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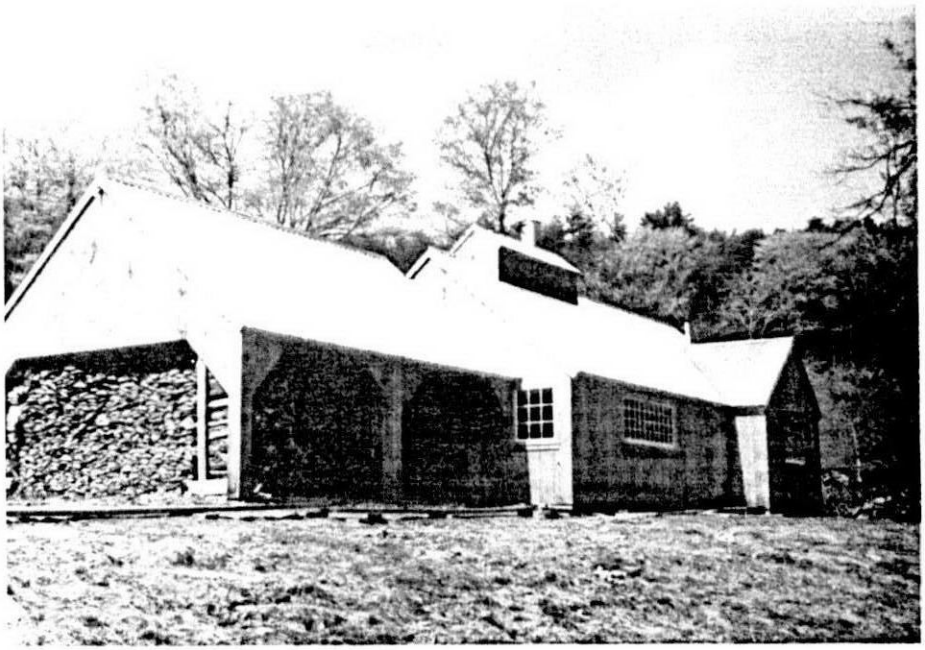

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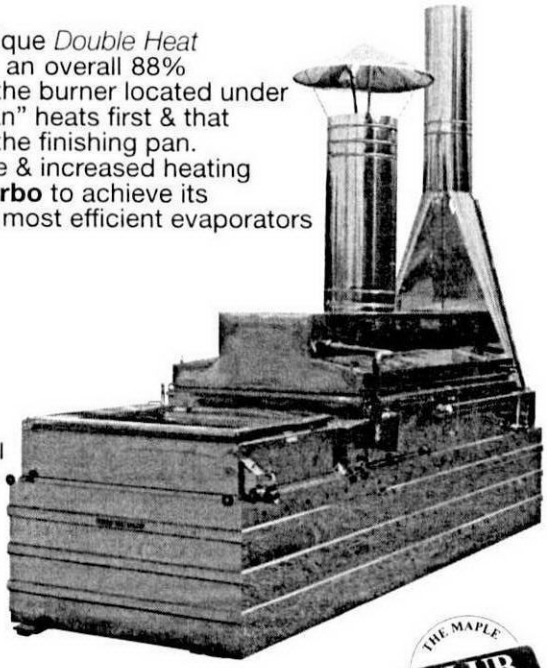

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DIRECTORY

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FIELD EDITORS

Connecticut . . .Gerry Milne—860-283-9851
204 Keegan Road, Plymouth, CT 06782

Indiana . . . . . .Dan Garner—812-824-4406
6776 W. Rockeast Rd., Bloomington, IN 47403

Maine . . . . . .Vicki Schmidt—207-377-6275
PO Box 282, Kents Hill, ME 04349

Mass . . . . . .James Graves—413-625-9066
R.D. 1, Shelburne Fall, MA 01370

Michigan . . . . .John Anton— 517-372-6356
2111 Barrett Street, Lansing, MI 48912

Minnesota . . . . . Carl Vogt—612-425-3742
10304 94th Ave. No. Maple Grove, MN 55369

N.H. . . . . .Jacquie Dearborn—603-726-3257
Box 1040, Rt 1, West Campton, NH 03223

N.S. . . . . . .Maxwell Spicer—902-392-2823
Spencers Island, NS, Canada B0M 1S0

N.Y. . . . . . Mrs. Marion Wells—518-766-2375
RD 2, Box 195, Nassau, NY 12123

Ohio . . . . . .Tom Hoffman—216-659-3061
P.O. Box 326, Bath, OH 44210

Ontario . . . . . .Bill Robinson—519-529-7857
RR 2, Auburn, Ontario, Canada

Pennsylvania . . . . Jim Tice—717-549-5257
427 Tice Road, Mainesburg, PA 16932

Wisconsin . . .Roland Jorns—414-868-3161
4518 Highway T, Egg Harbor, WI 54209

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NORTH AMERICAN MAPLE SYRUP COUNCIL DIRECTORY OF OFFICERS

ROBERT S. SMITH, President
36 Middle Street,
Skowhegan, ME 04976
207-474-3380

AVARD BENTLEY, Vice-President
12 Valley Rd.,
Westchester, NS B0M 2A0
902-548-2973

CARL VOGT, Secretary-Treasurer
10304 94th Ave. No.,
Osseo, MN 55369
612-425-3742

DIRECTORS

Richard Norman. **203-974-1235**
387 County Road, Woodstock, CT 06281

Daniel T. Garner **812-824-4406**
Bloomington, IN 47342

Tom McCrumm **413-628-3268**
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GREETINGS FROM YOUR PRESIDENT

It is almost time for the 37th Annual Meeting of the North American Syrup Council to be held in Lansing, Michigan, October 16-19, 1996. There are a couple of things you should consider. When we left Kingston, Ontario last year, we left a motion "Tabled" that dealt with the NAMSC and IMSI joining in membership. A committee was formed to study the matter, comprised of Mike Girard, Richard Norman, Luc Lussier and myself. The committee has come up with a proposal which I believe will work and it is a proposal of "Declaration of Association Between the NAMSC and IMSI". Your delegate has a copy of the document, contact him or her to get a copy and let the delegate know your feelings. After the plastic tubing session this summer and, knowing that sugarmakers want to make the best product possible, shouldn't we be asking all our equipment manufacturers and suppliers for food grade equipment only?

By the time you receive this it won't leave you much time to think about the couple of things mentioned. Get to your Delegates and let them know how you feel.

Sincerely,
Robert S. Smith
President

FROM THE EDITOR

I received a number of comments on the article about sugaring in Utah. One came from Paul E. Sendak, research forester who sent me material showing that Bigtooth Maples had been tapped in northern Utah in 1973.

Two men, Philip A. Barker and D.K. Salunkhe published their findings in the August 1974 Journal of Forestry.

Paul also included a USDA Forest Service research note showing experimental tapping done on Bigleaf Maples in Oregon in 1970-1971.

Tapping maples in the western states is not new but it is interesting to see that some people still do it.

We appreciate all the articles submitted to us and we try our best to include as many as possible.

I look forward to seeing you folks in Lansing in October.

