in its old manner. However, methods were developed to prevent infection and spread of viruses in the Beltsville plots and Demaree lost the wager (but never paid his bet!). From information developed at Beltsville and other locations several state departments of agriculture in the United States initiated state virus certification programs for strawberry nursery stocks, beginning about 1955. The American Pomological Society awarded its esteemed Wilder Medal in 1962 to the Beltsville Small Fruits Unit for its leadership in the protection of strawberries from virus diseases.

Conclusion

The principal thrust in the over-all program has been, and continues to be, origination of disease-resistant cultivars. USDA germplasm has been the source of red stele resistance for a number of American and foreign breeding programs. Since the inception of the program, 61 cultivars have been introduced (Table 1). Many of these cultivars have been grown widely, notably 'Blakemore', 'Earliglow', 'Fairfax', 'Guardian', 'Midway', 'Pocahontas', 'Redchief', 'Sunrise', 'Surecrop', 'Albritton', 'Atlas', 'Apollo', 'Earlibelle', 'Hood', 'Siletz', and 'Delite'. Many of the others have been grown regionally and have been used as parents.

Numerous technical reports have been published during the course of the work. These have dealt with species hybridization, polyploidy, seed germination, inheritance of economic characters, and breeding methods. References to these studies are found in Darrow (4, 5), Scott and Lawrence (14), and most recently in Melville et al. (12).

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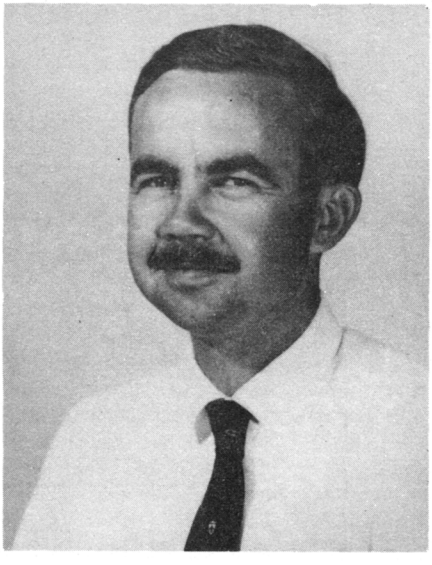
Extension Response to a Serious Freeze in Florida[1]

L. K. Jackson[2]

Fruit Crops Department, IFAS,
University of Florida, Gainesville, FL 32611

The severe freeze of January 12–14, 1981 gave Florida Fruit Crops Extension faculty some serious challenges and unique opportunities in ensuing months. Record-breaking low temperatures throughout peninsular Florida severely damaged much of Florida's citrus and growers were faced with many problems dealing with rehabilitation and care of frozen fruit and trees. Within 24 hours after the severity of the freeze was apparent, Extension faculty of the University of Florida's Department of Fruit Crops had formulated a massive state-wide effort of intensive Extension to help growers cope with their problems. This paper outlines the procedure used to formulate this educational program.

Severe freezes are infrequent in Florida and rarely cause widespread damage to the entire peninsula. Prior to the 1981 freeze, several lesser freezes (notably in 1971 and 1977) dealt damage to some areas of the state, but a really serious freeze had not occurred in the state since December, 1962. The area devoted to bearing-age citrus in Florida increased from 22,000 ha in 1962 to over 31,000 ha in 1981 (1). Another 3,000 ha of non-bearing trees were in the ground at the time of the freeze. Much of this development was planted by growers who had little or no experience in dealing with freezes of this magnitude. The availability and increased cost of heating devices and the fuel to operate them had also drastically altered cold protection practices since 1962. Therefore, many Florida citrus growers had no cold protection or cold damage experience and, due to the prohibitive cost of cold protection, many areas were damaged in this freeze which had not been seriously hurt in the past.



L. K. Jackson

Fortunately, as the citrus industry expanded, new groves had been planted in warmer areas in south Florida so that the overall damage sustained by the industry was not as serious as it might have been under the same conditions 20 years earlier, when much of the industry was located further north.

Faculty of the Fruit Crops Department were alerted to the potential danger of a massive cold front on January 11, 1981. By the evening of January 12th, it was obvious that critically low temperatures would occur in most of peninsular Florida. Later that eve-

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[2]Extension Horticulturist.

ning, the Department's link to the NASA GOES (Geosynchronous Orbiting Earth Satellite) provided hourly temperature maps of the state (3). By 7 AM the morning of January 13th, it was obvious that the state had sustained some of the lowest temperatures of the century and damage to horticultural crops was serious. This information was later confirmed as observers called in minimum temperatures and damage reports from all areas of the state.

Anticipating the need for a massive educational program to deal with this disaster, the Extension faculty organized a preliminary 3-point program:

1) Preparation of an immediate release to Extension Agents of educational materials dealing with freeze-damaged trees and fruit.
2) Release of prepared information to newspapers and radio-television spots and personal appearances.
3) Organization of a "disaster meeting" with state Citrus Extension Agents to plan a comprehensive program.

