



# ***Sunflower Seed Placement & Stand Uniformity***

## **Special Supplement To *The Sunflower***

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*Articles Written by Don Lilleboe*



# Improving the Odds



## Agronomists Discuss Achievement of Optimum Stands, Optimum Yields

**B**ruce Due suggests putting the issue of evenly spaced sunflower plant stands in perspective: “It’s important. But is it as important as in corn? Absolutely not. With sunflower, you can have a double or a skip, and there are negatives associated with that. Yet it’s not like having a double in corn.”

Fair enough. But having made that point, there’s no doubt Due would still like to minimize uneven plant spacing in sunflower fields — especially when it comes to the number of doubles or triples. “I’ve been in stands where 70% of the [seed] drops are doubles or triples,” says the Breckenridge, Minn.-based Mycogen Seeds agronomist. “Good for the seed company; really bad for the grower!”

Any sunflower producer or seed company representative knows firsthand the benefits of a consistently spaced plant stand:

- More-efficient use of moisture, sunlight and nutrients.
- Improved weed suppression (superior plant canopy).
- Similar pace of plant development (aids in insect management).
- Uniformity of head and seed size.
- More-even plant drydown across the field.
- Better final yield and crop quality.

Sunflower has long been touted for its ability to compensate for inconsistent spacing within the row. Plants adjacent to skips, for instance, will — assuming sufficient moisture and nutri-

ents — produce larger stalks, bigger heads and more seed weight. Though that’s a positive attribute, it’s not, however, what growers strive for — nor should they.

### No Need to Overplant

Proper planter equipment, calibration and operation are critical to the final outcome. But achieving the desired plant population starts with the seed bag — and that can be a little tricky in itself. Tim Petry, field production manager for Dahlgren & Company, points out that seed tags commonly understate germination because state regulations require the tag to list the “minimum” germination percentage.

“If the bag says 85% germ, that’s the minimum it can be. The majority [of seed lots] actually run in the low to mid-90s. So some guys tend to overplant,” says Petry, who believes excessive populations are one of the most common mistakes in confection sunflower production. “The perception is that overplanting is how to obtain the optimum yield. Really, it just adds risk.”

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If you don’t have an ideal growing season, if you have dry conditions or disease, you leave yourself at a higher risk. Any benefit you may gain in dry-down time doesn’t offset the downside.” The increasing use of Cruiser® seed treatment on sunflower in recent years has further widened the gap between the germination percentage on the tag and what often occurs in the field, Petry adds, since Cruiser’s activity on insects aids emergence levels.

In the Red River Valley area, for growers planting confections in 30” rows, Dahlgren typically recommends a seed drop of around 18,000. “If a guy is in 22” rows and looking at good moisture conditions, though, our target may be a little higher,” Petry indicates. To the west, under more-arid conditions, a seed drop of 16,000 is more standard with confections, he says.

Kevin Wall, sales manager for Breckenridge-based Seeds 2000, says he favors an oil-type sunflower seed drop within the 18,-22,000 range in higher-rainfall areas (or for irrigated fields), with 16,-18,000 more appropriate for drier areas. Wall has customers in the arid western Dakotas who are pulling in 1,000- to 1,200-lb yields — which is profitable for that area — with a 12,- to 13,000 seed drop.

Recommended populations vary considerably in the High Plains, where a significant percentage of the crop (especially confections) is irrigated.

The *High Plains Sunflower Production Handbook* suggests oil-type populations under dryland conditions run between 14,000 to 22,000, depending on moisture conditions and one’s yield goal. It also references a Nebraska study in which yields were similar with populations of from 11,000 to 20,000 plants per acre. (But the 11,000 population averaged 300 more seeds per head and a 2.0 lbs/bu lower test weight.)

The university-recommended range for irrigated oil populations in the High Plains runs between 17,000 to 22,000 final plants per acre, while that for irrigated confections typically is from 15,000 to 18,000. For dryland confections, it’s closer to 12,000.

What population justifies replanting? Some situations have an obvious answer, but “I’ll argue with growers in late spring about whether to replant,” muses Bruce Due. “If they’re adamant, you can’t stop them. But we have lots of data to show what sunflower will do for yield at reduced populations. In my estimation, 14,-15,000 plants are just as capable of a [given] yield as 20,000 plants— up to 2,300 or 2,400 pounds.”



## Growing What You Sow

Everyone knows “seed drop” and “final plant stand” are two different animals. Not all seeds will germinate, and not all germinated seeds will emerge and grow into healthy plants. Sometimes nine out of 10 will; at other times — due to unfavorable soil conditions, planter problems, disease, insects or other factors — the percentage will be considerably less.

Even if a grower achieves his targeted per-acre population, some of those emerged plants are likely to be spaced unevenly within the row. It's not a perfect world out there, regardless of the crop — and even less so for 'flowers. Sunflower seeds are odd creatures: irregular in shape, much flatter than corn or soybeans, lengthy (especially the new ultra-long confection varieties), and just plain tougher to plant. Toss in the fact that today's planters were designed for crops like corn — whose seeds are rounder and sown at a much higher population — and it's little wonder the average sunflower grower deals with skips and doubles.

Again, while a field's per-acre plant population may be on target, the issue is the distribution of those plants. “The key word is ‘even,’” emphasizes Kevin Wall. “If I have an even stand of 15,000 with confections, I'm going to have a pretty good crop with uniform seed size, uniform drydown. It's the blanks (skips) and doubles that get you in trouble.”

In general, Mycogen's Bruce Due views doubles or triples as much more of a yield-impacting factor than skips. “They (doubles and triples) are more damaging from a disease standpoint, from a harvest loss standpoint,” he says. “They're thinner stemmed, so if you're going to have plants breaking over, they'll be the ones. And I'll guarantee you that if one plant in a clump of three gets Sclerotinia, they all will.”

Due sees other effects as well — ones that may not be so apparent to growers. “If you have a lot of doubles and triples and you examine those plants, most likely you'll find some of the seeds rubbed out of the heads.” When the wind blows, the heads of the “cozy” plants tend to rub against each other. “Over time, that will actually wear seeds right out of the head.”

