, they were evaluating it on their farms,” says Schnitkey.

Similarly, successful sunflower growers are also carrying out their own on-farm evalua-



Ross Hakes is responsible for Business Development at Nuseed.

tions, says Hakes. For example, these farmers will plant two or three new hybrids on their farms to assess new traits or genetics.

High Returns are Necessary

Return on investment is an important evaluation criteria for farmers in the high profitability group, says Schnitkey. When assessing new production technologies or adopting new practices, resilient, profitable farmers would base decisions on returns, and not only yields. “It wasn’t yields. Usually these new technologies have higher yields, but they had to have a higher return,” he says.

Hakes couldn’t agree more. When assessing new technologies or practices, ROI should be foremost. “Every farmer ought to be looking at returns,” he says.

Cost Control is Paramount

An analysis of the farms in the study showed high-profit farms had lower costs, including items such as seed, herbicides, and fertilizers, than less profitable farms. “In this group, they were adopting the latest technologies but they weren’t doing that in terms of higher costs. They had lower costs at the same time they had higher yields—that’s just simply amazing,” says Schnitkey.

High-profit farmers had budgets, and they lived within their budgets. These farmers continually evaluated expenditures, and there had to be returns on the dollars they were investing in their operations, he says.

There are many ways sunflower growers can control production and input costs on their farms, says Hakes. Calibrating equipment, such as planters and sprayers as well as applying the correct input amounts at the appropriate timing will help farmers curb costs, he says.

Staying on top of innovations and best practices will also keep costs in check. “There are new fertilizer recommendations for sunflowerers. Anywhere farmers can utilize crop inputs better on the land is a good thing,” says Hakes.

High Production Levels Maintained

The more profitable farms in the study typically had higher yields, says Schnitkey. On average, those farms produced two to three bushels per acre more corn and one to two

bushels per acre more soybeans.

The growers of these successful farms were good production managers, says Schnitkey, and they maintained their yields at high levels. In addition, the farmers maximized their production inputs. “Part of being a good manager in this business for corn and soybeans is, and it would be the same for sunflowers, you have to get the most out of your production inputs,” he says.

Increasing their yields is an area Hakes says sunflower growers can really make improvements and find opportunities. However, optimizing yields may require a mindset change for some, he says. For example, sunflower crops often don’t get the same considerations farmers give other crops.

“IF A GROWER IS
IN BUSINESS
TODAY, THEY’RE
ALREADY DOING
SOMETHING
RIGHT.”
—GARY SCHNITKEY

“Some may not manage the sunflower crop to its highest potential, and that’s an area for improvement,” says Hakes. “If you look at the analyses in the North Dakota State University crop budgets, the sunflower crop is, year in and year out, on a per acre basis, one of the most profitable crops farmers can grow. The data is clear on that,” he says. “It’s just a matter of looking at the crop differently.”

Bringing in Expertise

When they needed it, the more profitable farmers in the group brought experts to their operations for help and advice. The expertise varied, said Schnitkey, from marketing to agronomic consultants.

The most profitable sunflower growers seek out advice and expertise, says Hakes. Whether it’s agronomic advice or market information, there are sunflower experts available, such as National Sunflower Association staff or Nuseed’s agronomists, ready and willing to help growers find answers. Educational seminars, such as Nuseed’s Sunflower University, also exist to help optimize growers’ profits, he says.

Non-Timing Price Opportunities Sought

Highly profitable farmers created additional revenue on their farms by seeking premiums for their crops, whether through higher yields or specialty crops, such as non-GMO soybeans.

“Here, the alternative is not to grow commodity soybeans, but to grow soybeans that are non-GMO, or have some other characteristic that someone is willing to pay more money for, so there’s a higher return,” says Schnitkey.

Most successful growers look for ways to get top dollar for their crops and sunflowers offer some of the best premiums, says Hakes. By growing sunflowers, there are opportunities to catch an oil, confection or dehull premium, which can improve profitability, margins and returns. Understanding sunflower markets and the opportunities they offer will increase growers’ resiliency, he adds.

Reach for Resiliency

As Schnitkey says, if farmers are still in business in today’s economic climate, they’re doing something right. But how do farmers make their businesses more profitable?

Understanding the above list is a good start, says Schnitkey. After that, discipline and evaluation are critical, he says.

“This is hard,” says Schnitkey. “We didn’t find a magic bullet here.” He suggests farmers spend time assessing each decision—right or wrong—that they make.

“These growers wouldn’t put down an input without some prospect of a return. And they’re going to try and measure if that input got that return. Discipline and really doing a good job of evaluation are key,” he says. ☀

SPOILED **FOR** CHOICE

Producers must consider the individual needs of their farms when choosing which sunflower varieties to grow.

“SUNFLOWER PRODUCERS WILL CONSIDER STRONG CONTRACTS, PRICES OR MARKET DEMAND, ULTIMATELY CHOOSING THE MOST PROFITABLE OPPORTUNITY FOR THEIR OPERATIONS.”

—ALISON POKRZYWINSKI

For producers, choosing which sunflower hybrids to grow on their farms

is not like choosing corn or soybean varieties, says Alison Pokrzywinski, Nuseed’s Sunflower Product Development Manager for North America, as they can’t narrow their hybrid choices by maturity only.

