

CARINATA GROWER MANUAL

2024

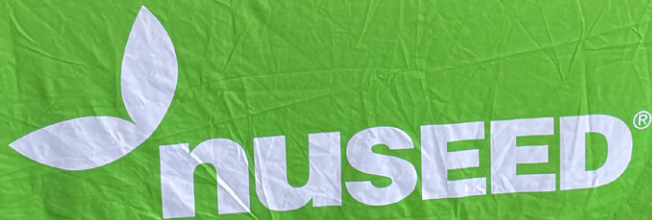




EMPOWERING GROWERS THROUGH KNOWLEDGE SHARING

When you sign a contract for Nuseed Carinata, you're signing up for local support throughout the entire season, from seed delivery to harvest and beyond.

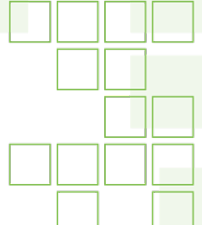
Our field team and agents are here to guide you every step of the way, offering expertise and insights tailored not only to your carinata crop but also on each carinata field's conditions and how they align with your farm's year-round crop plan.



BRINGING TOGETHER EXPERTISE AND RESEARCH TO HELP YOU GROW WITH US.



Nuseed is inviting growers to learn more about growing Nuseed Carinata as a cover crop. Discussions at Nuseed Carinata University will include crop performance, agronomic research, planting and harvesting for Nuseed Carinata. **New sessions to be announced - watch your email for registration details.**





CARINATA GROWER MANUAL

02 SEEDING

- Land Preparation
- Depth
- Soil Temperature
- Land Choice
- Seed to Soil Contact
- Seeding Rate
- Nutrient Management
- Frost Impacts

04 PEST MANAGEMENT

- Flea Beetles
- Thrips and Aphids

05 WEED MANAGEMENT

- Pre-Emergent
- In-Crop

06 DISEASE MANAGEMENT

- Pythium, Rhizoctonia, Fusarium, etc
- Sclerotinia Stem Rot

07 PROHIBITED CHEMICALS

09 HARVESTING

- Pre-Harvest Applications
- Harvest Aid Herbicide Use
- Combine Settings
- Delivery, Grading, and Settlements



Nuseed® is a registered trademark of Nufarm Limited.

SEEDING

Land Preparation

Carinata can be grown in no-till or following conventional tillage systems. Avoid excessive tillage in the fall or spring to prevent the seedbed from drying out because seed must be placed in moist soil, which is critical for rapid emergence.

Carinata seeded into standing stubble tends to have higher yield potential but residue should be spread evenly to ensure even emergence of seedlings.

Soil Sampling

Soil sampling should be performed each season prior to planting carinata. A benchmark sampling strategy is recommended by establishing GPS sampling points to be used each season in order to track differences in nutrient levels in fields from year to year. If this is not possible a random sampling technique can be applied. Two sampling depths are recommended -- a 6-12" sample and a 12"-24" sample. This improves the accuracy of Nitrogen determination in the lower levels where carinata is able to forage for nitrogen. Traditional laboratory soil analysis packages are generally sufficient. At minimum data for N, P, K and S as well as Organic Matter % should be available.

Optimum Practice:

Seeding depth should be between 1/4" and 3/4".

Depth

Good depth control is important. The optimum seeding depth for carinata is 1/4 to 3/4 inch, and should not exceed an inch. Always try to seed carinata at a depth that allows immediate contact to moisture. Seeding at a uniform depth is critical for crop management through to harvest.

Soil to seed contact is necessary. Cultipacking of the soil is recommended during seeding.

Soil Temperature

The minimum soil temperature for seed germination is 38 F. However best results are achieved when soils are at a minimum of 45 F at the time of seeding.

Land Choice

Residual concerns

Herbicide carryover from previous crops can injure new carinata seedlings. These herbicides include sulfonylurea, imidazolinone, triazine and PPO classes of herbicides. Always refer to the herbicide label information pertaining to crop rotation restrictions following their use.

