

Root Killing Temperature Explanation

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The values presented in the Excel table should be used as broad guidelines, since considerable variation in cold-hardiness may exist within a species or cultivar. As roots mature, they become more cold-hardy.

The data came from 2 sources, using different methods. The same results were not obtained when the same plant was tested. There were several variables.

Critical root killing temperatures were derived from experimentation conducted by Dr. Havis at the Univ. of Mass. and E. J. Studer et al at Cornell Univ. The temperatures listed by Havis are the highest temperature which killed more than 50% of a plant's root system including secondary mature roots. Studer determined separate root killing temperatures for mature (primary and secondary) and for immature (tertiary) roots. Any differences in temperatures reported by these researchers were more likely due to variations in root maturity, plant health, experimental procedures and maybe a few unknown aspects.

Comment about the Perennial information by Dr. Richard E. Bir, NC State Ext.: Dr. Leonard Perry at the Univ. of Vermont drew on the work of Dr. Jeff Iles at Iowa State and others in order to provide the temperatures provided in the Excel table.

Their basic procedure for testing hardiness was to allow plants to harden off naturally in the fall, then freeze plants at 32 degrees F for 2 days; then drop the temp. slowly (the procedure took 12 to 18 hours) to 28, 21, 15 and 8 degrees F. At each temp. listed, 6 plants of each species were moved back to the greenhouse where they remained at 35 degrees F for 2 weeks, then the temp. was raised to 55 degrees F. for 4 weeks to force regrowth and assess survival. Dr. Iles conducted similar studies. These are the numbers reflected in the Excel table. Significant injury occurred when the media got this cold.

Avoid lower temperatures. Under some circumstances, higher temp. may cause injury or death but these are the best guidelines Dr. Bir has found. See the July 1, 1997 issue of Am. Nurseryman, pg 80-85 for an article entitled "Keeping Their Feet Warm" by L. Perry.

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