Producers must assess a number of factors, including the individual needs of their farms, which will narrow their choices to a handful of hybrids, and then maturity is considered. For example, what processing facilities are within close proximity, such as oilseed crushing plants, what grain types local elevators take, and the contract’s delivery period and storage requirements are some of the other factors producers must consider.

Sunflower hybrid choice is directly related to the market a producer plans to enter and the specific region where the hybrid will be planted.

Typically, conoils and confections offer higher contract prices than other markets. However, higher contract prices usually mean higher stakes. For instance, meeting contract quality standards for the confection market, such as seed size and insect and disease damage, is often challenging, says Pokrzywinski. Thus, management of confection or conoil crops is different from oilseed sunflower crops.

Oilseeds are usually the easiest to grow and are the lowest risk for producers, however, of the three markets, they offer the lowest

financial rewards. Oil sunflowers can be produced under contract or for the open market. Local elevators also offer cash prices based on market demand.

Over the past few years, high oleic acreage has been growing and is the largest segment of the total oil sunflower acres in the United States. Demand from major buyers for sunflower oil, primarily high oleic and NuSun, is fairly consistent throughout the year. In addition, oil crush buyers will pay a premium of 2% for any percentage above 40% oil content.

Consider ROI

When choosing sunflower hybrids, usually ROI is considered first, says Pokrzywinski.

Sunflower Seed Types and Markets

Understanding the different sunflower markets, and the risks and rewards of each, before choosing a hybrid, is important. The three sunflower seed types—confection, oil and conoil—can be further divided by oil or visual traits and then again by buyer or end-use market.

1. Oilseeds are either high oleic or NuSun and are sold to oil crush, bird food or dehull buyers.
2. Conoil seeds are either striped or black and are primarily contracted for kernel (dehull) markets. Producers have the most potential versatility with conoils, which sometimes sell to in-shell confection, oil or bird food markets depending on specific processor criteria and market demand.
3. Confection seed types include round, long or extra-long hybrids, with in-shell or dehull as the primary markets. Sometimes, confection growers have the opportunity to sell into the bird food market, depending on processor or buyer criteria and markets.

Nuseed's portfolio includes a top-performing hybrid for every market segment and every region. Legend Seeds dealers, the official distributor of Nuseed sunflowers in the United States, are an excellent information source on the hybrids appropriate for their regions as well as the markets that fit producers' operations. Legend Seeds dealers are also familiar with the production practices required for the hybrids they sell, such as machinery adjustments and planting deadlines.



Alison Pokrzywinski is Nuseed's Sunflower Product Development Manager for North America.

"Sunflower producers will consider strong contracts, prices or market demand, ultimately choosing the most profitable opportunity for their operations."

Sunflower growers can sell to one market or several as there are many options open to them. Producers may also choose to plant multiple maturities or diversify hybrids to spread the risk on their farms. In addition, sunflower production contracts often include an "Act of God" clause further reducing producers' financial risks.

Next to price, on-farm storage capability is an important factor affecting hybrid choice. Producers with on-farm storage for sunflower are usually rewarded for storing their crops. Buyers often pay growers bonuses for storing the crop over an extended period of time, says Pokrzywinski. "If you can store, you're usually rewarded financially."

Producers without on-farm storage will want to consider contracts, and corresponding hybrid choices, that include hauling directly after harvest. "If you're a grower who doesn't have on-farm storage, you need to work with a processor that can take grain right away," says Pokrzywinski.

Logistics is another important factor to consider when choosing markets and hybrids. For some producers, proximity to receiving stations will limit their market and hybrid choices. While some producers will drive long distances for good contract prices, others may offer on-farm pickup, which is another factor influencing market and hybrid choice as well as a producer's contract.

Hybrid decisions should also be based on the herbicides producers use on their farms.

Sunflower producers have two options for in-season weed control—BASF's Clearfield or DuPont's ExpressSun production systems. Nuseed's portfolio includes both herbicide-tolerant traits.

"It's important for producers to know which weeds are the primary issues on their farms, or what weeds will be the issue in-season—and to choose their sunflower hybrids accordingly," says Pokrzywinski.

It's also important to consider disease pressure, and when at risk, choose a hybrid with resistance to that disease, she adds. Different disease pressures occur at different times, so growing sunflower hybrids with different maturities can also help manage the risk.

Seed treatments are a valuable risk management tool for the early stages of plant growth. Plenaris seed treatment is available on Nuseed hybrids. It provides excellent protection against all downy mildew races, and in combination with Dynasty seed treatment, brings resistance management as additional control.

Before purchasing seed, it is crucial all producers confirm their contract requirements, says Pokrzywinski. Knowing what is expected beforehand can help alleviate confusion later on and helps a grower to understand what is expected for quality standards, storage, etc., she adds.