Key Products of Concern: Cadre (imazapic)

Seeding Rate

Nuseed recommends a seeding rate of between 3-5 pounds per acre based on the type of planter used and row spacing applied. When planting with broadcast, drill, or air seeder equipment target a rate of 5 lbs/ac. If planting with vacuum or singulation planters the seeding target should be approximately 3-3.5 lbs/ac. A target of between 8-12 seedlings per square foot should result in a target adult population of 5 to 10 plants per square foot.

Nutrient Management

Fertilize for Success

Always start with a soil sample. Nuseed Carinata responds very well to organic fertilizers such as poultry litter and other types manure. Applied synthetic nitrogen should not exceed 80 lbs/Ac of actual N. Target a maximum combined total of 105 lbs/ac actual N that is available in the field from all sources of nitrogen including synthetic nitrogen, manure, and mineralization of organic matter to ensure their best economic results.

IMPORTANT:

Obtain a nutrient analysis of all manure used as a source of nutrients to identify those nutrients that may be needed for a successful carinata production.

Nitrogen

Nitrogen fertilizer recommended as per soil test requirement to a maximum of 80 lbs/ac synthetic N.

Phosphorus

Phosphorus is recommended at 15-20 lbs of P per acre depending on soil testing requirements. Phosphorous (MAP) and can safely be placed with the carinata seed and will improve emergence and cold tolerance of the seedlings.

Potassium

Fields with greater than 300 lbs/ac potassium in the soil generally do not require potassium fertilization. If soil levels are below this potassium fertilization can be beneficial.

Sulfur

Sulfur is necessary for carinata production. Due to the immobile nature of sulfur in soil, soil testing can be inaccurate. Regardless of soil testing results 15-25 lbs/ac of actual sulfur is recommended to be included at planting. Sulphur should not be placed with the seed, it should be banded to the side or below the seed row. The ratio between Nitrogen availability and sulfur fertilization should be maintained at ~ 4:1. In sure 1 unit of sulfur is available for every 4 units of nitrogen available.

Frost Impacts

Cotyledon to 6-leaf stage

Monitor crops after potential frost events. Carinata seedlings and young plants can survive temperatures down to 22° F for short (2-4 hours) periods as long as morning temperatures rise significantly or if the plants have been acclimated, or "hardened off", by previous temperatures below freezing. Look for damage to the growing point after frost events. Plants will require several days to recover after a frost and can survive despite looking severely injured in the days immediately after frost. Survival evaluations should be completed 10-14 days after the frost event. Look for new green growth occurring at the growing point.

Flowering to pod development stage

Exposure to a freeze during flowering can lead to yield reductions. The extent of damage inflicted by freeze on carinata is influenced by its stage of maturity. Typically, an immature seed containing 50 to 60 percent moisture can be killed by a frost of 27°F. Those that are close to 35 percent moisture or less will normally escape damage.

PEST MANAGEMENT

Crucifer Flea Beetle (*Phyllotreta cruciferae*), Striped Flea Beetle (*Phyllotreta striolata*).

Seed treatments will protect carinata seedlings for establishment for up to 3 weeks after planting under normal growing conditions. Growers should scout their carinata until the 4-leaf stage to ensure there is not abnormally high populations of flea beetles that could impact populations of plants.

Under high pressure or slow carinata growing conditions an application of insecticide may be necessary. If greater than 25% of the leaf surface area has been eaten away and flea beetles are actively feeding, growers should consider an application of a synthetic pyrethroid.

At harvest time sometimes second generations of flea beetles can emerge during carinata podding and harvest. While annoying, these populations do not warrant an application of insecticide as economic damage is rarely seen.



Thrips & Aphids

Carinata is in the same family as canola, other mustards, and cabbage, so it is expected to share similar insect pests. Potential pests may include thrips and aphids.