Editor

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MAPLE SYRUP PRODUCERS MANUAL

The old saying that "good things take time" may well refer to the newly completed "MAPLE SYRUP PRODUCERS MANUAL". A project initiated by the North American Maple Syrup Council in 1988 to up-date and revise the USDA Maple Manual published in 1963 and revised in 1976, came to fruition the spring of 1996. The committee chaired by Russ Davenport of Massachusetts included Fred Winch, New Hampshire; Roger Sage, New York; Dr. Mariafranca Morselli, Vermont; and Clarence Coons, Ontario, Canada proceeded with the project.

Up-to-date information and data was collected and put on computers to be further enhanced, added to and correlated. It soon became evident that more than just an up-date was needed so the decision was made to produce a new manual. After several revisions the new manual was presented to the Printing Office of the U.S. Department of Agriculture. At first they were favorable to the project. But, as time went by we realized that it was in the best interest of the project to see if the council could do the printing. In 1992 Dr. Mel Koeling of Michigan State agreed to do a final edit. He realized that the project would take considerable time so suggested that Randy Heiligman of Ohio State assist in the final edit and publication. Mel and Randy enlisted a number of the industries most knowledgeable people to present the most useful and up-to-date information, charts and pictures to make the manual the best possible.

The leaders who became part of this project came from all over the maple producing area. Along with the original committee I feel they are worthy of mention: Dr. Fred Laing (deceased), VT; Dr. Fred Taylor, VT; Chris Hauge, WI; Dr. Bob Morrow and Lewis Statts, Cornell, NY: Larry Myott, VT; George Cook, VT; George Buzzell, VT; Sumner Williams, VT; Bruce Martell, VT; Henry Marckes, VT; Arthur Merle (deceased), NY; Lloyd Sipple (deceased), NY; Dr. Greg Passewitz, OH; Frank Majszak, MI; Paul Sendak, NH; and M. Lynn Whalen, VT.

This manual will serve the maple industry for many years to come. The North American Maple Syrup Council must receive the credit for the production and completion as they covered the expense and persistence to get the job done.

Also a great "thank you" to Mel and Randy and the members of the original committee for the time and effort required to bring this final success. If I missed someone, please forgive me.

A big "thank you" to all for a "Job Well Done"!

Russ Davenport, project chairman

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SERVING THE MAPLE INDUSTRY SINCE 1979

AMERICAN MAPLE MUSEUM REPORT

PO Box 81
Croghan, New York 13327

By Haskell Yancey, Jr.

It's been some time since the American Maple Museum's May Opening and Induction Ceremony and the New York State Maple Queen Contest, but this is our first opportunity to report about the queen contest.

This year's contest was one of the largest and best in several years. Numerous people from both the Maple Museum and the New York State Maple Producers Association worked hard to make it a success. Of course the contestants, themselves, are the most important part and contribute the most to the success of the contest.

This year six contestants participated. Representing Albany County - Evelyn Gardner, Chautauqua County - Jacqueline Gustaffon, Oneida County - Laurie Jean Fanfarillo, Schoharie County - Angie Wright, St. Lawrence County - Christina Johnson, St. Lawrence County - Martha Holland.

Each of the contestants did an excellent job, making it a difficult task for the judges.

After the various aspects of the contest, the 1995 New York State Maple Queen, Jessica Woodrow from St. Lawrence County passed her crown to Angie Wright from Schoharie County. Angie has gone on to promote maple on several occasions.

Of course, the contest would not have been possible without judges. Serving very well in this capacity were Martha Davenport, Russ Davenport, Shelburne, Mass. and Avis Norman, Woodstock, Conn.

Congratulations to all the contestants and especially Angie Wright, the 1996 New York State Maple Queen.

If you have any questions, you may reach us at 315-346-6356.

NEW HAMPSHIRE SUMMER MEETING FOCUSES ON MAPLE AND TOURISM

By Lucien Blais

On July 20th about 50 producers gathered in Barrington for a meeting hosted by Ken and Harriet Gowen of the Sugar Shack. The sugar house is within a few minutes of the coast and its beaches, making the area one of the top tourist attractions in the state.

Following a morning business meeting and lunch, producers gathered to hear a panel discussion on tourism. This was organized by the newly formed education committee. Panelists included: Rob Robertson, University of NH Professor and specialist on tourism. He addressed current trends in tourism. For example, Heritage based tourism is the fastest growing segment of the tourist industry. Individuals and families today enjoy including educational tours and programs in their vacation plans. Agricultural events must be developed to tap into this market.

Julie Glosner of the Office of Economic Initiatives spoke of the various avenues already available within the state to help producers promote their products. These include a product directory, trade and hospitality shows and a state map identifying where products are made or grown.

Harriet Gowen, owner of the Sugar Shack, addressed her experiences in attracting local and tourist customers. The Gowens host bus tours, do on and off premise catering and serve pancake breakfasts. A key to their success has been networking with other businesses in the area to give their customers other places to visit. The local Chamber of Commerce has also been a good resource.

The presentation was followed by a round table discussion in which producers shared their own marketing experiences.

DEADLINE FOR NEXT ISSUE IS NOVEMBER 1, 1996

CONNECTICUT NEWS

By Jerry Milne

Connecticut enjoyed a good sugaring season. The flow was steady and the quality of the syrup high. Some said the syrup was a little darker with a stronger flavor than usual. There was a steady supply of snow for sugar on snow parties in the northern part of the state, while the southern portions had bare ground in mid-March, only to be covered with a substantial snow again in April.

Sugarmakers had displays at the local fairs, and the CT Association of Maple Syrup Producers had a display for two days in the Connecticut Building at the "Big E, New England's State Fair" in September.

The Association's annual meeting will be Saturday, November 2 in Winsted, CT.

EVALUATION OF THE CONDITION OF SELECTED MAPLE STANDS FROM NORTHWESTERN NEW BRUNSWICK

Research Report

Prepared by:
Richard Barry
Edgar Robichaud
Ecole de sciences forestieres
Universite de Moncton (CUSLM)
Edmundston, N.B. E3V 2S8

Summary

This report presents the results of four years of research activities accomplished within the framework of the project on the evaluation of the condition of selected maple stands in Northwestern New Brunswick and the use of fertilization to alleviate maple decline. The four maple stands, two on each of the two main regolith types: MN and RN stands on the Temiscouata regolith type and BL and GC stands on the Matapedia/Grog Brook regolith type, were selected in 1990 and their crown conditions were evaluated during four consecutive years using the North American Maple Project method. At the beginning of the project, one stand on each regolith type was considered as healthy (RN and GC) while the other (MN and BL) showed signs of moderate decline. The nutrient status at the soil, root, and foliar level of four maple stands were assessed. The effect of fertilization on the crown conditions and on the tree nutrient status was evaluated in the MN and BL stands. The project also included the monitoring of soil temperature and water content in a declining stand (MN) and in a healthy stand (RN). Furthermore, indirect methods for evaluating foliar area, a potential index of health condition, were investigated.

The crown condition of all four stands deteriorated between 1990 and 1994. The most notable deteriorations occurred in the GC stand between 1990 and 1991, and in the MN and BL stands between 1991 and 1992. In the initially healthy stand, this deterioration was mostly observed through increases in crown transparency. In the declining stands, the occurrence of dieback increased substantially during the 1991 season and remained relatively high during the two following seasons. In stands with a high component of red maple, signs of decline were more frequent, and more severe on this species than on sugar maple.

