

*The*

JULY 1973

# Boxwood Bulletin

A QUARTERLY DEVOTED TO MAN'S OLDEST GARDEN ORNAMENTAL



Large Boxwood in front of Rouss Hall University of Virginia, Charlottesville, Virginia

*Photo by Ralph Thompson*

Edited Under The Direction Of  
**THE AMERICAN BOXWOOD SOCIETY**

President ----- Rear Admiral Neill Phillips  
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 2nd V. P. ----- Mr. Alden Eaton  
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 Va.

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# The Boxwood Bulletin

July 1973

Vol. 13 No. 1

EDITOR — MRS. EDGAR M. WHITING

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# THE MAIL BOX

May 11, 1973

27 April 1973

Mr. Henry J. Hohman  
Kingsville Nursery  
Kingsville, Maryland 21087

Dear Mr. Hohman:

As a small token in appreciation of your outstanding contributions to the Boxwood Society, as well as to the plant world in general, it was unanimously voted at our annual meeting in Charlottesville on May 9th that you be made an HONORARY LIFE MEMBER of The American Boxwood Society.

Your work has been an inspiration to all our members and merits our deepest respect and gratitude.

Please accept our wishes for the very best in your future endeavors.

Sincerely yours,  
Mrs. Andrew Kirby  
Secretary-Treasurer

---

May 17th, 1973

Mrs. Andrew Kirby, Sec'y-Treasurer  
The American Boxwood Society  
Boyce, Virginia, 22620

Dear Mrs. Kirby;

The many compliments and honors given to me, help me to feel my services in the field of horticulture during the past 61 years, have been a success. I am deeply grateful for the fine honor given to me from all the members of The American Boxwood Society,

'Honorary Life Member'

and I cherish this great honor.

I want to thank each and every member of the American Boxwood Society, and to extend sincere best wishes to each one.

Sincerely,  
Henry J. Hohman

Dear Mrs. Whiting,

I feel most complimented by your publishing my "Air and Water" article in the April 73 issue. I hope that it does not give the impression of an intellectual combat with Bob Lambe — it seems generally agreed that some of these pathogenic fungi proliferate under wet conditions and that plants weakened by other causes are more susceptible to serious damage from parasitic fungi and bacteria. I do feel, however, that our basic problem is still open to question: do we have a new, unexplained, disease epidemic? a purely environmental problem of low soil oxygen content over time? or an interrelated complex situation where excess water, low oxygen and population explosions of several pathogenic organisms have combined? *In any case, a rigorous research study program to isolate the damaging organisms and to propose countermeasures is a necessity.*

In the meantime, since it is not certain which organisms are the trouble-makers and no fungicide recommendations are available, I am taking the following actions (and recommending same to others who have asked for advice) for plants showing symptoms of weak roots and chlorotic foliage:

a. Heavy pruning, including removal of both dead and weak twigs.

b. Eliminate excess surface water from planting area.

c. Heavier fertilization in February or March (25 to 30 lbs/1000 square feet of 10-10-10 granules), followed about 1 May with a liquid feeding (Peters 20-20-20 at standard rate) and in mid summer another liquid feeding with no nitrogen (Peters 0-24-30).

d. Broadcasting dolomitic limestone, at any time, if soil test shows low calcium/magnesium content. (Mine does not).

Sincerely,  
William A. Gray

# Minutes of the Thirteenth Annual Meeting

## of the

# American Boxwood Society

The Thirteenth Annual Meeting of the American Boxwood Society was held on Wednesday, May 9, 1973, in Charlottesville, Virginia, at Newcomb Hall, University of Virginia. The meeting was convened at 10:30 A.M. by the President, Rear Admiral Neill Phillips, who announced that a quorum was present. He stated it was gratifying to have such a fine attendance of members and guests. There were 75 members registered by the Secretary, in addition to friends and guests.

The minutes of the Twelfth Annual Meeting held May 10, 1972, were approved as published in the July 1972 issue of the Boxwood Bulletin.

The report of the Secretary-Treasurer, Mrs. Andrew C. Kirby, for the year ending April 30, 1973, was presented and approved. The complete report is appended herewith. The report was received with thanks and the Chairman declared that ABS is indebted to Mrs. Kirby for her efficient and detailed work on this job.

A discussion of the financial status of the Society for the coming year followed. The Society's commitment to the University of Maryland has been paid in full. We are obligated to Virginia Polytechnic Institute and State University for the two-year program of research in boxwood decline in the amount of \$5,000 for the second year, beginning July 1973; provided that the ABS Executive Committee finds that furnishing this sum is feasible. After consideration of the normal twelve-month expenses of the Society, it was announced that at present the Society appears to be approximately \$2,000 short of the \$5,000 goal. The President said that this matter will be the subject of a special report to be published in the next Bulletin.

The President displayed a new gavel which has been presented to the Society by Col. Thomas E. McCracken of Glen Allen, Va. The gavel was lathe-turned as a school project by Col. McCracken's son, from boxwood that had blown down and broken during hurricane Hazel. It is a beautiful example of boxwood work, showing the smooth creamy texture and interesting graining. Col. McCracken also contributed a Life Membership in ABS in the name of his son, Gustavus R. McCracken. A vote of thanks was given to Col. McCracken and his son for this generous and imaginative contribution.

The editor of the Boxwood Bulletin, Mrs. Whiting, made her report. She pointed out that the serious crisis in boxwood decline has led to a good deal of space being devoted recently to "boxwood troubles." She hopes to balance these with others on the pleasures and rewards of boxwood growing, and is always desirous of articles and pictures.

Mrs. Whiting reported that the American Boxwood Society was one of the "single plant" societies represented at the Chicago Flower and Garden Show on March 25th. This very successful exhibit was arranged and carried out by one of our Illinois members, Mrs. Charles Lindsay. Registration at the booth showed the gratifying interest in boxwood of many people in the Middle West. A vote of thanks was extended to Mrs. Lindsay for this accomplishment.

Mrs. Whiting expressed her thanks to Mr. Joseph Alsop for his fine appreciation of Mr. Henry Hohman, which Mr. Alsop permitted ABS to reprint in the April Bulletin from his syndicated column. It was noted that the Royal Horticultural Society at its Annual General Meeting in London in February 1973, had awarded its highly-prized Vietch Memorial Medal to Mr. Hohman. Mrs. Whiting closed with a motion that Honorary Life Membership in the American Boxwood Society be extended to Mr. Hohman. This motion was seconded by Dr. Singleton and unanimously carried. Mrs. Kirby was asked to send to Mr. Hohman an official notification of this action.

The next order of business was the election of directors and officers. The Nominating Committee consisted of Mr. Woodson P. Houghton, Chairman; Mrs. Edgar M. Whiting and Dr. Ralph Singleton. Mr. Houghton nominated and Dr. Singleton seconded the names of Mr. Alden Eaton, Rear Admiral Neill Phillips, Dr. Henry T. Skinner and Professor A. S. Beecher, whose terms expire in 1973, for election to succeed themselves as directors for a term of three years commencing May 1973. There were no nominations from the floor. By unanimous vote the above-named directors were so elected. With these elections, the Board of Directors stands as follows:

|               | Term Begins | Term Ends |
|---------------|-------------|-----------|
| Mrs. Whiting  | 1972        | 1975      |
| Dr. Singleton | 1972        | 1975      |
| Prof. Beecher | 1973        | 1976      |

|               |      |      |
|---------------|------|------|
| Mr. Eaton     | 1973 | 1976 |
| Adm. Phillips | 1973 | 1976 |
| Dr. Skinner   | 1973 | 1976 |

The Executive Committee consists of the President, 1st Vice President, 2nd Vice President, Secretary-Treasurer, and the Editor of the Bulletin.

