

Susceptibility of watermelon cultigens to ozone injury, 2001.

The experiment was conducted on a 2-acre site at the Central Crops Research Station in Clayton, NC (GPS coordinates: N35°40.074'; W078°30.495'). The soil types were: Norfolk loamy sand and Lynchburg sandy loam in proportions of 85% and 15% respectively. Watermelon was transplanted on 8 May (2 ft in-row spacing) on raised beds covered with black plastic mulch. Plots were single beds on 10-ft centers, 20 ft long with 7-ft alleys at each end. Irrigation and fertilization was by drip. Fertilizer was applied preplant (200 lb/A of 15-0-40) and through drip tape (424 lb/A of 13-0-44 and 334 lb/A of 15-0-0 total). Sixty treatments (cultigens) were randomized in four complete blocks. Thirty-five cultivars were red flesh, triploid (seedless) and 24 were red flesh, diploid (seeded) fruit types. The tetraploid (name not disclosed) is a commonly used parental inbred used in the development of triploid cultivars. It was included to determine whether it possessed ozone tolerant characters which it would confer to triploid cultigens. Foliar necrosis and chlorosis was first noted on 26 Jun. The condition was diagnosed as ozone injury based on the presence of classical symptoms: premature necrosis/chlorosis of older foliage; new growth not visibly injured; distinctive bifacial necrosis with white spotty patches within necrotic areas; absence of infectious agents; presence of atmospheric ozone levels judged high enough to cause symptoms. Injury severity was rated on 20 Jul. Percentage chlorosis and necrosis (injury) was estimated for individual plants on a whole-canopy basis in 5% increments (0-100%).

Based on field experience with ozone injury on watermelons in NC, the level of injury that occurred in this test is considered moderate to high. Daily 12-hr average ozone levels measured at the USDA, ARS Air Quality Research Unit in Raleigh (approximately 11 miles from the test site) were 52 ppb between 8 May (transplanting) and 20 Jul (evaluation). During this period ozone levels between 70 and 80 ppb occurred on 5 days, levels between 60 and 70 ppb occurred on 19 days and levels between 50 and 60 ppb occurred on 17 days. Cultigens differed significantly in their susceptibility to ozone injury. In general, triploid cultigens were less susceptible to ozone injury than diploid cultigens, confirming results from a similar experiment in 2000. Following evaluation, prolonged rainy weather reduced ozone levels and ozone injury was masked by new growth that was free of visible ozone injury.

| Cultigen | Ozone injury severity ^z | Ranking ^y | Genetic type | Cultigen source |
|----------------------------|------------------------------------|----------------------|-------------------------|-------------------------------|
| not disclosed | 22.5 g-m ^x | 42 | tetraploid ^w | Syngenta Seeds, Inc. |
| ACX 8238 | 11.3 a-e | 7 | triploid | Abbott & Cobb, Inc. |
| Afternoon Delight | 16.3 c-j | 23 | triploid | D. Palmer Seed Co., Inc. |
| Athens | 28.8 l-n | 50 | diploid | Sunseeds |
| Celebration | 17.5 d-j | 28 | diploid | Novartis Seeds, Inc. (Rogers) |
| Charleston Gray | 13.8 b-g | 17 | diploid | Wyatt-Quarles Seed Co. |
| Cooperstown (450339) | 16.8 c-j | 24 | triploid | Seminis (Asgrow) |
| Crimson Sweet | 27.5 k-n | 49 | diploid | Hollar Seeds |
| Disko (EMR-32) | 11.3 a-e | 10 | triploid | Hazera Seeds, Inc. |
| Dumara | 26.3 j-n | 47 | diploid | Sunseeds |
| EX4510759 | 11.3 a-e | 6 | triploid | Seminis (Asgrow) |
| Falcon | 21.3 f-l | 36 | diploid | Seminis |
| Fantastik..... | 11.3 a-e | 9 | triploid | Abbott & Cobb, Inc. |
| Festival..... | 28.8 l-n | 52 | diploid | Willhite Seed, Inc. |
| Fiesta..... | 22.5 g-m | 43 | diploid | Rogers |
| Freedom | 15.0 b-h | 19 | triploid | Sunseeds |
| Gem-Dandy | 31.3 mn | 55 | triploid | Willhite Seed, Inc. |
| Freedom | 21.0 a-d | 6 | triploid | Sunseeds |
| Gem-Dandy | 35.0 b-m | 26 | triploid | Willhite Seed Inc. |
| Hazera 103 | 8.8 a-d | 4 | triploid | Hazera Seeds, Inc. |
| Hazera 1032..... | 2.5 a | 1 | triploid | Hazera Seeds, Inc. |
| HMX 8914 | 14.3 b-h | 18 | triploid | Harris Moran Seed Co. |

