AZALEA SOCIETY OF AMERICA

The Azalea Society of America is an educational and scientific non-profit association organized December 9, 1977, incorporated in the District of Columbia, and devoted to the culture, propagation and appreciation of the series Azalea (subgenus Anthodendron) of the genus Rhododendron in the Heath family (Ericaceae).

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THE AZALEAN

Volume 5, No. 2 June 1983

The Journal of the Azalea Society of America, Inc.

Dr. Charles H. Evans, Editor

THE AZALEAN is published during March, June, September, and December by the Azalea Society of America, Inc., P.O. Box 6244, Silver Spring, MD 20906. Additional copies of the current and back issues are $1.25 each and can be obtained from the Secretary.

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IN THIS ISSUE:

THE EDITOR'S NOTEBOOK-

THE AZALEAN in this issue commences with an article by Azalea Society member Debby Emory reminding us of the characteristics necessary to consider when describing an azalea. Many are obvious, some are not, but all are important if we are to have a viable classification of azaleas, a means to identify (key-out) individual varieties, and a useful description for individuals looking for varieties of certain size, coloration, blooming time, etc. suitable for planting in a specific location. As Debby points out, while there are no set or standard requirements that must be met when describing an azalea, it is important that the salient characteristics, including height, breadth, bush habit, flower form and coloration, bloom season, and leaf shape, form, and color, be included to both distinguish the variety and to provide at least a minimum guide for those not familar with the variety.

Debby further admonishes us that better and more comprehensive descriptions are needed for newly introduced azaleas as well as for many of the older varieties where the recorded descriptions are incomplete. This is a serious problem for the fancier, collector, hybridizer, and propagator alike in view of the increasing number of introductions and the widening azalea growing range within as well as outside the United States. Photography from a scientific-technical standpoint could easily solve the problem of azalea classification. Alas, however, the cost of obtaining true to form photographs and of reproducing them with true color fidelity and permanence remains prohibitive. Thus we must at present continue to rely upon botanical taxonomy, with its admittedly occasional somewhat subjective descriptions, for classifying as well as selecting that azalea variety for that special purpose of hybridizing, propagation, landscaping, or just pure enjoyment.

Temperature hardiness, hot and cold, and bloom time in relation to temperature and geographic season are often unknown characteristics of new introductions. They remain, in addition, largely unrecorded in all current authoritative azalea references. It is difficult, due largely to publishing cost and frequency, to assemble and update the desired information in standard references such as The Azalea Book. That is one raison d'être of THE AZALEAN. Comprehensive descriptions for many azalea groups, well-established, nearly extinct, and more recently introduced-- including Back Acres, Beltsville Dwarfs, Harris, Pennington, and Shammarello-- are not available to azalea enthusiasts. They can be in THE AZALEAN. We look forward to comprehensive descriptions of established azalea groups and encourage originators of new hybrid groups to document in THE AZALEAN the salient features that make their varieties of value to the widest possible number of azalea enthusiasts.

The remainder of the June issue features articles dealing with propagation and growth of azaleas. Both long established and time-honored as well as more recently developed methods are presented. Articles on pot mixes, soil mixes, and tissue culture will appear in future issues. From time to time a given issue of THE AZALEAN will focus upon an area of azalea history or horticulture, using capsular reports as well as original and reprinted articles. Please let us know if this format is of interest to you. Suggestions of areas you would like covered and of articles that should be published are welcome.

THE AZALEAN for September 1983 will feature proceedings from the 5th National Meeting and Convention of the Azalea Society of America. More than 100 members from eight chapters participated during the weekend of April 29-May 1. The weather was beautiful, the azaleas held somewhat suppressed by Washington's 1983 chilly April pre-convention weather began to bloom, and the tours, azalea flower show, and convention addresses were equally well-attended. We missed the fellowship with those of you who were unable to attend and hope to see you at next year's national meeting.

Charles H Evans
Editor

DESCRIBING THE AZALEA

Debby K. Emory
Silver Spring, Maryland

One of the aims of the Azalea Society of America is to provide useful descriptions of both old and new azaleas. Our present descriptions are far from uniform, because they were generally provided when the varieties were introduced, and different writers have emphasized different features in their efforts to be comprehensive. Descriptions are easier to write to distinguish among 50 varieties than among 5,000. Some descriptions have not stood the test of time very well-- a variety may be decribed as large and late because it is being compared with Hinodegiri, although it would be described as small and early if compared with a Satsuki. A catalog description of a variety as brilliant, vivid, radiant, outstanding, spectacular, or sensational may be true enough and undoubtedly helps make sales, but it is little help in identification when the description fits so many different varieties.

Parts of the azalea that are easily observed and described are discussed separately in this article including: bush, leaves, flower coloring, and flower parts such as corolla, calyx and reproductive parts. Because many characteristics can vary with weather, shade, moisture, soil, and other growing conditions, the descriptions are usually given for normal healthy plants in light shade.

BUSH. The American Rhododendron Society recommends the following scale for describing height.

Table 1. Measurement of azalea height

	Height at maturity (feet)
Dwarf	Less than 1 1/2
Semi-dwarf	1 1/2 to less than 3
Low	3 to less than 4 1/2
Medium	4 1/2 to less than 6
Tall	6 or more

Upright plants are erect and taller than broad. Spreading plants are erect and broader than tall. Dense plants are compact and twiggy. It should be noted that plants growing in damp shade tend to be taller and looser, whereas plants of the same varieties growing in full sun will be more dense and compact.

The color of azalea shoots usually varies from light or medium green for young shoots to yellowish green and brown for older ones. A few varieties with red flowers have distinctively red young shoots.

LEAVES. Azalea leaves can be evergreen, deciduous, or semi-persistent. Leaves of evergreen azaleas occur in two distinct forms on the same plant and are called dimorphic. Leaves that form in the spring before -- or with -- the flowers are thin and drop in the fall. The leaves that form in the summer have heavier substance and generally remain over winter. The spring leaves are always larger and often more pointed at the tips than the summer ones. Forms of indicum and its hybrids may retain some leaves for two or more winters.

Deciduous azaleas lose all their leaves in winter, and the differences between the spring and summer leaves are not so pronounced. Azaleas with semi-persistent leaves lose most of their summer leaves and retain only a few small ones in a tuft covering the flower bud.