Seedset can also be affected. During pollination, heads jostling against each other “will rub off anthers, will rub off the female portion of the pistil,” Due notes. “So you end up with heads that don't set seeds normally.”

Long, consecutive skips down a row

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obviously are not a good thing — from either a weed control or final yield standpoint. But for Due, the occasional, sporadic skip is not worrisome. “Sure, we'd like to see uniform spacing of every plant out there,” he observes. “But realistically, if I was to count 100 plants and find I have 85 placed ‘normally,’ I can live with that. The nearby plants will try to compensate.”

## Optimizing Seed Placement

John Smith, agricultural engineer with the University of Nebraska at Scottsbluff (*see article on page 5*) recounts a conversation he recently had with a grower who used a John Deere vacuum planter to seed confection sunflower. “He said, ‘You know, I'm just not happy with my planter.’”

“He was using the [flat] plate that Deere recommends for confections. But then I asked him where he had his doubles eliminator set at. And he replied, ‘What's a doubles eliminator?’”

After discussing that topic, the grower next asked Smith what vacuum setting he was using in his Scottsbluff tests with the Deere vacuum meter for confection “flowers. Smith indicated he had experimented with a wide range and settled on 12” water vacuum. The grower responded that he had been running at just 1” vacuum.

In Smith's view, that conversation underscored the core problem inherent in many inconsistent plant stands:

inadequate information as to the right equipment and settings for planting sunflower — and confection ‘flowers in particular.

“This grower was used to the Deere cell plate-type planter,” Smith points out. For whatever reason, the grower didn't realize that when using the flat plate, he had to include the doubles-eliminator mechanism. “He installed the [flat] plate, dumped in the seed and started down the field —and of course, he was getting [numerous] doubles,” Smith explains. “So he backed his vacuum way down to where [the monitor told him] he had the right plant population. Well, in the meantime, he was ending up with long skips — and still some doubles.”

## Calibrate, Calibrate, Calibrate

“Sunflower is one of the hardest crops to calibrate for,” Bruce Due affirms. “Every hybrid is different. Some of have wide shoulders and narrow points; others have narrow shoulders and are very pointy. Plus, the length of the seed varies so much from hybrid to hybrid.”

Seed company agronomists commonly recommend that growers recalibrate their seeding systems whenever changing not only varieties, but also seed lots within a given variety — especially if there's a seed weight change. “Every lot number, as long as it has a significant difference in [per-pound] seed count, should be a reason for the grower to check to see if something changes,” Due advises.

“If the [new lot] has only a 200- to 300-count difference and it's of the same hybrid, it's not likely to change anything. But if you go to a different seed lot — same hybrid, same seed size — and there's a 1,200-seed-per-pound difference, I'll guarantee you



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*'Every lot number, as long as it has a significant difference in per-pound seed count, should be a reason for the grower to check to see if something changes.'*

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there's a change taking place in how your planter is planting that particular seed lot.

"The 'one size fits all' approach — for a grower to calibrate his first seed lot and then turn 'er loose and keep dumping in seed — just doesn't work," he states.

Due views planter calibration as a huge factor in laying the foundation for a successful sunflower crop.

"I used to work with a grower who used the old IH Cyclo," he illustrates. "They were a good planter in their day; but if you didn't have them calibrated right, they could really do a 'nasty' on you. He always told me, 'I can plant anything through my Cyclo.' And I believed him, because he knew how to calibrate that planter so it would work perfectly. He'd have to play with it for awhile; but when he got done, it was planting right."

At the other end of the spectrum, "I've seen people take a brand new planter out to the field and have nothing but nightmares," Due states. "If you don't know what you're doing, it can be a wreck."

While none of today's commercial planters were designed with sunflower in mind, most can, if properly equipped and calibrated, do a good job with this crop, adds the Mycogen agronomist. "I don't see problems as being a 'planter-specific' issue by type," he says. "It's a 'planter-specific' issue by planter. If a grower has a planter that hasn't been calibrated right, if it has worn components, or if it has an operator who'd rather be driving the tractor than calibrating the planter, there are going to be issues.

"Every time you go to a different field, your planting conditions change. And if you go to a different field that had a different previous rotation crop, it changes dramatically."

Due maintains that one of the biggest issues with planting sunflower is the residue from the prior crop. "I get more service calls based on residue management than I do for any other plantability [issue] in the spring," he states. The issue boils down to seed-to-soil contact and proper seed placement depth. Unless the planter is equipped

with the right residue clearance tools, the sunflower stand will suffer.

Given the excellent 2007 wheat and barley crops in central and western North Dakota, for example, Due expects heavy straw in many fields when planting the '08 sunflower crop. "If we have a lot of straw, we get a lot of hairpinning — especially earlier in the morning when the knives designed to cut through straw just can't do it very well because the straw is wet with dew. Sometimes it just comes down to looking at that and saying, 'I need to wait awhile, because I'm not putting seed down into the soil; I'm putting it into the residue.

"[Inadequate] seed-to-soil contact is one of the biggest reasons for reduced stands."

Dahlgren's Tim Petry says seeding depth and good seed-to-soil contact can be particularly important for confections. "Their thicker hull requires more moisture to absorb through for the kernel to germinate," he points out. "Also, the woodier, thicker hull requires more vigor on the seedling's part to break through to the soil surface.

"So seeding depth is critical. If you go too deep, it takes too much energy to get out of the ground." Petry, who recommends a confection seed depth similar to oils (1.5 to 2"), says the bottom line is to "get it into moisture so germination can take place." In high-residue situations, that calls for the proper residue managers and down pressure — and good furrow closure afterward.

### Air Seeders for Sunflower

Numerous sunflower growers — particularly larger-acreage ones in the central and western Dakotas and the High Plains — have used air seeders or



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*'I get more calls based on residue management . . .*

*Inadequate seed-to-soil contact is one of the biggest reasons for reduced stands.'*

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drills for a long time. While some have encountered problems, others have been quite satisfied with the results when using their units to seed this crop. Such growers like the more-equi-distant spacing of plants in all directions, the quicker plant canopy, the ability to combine in any direction — and, of course, the competitive yields they've been able to achieve.

