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A COLLECTION OF BELTSVILLE HYBRID AZALEAS

George Switzer
Prince Frederick, Maryland

The Beltsville Azaleas¹, also known as Yerkes-Pryor, are the result of a breeding program at the U.S. Department of Agriculture started by Guy E. Yerkes, who retired in 1946 and died in 1950. The work was continued by Robert C. Pryor. They were selected from 300 seedlings from approximately 50,000 grown over a five-year period. The first ten were released in February 1950. In all, 80 were named and introduced. Perhaps the most interesting are the 19 dwarf azaleas, introduced in 1957-1960. This was an unexpected result of the project, and according to Pryor², they appear to be true genetic dwarfs.

All of the varieties introduced were developed primarily for outdoor growth, but several showed promise for greenhouse forcing. They were grown and tested by nurserymen in widely scattered parts of the country, including California, Georgia, Illinois, Maryland, New York, Massachusetts, North Carolina, Pennsylvania, Virginia and Washington³.

Fifty-three of the named varieties have the Kurume 'Snow' as a pollen parent. Thirty of them are white. The flowers are generally small, and many are hose-in-hose. Very few of them seem to have made their way into the nursery and landscape trade, but there has been renewed interest in the group in recent years by collectors.

At Scientist Cliffs in Calvert County, Maryland is a planting of Beltsville azaleas as a memorial to G. Flippo Gravatt, founder of the community.

The collection was acquired by the late Dr. A. F.

Hollowell from the U.S. Department of Agriculture in Beltsville, Maryland. At the time it was planted, in 1970, it was a complete collection of Beltsville hybrids. The plants were placed in an open area, fully exposed to the elements, and were somewhat neglected in the ensuing years. Beginning in 1980, interested members of the Scientist Cliffs community began periodic maintenance and charted the planting. As of July 1980, we found labels on 56 of the 66* varieties originally planted (total approximately 128 plants, including duplicates). As of that date, 16 of the 19 dwarfs had survived and 40 of the 47 others were identified.

Today, these numbers are considerably smaller, especially the dwarfs. The latter were placed in a double row along a main road and due to their nature and location were easy prey for dogs, children and lawn mowers. Some of the others have also succumbed, but about 45 can now be identified.

Many of the plants have reached large size, some as much as ten feet across and five feet in height, with a very tight, mounded habit. They are highly floriferous and bloom in late April to early May.

Everyone is welcome to visit the Memorial Garden but should first contact me. (P.O. Box 562, Prince Frederick, MD, 20678, or (301) 586-1123.)

*Two specimens of 'My-O' added later brings this figure to 67.

¹For complete descriptions see *The Azalea Book* by Frederick P. Lee, D. Von Nostrand Co., Inc., 1965, and *Azaleas* by Fred C. Galle, Timber Press, 1985.

²The American Horticultural Magazine, July 1957.

³U.S. Department of Agriculture Press Release, February 6, 1950.

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STETHOCONUS JAPONICUS (HETEROPTERA: MIRIDAE): A PREDATOR OF STEPHANITIS LACE BUGS NEWLY DISCOVERED IN THE UNITED STATES, PROMISING IN THE BIOCONTROL OF AZALEA LACE BUG (HETEROPTERA: TINGIDAE)

Thomas J. Henry, John W. Neal, Jr. and Katherine M. Gott

(TJH) Systematic Entomology Laboratory, BBII, Agricultural Research Service, USDA, c/o U.S. National Museum of Natural History Washington, D.C. 20560; (JWN, KMG) Florist and Nursery Crops Laboratory, HSI, ARS, USDA, Beltsville, Maryland 20705.

Abstract.—The first Western Hemisphere record of the predatory Japanese plant bug *Stethoconus japonicus* Schumacher is reported based on specimens collected in four localities in Maryland. Established populations of this potentially useful, adventive, obligate predator of *Stephanitis* lace bugs were discovered preying on the azalea lace bug, *Stephanitis pyrioides* (Scott), also native to Japan. Predatory habits of species in the genus are reviewed, the adult is redescribed and illustrated, and information to help separate *japonicus* from other Nearctic Miridae is provided. The genus *Stethoconus*, previously placed in the tribe Clivinemini of the subfamily Deraeocorinae, is transferred to Hyaliodini also in the Deraeocorinae.

During 1985 while studying the field biology of the azalea lace bug, *Stephanitis pyrioides* (Scott), one of us (KMG) discovered a population of an unrecognized plant bug on an isolated, U.S. grown, potted azalea in Beltsville, Maryland. Initial observations indicated that adults and nymphs were preying on the lace bugs. Eventual study of these specimens revealed that the mirid was *Stethoconus japonicus* Schumacher, known only from Japan.

Herein, we review the literature discussing the predatory habits of species in *Stethoconus* Flor, give the first distribution and host records of *S. japonicus* in North America, redescribe and illustrate the adult, and provide information to help separate this species from all other Nearctic Miridae, including a clarification of the tribal and subfamily placement and its transfer to the tribe Hyaliodini in the subfamily Deraeocorinae.

This report was prepared to alert others studying azalea lace bug of the occurrence of this potentially important predator in the United States.

Predatory Habits in the Genus *Stethoconus*

The mirid genus *Stethoconus* contains eight Old World species, of which only two African species are not yet proven exclusive predators of lace bugs or Tingidae (Carayon, 1960). The species now included in *Stethoconus* are: *bimaculatus* (Schouteden), 1946, known from Africa ["Burunga, Luenga, and Mikeno volcano"]; *cyrtopeltis* (Flor), 1860, from northern Europe; *distanti* (Schouteden), 1946, from Africa ["Abimva"]; *trappai*

Carayon, 1960, from Madagascar; *japonicus* Schumacher, 1917, from Japan; *praefectus* (Distant), 1909, from India and Sri Lanka; *pyri* (Mella), 1869, from southern Europe and western Transcaucasia; *scutellaris* (Schouteden), 1946, from Africa ["Rutshura"].