Leaves vary considerably in size and shape among different azalea varieties, and their observation contributes significantly to positive identifications. Leaves have been described (Figure 1) as elliptic, lanceolate, oblanceolate, oblong, orbicular, ovate, obovate, oval, large, small, wide, or narrow, but mathematical limitations or pictures are rarely included so that many leaves are best described as in-between or whatever. It should be emphasized that the shapes of leaves on a given plant may vary according to when and where they are found. For example, a plant of Content may

have only obovate leaves in the winter although the new leaves were not obovate at the time of flowering.

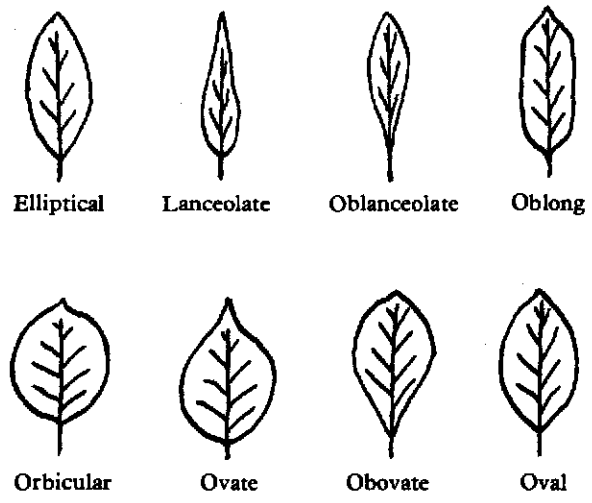

Figure 1. Leaf forms found on azaleas.

Some leaves are described as glossy; others are described as pubescent (covered with short soft hairs); but many others are merely "in between". Most healthy leaves are medium green in color, although a few are noticeably lighter or darker. A few varieties have leaves variegated with irregular patches of light green or yellow. In cold winters, leaves of most red and pink azaleas turn reddish bronze, while leaves of most white and a few pinks remain green.

BLOSSOM. A single bud of an evergreen azalea usually produces two or three flowers, although an occasional variety may have as many as five or six, and buds may be grouped to give the impression of larger heads. A single bud of a deciduous azalea may produce from one to 30 flowers depending on the species.

The principal parts of a typical single azalea flower are illustrated in Figure 2.

COROLLA. The corolla is the conspicuous part of an azalea bloom. On a typical single flower, it consists of five lobes flaring from a cone-shaped base resulting from the partial fusion of five petals. The shape of the fused section of the corolla varies from the long narrow tube (seen most often in deciduous azaleas) to an expanded throat that may be bowl-shaped or nearly flat. Blooms appear starry when the lobes are long and narrow or when the lobes are rolled backward along their length (revolute) or when the lobe tips are rolled back diagonally to form a point. Blooms appear round if the lobes are long and narrow but reflexed sharply backwards along their width. In spider forms, the five petals are separate and unfused.

The distance between the tips of the two upper lobes is usually the widest part of the flower and is the measurement used most often for flower size. In some flowers, however, the distance diagonally

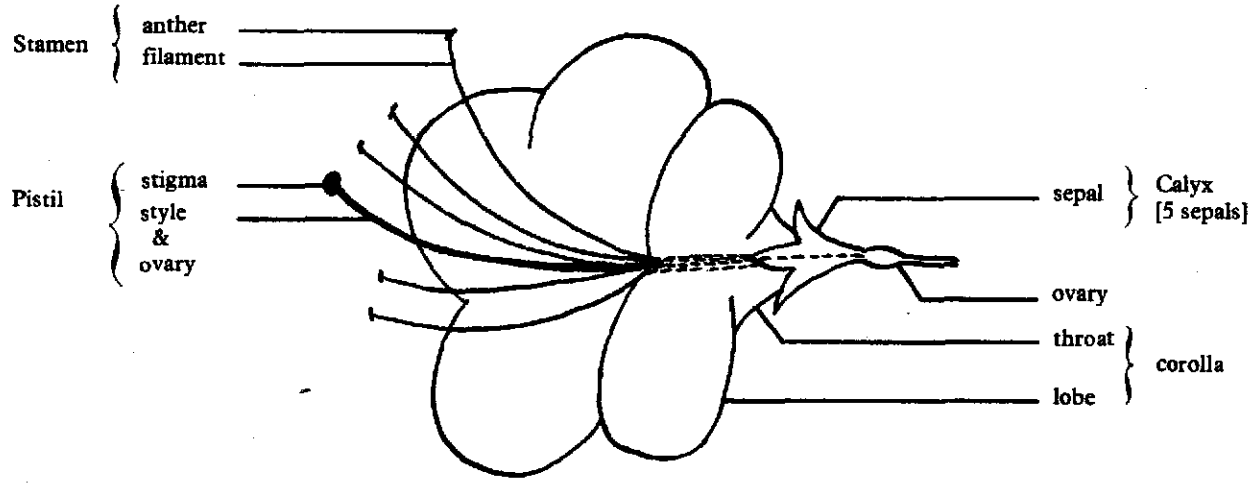

Figure 2. Parts of a typical single azalea flower.

between an upper and lower lobe may be wider, in which instance, both measurements are usually given.

CALYX. The calyx of a typical single flower consists of five green or brown partially fused sepals surrounding the corolla and ovary at the stem. The non-petaloid calyx is of firmer substance than the corolla and remains attached to any seed pod that forms, after the corolla drops or dies. It may clasp the seed pod tightly or flare away from it. The non-petaloid sepals can be smooth or extremely hairy, short and stubby, or long, narrow, pointed, jagged, or rounded. The non-petaloid calyx is not mentioned in written descriptions, but its observation in the garden can help with identification.

A petaloid calyx has been transformed so that it resembles the corolla in substance and color. In a hose-in-hose bloom, the calyx has been almost completely transformed so that the bloom appears to consist of two nearly identical corollas nested one inside the other. In an irregular (or imperfect) hose-in-hose bloom, the calyx has been partially transformed so that it has the substance and color of the corolla but is smaller or contorted. Unfortunately, many available descriptions do not distinguish perfect from imperfect hose-in-hose blooms.

REPRODUCTIVE PARTS. The female part of the azalea flower is the pistil, which consists of stigma, style, and ovary and is attached to the stem at the center of the corolla. The male part is the stamen which consists of a long filament and the pollen-bearing anther. Five or more stamens (depending on the variety) surround the pistil.