The recommendation is sampling of the crop, by plant inspection to detect initial infestation of pests. The application of insecticides registered for carinata may be warranted.



Diamondback Moth Larvae (DBML)

Thresholds for diamondback moth larvae are 10-15 larvae per square foot for crops up until flowering. For fields at the flowering stage or later, the economic threshold to spray rises to 20-30 per square foot. To scout for DBML, pull out all plants within one square foot and bang them on a flat surface to count the larvae. Economic thresholds to spray most often occur while the crop is in podding stage.

WEED MANAGEMENT

Pre-Emergent

Carinata is an aggressive crop and will outcompete many winter weeds. However pre-plant burndown and pre-emergent herbicides are best to control early season weed pressures. It's important to note these applications must be done at least 7 days before planting.

Sonalan or Treflan

Must be applied prior to seeding. Incorporation is a must and moisture is required for effectiveness.

Pre-Seed Burndown

Application of a glyphosate herbicide along with a contact herbicide with no residual properties such as carfentrazone is recommended.

In-Crop

Herbicide applications in crop can generally be made from 1-2 leaf stage up to the first bolting. Follow all crop staging and use rate restrictions for application on the herbicide label. Target application to eliminate the majority of weed pressure as opposed to crop staging.

Options including:

Clethodim to help control grassy weeds.

Clopyralid for dandelion and thistles

Note: For any application always read and follow manufacturer label instructions before use.

IMPORTANT:

Contact your consultant, dealer, or local extension service for help prior to applying any pesticides if there is any uncertainty with rates and timing.

DISEASE MANAGEMENT

Pythium, Rhizoctonia, Fusarium, etc

This disease complex affects plant stand establishment and is managed by seed treatments. Once the carinata plant is established, little to no economic impact is seen from these diseases.

Sclerotinia Stem Rot or White Mold

After plant establishment, sclerotinia has the highest potential to negatively impact yield of any disease. Simply put, if there are the following combinations of these conditions growers should consider a preventative application of fungicide:

- **Environment:** Humid to wet conditions in the crop canopy in the morning. Continued rain and humidity is expected.
- **Canopy:** Heavy plant stand creating a humid micro-climate within the canopy. A heavy canopy is an indication of significant yield potential.
- **Disease Presence:** White mold susceptible crops have been grown on the land in the previous 5-7 years. White mold susceptible crops include: soybeans, peanuts, cotton and sunflower.

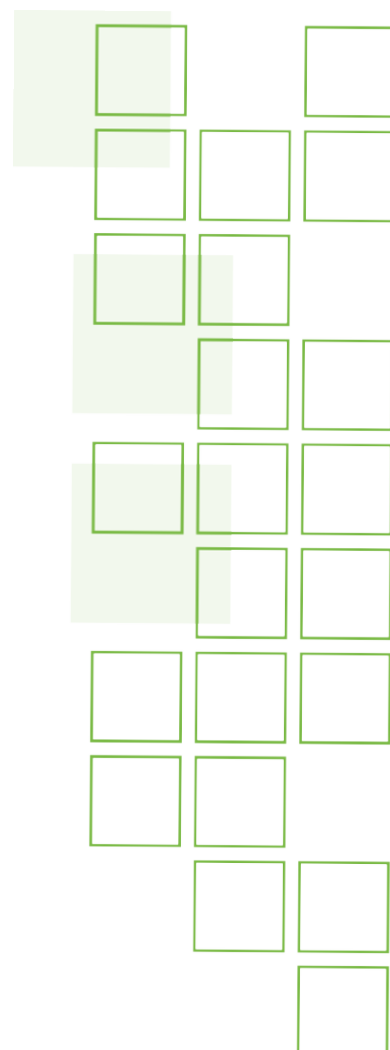
If these conditions are observed growers should consider a fungicide application of a registered product. All fungicides should be applied between the 20-50% bloom stage (when the field is most yellow). Follow label instructions for best results but focus on coverage of the most amount of flower petals as possible.



