DROUGHT-STRESSED ORNAMENTALS: PROSPECTS FOR WINTER DAMAGE

By John Kerr, Associate Editor

The effects are not visible now, but by spring or early summer many plants will be showing scald and winter burn. The drought and high temperatures that hit many parts of the country last summer and fall have severely damaged ornamentals, especially evergreens. Some specimens, especially small or newly planted ones, are probably already dead.

Late autumn rainfall and cooler temperatures temporarily revived many drought-stricken plants, but research has shown the damage may be already done. A time-honored recommendation for trees, especially evergreens, has been to provide ample soil moisture prior to soil freeze-up. Work done by Dr. Harold Pellett, research director for the horticultural research center at the University of Minnesota, may prove however that fall watering after water stress is insufficient to restore plant vigor.

Dr. Pellett and his associates tested his theory on container-grown pyramidal arborvitae, *Thuja occidentalis* 'Pyramidalis.' They watered plants under a clear fiberglass roof in different increments from mid-August to early November, some at optimum conditions and others at drought conditions. Tests on freezing indicated that there were no major differences in hardiness level of plants subjected to different soil moisture treatments. In all cases, plants were incapable of tolerating temperatures which might occur on the dates tested.

In observation of visual effects, the tests showed that plants subjected to the water stress treatments suffered considerable injury, with the amount of injury proportional to the severity of the stress treatment. Rewatering of the stressed plants did not reduce the amount of visible injury exhibited regardless of date of watering. "We feel that the injury was caused as a direct result of the moisture stress, and cold temperatures contributed little if any to the injury," according to the report.

Dr. Pellett did note that late fall watering will prevent the temperature of soil from dropping as low as dry soil and this could reduce winter injury to root tissues. Yet it does little to reduce winter injury of conifer stems and leaf tissue following summer and fall droughts.

Injury was proportional to the severity of water stress, with cold temperatures contributing little if any to the injury. Without adequate summer moisture, late fall watering does little to reduce winter injury of conifer stems and leaf tissue.

"We thought that the plants were more susceptible to cold injury," Pellett says. "Plants in the greenhouse still did as badly as the ones that were kept outdoors during winter."

Dr. Charles Dunham, University of Delaware extension horticulturist concurs. "Broadleaved evergreens like azaleas, andromeda, and Japanese holly were among some of the most severely damaged plants last summer," says Dunham. "You can expect them to show considerably more injury by spring."

Narrowed-leaved and broadleaved evergreens are particularly vulnerable because they keep their foliage all winter and prepare for the winter early. They must function at a high pace from late summer through fall. All plant roots need a proper amount of moisture in the soil as the winter approaches, but research has shown that evergreens require sufficient water in their foliage at this time of year to sustain the plant through the winter.

"We haven't seen the effect yet," says Richard Weir, III, cooperative extension agent-agriculture for Nassau County, Long Island. "It is taking place internally, but we will see it in the spring." The New York Metropolitan Area experienced its driest summer ever and its third hottest summer. Weir says there are no obvious characteristics to pinpoint to a particular plant, but scorching, blotching, twig die back, and a mixture of these could appear. This causes concern among nurserymen.

Leslie Hobbs, owner of Warren County Nursery in McMinnville, TN, says the combination of drought and particularly the heat in his area hurt his stock this past year. "Evergreens were the hardest hit; the heat cooked them. It hit the viburnums, pines, spruces, and hemlocks—we lost all our one-year-old hemlocks," Hobbs says.

He doesn't think he can do much for his stock through the winter. He dug the subsoil to at least 2 feet wherever it was possible. Breaking the hardpan this deeply allows moisture to come up. He is also considering irrigating for the first time.

Nurserymen with irrigation systems have certainly faired better through the drought and heat. Wayne Lovelace, general manager at Forrest Keeling Nursery, Elsberry, MO, says his stock hasn't suffered too much. A hard ground and digging in the fall forced him to up costs of balled and burlapped stock, but shaker diggers which dig the bare root worked better in the dry ground. Weather conditions caused a slowdown in sales more than economic conditions since many customers did not feel like planting this past summer.

Lovelace warns that he is not assured yet of a good crop next spring. Much depends on the winter. "The worst thing would be severe cold with no moisture," he says. "That's what causes winter burn."

Also wary of the winter is Bill Flemer, of Princeton Nurseries, Princeton, NJ. "If the ground freezes hard, there will be serious damage," he says. "Deep freezing, cold weather, and high wind would be a bad combination."

He had trouble with his rhododendrons. They received enough water to keep them alive but not to grow. Other than rhododendrons and evergreens, which suffered considerably, there were no significant losses.

Can much be done now? "It is never too late," says Weir. "Make every effort to give mechanical protection to any broadleaved evergreens that have tendencies for scalding, winter burn, or are recently planted." Burlap or a snow fence are suggestions. Since desiccation occurs in late January, February, and March, it is time to put stakes in for burlap or caging. Weir also recommends antidesiccant materials for tender plants to prevent the loss of moisture with the warning that only one application may do more harm than good.

Weir also says it would be wise to apply nutrients very early in the spring. "Just because plants look well in April and May doesn't mean they've survived," he says.

Dr. Dunham, realizing the gravity of the situation last fall, suggested putting down a 3 to 4-inch layer of some kind of organic mulch around plants about mid-November after a thorough watering. Next spring before growth starts (early April in Delaware), prune any dead wood back to live shoots. If plants appear much weakened, give them a severe pruning.

Other advice Dr. Dunham gave to his Delaware residents was to fertilize (if still feasible in the winter) with a 10-6-4 fertilizer, with part of the nitrogen in a slow release form. Apply 2 pounds of fertilizer for each inch of trunk diameter. Half of the fertilizer can be put down in 12-inch deep holes in the area under the spread of branches. Broadcast the other half over the ground. In the spring repeat this treatment, using half of the amount broadcast over the surface. Delay pruning until next June. At that time remove all dead and dying branches.

"Some loss is inevitable after such a severe drought," says Dr. Dunham. "But with this kind of care, your plants will have a better chance at survival."

Although researchers and nurserymen seem to disagree on the severity of last summer and fall's drought, there is no argument that a dry, cold winter would be very damaging to many plants. Exactly how damaging won't be seen until spring and summer and even later for some species. The verdict is still uncertain for anyone closely watching ornamentals and Dr. Pellett is the first to admit it.

"This (the research) is not the final answer, but it gives us something to work on," he says. "Cold hardiness is a complicated area. The more information we get, the more we find out we don't know." **WTT**