Again, though, calibration is critical. Using the right seed roller for sunflower and then calibrating seed drop before heading out to the field are essential to a satisfactory stand. Most air seeder/drill manufacturers have developed recommended procedures for calibrating for sunflower — procedures typically outlined in the operator's manual.

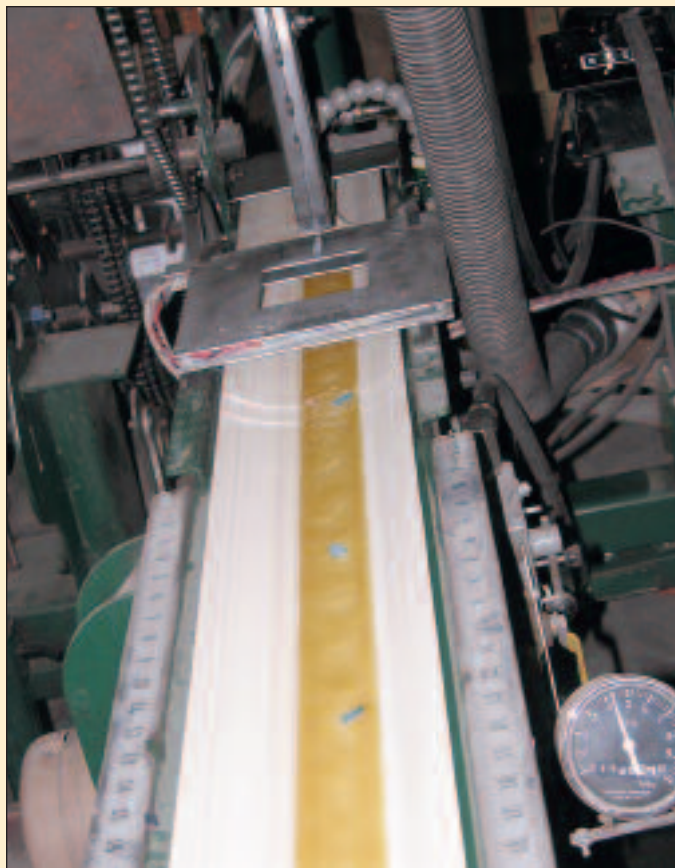
Given that these planting tools were originally developed for higher-volume crops like wheat or barley, sunflower does provide some challenges, however. "One of the biggest challenges with air seeders is getting the population down to where it needs to be," says Seeds 2000's Kevin Wall. "When planting a crop like wheat with probably 2.0 million seeds per acre, you can be off a little and still be fine. But with a crop like confection sunflower, where you're putting down only 15,- or 16,000 seeds, it's not very forgiving.

"Generally, with air seeders, I have more problems with people over-seeding," Wall continues. "If there's one word we have for growers who use them, it's **calibrate**. And if they still have any questions, calibrate again."

Bruce Due says it stands to reason that a planter that singulates seeds "is just going to do a nicer job" when it comes to leaving a consistently spaced sunflower stand. But, he adds, "I've seen some solid-seed design planters that work very well. I've seen some solid-seeded fields that were beautiful, with no more doubles than you'd have with a row planter. And I've seen others that you just shake your head and walk away from — not just triples or quads, but five or six seeds dumped in the same little spot.

"It's all about knowing your planter, calibrating it and having the right components to get the job done on sunflower." ■





# Putting Planters To the Test

## Nebraska Ag Engineer Evaluates Confection Seed Placement with Three Popular Units

The question caused Tom Jensen to grimace a bit as he steered his combine down the sunflower rows. Jensen's 2007 irrigated confection field was yielding well; but his chagrin sprang from the question about consistency of plant stands. The western Nebraska producer readily agreed that his stand wasn't as uniform as he'd like it to be — and that the problem ultimately traced back to the planting seeds' being so large and irregularly shaped, compared to the other crops for which he used his planter.

"There's nothing worse than planting large-seeded sunflower," Jensen affirmed with a wry smile. "I don't care what brand of planter you use. We've had different brands, and we've always had the same kinds of headaches: which planter plates to use, what air pressure setting, 'what this, what that.' There's a lot of room for improvement."

Jensen, who seeded his '07 crop with a John Deere MaxEmerge II, would like to see planter manufacturers place more research and development emphasis on confection sunflower. "Sometimes you just tear your hair out and think, 'I guess that's as good as we can do,'" he observed. "Sometimes you hit your mark; sometimes you don't. So you just do what you can — and go from there."

About 40 miles to the southwest of Jensen's Box Butte County farm, University of Nebraska-Scottsbluff ag engineer John Smith is generating research data that hopefully will help alleviate the problems faced by Jensen and other confection sunflower producers. Last fall, in a study funded by the National Sunflower Association, Smith conducted tests on metering units and their associated seed tube from a Case IH 1200 series flat-plate system, a John Deere MaxEmerge vacuum planter and a JD finger pickup series. He chose to test those three based on their wide usage for planting sunflower.

Smith focused on the main components of each unit that might be interchangeable, *e.g.*, plates, brushes, vacuum plates, fingers. He then zeroed in on the best option offered by the manufacturer for that particular unit.

Seed spacing was measured on the opto-electronic sensing test stand developed by Smith and his associates at the University of Nebraska. This unit can account for when the seed passes through the sensor system as well as where it passes through. It senses the seed below the seed tube at the depth of where the seed would contact the bottom of the seed furrow. Its grease belt also provides a visual evaluation opportunity.

Smith used 9" as the targeted in-row seed spacing, with 4.5 miles per hour being the standard ground speed. (He also evaluated seed drop at 3.0 and 6.0 mph.) Tested seed types included (1) a large, long/narrow confection variety, (2) a small confection variety and (3) a #2 oil-type variety. The larger confection seed length was commonly around 3/4" and sometimes closer to 7/8".

For both the Case and Deere vacuum planters, Smith examined sensitivity to vacuum as well as singulator sensitivity. He also evaluated seed drop with both a new and worn tube for each type of planter.