The Nominating Committee presented the names of the following officers for the year 1973-74:

Rear Admiral Neill Phillips — President  
 Dr. J. T. Baldwin, Jr. — First Vice President  
 Mr. Alden Eaton — Second Vice President  
 Mrs. Andrew C. Kirby — Secretary-Treasurer

There were no nominations from the floor. A motion was unanimously passed that the above-named officers be elected for the year 1973-74.

The Director of Blandy Experimental Farm, Mr. Tom Ewert, presented his report. He gave a brief history of the Farm and described its aims in horticulture education. Blandy has been neglected for some time and now the University of Virginia under the supervision of Dr. B. F. D. Runk is carrying out a program to revitalize it, to make it more useful, and to have it open for the public to enjoy. Changes are being made in the gardens, specimens are being relabeled and other improvements accomplished. Dr. Singleton asked that Mrs. Ewert be recognized for her work in holding adult education classes at Blandy.

The President then made his report, commencing with the request that every person present at the meeting take an application blank for membership in ABS and strive to sign up one new member — "Every Member Get A Member."

He next read a letter from Dr. Wagenknecht, the ABS official Registrar. Dr. Wagenknecht described the difficulty he is encountering in naming new specimens. He hopes to have a Revised Registration List ready by next summer or fall.

Dr. Skinner's retirement as Director of The National Arboretum was noted, and the President stated with gratification that Dr. Skinner is willing to continue as a Director of ABS and provide the Society with his invaluable experience and advice. In February, 1973, Dr. Skinner was made a Vice-President of the Royal Horticultural Society in London.

The President presented our host for the day, Dr. B. F. D. Runk, who stated it was a pleasure to welcome ABS to the University of Virginia and said that Mr. Jefferson would have been pleased to see us here today. He described the planned tour of the University gardens, which have been restored by the Garden Club of Virginia; and said that there

would be a drawing for the door prize, a Columnar Box contributed by Blandy Farm, at the end of the meeting.

The program was the next order of business. Dr. Francis C. Stark, Head of the Department of Horticulture at the University of Maryland, introduced Mr. Wayne Hefley, graduate student at the University of Maryland in charge of the Nutritional Research Project. Mr. Hefley gave an informative presentation accompanied by slides on the Nutritional Project sponsored jointly by the University of Maryland and the American Boxwood Society. The results of this project will be printed in the Bulletin for the information of the members.

The meeting adjourned at 12:30 P.M. for lunch, and reconvened at 1:30 P.M.

The program for the afternoon was presented by the representatives from V.P.I.: Dr. W. H. Wills, Dr. R. C. Lambe, and Mr. George Montgomery.

Dr. Lambe told of several publications available by writing V.P.I. that would be helpful to members. (List will be printed.) Dr. Lambe discussed the status of boxwood decline in Virginia and showed slides depicting the seriousness of the various maladies.

Mr. George Montgomery, the graduate student who has been with VPI for one year conducting the research program on boxwood diseases in cooperation with ABS, outlined his plans for future work. They are to compare disease symptoms in the field with those in the greenhouse, check further on root damage found at Waterford and other locations, take soil samples from affected areas, make a geographical survey of diseased plants, conduct temperature studies, etc. His talk was illustrated with slides showing various stages of diseased plants. His lecture and pictures served to remind and convince the members of the essential need for continuing research in this field.

Dr. Wills expressed appreciation for the interest and financial aid given by ABS for research on decline of boxwood. He continued on the subject by describing techniques and plans for future analysis; and expects to devote more of his time in the future to help find a solution to this disturbing situation.

The President stated that at Heronwood an infestation of pathogens in English box appeared to have been checked; at least for the time being. In every case as soon as discoloration of leaves appeared the bush was pulled up by the roots and burned. All loose soil was removed from the hole. In one instance (following Dr. Lambe's suggestion) the hole was drenched with NEMAGON (tsp./gal. water) and also with BENLATE (1 tbs./gal. water). Both Ne-

## NEW MEMBERS

magon and Benlate were used because examination at VPI indicated that the plant was suffering from a combination of nematodes and fungus. In several other instances, only Benlate was used to drench the holes. These treatments appear to have stopped the continuance of trouble in these particular English boxwood plantings. In March, 1973, some English boxwood bushes in another part of the gardens began to show the dreaded red and bronze discoloration. Bushes were left in place, and crowbar holes were made in the ground. On the theory that the fungus infection might be caused by acidity, we made up a supply of lime water (1 qt. dry slaked lime to 5 gal. water) and poured it down the crowbar holes and also on top of the ground around the bush. Bushes appear to have returned to normal health.

At the end of these presentations, the President on behalf of the entire ABS membership expressed the deep gratitude of the Society to the University of Maryland and VPI for their work and for assigning to the projects men of such dedication and ability. Transcripts of their reports will be published in the Bulletin.

Admiral Phillips thanked the University of Virginia authorities, and Dr. Runk in particular, for the kind hospitality extended to ABS and for the privilege of being in such an historical atmosphere. The door prize (another columnar box plant) was drawn for, and Mrs. Emily Browning, Charles City, Va., was the winner.

The meeting was referred back to Dr. Runk, who introduced Mrs. George Cochran, President of the Garden Club of Virginia, together with Mrs. Dure and Mrs. Shea. Mrs. Cochran talked on the history of the gardens at the University with their original design by Thomas Jefferson and their restoration by the Garden Club of Virginia.

The meeting was adjourned at 3:30 P.M. and the members and friends then were guided on a tour of the University Gardens by Dr. Runk, Mrs. Cochran, Mrs. Dure, and Mrs. Shea.

Respectfully submitted,  
Ruby P. Dove, Recorder

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*A recent move of the Boxwood Bulletin's storage room revealed a still fairly large supply of the special issue (the only one we have put out in our first 12 years) edited by Dr. J. T. Baldwin, Jr., dealing with "the relatives of Buxus - namely, Sarcococca, the African Boxes, Styloceras, Pachysandra and the desert Boxwood, Jojoba.*