Foliar analysis indicated nitrogen deficiency or near deficiency levels in the two declining stands, low potassium levels in the two declining stands, and low magnesium levels in the four stands. Seven fertilizer treatments consisting of nitrogen, calcium, magnesium, and potassium applied individually or in combinations were applied to 40 declining trees in the MN and BL stands.

The trees selected for the fertilization trial generally improved their crown conditions. However, the effect of this improvement was not linked to the fertilization effect since improvements of the same order were also observed on the control trees. In the BL stand, fertilization seems to

have accelerated the improvement of crown transparency ratings when compared with the control. In that stand, all treatments appeared to have reduced the proportion of trees showing transparency levels above 15% one or two seasons more quickly than for the the control. In both MN and BL stands, the reduction in the number of trees showing transparency ratings above 15% dropped sharply during the years following fertilization, except for the control group where it increased slightly during the second season after fertilization. However, comparisons of the average difference between the levels of symptoms observed during the year before fertilization (1990) and the years following fertilization (1991–92–93) indicated only very few significant changes attributable to treatments. When compared to the control trees, the Mg treatment resulted in a slight but significant increase in crown dieback in the MN stand, and the NCaMgK treatment resulted in a slight decrease in the transparency level in the BL stand.

Analysis of foliar nutrient concentrations in response to fertilization treatments confirmed the low nitrogen status observed at both MN and BL sites. Significant increases in both foliar N concentration and content were observed in all trees which were fertilized with nitrogen. However, only treatments combining N with K, and with the other base cations (NCaMgK) resulted in an increase in N concentration during the two seasons following treatment, indicating that these elements are also deficient in this stand. However, because most of the treatments did not increase the

concentration in base cations during the first season, some desequilibria in the N:base cations (Ca, Mg, K) ratios may have been induced by the treatments.

In the BL stand, treatments NMg, CaMgK, and NCaMgK resulted in a significant increase in foliar calcium concentration during the first season following fertilization, and foliar magnesium concentrations were also increased by treatment NCaMgK. Some desequilibria, expressed by the N:base cations ratios, were also induced by the application of these treatments.

During the summer and early fall of1991, the movement of fertilizers through the soil was monitored using tension lysimeters and ion exchange resin bags. The sampling with tension lysimeters was continued during summer 1992. Although it was not possible to assess the net loss of added nutrients by leaching under the rooting zone, both methods indicated significant losses of ammonium, nitrate and base cations during the first season following fertilization, important losses of base cations during the second year, mostly calcium and magnesium, and lower losses, but still significant during the third season.

Fine root biomass and nutrient content of the two stands on the Temiscouata regolith type (MN and RN) were evaluated. Fine root biomass was higher in the declining site (MN), reflecting the lower fertility of the site and the requirement for a larger root system to access the required nutrients. Roots were also concentrat-

ed nearer to the surface in the MN site, possibly rendering them more susceptible to environmental extremes (i.e. frost, desiccation). Fine root nutrient concentrations generally reflected the foliar nutrient status with lower levels of most major nutrients (except Ca) in the MN site. In contrast, levels of Al were higher in the MN site.

Those root parameters were also evaluated in the MN stand during the second season after fertilization (1992) in order to compare the effect of the treatment on the nutrient status of the root system.

Soil temperatures measured in the rooting zone were generally higher in the declining MN stand than in the healthy RN stand. However, differences between the two stands were always small, being less than one degree C during the three years of observation. Soil frost, a factor proposed as an inciting factor in hardwood decline, was observed in both stands frequently during the three winter seasons at 5 cm, sporadically at 15 cm, and never at 35 cm.

Soil water content measured in both stands were generally very low during the growing season, sometimes reaching levels associated with values of permanent wilting points, notably during early summer 1991 and 1993. The effect of this drought on the progression of decline symptoms in these stands is difficult to assess since these low soil moisture values were observed in both declining and healthy stands.

The method used for the evaluation of the health status of the tree is based on a rating of decline symptoms determined by a visual appreciation of some crown characteristics. In order to identify a more objective method to make this evaluation, the potential usefulness of different tree measurements (diameter at breast high and at the base of live crown, crown volume, sapwood cross-sectionnal area, annual ring area) to predict the foliar area was assessed. Between 10 and 15 trees were sampled in four healthy maple stands and in one declining maple stand. It was found that the use of a linear regression equation combining the cross-sectionnal sapwood area at breast high, the annual ring area of the former growing season measured at breast high, and the crown volume provided reasonably good predictions ($r^2 > 0.91$) of the foliar area. However, the operational applicability of this method for the evaluation of the effects of fertilization on crown conditions remains questionable.

Sugar Synergy

Two Suppliers of Maple-Sugar Tools Mark Their Merger

By Francois Shalom, The Gazette

With a mere 27 years under his belt at the head of a 128-year-old family company, Steve Selby could be considered a stripling.

After all, Small Brothers did hook the gold medal for excellence at the Columbian World Exposition in 1893, and again at the Paris Universal and International Exposition in 1900.

Ninety-six years on, the maple sugaring equipment manufacturer has merged with a parvenu on the scene; Waterloo Evaporators, in business since only 1917.

The companies are venerable but the competition is anything but gentlemanly, Selby said during the official announcement of the merger. "Everyone knows everyone else, but it's a brutal, cutthroat business," said Selby.

Combining forces makes the new Eastern Townships firm, Waterloo/Small Inc., the biggest maker of evaporators and hundreds of other products for the maple-sugar industry, with Canadian sales of about $11 million annually and another $3 million in the U.S.

In 207 years of combined experience, the two companies have undergone strikingly few changes in ownership.

Steve's family has been running Small Brothers ever since his grandfa-

ther, Oscar, acquired the company from the Small family matriarch in 1928. The centenarian's two sons, who founded the company in Dunham the year after Confederation, had both died the previous year.

Waterloo, for its part, changed hands twice before being bought in 1982 by Swiss native Ernest Bieri, who is the new company's president.

"Worldwide," said Selby in an interview, "demand has grown in the last five years from about 40million pounds to more than 70 million pounds."

He credits the Canadian government for the surge. Ottawa has tapped world markets aggressively for the last four years at international trade shows and at forums attended by government agencies.

Consumers needn't worry about inflated prices, Selby said. Maple syrup retails for about $35 a gallon (the industry has yet to adapt to the upstart metric system) but consumer resistance above that price means producers can't jack up the price much higher, even if inventories are at record lows and demand at record highs.

Bieri joked that the main problem he's encountered is "the life span of the equipment."

"We're having problems finding ways to render the equipment obsolete more quickly."

Selby said that he was surprised at the way sales have shot up since the merger was announced in October.

Each with annual sales hovering between $3 million and $4 million, the combined firms are expected to nearly double their revenues for the year ended July 31 to about $13 million. Selby said the companies, both privately held, were profitable for several years before the merger.

Only Canada and the U.S. produce maple syrup. But Quebec has the lion's share with an estimated 70 percent of total output, or an expected yield of about 52 million pounds this year.

The rest of the producers are scattered in northern states from Maine across to Minnesota, a diffuse market in which Waterloo/Small has deep roots, said Selby.