The tests incorporated four replications, with more than 300,000 seeds dropped over the course of the study. The table on the next page summarizes Smith's findings in terms of how accurately the various units placed the seeds.

Of the three parameters Smith used to describe seed spacing performance, two are defined by the International Standards Organization (ISO).

- The first, "ISO close spacing," refers to placement that is less than one-half the target spacing. In this case, that would be seeds spaced less than 4.5" apart (the target having been 9"). Most spacings in this category are actual "doubles" but also include very close spacings.

- The second, "ISO wide spacing," refers to seed placement greater than one and one-half times the target spacing — *i.e.*, 13.5 inches or greater in the UN study. This group would include mostly "skips" but also a few very long spacings.

- The third performance parameter was called "CP3." This indicates the percentage of seeds falling within  $\pm 0.5$ " of the target spacing (9" in this study). So the higher the percentage within this category, the better the spacing accuracy.

Smith's preliminary evaluation of the Case vacuum planter is that it performed very well with the long confection seeds. The best seed drop consistency with the long/narrow confection variety occurred when using plate #2440 with 26" of water vacuum, singulator setting #2 and a new tube. "At this optimum setting, ISO-close and ISO-wide spacings were below 2%, and the CP3 was above 55% — which is a very good singulation and spacing performance," the Nebraska ag engineer



John Smith

# 'Best Setting' Summary: '07 UN-Scottsbluff Confection Sunflower Planting Study

## Case IH 1200 Vacuum Series

### Large Confection (new seed tube) —

Plate Option: 2440  
 Vacuum (inches water): 26  
 Singulator Setting: #2  
 ISO Close (%): 2.4  
 ISO Wide (%): 1.6  
 CP3 (%): 57.6

### Small Confection (#1) —

Plate Option: 2440  
 Vacuum (inches water): 17  
 Singulator Setting: #1  
 ISO Close (%): 1.4  
 ISO Wide (%): 1.0  
 CP3 (%): 59.9

### #2 Oil-Type Seed —

Plate Option: 2440  
 Vacuum (inches water): 17  
 Singulator Setting: #2  
 ISO Close (%): 0.9  
 ISO Wide (%): 0.9  
 CP3 (%): 69.6

## Deere MaxEmerge Vacuum

### Large Confection (new seed tube) —

Plate Option: A52391  
 Vacuum (inches water): 12  
 Doubles Eliminator: 3/4 hole covered  
 ISO Close (%): 6.5  
 ISO Wide (%): 2.6  
 CP3 (%): 38.4

### Small Confection (#1) —

Plate Option: A52391  
 Vacuum (inches water): 5  
 Doubles Eliminator: 3/4 hole covered  
 ISO Close (%): 3.1  
 ISO Wide (%): 2.9  
 CP3 (%): 39.8

### #2 Oil-Type Seed —

Plate Option: A52391  
 Vacuum (inches water): 6  
 Doubles Eliminator: 3/4 hole covered  
 ISO Close (%): 2.5  
 ISO Wide (%): 1.5  
 CP3 (%): 47.9

## Deere Finger Pickup Series

### Large Confection (new seed tube) —

Finger Option: Deere Long  
 Backing Plate: Deere  
 Brush: Deere  
 ISO Close (%): 8.4  
 ISO Wide (%): 23.3  
 CP3 (%): 35.3

### Small Confection (#1) —

Finger Option: Deere Short  
 Backing Plate: Deere  
 Brush: Deere  
 ISO Close (%): 2.3  
 ISO Wide (%): 16.6  
 CP3 (%): 42.3

### #2 Oil-Type Seed —

Finger Option: Deere Long  
 Backing Plate: Deere  
 Brush: Deere  
 ISO Close (%): 9.1  
 ISO Wide (%): 1.5  
 CP3 (%): 59.6

*ISO Close % equates to "doubles"; ISO Wide % equates to "skips". The higher the CP3 %, the better the spacing accuracy.*

indicates. Optimum vacuum pressure with the smaller confection variety and the #2 oil-type was 17" (The singulator setting for small confection was #1 and for the #2 oil-type it was #2). The CP3 rating for the small confection was nearly 60%; for the #2 oil-type, almost 70%. "One thing to look for when planting sunflower with the Case IH model 1200 planter is

seed fragments sticking in the seed plate hole," Smith says. "The sunflower plates for this planter have 24 holes. If one hole plugs, seed population will be reduced by 4%. Watch the seed population on your planter monitor very carefully. If you have one row that is about 4% (or a multiple of 4) less seed population than the other rows, remove the plate and check for a plugged hole — it does happen and will cause skips."

With the Deere vacuum planter and large, narrow confection variety, the best results were with "flat plate" #A52391, with the doubles eliminator set with 3/4 of the hole covered and 12" of water vacuum. "At this best setting, ISO close spacings were about 6%, ISO wide spacings were about 3% and the CP3 was about 35%," Smith says. "This is not as good as the Case planter, but it's probably acceptable, considering the difficulty of singulating this particular seed." Smith says adjusting the doubles eliminator and vacuum "could reduce the percentage of either wide spacings or narrow spacings — but only at the expense of increasing the percentage of the other."

The same flat plate proved the best option for the small confection variety and #2 oil-type as well. Top performance with the JD vacuum unit for these two seed types was attained with 3/4 of the hole covered and vacuum settings of 5" and 6", respectively. The CP3 rating for the small confection was just under 40%, while it was about 48% for the #2 oil.

For Deere planter owners not familiar with the "flat plate" system, "the doubles eliminator must be in place and must be carefully adjusted," Smith notes. "This adjustment may need to be changed if the planter field speed is very slow or very fast." Several "cell-type" plates — including those for corn and peanuts — were evaluated; but none were even close to acceptable, according to Smith. The Precision Planting "eSet" option for the Deere vacuum planter did improve seed spacing performance over the Deere plate options. (The eSet kit includes a new plate, a brush and singulator.) "We did not test the eSet to the extent I would necessarily recommend it," Smith says, "but the eSet kit with plate 7200034 was better than the best Deere option we tried."