- Alley, Timothy A. Route 519, Stockton, N.J.  
Alsop, Stewart, 3520 Springland Lane, N.W.,  
Washington, D.C.  
Badger, Mrs. David H., 341 Crum Creek Lane,  
Newtown Square, Pa.  
Bland, Mr. George C., 711 Paper Mill Road,  
Philadelphia, Pa. 19118  
Boyd, John Michael, Rt. 1, Box 93E, Leesburg, Va.  
Brent, Samuel R., 8653 Trabue Road, Richmond, Va.  
Browning, Mrs. O. J., Epps Island Farm,  
Charles City, Va.  
Colonial Williamsburg Foundation, P. O. Box C,  
Williamsburg, Va.  
Cox, Thomas E., 923 Rolandvue Road, Towson, Md.  
Cox, Mrs. Thomas E., 923 Rolandvue Road,  
Towson, Md.  
Davis, Mrs. Mary, 35 Monterey Drive  
Charlottesville, Va.  
Evans, Mrs. G. Heberton, 6134 Barroll Road,  
Baltimore, Md.  
Dr. and Mrs. James G. Gay, "Mansfield," Richmond  
Road, Lexington, Ky.  
Gunston Hall Plantation, Gunston Road, Lorton, Va.  
Hudson, Mack E., Box 116, Clarksville, Va.  
Hulse, Gerald S., 481 Herbertsville Road,  
Brick Town, N.J.  
Lahman, Mrs. John S., 10 Apple Tree Lane,  
St. Louis, Mo.  
Lohse, Austin W., 7 Taylor Road, Short Hills, N.J.  
McCracken, Gustavus R., Box 250A, Route 3,  
GlenAllen, Va.  
McSwain, H. C., Kilmarnock, Va.  
Munro, Mrs. Conway, 110 N. Elizabeth Avenue,  
Ferguson, Mo.  
Poor, Dr. Robert W., 4408 White Avenue,  
Baltimore, Md. 21206  
Sayles, Peter F., Box 913, Middleburg, Va.  
Steuart, Dr. R. Calvert, Box 2107, Upper Marlboro,  
Md.  
Stuart, Mrs. Charles, Rose Hill, Port Tobacco, Md.  
Taylor, Dr. Allen, 1711 W. Sixth Street,  
Greenville, N.C.  
Trefny, Rudolph S., P. O. Box 1053,  
Alexandria, Va.  
Ward, Mrs. Roger C., 91 Highland Avenue,  
Short Hills, N.J.  
Ware, L. R., P. O. Box 77, Urbanna, Va.  
Wolfe, Mrs. T. K., 5401 Cary Street Road,  
Richmond, Va.

*Looking ahead to Christmas, we suggest this as that rare gift — worthwhile, yet costing only a little more than a card.*

*Please send Mrs. Kirby your order as soon as possible. It is the issue for October 1965, Vol. 5, No. 2. It is \$1.25 plus 5¢ postage to A.B.S. members; plus 5¢ postage for non-members. Orders for five copies or more will be sent postpaid.*

# THE AMERICAN BOXWOOD SOCIETY

## SECRETARY'S REPORT,

13th Annual Meeting, May 9, 1973

The 1972-73 Society year ended April 30th with an enrollment of 4 Honorary Life, 17 Life, 12 Sustaining, 17 Contributing, and 427 Regular Members. These 531 individual members plus 30 non-members (subscribers), and 25 institutions receiving complimentary copies of The Bulletin, make up our mailing list which now totals 586.

In comparison with last year's report, enrollment figures reflect a decrease in the number of Regular members (11), but this was offset by an increase in Sustaining (4) and Contributing (13) memberships.

During the year 58 new members joined the Society as opposed to 60 names being removed from the rolls: 49 because of nonpayment and 11 by request or for other reasons.

We are pleased to add the name of Mrs. Vincent Shea of Charlottesville, Va., to our list of Life Members.

More than 300 extra BOXWOOD BULLETINS were sent out from the storage room at Blandy Farm in 72 separate mailings. These were the Editor's copies to contributors, back issues sold, and copies to new members.

Shortly after the annual meeting last year, about forty brochures were mailed to persons whose names had been sent in on the remittance envelopes by members. Brochures were made available for distribution at the Flower Show in Chicago and at the Spring Garden Symposium in Williamsburg, and were also mailed on request throughout the year.

In addition to the routine duties of keeping records, etc., the following pertinent matters were taken care of:

(1) Applications were submitted to register a Claim to Copyright for four issues of THE BOXWOOD BULLETIN (April, July, October 1972, and January 1973), and validated certificates received.

(2) A Statement of Ownership, Management and Circulation was filed with the U. S. Postal Service at Boyce, Va., on September 28, 1972, to secure admission of the Bulletin to the mails at the second-class rate. (Note: I was told when I filed this form in 1971 that this practice would be discontinued. Sometime later, however, the postmaster notified me that it would be necessary to file a Statement each year prior to October 1.)

(3) The Annual Report to the State Corporation Commission of Virginia was filed January 22, 1973, naming the registered agent for ABS, as well as officers and directors for the 1972-73 year.

(4) Form 990 (with Schedule A) was filed with the Internal Revenue Service in July 1973 to cover the year ending April 30, 1972.

Printing jobs included an additional supply of brochures (1000) and gift cards with envelopes (500), the annual meeting notices (600), revised remittance envelopes (1000), and three types of envelopes—letterhead, outlook, and manila. Our printing needs were handled by the Carr Publishing Company, of Boyce, Va., and I would like to express our appreciation to Mr. Carr and his staff for their prompt and courteous service.

---

## THE AMERICAN BOXWOOD SOCIETY

Treasurer's Report, 13th Annual Meeting, May 9, 1973 for the Society Year May 1, 1972 — April 30, 1973:

|   |       |            |
|---|-------|------------|
| Checking account balance May 1, 1972  | ---   | \$1,708.14 |
| Savings (\$800) plus interest transferred to checking account July 11, 1972 | ----- | 959.22     |
| CD No. 1025 withdrawn and funds placed in checking account March 30, 1973   | ---   | 2,000.00   |
|   |       | <hr/>      |
|   |       | 4,667.36   |

### Receipts

|                        |       |          |          |
|------------------------|-------|----------|----------|
| Memberships            | ----- | 3,469.00 |          |
| Bulletin Sales         | ----- | 242.70   |          |
| Interest (CD No. 1025) | ----- | 100.00   |          |
| Research Fund Gifts    | ----- | 985.00   | 4,796.70 |
|                        |       | <hr/>    | <hr/>    |
|                        |       |          | 9,464.06 |

### Disbursements

#### The Bulletin:

|   |       |          |          |
|---|-------|----------|----------|
| Printing  | ----  | 1,120.00 |          |
| Copyrights  | --    | 24.00    |          |
| Mailing   | ----- | 152.03   |          |
| Cuts, Prints                                      | -     | 392.50   | 1,688.53 |
| Secretarial Services (R. Dove)                    |       | 108.18   |          |
| Office supplies, stamps (88)                      |       |          |          |
| 3-M paper, gift cards, remittance envelopes, etc. | -     | 198.49   |          |
| Research Projects:                                |       |          |          |
| VPI & SU  | ----- | 5,000.00 |          |
| University of Maryland                            | -     | 800.00   | 7,795.02 |
|   |       | <hr/>    | <hr/>    |

|  |       |            |
|--|-------|------------|
| Checking account balance at the end of the 1972-73 fiscal year | ----- | \$1,668.86 |
|--|-------|------------|

Respectfully submitted,  
Anna C. Kirby  
Secretary-Treasurer

# The American Boxwood Society

## Research Projects

In its thirteen years of existence, The American Boxwood Society has developed from a small hobby group of boxwood lovers into a horticultural organization of recognized professional standing. The renewed interest in ABS by the University of Virginia in their reactivation, under the supervision of Dr. B. F. D. Runk, of boxwood cultivation and research at Blandy Experimental Farm is an outstandingly gratifying milestone in our progress. All of our members and friends realize that our achievements have been in great part due to the character, interest, and technical competence of the ABS Bulletin under the editorship of Mrs. Edgar M. Whiting.

In the opinion of your President, two other outstanding achievements of ABS are the Research Projects now being carried out: Boxwood Nutrition at the University of Maryland, and Boxwood Decline at Virginia Polytechnic Institute. Continuous reports on these projects are being published in the ABS Bulletin and are essential reading for every person concerned with boxwood and its survival in the modern Age of Pollution. It is a matter of the highest gratification that these great educational institutions have assigned to their boxwood research projects personnel of outstanding competence, and that their authorities are showing deep personal interest.