Stethoconus pyri (Mella) [most frequently cited as *Stethoconus cyrtopeltis* (Kerzhner, 1970)], one of the better known species, is closely associated with the pear lace bug, *Stephanitis pyri* (Fabricius), found on various fruits, including apple, apricot, peaches, and pears, and other trees such as hawthorn, linden, and mountain ash (Carayon, 1960). Wagner (1970) illustrated the adult dorsal habitus, head, and claws [as *cyrtopeltis*]. Rey (1881) remarked that the predatory nymphs of *Stethoconus pyri* [as *Stethoconus mamillo-sus* Flor, 1861] closely resembled the appearance, coloration, and movements of *Stephanitis pyri* nymphs to the extent that he declared them "mimics." Gautier (1927) observed that *Stethoconus pyri* [as *cyrtopeltis*] uses its front legs to hold *Stephanitis pyri* and does not abandon its prey until it is completely empty of fluids. He reported also that a single nymph of this mirid could destroy more than 20 lace bugs in a single day. In the USSR, Puchkov and Puchkova (1957) also observed that individuals of *Stethoconus pyri* [as *cyrtopeltis*] use their anterior legs to hold prey against the leaf surface of linden, randomly probe with their rostrum, and feed until the lace bug is drained. They reported that a 3rd instar nymph could destroy 5—10 or more 1st and 2nd instar *pyri* nymphs in 24 hours. Golfari (1937) considered *Stethoconus pyri* [as *cyrtopeltis*] the most important predator attacking *Stephanitis pyri* in central Italy, followed by anthocorids, nabids, and a mymarid egg parasite.

In northern Europe where *Stephanitis pyri* is absent, Schumacher (1917) suggested that *Stephanitis oberti* Kolenati served as the host of *Stethoconus cyrtopeltis*. This information is probably the only correct prey association for *cyrtopeltis*. Kerzhner (1970) illustrated male parameres and provided a key to separate *Stethoconus cyrtopeltis* from *Stethoconus pyri*.

Stethoconus praefectus (Distant) is a major predator of a coconut palm lace bug, *Stephanitis typicus* Distant, in India. Mathen et al. (1967) first noted for *praefectus* [as *Apollodotus praefectus*] "that the swift-moving, milk-white predatory nymphs were available in large numbers. . . on coconut seedlings and, in the labora-

tory, they fed on all stages of the coconut lace bug, *Stephanitis typicus*, at the rate of one to seventeen nymphs per predator nymph per day. Mathen and Kurian (1972) studied the life history in more detail and described and illustrated the life stages. In that study, 54 to 74 lace bugs were consumed during nymphal development, and adults consumed an average of slightly more than 5 lace bugs per day, a significant number considering that this bug breeds throughout the year and females potentially produce more than 50 eggs during their life cycle.

Cheng (1967), in studying the ecology of *Stephanitis typicus* on banana in Taiwan, reported that a *Stethoconus* sp. [possibly *praefectus*] could be found throughout the year, except December and January, and that females of this predatory species deposited an average of this predatory species deposited an average of 34 eggs in 8–10 days. He further noted that a single specimen of this species destroyed about 356 tingids during its life.

Less is known about the African species of *Stethoconus* but at least two are known to feed on tingids. *Stethoconus scutellaris* (Schouteden) from the Zaire (previously Belgian Congo) is said to be an important predator of coffee tingids in the genus *Habrochila* (Carayon, 1960). More recently, Carayon (1960) described the new species *Stethoconus frappai* from Madagascar, which was found preying on a coffee tingid, *Dulinius unicolor* (Signoret). Decazy (1975), in studying the control of *D. unicolor*, noted that *frappai* afforded some degree of control when lace bug populations were high and recommended special timing of insecticide applications to avoid affecting predator levels. ***Stethoconus japonicus* Schumacher**

No detailed life history data are available for *japonicus*. Nawa (1910) reported that its habits [as *Capsus* sp.] in Japan were similar to those of *cyrtopeltis* and *praefectus* and provided illustrations of the adult (including the antenna, rostrum, legs, wings, and genital capsule) and a figure of a nymph feeding on *Stephanitis ambigua* Horvath [as *Stephanitis pyrioides* (Scott); clarified by Schumacher, 1917]. Esaki (1932) illustrated the adult and noted that this beneficial species also preys on *Stephanitis nashi* Esaki and Takeya. Kerzhner (1970) illustrated the male parameres.

Our observations in Maryland indicate that *japonicus* is a voracious predator of azalea lace bug and, although both species are native to Japan, this report may be their first predator-prey association (Oliver et al., 1985). The literature leaves little doubt that all members of the genus *Stethoconus* are specialized predators of Tingidae; all but the African species appear to prefer lace bugs of the genus *Stephanitis*. Reports of prey consumption for *pyri* and *praefectus* indicate that members of the genus are potentially important biological control agents that could be used in integrated pest management programs. Because *japonicus* is said to have habits similar to those of better known *Stethoconus* species, the presence of large, established populations of this

species in the United States could have a significant impact on azalea lace bug control programs. Researchers working with ornamental azaleas should be alert to the presence of this adventive, beneficial species in the United States.

Description of adult (Figs. 1-6).—*Male*: Length 3.58-3.76 mm, width across widest point on hemelytra 1.76-1.84 mm; general coloration yellowish brown with extensive fuscous markings; clothed with rather long, semierect, yellowish pubescence. *Head* (Figs. 1,2): Length 0.26-0.30 mm, width 0.78-0.80 mm, vertex 0.28-0.30 mm; much wider than long, basal margin distinctly carinate, eyes prominent, not touching anterior margin of pronotum; shiny yellow to yellowish orange, vertex sometimes with an inverted, dark-brown, V-shaped mark extending to bases of antennae, tylus narrowly bordered by dark brown. *Rostrum*: Length 0.96-1.02 mm, extending to middle of prosternum between pro- and mesocoxae; yellowish brown with apex of segment IV fuscous. *Antenna*: Pale yellowish brown, segment I sometimes more yellow to yellowish orange, apical 1/2 of segment II fuscous; segment I, length 0.30-0.32 mm; II, 1.28-1.34 mm; III, 0.36-0.40 mm; IV, 0.32-0.34 mm. *Pronotum* (Figs. 1-2): Length 0.96-1.00 mm; basal width 1.52-1.56 mm; trapeziform, distinctly convex, evenly and deeply punctate except for shiny depressed calli, area between calli with a somewhat V-shaped carina; areas between punctures on disc appearing calloused, callouses coalescing in some areas to form small bumps or blunt tubercles, collar wide, punctate, about 0.16-0.18 mm long at meson; lateral margins rounded, straight in dorsal aspect, with a distinct, narrow carina on propleura; posterior margin straight through middle with lateral 1/3 angled anteriorly; overall coloration yellow brown, mesal carina and calloused areas between punctures ivory white, two large spots at base of disc on either side of mesal carina, two spots on middle of disc near lateral margins, and area bordering calli dark brown. *Scutellum* (Fig. 2): Shiny fuscous, each side of base with a large yellowish spot; swollen, cone-shaped, nearly pyramidal; apex laterally compressed. *Hemelytra*: Broadly rounded, embolium wide; generally shiny, yellowish brown with a large, wide, dark-brown to fuscous band through middle of embolium, corium, and clavus, a large, irregular, white spot at middle of corium (anterior to fuscous band) adjacent to clavus, also with a dark brown or fuscous spot at base of embolium, clavus, and on anterior side of white spot, cuneus and apical 1/4 of Corium translucent, tinged with pale brown, apex of cuneus sometimes brown. *Ventral surface*: Thorax shiny, fuscous to black, ostiolar evaporative area and a narrow mesopleural sclerite yellowish; abdomen shiny yellow to pale yellowish brown, invaded by darker brown along segment margins and ventral area of basal segments. *Legs*: Uniformly pale yellow, metafemur with a wide, fuscous, subapical band and apex yellow to yellowish orange. *Claws*: Deeply cleft (Fig. 3). *Genitalia*: Left paramere (Fig. 4); right paramere (Fig. 5); aedeagus (Fig. 6).