"To achieve top quality, producers should ensure the crop is managed properly with the appropriate fertility plan, weed control, and insect and disease management. If producers manage the crop well, they will be rewarded financially," says Pokrzywinski. ☀️



CHOOSING THE HYBRID THAT'S RIGHT FOR YOU

HYBRID	MATURITY	TRAITS	ADDITIONAL MARKETS	PERFORMANCE POTENTIAL				HARVEST CHARACTERISTICS			AGRONOMICS			
				EMERGENCE	DROUGHT TOLERANCE	UNIFORMITY AT FLOWERING	YIELD FOR MATURITY	TEST WEIGHT	DRY DOWN	OIL CONTENT	LATE SEASON PLANT HEALTH	STALK RATING	ROOT RATING	PLANT HEIGHT
HIGH OLEIC														
Cobalt II	Early	Clearfield/DMR	Bird Food	8	7	9	8	7	8	6	7	8	8	5
NEW N4H302 E	Medium-Early	ExpressSun	Bird Food	9	7	8	7	7	8	7	7	7	6	6
Daytona	Medium-Early	Clearfield	Bird Food	8	8	6	7	8	7	6	7	8	6	5
NEW N4H470 CL Plus	Medium	Clearfield Plus/DMR	Bird Food	8	9	9	8	8	7	9	8	8	8	7
Hornet	Medium	Clearfield/DMR	Bird Food	8	8	7	9	7	6	7	8	7	6	7
NEW N4H521 CL	Medium-Late	Clearfield/DMR	Bird Food	8	8	7	9	8	6	8	8	7	6	7
Sierra	Medium-Late	N/A	Bird Food	7	8	8	9	7	6	6	7	7	7	8
NUSUN														
Talon	Early	ExpressSun	Bird Food, Dehull	7	6	8	7	6	7	5	6	7	8	5
N4HM354	Medium-Early	Clearfield/DMR	Bird Food	8	7	8	9	7	8	8	7	8	8	6
Falcon	Medium-Early	ExpressSun	Bird Food	7	8	8	8	8	7	7	8	8	7	6
Camaro II	Medium	Clearfield/DMR	Bird Food	7	8	8	9	8	7	7	8	8	7	6
DEHULL (CONOIL)														
N5LM307	Medium-Early	Clearfield/DMR	NuSun, Bird Food	8	7	7	8	7	8	4	8	7	7	6
Badger DMR	Medium	Clearfield/DMR	NuSun	8	7	7	7	7	7	4	7	7	8	8
CONFECTION														
Panther DMR (LT)	Early	DMR	See Contract	7	6	7	8	8	7	N/A	7	8	7	6
LD5009 (LT/XL)	Medium	N/A	See Contract	8	6	8	7	7	7	N/A	6	7	8	7
Jaguar II (LT)	Medium	Clearfield	See Contract	7	6	6	7	7	7	N/A	6	7	6	7
4334 (LT)	Medium-Late	Clearfield	See Contract	7	7	6	8	7	6	N/A	8	7	7	7
NEW N6L602 CL (XXL)	Late	Clearfield	See Contract	6	7	6	5	6	6	N/A	7	7	7	7
NEW N6L691 CL (XXL)	Late	Clearfield	See Contract	7	7	7	6	7	6	N/A	8	8	7	7
Hybrid Rating Scale: 1=Poor, 9=Excellent (excluding Plant Height) Plant Height Rating Scale: 1=Shortest, 9=Tallest														



THE NEXT FRONTIER IN CROP PROTECTION

A revolutionary pest control application technology will soon be available for sunflowers.

“We’re on the cusp of a new wave of pest control application technology,”

says Bob Weigelt, FMC Retail Market Manager. He’s talking about the 3RIVE 3D application system, which will soon be available for control of sunflower pests.

“It’s a glimpse of the future, and it’s exciting,” says Weigelt. “This is the next frontier of in-furrow pest control.”

Rather than using traditional liquid or granular insecticides or fungicides, the system delivers a continuous band of foam that creates a three-dimensional layer around the seed in the furrow at planting, which FMC calls a Zone of Protection. The foam applica-

tion contains an insecticide or a combination of an insecticide and fungicide for seedling defense and yield enhancement. The system is currently available for pest control in corn, soybean, dry bean and pea crops and delivers highly effective control at a very low liquid volume, optimizing performance as well as efficiency for the grower, says Weigelt.

“The idea is to take the insecticide or the biofungicide-insecticide combination, put it in the system, and lay a band of insecticide and fungicide right over the seed before row closure,” he adds.

The 3RIVE 3D products formulated exclusively for the application system, Capture 3RIVE



3D insecticide and Ethos 3D insecticide/fungicide, are currently undergoing the EPA registration process and may be labelled for sunflowers in 2020 or early 2021.

“Capture 3RIVE 3D insecticide is a broad-spectrum pest control product containing the Group 3 insecticide bifenthrin that provides very strong protection from soil insect problems like wireworms, seedcorn maggots, white grubs and other pests,” says Weigelt.

Ethos 3D insecticide/fungicide is a combination of bifenthrin insecticide and a Group 44 fungicide comprised of the bacterium *Bacillus amyloliquefaciens*, a naturally occurring biofungicide that colonizes plants’ roots to create a barrier to insects and disease. According to Weigelt, Ethos 3D insecticide/fungicide maximizes crop health, improves stands and protects seedlings during their early growth stages.

“With the 3RIVE 3D application system, application efficiency and control has reached a whole new level,” he says.

The unit can be mounted to most planter brands and models. “The process is simple,” says Weigelt. Hoses are attached to the product and water tanks, and pumps are engaged. Water and product are transferred to the system with quick-connect, dry-lock valves minimizing user exposure to the product. Also, no measuring, mixing or tank agitation is required.