Styles, stigma, filaments, and anthers are usually the color of the corolla or slightly paler. On flowers of most evergreen varieties, the styles and filaments are shorter than the corolla; on many deciduous varieties, they are extended far beyond the corolla (exserted). Non-petaloid stamens or pistils are rarely mentioned in descriptions unless they are a contrasting color, conspicuously exserted, or in some way unusual. Each stamen can be transformed into one or more petal-like structures of the same color and substance of the corolla. In double flowers, most or all stamens are fully transformed. The pistil may be absent or transformed. In semi-double flowers, most or all stamens are partially transformed, but smaller than true petals or petals contorted with anthers or filaments are present. A double hose-in-hose or a semi-double hose-in-hose flower results from petaloid modification of both calyx and stamens.

FLOWER COLOR. The color range of the azalea is delightful, and color is one of the most important features of good descriptions, but it can be difficult and expensive to describe precisely. Color is generally described by hue (from yellow to yellow-orange to orange to orange-red to red and so on) and brightness (the lightness, darkness, tone or value) with subdivisions for degree of color saturation (dilution with grey or white).

The systems that have been used in the past to describe azalea color are currently not in publication. A standard color chart that is prepared by the U.S. National Bureau of Standards will be described in detail in a future issue of THE AZALEAN.

The corollas (and petaloid parts) of some flowers consist of only one color, but most have at least two colors and those with three or four are not unusual. The second color that is seen most often on the corolla is the blotch.

The blotch is a symmetrical patch of contrasting color on the standard (upper middle) lobe often extending onto the two adjacent lobes. The blotch may be composed of a few small distinct marks or many larger, less distinct spots that merge together. Blotches have the same general appearance for all flowers of a given variety when they are on a pure white or solid colored flower. Blotches on flowers with light centers and darker edges may vary with the width of the darker edge; the blotch may appear only on the darker edge and not in the center or it may be different colors

on the light and dark areas. Blotches of flowers with colored stripes and sectors may appear only incompletely and sporadically on a stripe or sector that occurs in the normal blotch area.

Blotches on flowers of different varieties can vary substantially in size, shape, and abundance of individual marks composing the blotch and in the extent to which the blotch covers the three lobes. Studying the design of the blotch can be an aid to flower identification. Since most azaleas have a blotch (even though it may not be showy), the absence of any blotch can also be considered distinctive. Unfortunately, many written descriptions we now have do not mention if the blotch is showy, inconspicuous, or absent.

The centers of some corollas are conspicuously paler than the margins. At times thay are pure white or yellowish for a distinctly bicolored effect. The difference between the width of the light center and darker margin varies considerably with variety, branch maturity, or growing conditions.

The centers of some corollas are conspicuously darker than the margins, and the color appears to be feathered or brushed irregularly outward so that the light margin appears sharp and jagged. Stripes and flakes of a still darker color are often present.

Other contrasting colors of the corolla include stripes, flakes, sand, sectors and dapplings which appear irregularly on any area. These markings differ from the blotch in that they usually do not occur symmetrically on the standard lobe, and their appearance is rarely the same on any two flowers of the same plant. A "stripe" is a broad line, usually irregular in outline, that extends from the base of the corolla to the margins or nearly so. A "flake" is a similar line that does not approximate either limit, though sometimes it begins at the margin. "Sand" refers to the very small patches that frequently dot or freckle the lighter background. A "sector" is a large wedge-shaped patch of color. "Dapplings" are spots that are rounded and cloudy and larger than flakes or sand. Plants with the foregoing markings will frequently bear branches known as "sports" due to their bearing flowers that are of solid color or significantly different from the flowers on the rest of the plant.

The aforementioned characteristics may be used as a guide when describing an azalea and in interpreting previously written descriptions. There is no standard method, and no "key" is available for azalea classification and identification. It is hoped that in the future our Society can help provide more uniform and comprehensive descriptions for both newly developed as well as older recognized varieties, keeping in mind both the full habit as well as the distinguishing characteristics of each variety. This in turn will insure the most accurate and useful reference for the purposes of classification as the number of azalea varieties increases.

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3) Clark, J. Harold Rhododendron Information. (1967). American Rhododendron Society.

4) Emory, Debby K. Personal observations.

Debby K. Emory is a retired chemist. She has been collecting azaleas for more than 30 years. Debby is also interested in daffodils, primroses, hostas, and wildflowers. She is an active member of the Brookside Gardens chapter, having partcipated in many of the chapter's annual azalea marts and azalea flower shows.

EVERGREEN AZALEA CUTTINGS
(Step-by-Step Procedure)

Inga Derato
Takoma Park Azalea Committee, Takoma Park, Maryland

1. Flats - They may be either of wood, metal, or plastic, but wood is the cheapest of the three. It is not necessary to purchase any good wood. Get some boxes from the fruit and vegetable store, and if necessary use two boxes to make one good flat. A convenient size for a flat is 20 inches long, 14 inches wide, and 3 1/2 inches deep.

2. Mixture - Either of the four following mixtures may be used:
   (a) Chopped [or milled] sphagnum moss alone;
   (b) Half sand and half Canadian (Polish) peat moss;
   (c) Half Canadian (Polish) peat moss and half perlite;
   (d) Half sphagnum moss and half perlite.

   I have had good success with both mixtures (a) and (c) above, but have found that there is a better percentage of rootings with mixture (c). Besides the better percentage of rootings, I favor mixture (c) for two other reasons: (1) perlite is very light whereas sand makes the flat rather heavy to carry and (2) both the peat moss and the perlite tend to retain moisture, and this keeps the flats from drying out too rapidly.

3. Procedure - After selecting the mixture to be used, fill the flats close to the top. Cover with 3/4 inch of sphagnum moss which has been shredded through a wire screen having about three meshes to the inch. Using a brick or flat board, press the mixture tightly to a smooth surface about 1/2 inch below the top of the flat. Soak the mixture until the contents are thoroughly moist. (Moss is slow to absorb water at the beginning, but once moist it will maintain a uniform degree of moisture for long periods without much attention to watering.) Finally, sprinkle the flat with a mixture of one tablespoon vinegar to one gallon of water. This provides the necessary acidity for best results. For optimum rooting, prepare the flats a day or two before they are needed.

4. Cuttings - Cuttings may be taken from late June until the first frost. How can one determine when a cutting is "ripe" enough to be taken? A cutting must be the new growth, neither soft enough to bend like rubber nor brittle enough to snap like a match stick. When taking your cuttings, be sure to use sharp pruning shears. Wrap the cuttings in moist newspaper or toweling [optional (Ed.)] and place in a polyethylene bag.

   It is best to take cuttings on a cool day and at a time when the plant has had plenty of water. As long as the cuttings are wrapped in moist newspaper and kept in a polyethylene bag they may be kept that way for several days until you are ready to actually place them in the flats. [During this period they may be kept in the vegetable drawer of your refrigerator (Ed.)].

