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Low Temperature Effects

What temperatures can carinata tolerate?

Carinata can tolerate freezing temperatures (<32°F), however the extent of freeze damage depends on temperature, duration at a given temperature, crop growth stage, and nitrogen application rates.

What are the symptoms of freeze damage?

Minor freeze damage first appears as wilting. Within about one week, symptoms present as bleaching of the leaves, particularly near the tips and leaf margins. If freeze damage is more severe, these areas may become necrotic, but the crop is expected to outgrow this level of damage with minimal yield loss.

How will freeze damage impact crop yield?

While freeze damage can be severe, carinata has shown impressive resiliency. Minor leaf bleaching will have minimal to no effect on yield. As a highly plastic crop, carinata can promote branching, pod formation, and leaf area to compensate for stand loss, but secondary branches are not as productive as primary branches. Prolonged exposure to freeze at bolting can weaken carinata stems. This can lead to significant damage later during the season (at pod fill) as the plant struggles to support heavy growth at the top which can ultimately result in yield loss. Prolonged hard freeze events can result in severe stand loss leading to reduction in seed yield.

How does freeze affect the crop at different growth stages?

At seedling stage when roots are shallow and there are few carbohydrate reserves, freeze can kill the crop. At rosette stage, leaves protect the growing point and roots are deeper, so there is greater freeze tolerance; but some leaf tissue damage may occur. After bolting, the stalk and growing points are most susceptible to freeze damage. Stalk damage typically results in tissue damage several inches above the soil surface where structural stresses are high. Death of the growing point commonly results in new shoot growth from the crown of the plant or from just below the damaged tissue after bolting. Freeze damage during pod fill can lead to poor seed set and pod abortion. This may cause undeveloped seeds and empty pods, leading to severe crop losses. A crop that has suffered freeze damage during pod fill may re-sprout from the crown. A field suffering this level of damage may be considered a complete loss.

What measures can be taken to minimize impact of freeze on carinata?

A general recommendation is that carinata should be sown approximately six weeks before first frost.

In Alabama, Florida, and Georgia, plant carinata during the first two weeks of November. In North Carolina, planting should occur between mid-September and early October. Timely planting allows plants to develop into the rosette stage by the time probability of freeze is highest. Plants in rosette stage are most resistant to freeze. Do not over-apply early-season nitrogen (N). Excessive N promotes luxuriant growth that is more susceptible to freeze damage. Limit at-plant N applications to 20 lb N/ac or lower. Calibrate your spreader so you do not over-apply.

What steps should be taken after a low temperature exposure?

Monitor stand to determine stem splitting at the base of the plant. If plants are damaged due to cold temperatures but it looks like the crop will survive 7 to 14 days after the freeze event, a preventative fungicide application may be considered to protect the damaged plants from *Sclerotinia sclerotiorum*.

More Information

More information regarding cold-tolerance of carinata can be found in our [fact sheet](#).

Additional Resources

[Carinata Production Manual](#)

[Journal Articles, Factsheets, & Helpful Websites](#)

[Nuseed Carinata Contract Production](#)

[Contact the SPARC Team](#)