PROHIBITED CHEMICALS

The below-mentioned chemicals have been prohibited for field application within the Nuseed Carinata program. Should you have any inquiries regarding the application of any chemicals, please reach out to your local Nuseed representative for further guidance and assistance

Active Ingredient	Trade Name
Abamectin	Agri-Mek
	Abamex
Aldicarb	Meymik 15G
Cyfluthrin /Beta-Cyfluthrin	Baythroid XL
	Sultrus/Sultrus HAE
	Leverage 360
Dicrotophos	Bidrin XP II
	Bidrin 8
	Dicromax 8
Methomyl	Lannate LV
	Lannate SP
	Corrida 29 WSP Insecticide
	Corrida 90 WSP Insecticide
Oxamyl/Thioxamyl	Vydate L Insecticide/Nematicide
	Vydate C-LV Insecticide/Nematicide
	Vy-King 42
Phorate/Timet	Timet 20-G
Zeta-cypermethrin	Mustang Maxx
	Gladiator
	Triple Crown



CARINATA HARVEST



PRE-HARVEST APPLICATIONS

Pre-Harvest Glyphosate, Harvest Aid Herbicide and Desiccant Herbicide applications

The use of herbicides as harvest aids or desiccants is recommended to optimize carinata harvest. Harvest aids and desiccants increase the uniformity of crop dry-down and depending on the product used can speed dry down allowing for earlier harvest. A combination of desiccants may be beneficial, refer to your local rep for optimal desiccant use.

Pre-Harvest Glyphosate Use:

Pre-harvest glyphosate applications can even out crop maturity and provide late season weed control. Glyphosate applications are ideal at 70% seed color change.

Observing these application guidelines ensures active ingredient is not transferred into the seed, and limits the potential for yield loss that could occur by premature application. Glyphosate applications will kill the carinata plants resulting in no potential for regrowth later in the season. Should harvest be delayed by adverse weather, however, crop dry down will occur at a natural pace, speed to harvest is not significantly increased with an application of pre-harvest glyphosate.

Benefits:

- Glyphosate is systemic and will kill carinata plants limiting any risk of regrowth initiation.
- Glyphosate provides activity on susceptible weeds present in the crop canopy.
- Lowest cost option.

Cautions:

- Application timing must be followed carefully.
- Glyphosate applications will not result in rapid dry down of the crop. Plant growth will be halted but dry down will progress based on prevalent weather conditions.

For informational purposes only, always read and follow all herbicide product label warnings and instructions.

HARVEST AID HERBICIDE USE

Harvest Aid Herbicide Use: Example - Saflufenacil

Harvest aid herbicides are applied in tank-mixtures with glyphosate. These mixtures will provide the benefits of pre-harvest glyphosate applications and increase the speed of crop dry down relative to glyphosate alone. Note that dry down will not be as fast as should be observed with a true desiccant herbicide. Harvest aid herbicides are generally contact herbicides, thus canopy penetration and coverage with spray droplets necessitates the use of high water volumes. Applications must be made later in the crop. Harvest aid applications should not be made until the crop has reach 75% seed color change.

Benefits:

- Similar to glyphosate applications with the addition of more rapid crop dry down and an additional mode of action to provide late-season weed control

Cautions:

- Similar to glyphosate

Desiccant Herbicide Use: Example – Diquat

Desiccants are herbicides that work very fast – these tend to be contact activity only herbicides that kill plant tissue they directly come into contact with. These products are not systemic thus they do not enter the plant and kill it, they work by entering and rupturing the cell walls of cells each droplet lands on and is absorbed. High water volume and complete plant coverage is required for successful activity.

Benefits:

- Rapid dry down of plant material. In warm conditions harvest can begin in as little as 3-7 days after successful applications.
- Application should be made close to harvest when at least 90% of seed has reached maturity and changed color.