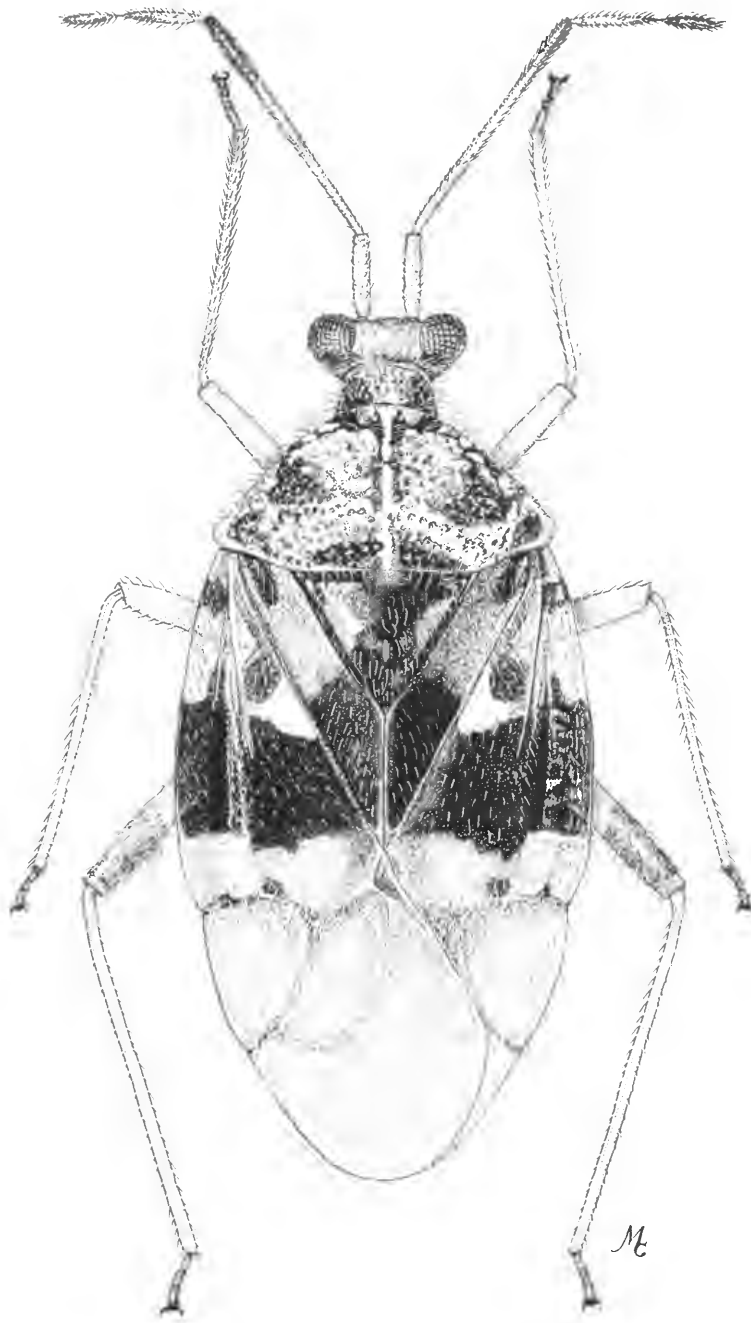


Fig. 1. Adult female habitus of *Stethoconus japonicus*.

