

NEW CONCEPTS IN UTILITY ARBORICULTURE¹

by R.E. Abbott

Tree regrowth inhibition, street tree planting, right-of-way vegetation management, selective right-of-way clearing, landscaping, and environmental considerations are just a few of the arboricultural-horticultural areas that the utilities are increasingly involved with.

Past research directed at utility tree and vegetation problems was mostly sponsored by chemical manufacturers, equipment manufacturers, or Edison Electric Institute (E.E.I.) a trade association of investor-owned utilities.

Electric Power Research Institute (E.P.R.I.) was formed in 1972 by government, investor, and publicly owned utilities to sponsor and coordinate research and development on all utility problems. Approximately \$125,000,000 per year is available for research in all areas, including generation, transmission, distribution, undergrounding, transformers, tree and brush problems, landscaping, engineering, etc.

1. *Tree Regrowth Inhibition*

Retrimming of trees alongside or under overhead distribution lines on a one to three year cycle costs someplace between \$150,000,000 to \$500,000,000 per year. There has never been a real accurate survey to determine the actual dollar expenditure. As the size of the trees affecting the lines increases so does the problem.

E.E.I. sponsored a ten year \$750,000 "tree growth control" research project at Battelle Memorial Institute in Columbus from 1956 to 1966. Drop crotch pruning, together with painting all cuts with a tree paint fortified with 1% N.A.A. (alpha naphthalene acetic acid) proved to be the most effective inhibitor. A difficulty with this technique is the problem of painting all power pruner cuts made from aerial buckets. These small cuts would not normally be painted except for the growth inhibitor fortified tree paint. Tree paint with N.A.A. is not equally effective on all species of trees.

E.P.R.I. is sponsoring a five year \$400,000 research project on "New Methods and Chemicals to Control Tree Regrowth" at the U.S.D.A. Agricultural Research Service, Shade Tree and Ornamental Plants Laboratory, Delaware, Ohio. Dr. Galen Brown is presently project leader and Robert Nosse of Ohio Edison Company, Akron, is chairman of the steering committee. The basic plan of research is to investigate application of growth regulators directly into the tree using pressure injection systems. The rationale being that method would eliminate the possibility of environmental contamination and lower concentrations of the chemical could be utilized.

A portable injection system looks promising from 1975 field tests. Research is being done on chemical concentration, timing, uptake rate, and the variation of species in response to materials.

Ontario Hydro Electric Power Commission, Toronto, undertook an extensive evaluation of potential growth regulating compounds. Their research also is investigating application of materials aerially to transmission rights-of-way to retard brush development. Aerial application of growth inhibitors to transmission rights-of-way would be particularly effective for the screen plantings now being developed at road crossings. These are increasingly going to be a problem to maintain in the future.

E.P.R.I. is also sponsoring research by Dr. Sachs at the University of California on chemical growth regulators. One result of his research has been the large scale test application of MH 30T in used transformer oil as a basal spray for tree regrowth inhibition. A number of west coast utilities have reported excellent results with that technique involving tens of thousands of trees.

Amchem, Dow, DuPont, Niagara, U.S. Rubber, are among the manufacturers evaluating growth regulating compounds. A great deal of research has been done but much more is needed. Presently available materials are not consistently effective over a variety of species and conditions.

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An ideal growth inhibitor should be effective on a wide range of species under varying conditions capable of being applied at any time of year without formative effects as well as being economical and environmentally safe.

2. *Street Tree Selection*

Selecting a species or cultivar of tree that can develop naturally within the available space was pioneered by Ed Scanlon in 1955 and 1957 in Cleveland, Ohio. International Shade Tree Conference, Edison Electric Institute and Illuminating Engineering Society jointly sponsored a meeting to promote use of low growing functional trees under wires.

The Ohio electric utilities sponsored a ten year \$69,000 research project at the Ohio Agriculture Research and Development Center, Wooster, to evaluate street trees in urban, suburban areas. The project which involves two parts was begun in 1969. The first phase involved a planting of numerous tree species and cultivars located in a randomized pattern at the O.A.R.D.C. with data taken throughout the year. The second phase was concerned with evaluation of existing street trees in five Ohio cities: Cincinnati, Columbus, Toledo, Wooster, and the Greater Cleveland area.

A proposal to extend this project for five more years at a cost of \$45,000 is now under consideration by the Ohio utilities.

Arnold Arboretum, Morton Arboretum, and National Arboretum are conducting some research on street tree selection. Considering geographic, weather, and species variations, considerably more research should be performed. Additionally municipal officials and the public should be aware of the benefits from proper street tree selection.

Knoxville, Tennessee Utilities Board has initiated a large-scale tree removal and replacement program. K.U.B. will remove an existing problem tree requiring frequent retrimming and replant a dogwood, flowering crab, or other suitable tree which will not grow large enough to interfere with overhead electric lines. Some utilities have utilized this tool in the past but not to the extent that the Knoxville Utilities Board has.

