48. Van der Grinten, M., B.F. Wilson and B.C. Fischer. 1977. *Forest structure, composition, and vigor in housing developments.* Journal of Forestry 75(10):653-655.
49. Wisniewski, S.G. and R.O. Blanchard. 1982. *Effect of injection site on injury sustained from chemical injections in oak and maple.* Phytopathology 72(2):267. (abstract).
50. Initiated in 1987, the Municipal Tree Restoration Program is an attempt by scientists to disseminate their research results among a wider audience. It includes representatives from Pennsylvania State University, Pennsylvania Bureau of Forestry, and Pennsylvania Electric Company (Penelec). Various utility companies, including Penelec, have donated grants toward the restoration and preservation of urban trees. A research component has also been funded. Researchers at Pennsylvania State University, where the program is based, suggest that work they did as Consortium members was instrumental in getting the original program off the ground.

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Abstracts

BORLAND, JIM. 1988. **Mapping flaws.** Am. Nurseryman 168(7):59-66.

This is the first of two articles about the drawbacks of hardiness zone maps. In this issue, the author details other factors besides low winter temperatures that figure into a plant's hardiness. The second article explores how a plant's individual parts, particularly the roots, can survive different minimum temperatures. It also looks at the relevance of mulching techniques and how spring acclimation periods affect hardiness. In addition, the author lists the killing low temperature for a wide selection of plants, plus sources for additional reading. To date, zone maps rate a plant's hardiness according to how it survives low winter temperatures. But so many other factors contribute to a plant's success. How useful, then are plant hardiness zone maps, and what other factors should we consider when we plant material outside its native range?

SCHOENEWEISS, D.F. 1989. **Winter temperature variations leave plants susceptible to cankers.** Landscape Contractors, January pp 14-17.

Popular belief says the culprit behind severe winter injury to woody landscape plants is prolonged cold weather. However, most winter stress and injury is due to sudden temperature changes (often associated with passing cold fronts) rather than deep cold spells. Much, if not most, winter injury follows rapid radical temperature drops to below-freezing levels following extended mild fall weather. This is why extensive "winter" damage can appear following a warmer-than-average winter. To complicate diagnosis, however, such injury does not usually become apparent until after bud break the following spring—when the previous fall's freeze has been forgotten. In many cases, the sensitivity of a plant part to low temperatures limits the plant's geographic or economic use. For example, temperatures drop low enough in many northern regions to kill a peach or plum's flower buds without affecting the rest of the tree. In general, however, very low temperatures are much less important to a landscape plant's survival than are rapid and severe variations in temperature.