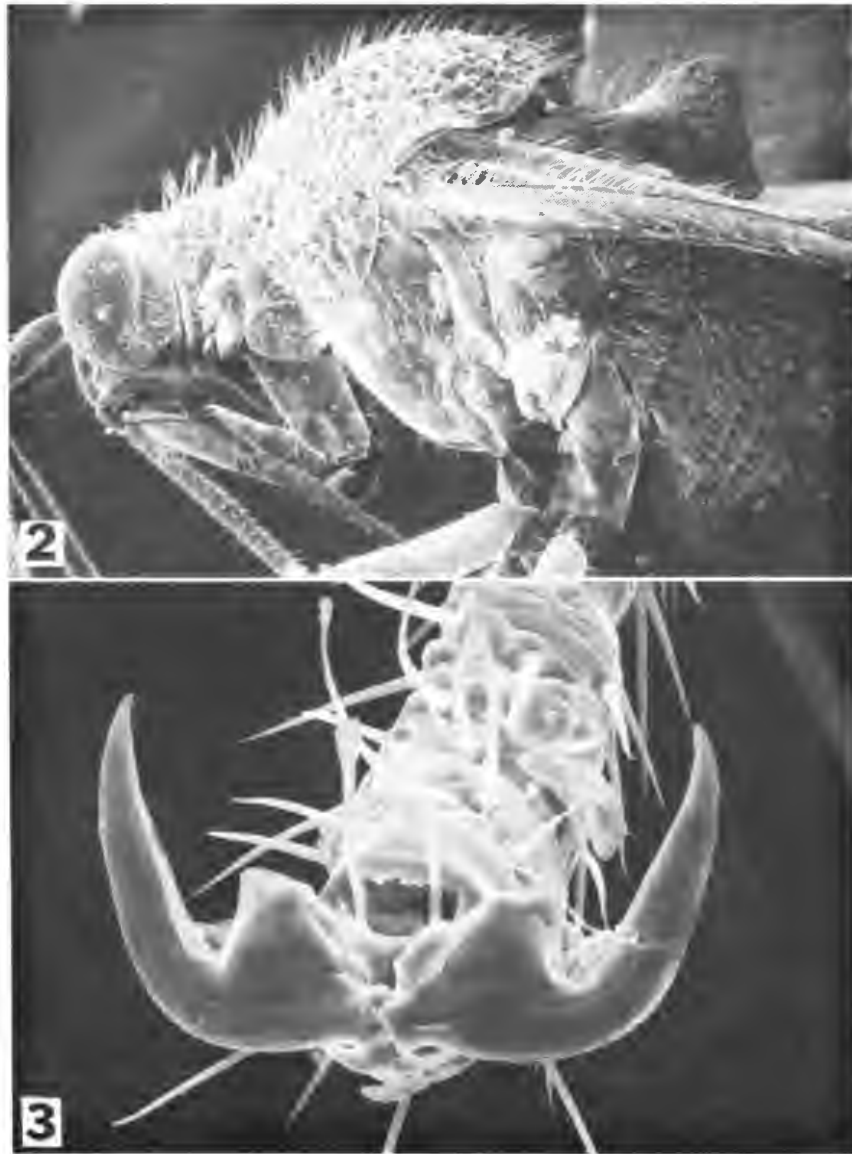
Female: Length 4.08-4.40 mm, width 2.08-2.12 mm. *Head*: Length 0.40-0.42 mm, width 0.76-0.78 mm, vertex 0.30-0.34 mm. *Rostrum*: Length 1.06-1.14 mm. *Antenna*: Segment I, length 0.36-0.38 mm; II, 1.30-1.32 mm; III, 0.40-0.44 mm; IV, 0.28-0.30 mm. *Pronotum*: Length 1.06-1.16 mm, basal width 1.60-1.74 mm.

Very similar to male in coloration and markings, differing in the larger, more robust size and more broadly rounded hemelytra.

Voucher specimens preserved (all specimens in U.S. National Museum of Natural History, Washington, D.C. [USNM]).—Maryland: 4 ♂, 1 ♀ (plus nymphs), Prince

Georges Co., USDA Res. Area (BARC-East), 1-2 Aug. 1985, K. M. Gott and J. W. Neal, Jr., taken on 'Martha Hitchcock' azalea, infested with *Stephanitis pyrioides*; 3 ♂, 6 ♀ (plus nymphs), Prince Georges Co., Rt. 1, 2 mi. E. of Beltsville, 21 Aug. 1985, T. J. Henry, on ornamental azaleas infested with *S. pyrioides*; 4 ♂, 8 ♀ (plus nymphs), Prince Georges Co., Laurel, Rt. 194, 21 Aug. 1985, T. J. Henry, on ornamental azaleas infested with *S. pyrioides*. Numerous other individuals observed in the field or dept for laboratory study.

Remarks.—The generic identification of our specimens eluded us early in the discovery of *S. japonicus*.



Figs. 2, 3. Scanning electron micrographs of *Stethoconus japonicus*. 2, Lateral aspect of head and thorax (48.5 \times). 3, Deeply cleft claw (867 \times).

The combination of deeply cleft claws (Fig. 3), with only simple hairs between them and without flesh arolia, the deeply punctate pronotum (Figs. 1-2) with a wide, punctate collar, and the shiny, translucent hemelytra having a wide embolium, placed our genus in the subfamily Deraeocorinae and the tribe Hyaliodini using Carvalho's (1955) key to the world mirid genera or to *Hyaliodes* Reuter using Slater and Baranowski's (1978) key to the North American mirid genera. Only through persistent perusal of the world genera did it become apparent that our specimens belonged to the genus *Stethoconus*, until recently (Kerzhner, 1964, 1970), inexplicably placed in the tribe Dicyphini of the subfamily Phylinae (Carvalho, 1958) or Bryocorinae (Schuh, 1976). Careful study of the claws, pronotum, hemelytra and male genitalia convinced us that *Stethoconus* was misplaced in the *Ciyphini* and should be transferred to the subfamily *Deraeocorinae*.

Eventual discovery of Kerzhner's (1964) transfer of *Stethoconus* to the subfamily Deraeocorinae supported our conclusion of improper placement in the Dicyphini. We disagree, however, with Kerzhner's (1964, 1970) placement of the genus in the tribe Clivinemini. Clivinemines are characterized by a trapexiform pronotum, having a narrow, impunctate, ringlike collar, and the calli of *Clivinema* and *Largidea* are represented by two depressed, shiny areas connected by an impressed, shiny line (Knight, 1968). Species of *Stethoconus* have the pronotum narrowed anteriorly into a wide, punctate collar and lack the depressed, shiny area of the calli.

In addition to the adult characters given above, examination of the nymphs, having a distinct, elongate anal tube characteristic of the tribe Hyaliodini (Akingbohunge, 1974; Wheeler, 1980) and an abdominal scent gland opening similar to that of species in *Hyaliodes* (Akingbohunge et al., 1973), further supports place-

ment in the Hyaliadini. We, therefore, remove *Stethoconus* from Clivinemini and transfer it to the tribe Hyaliadini in the subfamily Deraeocorinae, with the realization that the tribal classification within Deraeocorinae needs attention on a world level.