The most serious problem the Scottsbluff researchers found with the Deere vacuum unit and the long, narrow confection

## The Good ... The Bad ...

*These photos provide a visual summary of the findings of the confection sunflower planting accuracy study conducted in the fall of 2007 at the University of Nebraska-Scottsbluff.*

*The photo at left shows excellent seed placement on the test stand's grease belt, while the photo below depicts a different story with its obvious trail of skips and doubles.*





sunflower was that of an occasional seed sticking in the tube. It happened about once in every 5,000 seeds; but when it did, it resulted in very inconsistent placement from that point onward. While the seed tube did not plug, each ensuing seed would hit the lodged seed, leading to a very inconsistent spacing. "The bad part is that the planter monitor will not sense the stuck seed, so the operator will never know," Smith points out. He does not know how often this actually happens in the field, but assumes if it happened that often on his test stand, it must happen at least occasionally in the field.

The Scottsbluff group used the curved corn seed tube — the largest available from Deere. So the only solution (until Deere develops a different tube for the long confection sunflower seeds) is for the operator to occasionally stop, remove the tubes and check to make sure there are no stuck seeds — a practice which, in reality, is not very practical.

Another issue — but far less serious than the stuck seed, in Smith's opinion — is that of worn seed tubes. "A worn seed tube — one that feels like used sandpaper on the inside front surface that contacts the seed — will deliver the correct number of seeds; but seed spacing accuracy is not as good as that with a new seed tube," he notes.

Tests on the John Deere finger pickup planter indicated excessive skips with the long/narrow confection seeds. "The best Deere configuration was with the long fingers," Smith says. "But with the large, narrow confection seed, we had approximately 8% close spacings (doubles) and 23% long spacings (skips)."

The best results for the smaller confection variety with the finger pickup unit occurred with the Deere short fingers (42.3% in CP3); for the #2 oil-type variety it was the Deere long finger (nearly

*Below: A long confection seed stuck in the tube during the JD MaxEmerge test.*



*Compared to the teardrop-shaped back plate, the large-seed exit hole plate results in significantly fewer skips with the JD finger pickup unit.*

60% in CP3). The Deere backing plate and brushes were used in both instances.

Illinois-based Precision Planting offers several optional parts for the finger pickup assembly. "These components reduce the numbers of both close and wide spacings; but we still exceeded 10% skips with the best combination we tested," Smith reports.

The size of the seed exit hole in the back plate can make a difference in the number of skips. "We compared two Kinze backing plates and found that the smaller hole (designed for corn) had 36% skips," Smith observes. "The larger hole (original size and shape for both Deere and Kinze) had 15% skips."

Since the Deere finger pickup planter uses the same or similar seed tube as the vacuum planter, the Scottsbluff investigators again encountered the problem with single seeds sticking crossways in the seed tube — which resulted in "an almost-random seed spacing pattern."

One of Smith's concerns about planting these large, narrow confection sunflower seeds is: how does the planter operator accomplish the correct planter adjustments like vacuum or singulator settings? And, how does the operator know the planter is delivering seed properly while planting? The operator can probably trust the planter monitor in the field to provide accurate seed population measurement. But most monitors provide only an average population or seed spacing, without any information on the variability of individual seed spacings.

For example, if all seeds were spaced at exactly 9", the monitor would indicate 9" seed spacing. But if the seed spacing pattern was 1"-17"-1"-17"-1"-17", etc. (one double, then one skip), the monitor would indicate the average spacing is 9". So the seed *population* would be correct, but seed *spacing* would be unacceptable.

Smith suggests using a planter monitor that does provide information on seed spacing variability (one example being Precision Planting's planter monitor) — or, use the combination of a standard planter monitor and frequent checking of seed spacing in the furrow behind the planter. If a producer is starting with an unfamiliar planter or a different seed size or shape, it is a good idea to have that seed run in his particular planter meter on a good planter test stand. ■

## Useful Planting-Related Web Sites

There are a number of useful web sites with information and contacts relating to the planting of sunflower and other crops. Some are obvious; others less so. Here's a partial list.

### — Planter Manufacturers —

- **Case IH:** [www.caseih.com](http://www.caseih.com) — Go to "Products," then "Planting & Seeding Equipment" for full descriptions of the Case product line, including the 1200 Series ASM planters.

- **John Deere:** [www.johndeere.com](http://www.johndeere.com) and [www.readytoplant.com](http://www.readytoplant.com) — The Deere "Ready to Plant" site is an excellent educational resource, including details on planter maintenance, operation and troubleshooting tips.

- **Kinze Manufacturing, Inc.:** [www.kinze.com](http://www.kinze.com) — Go to "Planters," then "Seed Metering," then "Finger Pickup Seed Meter" for commentary on singulating seeds for sunflower.

- **Monosem:** [www.monosemplt.com](http://www.monosemplt.com) — Monosem manufactures the NG Plus line of precision vacuum planters.

- **White:** [www.whiteplanter.agco-corp.com](http://www.whiteplanter.agco-corp.com) — Go to "Seeding & Tillage" for complete details on the White line of planters and air drills.

### Air Seeder / — Drill Manufacturers —

- **Bourgault Industries** — [www.bourgault.com](http://www.bourgault.com)

- **Case IH** — [www.caseih.com](http://www.caseih.com)

- **Flexi-Coil** — [www.flexicoil.com](http://www.flexicoil.com)

- **Great Plains Mfg.** — [www.greatplainsmfg.com](http://www.greatplainsmfg.com)

- **Horsch Anderson** — [www.horschanderson.com](http://www.horschanderson.com)

- **John Deere** — [www.johndeere.com](http://www.johndeere.com)

- **Morris Industries** — [www.morris-industries.com](http://www.morris-industries.com)

### — Other —

- **Precision Planting:** [www.precisionplanting.com](http://www.precisionplanting.com) — This Illinois-based company offers the MeterMax Plus calibration system, the eSet vacuum disks, Keeton seed firmers, Bullseye seed tubes and other products and educational services geared toward optimizing the preci-

sion placement of crop seeds.