To fill the 130-gallon water tank and 30-gallon product tank—the unit holds up to two 15-gallon kegs of product—it takes only 10 minutes with the capacity to plant up to 500 acres between refills. After the tanks are filled, hoses are then detached and growers can start planting.

According to Weigelt, growers cover more ground in less time with fewer refills, which saves them fuel, labor, time and water. The system uses 90% less water than traditional liquids and is nearly half the weight of granular crop protection products. Also, the system doesn’t require growers to lift product, and application rates can be altered as crops and pest control needs change.

The 3RIVE 3D application system is self-contained and includes the water and product tanks and system control components, such as concentrate and solution pumps, precision flowmeter, air compressor and associated plumbing and wiring harness. For planters larger than 24 rows, the unit contains two air compressors.

The chemical pump precisely meters product, the solution pump combines water and product and pumps solution to the manifold. The flowmeter measures the combined water and product solution.

The unit works by delivering compressed air to the manifold, which combines water, chemical concentrate and air in precise ratios to expand the solution up to 50 times, delivering it to individual planter row units.

“You can put down 40 fluid ounces total of carrier, for instance, water and chemical per acre, and the foam expands 50 times to make it the equivalent of 15 – 20 gallons per acre liquid application. The expansion of the foam is the genius of it,” says Weigelt.

“This in-furrow delivery of insecticide or bio-fungicide combined with insecticide is really exciting. There’s a lot of interest in the 3RIVE 3D system, and customers are now using it on corn and soybeans. And those growers are already experiencing the benefits of using the system,” he adds.

“In 200-bushel per acre environments where this is currently used, farmers are getting a five- or six-bushel per acre bump out of Capture 3RIVE 3D insecticide and a 10 bushel per acre bump out of Ethos 3D insecticide/fungicide, due to the precision and efficiency of the placement,” he says.

The system only works with specially formulated 3RIVE 3D products. Farmers pay nothing for the unit when they commit to using FMC products at a certain volume for a three-year period.

Weigelt is looking forward to getting the system in the hands of sunflower growers. He’s hoping early technology adopters will try it out on their farms.

“Stay tuned. We’ve talked to Nuseed and Legend Seeds about folks to demo this [system] as soon as we have our [product] registrations for sunflowers. We’re excited about that and we want to work with early adopters to get a good idea about the utility of the system in sunflower production.” 🌻

FMC’s 3RIVE 3D Application System By the Numbers

- Refills take 10 minutes.
- The unit holds up to two kegs of product and can plant up to 500 acres with a single fill.
- Running time between refills is 11 hours.
- Area planted in 14 hours is 602 acres.
- Total weight of product per refill is 275 lbs.
- The 3RIVE 3D applicator weighs less than 500 lbs. when empty.



LOOKING UP AND DOWN THE PIPELINE

Nuseed's top sunflower experts share how they keep abreast of growers' evolving needs and provide insights on corresponding breeding priorities.



Meeting growers' needs now and in the future is top of mind in all of Nuseed's breeding pipelines, including sunflowers.

"It's an exciting time for sunflowers," says Jeremy Klumper, Nuseed's Oilseed Sunflower Breeder for the northern hemisphere. "Nuseed's sunflower research and development group continues to lead in addressing evolving developments with this crop in terms of agronomics, processor demands and new opportunities.

"We are committed to both keeping pace with, and anticipating, growers' needs, and we do that by keeping in close contact with commercial growers. Our team is constantly seeking out grower feedback. At the same time, we also share with growers the latest findings on best practices like rotation and timely use of insecticides," he says.

Nuseed also gathers feedback through grower field days and "Knowledge Plots" held by Nuseed's U.S. sunflower seed distributor, Legend Seeds. "In addition, every second year, we hold our 'Sunflower University' event," explains Alison Pokrzywinski, Nuseed's Sunflower Product Development Manager for North America.

"At this event, we ask growers about their needs and recent cropping experiences, and bring in industry experts to help growers take it to the next level."

Pokrzywinski adds that the Sunflower Crop Survey conducted by the National Sunflower Association, to which Nuseed often provides volunteers, is another good source of information for Nuseed on recurring issues and trends in the field.

Nuseed also has R&D trial sites scattered throughout the Dakotas, which is also helpful. "We can bring in growers and processors to show them our new hybrids," says Pokrzywinski. "This provides a lot of value and opportunity to gather feedback."

With a niche crop like sunflowers, it's critical for Nuseed to have strong relationships with processors as well as growers. As the specifications for the confectionary (seed size and shape), bird seed (color and test weight) and oil crush (oleic and oil content) markets are always evolving, Nuseed makes sure to stay on top of them.

Specific Needs

Longer maturity is a trait that's definitely in current demand by growers. Klumper says Nuseed is working diligently to expand its maturity range in a project that spans

the planet. “In the United States, hybrids adapted for longer growing seasons in South Dakota and the High Plains region are becoming more important.”

The High Plains encompasses southeastern Wyoming, western Nebraska, eastern Colorado, western Kansas, eastern New Mexico, and western Oklahoma, to just south of the Texas Panhandle. “Sunflower interest in the High Plains region has increased in recent years,” explains Pokrzywinski, “as it works well in their rotations and there are good contract opportunities.”