I do not imply that the research projects are brain children of ABS. They were originated by the schools. But I believe I am not showing bad taste or being indiscreet when I say that the sponsorship of the projects by ABS has, in my opinion, been one of the fundamental factors in their scholastic support. As most of us know, college budgets are matters of acute concern, with highly important and urgent activities striving for a bite out of the academic dollar. Both University of Maryland and V.P.I. are spending a great deal more money on boxwood projects than ABS is contributing. Both institutions have been most forbearing in pressing us for cash. Both institutions have indicated that it is their aim to continue boxwood research after the ABS research commitments have expired. *And both institutions have indicated that ABS interest and support are essential.*

For these reasons I appeal to our membership to fulfill our commitment of \$2,000 still to be raised for the VPI project, as set forth below:

*Estimated Approx. figures — May 1973*

|   |         |
|---|---------|
| ABS Operating Expenses - 12 months<br>beginning June 1973 ..... | \$3,000 |
| V.P.I. Obligation .....   | 5,000   |
|   | <hr/>   |
| Gross Amount Needed .....                                       | \$8,000 |
|   | <br>    |
| Less Cash on Hand, May 9, 1973 ..                               | 3,500   |
|   | <hr/>   |
| Net Amount Needed .....   | \$4,500 |
|   | <br>    |
| Estimated Dues to Come in<br>during the year .....              | 2,500   |
|   | <hr/>   |
| Needed to be raised 1973 .....                                  | \$2,000 |

Please send Mrs. Kirby any amount you can afford, large or small. Make out the check to American Boxwood Society and mark it "Research Project." It is tax-deductible. And equally important, every member enlist a new member, to broaden our financial base and our activity. Only thus may we save that noble gift of nature, *buxus*, from its present perils.

*Neill Phillips*



*HELP TO STOP THIS — CONTRIBUTE TO THE A.B.S. RESEARCH FUND*

*The Boxwood Society acknowledges with thanks the contributions of the members and friends listed below, covering the period from mid-April to the end of July.*

*Some names have also appeared on previous*

*lists. This is not a mistake, but means that more than one contribution has been received from a concerned donor. As previously stated, the amount of the gift is not published, but is stated for tax-return purposes in a letter of thanks. All gifts to the Society are tax-deductible.*

Mrs. J. F. M. Stewart, Upperville, Va.  
 Mrs. Edward Anderson, Richmond, Va.  
 Mrs. Clay B. Carr, Boyce, Va.  
 Mrs. Stephen C. Clark, Jr., Middleburg, Va.  
 Mr. Arthur A. Dugdale, Ashland, Va.  
 Mr. Alden Eaton, Williamsburg, Va.  
 Mr. and Mrs. Marshall Exnicios, Watch Hill, R.I.  
 Mr. and Mrs. D. Goodrich Gamble, St. Louis, Mo.  
 Mr. Wyford D. Jones, Delaware, Ohio  
 Mrs. James H. McGhee, Falls Church, Va.  
 Mrs. John S. McIntyre, Keswick, Va.  
 Mr. Wade E. Muldoon, Millwood, Va.  
 Mrs. Orsen N. Nielsen, Centreville, Md.  
 Mr. Charles Otey, Westmoreland Davis Foundation,  
 Morven Park, Leesburg, Va.  
 Mrs. Frank Spears, Portland, Oregon  
 Mr. Harrison M. Symmes, Alexandria, Va.  
 Mr. Jaquelin E. Taylor, Orange, Va.  
 Mrs. John B. Veach, Asheville, N. C.  
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 Mr. Walter Wisecarver, Jr., Berryville, Va.  
 Prof. Albert S. Beecher, Blacksburg, Va.  
 Mr. Theodore G. Chingos, New York, N.Y.  
 Mrs. B. C. Fisher, Charles City, Va.

Mr. A. A. Greenwood, Alexandria, Va.  
 Dr. William P. J. Peete, Durham, N.C.  
 Adm. Lewis L. Strauss, Brandy Station, Va.  
 Capt. W. C. Wickham, Ashland, Va.  
 Mr. and Mrs. Forrest E. Mars, The Plains, Va.  
 "Anonymous" in Virginia  
 Mrs. O. J. Browning, Charles City, Va.  
 Mr. Joseph R. Dinnen, Middletown, N. J.  
 Mrs. Samuel C. Loveland, Jr., Centreville, Md.  
 Mrs. Edward R. Meade, Marshall, Va.  
 Mrs. Lucien C. Powell, Alexandria, Va.  
 Mrs. Lester P. Schoene, Paeonian Springs, Va.  
 Prof. Charles K. Woltz, Charlottesville, Va.  
 Mrs. John F. Donoho, Easton, Maryland  
 Board of Regents, Gunston Hall, Lorton, Va.  
 Mr. Philip P. Hilbert, Waterford, Va.  
 Mrs. David G. Holmes, Williamsburg, Va.  
 Mr. Donald W. Martin, Henderson, Ky.  
 Miss Jacqueline B. Phillips, Baltimore, Maryland  
 Mrs. Bluford R. Winters, Washington, Conn.  
 "In memory of my father, Ralph D. Richardson."  
 Mr. and Mrs. Robert L. Frackelton,  
 Fredericksburg, Va.  
 Mrs. Ruth Donovan, Berryville, Va.

# Boxwood Decline: A Progress Report

A report on Boxwood decline and investigations into its cause presented at the Thirteenth Annual meeting of the American Boxwood Society; Charlottesville, Virginia May 9, 1973. R. C. Lambe; G. B. Montgomery and W. H. Wills. Department of Plant Pathology and Physiology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

## The Status of Boxwood Decline in Northern Virginia — R. C. Lambe

During the last year, since the last annual meeting of the American Boxwood Society, the threat to English boxwood in Northern Virginia has intensified. Several trips have been made to examine English boxwood plantings previously showing only a small amount of decline during the last season. These plantings have become severely affected with large numbers of plants dying. All efforts to identify changes in cultural practices, application of possibly toxic chemicals or other factors have met with negative response from Boxwood growers. Rainfall has been above average in certain areas of Northern Virginia and has been suggested as predisposing plants or at least creating favorable conditions for Boxwood diseases. It has been observed that some boxwood plantings have not been regularly thinned or cleaned of dead leaves and stems. Considerable effort has been made on the part of certain individuals to thin out boxwood in the hopes of improving disease resistance.

Only English boxwood has been observed to decline in Northern Virginia and the other principal variety, American boxwood, has been unaffected by serious disease. Numerous isolations have been made in the Plant Diagnostic Laboratory using artificial media culturing for *Phytophthora*, *Pythium*, *Volutella*, *Fusarium* and *Paecilomyces*. All efforts to culture *Phytophthora* have been negative. Several cultures of *Pythium* have been recovered and many cultures of *Fusarium*, *Volutella* and *Paecilomyces* have been recovered.

In the central and southern parts of the state, English boxwood has been cultured for root rot organisms with the result that *Phytophthora* was successfully cultured from English and American boxwood. In one situation in Central Virginia, American boxwood was dying, possibly from infection by a previously unreported fungus.

No chemicals for the control of boxwood disease can be recommended at this time, as the Environmental Protection Agency has not approved any fungicides. The State of Pennsylvania has recommended the use of lime-sulfur sprays to prevent leaf and stem diseases and it has been suggested that copper fungicides will prevent foliar boxwood diseases. Boxwood growers are using severe pruning to reduce spread of leaf and stem diseases. Also,

more attention is being given to removal of dead leaves and dead stems that accumulate in the centers of boxwood bushes.

