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FOAM OR SPRAY?

Economics of Growth Regulator Application

By HENRY HIELD, Specialist with the Department of Plant Sciences,
University of California, Riverside

ECONOMIC UTILITY of certain plant growth regulators is frequently limited by the high concentrations required for effective response. Alar is an example of such a case. This chemical possesses desirable characteristics in that it may cause vegetative growth reduction, primarily from shortening internode length, and it causes neither leaf deformity nor reduction of flowering.

Greenhouse trials conducted with Alar applied in heavy foams showed that the effective Alar concentration could be reduced from 1% to .5%.¹ The advantage of the foam application was related to the

lengthening of wetting which allowed a longer time when the chemical solution might enter the plant. As the foam breaks, the liquid solution drains over the foliage and is available for entry. Tests with growth regulators have shown that the greatest uptake is during the wetting of the spray.²

This report gives results of further experiments conducted on commercial landscape and freeway plantings.

Procedure: Trials had four or five replications of treatments with plot size of one to five plants. Sprays were applied with a field gun or by a backpack sprayer. Preliminary trials

were conducted testing several methods of foam expansion. This equipment consisted of either aerating spray nozzles or foam-generating pumps. The Waukeshau foam generator pump produced a suitable foam and was used in the foam application.

Foam: Foams differ in their stability under varying temperatures, their capacity for expansion, their degree of phytotoxicity to the plant, and in their compatibility with commercial growth regulator formulations.

The foams were tested approximately at 60 fold expansion. Temperatures above 70 degrees F., high radiant energy and wind decreased the persistence of the foams. Commercially available foaming agents were tested and no attempt was made to characterize the potentially desirable ingredients of these foaming agents. The Alar was used as the 80% wettable powder.

Results: Six foaming agents were compared for their effectiveness in increasing the growth reduction of Alar on oleander. These foam applications were applied on December 21 when temperatures ranged from 45 to 65 degrees F. with a maximum wind of four mph. The minutes to dryness of the one percent Alar in foam, for the foams which showed greater growth reduction on April 11, were: Fomex, 32; Jet X, 107; and Fomark, 265. These three foaming agents were tested in further experiments since they showed the greatest growth reduction with the Alar.

A comparison of the oleander shoot growth reductions from treatments with 1% Alar in combination with X-77 adjuvant, Jet X foam, or Amchem LoDrift spray additives are shown in Table 1. The LoDrift (alone or with Alar), Alar plus X-77 and foam only treatments were ineffective for reducing growth. Alar applications in both 1% and 1.25% Jet X foam showed a growth reduction on both marked shoots and on plant height for seven months with the two spray applications.



Foam application of Alar on a freeway median planting of Oleander. The foam expansion is by a Waukeshau foam generator.



A compact Oleander plant at the left showing growth retardation at 107 days after treatment with 1% Alar in 1% Jet X foam. The longer internode length and greater height of the untreated control is shown to the right. The Alar in foam treated plant is starting to make normal growth.

A recently trimmed oleander hedge was used to compare a spray of 2% Alar plus .1% X-77 with a foam application of 2% Alar in 1% Fomark (Table 2). Treatments were also made with sprays of the growth inhibitor NIA 10656. In this experiment both Alar in foam and the NIA 10656 treatments caused good growth reductions and resulted in a

more dense hedge wall than either the Alar plus X-77 or control treatments. An oleander hedge does not bloom because of frequent prunings. The potential use of NIA 10656 is practical under these conditions since it inhibits flowering as well as vegetative growth. The inhibitor treatment is less desirable when oleander is not hedged and flower-

ing is desired.

A comparison of Alar in Jet X foam and Alar in Jet X unexpounded foaming agent is shown in Table 3. It was possible to apply the Jet X as a spray (not foaming) by CO₂ pressure displacement on the spray mixture. While the treatment with Alar in foam showed less

(continued on page 22)

Table 1: Growth reductions of oleander from various Alar treatments applied 3-5-73 with retreatment 7-10-73.