At the other end of the spectrum, early-maturing hybrids are in demand in northern locations such as Canada, northern North Dakota and northern Minnesota.

“We are keen to expand sunflowers into areas they haven’t been grown before,” says Klumper. “Tied into a strong global need for early-maturing hybrids is an interest among High Plains growers in exploring double-cropping. After the winter wheat harvest, if adequate soil moisture and other factors are in place, interest in planting early-maturing sunflowers is growing. At this point, there is much to be researched in terms of agronomics and how factors such as crop insurance would play out, but we are actively keeping an eye on this possibility.”

Strong disease resistance is also a trait that’s a must for sunflower growers. Downy mildew today has evolved significantly from the races of 10 years ago, says Klumper, but good technologies have come into play in terms of new seed treatments and newly-identified resistance genes.

Klumper and other Nuseed sunflower breeders are “stacking” the newest genes and working with the latest seed treatments

to provide growers with the best multi-layered defense now, but also with a focus on creating solutions that are effective for years to come.

Tolerance to Phomopsis is also a Nuseed sunflower breeding priority. Klumper says the USDA-ARS sunflower breeding program based in Fargo is a huge resource for the sunflower community.

**“WE ARE LASER-FOCUSED ON THE FACT THAT FOR EVERY 1% OIL INCREASE, THERE IS A 2% PREMIUM TO THE GROWER. WE WANT TO CONTINUE TO BRING EVERY OPPORTUNITY FORWARD FOR THE GROWER TO MAKE MORE MONEY.”
—JEREMY KLUMPER**

“Over the last 10 years, we have been working to put a bigger focus on late-season plant health, so plants have higher levels of Phomopsis tolerance. We are looking for hybrids that have really good standability and strong late-season robustness. There are multiple genes involved and tolerance to this fungus is a continuous breeding goal,” he adds.

In addition, for many years Nuseed has also produced hybrids that function with all three herbicide platforms (ExpressSun, Clearfield and Clearfield Plus).



The Big Picture

In addition to taking grower feedback and market trends into account to guide its sunflower R&D, the Nuseed team also makes sure there is an overarching wider vision in place. “We are working to address how current trends could be moving so growers are ready for that,” Klumper explains. “It’s critical that our growers be ready for various scenarios in terms of pests, expansion of acreage in existing and new growing regions, and be able to adapt to market trends as quickly as possible.”

Thus, Nuseed is always working on multiple projects within its sunflower pipeline and expanding testing as hybrids approach commercialization so confidence is as high as possible about hybrid fit in terms of maturity and agronomic performance.

“We continually strive to be sunflower market leaders, working to improve yield, agronomic performance, standability, insect resistance, disease tolerance and resistance, and to increase oil content above any other available seed,” says Klumper.

“We are laser-focused on the fact that for every 1% oil increase, there is a 2% premium to the grower. We want to continue to bring every opportunity forward for the grower to make more money.” ☀️

Nuseed Sunflower Breeding Priorities

Listed below are Nuseed’s priority traits for its North American growers.

- Longer- and shorter-maturing hybrids
- Disease resistance (i.e. downy mildew)
- Tolerance to Phomopsis
- A wider breeding vision so growers are prepared for future scenarios
- A continuing focus on yield and agronomic performance improvement, better standability and insect/disease tolerance/resistance, and higher oil content
- Nuseed is committed to bringing every opportunity forward so growers are more profitable

TOP TIPS FROM NUSEED

Trygg Olson, a Field Sales Leader for Nuseed, offers his top tips for a successful sunflower crop from planting through harvest.

Planting Tips

When you're starting the season, the biggest thing is to ensure you've got the right seed for your growing area and your contract. You also want to make sure you've got the right hybrid for your herbicide platform.

I like to see earlier planting for sunflowers. They can handle a little bit colder weather than soybeans and some other crops, and I've

seen them going in as soon as early May. If you can get the seed in the ground early (or at least as early as your crop insurance lets you), there's a good chance you'll see better emergence, better stands, and plants that are a little shorter in stature. It's also more likely you can get the crop killed off and safely put away in the bin before the blackbird migration goes through.

When it comes to planting, try to ensure the seed is placed at a one and three-quarter-inch to two-inch depth. You always want to make sure you have singulation and that the seeds are evenly spaced. With every skip, you'll get a bigger head which may lead to slower dry down, and multiple seeds will produce a smaller head with smaller seeds that oftentimes can affect test weight or will just blow out the back of the combine.



Olson says weed control is a major factor in a crop's success, so farmers want to make sure they get a good pre-emergence herbicide down to get the early-season weeds.

In-Season Tips

Weed control is a major factor in your crop's success, so you want to make sure you get a good pre-emergence herbicide down to get the early-season weeds. For post-emergence applications, it's critical they correspond with the correct plant stage timing for the herbicide product you're using. For a Clearfield product, that's the two- to eight-leaf stage,

and for Express, it's the two-leaf stage up to pre-bud (before the formation of the bud).

Early-season disease is something you need to keep an eye out for. That's especially true when the weather is conducive to disease development, like the wet season we've had this year throughout North and South Dakota. As the crop matures out, also watch out for

those late-season diseases like Phomopsis and sclerotinia.