## Current Investigations I — G. B. Montgomery

One of the requirements in the study of boxwood decline is to conduct a geographic survey of the disease situation in Virginia. Declining English boxwood plants have been noted in the vicinity of Leesburg, Winchester, Culpeper and Lexington, Virginia. The most serious decline has been seen in the Loudoun County area where several private gardens have suffered a 50 - 100% loss of boxwood plantings.

A private nursery near Waterford, Virginia has been selected for a detailed study of boxwood decline. Two hundred fifty plants in an 80 ft X 70 ft plot are rated individually every 3 - 6 months to determine the rate of decline.

Other information sought from this plot are the soil factors and cultural practices that contribute to boxwood decline.

During October 1972, a green-house test was initiated in order to ascertain the pathogenicity of various organisms that had been isolated from declining boxwood. English boxwood plants were inoculated with a foliar spray of the isolates, a foliar spray with a stem wounding to simulate a stem injury and a root treatment. Results demonstrated that a fungus, *Paecilomyces buxi* was the most pathogenic isolate but the results varied with the type of treatment utilized.

Several problems arose which have led us to believe that this technique would not be an efficient one to use in the future. The entire test required a six month time period before adequate symptom expression had developed. This was probably due to the slow growth of boxwood and the inoculation procedure utilized. Procedures for the inoculation of boxwood have been modified in hopes of decreasing the time required for symptom expression. These include the use of young rooted cuttings and a root dip inoculation procedure. These tests are underway at the present time.

Other tests that will be conducted during the coming months include those designed to demonstrate the environmental factors required for disease development and the environmental requirements

of the pathogen(s).

Several organisms which cause disease and are also common soil inhabitants have been isolated from both healthy and diseased boxwood. These must be checked to determine their pathogenicity.

A well known systemic fungicide has been tested in agar culture against several isolates. Results have not been promising with this fungicide but this one test is not conclusive evidence that this fungicide is ineffective.

## Current Investigations II — W. H. Wills

First, I would like to again express our appreciation to the American Boxwood Society for the support of this project. This work could not have been undertaken without this support. Secondly, I can now report that I am about to devote more of my own effort in the area of ornamentals, particularly on boxwood decline.

There are at least three, perhaps more, fungi we believe to be connected with the etiology of boxwood decline which we see in English boxwood in Northern Virginia. Two of these fungi have quite different appearances on the diseased plants when they are incubated in moist chambers. *Volutella buxi* shows as salmon pink cushions on the leaves where as the whitish growth on the blackened small stems are the fruiting stages of *Paecilomyces buxi*. Other isolates of the fungus genus *Fusarium* cannot be observed this way but can be readily isolated from diseased woody tissues and roots of diseased plants.

One reason we think that these fungi are important in decline is their consistent association with diseased plants. We think they are soil-borne pathogens as shown by what has happened to some plants we have observed in the greenhouse. Symptoms of decline are evident in plants grown in non-sterilized soil from a disease location in Northern Virginia, whereas, no decline is seen in plants grown in a sterilized portion of the same soil sample. American boxwood plants planted in a non-sterilized portion of that sample remain symptomless. These observations argue for our two assumptions, that decline is associated with the infection by certain soil-borne fungi of English boxwood in Northern Virginia and that it is a different disease from that caused by *Phytophthora* in both English and American boxwood in other areas.

As Mr. Montgomery has indicated, we are concerned about the lengthy incubation period for disease symptoms to show after inoculation in our greenhouse tests. We are trying to reduce that period by using unrooted cuttings incubated in test tubes. Some preliminary data from one such test

shows that *Paecilomyces* and *Fusarium* are indeed capable of causing foliage and stem symptoms similar to those observed in nature and can be reisolated from stems, constituting a proof of pathogenicity for these fungi. We are still having difficulty with naturally occurring infections in the controls, however, and better controls will have to be devised for our inoculation experiments. Our real problem will be in defining the environment under which these or other organisms become pathogenic.

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## PRUNING ENGLISH BOXWOOD

William A. Gray

*Pruning:* There is no need to prune this slow-growing and compact shrub to control its shape and size; it is likely that an English Boxwood will thrive indefinitely without such care. Nevertheless, periodic thinning will contribute to general plant vigor and will minimize the possibility of winter damage.

*Thinning:* The random removal of 5" to 10" twigs from the upper half of the plant, including the sides, is preferable to shearing or clipping. Shearing encourages the proliferation of small terminal twigs and the concentration of outer foliage, increases the possibility of winter damage, and in time will require more drastic thinning. The formally clipped specimen or hedge is, however, a traditional form for English Boxwood.

*When To Thin:* Thinning can be done any time the weather is suitable for working outdoors, but it may be wise to avoid the normal growing season (mid-April through May) when the new foliage is still tender. Since English Boxwood is a source of prestige materials for Christmas decorations, late November or early December is a popular time. Heavy pruning, including surgery on weak or damaged plants, should be done in late winter or early spring.

Basic principles for pruning woody plants should be followed. Remove dead and weak twigs or branches; remove overly crowded twigs; do not leave stubs — cut back to an inner branch or twig.

*Clipped Hedges:* English Boxwood can withstand severe pruning and, if desired, can be maintained as a low clipped edging for a formal garden. For this purpose, heavy pruning in March with hand or electric shears is recommended, since winter-burned foliage will be removed and spring growth will shortly conceal the cut leaves and twigs.

It should be kept in mind that such a clipped hedge entails much more maintenance than Boxwood left in a natural form. Occasional thinning to insure vigor will be mandatory and the plucking of crowded or winter-killed terminal twigs is often necessary. In parterres, the round symmetry of an unclipped English Boxwood hedge may offer an attractive and care free alternative.

# Progress Report on Mineral Nutrition Studies with Boxwood (*Buxus*)

M. Wayne Hefley and Francis C. Stark

Department of Horticulture, University of Maryland

Research at the University of Maryland to determine the mineral nutrient requirements of boxwood was begun in October of 1970. The research program consisted of two major experiments. The first was to study the growth response of boxwood with all possible combinations of three levels of K, Ca, Mg, and N when half of the N was supplied as ammonium ( $\text{NH}_4^+$ ) and half as nitrate ( $\text{NO}_3^-$ ) nitrogen. The second experiment was to determine if the type of nitrogen supplied ( $\text{NH}_4^+$  or  $\text{NO}_3^-$ ) influenced the growth of boxwood. Three cultivars of *Buxus sempervirens* L. (cv. 'Angustifolia,' cv. 'Pyramidalis' and cv. 'Vardar Valley') and one selection of cv. 'Suffruticosa' were grown in each of the 81 nutrient solutions using the hydroponic "slop culture" technique.

The response of cv. 'Suffruticosa' differed from the other three forms by requiring more N and Mg. All plants require similar amounts of K and Ca for optimal growth. 'Vardar Valley' grew too poorly with the amounts and combinations of nutrients supplied to obtain information on this cultivar. Evidently some nutrient element or elements were excessive and/or deficient for growth of 'Vardar Valley.'

In general, boxwood requires and can tolerate much lower levels of N than many other ornamental plants. The optimal levels of N in nutrient solution culture for *Pinus Strobus*, *Gleditsia* and *Taxus* are 6 to 8 times greater than that required for optimal growth of the boxwood studied here. The amounts of N needed for optimal growth of the other species mentioned were detrimental to the growth of boxwood. The type of N supplied ( $\text{NH}_4^+$  or  $\text{NO}_3^-$ ) also influenced the growth of boxwood. The ammonium form ( $\text{NH}_4^+$ ) commonly found in many lawn and garden fertilizers as ammonium sulfate or ammonium nitrate was detrimental to growth even at the lowest level supplied. The nitrate form ( $\text{NO}_3^-$ ) produced satisfactory growth if it was combined with the proper amounts of K, Ca, and Mg. This suggests that mulching, the use of organic fertilizers, or other practices that increase soil organic matter would decrease the incidence of  $\text{NH}_4^+$  toxicity in boxwood. The use of organic fertilizers which release nitrogen slowly and assurance against accidental fertilization from adjacent lawn areas may be desirable.