Preparation of material for agents. The day after the freeze, an extensive collection of educational materials consisting primarily of observations from previous freezes and advice on the current freeze was prepared and sent in a newsletter to all Extension Agents in Florida who would be working with citrus growers (2). Concomitantly, a Fact Sheet entitled "Care of Freeze-Damaged Citrus Trees" (4), published shortly after the 1977 freeze, was revised, reprinted and sent in quantity to affected counties within 72 hours. This provided material which agents could send growers who requested information. Additional information was sent later detailing minimum temperatures and durations for all areas of the state. Other supplemental materials were mailed to agents as they became available. In this way, the agents were furnished the best possible information as quickly as possible. Emphasis was on agent-grower interaction at the local level.

Use of mass media. While educational material was prepared for use by local Extension Agents, similar, but less detailed information was assembled for use by the press. Television and radio interviews were frequent as stations scrambled to get authoritative information on the effects of the freeze. The faculty was well-prepared and had met as a group to decide what could and would be said if an interview was requested. Releases for newspapers and magazines were also prepared with help from our Editorial Department.

Information pertaining to freeze effects in local areas was disseminated by agents to local papers and radio stations, often based on the prepared material sent to them the day after the freeze.

It is critical that the most accurate and factual information be presented in educational programs and news releases after such a disaster. Careful planning and execution through the use of packaged program educational materials will help achieve consistency in reports obtained from interviews of Extension workers. There is probably no quicker way to lose credibility than to disagree with other authorities in circumstances such as these. Unanimity of opinion is essential for success.

Fig. 1. One of the many large audiences that turned out for the Extension Freeze Damage Seminars.

Strategy meeting with agents. About 1 week after the freeze, County Extension Agents with major citrus program responsibilities met with State Extension Specialists to plan strategy. Educational programs were planned for growers which would make best use of faculty time and reach as many growers as possible.

A series of 8 meetings, held 2 each day for 4 consecutive days was scheduled for the week of February 9th. The meetings were held in key locations where large meeting facilities were available and where travel time was minimal for both participating specialists and clientele. The first 2 meetings were held in Weirsdale and Tavares in north-central Florida, the following 2 in Bartow and Plant City in the central district, the next 2 in south Florida in Arcadia and LaBelle and the last 2 in the eastern Florida Indian River area in Vero Beach and Mims.

A panel of 5 Fruit Crops faculty was assembled for the series of meetings. The 5 panel members and their topics for discussion were as follows: A. H. Krezdorn (coming out of retirement to work with this Extension team) – Pruning freeze-damaged citrus; Larry Parsons – Results of cold damage and recognition of symptoms; Will Wardowski – Handling frozen fruit; David Tucker – Post-freeze irrigation and fertilization; and Larry Jackson – Care of young trees and resets damaged by cold. Each speaker had up to 20 minutes to cover his topic. The speakers then came together as a panel to answer questions from the audience (Fig. 1).

A total counted audience of nearly 1000 at-

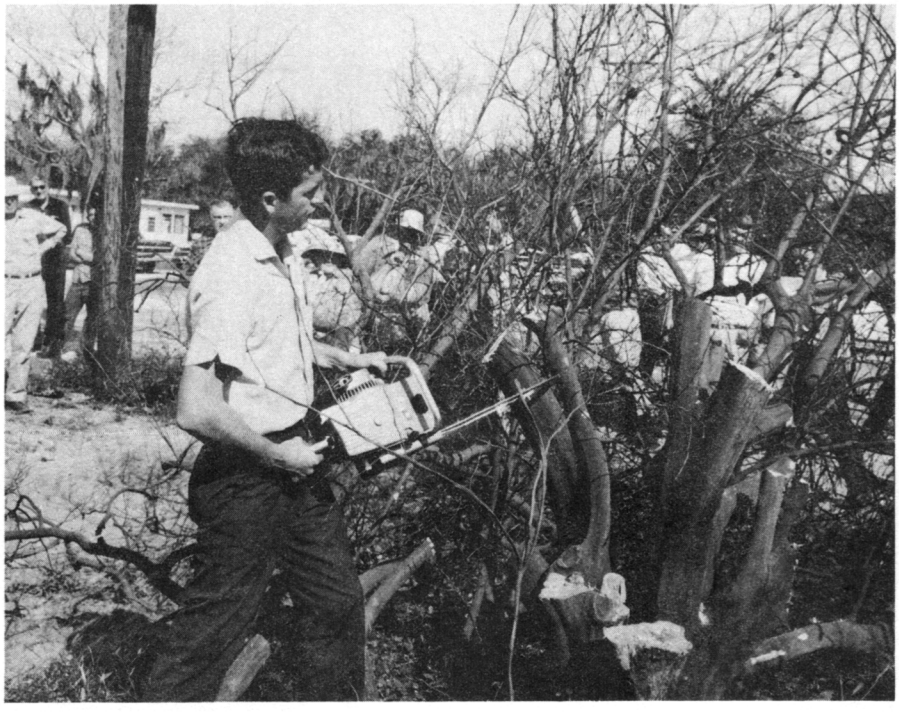

Fig. 2. Demonstration of severe pruning of badly-damaged citrus trees in area meeting.

tended the 8 area meetings. Local press was well-represented at most of the meetings and their reports spread the information presented to an even larger secondary audience.