Scouting for diseases and insects is something you should do throughout the spring and summer to ensure that your sprays are timed correctly. If you go in too late, the damage is likely done, and you won't see it until harvest. In addition, always follow product labels and registered uses.



Trygg Olson is a Field Sales Leader for Nuseed. He says it's crucial to have the right seed for your growing area and your contract, and the right hybrid for your herbicide platform.

End-of-Season Tips

Scouting is also important when it comes to deciding when to desiccate your sunflower crop. You want to make sure the plants are physiologically mature at around 35% moisture, because if you desiccate too soon, you can lose oil percentages and test weight. In the specialty markets of dehull and confec-

tion you cannot only affect the test weight of premature seed, but may also affect seed sizing that you need to make grade.

When you're out in the field, you'll want to see the back of the sunflower heads colored banana yellow and the bracts dying back from the tip down through the shoulders. You

should always play it safe—I recommend taking quarters from a sampling of heads throughout the field, hand thrashing them, and then taking the seed to your local elevator, which should be able to give you a really accurate moisture reading.



Toussaint Farm's N4H302 E sunflower field being harvested near Campbell, Minn., this October.

Harvest Tips

When you're harvesting your crop, it's important to have the proper combine set-up. You don't want to be grinding the seed or getting too much head and unthashed material in your grain hopper—using the right header

will reduce the chances of head shatter and head loss.

When combining the field, always try to maintain the right speed to keep the machine full and doing the best job of thrashing. It's a

good idea to take samples from time to time and also check behind you to ensure there isn't too much wind that may be blowing material from the back of the combine. ☀

IS DESICCATION RIGHT FOR YOUR FARM?

Reduced risk and losses are only a couple of reasons sunflower growers use desiccation as a harvest aid.

Using a desiccant on a sunflower crop can decrease a grower's losses due to inclement weather, lodging and bird depredation, as it will speed up the dry down process, says Alison Pokrzywinski, Nuseed's Sunflower Product Development Manager for North America. However, the use of desiccation as a harvest aid is underutilized in sunflower production, she adds.

"If a grower doesn't desiccate, then they are at the mercy of Mother Nature, waiting for a hard frost to kill off the plants or natural dry down. Sometimes growers are waiting until October or November for that to happen."

According to Pokrzywinski, there are three important reasons growers should consider desiccating their sunflower crops prior to harvest: disease, unknown fall weather vari-

ables and blackbirds. For example, if a crop is experiencing late-season stalk disease, getting the crop off as soon as possible will prevent further stalk damage.

Producers will also have peace of mind the earlier the crop is in the bin and not at the continued mercy of late-season environmental conditions. This past year was a prime example, where 24 inches of snow fell on some fields in the Northern Plains in early October. Additionally, blackbirds can settle into a field two weeks after petal drop, and once established, are hard to get rid of. Thus, getting the crop off earlier is the best solution to this difficult problem.

"Sunflowers can get hit by a lot of issues in the fall, whether it's disease, blackbirds, wind or rain. Growers need to consider the

maturity of their crops and how far from harvest they would be if they don't desiccate," says Pokrzywinski.

Growers who desiccate also have more control over harvest timing, and desiccation also helps even out moisture levels before harvesting, she adds. "If you plant on the earlier side, you should automatically put desiccation into your budget."

Maturity and Dry Down

It's important for growers to understand the maturity and dry down of their hybrids and that they sometimes don't go hand in hand. An early-season hybrid with good late-season plant health or stay green is not necessarily going to have good dry down and vice versa. And a fuller-season hybrid could dry down really well, depending on the hybrid.



“IF A GROWER DOESN'T DESICCATE, THEN THEY ARE AT THE MERCY OF MOTHER NATURE.”

—ALISON POKRZYWINSKI

early and put in the bin before the elements or blackbirds decrease yield.

Waiting for a crop like this to dry down naturally, or for a killing frost, may take a long time, during which the sunflowers are vulnerable. Sometimes growers are waiting until October or November for a hard frost to kill off the plants, adds Pokrzywinski.

Desiccant Timing and Products

Desiccants can be applied to the crop once plants have reached physiological maturity. At this stage (R-9), the back of the head turns yellow, the shoulders of the bracts turn brown and seed moisture is about 35%. Applying desiccant before physiological maturity may reduce test weight and seed quality.

Growers can often desiccate earlier than they realize, says Pokrzywinski, especially if the weather is sunny and warm. She recommends growers check their fields often under these conditions as their crops may be ready to desiccate.

Desiccation products for use on sunflowers include glyphosate; Gramoxone (paraquat), which is known as Reglone in Canada; Drexel Defol (sodium chlorate), which is only registered in the United States; Sharpen (saflufenacil), which is known as Heat in Canada; and Valor (flumioxazin), which is also only registered in the United States. Always follow registered uses on the product label, states Pokrzywinski.

One of the big differences in desiccation products is speed. Usually growers can start harvesting approximately three weeks after applying glyphosate. Alternatively, products like Gramoxone and Drexel Defol work faster, allowing growers to harvest about 10 days after application.

However, another important difference between products is Gramoxone and Drexel Defol will remove the waxy layer on the back of sunflower heads, whereas glyphosate will not. This waxy layer prevents water absorption into the head if it rains.