He can't claim credit for two major factors playing into the industry's hands, however. The Canadian dollar makes it tough for his competitors like G.H. Grimm of Rutland, VT and Leader Evaporators of St. Albans, VT. And acid rain, which threatened to defoliate the forests of rock maples, has "stabilized" in the last four years.

EDITOR'S NOTE: The previous article was written in reference to the open house held by Waterloo/Small to celebrate the merging of Waterloo Evaportor and Small Brothers. This event brought over 2500 maple producers from the US and Canada to join in the festivities.

A REEXAMINATION OF THE EFFECTS OF PARAFORMALDEHYDE ON TAPPED SUGAR MAPLES II. DEVELOPMENT OF DISCOLORATION AND DECAY AROUND TAPHOLES

By David R. Houston and J. Chris Fagan

ABSTRACT: The use of paraformaldehyde (PFA) pellets to prolong sapflow remains controversial in light of evidence that the chemical injures wood tissue and promotes decay. The effects of PFA were reexamined to determine the extent to which subsequent taphole closure and internal discoloration and decay also are influenced by the time of tapping and spout removal, and by taphole flushing. PFA markedly increased both the size of the discoloration columns and the incidence and severity of decay columns. Also, tapping at onset of sapflow and removing spouts just before growth resumes appeared to help reduce the incidence and severity of decay. The incidence of decay around control tapholes was reduced when spouts were pulled early. Although most decay columns were relatively small, the presence of decay promoted larger columns of discoloration, and thus resulted in more tissue that was unsuitable for tapping. Of course, columns of discoloration and decay would be larger in older, slower growing, and less vigorous trees than those used in this study.

INTRODUCTION

Pellets containing paraformaldehyde (PFA) are sometimes placed in tapholes behind spouts to prolong sapflow and increase sap yield. The use of PFA has been shown to promote decay of sapwood around tapholes (Shigo and Laing 1970; Walters and Shigo 1978, 1979), and some sugarbush operators claim that the chemical kills cambium around tapholes and delays closure. Despite these accounts, the use of PFA often has been encouraged, partly because of the increased yields that have been reported (e.g., Reynolds 1989) and partly because external damage (cambial dieback, poor closure) often occurs even where PFA has not been used. Indeed, a survey of Wisconsin sugarbushes revealed that cambial dieback and poor closure were associated with such factors as poor tree condition and poor tapping practices (Houston 1996).

In this paper, we report findings of Part II of our study to reexamine the use of PFA and its effects on taphole closure and internal discoloration and decay, and discuss how these effects also are influenced by the time of tapping and spout removal, and by taphole flushing.

MATERIALS AND METHODS

Trees. We used 162 sugar maples, 8-10 inches (20-25 cm) in diameter that were growing on a 10-acre (4-ha) portion of Bear Swamp State Forest near Dorloo, New York. In each tree, two standard tapholes were drilled 2 inches (5.1 cm) deep opposite each other at a height of 4 feet (1.2 m). Each tree was randomly assigned to a group of three trees and received two treatments assigned systematically so that there were two replicates of each treatment for each tree group.

Treatments. The three treatments were: 1. No PFA placed in the taphole. 2. A 250-mg pellet of PFA placed in the taphole behind standard

plastic spouts. 3. As in 2 but the taphole flushed with sterile water after spouts were removed.

All spouts were fitted with a 1-foot (30.5 cm) length of open plastic tubing, curled upward and held in place by a spout clip. This simulated a closed tubing system so that sap could flow from the open end. However, once sapflow began, the loop filled with sap restricted the entrance of air and microbes into the taphole.

In 1991, three different groups of 54 trees each were tapped on January 8 prior to sapflow, on February 21, soon after onset of sapflow, and late in the sapflow season (March 15) (Fig. 1).

Spouts from half of each treatment group were carefully pulled "early" on April 5 (soon after sapflow ceased) or "late" on May 4 (just prior to cambial activity and/or budbreak).

Harvests and Measurements. Groups of 54 trees each, were felled in September of 1992, 1993 and 1994, or two, three, and four growing seasons after treatment. A 2-m-long (6.5 ft.) bolt, centered about the tapholes was brought to the laboratory where it was dissected and measured. Intact bolts were first cross-sectioned through each taphole and a disk was removed. Measurements were made on the disk face of the width and depth of discoloration and decay columns around the tapholes (Fig. 2A). The two bolt halves were then split longitudinally through the opposing taphole columns and overall lengths of the discoloration and decay columns were measured (Fig. 2B). For this study, discolored wood was wood altered in color without a loss of strength; decayed wood was wood altered in color and determined to be softer or weaker than surrounding tissues when probed with a sharp scalpel.

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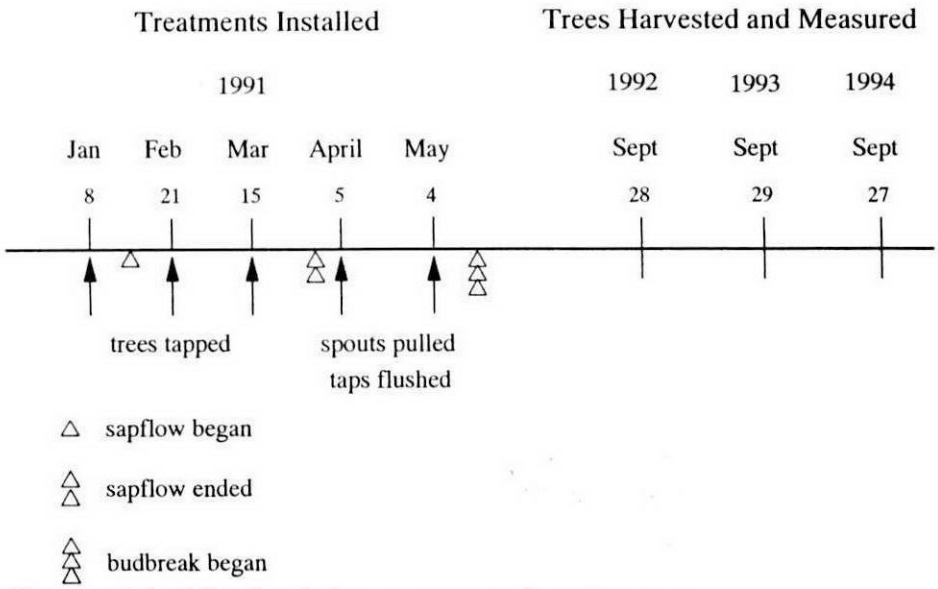

Figure 1. Schedule of taphole treatments and tree harvests.