   When you are ready, pinch off (or strip off if you are careful not to tear the bark) all but three or four leaves of the top leaves from each cutting. You then moisten and clip off [with clean sharp shears or a razor blade (Ed.)] the bottom end of the cutting, dip it in Rootone® so that about an inch of the cutting has come in contact with the Rootone®, and lightly shake off any excess.

Cuttings should then be placed in the flats about 1 to 1 1/2 inches apart at a depth of approximately two inches and in rows 1 to 1 1/2 inches apart. When the flat is filled, water with a fine spray from a sprinkling can.

Now cover the flat with polyethylene plastic held above the cuttings by pegs or half circles of wire (metal coat hangers) stuck down in the sides of the flat. The plastic should cover all of the flat and, if it is a large enough piece, tuck it underneath the flat. The plastic should be held close to the flat by tying it with string [rubber band or twistem (Ed.)] - around the flat.

[Place the flat in a shaded location such as against the north side of your house or in the shade under the filtered light from an oak or other shady tree. After approximately six weeks, carefully commence opening the plastic covering until after three to four days it is fully open, following which care must be taken not to allow the rooted cuttings to dry out. (Ed.)] For the winter, place flats in a cold frame or in a protected place such as a window well, but not indoors.

Inga Derato now lives in Florida. With advice from Stuart Armstrong, she described this classical method of rooting azalea cuttings a number of years ago while a member of the Takoma Park Azalea Committee. Members of the Brookside Gardens chapter have had success with this method and have distributed copies of the method at their azalea plant sales and cuttings auctions during the past five years. THE AZALEAN presents this procedure as one successful time honored method. Many excellent variations and other procedures are used successfully by amateurs and professionals alike in propagating azaleas.

Additional information pertaining to the propagation of azaleas previously published in THE AZALEAN includes:

1. Propagation of Azaleas, by Don Hager. THE AZALEAN. Vol. 3, No. 2, pp. 4-5, April 1981.

2. Rooting Dormant Cuttings (notes from a demonstration by Donald W. Hyatt). THE AZALEAN. Vol. 3, No. 2, pp. 5-6, April 1981.

3. Osmocote at High Soil Temperatures (excerpts from a letter by G. Albert Reid). THE AZALEAN. Vol. 4, No. 4, pp. 13-14, Winter 1982-1983.

VENTILATED HIGH HUMIDITY: A New Method for Azalea Propagation

Charles J. Elstrodt and Daniel C. Milbocker, extention horticulturists at the Virginia Truck and Ornamental Research Station, Virginia Beach, Virginia, recently reported on a new method for propagating woody ornamentals. THE AZALEAN is pleased to bring their comments regarding this potentially valuable new propagation technique to our readers, as it should be easily adaptable to propagation by the amateur as well as the small professional propagator.

The passages below are excerpted verbatim from Drs. Elstrodt's and Milbocker's article, "New high-humidity greenhouse improves plant propagation," published in the January 13, 1983 issue of FLORISTS' REVIEW, Volume 172, pp. 17-18, and are followed by a republishing of Drs. Milbocker's and Elstrodt's detailed research article from the American Nurseryman.

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"Through the years, propagators have developed numerous structures and techniques for propagation, but most of them have problems, especially with hard-to-root genera or cultivars. The old, sealed, high-humidity chambers (such as cold frames and hot beds) heated excessively from solar radiation. Shading to reduce this heating slowed rooting and, at the same time, increased the incidence of disease. This meant that a very careful sanitation and fungicide program was essential. The chambers also had to be relatively small for maximum surface cooling, so monitoring of many structures became tedious and time-consuming.

With the advent of intermittent mist approximately 40 years ago, plant propagation became automated. The old watering can was replaced with a time clock and a mist nozzle. Many plants responded well and results were repeatable with automatic programmed systems. But automatic mist produced its fair share of problems, foremost of which was the difficulty of adjusting water volume to compensate for climatic changes. During hot, dry, sunny weather, the frequency of misting had to be increased, and during muggy cloudy weather the rate had to be decreased. Injury or stress to the cuttings will occur from exposure to either extreme.

Efforts have been made through the years to combine mist with high humidity, but these have normally resulted in excesive temperatures and saturation of the propagation medium as a result of decreased evaporation. Thus the attempt to incorporate the best of the two systems was a failure.

The ventilated high-humidity system was a result of extensive research to combine the best qualities of mist, temperature control and the best qualities of high humidity, no saturation. In order to achieve this result, it was necessary to control high temperatures with ventilation, yet have the air saturated with water droplets that would not excessively wet the leaf and soil surface.

To minimize saturation, it was decided that water droplet size had to be reduced. Droplets greater than 50 microns in diameter descend rapidly and soak plants and soil surface.

Droplets smaller than 10 microns are called aerosols and they remain in suspension, requiring excessive amounts of energy for their production. Intermediate-sized droplets between 10 and 50 microns were found to be small enough to be suspended in air currents yet large enough to be produced economically.

Large volumes of water-laden air could be produced to replace heated air removed by ventilation without appreciably lowering the humidity. Putting this concept into practice reduced temperature stress and minimized the problem of saturation at the basal end of the cutting while protecting the terminals with the humid environment.

How does ventilated high humidity propagation work? Can it be economically feasible?" [The answers are yes and are described in the following republished article (Ed.)].

HIGH-HUMIDITY PROPAGATION MAY PROVE USEFUL FOR COMMERICIAL OPERATIONS

Dr. Daniel C. Milbocker and Dr. C. J. Elstrodt
Virginia Beach, Virginia

Can ventilated high-humidity propagation be used commercially? This question was answered by a demonstration of this system at the Virginia Truck and Ornamentals Research Station, Norfolk Branch, Virginia Beach, during the annual meeting of the International Plant Propagators' Society, Southern Region, late last year.

The ventilated high-humidity propagation concept has been under development at the research station since 1974 as a means to improve cutting propagation of woody plants. The system relies on large-capacity humidifiers to continuously maintain a humid atmosphere around the cuttings. Heat from solar radiation is removed with an exhaust fan, while cool air entering the intake vent is immediately humidified. The cool, humidified air is then circulated among the cuttings to help remove the heat resulting from solar radiation striking and being absorbed by the propagation medium.

The System

A commercial 30- by 96-foot hoop house was erected and equipped for ventilated high-humidity propagation. A seven-square-foot vent was cut and framed in a low corner at one end of the hoop house. An Agritech humidifier was suspended in front of the vent to treat the incoming air. An oscillator and fan were built into the unit to circulate the humidified air among the cuttings within a 30- to 35-foot arc radiating from the corner.