“If you get rain a couple of days after spraying, the sunflower head is going to absorb water and you could be waiting longer to harvest than if you hadn't sprayed,” says Pokrzywinski.

Growers can typically harvest sunflowers 10 to 14 days after applying a tank mix of Sharpen and glyphosate, she adds.

When considering desiccation as a harvest aid, growers should factor in planting date, weather, typical hard frost date and market.

“You have to weigh your odds on what the weather's like, your potential for a hard freeze, when you planted and how much time you have. For example, are you going to be waiting for a hard frost for 30 days or more?” asks Pokrzywinski.

“The other part to consider is what the price of the crop is, and what market you're going into. Those in a higher value specialty market, like confections, want the highest quality to get the best price they can.” 🌻

“This is where desiccation can be important. A medium maturity hybrid with good late-season plant health may not look like it's ready, but all the indicators for maturity are there and you can desiccate. However, if you wait for Mother Nature, it could take a while.”

However, desiccation is not for everybody and it's not for every farm, adds Pokrzywinski. For example, growers in central or South Dakota, who plant around June 20, likely aren't going to desiccate—by the time the crop is mature enough for desiccation, fall has set in and the temperatures are much cooler, or it's close to a killing frost.

A sunflower crop planted early in the growing season may be mature by the end of August. In this case, desiccation is advantageous for growers because the crop can be harvested

Desiccation Fast Facts

- Growers can harvest earlier with the use of a desiccant.
- Physiological maturity (R-9) must be reached or test weight and seed quality will be reduced.
- Apply desiccant when seed is at 35% moisture or below, or when bracts are turning brown. This can be difficult to determine exactly as most hybrids are now the “stay green” type. Often hybrids have dry seed in the head but have the coloring of an immature plant.
- Growers in Central or South Dakota planting around June 20 likely don't require desiccation; by the time the crop is mature enough, it's close to a killing frost.

SEASON-LONG

SUNFLOWER PRODUCTION CHECKLIST

From planting through to storage, this checklist will keep you on track to reach your yield and profit goals.



1 HYBRID SELECTION

Choose hybrids based on market, herbicide tolerance, maturity and disease tolerance needed on an individual farm. Nuseed has a sunflower hybrid right for every field and every market.

2 PLANTER BASICS

- Consult your planter manual for proper inflation and tire size. Unwanted population variation occurs with overinflation or underinflation of the meter drive system tires.
- Check closing wheel alignment.
- Check disk openers for wear. For John Deere, Kinze, and White 8000 and older planters, the diameter of a new disk is 15". A disk worn smaller than 14.5" may create a W in the trench and cause a difference of up to 3/4" in seed depth. White 9000 planters are 16" openers and Case IH planters are 14" openers when new.
- Make sure drives are all in good working order (chains, bearings and shafts).

- Make sure all chains and sprockets are properly aligned to prevent binding.
- Make sure all seed tubes and sensors are clean and functional.
- Row cleaners are vital. They should float freely with maintained pivot point and bearings. Residue left in-furrow can change soil temperature and cause delayed emergence.

3 AIR SEEDER BASICS

- Check opener disks for wear—most manufacturers' disks are 18"; if they are 17" or less, replace them.
- Examine firming and closing wheel arms; check bushings.
- Check the condition of the air delivery system, making sure the air system fan is operating at the proper speed.
- Check all hoses and distributors for wear, air leakage, cracks or blockage.
- Make sure seed boots are within spec (if more than 1/2" is burned off the bottom of the boot, it should be replaced. To check, use your tape measure and if the boot is less than 11.3", look into replacing the boot.

- Calibrate downforce to ensure the boot is running parallel with the ground (too much downforce will cause the seed boot to run deeper in the trench, and it will not run parallel to the ground).
- Make sure all bearings are in good condition.
- Check that you have the proper metering roll for the proper application. Also, check the metering roll for wear, and clean from any foreign material.
- Check meter calibrations prior to entering the field, and check your calibrations and seed usage after planting a few acres.

4 BEFORE YOU PLANT

- Early-season weed control is crucial. Control early-season weeds with soil-applied herbicides to keep fields as free from weeds as possible for the first four to six weeks.
- Utilize seed treatments for below-ground protection of insects and diseases.
- When appropriate, plan for and use a registered in-furrow insecticide at planting to control chewing insects.

- Proper seedbed preparation is required prior to seeding sunflowers.
- Whether using conventional-till or no-till, an even seedbed promotes uniform germination and emergence and good plant stand establishment.
- A minimum three-year rotation to reduce disease and weed pressure is also recommended. Avoid back-to-back rotation with canola, rapeseed, dry edible beans and soybeans, or other crops susceptible to the same diseases as sunflowers. Carefully plan your rotation to control problem weeds and also manage herbicide resistance. Always follow registered uses and label instructions.
- Meet the crop's specific nutrition requirements and fertilize for realistic targets according to geography, soil type and annual precipitation. Remember, overfertilization can do more harm than good, and fertilizer should never be placed in the seed furrow.