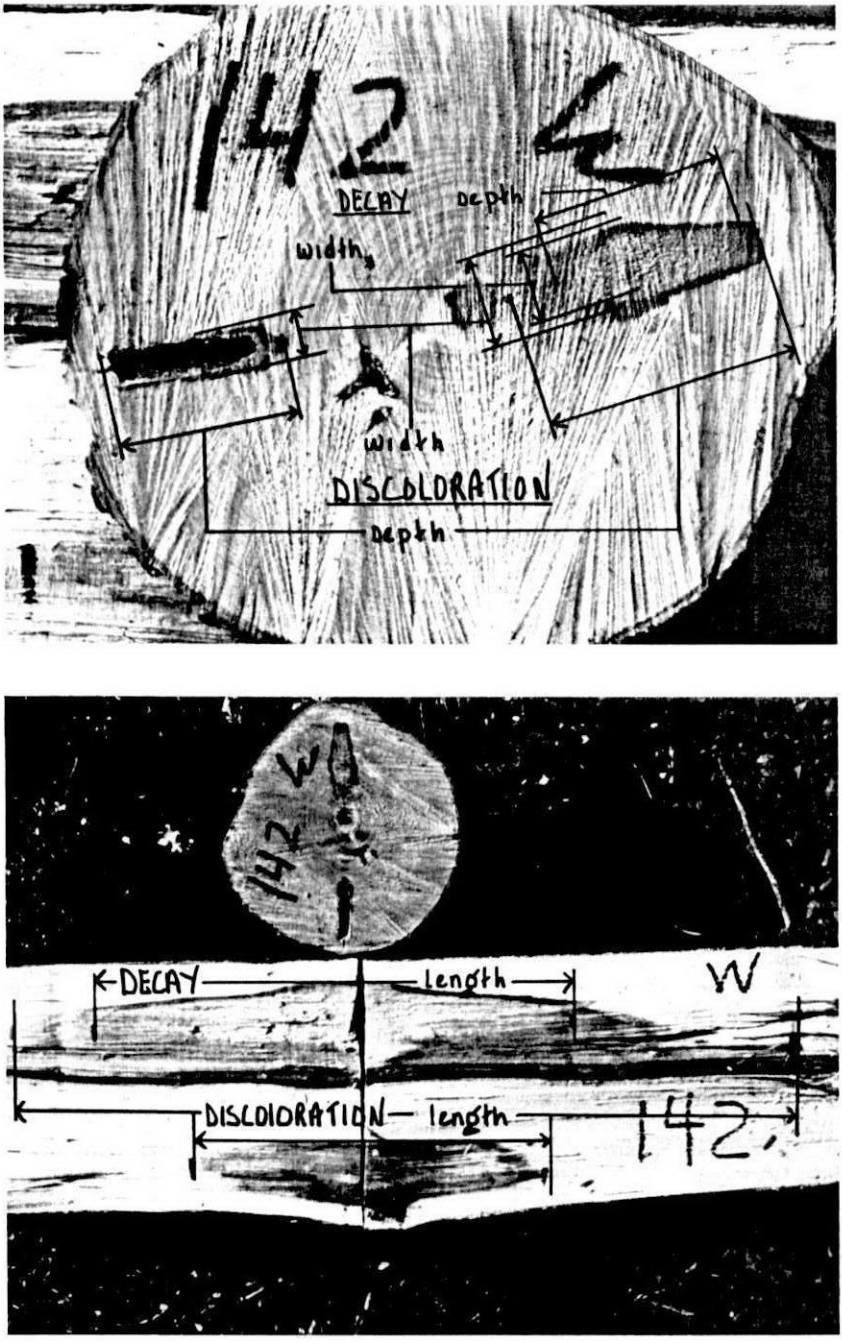

Figure 2. Photo(s) of cross sectional disk (a) and split bolts (b) with typical discoloration and decay associated with the tapholes. Taphole "w" (with decay) had received PFA, the other had not.

The following variables measured on tapholes were evaluated:

1. Tapholes open or closed at time of harvest.

2. Area of cambial dieback calculated as the length x width of the opening.

3. Volume of discoloration columns calculated as the vertical length x tangential width over 2 x radial depth of discolored column.

Number of tapholes with decay.

Volume of decay columns calculated as the vertical length x tangential width over 2 x radial depth of decay columns.

RESULTS

Taphole Closure. PFA did not affect rate of taphole closure. After two growing seasons, about half of the non-PFA and two-thirds of the PFA-treated taps had closed. By the fourth growing season, 97% of the non-PFA and 99% of the PFA-treated taps had closed.

Discoloration. Columns of discolored sapwood were associated with every taphole wound. However, larger columns developed about taps with PFA than about non-PFA taps (Fig. 3). In fact, PFA was the principal factor affecting the volume of discoloration columns (Tables 1-2). For PFA-treated tapholes, columns generally were largest around tapholes made before or well after sapflow (Table 1). After four growing seasons, the very largest columns were around PFA-flushed tapholes that had been made before sapflow (Table 1) and whose spouts

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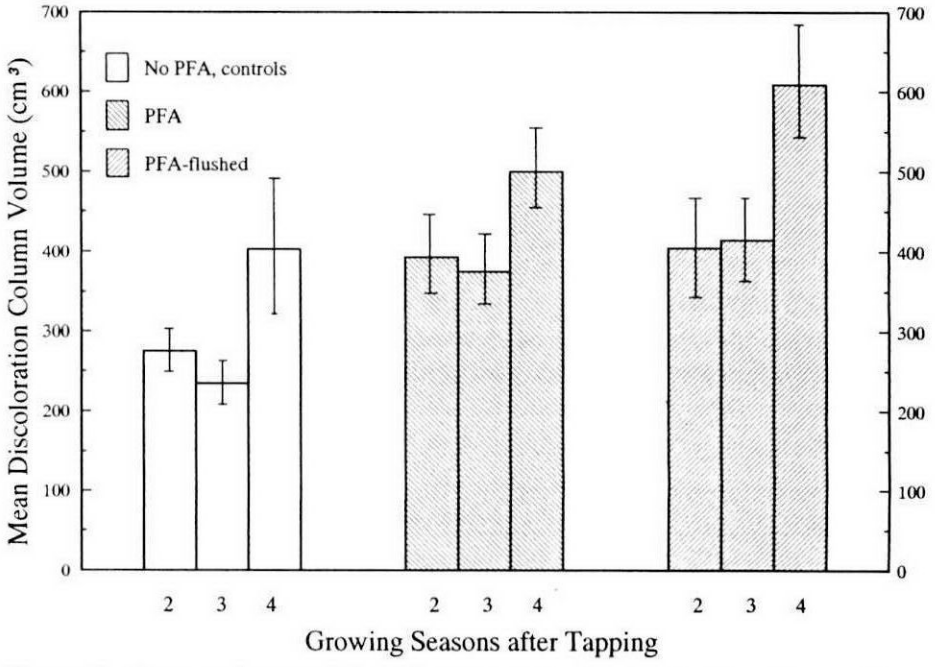

Figure 3. Mean volume of discoloration columns by treatment over time. Columns were measured in September of 1992, 1993 or 1994, two, three, or four growing seasons after tapping in 1991.

had been pulled early (Table 2). The smallest columns after four growing seasons were around non-PFA control tapholes made at the onset of sapflow and whose spouts were pulled late (Tables 1-2).

Decay. PFA increased both the number (incidence) and size (severity) of decay columns. After four growing seasons, 75% of the flushed and 60% of the non-flushed PFA tapholes were decayed compared to less than 25% of the controls. After three growing seasons, significantly fewer PFA-treated taps made in February had decay compared to those made earlier or later (Fig. 4). After three and four growing seasons, considerably more of the control tapholes whose spouts had been removed late were decayed. However, for PFA taps, the reverse was true — tapholes whose spouts were pulled early had consistently higher incidences of decay (Table 3).