A second humidifier on the opposite side of the hoop house was suspended just beyond the area covered by the first unit to rehumidify the air (heated by sunlight) and to circulate it among the cuttings in the midsection of the hoop house. A third unit was similarly positioned on the same side as the first to humidify the remaining section of the house.

A thermostatically controlled exhaust fan (activated at 80° and later at 90° and capable of moving 6,000 cubic feet of air per minute) was installed to remove heated air from the hoop house. It was placed near the ceiling at the end of the structure opposite the intake vent.

The Experiment

A two-part experiment was set up to examine the system's effects on the rooting of cuttings of 15 species and cultivars. Cuttings were struck on October 7 and evaluated on December 7.

In the first part of the test, cuttings of 10 plants were stuck in ground beds with a rooting medium of either sand or Pro Gro, a commercial mix containing equal parts of vermiculite, ground polystyrene and peat moss.

The plants used in this part of the experiment were: x Cupressocyparis Leylandii 'Leighton Green' ('Leighton Green' Leyland cypress), Rosmarinus officinalis (rosemary), Pyracantha coccinea, P. c. variegata, Punica Granatum (pomegranate), Lagerstroemia indica (crape myrtle), Raphiolepis umbellata ovata (yedda hawthorn), Euonymus japonica 'Variegata' (variegated spindle tree), Thuja occidentalis 'Little Gem' ('Little Gem' American arborvitae) and Cotoneaster Dammeri 'Royal Beauty' ('Royal Beauty' cotoneaster).

In the second part of the experiment, five plants were tested for their rooting under ventilated high-humidity propagation. At the same time, three cultural variables were also examined.

Approximately 2,000 cuttings each of Rhododendron obtusum 'Hershey Red' ('Hershey Red' azalea), Juniperus chinensis 'Hetzii' (Hetz blue juniper), J. horizontalis 'Wiltonii' (Wilton carpet juniper), Ilex crenata 'Helleri' ('Helleri' Japanese holly) and Ligustrum lucidum (glossy privet) were subdivided in a factorial arrangement for this part of the test.

Three variables were tested: (1) the

rooting medium, which was either sand or Pro Gro; (2) the rooting structures, which were either beds or flats; and (3) a hormone treatment, a 15-second dip in 4,000 parts potassium indolebutyric acid per million, which half the cuttings received and half did not. All combinations were made, so there were eight treatments in all.

In addition, six subdivisions using J. chinesis 'Hetzii' were interspersed among the replicates to measure the effect of distance from the humidifier, both length and width, on root initiation.

Besides the rooting data for the 15 plants, this experiment design was chosen to determine the uniformity of rooting throughout the structure and the effects of the cultural variables tested in the second part of the study. These factors have been of considerable importance in other types of propagation and may be of questionable significance in ventilated high-humidity propagation. Thus nurserymen would be better informed about the high-humidity system if these responses were known.

Results

Of the plants in the test's first part, Rosmarinus officinalis rooted first (after 10 days). At three weeks rooting occurred on Pyracantha, Cotoneaster Dammeri 'Royal Beauty' and Punica Granatum. P. Granatum, a deciduous plant, rooted even though its leaves turned yellow in response to the onset of fall. Lagerstroemia indica, x Cupressocyparis Leylandii 'Leighton Green', Euonymus japonica 'Variegata' and Thuja occidentalis 'Little Gem' began rooting at four weeks.

Of the plants in the second part of the experiment, Rhododendron obtusum 'Hershey Red' not treated with IBA and Juniperus horizontalis 'Wiltonii' rooted at two weeks. After three weeks, cuttings of J. horizontalis 'Wiltonii' stuck in Pro Gro had rooted better than those stuck in sand. At the same time, cuttings of R. obtusum 'Hershey Red' dipped in IBA remained unrooted and lost some of their leaves. Ilex and Ligustrum treated with IBA and stuck in Pro Gro rooted earlier (after four weeks) than those receiving no IBA and stuck in sand.

At eight weeks, the time of the IPPS tour, all plants in both parts of the experiment had rooted to some extent (Table 1). Most rooted quite well, even though no supplemental heating was used and the cool days of late November were somewhat adverse to rapid root initiation.

Table 1. Rooting percentages of cuttings of 15 plants produced under high-humidity propagation.

Plant	% Rooting
Cotoneaster Dammeri 'Royal Beauty'	100
Euonymus japonica 'Variegata'	100
Ilex crenata 'Helleri'	100
Pyracantha coccinea	100
Pyracantha coccinea variegata	100
Rosmarinus officinalis	100
Thuja occidentalis 'Little Gem'	95
Punica Granatum	90
Juniperus chinensis 'Hetzii'	88
Ligustrum lucidum	87
Lagerstroemia indica	85
Juniperus horizontalis 'Wiltonii'	64
Rhododendron obtusum 'Hershey Red'	55
Raphiolepis umbellata ovata	45
x Cupressocyparis Leylandii 'Leighton Green'	19

Most cuttings, except those of 'Hershey Red' azalea dipped in IBA and the deciduous plants, looked as healthy as the day they were cut, indicating that they would also root.

Unrooted cuttings, with few exceptions, were well callused, including even those that were improperly stuck or remained on the surface of the propagation medium. Signs of declining vigor were rare.

For Hetz blue juniper, no significant differences in rooting were measured over the width or length of the hoop house.

Other Observations

The weather was much more favorable for root initiation in October than in Nov-

ember. Cool weather in November caused noticeably slower rooting in sand than in Pro Gro, possibly because Pro Gro is darker than sand and thus absorbed more heat. The exhaust fan thermostat was raised from 80° to 90° and better rooting followed.

At eight weeks, cuttings of Ligustrum lucidum and Ilex crenata 'Helleri' stuck in Pro Gro had significantly better rooting than those stuck in sand. Differences were smaller for the other three plants used in the second part of the experiment.

During cool periods of the year, the darkness of the propagating medium is probably more important than its ability to drain excess moisture, which is a problem with conventional mist propagation. The need for a well-drained medium was not eliminated at the higher thermostat setting of the exhaust fan. With less frequent operation, more water condensed on the plastic film of the hoop house.

The increased dripping tended to wet the propagation medium. This type of saturation was expected to have a greater influence on the cuttings in flats than on those in beds when rooting data were analyzed, but significant differences were not measured. Nevertheless, nurserymen propagating in flats or shallow containers may benefit by adjusting their humidifiers to provide minimum adequate humidity levels or adjusting the thermostats to run the exhaust fans more frequently than when propagating in beds.