Treatment	Shoot growth cm							Plant height cm
	Days after treatment							
	44	73	99	127	157(30) ¹	183(56)	224(87)	
1. 1% Alar + 0.1% X-77	3.6a ⁴	9.5b	23.8b		44.1c	51.5a	73.6a	155ab
2. 1% Alar + 1% Jet X foam	2.2a	6.3c	15.8c		32.8c	36.4b	56.0b	134b
3. 1% Alar + 1.25% Jet X foam	2.9a	6.2c	13.3c		32.7c	35.4b	50.5b	125b
4. 1% Alar + Lo Drift ²	5.0b	13.9a	29.4ab	Re- spray	52.9ab	59.2a	76.2a	155ab
5. 1.25% Jet X foam	4.6b	13.7a	30.0a		59.6a	64.8a	83.9a	165a
6. 0.25% Lo Drift ³					54.5ab	61.5a	81.5a	158a
7. Control	4.9b	14.3a	28.3ab		55.9ab	61.6a	85.4a	167a

¹ Days after retreatment shown in parenthesis.

² Lo Drift at 1% on 3-5-73 spray and 0.25% on 7-10-73 respray.

³ Shoots marked but not treated on 3-5-73 and treated 7-10-73.

⁴ Duncan's multiple range mean separation, 1% level, for each day period.

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ISTC Convention Report

Old friends, New ideas and Changing times



A special exhibit area in the Marriot Hotel, Atlanta, GA, featured the latest developments in tree care equipment, fertilizers and educational materials. There were 39 commercial exhibitors, 24 field exhibitors and 18 educational exhibits.

THE DAYS when an arborist talked of a "five dollar job and two small ones" have long since passed. But as A. E. Price reminisced through 54 years of tree work, those people of a younger generation attending the International Shade Tree Conference's 50th Golden Anniversary Convention were reminded that times have changed.

Changed indeed. William E. Wallner, professor of entomology, Michigan State University, told the audience at Tuesday's educational session of two recent developments dictating changes in shade tree pest control.

"The attitudes toward pesticides which spawned enactment of the Federal Environmental Pesticides Control Act (FEPCA) in the U.S. in October 1972, and worldwide demands for non-chemical pest control alternatives will be the driving forces for at least the next decade. The practicing arborist or plant protection specialist finds himself confused by the practicality of initiating or implementing new insect control techniques and threatened by impending regulations and legislation," he said.

Wallner also stressed the waning

interest of chemical control materials research by university, state and federal sources. "Perhaps most critical is the lack of support by the chemical industry itself to encourage efficacy programs for non-food minor crops. The current trend among shade tree and ornamental researchers is to zero in on two or three major tree pests rather than attempting to research a diverse number of pests," Wallner said.

He emphasized preservation of pesticide availability by "reducing misuse or questionable use patterns since they will likely influence the future categorization of a chemical. The intent of FEPCA is to encourage proper pesticide usage, meaning that unwarranted applications such as routine protective sprays in the absence of a problem will be suspect," he said.

Included in Tuesday's session was a presentation by William R. Nelson, Jr., University of Illinois, entitled "Trees in the Landscape — A Look Beyond the Obvious." He dispelled old theories of touting trees for the shade they produce and their beauty. First consideration, he said, should be a return for dollar economic investment and their func-

tional role in the environment.

Nelson's slide presentation demonstrated the development of space to a relative scale; larger trees relate to tall buildings and small trees and shrubs relate to man. Trees help identify a destination, indicate a change in traffic, define paths, alleviate monotony and eliminate the distressing feeling of broad open spaces with nothing to relate to, he said. Trees emit large amounts of water through transpiration thus cutting down on noise, cooling the air, producing oxygen, reducing the amount of dust particles in the air, controlling temperature, refracting light, and eliminating wind erosion and snow drifting, Nelson said.

Dr. G. N. Agrios, University of Massachusetts, pointed out the lack of available knowledge about viruses, their cause and spread. He explained that once a virus is introduced into a plant cell, the virus's nucleic acid agitates the plant and causes the plant to produce substances conducive to virus reproduction. Agrios listed the primary causes of virus spread as vegetative propagation, root grafts, insects, mice, nematodes, seed from infected

(continued on page 19)

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Arborist in the

HE'S THERE because people realize trees have value. A difference of opinion exists as to how much value the particular tree or trees actually have. In the careful, deliberate manner courts employ, all the facts are being examined. The arborist is to furnish an expert opinion, based on his thorough understanding of trees and the contribution they make to the value, beauty, usefulness and desirability of the property involved. His testimony will be used to arrive at a dollars and cents figure.

Most of us who have worked with trees, diligently learning daily all we can about them, obviously know more about trees than the average man-on-the-street. It isn't far amiss to say therefore, any one of us might find himself in the witness chair, should just the right set of circumstances arise. For that reason you may well visualize the arborist in the witness chair as being you.