A few words of caution are needed when mulches are applied. Don't allow the mulch to contact the trunk of the plant since this could favor infec-

tion of the trunk by pathogens; keep the mulch 3-4 inches away from the trunk. Application of undecomposed mulch material other than manures may induce N deficiency because the organisms that decompose the mulch to humus require N to grow. These organisms may utilize all of the available nitrogen, creating a deficiency if the soil N level is low. Use only mulch material which has been composted for at least one year.

Boxwood requires relatively large amounts of Ca. and Mg. In many cases the detrimental effects of too much N were partially if not totally offset by supply large amounts of Ca and Mg. In most mineral soils the amount of available Ca can be roughly estimated by determining the soil pH. Generally as the pH decreases, the amount of available Ca. decreases, and vice versa. A pH of 6.5-7.0 should provide sufficient Ca and Mg if maintained by the addition of ground dolomitic (agricultural) limestone. Correction of pH by addition of high calcium lime does not provide sufficient Mg for optimal growth.

Information on foliar symptoms and terminal death of the plants are described below:

*Interveinal chlorosis of leaves of cv. 'Angustifolia.'* This symptom appeared only on new growth. The symptom severity ranged from a slight yellowing of the area between veins, to yellowing over most of the leaf accompanied by stunting of the new leaves, followed by death of the terminal.

This symptom was associated with high levels of N in combination with low levels of Ca and Mg. Increasing the supply of Ca and Mg while decreasing the amount of N reduced or eliminated the occurrence of this symptom.

*Bronze leaf of cv. 'Angustifolia.'* This symptom appeared primarily on recently matured leaves, but was observed occasionally on new growth. The

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\*(so you needn't look them up)

|                            |                |
|----------------------------|----------------|
| N — Nitrogen               | K — Potassium  |
| $\text{NO}_3^-$ — Nitrate  | Ca — Calcium   |
| $\text{NH}_4^+$ — Ammonium | Mg — Magnesium |

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symptom severity began as a reddening of the leaf margin, followed by merging of the red margin at the leaf tip, and subsequent death of the leaf tip or the entire leaf. This symptom was associated with high N, high Ca and low Mg. It did not appear or was reduced in severity when the amount of N was decreased and the amount of Mg increased with Ca at the high level.

*Speckling and red vein on leaves of cv. 'Pyramidalis.'* This symptom appeared on recently matured leaves. Symptoms first appeared as small red specks on otherwise healthy leaves. Subsequently the center veins became red with a chlorosis of interveinal tissue (many times the margins of the leaves remained a deep green color). In advanced symptoms, the entire leaf became chlorotic with red to purple specks, and the leaf abscised. As a result the plant had a tuft of leaves at the terminal, a leafless stem with old leaves at the base of the plant. This symptom was associated with high N combined with low Ca. With adequate Ca levels and a limited supply of N, the symptoms were less severe or did not occur.

*Red vein of cv. 'Suffruticosa' leaves.* This symptom appeared on new growth. The symptom severity ranged from a slight chlorosis of tissue with light red vein coloration to severe interveinal chlorosis and dark red or brown veins, followed by death of the leaves. This symptom was associated with the high level of N combined with low Ca availability. When N was decreased or Ca increased, the severity of the symptoms decreased.

*Linear lesion on leaves of cv. 'Suffruticosa.'* Symptoms appeared on recently matured leaves. Symptom severity ranged from light yellow linear lesions on or parallel to leaf veins, to chlorosis of interveinal tissue accompanied by bronzing of the mid-rib with linear lesions. This symptom was associated with low Ca and medium or high nitrogen levels. With adequate levels of Ca, the symptom was eliminated.

*Orange leaf of cv. 'Suffruticosa.'* This symptom occurred on terminal leaves. Growth rate was slow when this symptom was present. The symptoms ranged from orange leaf edges with no distinct line of delineation between the green and orange portions of the leaf, to a merging of the coloration at the leaf tip, followed by death of the leaf tip. This symptom was associated with low availability of all nutrients. Plants grown with a medium or high level of N, high levels of Ca and Mg, and a medium level of K did not exhibit this symptom.

*Terminal death.* This symptom was common to all forms and ranged in severity from death of a single terminal to death of the entire plant. Terminal death of cv. 'Angustifolia' was most severe at high N and low Ca and Mg availability, and was least severe with low N, medium Ca and high Mg. Terminal death of 'Vardar Valley' was most severe with high N, high Ca and low Mg supply, and was least severe with low or medium N, low Ca and high Mg. Terminal death of cv. 'Suffruticosa' was most severe with low levels of Ca and Mg.

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## Request For Materials Of Buxaceae

I am initiating a comparative study of the reproductive structures, especially the flowers, of the six genera of the Buxaceae (*Buxus*, *Notobuxus*, *Pachysandra*, *Sarocococca*, *Simmondsia*, and *Styloceras*). Goals of this study include the following: (1) determination of basic trends of floral evolution in the family, (2) evaluation, from the standpoint of floral anatomy and other lines of evidence, of (a) the proposed famalial segregates (i.e., Stylocerataceae and Simmondsiaceae) of the Buxaceae, (b) the tribal subdivisions of the family, and (c) the sectional subdivisions of *Buxus*, and (3) consideration of possible extrafamilial relationships of the Buxaceae.

I am interested in knowing of others working on related projects so as to avoid duplication of research effort. I would also be most appreciative to receive vouchered and (preferably in formalin-acetic acid-alcohol) reproductive material (flowers in all stages, fruits, and seeds) of various members of the Buxaceae to supplement the extensive dried material I have already garnered from various herbaria.

Rudolf Schmid  
Dep't of Botany  
University of California  
Berkeley, Calif. 94720



## New Headquarters of American Horticultural Society

*Once Owned By George Washington*

Wellington, a fine old mansion on 25 pleasant acres of rolling land running down to the Potomac River, became the property of the American Horticultural Society at a small informal ceremony on the day after Washington's Birthday, 1973. The Society has moved its staff from an office building in nearby Alexandria, Va.; and its computer operation, the Plant Record Center, from Lima, Pa.; so that for the first time the organization's administration and its other activities will all be under one roof.

The Society plans and hopes to develop a national center of gardening and horticulture, with activities and exhibits stressing the social as well as the aesthetic role of gardening. Special attention will be given to urban horticulture and environmental gardening, as well as group work for young people and senior citizens. Plant specialty societies such as the American Boxwood Society will be invited to participate in seasonal flower shows. A conservatory-type greenhouse will eventually be built, as well as smaller greenhouses where the techniques of window and greenhouse plant culture may be seen and learned.

George Washington bought the property in 1760. At that time it included about 3000 acres of land, and a house built in 1757. He called it his River Farm. In 1795 one of his favorite secretaries, Tobias Lear, who lived at Mount Vernon almost as a son of the family, married Fanny Bassett Washington, widow of George Washington's nephew, George Augustine Washington. The President and Mrs. Washington were delighted, and as a wedding present gave them a life lease, rent free, on 360 acres of the River Farm, with the original house enlarged and improved. Other alterations and additions have been made through the years, so that now the house has no less than 14 bedrooms. Mr. and Mrs. Malcolm Matheson acquired the property in 1919, and are responsible for most of the boxwood and landscaping. One ancient black walnut tree is said to have been planted by George Washington himself.