- **Pioneer Hi-Bred International:** [www.pioneer.com](http://www.pioneer.com) — The seed company's "GrowingPoint" website contains a wealth of information on numerous aspects of crop production.

- **Colorado State University:** [www.ext.colostate.edu/pubs/crops/pubcrop.html](http://www.ext.colostate.edu/pubs/crops/pubcrop.html) — Site lists a "Planting Guide for Field Crops" that includes sunflower.

- **Kansas State University:** <http://www.oznet.ksu.edu/library/crpsl2/MF2384.pdf> — You can download a pdf of the *High Plains Sunflower Production Handbook* from this address.

- **North Dakota State University:** [www.ag.ndsu.edu/pubs/machine.html](http://www.ag.ndsu.edu/pubs/machine.html) — This site has a bulletin titled "Calibrating Drill Seed Meters" (AE-1144). Though produced 10 years ago, it still contains useful recommendations for seeding a variety of crops.

- **South Dakota State University:** <http://plantsci.sdstate.edu/precision-farm/paper/papers/SSMG/SSMG-37.pdf> — While not speaking to sunflower, the bulletin "Estimating Corn Yield Losses from Unevenly Spaced Planting" is a good introduction to the value of collecting and interpreting yield loss information. ■

## Updated Planter Performance Info

The February 2009 issue of *The Sunflower* magazine contains new information on University of Nebraska-Scottsbluff ag engineer John Smith's work with planter performance and sunflower seed spacing accuracy.

- "Putting Planters to the Test" — This article reports on Smith's 2008 tests with *oil-type* sunflower seed spacing accuracy. Three planters were evaluated: the Case IH 1200 vacuum series, the Deere MaxEmerge vacuum planter and the Deere finger pickup planter.
- "Planter Performance & Confection Sunflower" — This article discusses solutions for the problems found in the 2007 testing described on the preceding pages 5-7.

To view these articles online, go to [www.sunflowernsa.com](http://www.sunflowernsa.com). Click on "Sunflower Magazine."

# 'The Most Important Thing You Can Do'

## N.E. North Dakota Grower Discovers Way to Slash Doubles

Being a sugarbeet producer, Tim Schumacher is very familiar with planter test stands. For years, the Thompson, N.D., farmer has regularly hauled units from his beet planter to a site where the North Dakota State University-run sugarbeet test stand is operating. There, the units are thoroughly evaluated for worn parts and other potential performance issues.

But Schumacher was in store for a big surprise when, last winter, he checked out the 16-row John Deere 1780 MaxEmerge that he uses for corn, sunflower and dry beans. He brought its metering units down to Oppegard, Inc., of nearby Hillsboro — a dealer for Illinois-based Precision Planting, Inc. Oppegard's Randy Klassen mounted the units on the MeterMax Plus® test stand, filled the meter with the exact lot of sunflower hybrid that Schumacher planned to plant, and turned on the switch. The calibration system's photoelectric "eyes" detected seeds on a 50-cell gated belt, counting the number of empty cells (skips) and the number of times two or more seeds were picked up (doubles or triples).

The result for Schumacher's units? "Though we already had doubles eliminators in the planter, we found we were running about 25% doubles," he reports — still rather amazed nearly a year later. After switching to a recommended eSet® corn disk developed by Precision Planting, Schumacher says his doubles dropped down to between 1 and 2%.

"We'd never had a problem before in getting the right seed drop per acre," he notes. "Vacuum planters are known for their accuracy in that. The problem was in where we placed the seeds."

According to Precision Planting's web site, the company's eSet disk offers four key advantages over a standard vacuum disk:

- It singulates any seed size or shape. There's no pocket or cell, which means the disk is not seed sensitive.
- It improves seed release. The raised platform means seeds release down the center of the seed tube, thus minimizing seed tube ricochet.
- No adjustments. Singulation of

98.5%+ is achieved on almost every seed type without adjusting vacuum or double eliminators.

- Better seed agitation. Seed treatments can inhibit singulation because seeds pack together at the bottom of the meter. The eSet has aggressive seed agitation that keeps the seed pool fluid for better loading.

Count Tim Schumacher among the believers. He ordered a set of the disks recommended for the size sunflower seed (oil-type) he was planting last spring. "We could really see the difference in the fields this [past] year," he



Tim Schumacher

states. "The stands were so even."

While the planter update was not cheap, Schumacher considers it an excellent investment.

"With the price of seed and

importance of proper plant spacing — even more so with corn — we just felt it was something we had to do," he says. "When we saw on the [test stand] that we were throwing 25% doubles and were able to get it down to around 1 or 2%, well, that really opens your eyes."

Oppegard's Klassen says that while the eSet disks were not designed specifically for sunflower, "they do work. It improves the accuracy by far over what we were doing before." The disk has an automatic doubles eliminator, meaning it doesn't have to be physically adjusted for different seed sizes — "unless you have a big seed size change. Then it comes down to basically swapping the seed disk out to a different one — and back to the field you go."

"In today's environment, with everything being so expensive, planter calibration is really important," stresses Tim Schumacher. "If you don't plant right, the season is not going to turn out right. The most important thing you can do is spend more time with your planter." ■



# Confection Planting Guide & Troubleshooting Tips

## Seed Company's Set of Recommendations

What's the most important information source available for avoiding or rectifying problems associated with planting sunflower? It's a tool every grower has — but one that some may not utilize as often as they should: your planter operator's manual.

While some planter manuals are more "sunflower friendly" than others, all of them provide some information on metering systems, calibration procedures, depth control, planting speed, troubleshooting tips and the like. If you don't find the answers in the manual, a call or trip to your dealer is in order.

Beyond that, several sunflower seed companies have web sites with useful seed selection and planting recommendations. A few even have developed — or are presently developing — booklets that provide specific advice on equipping and calibrating planters for top performance when seeding sunflower.

One of those is Seeds 2000, which makes available to its customers a general sunflower planting guide, as well as one that focuses specifically on planter recommendations for the large "new-generation" confection varieties.

