

Ozone Injury in Watermelon

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In recent years ozone injury to the foliage of watermelon has been observed at several locations in KY. Frequently misdiagnosed as a nutrient disorder, drought stress, foliar pathogen or insect injury, ozone damage to watermelon leaves can result in the misapplication of pesticides. Misapplications of pesticides not only have an economic cost, but can be harmful to the environment and lead to resistant pest populations.

One of the reasons ozone injury is often misdiagnosed in KY is that it is not found across large areas of the state, but is localized to certain regions that have the right combination of climatic conditions leading to high levels of ground level ozone. Ozone production at the ground level is the result of a photochemical degradation of nitric oxides or other related air pollutants. Although automobile exhaust and power plants are generally the primary sources of nitric oxides in the atmosphere, ozone injury is often observed in areas far removed from automobile traffic. The production of ozone at ground level is a light driven process. Therefore, high levels of ozone pollution are often seen during the hot days of summer, typically in July, when light intensity is highest in KY.

Although high levels of ozone can cause damage to a large number of crop plants, Cucurbits are particularly sensitive. Within the Cucurbit family, watermelons, squash and cantaloupe seem to be the most affected. Ozone injury in melons can occur at levels ranging from 50-130 parts per billion. In many parts of KY, ambient levels of ozone are higher than the injury threshold for melons.



Symptoms: Ozone injury generally appears first on older leaves as chlorosis or yellowing followed by a mottling and then a bleaching of small areas of the leaves. Severe ozone injury will result in the necrosis of the older leaves first, before reaching newer growth.

Left: Various stages of ozone injury on watermelon leaves. The leaf on the bottom of the picture has chlorotic regions, an early symptom of ozone injury. The leaf near the top of the picture has bleaching and flecking associated with later stages of injury

Management: Unfortunately when ozone injury occurs there is little the grower can do. If ground ozone levels decline below the threshold for damage most plants will continue to grow, and the effects will be minimal. If ozone levels remain high for an extended period of time, significant foliage can be

lost, which may result in an increased chance for sunburned melons. It is important to recognize ozone injury; however, so that time and money are not wasted on unnecessary pesticide sprays.



Above: More advanced ozone injury on watermelon leaves.



Above: Effects of ozone injury in the field

If ozone injury has been a problem in the past consider selecting a watermelon cultivar that is more resistant to injury as there are large differences among cultivars in resistance. If ozone injury has not been a problem then continue to grow what performs best for your situation. Although all melons will exhibit some injury if exposed to high enough levels of ozone, recent findings have suggested that triploid (seedless) watermelon cultivars are more resistant to ozone injury than diploid (seeded) varieties. Furthermore, consumer demand for seedless melons continues to increase across the state. If your market does not demand a seeded cultivar and you have had significant ozone injury in the past, you might want to try a seedless variety, such as those listed below.

Table 1. Seedless (triploid) watermelon cultivars with some tolerance to ozone pollution that are recommended for KY.

<i>Cultivar</i>	<i>Source</i>
<i>Freedom</i>	<i>Sunseeds</i>
<i>Millionaire</i>	<i>Harris Moran</i>
<i>Revolution</i>	<i>Sunseeds</i>
<i>Cooperstown</i>	<i>Seminis</i>

Selected References

Holmes, G.J. and J. Schultheis 2003. Sensitivity of watermelon cultigens to ambient ozone in North Carolina. *Plant Disease*. 87:428-434.

Decoteau, D.R., J.E. Simon, G. Eason, and R.A. Reinert. 1986. Ozone-induced injury on field-grown watermelons. *HortScience*. 21:1369-1371.

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