A farm woodlot was being logged by an out-of-town firm. The logger, according to the owner of the woodlot, used destructive and wasteful methods, killing or damaging many desirable trees as he tried to gain access to the specific trees he wanted. An opinion was desired as to the value of the trees damaged and killed. In this instance a nurseryman who could furnish specific prices on specific sizes of trees was asked to list prices applicable as a basis for determining what it would cost to restore some of the value lost as a result of poor logging practice. There were many questions asked about how one would replant trees in a woodlot where terrain is steeply sloping, and what kinds and sizes of trees would be used. Emphasis was strictly on the practical; the esthetic values

*The author is a member of American Society of Consulting Arborists. He also owns and operates Webster's Nursery in Waterloo, Iowa.

were ignored.

But the arborist-nurseryman was not the only expert whose opinion was sought. Information on soils and how logging practices would affect erosion came from an environmental biologist. He also showed how the change in the forest canopy would have an effect on the value of the woodlot. The point this illustrates is that no one person had all the information or answers needed.

In other cases the emphasis is on the esthetic value of a tree. Where a large tree casts its comforting shade on a house at just the right place, and during the warmest time of the day, it obviously would be difficult to replace that tree. Consider also the fact that the tree is simultaneously serving as an integral part of the home. It is a very real part of graciousness and beauty that characterizes the home; a part of what instantly appeals to the passerby or prospective buyer. The arborist will need to carefully avoid being carried away in poetic description, and yet be realistic enough to determine an actual dollar value, should the tree be condemned, damaged or destroyed.

Should you become that arborist in the witness chair, you need not fear a traumatic experience as inevitable. Nor should you think of it as a lark. In the role of expert witness you can do a great deal to help the public realize your professional status as an arborist. It is a place for your very best, most professional, performance. If one has kept up to date on all aspects of his daily activity with trees, then being an expert witness for a day in court can be an interesting addition to the sum of experiences that make a good arborist better.

Suppose an attorney asks you to be an expert witness, what can you do by way of preparation? You can get acquainted with the attorney,

and talk with him — well before the trial date — on different aspects of the problem. Suggest questions he can ask you during the trial to further the case. Ask him to suggest appropriate clothes for the occasion, since he'll know the jury and how they might react to, say, a jacket that's a bit too sporty, or clothes that are too casual. Help him establish how well you are qualified as an expert by telling him all the facets of your background that could possibly be helpful. The professional organizations you belong to — and may have held office in — such as International Shade Tree Conference, National Arborists Association or American Society of Consulting Arborists (ASCA) are assets an attorney will quickly recognize. List all the ways you have continued your education in seminars and shortcourses, as well as your years of practical experience.

When the day comes for you to assume the witness chair it will help you to remember to be the courteous, confident professional in everything you do. When the varied and many questions are asked, answer simply, clearly, positively, and with integrity. If you're "cornered" with having to give a yes or no answer and you feel sure it can't be honestly answered that way, ask permission of the judge to give a qualified answer. If that is denied, then say you don't know. There's no advantage in going out on a limb to answer questions. More than likely you'll find the limb cut off behind you, so keep your answers simple and direct. Always answer honestly on your grounds. Remembering to be courteous can help when questions tend to be exasperating. Losing one's temper when in the witness chair may be human, but later it will be sorely regretted. As a witness you will be talking to the jury or the judge, so speak to them,

Witness Chair

By ARNOLD WEBSTER*

not the lawyers. Ask yourself: If I were a juror, what kind of a witness would I like?

You may wonder where a prospective witness can find help. If you were a member of the American Society of Consulting Arborists, you would have access to all case histories submitted (nation-wide) to the executive director by your fellow members. You could phone any member for his ideas or experiences. National meetings of the society bring information to members that can pay many times over the cost of attending those meetings.