"For many years, confection sunflower has been a challenge to plant with certain planters," the Breckenridge, Minn.-based company notes. "As the industry moves to the new generation of even longer and larger seed, planting has become even more challenging."

The following confection planting recommendations were compiled by

Seeds 2000 from an variety of sources, including grower and dealer experiences, planter test stand results, and manufacturers' recommendations.

### — John Deere Vacuum —

- Recommended Disk — large sweet corn (ProMax 40, #A52391)
- Other Disk — small sweet corn (#A52390)
- Vacuum Setting — 8 to 12" water pressure
- Doubles Eliminator — #A61046
- Knockout Assembly — #A37348

*Editor's Comment: Deere itself recommends using the A52391 disk for seed lots that range from 2,250 to 3,250 seeds per pound, and the A52390 for seed lots ranging from 3,250 to 5,250 seeds per pound. Both are flat disks to aid with the pickup of the odd-shaped sunflower seeds. For other seed sizes, Deere offers the 30-cell sunflower disk #H136478.*

### • Troubleshooting —

*Problem:* Can't set planting rate low enough for target population

*Solution:* Plug every other hole with silicone; then set planter at 2x the target rate in manual to compensate.

*Problem:* Monitor reads sporadically.

*Solution:* Mix talc slightly above manufacturer recommendation of one-half cup per bushel. If seed is treated with Cruiser, double manufacturer recommendation to 1 to 2 cups per bushel.

*Problem:* Seed plugging in tubes.

*Solution:* Switch to large curved seed tube #A56786.

### — Deere Center Fill (CCS) —

• Same recommendations (including talc) as for the Deere vacuum planter.

### • Troubleshooting —

*Problem:* Seed is plugged in hopper's seed delivery hose end.

*Solution:* Reduce tank pressure, set at lighter density seed setting. Use hose end #A81580; cut hose end at 45°, with deepest cut starting at fill side of the end.

### — Kinze or Deere Finger Pickup —

• Use large fingers. If planter setting cannot be set low enough, some growers take worn-out fingers, cut 0.5 to 1" off the pickup end of every other finger, and then set the planter at 2x the desired rate to compensate.

• Mix talc with seed at 1/2 to 1 cup per bushel. Use 1 to 2 cups if seed is treated with Cruiser.

*Editor's Comment: Deere recommends using sunflower finger #A37177 for oil sunflower seed sizes 3, 4 and 5.*

### • Troubleshooting —

*Problem:* New planter or updated units are under-planting or planting sporadically.

*Solution:* New teardrop-style metering cradle (backing plate) will not plant seeds consistently, kicking seeds out because the opening is too small. Use Kinze part #GR0664 (also works on JD units) or the old-style JD metering cradle. Part #GR0664 is more rectangular and will plant with 80-90% accuracy.

*Problem:* Seed tube plugging.

*Solution:* Use large curved seed tube — #A26184.

### — White / Air Delivery —

• Recommended Disk — large corn (#852434) or medium corn (#852435)

• Air Setting — #2

• Tickler Brush — Set down 1/4 turn so just two of the four brushes touch.

### — Case IH / 1200 Vacuum —

• Recommended Disk — large corn (#275116A)

• Vacuum — 20-22" water pressure

• Baffle Setting — 2

• Singulator Level ("old", lever) — 0.75

• Singulator Level ("new", dial) — 3

• Mix graphite (seed flow lubricant) at 1/8 to 1/4 cup per bushel. Use 1/4 to 1/2 cup if seed is treated with Cruiser.

### — Case IH / Cyclo Air —

Seeds 2000 does not recommend the use of the Cyclo for planting confection sunflower.

### — Air Seeders / Drills —

Follow manufacturer guidelines. Varies by brand. ■



# Planting Sunflower With An Air Seeder

## Manufacturer's Advice on How To Achieve Optimum Results

**Editor's Note:** *Using air seeders or air drill systems to plant sunflower is far from new. Some growers did so back in the early to mid-1980s, and it's now quite common in certain growing areas. In the 2006 National Sunflower Association crop survey, for instance, nearly half of surveyed fields in North Dakota were in row spacings of less than 20" — suggesting they were planted with an air seeder or air drill.*

*Saskatchewan-based Bourgault Industries is one of several manufacturers whose air seeders and drills are used to plant sunflower. In the following remarks, Ron Allan, general manager of Bourgault's Minot, N.D.-based U.S. division, addresses several questions posed by The Sunflower.*

### **What special challenges are posed by sunflower seeds, due to their irregular shape and the low seeding volume?**

The Bourgault air seeder uses one metering auger per tank to meter product. The rate of application is determined by the speed the auger turns. These augers are designed with a large capacity to handle very large seeds and/or high rates. Sunflower seeds pose no issue at all. The metering auger is simply slowed to a speed that delivers the correct rate.

### **Years ago we used to hear about seed depth placement inconsistencies when using an air seeder for sunflower. How has that been addressed with the newer models?**

Many of the new toolbars designed to be used with air tanks have much-improved contourability. Design features ranging from floating hitches to independent depth control openers follow the surface of the field much closer than early converted tillage units.



### **Some folks suggest sunflower seed-to-soil contact and depth control are not adequate when using the wider sweeps (8" or more). What are your thoughts on that assessment?**

The seed-to-soil contact challenges experienced when using wide sweeps were more a result of insufficient packing as opposed to poor seed placement. In this type of system we often used coil packers or rolling baskets to firm the soil that had been tilled during the seeding operation.

What we have seen changed is most sunflower is now sown with a much narrower tip where on-row packing can be achieved. This has increased seed-to-soil contact and improved emergence significantly — especially in dry conditions.

### **How do you recommend that growers calibrate their Bourgault units for planting sunflower — i.e., the process prior to heading to the field?**

All our seeding units are equipped with charts that instruct the operator on where to set the unit for the desired seed rate. Once the initial setting is complete, we then utilize our powered stationary calibration system where the metering system is turned via a hydraulic motor until the sample box is filled. (This is all standard equipment.)

Once the box is filled, the sample is weighed and the weight entered into the air seeder monitor. The monitor then calculates the actual application rate. If the application rate is correct, the seeding operation begins. If the rate is not correct, the operator begins the seeding operation and adjusts the rate from the tractor cab.