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The new mailing address for the Society is:  
American Horticultural Society, Wellington, Mount  
Vernon, Va. 22121.

# Mulching and Composting

Neill Phillips

*At the ABS (May 1973) Annual Meeting, this subject was brought up during the discussions, but it was not gone into in detail. It is so important that I am now listing our mulching practises at Heronwood. And I hope that our readers will then send in to Mrs. Whiting any ideas that they have found to be productive, so that they may be shared by other readers of the ABS Bulletin.*

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Mulching, as I understand it, has four principal purposes: conservation of soil moisture, protection of plant roots from extremes of temperature, weed control, and (in the case of organic mulches) the supply of plant food as the material breaks down.

Like most other plants, boxwood in many cases is benefited by a mulch. A thrifty, well-established box bush with its limbs growing down to the ground usually does not need mulching. More important is an annual or biennial thinning out of the center of the plant (anytime, spring or summer) to admit light and air. For American boxwood we use long handled lopping shears for large branches, secateurs for small branches, and usually we cut right off at the base. For English boxwood we prefer to pluck by hand: reach into the center of the bush and break off branches at their base. But for rooted cuttings lined out in the field, boxwood standards, boxwood in tubs, espaliered boxwood, and any newly transplanted boxwood, large or small, mulching is highly desirable.

We have tried many kinds of mulches, as I shall set forth below. But this does not mean that we know all about mulches and mulching. We welcome comments and suggestions.

**COMPOST** — This material has great value as a combination of mulch, plant food, and soil conditioner. It is only partially effective in weed control, but the weeds that sprout up in a compost mulch usually are easy to pluck out.

The literature contains much valuable information on constructing and maintaining a compost heap: layers of vegetative material interspersed with layers of topsoil, the application of a breakdown chemical, the turning and stirring of the mass from time to time. This practice gives a rich and valuable product but it is expensive in time and labor. We prefer to follow the shredding method. Our small shredding machine is a KUTUP, made by Gilson Bros., Plymouth, Wisconsin, but there are lots of others available at the stores. The cost of the machine is soon compensated for by the saving in time and labor. To supply material for our shredder

we have several compost heaps at various convenient locations on the place. Some of the heaps are piled up on the ground, others are started in shallow holes dug in the ground (to hold moisture and thus speed up decomposition.) Every heap is given a depression, or dimple, in its top (with a shovel or a tractor blade) to retain moisture. Our heaps are made up of leaves raked up in the autumn, grass clippings from lawn mowers, assorted non-woody debris and weeds from the vegetable and flower beds, vegetable tops and parings from the kitchen, and any other non-woody vegetative trash. We do not bother with stirring, turning, or the addition of layers of topsoil and breakdown chemicals. In shredding a supply of mulch from compost, we usually select the oldest piles, though we find that shredded compost gives desired results even though the material is not thoroughly rotted. Shredded compost comes out of the machine in masses of soft, fluffy dark brown flakes; very light and easy to handle. Spread as a mulch it decomposes in about 6 months without ever packing down. Such a mulch must therefore be renewed about twice a year, but this means that in decomposing it has supplied valuable plant food. We use it around newly transplanted boxwood and other shrubs. Twice a year we spread it on our flower beds, where it has great value. For a wildflower garden it is the essential key to success.

**GRASS CLIPPINGS** — Note above that we list grass clippings as an ingredient of our compost heaps. But unless mixed up with leaves and herbaceous materials grass clippings require several years to begin decomposing. So in the summertime when we have lots of grass clippings and not many leaves to mix with them, we pile the grass clippings into a separate heap. These dry, unrotted grass clippings are invaluable for weed control. Spread 2-3 inches deep around shrubs or bushes they cut off the encroachment of choking grasses and weeds almost completely. For flower beds the mulch of grass clippings is absolutely invaluable. In June, as soon as the annuals have been bedded out, all the flower beds are mulched with a 2-inch thickness of dry grass clippings. Watering and weeding are then hardly needed for the rest of the season. We have found no material as excellent as grass clippings for conserving ground moisture and for resisting weeds. There are these factors to observe:

This mulch can be used only around established plants. No bedding plants (as well as no weeds) can sprout through it.

The ground must be well watered before the mulch is applied.

If it is necessary to feed the plants, the layer of matted grass clippings can easily be raised up so that fertilizer can be applied.

After the first freeze in late autumn has finished off the growth of weeds, the grass mulch is raked off. It will still show little decomposition. A heavy mulch of shredded compost is then applied to the beds for protection against winter heaving and thawing, and for decomposing into the plant food available early the next spring.

**SAWDUST** — From time to time you may acquire a truckload of sawdust. Dump it in a convenient place in the work area. Make a dimple in the top to hold moisture and thus hasten decomposition. Let it stand for a long time (at least a year) to become rotted. Unrotted sawdust used as a mulch will in decomposing draw off a considerable amount of nitrogen from the soil, which will have to be replaced by expensive fertilizer.

**PINE BARK MULCH** — Available as a bagged commercial product at most supermarkets and garden supply stores. Relatively inexpensive, light in weight and bags are easy to handle. Material is soft and fluffy and easy to spread and to work around the plants. Makes a pleasant, long lasting (about 1 year) surface for paths and walkways in boxwood gardens where it is too shady for grass, or where you wish to avoid having to mow the grass. Almost impervious to weeds. We recommend it as our choice for a commercial mulch. It has given us an interesting side dividend. In some of the boxwood alleés where the paths are spread with pine bark we have established clumps of mahonia bealei and hellebore (Christmas rose and Lenten rose), which can be cranky about increasing from seed. But if pine bark is spread around the plants dozens (or hundreds) of thirsty seedlings spring up.

**WEED-KILLER MULCH** — In extensive plantings in fields and woodland where grass grows rank and may choke young trees and shrubs, we use the weed killer Paraquat. It is only for experienced personnel to use, and manufacturer's instructions must be carefully followed. The grass and weeds thus killed are left lying on the ground around the base of the tree or bush and form an effective mulch that lasts for months and keeps down further growth of grass and weeds. Other weed killers we have been told are too toxic to be recommended except for special cases with trained personnel.

**BUCKWHEAT HULLS** — An effective mulch, easily handled, but fairly expensive, not obtainable at many stores, and subject to dispersal by high winds.

**PEANUT HULLS and COCONUT HULLS** — Very good mulches but giving off an unpleasant, sweetish odor in hot weather.

**STONE CHIPS and GRAVEL** — Excellent mulches, especially where permanence is desired. But

troublesome to remove, and highly undesirable in the vicinity of a mowing machine.

**WOOD CHIPS** — When a professional tree expert comes to your place to cut down or to prune trees, he no longer hauls away the debris (his term for all trash except trunks and large limbs.) Instead he runs the debris through a powerful grinder and produces for you a nice pile of small size wood chips. This makes a useful coarse mulch but, like sawdust, it takes up nitrogen in decomposing.

**BRUSH** — We formerly burned our brush heaps to produce useful wood ashes as a source of potash. But brush fires have many drawbacks, so now we just leave the brush piles out in the meadow and eventually they decompose. They may take years before being ready to go through our compost shredder but meanwhile the brush piles are ideal cover for wildlife and they significantly increase our bird population.