Stethoconus japonicus, unlike any other mirid known from North America, is distinguished from all other Nearctic genera and species by the deeply punctate, swollen pronotum, wide pronotal collar, cleft claws having simple hairlike parempodia, the cone-shaped scutellum, and the broadly rounded, shiny, partially translucent hemelytra, with a wide embolium, a large white spot on the middle of the corium, and a large, transverse, dark-brown band through the embolium, corium, and clavus (Fig. 1). As mentioned, it will key to the genus *Hyaliodes* in Slater and Baranowski (1978: 188) if the hemelytra are considered completely transparent and glassy. If this choice is not accepted, that is, if the wings are considered "somewhat glassy," then the second antennal segment must be clavate distally, which it is not. Therefore, couplet 140 in Slater and Baranowski should be modified to read as follows:

- 140 Scutellum greatly swollen, nearly cone-shaped *Stethoconus*
 140a Scutellum flattened or only slightly raised 140'
 140' Front wings almost completely transparent and glassy in appearance *Hyaliodes*

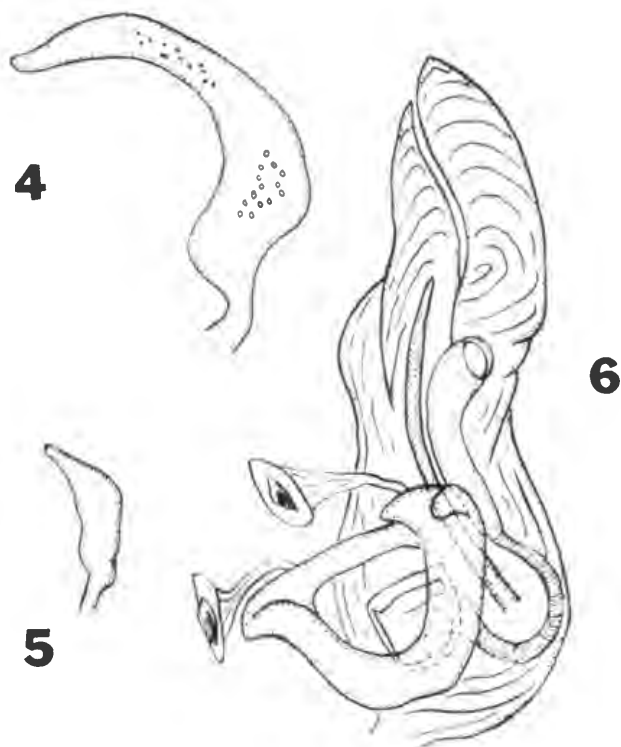
- 140" Front wings subopaque throughout or only partially transparent, if appearance somewhat glassy then antennal segment 2 abruptly clavate distally 141

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Figs. 4—6. Male genitalia of *Stethoconus japonicus*. 4, Left paramere. 5, Right paramere. 6, Aedeagus.

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John W. Neal, Jr. is a Research Entomologist with the US Department of Agriculture, a previous contributor, and a member of the Brookside Gardens Chapter.

USING HOUSE BRAND PLANTS

Carl Orndorff
Kensington, Maryland

House brand products are sold by department, hardware, food, drug, auto-parts, and other stores. The names designated are those of the merchandiser and not the manufacturer and have relatively little bearing on quality. There are instances where house brands are superior to the manufacturer's top brand, because mass merchandising often makes for lower pricing of premium products.

House brand plants have been produced and merchandised by nurseries for years without such a designation. Often improved cultivars found in nurseries may be produced and sold as species. There are various prudent economic reasons for not formally introducing these plants as new cultivars.

For example, approximately 25 years ago the author found, among a sizeable planting of Yoshino cherries, (*Prunus yedoensis*), a tree that attracted immediate attention. The tree was slightly more dense, and its foliage had more substance and deeper green color than the other trees of the same species. Although its flowers were normal size, they were slightly deeper pink in color, flowered more prolifically, lasted several days longer, but flowered five to seven days later. This delayed flowering was beneficial, because it reduced chance of late frost damage. Because of these distinguishing characteristics, this made the selection more favorable to produce over the recognized species. Furthermore, cuttings of this selection rooted easily. Vital information on this plant was recorded, and it was put into production and soon replaced the common Yoshino cherry.

Because introducing new plants into the trade is costly, time consuming, and an uphill battle, requiring much publicity and extra production costs, this new cultivar was introduced without fanfare and was preferred by the buyers. The landscape quality of this selection was soon noted, and sales increased steadily. Had we chosen the route of big publicity, profits may have been delayed for up to ten years.

After driving by a private garden for several years and observing an outstanding forsythia plant in the spring, one day I stopped and inquired as to the cultivar and source. Since neither could be supplied by the property owner, I received permission to take cuttings for propagation. Although this plant had flowers similar to that of 'Beatrix Farrand', it flowered more profusely, and it had outstanding vigor with a habit of growth similar to that of *Forsythia spectabilis* but with slightly more pendulous side branches. As soon as production was well established, all other forsythia species were dropped from production including 'Lynwood Gold', which was the most popular cultivar at that time. Since 90% or more of forsythia customers do not specify cultivars, few ques-

tions were asked. Although it was referred to as an unnamed, unrecorded improved cultivar, orders were never rejected and sales increased. In other words, both the improved forsythia and Yoshino cherry plants were introduced into the trade and promoted by accident.

However, we made efforts at creating house brand plants by intent. Prior to 1950 and the introduction of mist propagation, many ornamentals were grown from seeds which resulted in producing a large number of unsaleable seedlings. When growing Christmas berry (*Ilex verticillata*), approximately 10% to 20% of the seedlings were undesirable. Because these plants are deciduous and do not produce fruit until they grow to considerable size and acquire some age, the sex of the plants was identified in the spring when they flowered. Those plants with female flowers were marked with a red spot of enameled paint on the trunk while those with male flowers were marked with a spot of blue paint. From a block of approximately 700 seedlings at a mature state of growth, 10 to 12 female plants were selected based on habit of growth, foliage color and heavy fruit production of brightly colored, long-lasting fruit. Cuttings of these selections also rooted easily. To provide adequate pollination, three choice male plants with similar growth and rooting habit were selected and identified separately. These hollies were always sold at a ratio of 70% female and 30% male in order to provide good fruiting. These selections were sold as house brand products.

A similar method was used to produce a house brand American holly (*Ilex opaca*). Selections were made from plants that had good dense foliage with narrow and medium width bodies, developed only single stems, and could be reproduced from cuttings. Some of the trees were grown with foliage to the ground while others the branches were pruned for high clearance street and garden use. Among this selection, a female plant was found that could fruit without male pollination (parthenocarpic). One of our good customers referred to this selection as the "bastard" holly. These hollies became so popular that we were frequently sold-out of all types.

Similar selections were made with linden leaf viburnum (*Viburnum dilatatum*) having large clusters of brilliant red fruit, and a lilac (*Syringa benryi*) that had improved foliage and larger tresses of brighter pink flowers than the species commonly grown in the trade. Two flowering quince (*Chaenomeles* sp.) were also selected. One had bright scarlet flowers while the flowers of the other were rosy pink; however, both had compact habits of growth, did not sprawl extensively and required little pruning. A selection of the oriental photinia (*Photinia villosa*) with improved habit of growth and fruiting, making this plant more appropriate for use

as a small garden tree was also selected. From a seedling population of Japanese holly, (*Ilex crenata*) an upright form of medium size with extremely dark green foliage was selected. This selection could also tolerate temperatures of -15°F and could be propagated from cuttings.