3. *Right-of-Way Vegetation Management*

Reclearing by chemical or mechanical methods on about 300,000 miles of electric transmission rights-of-way costs about \$50,000,000 per year. Extensive research has been conducted by chemical and equipment manufacturers on their products.

An investigation of the "Environmental Effects of Herbicides" is being sponsored by E.P.R.I. and West Virginia University. Dr. Kenneth Carvel is project leader. Data are being taken on the long term effects of herbicide application at various locations throughout the country.

Dr. W.C. Bramble and W.R. Byrnes, Pennsylvania State University, conducted a ten year investigation of the long term effects of different spray techniques on game food and cover on a right-of-way.

Dr. William Chappell, Virginia Polytechnic Institute has performed extensive research on herbicides and spray application equipment. This has been financed principally by modest grants from the manufacturers and utilities.

Two other institutions conducting research are Carey Arboretum at Millbrook, New York, a Division of the New York Botanic Gardens, and the Applied Forestry Research Institute, State University of New York, College of Environmental Science and Forestry at Syracuse.

Increasing emphasis on esthetic concern about ecology and pesticide regulations require additional research to determine the minimum dose of a selective herbicide necessary to control a problem species without affecting any other species.

4. *Environmental Considerations*

Effects of sulfur dioxide from coal burning electric generation plants is another problem needing research. Recently an east coast utility paid \$450,000 to three Maryland Christmas tree growers who claimed their trees were ruined by sulfur dioxide emissions from a generating plant. Evidently there is some concern that the damage produced was a result of insect injury and not sulfur dioxide.

American Electric Power Service Corporation is sponsoring research at Ohio State University, Columbus, Ohio on the biological effects of sulfur dioxide on plants. One part of this project in-

volves the mapping of lichen distribution in a seven state area. Some lichen species are very sensitive to low levels of SO₂ and are being considered a good indicator plant.

Transmission line sighting has become a very complex, involved issue because of the Federal Environmental Policy Act of 1969. That act required that all projects which significantly effect the environment had to have an Environmental Impact Statement.

No longer can utility engineers determine the most direct and economical route when considering transmission line locations. An Environmental Impact Statement must be filed, hearings held and all possible consideration resolved before the utility can get a permit to construct the line.

Recently, one power plant required 101 permits from 67 different state and federal agencies before construction could begin. The refusal of any one of the permits would kill the entire project. The utility had to establish the needs and benefits of the power plant 101 times before starting construction.

Concern has been expressed that mercury vapor street lights have been affecting plants as a result of research conducted by the U.S.D.A. at Beltsville, Maryland. The Maryland research involved seedling plants enclosed within containers such that the only light source was street light. Research by John Andresen, professor of urban forestry, Toronto University, conducted for the City of Chicago indicates that mercury vapor street lights do not affect urban trees.

There is concern about the effect of extra high voltage transmission lines on biological organisms, animal and plant. American Electric Power for a number of years has utilized Johns Hopkins University to evaluate the physical effects of E.H.V. transmission on employees exposed to those voltages. Westinghouse Corporation has a grant from Electric Power Research Institute to perform research on the effects of E.H.V. on plants. These E.H.V. lines have a large magnetic field around the conductor.

5. *What is the Future?*

There is increasing importance and emphasis on the esthetic, environmental, and ecological areas in which the utilities arborists are concerned. Presently many utilities have curtailed their tree and brush control programs, landscaping, grounds care, pole treating, etc. because of economic necessity. These operations will be resumed with increased importance in the future. You can postpone doing some of the work, but you cannot eliminate the need. The expense is temporarily deferred only to cost more in the future to perform the given activity. Presently large areas of the country are feeling the effects of an extensive ice storm. The delay in restoring electric service and the cost of restoring electric service are directly proportional to the deferment in their utility tree trimming activities.

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ABSTRACT

Anonymous. 1976. **Tree anchors aid large planting project.** *Grounds Maintenance* 11(3): 64, 70.

When the town of Radisson, N.Y., decided to have 100 trees transplanted in a long strip of land alongside a new waste water treatment facility, guying problems were a matter of particular concern. Wooden stakes used for guying some 200 trees in an earlier project had been unable to withstand the high prevailing winds and soil conditions. The Radisson officials agreed to change the specifications to allow the use of a special anchor, called Arrowhead Earth Anchors. The arrowhead shape of the metal anchors makes it easy to drive them into any kind of soil with a minimum of ground disturbance. The anchor shaft can be fitted into the driving rod of a pneumatic hammer for easier installation. Manual installation of the anchors is another alternative. As many as three turnbuckles may be attached to one anchor, reducing installation costs and improving appearances.