Hormones

Dipping basal ends of cuttings in rooting hormones is a common practice in preparing plants for mist propagation, but it is of questionable value for ventilated high-humidity propagation. On several previous occasions, rooting of plants was delayed by hormone applications.

In this test, Ligustrum lucidum and Juniperus horizontalis 'Wiltonii' did not respond to IBA. Rhododendron obtusum 'Hershey Red' responded adversely by dropping its leaves and developing necrotic basal stems, symptoms of excessive application. However, Ilex crenata 'Helleri', which rooted 100 percent regardless of treatment, rooted earlier and more vigorously when IBA was applied.

Thus in this type of propagation, IBA should be used with more caution than in mist propagation, and fewer beneficial results should be expected.

Under mist, the surface of the propagating medium is cooled by evaporation. On the other hand, the medium surface is heated (by sunlight) in ventilated high-humidity propagation, because evaporative cooling takes place in the air.

Thus the higher temperature of the propagating medium under humid air conditions may partially or completely substitute for hormones during root initiation.

Conclusion

Ventilated high-humidity propagation is a new method that can be used commercially. While it is only in its ninth year of development, it looks promising.

The high-humidity propagation system can be successfully installed in a typical nursery hoop house and can be used for rooting cuttings of plants commonly grown in nurseries. In addition, it is capable of producing high-quality rooted cuttings under conditions that are easily duplicated in most greenhouses.

Dr. Daniel C. Milbocker is a plant pathologist and Dr. C. J. Elstrodt is an ornamentals extension specialist at the Virginia Truck and Ornamentals Research Station, Norfolk Branch, Virginia Beach, Virginia. This article less two figures is republished from the American Nurseryman, Vol. 157, pp. 57-59, April 1, 1983.

CONTAINERS VS. POLY BAGS--WHICH ARE BETTER?

Dr. Carl E. Whitcomb
Stillwater, Oklahoma

British and Australian nurserymen have been using poly bags made of four- or six-mil black polyethylene sheets for years. They say the bags offer many advantages. The bags are more economical than rigid plastic or metal containers, easy to use and acceptable to customers. They also use up several times less petroleum in manufacturing than rigid plastic containers.

Other Advantages

Poly bags are flexible and stored easily. They come folded flat in boxes. A box about 6 by 12 by 22 inches can hold about 250 five-gallon bags. The same number of rigid plastic containers of the same volume would require about 40 times as much storage space.

Some nurserymen still use metal food containers with straight sides for nursery stock. These cans must be cut with a special tool before they leave the retail nursery. The rough edges often cut fingers during handling and planting. Disposing of used cans is also a problem. Plastic containers, although not a hazard, can create disposal problems for homeowners if they do not want to reuse them.

In contrast, poly bags can be easily removed from the root balls. They may be slipped off and reused or cut off and thrown away.

Poly bags do have a few drawbacks. Filling the bags takes a little longer than with containers, but other handling operations appear similar. Bags two gallons and larger are filled and handled most easily.

Six-mil bags are filled more easily and withstand handling better than three-mil bags. The thinner bags tend to fold in while filling.

Transplanting liners into gallon bags or shifting plants from gallon to five-gallon bags is difficult without some device to hold the bags in the filled position. However, transplanting liners or seedlings into larger bags is accomplished easily.

A Comparison

A comparison was made between poly bags and rigid green plastic containers to determine the impact on plant growth. The growing medium and all cultural practices were identical for the two sets of plants.

Seven plants were tested: Cercis canadensis, Elaeagnus angustifolia, Quercus acutissima, Lagerstroemia indica, Acer Ginnala, Gymnocladus dioica and Ulmus parvifolia.

During the growing season, trees in rigid containers were blown over by wind several times. This rarely happened with trees of the same size in poly bags. This is due to the broad, flat bases of the bags, which are wider than the container bases. Thus the bags could yield substantial labor savings to nurserymen in areas where wind is a problem.

At the end of the growing season, the plants in the bags were 5 to 15 percent larger than those in the containers. This was surprising, because the bags were black and therefore had slightly higher soil temperatures than the containers.

However, the reason for the greater growth was highly visible when the root systems were observed. Plants produced in the poly bags had more fibrous root systems than plants grown in containers. They had six times more white root tips visible on the root ball surfaces.

Root System Development

Improved root systems on the bag-grown plants resulted from root tip pruning caused by the folds at the bottom of the bags. As a root grows in a container, it contacts the wall and is directed

downward. When it reaches the bottom, it follows the curvature of the container.

Root development proceeds similarly in a poly bag, except that when the root reaches the bottom, it is trapped in one of the four folds. Because the root tip is unable to elongate further, it dies. When the root tip dies, the apical dominance is lost. Lateral secondary roots quickly form.

This process continues as additional root tips reach the folds and are trapped. It is similar to the lateral branch development that occurs on a tree or shrub when the terminal branches are removed.

The increased number of roots helps plants become established in the landscape more quickly. Roots that continue to develop while plants are being held in retail outlets are forced to branch. This increases the holding time of container nursery stock somewhat, but little if any loss in plant vigor occurs as long as good cultural practices are continued.

Other Thoughts

White-and-black poly bags have not passed durability tests yet, even though they do reduce soil temperatures by 10^{o} to 15^{o}. Until further refinements are made, only black poly bags are recommended.

Clearly, poly bags are not for everyone in the nursery business. However, small nurseries and retailers who grow part of their own stock should consider using them. My observations indicate that retail customers are more interested in plant quality than container type. If this were not true, no container plants would have ever been sold in the days of the rusty tin can.

I much prefer trees and other plants grown from seed in poly bags over those produced in rigid containers, where root circling is a major problem. Until a design for rigid containers is developed that stops root circling, placing trees in conventional round containers does not create a good image for the nursery industry.

Consumers know very little about how plants grow, but even they know that tree roots should not look like screen door springs.

Dr. Carl E. Whitcomb is a member of the Department of Horticulture, Oklahoma State University, Stillwater, Oklahoma. This article less four figures is republished from the American Nurseryman, Volume 157, pp 101-103, January 1, 1983.

CARE AND MAINTENANCE OF YOUR AZALEAS

Emile Deckert
Hampstead, Maryland

Azaleas are among the most beautiful, varied, and versatile plants in our world. They have excellent longevity, with some reaching the age of from 75 to 200 years! Their value and beauty increase with each year's growth, and they range in size from two or three inch tall miniatures to enormous plants 20 feet in height and 15 feet in width. The azalea requires simple and minimal care, and the maintenance expense is very low. Azaleas can be used as foundation plantings, backgrounds, hedges, edgings, rock garden plants, or low ground covers.