Decay columns that developed were consistently smaller about control tapholes than about PFA tapholes (Tables 4-5). The trend for mean col-

Table 1. Mean volume (cm^3) of discoloration columns around tapholes treated or not treated with PFA before (January), at (Februrary), or after (March) the onset of sapflow in 1991, in trees harvested two, three, or four growing seasons after tapping. Means followed by the letter "a" are significantly different ($p < 0.05$) from those followed by the letter "b" as determined by Tukey's Studentized Range Test.

	Growing seasons after tapping								
	2			3			4		
Treatment	*Jan*	*Feb*	*Mar*	*Jan*	*Feb*	*Mar*	*Jan*	*Feb*	*Mar*
No PFA	306	253[b]	264[b]	303	190[b]	209	345	332	537
PFA	437	260[b]	506	393	368	362	552	379	537
PFA-flushed	555	299	348	555	259[b]	440	722[a]	597	508

Table 2. Mean volume (cm^3) of discoloration columns around tapholes treated or not treated with PFA and where spouts were pulled early (April) or late (May), two, three, or four growing seasons after tapping in 1991. Means followed by the letter "a" are significantly different ($p < 0.05$) than those folowed by the letter "b"; and those followed by "c" are significantly different from those followed by "d" as determined by Tukey's Studentized Range Test.

	Growing seasons after tapping					
	2		3		4	
Treatment	*Early*	*Late*	*Early*	*Late*	*Early*	*Late*
No PFA	277[b]	272[b]	199[b,c]	289[b]	474[b]	349[b]
PFA	440	343	356[b]	399	559[d]	450
PFA-flushed	484	322[b]	407	422	711[a]	527[d]

Table 3. Percentage of tapholes treated or not with PFA and whose spouts were pulled either early (April) or late (May) with decay two, three, or four growing seasons after tapping in 1991 (number of obervations in parentheses).

	Growing seasons after tapping					
	2		3		4	
Treatment	*Early*	*Late*	*Early*	*Late*	*Early*	*Late*
No PFA	29% (17)	32% (19)	14% (22)	40% (15)	113% (16)	33% (21)
PFA and PFA-flushed	59% (37)	43% (35)	65% (40)	14% (29)	81% (32)	56% (39)

Table 4. Mean volume (cm^3) of decay around tapholes treated or not treated with PFA before (January), at (February), or after (March) the onset of sapflow in 1991, in trees harvested two, three, or four growing seasons after tapping. Means followed by the letter "a" are significantly different ($p < 0.05$) from those followed by the letter "b" as determined by Tukey's Studentized Range Test.

	Growing seasons after tapping								
	2			3			4		
Treatment	*Jan*	*Feb*	*Mar*	*Jan*	*Feb*	*Mar*	*Jan*	*Feb*	*Mar*
No PFa	23	27	10^b	6^b	3^b	21	37	20	16
PFA	104	39	62	85	41	72	67	46	125
PFA-flushed	46	63	27	102	55	72	141^a	96	124

Table 5. Mean volume (cm^3) of decay around tapholes treated or not treated with PFA two, three, or four growing seasons after tapping in 1991, and whose spouts were removed early (April) or late (May). Means followed by the letter "a" are significantly different from those followed by the letter "b" ($p < 0.05$); those followed by letter "c" are significantly different ($p < 0.05$)from those followed by "d" as determined by Tukey's Studentized Range Test.

	Growing seasons after tapping					
	2		3		4	
Treatment	*Early*	*Late*	*Early*	*Late*	*Early*	*Late*
No PFA	18^b	23^b	$2^{b,d}$	22^b	$2^{b,d}$	42^b
PFA	78^b	55^b	60^b	75	111^c	53^b
PFA-flushed	54^b	36^b	70^b	84	171^a	79

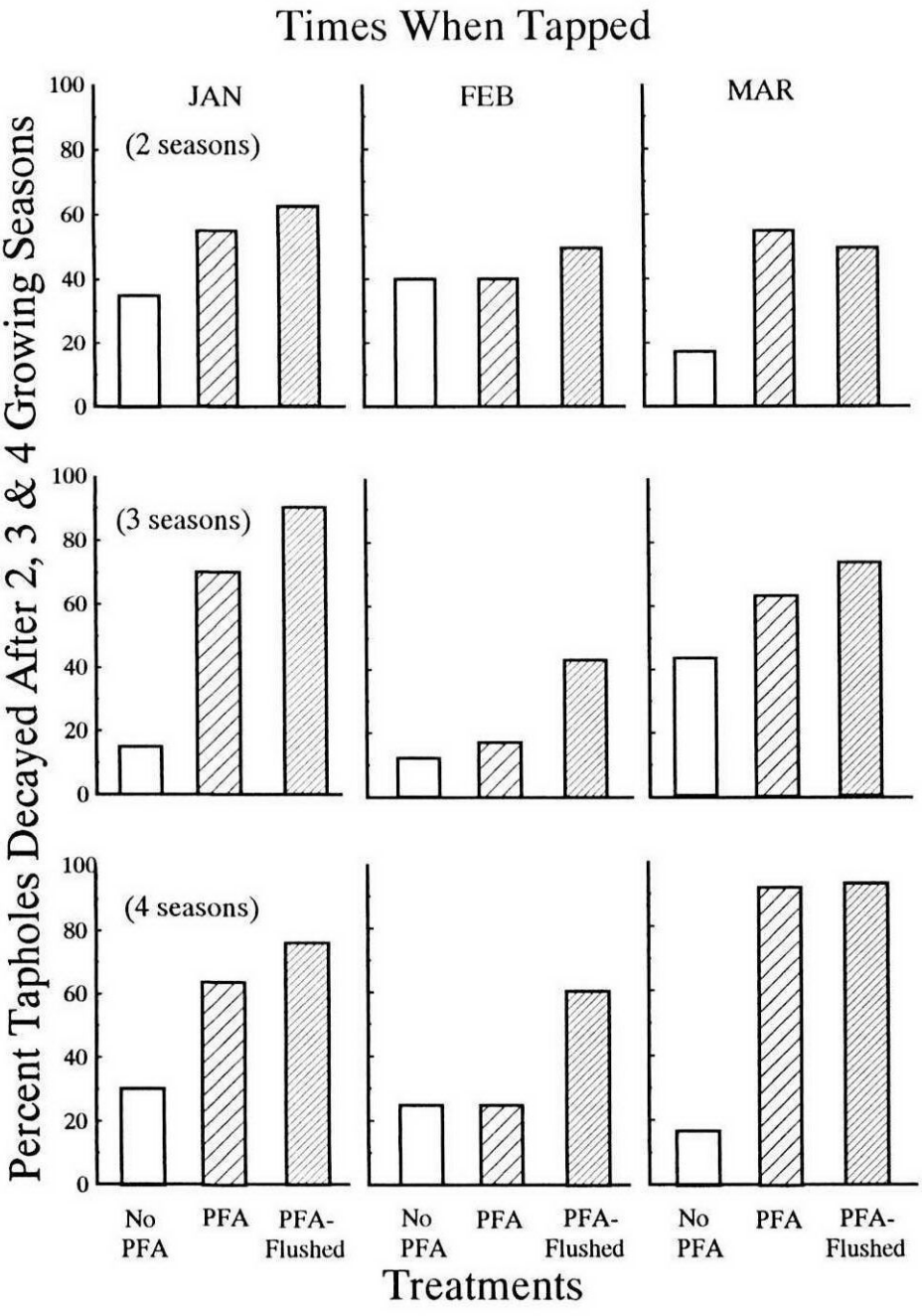

Figure 4. Percentage of tapholes decayed by treatment over time in relation to time of tapping (January, February, or March) in 1991. Tapholes were examined in September of 1992, 1993, or 1994.

umn size to increase over time for the two PFA treatments reflects the increase over time in numbers of tapholes with decay within these treatment groups. For PFA-treated tapholes, the mean volume of decay columns was largest around those installed before or well after sapflow began (Table 4), and especially around tapholes whose spouts were pulled early (Table 5). For the controls, decay columns were largest about taps whose spouts were pulled late (Table 5).