Follow-up activities. The overwhelming success of the 8 post-freeze meetings prompted another series of meetings a month later. These meetings were reduced in number to 4 and were held in areas which had suffered the most freeze damage. A smaller crew of 3–4 Extension specialists participated in these meetings and handled topics of current interest such as pruning, fertilization and pest control. A question and answer panel discussion followed the prepared talks.

Several Extension Agents planned further local activities for growers in their counties. These included meetings at which panels of growers told how they were dealing with the effects of the freeze, meetings at which a speaker discussed a particular production practice, and meetings with field days which featured pruning equipment and its use (Fig. 2).

Follow-up educational materials have been published in newsletters and sent to Extension Agents regularly since the freeze and several magazine articles have been written for trade magazines by departmental Extension faculty.

Summary and conclusions. The freeze of January, 1981 provided Florida Fruit Crops Extension faculty a challenge and an opportunity. The challenge was to meet the need of a crippled citrus industry for educational material on the care of freeze-damaged citrus. The opportunity was to deal with a natural disaster effectively by assisting as many citrus growers as possible through a balanced and dynamic Extension program.

The Extension program was an example of an effective cooperative program with research scientists, Extension specialists and County Extension Agents working together to meet the needs of Florida citrus growers. Such cooperation and planning culminated in one of the most effective Extension program efforts ever for the Florida Fruit Crops Department. Analysis of the program's effectiveness points up the importance of involving agents, specialists and researchers in designing educational information delivery systems followed by an integrated approach consisting of state-wide, area and local meetings coupled with effective use of mass media.

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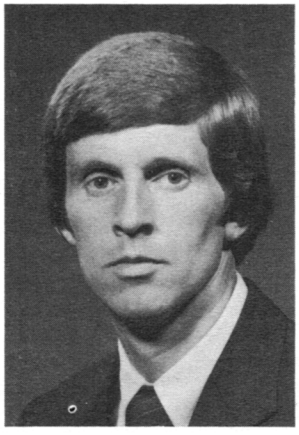
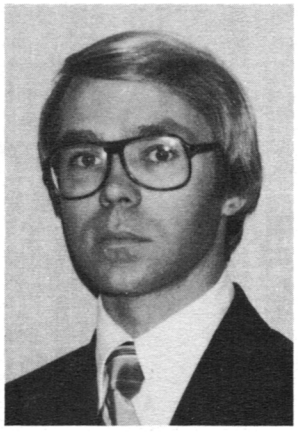
Performance of a Modified Brace Institute Greenhouse in Virginia[1]

T. K. Hartz,[2,3] A. J. Lewis,[2] and H. A. Hughes[4]

Virginia Polytechnic Institute and State University, Blacksburg, VA 24061



T. K. Hartz



A. J. Lewis

H. A. Hughes

Considerable research on greenhouse energy conservation has been conducted since the escalation of fuel prices began in 1973. A variety of conservation techniques such as air-inflated polyethylene over glass (17) and thermal curtains (8, 24, 25) have been studied. Alternative energy sources such as solar energy (7, 14, 15, 16, 18, 19), waste heat from power plants (26) and deep mine air (23) have been examined. Unfortunately, commercial application of these techniques frequently results in reduced light transmission, growing area or precision of environmental control, offsetting the conservation potential.

One approach which could potentially improve greenhouse light regime while reducing energy demand is the use of an insulated, reflective north-facing sidewall and roof section incorporated in an asymmetric greenhouse design. Such greenhouses have been used by hobbyists for years, but only recently has the applicability of this concept been tested for commercial use. Lawand et al. (13) found increased winter light transmission and improved plant productivity in a reflective north wall greenhouse. Albright et al. (1) showed decreased light level and plant productivity in a similar structure. The objective of this study was to determine the energy conservation and plant production potential of a prototype reflective north wall greenhouse designed for Virginia's latitude. Further, an attempt was made to project the performance of commercial scale reflective wall houses under varying climatic conditions.

Greenhouse structures

A 5.5 × 9.0 m prototype greenhouse (Fig. 1), patterned after the Brace Institute greenhouse (13) was constructed with the

[1]Received for publication January 30, 1981.

[2]Department of Horticulture.
[3]Present address: Texas A & M University Agricultural Research and Extension Center, Weslaco, TX 78596.
[4]Department of Agricultural Engineering.