From the approximately 70 species and over 6,000 named cultivars, the gardener has a tremendous choice of color, form, size, and blooming period ranging in the middle Atlantic states of the U.S. from March through the fall. Colors available range from white, pink, yellow, orange, red, and purple in hundreds of shades, to multi-colored blooms with two or more colors on each flower. Most azaleas display a burst of red, yellow, or bronze foliage in the fall. The most common azaleas in the mid-Atlantic region are the early blooming varieties with a peak of bloom in late April or early May. The flowering season may be extended by planting such varieties as some of the Satsukis, Robin Hills, Linwoods, prunifolium, and arborescens to be followed by such varieties as Opal, Indian Summer, and Dorsett, which bloom until frost appears.

Location and Exposure

All azaleas prefer light high shade, yet many will do well in full sun, particularly those that shed their leaves in the winter. Filtered sunlight under tall oaks provides the ideal location for the azalea. When found growing naturally in the wild, they will generally be found along the edges of the woods or in small clearings where they receive shade for a portion of the day. These conditions are easy to duplicate around the home by planting near the house, by a fence, or on a bank or any spot that provides shade for a portion of the day. Most garden sites are satisfactory. Never plant an azalea where the ground stays wet and soggy. In all such cases provide optimum growing conditions by creating raised beds.

Soil Preparation and Planting

Azaleas can be planted or transplanted at any time of the year that the ground can be worked and are one of the easiest plants to transplant. Container grown plants are all too often pot bound, in which case a knife may be used to slash the root ball so as to cut the compacted roots. Failing to do so will prevent the plant roots from ever establishing themselves toward the outside, which will cause the death of the plant. The old cliche not to plant a five dollar plant in a fifty cent hole still holds true particularly where the soil is clay. Making a hole in clay will forever restrict the health of the plant, because the roots will never be able to escape into the clay wall of the hole, regardless of what is added to the soil mixture being used. Furthermore, in a wet season the hole in the clay becomes a bathtub. The longer such conditions prevail the more certain drowning of the plant will occur.

When your soil is clay, I recommend beds at least five to six inches above the surrounding area. The preferred mixture is two parts of your soil, one part sphagnum peat (not Michigan peat), and one part coarse concrete sand. If your plant has a root ball of more than seven to eight inches high, then remove any amount in excess of this. Set the root ball flat on the ground, removing only coarse debris. Then take the soil mix and surround the root ball making the hill at least double the diameter of the root ball. Add three to four inches of mulch. During the first year, watering at regular intervals will be necessary unless you have a wet year, in which case your plant will have all the drainage needed and will fluorish for you.

Mulching

Mulch comes in many forms. I have found freshly cut wood chips to be the best. Partly decayed leaves, shredded bark, or root mulch are all very good. Peanut shells and cocoa mulch are also recommended. Pine bark is often used, however, be sure to get the finest grade, not more than 1/2-3/4 inch. Larger grades will forever blow away during wind or float away during heavy rain.

Fertilizing

Fertilizing should be refrained from as long as possible, since it tends to offset the trace element balance available. All too often fertilizer burns the fine surface roots of the plant. Cottonseed meal is the only recommended fertilizer for use on azaleas. It should be applied in late winter or very early spring. Since only plants which are poorly planted seem to need fertilizer, I suggest you replant those plants using the above suggested method. Fertilizer is never to be used to treat a sick plant.

Watering

The most critical watering period in the mid-Atlantic region occurs during July and August. At this time, if any shortage of water should occur, then plants tend to go into a short dormancy which causes them to produce new growth with the coming of heavy rain in the fall. This results in severe winter kill of plants, as the new fall growth is too tender to survive the mid-Atlantic winter freezes and thaws.

Maintenance

Your azaleas will be virtually maintenance-free, with the exception of spraying against insects. Systemic insecticides readily available at most garden centers should control lace bug, red spider, and white fly. In the event of fungus, Bayleton or one of the other fungicides (see THE AZALEAN, Volume 5, page 6, March 1983) may be used according to instructions on the label. The newer fungicides can be quite effective in controlling petal blight. When used for this purpose, they should be applied at the time of color beginning to show in the bud. Pruning of your azaleas should never be done later than July 4th. Also, never reduce the overall size of the plant by more than 1/3 when pruning. Azaleas in the middle Atlantic region set flower buds in August and September. These are the buds that will give you a profusion of flowers in the spring. Because of this bud setting process, they should be pruned, if necessary, during or just after blooming.

Emile Deckert is a founder and a past president of the Azalea Society of America. He now lives in Hampstead, Maryland, where he is developing an azalea nursery.

AZALEA SOCIETY OEVELOPMENTS

National Meeting

The 5th National Meeting of the Azalea Society of America was held on April 30, 1983, at the National 4-H Center in Chevy Chase, Maryland. The four proposed ammendments to the Society's By-laws distributed to the membership in the March 1983 issue of THE AZALEAN were each adopted by unanimous vote of the assembled members. Unanimous votes were also cast for each of the five nominees for at-large members to the Society's Board of Governors for the 1983-1985 term: James A. (Tony) Dove, Jr., Charles H. Evans, M.D., Ph.O., Oonald W. Hyatt, Ryon A. Page, and George S. Switzer, Ph.D. The charter for our ninth chapter, the Mobile chapter, was presented to its convention delegate, Russell Scott, chapter treasurer. The Board of Governors at its meeting May 1 elected the following Society officers for 1983-1984: Ryon Page, chairman of the Board of Governors; Tony Oove, president; John Rochester, vice-president; Alice Holland, secretary; and Rusty LaGuardia, treasurer.

At the National Meeting, President Jerry Goodman expressed the Society's appreciation to Mr. John (Jack) G. Shaffer, retiring editor of THE AZALEAN. Jack relinguished the editorship of THE AZALEAN with the last issue of Volume 4, Winter 1982-1983 after serving for almost three years. Undoubedtly, the Society's steady growth during that span is due in no small part to the quality of THE AZALEAN. Only those who have been closely associated with this operation or with similar projects can appreciate the amount of effort involved. We are grateful to Jack for his service as Editor of THE AZALEAN.

Jerry Goodman
Retiring President
Azalea Society of America

Ryon Page
Chairman
Board of Governors
Azalea Society of America

ASA Joins U.S. Botanic Garden in 'Florafest'

For the past three years, the Azalea Society of America has been part of the U.S. Botanic Garden's pre-spring celebration named 'Florafest', c20ng with 28 other plant societies in the Washington, D.C. area.