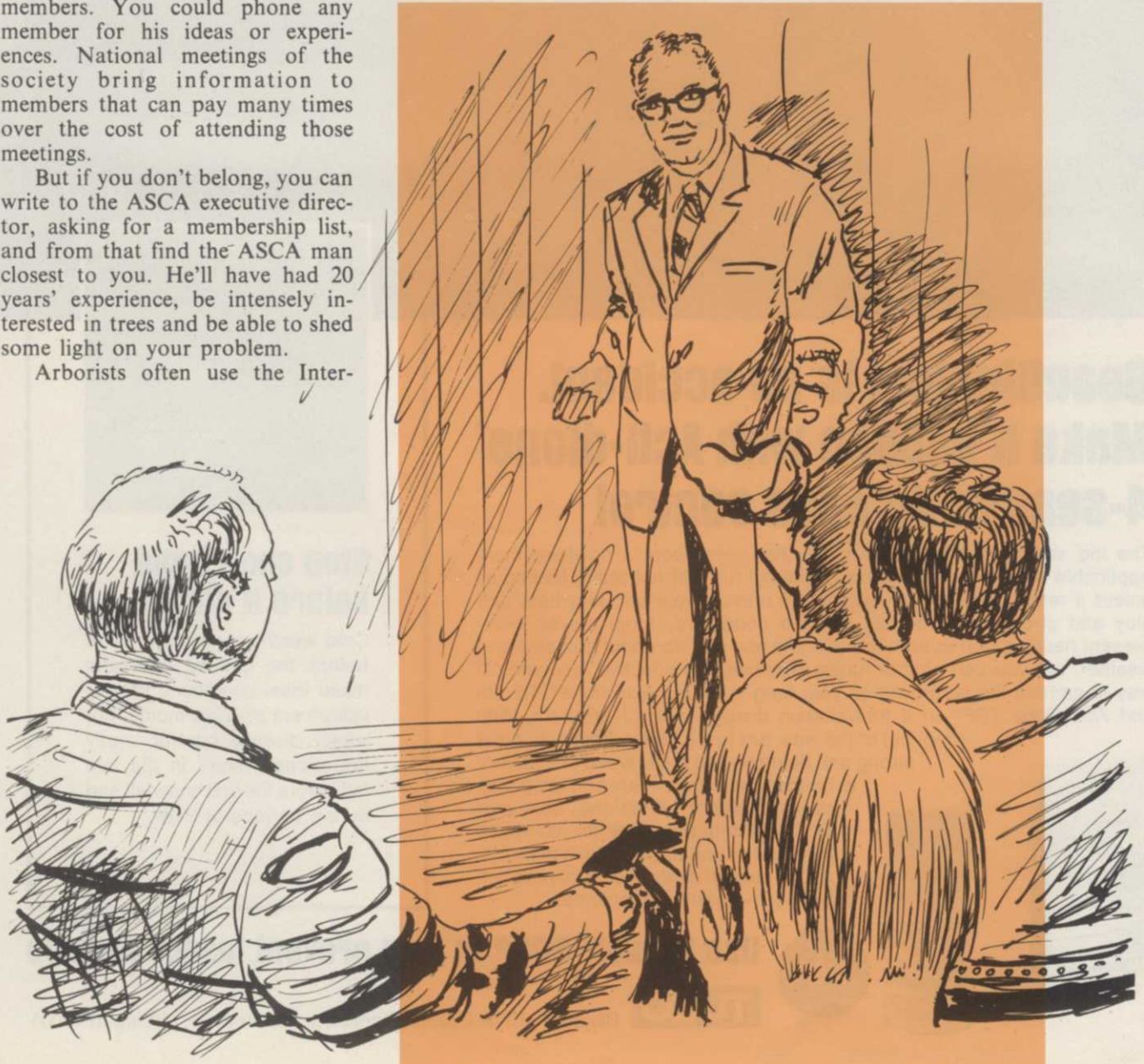
But if you don't belong, you can write to the ASCA executive director, asking for a membership list, and from that find the ASCA man closest to you. He'll have had 20 years' experience, be intensely interested in trees and be able to shed some light on your problem.

Arborists often use the Inter-

national Shade Tree Conference (ISTC) *Shade Tree Evaluation Manual*. The Internal Revenue Service (IRS) has at times demurred at values thus established, calling them contrived or unrealistic. ASCA has a committee actively working to establish a method of evaluation based on replacement costs, or a combination of tree cost from a

nursery plus the cost of a tree mover's service. Interestingly, some nurserymen have found that the ISTC evaluation system comes close to achieving the same figures, especially when trees less than 12 inches diameter are involved. When a system of evaluation acceptable to IRS is devised, it will likely be uni-

(continued on page 19)





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ISTC (from page 14)

plants and pollen. The best method of control is sanitation (removal of infected limbs and other host plants), he said.