Cautions:

- Desiccants will kill the plant material they touch, but they do not necessarily kill the plant. If poor conditions limit the opportunity to harvest after application of a desiccant plants can begin to regrow putting out new green material that can negatively impact harvestability and harvested grain moisture content
- A dense crop canopy makes even application to whole plants very difficult with desiccants, lack of coverage will lead to poor herbicide performance
- Application of desiccants should not be made to fields with highly variable plant staging. Immature plants will not be effectively dried down and mature plants are more susceptible to pod shatter after desiccant applications.
- Desiccants are often not effective at providing additional weed control
- Do not tank-mix glyphosate and some desiccants. The rapid activity of the desiccant can limit trans-location and effectiveness of glyphosate.

COMBINE SETTINGS



SETTING UP FOR SUCCESS

Carinata is 40-50% oil and can be easily damaged by releasing free fatty acids and causing the seed to stick together.



Combine settings should be as gentle as possible while still moving the crop through the combine and the air for the cleaning shoe as high as possible without blowing the seed out the rear of the combine.



Never open the concave all the way because this can cause the cylinder/rotor to plug, and it will take a long time to remove the plug.



Carinata needs to be below 10% moisture during harvest. As the sun sets, the seed will begin picking up moisture in humid areas. Harvest must stop and begin the next day after the dew is gone, and the seeds moisture is below 10%.



Daily cleaning of the combine and platform will provide you with the opportunity to obtain the highest quality resulting in maximizing your profit.

Disclaimer: For Informational Purposes Only

The following manual is provided solely for informational purposes. It is important to note that when operating large and heavy machinery equipment, safety protocols must always be adhered to.

COMBINE SETTINGS

The combine initial settings listed below are provided as a place to begin your field adjustments. The crop conditions and combine configuration will also affect your field adjustments.

Make sure the concave is level to the rotor and the concave indicator is zeroed.

John Deere 50, 60, 70, & S Series STS:

- Feed Accelerator wear strips: Serrated
- Concaves: Best - Small Wire.
- Separator Grate Covers: Install as Required
- Feeder house Drum Height: Down
- Feeder house Conveyor Chain 26T sprocket
- Feed Accelerator: Low
- Threshing Speed RPM Range: 320 - 450
- Cleaning Fan RPM Range: 650 - 750
- Concave Clearance: 25 - 35 mm
- Chaffer Clearance: 4 - 10 mm
- Chaffer Extension: 5 mm
- Sieve Clearance: 2 - 6 mm

John Deere 9000, 9010, 50, & 60 Series Walkers:

- Concaves: Best - Small grain
- Feeder house Drum Height: Down
- Feeder house Conveyor Chain Large sprocket
- Threshing Speed RPM Range: 350 - 450
- Cleaning Fan RPM Range: 650 - 750
- Concave Clearance Range: 25 - 35 mm
- Pre-Cleaner: Closed
- Chaffer Clearance: 8 - 12 mm
- Chaffer Extension: 4 - 6 mm
- Sieve Clearance: 2 - 6 mm

Cat/Lexion 400, 500 series:

- Concave: Small Grain
- Threshing Speed RPM Range: 320 – 500
- Rotor RPM: 750
- Cleaning Fan RPM Range: 600 - 720
- Concave Clearance Range: 25 – 35 mm
- Chaffer Clearance: 5-9 mm
- Sieve Clearance: 3-6 mm
- De-awning plates: Open

Case IH 1680/2388:

- Concaves: Best - Small Wire
- Threshing Speed RPM Range: 325 - 400
- Cleaning Fan RPM Range: 650 - 750
- Concave Clearance Range: 33 - 40 mm
- Front Chaffer: 2 - 6 mm
- Middle Chaffer: 3 - 8 mm
- Rear Chaffer: 2 - 4 mm
- Sieve Clearance: 2 - 4 mm

Case IH 10,20,30,40,50 Series Flagship

- Concaves: Best: Small wire
- Rotor: 320 – 380
- Cleaning Fan RPM: 570 – 700
- Pre-Sieve: 3-4 mm
- Chaffer: 4 – 6 mm
- Sieve: 3 – 5 mm