The theme of the show this past March was "Gardens of the World." The Azalea Society's exhibit this year was a Japanese garden called "Azaleas- Reflections of the Far East." The display included a pond fed by a bamboo pump and crossed by a bamboo foot bridge in front of a bamboo and grass paneled facade. Azaleas that had been forced and companion plants enhanced the setting. A Japanese lamp and a sand design enhanced the educational exhibit, where handout information on an evergreen cutting procedure (see page 23 of this issue) was available along with information on membership in the Azalea Society of America.

An average of 35,000 people visit the the U.S. Botanic Garden during the four day exhibit, drawing people not only from the Washington, O.C. area, but also American tourists and visitors from all over the world. Over the past three years, Florafest has benefited the Azalea Society of America by the addition of new members to local chapters and new members located all over the U.S. An example of the latter is that Florafest is directly credited with the inception of the Louisiana chapter.

I wish to thank members of the Brookside Gardens, Ben Morrison, and Northern Virginia chapters for their assistance in setting up the Society's display at Florafest this year.

Bob Barry
Chairman
1983 Florafest Committee
Azalea Society of America

CHAPTER ACTIVITIES

Louisiana Chapter's First Azalea Show

We did not believe we could pull it off when it was first discussed, but the Louisiana chapter held its first azalea show March 26 and 27, 19B3, despite the unusually cool spring and lack of blooms.

The show was the first of its kind in the area exhibiting azaleas. It was patterned after the first show given by the Brookside Gardens chapter, "A Salute to Azaleas." The Louisiana chapter decided it would open the show to participation by local residents even though they were not yet members. The chapter wanted the first show to be more educational rather than competitive. There were no awards for specimens exhibited, and there were many fine specimens, over 200 varieties. There were also 20 flower arrangements designed under the guidelines of the local garden clubs. First, second, and third prizes were awarded for the arrangements.

Much advance publicity was given the show with articles in all the local newspapers within a 100 mile radius, and the local radio station gave spot announcements. Despite the bad weather, attendance was good. The comment heard most often was, "I didn't know there were so many varieties of azaleas."

Several of the nurserymen and propagator members exhibited container grown plants ranging in size from one to seven gallons, which provided an excellent background in the large temporarily vacant corner store in the Riverside Shopping Center, donated to stage the show by the owner, Ray Sylvest.

Dr. Larry Brown had an interesting educational exhibit of his grafting techniques that included a number of specimens of his fine grafted azaleas. Dr. Brown has been grafting unusual varieties of azaleas onto vigorous Formosa growing stock. The Formosa stock was in 'standard' forms about four feet high. These tree azaleas, three to five years old, are quite a sight to see. This process enables even the low growing varieties such as Gumpo to become a tree.

Twelve three gallon azaleas were given in the door prize drawing. All members were pleased with the first azalea show and are already planning for next year's show.

John U. Rochester, Jr.
President
Louisiana chapter

Footnote: I attended the Show and want to congratulate the forty members of the Louisiana chapter for not only 'dishing-up' a spectacular show, but also for a truly hospitable and educational experience for all who attended.

Robert K. Barry
Chairman
Chapter Expansion

19B3 National Meeting & Convention

The Ben Morrison, Brookside Gardens, and Northern Virginia chapters are pleased to report that the 5th National Meeting and Convention of the Azalea Society of America, held April 29 - May 1, 1983 at the National 4-H Center, Chevy Chase, Maryland, was a resounding success. More tha 100 ASA members participated in the activities during the weekend. Many chapter members assisted in the planning and running of the Convention. Among those were registrars Don Hyatt and Marge Taylor and local arrangements chairman, Charlie Evans. Bob Barry arranged for the flower appliques for the registration badges, which were hand lettered by Don Hyatt. Bob also served as the "official" convention taxi picking up Fred Galle upon his arrival from Georgia at the airport. Flower sprays decorating the National 4-H Center were secured and arranged by Glenn Taylor with assistance from Frances Louer and Denise Stelloh and with bud and flower vases supplied by Andy Dietz and Nancy Evans.

Bill Miller and Charlie Evans arranged for exhibits from the Gaywood Garden Club of Silver Spring, by Ron Bare of the U.S. National Arboretum, the Plant Quarantine Section of the U.S. Department of Agri-

culture, Paygro Inc., Hormex, and Menne Poly Bags. Roger Brown and Bill Miller helped arrange for the speakers including the keynote speaker Martha Prince, Dr. John Neal of the U.S. Department of Agriculture, and society members Tony Dove and Art Frazer. Betty Queen handled hospitality, and Nancy Evans kept us filled and conversing with meals and receptions. Andy Dietz and Roger Brown surprised us all with Glenn Dale seedlings at the National Meeting, and a special treat were Gordon Severe's azalea plant favors for the ladies at Saturday evening's dinner.

We were pleased to have Neil Campbell lead the McCrillis tour, Ryon Page conduct the Brookside Gardens tour, Andy Dietz and Roger Brown coordinate the Glenn Dale tour, and to have Frank White open his Azalea Acres Farm for a visit. The azalea flower show, "A Celebration- Our Fifth Anniversary," was splendid under the direction of Bunny Carroll with help from among others: Lois and Paul Bowker, Anna Jane and Willard Martin, Nancy Batson, Mary Ann and Fred Thane, Janet and Bill Miller, Abe Hannawald, Mary Rutley, Dianne Gregg, Ryon Page, Buck Claggett, Don Voss, Nancy Swell, Reid Denis, Catherine Nickle, and Brookside Gardens staffmember Joe Dieter and greenhouse manager Bob Rinker. Several hundred azaleas were exhibited as well as twenty artistic design arrangements.

Congratulations to the horticulture and artistic design winners including: Bob Trayhern's (Northern Virginia chapter) Santoi, Best in Show; Heather Evans' (Brookside Gardens chapter) Coral Bells (kirin), Second Best in Show; Nancy Batson (Brookside Gardens chapter) the Sweepstakes Winner with the most blue ribbons; and Lois Bowker (Brookside Gardens chapter) winner of Best Artistic Design. A special thanks to Anne and Donald Brooks, Anna Jane and Willard Martin, William Nickle, Thurza and Bill Parsons, and Bob Stewart for opening their gardens to visits on Sunday afternoon. To all who attended the Convention and to each who helped make it a great success, the 1983 Convention Committee thanks you one and all.
