

Finally, the most important advice is: Don't let the tree be defoliated again next season.

Literature Cited

- Campbell, R.W., and H.T. Valentine. 1972. Tree condition and mortality following defoliation. U.S. Dep. Agric. For. Serv. Res. Pap. NE-236.
- Cote, W.A. 1976. The biology of the two-lined chestnut borer and its impact on defoliated oaks. Ph.D. thesis, SUNY, Coll. Environ. Sci. and For., Syracuse. 102 p.
- Dunbar, D.M., and G.R. Stephens. 1975. Association of two-lined chestnut borer and shoestring fungus with mortality of defoliated oak in Connecticut. For. Sci. 21: 169-174.
- Heichel, G.H., N.C. Turner, and G.S. Walton. 1972. Anthracnose causes dieback of regrowth on defoliated oak and maple. Plant Dis. Rep. 56(12):1046-1047.
- Heichel, G.H., and N.C. Turner. 1976. Phenology and leaf growth of defoliated hardwood trees. In Perspectives in Forest Entomology. J. Anderson and H. Kaya, eds. p. 31-40. Academic Press, New York.
- Houston, D.R. 1973. Diebacks and declines: Diseases initiated by stress, including defoliation. Proc. Int. Shade Tree Conf. 49: 73-76.
- Houston, D.R., and J.E. Kuntz. 1964. Pathogens associated with maple blight. Studies of Maple Blight Part 3. Univ. Wis. Res. Bull. 250 p. 59-79.
- Kegg, J.D. 1973. Oak mortality caused by repeated gypsy moth defoliation of oak in New Jersey. J. Econ. Entomol. 66: 639-641.
- Kulman, H.M. 1971. Effects of insect defoliation on growth and mortality of trees. Ann. Rev. of Entomol. 16: 289-324.
- Kozlowski, T.T. 1969. Tree physiology and forest pests. J. For. 67:118-123.
- Kozlowski, T.T. 1971. Growth and development of trees. Seed germination, anatomy, and shoot growth, vol. 1. Academic Press, New York. p. 207-244.
- Neely, Dan. 1970. Healing of wounds on trees. Amer. Soc. Hort. Sci. 95:536-540.
- Nichols, J.O. 1968. Oak mortality in Pennsylvania. A ten-year study. J. For. 66:681-694.
- Parker, J. 1970. Effects of defoliation and drought on root food reserves in sugar maple seedlings. U.S. Dep. Agric. For. Serv. Res. Pap. NE-169.
- Parker, J. 1974. Effects of defoliation, girdling, and severing of sugar maple trees on root starch and sugar levels. U.S. Dep. Agric. For. Serv. Res. Pap. NE-306.
- Parker, J., and D.R. Houston. 1971. Effects of repeated defoliation on root and root collar extractives of sugar maple trees. For. Sci. 17:91-95.
- Parker, J., and R.L. Patton. 1975. Effects on drought and defoliation on some metabolites in roots of black oak seedlings. Can. J. For. Res. 5:457-463.
- Pawsey, R.G., and M.A. Rahman. 1976. Chemical control of infection by honey fungus, *Armillaria mellea*: A review. J. Arboric. 2:161-169.
- Staley, J.M. 1965. Decline and mortality of red and scarlet oak. For. Sci. 11(1):2-17.
- Wargo, P.M. 1972. Defoliation-induced chemical changes in sugar maple roots stimulate growth of *Armillaria mellea*. Phytopathology 62:1278-1283.
- Wargo, P.M. 1975. Estimating starch content in roots of deciduous trees: A visual technique. U.S. Dep. Agric. For. Serv. Res. Pap. NE-313.
- Wargo, P.M. 1977. Wound closure in sugar maple: Adverse effects of defoliation. Can. J. For. Res. 7: (In press).
- Wargo, P.M. 1977. *Armillariella mellea* and *Agrilus bilineatus* and mortality of defoliated oak trees. For. Sci. 23:(In press).
- Wargo, P.M., J. Parker, and D.R. Houston. 1972. Starch content in roots of defoliated sugar maple. For. Sci. 18(3): 203-204.
- Wargo, P.M., and D.R. Houston. 1974. Infection of defoliated sugar maple trees by *Armillaria mellea*. Phytopathology 64(6):817-822.

Research Plant Pathologist,
USDA, Forest Service,
Northeastern Forest Expt. Station,
Forest Insect and Disease Laboratory,
Hamden, Connecticut

ABSTRACT

Baumgardt, J.P. 1978. Soil chemistry and structure as related to water. Grounds Maintenance 13(3): 24, 26, 30, 32.

Water occurs in soil in several forms. Following a rain considerable free water is found in the spaces between soil particles. But not all soil water coating particles is held loosely. A very thin layer of bound water covers each particle or, in the case of humus matter, the faces of the spongy materials. This water is unavailable to plants, being held by molecular forces to the particles. It pays to know the structure and chemistry of your particular soil. Only by knowing your soil profile can you make the most of an irrigation program. You can also manage an optimum fertilizing program based on plant needs, leaching, and soil retention.