PLANTING CONSIDERATIONS

- Soil temperature needs to be at 50 F or more for your chosen soil depth (1.5" to 2.5"). Planting sunflower seed into cold soils may cause seed to go into dormancy, resulting in delayed germination.
- If planting deeper than 2", consider increasing planting population. Percent emergence will decrease as planting depth is increased. Confection sunflowers should never be planted deeper than 2".
- For good seed-to-soil contact, make sure soil is pressed firmly against the seed at planting and the furrow is closed following seed placement. This is important in all crops, but particularly for sunflower. Moisture first needs to get through the woody hull and then to the seed. Poor seed-to-soil contact will result in uneven emergence.
- When planting into no-till, stop and check incrementally that the planter is knifing into the soil. Planting into a field with wet residue can cause "hair pinning"—pushing straw into the seed slot instead of slicing through it. Row cleaners should be able to move residue away from the furrow to prevent hair pinning. With air drills, very little can be done; wait for better conditions.
- Be willing to dig seeds to check placement.

5. Continued...

- Be prepared to switch plates, baffle settings, singulator or double eliminator settings and vacuum or air pressure for desired singulation. Revisit settings between seed lots.
- Use a lubricant, such as eFlow 80/20 Seed Lubricant.
- Ensure your vacuum is set properly as your skips and multiples should be close to equal (if more multiples, lower your vacuum; if more skips, increase your vacuum).
- Know the speed at which your planter's meters operate best for each seed lot. Some lots may require faster or slower speeds than normal.
- Consider filling your planter hoppers half full to reduce bridging potential.
- Because seeding rates are based on commercial grain characteristics desired by specific end-use markets, review Nuseed seeding rate recommendations for the chosen hybrid.

IN-SEASON

- Base herbicide decisions on the specific weeds present in fields at time of spraying.
- Use of herbicide-tolerant sunflower hybrids in addition to soil-applied herbicides will result in optimal weed control and help reduce resistant-weed development risk.
- Scout after herbicide spraying to confirm control of target weeds.
- Scout before bloom for rust to manage it in-season.
- Apply fungicide at the R-5 stage on crops infected with one percent or more sunflower rust on upper four leaves.
- Use integrated pest management strategies for optimal insect control. Correct pest identification is key. Scout fields weekly for pests in-season. Scout fields more often (twice per week) as key pests come into critical windows based on an insect scouting calendar.
- Follow correct scouting protocols and base insecticide application decisions on economic thresholds.
- In all regions, seed-boring insects can be controlled with insecticides during the bloom stage.



SUNFLOWER CHECKLIST

PRE-HARVEST PREP

- Get the crop off early by applying a desiccant. Natural sunflower dry down can be slow and uneven. By speeding up the dry-down process, chemical desiccants decrease crop losses due to inclement weather, lodging, disease and bird depredation.
- Desiccants can be applied to the crop once plants have reached physiological maturity. At this point, seed moisture is about 35%, the backs of the heads turn yellow, and bracts turn brown in color (R-9 stage). Applying desiccant before this stage may reduce test weight and seed quality. Remember to check local regulations for approved desiccants.

HARVEST

- Sunflowers are ready for harvest when the backs of the heads turn from yellow to brown. Prepare harvest equipment—minor adjustments to combines can make a big difference at harvest.
 - Cylinder speeds should range from 300 to 500 revolutions per minute.
 - Concave settings should be open.
- Use the slowest cylinder speed with the largest concave opening to reduce seed damage.
- Adjust the fan to accommodate sunflower seeds, which are lighter than other grains, so that air flow keeps only trash floating across the sieve. If fan speed is too high, seeds will be blown out the back of the combine. If fan speed is too low, empties will end up in the grain, which will affect test weight.
- Combine when seed moisture reaches 20% or less—experts recommend 12 to 15%. Seed moisture can be brought under 10% by drying for storage.
- Combine speed should average between five to six miles per hour. However, today's large combines often need to travel more than five miles per hour to keep full—ground speed should keep the combine full for optimal threshing.
- The target for seeds thrown behind the combine is less than 10 seeds per square foot, which is 100 pounds of actual yield.
- Check test weight when harvesting.
- Keep a clean combine to reduce fire risk. Blow the combine down at least twice daily and have fire extinguishers on hand.

DRYING AND STORAGE

- All grain drying fundamentals apply, no matter what method is being used to dry the grain.
- Check drying rates as sunflowers dry quicker than other grains because there are fewer pounds of water to be removed.
- When drying in a high-temperature dryer, constant monitoring is needed as the chaff, lint and other debris associated with sunflowers are highly combustible.
- Oilseeds (at 40% oil content) should be stored at eight percent moisture, however that value is determined by the oil content. Oilseeds with higher oil contents (closer to 45%) should be stored between seven and eight percent. Typically, confection and non-oil seeds can be stored short term at 10% moisture content, but for long-term storage growers must dry grain to nine percent.
- In storage, monitor grain every couple of weeks when outside temperatures are warm and every two to four weeks in the winter months. ☀️

Sources:

- Nuseed and Industry Experts
- Nuseed Sunflower Field Guide (www.nuseed.com/wp-content/uploads/2017/05/2015-Sunflower-Field-Guide-LoRes-for-Website.pdf)
- Nuseed Confection Sunflower: Best Practices Guide (www.nuseed.com/wp-content/uploads/2017/05/5-1-17-NuseedBestPracticesGuide_US_online_version.pdf)
- North Dakota State University Sunflower Production Guide (www.ag.ndsu.edu/publications/landing-pages/crops/sunflowerproduction-a-1331)



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