

crowns may require additional conductors which extend into the highest parts of the side branches in order to cover the spread of the crown. Lightning protection systems should be checked periodically and adjusted to allow for growth and expansion of the tree.

"Lightning Protection Installation Systems Standard" is available from the National Arborists Association, 3537 Stratford Road, Wantagh, New York 11793.

Homeowners are warned not to attempt to install lightning protection systems in trees. One should consult a commercial arborist with the proper training and experience.

### Bibliography

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### ABSTRACTS

Johnson, W.T. 1982. **Horticultural spray oils for tree pest control.** Weeds, Trees & Turf 21(5): 36-40.

Oil is one of the oldest natural pesticides. In the first century A.D., the Roman scholar Pliny wrote that mineral oil would control certain plant pests. It was also known at that time that the oil was liable to injure plants. Between 1942 and 1970, teams of petroleum chemists and entomologists made great strides in spray oil science and technology. Arborists and nurserymen benefited from the work on fruit trees because many of the pests controlled by oil were the same pests that injured shade trees and shrubs. Today, superior horticultural oils are being produced by four oil companies. Modern spray oil can kill arthropods in two ways: 1) by penetrating the egg and interfering with the vital metabolic processes, or 2) by preventing respiration through egg shells or respiratory passes (tracheae) of both immature and mature insects.

Powell, C.D., Jr. 1982. **Developing a spray calendar.** Am. Nurseryman 155(10): 49-51.

Disease infestations and development occur in cycles that are based largely on the seasons. Diseases go through these cycles mainly because their hosts go through cycles of growth and development that are also governed by the seasons. In the landscape, there are not many diseases that require chemical control programs. However, we should remember that chemicals are only one means of combating plant diseases. We should be just as interested in using resistant varieties, attempting cultural modifications, or choosing an alternate planting site. The amount of stress a plant is subjected to has a good deal to do with how widespread the disease will be on the plant at the end of any one season. Spray prevention of diseases should be thought of as a fourth means of defense against diseases. Using resistant varieties, thinking about cultural control, and practicing good sanitation and management should all be considered before resorting to chemical sprays.