DISCUSSION AND CONCLUSIONS

Two basic questions are addressed in this study: To what extent does the use of PFA alter the natural ability of the tree to set and maintain (compartmentalize) its defensive barriers around tapholes? And to what extent are these effects influenced by when the wounds are made and when spouts are pulled?

Taphole Closure. Treating tapholes with PFA did not cause dieback of cambium around tapholes or prevent or retard taphole closure in this or previous experiments (Walter and Shigo 1978, 1979). Abiotic and biotic factors that adversely affect tree growth and vigor and practices that physically damage bark tissues around tapholes seem to be associated with poor taphole closure (Houston 1996).

Discoloration. Wounds in trees invariably result in the development of discoloration columns. From the outset, the use of PFA and to some extent the time of tapping during the sapflow season strongly influenced the size of discoloration columns. These columns continued to increase in size for at least four growing seasons after tapping, especially around PFA tapholes. Yet, columns were longest and largest around tapholes that had been both made and flushed the earliest. This suggests that the chemical first impairs the surrounding wood tissue's ability to compartmentalize its wounds and later to retard invading stain and decay-causing

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microorganisms. Flushing PFA from tapholes, particularly if done early, may allow subsequently invading organisms to rapidly grow in "weakened" tissues prior to the resumption of active spring growth.

That PFA strongly increases the volume of discoloration columns is an important finding where sap production is concerned. Columns of discolored tissues neither store sugars nor transport sap. Consequently, their presence determines the availability of future tapping sites. Also, their size and shape establishes the potential limits of subsequent decay columns (Shigo and Hillis 1973). The complex interactions between discoloration and decay is further demonstrated by studies (Shortle et al, 1995) that indicate that the spatial limits of discoloration (column sizes) may be increased by the presence of decay fungi.

Decay. Decay develops in trees that are wounded, i.e., within tissues that have become discolored. With respect to decay, the questions addressed here are: To what extent does PFA first increase the likelihood of decay? To what degree does it facilitate the decay process? And to what extent does the presence of decay increase the size of the associated discoloration columns?

PFA treatments resulted in more than twice as many tapholes becoming decayed compared to the controls (and, therefore, twice as much decay) for those treatments. The actual average sizes of the decay columns that resulted also were larger. While trees

in this study were smaller than recommended (e.g. Houston et al. 1990) for operational sugarbushes,they were young and vigorous, their taphole wounds closed quickly, and their internal compartment barriers probably became established rapidly. It is likely that decay volumes would be larger in old trees or in trees under stress.

Our results indicate that treating tapholes with PFA increases the size of the discoloration columns, and that these columns continue to enlarge for at least four growing seasons after tapping. Further, the establishment of decay columns is increased in both number and size when PFA is used. Yet, the question remains: Are these effects important to the tree or to the sugarbush?

One way to answer this question is to project our results over time — given certain assumption of practice and tree condition. If we assume that a tree will be tapped only after reaching a dbh of 12 inches, that there will be two taps per year, that tapping and its effects will be limited to a 4-foot section of stem, and that the tree will grow 1 inch in diameter every 10 years, we project that:

1. Without PFA, about 9% of the outer 3 inches of wood in the tapped section will be discolored in 10 years; about 15% of the outer 4 inches will be discolored after 20 years.

2. With PFA, these values will be about 15% (10 years) and 23% (20 years), and thus in our hypothetical tree represent an increase of 6-8% (compared to no PFA) in sapwood rendered unsuitable for tapping due to discoloration.

We found that the volume of decayed wood around tapholes was relatively small even though significantly more decay columns developed when PFA was used. From our results and the assumptions given earlier, we project that when PFA is used, about 2.2 to 3.4% (10 to 20 years) of the tapable sapwood will be decayed compared to 0.6 and 0.9% with no PFA. That discoloration columns increase in size when they are invaded by decay organisms (Shortle et al. 1995) results in an additional and perhaps even more important effect of decay on sap production.

Factors that could alter these values adversely include tapping slow-growing trees (very old trees and trees under intense competition for light, moisture, and nutrients growing in sugarbushes that are too crowded), the occurrence of external stress factors that slow growth and prevent

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rapid taphole closure (e.g., drought and insect defoliation), and over tapping (increased tapping intensity or tapping undersize trees).

It should be pointed out that with respect to sap production, discoloration columns are more important—because of their larger size—than the decay columns that follow. Columns of discoloration do not store sugars or transport sap. We project that in our hypothetical trees, after 20 years, 23% of the tapable wood in the 4-foot stem section would be discolored if PFA is used versus about 15% if PFA is not used.

An important factor is the distribution of the discoloration and decay columns associated with tapholes. Thus, in a tree 12 to 14 inches in dbh, even 23% of the tapable wood with discoloration distributed as many separate columns could be damaging, especially if they are concentrated in a limited area. Of course, this volume would be a significantly larger proportion of the available sapwood in trees smaller than 12 inches dbh.

LITERATURE CITED

Houston, D.R. 1992. Effects of paraformaldehyde on sugar maples tapped for sap. I. Survey of damage in some Wisconsin sugarbushes. Phytopathology 82:116. (Abstract).

Houston, D.R. 1996. A reexamination of the effects of paraformaldehyde on tapped sugar maples. I. Survey of some Wisconsin sugarbushes. Maple Syrup Digest Vol. 8A(2) 12-16.

Houston, D.R., D.C. Allen and D. Lachance. 1990. Sugarbush management: a guide to maintaining tree health. USDA For. Serv. Gen. Tech. Rep. NE-129. 55 p.

Reynolds, L. 1989. Editorial. Maple Syrup Digest 1A(1): 16–17.

Shigo, A.L. and W.E. Hillis. 1973. Heartwood, discolored wood, and microorganisms in living trees. Annu. Rev. Phytopathol. 11:197–222.

Shigo, A.L. and F.M. Laing. 1970. Some effects of paraformaldehyde on wood surrounding tapholes in sugar maple trees. USDA For. Serv. Res. Pap. NE-161.

Shortle, W.C., K.T. Smith, K.R. Dudzik and S. Parker. 1995. Response of maple sapwood to injury and infection. Eur. J. For. Path. 25:241–252.