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|---------------------------------|------------------------------------|----------------------|--------------|-------------------------------|
| Jubilee..... | 18.0 d-k | 32 | diploid | Wyatt-Quarles Seed Co. |
| Mara | 22.5 g-m | 40 | diploid | Siegers Seed Co. |
| Mardi Gras | 15.0 b-h | 21 | diploid | Syngenta Seeds, Inc. (Rogers) |
| Margarita | 31.3 mn | 54 | diploid | Southwestern Seed |
| Millennium | 20.0 e-l | 34 | triploid | Siegers Seed Co. |
| Millionaire | 12.5 b-f | 15 | triploid | Harris Moran Co. |
| Montreal..... | 43.8 o | 59 | diploid | Sunseeds |
| Pinata (Large Seed)..... | 22.5 g-m | 39 | diploid | Willhite Seed, Inc. |
| Premiere..... | 27.5 k-n | 48 | triploid | Southwestern Seed Co. |
| Regency (99) | 23.8 h-m | 44 | diploid | Petoseed |
| Revolution..... | 12.5 b-f | 12 | triploid | Sunseeds |
| RWM 8114 | 22.5 g-m | 41 | diploid | Syngenta Seeds, Inc. (Rogers) |
| RWT 8096-VP..... | 17.5 d-j | 31 | triploid | Syngenta Seeds, Inc. (Rogers) |
| RWT 8120 | 6.8 ab | 2 | triploid | Novartis Seeds, Inc. |
| S Seedless HQ Var 7167 HQ..... | 15.0 b-i | 20 | triploid | Abbott & Cobb, Inc. |
| S Seedless HQ Var 7177 HQ | 13.8 b-g | 16 | triploid | Abbott & Cobb, Inc. |
| S Seedless HQ Var 7187 HQ | 17.5 d-j | 29 | triploid | Abbott & Cobb, Inc. |
| Seedway 4502..... | 18.8 e-k | 33 | triploid | Seedway |
| Sentinel | 28.8 l-n | 51 | diploid | Seminis |
| Slice n Serve 830 | 16.3 b-i | 22 | triploid | Southwestern Seed Co. |
| Starbrite | 12.5 b-f | 14 | diploid | Asgrow |
| Stargazer | 33.8 n | 57 | diploid | Asgrow |
| Sugar Baby | 50.0 o | 60 | diploid | Wyatt-Quarles Seed Co. |
| Summer Flavor Var. 800 | 17.0 c-j | 25 | diploid | Abbott & Cobb, Inc. |
| Sunday Special | 21.3 f-l | 38 | triploid | Hazera Seeds, Inc. |
| Sweet Eat'N..... | 17.5 d-j | 30 | triploid | D. Palmer Seed Co., Inc. |
| Sweetheart (8003)..... | 17.5 d-j | 27 | triploid | Siegers Seed Co. |
| SWX-190..... | 11.3 a-e | 8 | diploid | Southwestern Seed Co. |
| Til | 33.8 n | 56 | triploid | D. Palmer Seed Co., Inc. |
| Trillion..... | 7.5 a-c | 3 | triploid | Abbott & Cobb, Inc. |
| Triple Crown..... | 25.0 i-n | 46 | triploid | Seedway |
| Tri-X-313..... | 20.0 e-l | 35 | triploid | Syngenta Seeds, Inc. |
| Tri-X-Palomar | 23.8 h-m | 45 | triploid | Syngenta Seeds, Inc. |
| W 5023 | 43.8 o | 58 | diploid | Sunseeds |
| W 5051 | 11.8 a-f | 11 | triploid | Sunseeds |
| W 5052 | 12.5 b-f | 13 | triploid | Sunseeds |
| W 8062 | 28.8 l-n | 53 | triploid | Sunseeds |
| Wrigley 4590249 | 11.3 a-e | 5 | triploid | Seminis |
| WX 8 | 21.3 f-l | 37 | diploid | Willhite Seed, Inc. |
| WX 55 | 17.5 d-j | 26 | triploid | Willhite Seed ,Inc. |
| LSD (<i>P</i> =0.01) | 9.5 | -- | -- | -- |

^z Percentage chlorosis and necrosis (injury) was estimated for individual plants on a whole-canopy basis in 5% increments (0-100%).

^y Ozone injury ranking relative to 60 cultigens tested (1=least injury; 60=greatest injury).

^x Values are the means of 4 replicates; treatments followed by the same letter within a column are not significantly different (*K*=100, Duncan-Waller *K*-ratio test).

^w Commonly used parental inbred used in the development of triploid cultivars.