House brands need not remain as house brands all of their lives. If they prove to be hardy, dependable and widely accepted, they can be named but not patented. In the early 1950's, most white varieties of azaleas were either killed or damaged by severe winter minimum temperatures. In search of a white azalea to fill orders, a small supply was found in a small northern New Jersey nursery. Because of its superiority over what was available at that time, we purchased all that could be produced by that nursery for several years. In anticipation of a surge in sales for this superior hardy azalea which continued to attract an increasing number of customers, we approached a large wholesale grower to include this azalea in his production schedule, and we supplied the stock plants. After a few years of production, we named the azalea 'Delaware Valley White' without the permission of the originator, in honor of his Delaware Valley Nursery. "And now you know the rest of the story." It is interesting to note that after 30 years, 'Delaware Valley White' azalea is now being offered for sale in the Dallas, Texas, area as a new white azalea.

This is not an attempt to promote the introduction and recording of new cultivars. Thousands of new cultivars are introduced annually which are often not distinctively

different from those already in the trade. Over 5,000 azaleas and roses have been recorded and over 22,000 daylilies have been registered to date. Often these new introductions cannot be identified without first consulting the labels. If they cannot be easily identified by their outstanding characteristics, then how can they be worthy of introducing and recording.

Those plants that are introduced from a well-planned hybridizing program combined with vigorous testing generally make significant contributions. However, most nurserymen and amateur hybridizers, who are frequently associated with plant societies, do not have a well-planned hybridizing program and often rely on chance seedlings and luck to capture their imagination and boost their egos. Many such introductions undergo limited testing and evaluation. It is profitless to produce quantities of plants that are simply nice but of dubious origin and performance. Often these become a menace to the industry. There is nothing wrong with producing house brands, but they should not be named and entered into the trade until they have passed the acid test of time. However, don't let this discourage you from keeping a sharp eye out for superior plants.

Part IV of "Revising the Production Schedule" from the September, October 1986 issue of *Nurserymen's News*, published by the Cooperative Extension Service at the University of Maryland, College Park, Maryland.

HOW TO USE YARD CHEMICALS SAFELY

Gene W. Grey

"What can I spray it with?" I wonder how many times I have heard people ask this question after observing insect or disease problems in their yards. People use chemicals in their yards in direct proportion to their attitudes about insects, weeds, and other pests. Chemical use ranges from practically none by organic gardeners to reckless abandon by "dead bug, good bug" advocates, the latter being the majority in our spray-conditioned society.

But this article is not going to be a condemnation of modern society or of landscape chemicals. It is, rather, an attempt to sort out different types of chemicals, to explain some factors and situations that may make their use unnecessary, and to describe safer and more effective methods to use when chemicals are needed.

Let's start by classifying landscape chemicals into pesticides, fertilizers, and miscellaneous. Pesticides include insecticides for controlling insects, miticides for mites, rodenticides for rodents, fungicides for fungi, nematicides for nematodes, and herbicides for unwanted vegetation. To continue with the obvious, fertilizers are for enhancing plant growth. Perhaps less obvious, though, are miscellaneous landscape chemicals including less-used growth inhibitors, wound dressings, and

hormone-influencing stimulants. Deicing salts should also be included here. Even though they are not used directly on vegetation, their potential for plant damage is great.

Since insecticides, miticides, fungicides, herbicides, and fertilizers are the most commonly used, let's concentrate on them.

Insecticides

Perhaps the best approach to insecticide use is to look at what's bugging your tree. Before you grab the sprayer, look closer. You may not be able to see the critters, but you can see their damage. Recognizing the type of damage—chewed or curled leaves, leaves or stems with grooves, tiny holes in tree trunks with sawdust falling out—gives you a better idea of what's causing it and what to do about it. You may choose to do nothing if the problem is not severe. Perhaps the insects have come and gone, or maybe you can put up with a few of them. Maybe birds, other insects, or other natural predators will be your insecticide. And if things are bad enough, you may have to spray.

The point is that you cannot use insecticides effectively (remember that no use might be the most effective

use) unless you know something about the insect causing the problem, or, at the very least, the type of damage caused by the insect. It is also important to understand that insects may be symptoms of other landscape plant problems. Trees and shrubs already under stress because of poor soil, lack of water, or insufficient nutrients are often more vulnerable to insect attacks.

What I am talking about here is fundamental to integrated pest management. IPM (remember this acronym—you will hear it more and more) is a planned mutual relationship between you and landscape pests. It involves such things as planting resistant varieties; using biological, cultural, and physical control measures; practicing sanitation; and applying chemicals. The concept is not anti-pesticide, although its practice generally means that fewer pesticides will be used, with better results. It is, rather, an attempt to strike a balance between production of landscape values and environmental and economic costs.

Insecticides are important IPM tools. Let's examine them by matching them with the type of damage being done to your tree. Some insecticides are for leaf chewers, some are for suckers, some for miners and borers—one kind generally won't work for the other insects. Some insecticides must be eaten by the critters, some are contact poisons, and others infect insects with bacteria or fungi. You need to know how they work and what to expect before and after using them.

Insecticides come as liquids, powders, or granules. Liquids may be concentrated, and need to be added to water. Powders can be dusted on, or put in water to make a spray. Granular insecticides are generally spread on the ground for turf insects, although some may be applied to the ground and taken up by tree roots.

Spraying is the most common form of application. To do the job, there are two types of sprayers—hydraulic and mist blower. Hydraulic sprayers simply squirt the spray under pressure. Mist blowers combine air with water pressure for application of extremely fine particles. If you have a sprayer, chances are you have a hydraulic sprayer, as mist blowers are generally used only by commercial operators.

If you are like most homeowners, you probably have a hose-end sprayer—which consists of a little jar to put the concentrated insecticide in and a nozzle with a thumb hole to control the flow. These are inexpensive and effective sprayers, but they present two potential problems. The first is the difficulty of determining exactly the right amount of solution. The second stems from the first—the likelihood of mixing too much for the job you have to do. What do you do with the rest? Since you have it mixed anyway and the hose is running, it's easy to spray something else, or everything, whether it needs it or not. Come on now, confess. How many of you have done this?