### **Are there additional steps growers should take to achieve the best possible seed placement and a uniform plant stand?**

Proper fan speed is very important. Because the seed rate is typically lower with sunflower than many other crops, the operator must ensure he adjusts the fan speed accordingly. Too high a fan speed can affect seed placement.

Seeding on a 20" row spacing is another option we have seen many of our customers use when seeding sunflower with our units. Again, fan speed is an important setting.

Seeding speed is also an important consideration. As soil types and conditions vary, so should ground speeds. With narrow-row spacing, soil can "step" from one row to the other, leaving more soil covering the rows seeded by the drill's front row. Maintaining an even amount of soil over each row will contribute to even emergence.

### **Any other comments pertaining to the use of your units to plant sunflower?**

With the ability to direct seed into standing stubble, we often find our units seeding sunflower directly into many different types of residue with low-disturbance openers. We've also seen many different crops seeded into sunflower stalks with our drills. ■



# Protect Stands From Early Season Bugs

## Three Insects That Can Have An Up-Front Impact

Life is good. You selected a high-yielding sunflower hybrid with strong resistance to key diseases, your planter was calibrated to perfection, seedbed conditions were excellent, and seed placement consistency was the best it's ever been. The foundation has been laid for a superb sunflower crop.

But there could be one cloud hanging over this otherwise giddy scenario: bugs. Serious infestations of certain early season insects can poke holes in that otherwise-stellar plant stand and ultimately take a chunk out of your final yield. So well before you head out to the field, it'll "pay to pay" some attention to those potential early season threats. Here are brief descriptions of three key culprits.

### — Wireworm —

Wireworm larvae and adults overwinter anywhere from nine to 24 inches deep in the soil. At about the same time that planting gets under way (soil temperatures of 50-55°F), the larvae and adults move toward the soil surface. After mating, adult females burrow down to lay their eggs — sometimes re-emerging, moving to other sites and laying more eggs.

Wireworm larvae feed at around a 6" depth in the early spring, moving deeper as the topsoil warms up and/or becomes dry.

Field history is the best indicator of whether wireworm problems can be expected in a given year, though considerable population variation can occur between years, both within and between fields. The only insecticide currently labeled for wireworm is the seed treatment Cruiser. Since it is a seed treatment product, the decision whether to include Cruiser must be

made at the time of hybrid selection.

Recently, FMC received a label amendment for Mustang Max® to control wireworm and other early season insects with an at planting in-furrow treatment.

*One point:* Seeds treated with the earlier Cruiser formulation sometimes would sometimes stick to seed plates, creating seed flow problems and hurting seed placement consistency. The new CruiserMaxx is significantly better in that regard; also, some seed companies now use special polymers to minimize the problem even more.

### — Cutworm —

There are three species of cutworm: the darksided, the redbacked and the dingy cutworm. The female darksided and redbacked cutworm moths deposit eggs in midsummer, with the eggs staying dormant until the onset of warm weather the following spring. Larvae emerge from late May to early June.

The adult dingy cutworm emerges anywhere from August to mid-October in the Northern Plains, with peak emergence in September. Eggs are deposited in plants of the Compositae family (e.g., sunflower) in the fall, and the larvae eventually overwinter in the soil.

Cutworm damage in sunflower fields typically consists of plants being cut off from 1" below the soil surface to 1 to 2" above the surface. Young leaves may be severely chewed as well, due to cutworms climbing up to feed on plant foliage.

Most feeding occurs at night. During the day, the cutworms reside just beneath the soil surface under recently damaged plants. Scouting for cutworms should start as soon as plants emerge, with monitoring continuing at

least twice weekly until around mid-June. North Dakota State University says the sampling should encompass 100 plants at each of five sites within the field. The economic threshold is one larva per square foot, or a stand reduction of 25 to 30%. (Kansas State University recommends treatment if cutworm feeding has caused a stand loss of more than 15%.)

Several insecticides are labeled for cutworm control in sunflower, including Asana XL, Baythroid XL, Lorsban 4E and 15G, Sevin, Mustang Max and Warrior. Except for Sevin, all are restricted use pesticides.

### — Sunflower Beetle —

Though quite similar in appearance to the adult Colorado potato beetle, the sunflower beetle is a separate species associated exclusively with sunflower. It is more common in the Northern Plains than in the High Plains.

Adult beetles overwinter in the soil, emerging in late May to early June. They'll start feeding on sunflower plants immediately following emergence. Damage can be very pronounced on the first true leaves (sometimes completely consumed), and fields can be severely defoliated if beetle populations are high enough. The adults feed mainly on leaf margins, while sunflower beetle larvae munch on the entire leaf surface. Most larval feeding occurs at night, while the adults feed during the day.

NDSU recommends counting beetles on 20 plants at each of five sampling sites in an X pattern. Sampling sites should be at least 75 to 100 feet from field margins. The larger the plant, the more damage it can tolerate. In the seedling stage, the recommended economic threshold is one to two adults per seedling. With beetle larvae, treatment is recommended when the population reaches 10 to 15 per plant, or when about 25% defoliation occurs on the upper eight to 12 leaves.

The sunflower beetle can be effectively controlled with insecticides such as Asana XL, Baythroid XL, Furadan 4F, Lorsban 4E, Mustang Max and Warrior — all of restricted-use pesticides. ■

**Wireworm Larva**



**Darksided Cutworm Larva**



**Adult Sunflower Beetle**





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- More herbicides to control both broadleaf and grassy weeds, including two post-emerge herbicides for most broadleaf weeds.
- New seed treatments for wireworm, flea beetle and downy mildew.
- Improved hybrids with good standability, disease tolerance and yield.
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- Strong domestic markets for sunflower oil and confections.
- High oil content hybrid choices for maximum oil premiums.
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- Increasing local delivery points.

*This message brought to you by the National Sunflower Association, which combines grower checkoffs in Kansas, Colorado, South Dakota and North Dakota, along with industry checkoffs from oil and confection processors and hybrid seed companies.*