Wednesday afternoon's educational session featured a three-member panel discussion on shade tree evaluation. Dr. L. C. Chadwick, executive director emeritus, presided. J. James Kielbaso, associate professor of forestry at Michigan State University, asked if hardiness zones and location should be made part of the ISTC shade tree evaluation formula. He defined hardiness zones as a key by nature that limits growth of certain species, usually by temperature.

Federal income tax laws are largely influenced by the fair market value of a tree, said Ray Gustin, Jr., Gustin Gardens, Gaithersburg, Md. He interpreted fair market value as the price which property will bring under no pressure to sell. One reason the Internal Revenue Service rejects the shade tree evaluation formula for determining the monetary value of a tree is its non-relation to the fair market value, he said. Gustin was also a member of Wednesday's shade tree evaluation panel discussion.

A slide presentation produced by Doyle Kincaid entitled "One Touch

of Nature" highlighted Wednesday evening's activities. The presentation was originally designed for nature appreciation in school-age children, but many grade school teachers are finding Kincaid's slide show helpful in stimulating creativity in children.

Two more slide presentations — one describing Georgia's utility arboriculture program and another 18-minute presentation on the proper use of pesticides — were also shown.

Following the audio-visual program was an ISTC Pesticide Committee meeting. Hyland Johns, Asplundh Tree Expert Co., Willow Grove, Pa., said pesticide problems were national in scope but local in solution. He emphasized the need for the Green Industry to work together "for effective legislation action in our state houses." A lengthy question and answer period followed. Members of the committee included Leo Creed, Utility Arborists Assn.; Robert Felix, National Arborists Assn.; Dave Shaw, Municipal Arborists Assn.; and John Weidhaas, Virginia Polytechnic Institute, Blacksburg, Va.

Thursday's educational sessions were divided into four sections: utility arboriculture, municipal arboriculture, commercial arboriculture,

and arboriculture research and education academy.

Robert Felix, National Arborists Assn., outlined a few basic business principles in a talk, "How to Manage an Arborist's Business." Felix discussed profit, selling the job, income for the job, personnel and wise planning.

Henry Pratt, B. G. Pratt Division, Gabriel Chemical, Paterson, N.J., said the popular environmental studies were causing most of the delays and problems in the classification and reclassification of pesticides. "Standards for pesticide classification will be met by the 1975 deadline but actual classification of specific chemicals will take longer than government officials have allowed," said Pratt.

Hyland Johns, taking a slightly different approach to new EPA regulations, suggested increasing awareness at the state level. Know your extension personnel, local pesticide applicators and be aware of changes made at state level, he said. Felix, Pratt and Johns made their presentation during the commercial arborists session on Thursday.

New president for ISTC is John Z. Duling, Duling Tree Expert, Inc., Muncie, Ind., vice president, Hyland Johns, Asplundh Tree Expert Co., Willow Grove, Pa., and president-elect is Jack R. Rogers, superintendent of Street Trees, City of Los Angeles, Pasadena, Calif. Total attendance for the meeting was 874. A special exhibit area in the Marriot Hotel featured the latest developments in tree care equipment, fertilizers and educational materials. Exhibitors were also given a chance to demonstrate their equipment at Stone Mountain State Park on Tuesday. There were 39 commercial exhibitors, 24 field exhibitors and 19 educational exhibits.

WITNESS (from page 17)

versally accepted, a boon to the man in the witness chair and all of us. It would help present to the public a picture of an arborist profession whose members are not widely divergent in tree evaluations, but are both uniform and practical.

You may find additional help from foresters, biologists, entomologists, pathologists, landscape architects, nurserymen and others.

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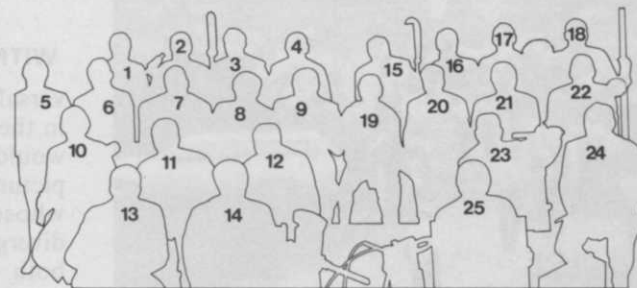
The all-delegate event at Stone Mountain State Park featured equipment demonstrations as well as a southern barbecue. There were 24 manufacturers represented at the outing. Delegates viewed the equipment in operation and were given the chance to operate nearly all the units.



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