A final word about sprayers. Don't use the same sprayer for both insecticides and herbicides. Some herbicides are extremely hard to wash out of sprayers.

And if you spray for insects after having had a herbicide in your sprayer, you may damage or kill the plants you are trying to save. Follow label directions for washing, or better yet, use separate sprayers. I remember a well-meaning neighbor who sprayed my tomato plants with an insecticide using a sprayer containing herbicide residue. My tomatoes were not happy. Neither was I, nor my neighbor.

Labels

Before you apply an insecticide or other landscape chemical, please read the label. I cannot emphasize this factor enough. Reading the label is simply the most important thing you can do in your yard. The label is the information printed on or attached to the container. It is a legal document giving the manufacturer a "license" to sell and providing the government a means of assuring relative safety of the product. More important to you, though, the label is your main source of facts on how to use the material safely, effectively, and legally.

Labels give you a bunch of information—brand name, common name, ingredients, toxicity rating, human (and pet) hazards, environmental hazards, accident treatment, and directions for use including pests the material is registered to control. Some labels are a bit complicated, but it is all there. Before using a pesticide, spend a little time reading the label to find out:

- *What it is registered to control:* Pesticides are registered by the Environmental Protection Agency for specific pests. It is a violation of the law to use them for pests other than those listed on the label.

- *Protective equipment:* Remember, some lawn chemicals are extremely toxic, and gloves or masks may be required under certain conditions.

- *Warnings and first-aid measures:* Labels will tell you how to avoid contamination, and what to do in case of an accident—what to wash with, antidotes, and the like.

- *What to mix it with and how:* Most soluble lawn chemicals are mixed with water, but some insect sprays are oils and require special procedures.

- *How much to use:* Don't guess! Use exactly the amount of chemical specified on the label. Mix the proper amount, and apply the proper amount. Avoid the temptation to use a little more for good measure.

- *When to apply:* Timing of chemical application is very important. Insect pests are generally most vulnerable during juvenile stages, and weeds are best controlled when growing vigorously. Timing is also important to avoid damage to non-target organisms.

- *How to apply:* This part of the label tells you what kind of a sprayer or other applicator to use, and how to apply the chemical. Often, in the case of sprays, it will tell you to "apply to the drip point." This means that once the leaves are wet, don't keep spraying just because you have more solution in the sprayer.

- *Special instructions:* The label will tell you how long to keep pets and kids out of the treated area and other important things you should know.

Fungal diseases occur as various wilts, blights, and rusts. Most of them have the unfortunate characteristic of being untreatable after symptoms appear. Thus, they must be anticipated and fungicides applied in advance. Fungicides are relatively safe to use, but their effectiveness depends on timely application, based on an understanding of the disease and its life cycle.

Herbicides are for controlling unwanted vegetation. You will probably use them in your yard for edging (killing weeds around fences and other objects), to kill dandelions, and to prevent crabgrass. Herbicides are either pre-emergent or postemergent, meaning that they are applied to the soil or turf before seeds germinate or applied to the plant after it starts to grow. Pre-emergent herbicides work by preventing seed germination or affecting growth immediately after germination. Postemergent herbicides are absorbed by leaf or stem tissues and translocated to other plant parts. Some are selective and will affect only certain plants under certain conditions. Nonselective herbicides will kill all plants.

Herbicides, if understood and used properly, can be great landscape tools. Their use, however, should be a part of the IPM process—weeds are pests too. To put weeds in an IPM context, have you ever considered that weeds may be a symptom rather than just the problem? For example, dandelions are more likely to become established in "thin" lawns that have been underwatered, underfertilized, mowed too short, or infested with insects or diseases. The best way to prevent weeds is to maintain a healthy turf. Weeds have trouble competing with vigorous grass.

Again, before you use herbicides, read the label. You need to be aware that nonselective contact herbicides will kill leaf tissue of all plants they touch: some herbicides, especially 2,4-D, may volatilize or drift to non-target plants: some may be absorbed by tree roots in the target plant vicinity; and some may translocate by rain-fall or irrigation runoff.

To illustrate this, I received a call from the city manager of a neighboring town who told me that all the trees in the city cemetery were dying. I resisted making a pun that such might be appropriate in a cemetery, and upon visiting the cemetery, discovered that the groundskeeper had chemically edged around every tombstone for mowing ease. He has used an extremely toxic non-selective herbicide, which was absorbed by tree roots. A magnificent stand of old oaks, maples, and elms was severely damaged. Their condition was not helped by the clear statement on the herbicide label that it should not be used in the vicinity of tree and shrub roots.

Fertilizers

Commercial chemical fertilizers commonly contain nitrogen, phosphorus, and potash, with the relative amounts of each expressed in numerical sequence on the container label. For example, a 12-12-12 fertilizer contains 12 parts per 100 of each element. Thus, if you buy 100 pounds of 12-12-12, you are buying 36 pounds of actual chemical and 64 pounds of inert carrier. The carrier is necessary though—it allows for spreadability, and determines the rates of release of the chemical elements.

Nitrogen is generally the most important element to add to established plants, particularly turfgrass, since it is lost through mowing. Phosphorus and potash are often adequate, and can accumulate to harmful levels when "complete" fertilizers are used repeatedly.

The Other "-Cides"

Miticides are closely related to insecticides. In fact, they will kill certain insects as well as mites. They are differentiated from insecticides only because mites aren't insects. Chances are you will have to deal with spider mites in your yard. They attack nearly everything but are especially fond of spreading junipers, other evergreens, garden vegetables (especially beans), and various flowers. The worst thing about them is that they usually don't become apparent until they have nearly sucked the life out of plants. A good way to find them is to shake a plant or branch over a white sheet of paper. If little pepper specks appear and move about, you have mites. My advice is to monitor closely and spray according to label directions.

Fertilizers are also available containing insecticides or herbicides. The problem with them is that the time for applying a particular pesticide may not coincide with the proper time for fertilizing.

Fertilizers, herbicides, insecticides, and other landscape chemicals are readily available. They are often promoted as offering easy solutions to landscape management problems. Their effectiveness, however, depends on proper application in a complex environment. They should not be imposed on the environment, but their use should be tuned to various natural processes. The key is a better understanding of the various linkages, causes, effects, and life cycles in this complex area known as our backyard.