**PEAT MOSS** — Used as a mulch, this material packs down too tightly unless it is shredded, and for shredding we prefer to use our compost heap. Otherwise we use pine bark mulch in preference to peat moss.

**PINE BOUGHS** — These may be considered a mulch. After the first freeze, light pine branches are laid over the beds or are stuck into the ground so that they lop over the plants. For low growing boxwood they are very effective against snow burn and winter bark-splitting.

**BLACK PLASTIC** — The trunks of boxwood standards should be wrapped in black plastic strips, securely tied, in winter to ward off bark-splitting. Black plastic strips laid on the ground are very effective for moisture conservation and weed control, especially for plants growing in rows. Relatively expensive and somewhat troublesome to put in place and to remove.

**HAY** — We have had no experience with hay, or with salt hay, for a mulch although they are often mentioned in the literature.

**CONCLUSION** — Experiment with available materials and methods for mulching and determine what is best for you. Some mulches are permanent (e.g., stone chips). Some decompose completely and incorporate with the soil. Some must be removed when their usefulness is over.

Before applying a mulch be sure that there is plenty of moisture in the ground, since the mulch will tend to shed rain water.

Do not mulch with materials that pack down, such as unrotted leaves or unshredded peat moss.

Boxwood is tolerant of a wide range of pH and you don't have to worry too much about the pH of your boxwood mulch. For acid loving plants such as azaleas and rhododendrons it is desirable to use a mulch made from oak leaves which are high in acidity.

# Development of Potentialities of Desert Boxwood Continues

## Coordination of Jojoba Program

The University of Arizona, Office of Arid Lands Studies (OALS) continues to coordinate the Indian jojoba activities sponsored by the Office of Economic Opportunity and other cooperating agencies. This includes maintenance and continued development of an international jojoba information system located at the OALS, coordination and distribution of the harvest products, and agency and Indian coordination. Planned activities include providing seeds to the Southwestern Arboretum for establishment of a germ plasm nursery, conducting an economic feasibility study and an environmental impact study of an Indian Jojoba Industry, conducting studies leading to the development of an Indian Cottage Industry, and research by reservation Indians to improve the efficiency of harvesting native jojoba.

## Arizona Harvest — 1972

The very successful jojoba seed harvest by the San Carlos Apaches was approximately 75,000 pounds in the summer of 1972 and was described in the last Jojoba Happenings (Boxwood Bulletin Vol. 12 No. 2, October 1972) . . . . . A concerted effort will be made by reservation Indians in 1973 to improve significantly the efficiency of harvesting jojoba seed, with a goal toward reducing both harvest costs and the ratio of unripe to ripe seed harvested.

## Jojoba Utilization Committee

The National Academy of Sciences has been asked by the Office Of Economic Opportunity to study the feasibility of developing commercial jojoba products. A Jojoba Utilization Committee, chaired by Dr. Milton Harris, met in Tucson toward the end of March 1973 to review what is known about the chemical properties and utility of jojoba liquid wax and to set priorities for large scale testing.

## Jojoba Research

D. N. Yermanos at the University of California, Riverside continues his extensive agronomic and genetic research program on jojoba. Future plans include the large scale establishment of potted jojoba seedlings in cans for eventual transplanting to jojoba plantations on Indian Reservations in California and Arizona.



*Fruiting Jojoba in four forms A, Typical; B, nodal; C, fascicled; D, racemose. Drawing by Regina Hughes.*

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*Excerpted from Jojoba Happenings No. 3, January 1973 Published by the International Committee On Jojoba Research and Development, Dr. W. G. McGinnies, Chairman; Office of Arid Lands Studies, Tucson, Arizona.*

Jojoba research also continues at the U.S. Department of Agriculture Regional Research Laboratories. T. K. Miwa, at the Northern Regional Laboratory in Peoria, Illinois is working on emulsifiers and on wax esters from the C 42 group. He has recently published on the chemical aspects of jojoba oil in *Cosmetic and Perfumery* for January, 1973.

A. N. Booth and A. Waiss at the Western Regional Laboratory at Albany, California are working with the jojoba meal which remains after the oil has been extracted from the seed. Laboratory rats would rather starve than eat food with jojoba meal. Dr. Waiss has isolated a crystalline material from the meal which may function as an appetite depressant; rats accept the meal when it has been removed.

J. J. Spadero at the Southern Regional Laboratory in New Orleans, Louisiana is working on an edible jojoba seed which has part of the oil expressed and is then roasted.

A variety of jojoba research is underway at the University of Arizona. In the Department of Horticulture and Landscape Architecture, A. E. Thompson and L. Hogan are evaluating asexual propagation techniques; rooted cuttings are being subjected to various treatments to induce development of root systems.

In the Department of Poultry Science, B. L. Reid has fed poultry on a diet of up to 40% jojoba meal. The poultry have not died or become ill. An analysis of the metabolic energy obtained by poultry from the meal is presently underway.

C. W. Weber, also in the Poultry Science Department, has fed jojoba meal and wax to young adult and weanling mice. High mortality rates occurred in weanlings, but death was relatively rare in young adults.

W. H. Hale in the Animal Science Department has attempted to feed jojoba meal to steers at University of Arizona farms. The steers have refused to eat the meal even when it is mixed or hidden in other feed. It appears that undesirable odors may be related to the rejection of the meal by the steers.

W. J. Stull in the Department of Dairy and Food Sciences is investigating nutrition and food applications for jojoba oil.

H. W. Kircher in the Department of Agricultural Biochemistry is working on the isolation of sterols from jojoba oil.

R. L. Caldwell and S. M. Alcorn of the Department of Plant Pathology are investigating toxic products associated with jojoba seed which may have fungal origin.

Numerous other scientists at the University of Arizona and elsewhere have expressed a keen interest in research on various aspects of jojoba, but are largely immobilized at the present time by funding constraints.

### Potential for Indian Industry

An expanding low volume market for jojoba seed products currently exists in Mexico. The Laboratories Jojoba, S.A., Guadalajara, Mexico manufactures several jojoba cosmetic products, including soap, hair oil, and shampoo.

Liquid wax samples have been distributed to several organizations by OALS for testing and potential product development. Sample distribution is expected to continue at an accelerated rate in the near future.

Preliminary results obtained by Dr. Henry Gisser at Frankford Arsenal, Philadelphia, Pennsylvania, indicate that sulphurized jojoba oil and sulphurized sperm whale oil are essentially equivalent in considerably improving the load carrying capacity of machinery under conditions of extreme pressure. Dr. Gisser concludes that sulphurized jojoba oil shows promise equal to that of sulphurized sperm whale oil for use in lubrication applications.

Possible application for candle production appears quite encouraging. Hendricks Enterprises, a Tucson based small candle manufacturer and seller of beeswax, has indicated an existing demand for several thousand pounds of sheet beeswax which might well be satisfied by hydrogenated jojoba wax.

Similarly, the Knorr Beeswax Products Company of Del Mar, California would use in excess of 200,000 pounds of the hydrogenated wax annually if it meets its apparent potential.

Recent tests at Shirley Pewter Shop in Williamsburg, Virginia show that jojoba liquid wax is an outstanding alternative to sperm whale oil as a fuel in whale oil lamps.

Research on the application and use of jojoba seed products is being pursued on a broad front and optimistic reports are beginning to snowball. A significant demand for jojoba seed from Indian sources in the near future appears inevitable. Future research is planned to help Indians develop, manufacture, and market specialty items from jojoba seed products.

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