AGCO R60/65:

- Concave: Grain
- Threshing Speed RPM Range: 350 - 400
- Cleaning Fan RPM Range: 0.9 - 1.5
- Concave Clearance Range: 1.0 – 2.5
- Chaffer Clearance: 3 - 9 mm
- Sieve Clearance: 1 - 3 mm

AGCO R72

- Concave: Small Grain
- Threshing Speed RPM Range: 350 – 400
- Cleaning Fan RPM Range: 0.9 – 1.5
- Concave Clearance Range: 11 – 14
- Chaffer Clearance Range: 3 – 9 mm
- Sieve Clearance Range: 1 – 3 mm

COMBINE SETTINGS

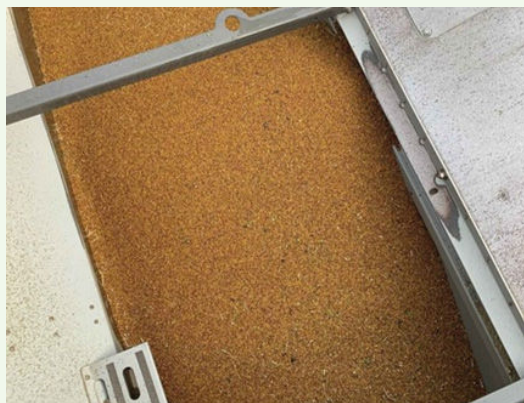


Field Adjusting

Once you enter the field and cut approximately 100 yards or more, stop the combine, shut off the engine, and walk around the combine and platform looking for Carinata seed leaks. Get the leaks repaired before you continue to harvest.

Best Practices + Recommendations

- Like other crops you harvest, cut a small sample and test for moisture.
- As you adjust your combine, make one adjustment at a time so you can view results.
- Ground speed needs to be fast enough to load the combine and help bring crop into the platform
 - Suggest: Adjust platform for even feeding and minimum seed loss.
- Partial stalks with some seed pods still attached can be seen coming off the straw walker or rotor. There might be a few immature seeds in the pods. We recommend you NOT over tighten the concave or increase cylinder/rotor speed to remove these seeds.
- Over threshing will result in more broken seed and seed loss due to overloading the cleaning system.
- Check for broken seeds. Slow down cylinder/rotor and/or open/close the concave, try one at a time.
- Increase the air until seed starts coming out the rear and then lower just a little.
- Recheck the tailings/return system to insure there is no seed.



It's common to see some small trash on top of truck sample around the edge as shown to the left, this is a good sample.

Disclaimer: For Informational Purposes Only

The following manual is provided solely for informational purposes. It is important to note that when operating large and heavy machinery equipment, safety protocols must always be adhered to.

COMBINE SETTINGS



Retaining Seed

It is normal to see the larger trash around the edge of the grain tank. Adjustments should be made to prevent any increase in trash.



Minimize Trash Accumulation

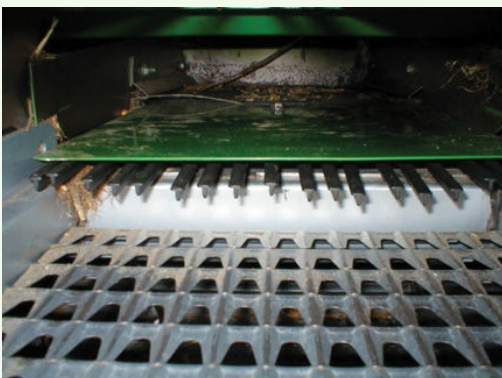
The trash moves to the edges of the truck as you load it. This sample below has too much trash. The combine needs some adjustments to remove the trash.

IMPORTANT: It is crucial to exercise caution to ensure the seed remains in the combine.