Walters, R.S. and A.L. Shigo. 1978. Discoloration and decay associated with paraformaldehyde-treated tapholes in sugar maple. Can. J. For. Res. 8(1): 54–60.

Walters, R.S. and A.L. Shigo. 1979. Paraformaldehyde-treated tapholes: effects on wood. Natl. Maple Syrup Dig. 12(2): 13–18.

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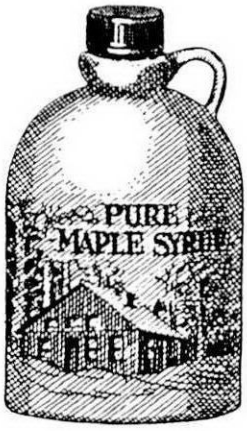

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SYRUP PRODUCTION UP 43 PERCENT OVER '95

U.S. maple syrup production in the 10 major producing states totaled 1.6 million gallons for 1996, up 43% from last year. This is the highest production recorded since 1992. The preliminary crop value is $37.2 million, up 20% from 1995.

U.S. maple producers generally experienced favorable weather and temperatures allowing for the best production run in recent memory. The season started a few days later and ended a week later than last year, giving producers a few additional days for sap collection and boiling.

Excessive snow cover hampered production in northern Wisconsin and Michigan but was more than made up for in southern areas of the two states.

Colder temperatures in Northern Maine during March and April slowed sap flow in that area. Syrup color was slightly darker than last year in New England and Ohio; while the rest of the producing region had mostly lighter syrup.

Sugar content averaged higher than last year across the U.S. Vermont led U.S. production with 550,000 gallons of syrup. New York production at 343,000 gallons was the second highest. The 167,000 gallons produced in the state of Maine makes them the third leading state. Increased syrup supplies are expected to be reflected by lower 1996 prices.

(Prepared by the New England Agricultural Statistics Service.)

DEADLINE

FOR NEXT ISSUE IS

NOVEMBER 1, 1996

IMSI NEWS

I cannot remember a summer with any nicer weather than we have had. Especially temperatures were not too hot. However, the farmers are concerned about crops maturing due to the cool temperatures. But all in all, things look pretty good. Well, that is the bad news. I guess in all of my experience, I have never seen the maple industry more healthy. Everybody seems to be making some money. The price is good to the producers, packers are able to acquire adequate supplies at profitable margins, and the price to the consumer has not gone out of line. In my opinion, the state of the maple industry is just fine.

At the recent IMSI meeting, the committee to analyze the possibility of a cross membership between the IMSI and the NAMSC offered a "Declaration of Association". I salute the committee's efforts in introducing a resolution to a very difficult situation. And, whether you call this resolution a "Declaration of Association" or a "Cross Membership" is of small significance. The real significance of this potential agreement is that a formal working relationship shall be established between the two International Maple Organizations. The time is right and this is the final step in establishing a total industry representation. With the two Boards approval of this document, a "world working relationship" will have been established between the IMSI, the NAMSC, the Regroupement, the Federation, and all 16 of the Provincial and State Maple Associations. In my opinion, this may be the most significant positive step in maple industry history. For the first time ever, the world maple industry shall set down at the table and discuss mutual maple concerns four times a year with total representation. This should be paramount in providing maximum communication. I urge both the IMSI and the NAMSC Boards to approve this agreement at the upcoming convention in Lansing, MI.

The IMSI Board at a recent meeting accepted a resolution to support EUROFINS in securing an AOAC approval of the Sniff NMR test specifically for pure maple syrup. This will the be final step in establishing integrity to the maple industry's accepted test for adulteration. As you are aware, both the IMSI and the NAMSC Board has passed resolutions to establish the EUROFINS test as the accepted method to check for adulteration. Considerable research dollars of yours have gone into developing this test. I am informing you that this test is being utilized in determining the purity of syrup in the market place. It has been effective. And, it is being accepted by those of major concern as reliable. The AOAC will simply amplify the effectiveness and credibility of this necessary tool. As technology develops, something better may come along, but as of now, I believe we have the best. You can be proud that your organizations have pursued this adulteration deterrent to its fullest. This approval by AOAC will just make it stronger.

There comes a time each year when we have the opportunity to assemble as an industry. The time is here. I hope all of you are considering coming to Lansing, Michigan, for the

annual convention of the NAMSC and the IMSI, October 16 through 19, 1996. Let me make sure that you feel welcome to come. This is your chance to associate, socialize, and to express your concerns. Come join your fellow syrup makers. You will have a great time. See you in Lansing.

Lynn Reynolds
Executive Director

MAPLE SYRUP/WOOD PRODUCTS EXTENSION ASSISTANT PENN STATE

Penn State's School of Forest Resources seeks applicants for a maple syrup/wood products extension assistant with responsibilities to support Pennsylvania's maple producers by preparing and distributing educational materials, conducting educational programs, and training other educators. The assistant will perform similar duties in wood products processing.

Preference will be given to candidates who have a bachelor's or master's degree in forestry or wood products and related work experience. Candidates should possess teaching, evaluation and program development skills, along with positive human relations and effective communication skills.

The initial appointment is for one year, beginning January, 1997, and is renewable for two additional years. The closing date for applications is October 31, 1996, or until a suitable candidate is found.

Applications and a detailed position announcement are available by writing or calling Human Resource Services, Box FR1, 307 Agricultural Administration Building, The Pennsylvania State University, University Park, PA 16802, (814) 863-3452.

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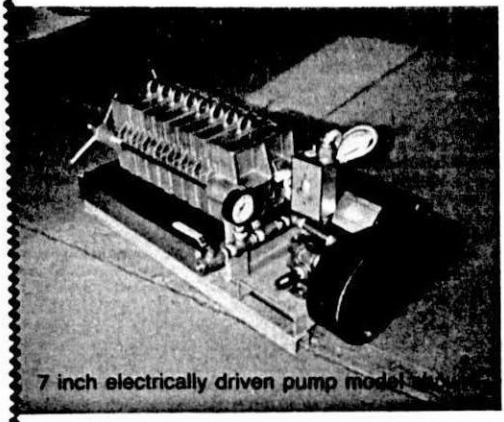

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REMINDER
Research Proposal Guidelines

Research projects may be submitted for consideration based on the following guidelines:

(1) Proposals must be received no later than July 1, 1997 for consideration in 1997. Proposals received after that date will be considered in 1998.

(2) Proposals shall be complete and detailed in content. However, proposals shall contain a short concise cover statement briefly explaining cost, scope, objective, procedure, and anticipated value to the maple industry.

(3) Proposals shall contain detailed estimated cost breakdown, within the detailed report.

(4) Proposals shall be submitted with a minimum of forty (40) complete copies.

(5) Proposals must contain a complete reference section listing and explaining any similar or duplicating research previously accomplished. Proposals for duplication of previously completed research must contain detailed explanations of why such duplication is warranted.

(6) Results or progress of funded projects must be presented annually at the convention of the NAMSC and must be published in the Maple Syrup Digest as soon as possible after completion.

(7) Send proposals to: Lynn H. Reynolds, Research Committee, North American Maple Syrup Council W10010 Givens Road, Hortonville, WI 54944.

Remember: July 1 Deadline.

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