Improving Efficiency and Reducing Waste

The parts listed below can assist in cleaning up the large trash in the grain tanks

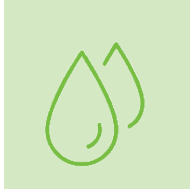
John Deere 50 and early 60 series STS combines could use the fixed chaffer finger cover shown below. It goes on the bottom set of fingers. Four – H222015 covers are used. The cover is held in place with existing 13 mm bolts. This cover will reduce pods and stalks from the grain tank.



John Deere 9000 series plus the 50 and 60 series walkers could use the *** H136608 cover (Lip down) and 2 or 4 – H136610 brackets plus the bolts and nuts shown below at the rear of the pre-cleaner (See your dealer). *This cover reduces stalks from lodging in the chaffer. *



DELIVERY, GRADING, AND SETTLEMENTS



Moisture

Grain should be delivered at 10% moisture or below. Green and foreign material may increase moisture. We recommend using glyphosate, glyphosate plus a harvest aid herbicide, or a desiccant and following the recommended combine settings.



Foreign Material & Damage

Samples will be inspected for the following:

- Conspicuous mixture
- Stones
- Sclerotinia
- Ergot
- White-rimmed seed or mold-colored seed
- Shrunken or shriveled seed
- Sprouted seed
- Any other seed distinctly discolored or damaged.



Settlement Calculation and Payment

Payment will be processed within 30 days of final grain delivery and verification that all required Nuseed sustainability paperwork is completed. The Nuseed team will provide a complete summary of all deliveries, discounts, and settlement adjustments such as trucking payments.

Nuseed strongly prefers ACH payments. If a grower prefers a paper check, processing will be within 60 days of final grain delivery.

Nuseed Carinata Discount Schedule (US\$)			
BU = 60 lbs	MT = 36.74 BU	CWT = MT/22.046	BU = MT/36.74

Moisture %	% of Price
10.1-10.5	1.00%
10.6	2.00%
10.7	3.00%
10.8	4.00%
10.9	5.00%
11.0-11.5	6.00%
11.6-12.0	8.00%
12.1-12.5	10.00%
12.6-13.0	12.00%
13.1-13.5	14.00%
13.6-14.0	16.00%
Over 14% subject to rejection	

Other Damage %	Discount \$/MT
0-3.0	0.00
3.1-7.0	10.00
7.1-10.0	20.00
10.1-20.0	30.00
Over 20% subject to rejection	

Other Damage includes mold, completely rime-covered, excessively weathered, sprouted, or otherwise distinctly damaged. Anything over 20% is subject to rejection.

Disclaimer: For Informational Purposes Only

The following manual is provided solely for informational purposes. It is important to note that when operating large and heavy machinery equipment, safety protocols must always be adhered to.

This manual serves as a resource to provide general information and guidelines on the operation of said machinery. However, it is not intended to replace or override any safety regulations, guidelines, or instructions provided by the manufacturer, employer, or relevant governing bodies.

It is strongly recommended to consult the manufacturer's instructions, undergo appropriate training, and adhere to all applicable safety protocols before operating such equipment.

By using this manual, the user acknowledges and agrees that the information contained herein is not exhaustive or comprehensive, and it is their responsibility to ensure that they are aware of and comply with all relevant safety guidelines and regulations.

Always prioritize safety and exercise caution when operating large and heavy machinery equipment.

Nuseed is not liable for any damages, injuries, or losses that may result from the use of this manual.





OUR TEAM

CONTACT OUR FIELD TEAM:

Field Sales Team Manager

Parker Bontrager | 260-336-2261 | parker.bontrager@nuseed.com

Texas Coast & Louisiana

Danny Crane | 979-253-1813 | danny.crane@nuseed.com

Southeast

Derek Barber | 904-776-3547 | derek.barber@nuseed.com

Carinata Commercial Program Manager

Michelle Howard | 912-300-7118 | michelle.howard@nuseed.com

Carinata Stewardship Coordinator

Megan Gould | 979-485-3713 | megan.gould@nuseed.com