Gene Grey teaches forestry at Kansas State University. Reprinted from *American Forests* 91: 7-10 (1985).

ASA NEWS AND VIEWS

Brookside Gardens Chapter Show

The Eighth Annual Brookside Gardens Chapter Azalea Flower Show was held May 1-3, 1987 as part of the Landon Azalea Garden Festival in Bethesda, Maryland. The show featured horticulture displays, artistic designs, and educational exhibits. One hundred eighty-six azalea sprays were entered in 39 competitive horticultural classes and were judged by two panels of judges which included ASA members Emile Deckert, Reid Denis, Carl Hahn, and Pete Vines. The azalea entry judged Best in the Show was 'Geisha' entered by Heather Evans, daughter of Nancy and Charlie Evans. Heather also won the Sweepstakes award for receiving the highest score for ribbons given to an exhibitor. In the Artistic Design Division, Mary Ann Thane received the Tricolor Award, and Senora Simpson received the Creativity Award. Three educational exhibits filled out the show: an annotated photographic display, "What's Bothering Your Azaleas", was presented by Janet and Bill Miller; a continuous showing of Bob Stewart's azalea slides was arranged by Buck Clagett; and Charlie Evans displayed a variety of books about azaleas. The show was visited by thousands of visitors at the festival, and many thanks go to Buck Clagett and Denise Stelloh, co-chairs, to the numerous Brookside Gardens Chapter members who served on the Show Committee and during the show, and to Mike White for providing plants for the judges. The Chapter also wishes to express its sincere appreciation to: Mary Lee Banfield, Malcolm Coates, Betty Tap-tich, Michele Ratcliffe, Sharon Buchanan, Isabel Tram, Bobbi McCeney, and the Landon School and Festival Committee.

International Rhododendron Conference

An International Rhododendron Conference is to be held at the Wollongong University under the auspices of the International Rhododendron Union from October 1 to 5, 1988.

The Conference will be sponsored by the Australian Rhododendron Society as part of the Bicentennial activities celebrating Australia's 200th Anniversary.

The Wollongong City Council and Botanic Gardens, the Royal Botanic Gardens, Sydney and Sydney University are supporting this Conference and the Illawarra Branch of the Australian Rhododendron Society will be the host organization.

The major topics of the conference will focus on the azalea and the vireya sections of the genus rhododendron. The program will include aspects of distribution, cultivation, plant exploration, research and classification.

The Conference will have an international program of speakers. Topics covered will include the taxonomy, distribution and cultivation of Rhododendrons with some emphasis on subgenus Vireya.

Complementing the conference session timetable will be visits to local gardens of merit and places of interest in the surrounding countryside, while the last two days of the conference will be devoted to visiting significant major Australian gardens further afield. The first meeting of the International Rhododendron Union will follow this conference.

Details of the provisional program and the Application Form for conference reservation will be sent to any interested person by writing to: The Rhododendron Conference Organiser, P.O. Box 1988, Wollongong East, 2500 New South Wales, Australia.

LETTER TO THE EDITOR

"TEN INCHES FOR HARVEY"

We have noticed that "ultimate height"
Is a function of shade and sunlight,
As well as the age
Of both plant and sage
And our rabbits' Gartrell appetite.

Bob Carlson
CARLSON'S GARDENS
Box 305
South Salem, NY 10590
(914) 763-5958

THE AZALEA CALENDAR

September 19, 1987

October 17, 1987

November 21, 1987

Glenn Dale Preservation Project Workdays
9 a.m. - 1 p.m. Contact Roger Brown at (301)
577-7509 or Andy Dietz at (301) 384-2092.

May 6-8, 1988

10th Annual Meeting and Convention
Washington, D.C.

Install a Greenhouse Window



Greenhouse windows can be installed into the sales area to display potted plants, or in the back room to grow a small collection of specialty crops for cutting. Foliage plants thrive in a greenhouse window. Brightly-colored flowering potted plants also work well alone or as complements to the foliage. Leave a light on inside the window at night to show off a display of red poinsettias.

Kits can be purchased to fit over existing window frames, and a florist doesn't have to be handy with tools to install one. Many models can be put up in one day. An alternative to a bump-out model is to attach solarium shelving units (that are created specifically for window growing) to the inside of the window on its frame.

For more information write:

1. Alenco, 615 West Carson, P.O. Box 3309 Bryan, Texas 77801. Phone (713) 822-0121
2. Arcadia Industries, 5500 North Kedzie, Chicago, Ill. 60625. Phone (312) 463-0100.
3. Lord & Burnham, P.O. Box 255 Irvington, N.Y. 10533. Phone (914) 591-8800.
4. Window Bridge Systems, Inc., 30 Jefferson Ave., Grand Rapids, Mich. 49503. Phone (616) 458-9601.

Sizes and Prices

Company Name	Size	Cost
Lord & Burnham Insulated Window Greenhouse	36" x 36"	\$394
	48" x 36"	\$433
Arcadia's 3700 Series Sun Garden greenhouse window	35½" x 35"	\$347
	35½" x 47"	\$398
Alenco greenhouse window	36" x 48"	\$451
Window Bridge Systems, Inc. solarium shelves	Adjusts from 30" to 66" high	\$99.95

Note: Delivery charges are included in the price for both Lord & Burnham and Arcadia windows.

Now you can have a window garden for less than \$400!

For display or for growing, adding a small window greenhouse to your store can be a rewarding summer project — easier and less expensive than you think.

What to Look For

These items are essentials when choosing a window:

- **Tinted or Glazed Glass** Use tinted glass in areas with moderate year-round temperatures. Single- or double-glazed glass is recommended in areas with very cold winters.

- **Shatterproof Glass** The glass should be able to withstand damage from windstorms, vandalism and accidents.

- **Maintenance-Free Frames** Vinyl-coated metal frames are recommended because they won't fade, peel or blister. Redwood or cedar frames are attractive when first installed, but time and weather will diminish their beauty.

- **Ventilation** Vents at the top and/or sides of the greenhouse will allow for proper air flow and keep the greenhouse cool during the summer.

Options

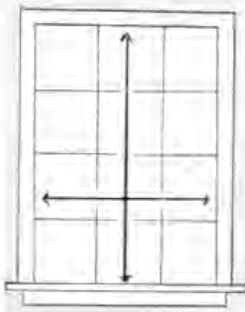
These items are not essential, but will make your greenhouse multi-functional:

- **Heat Reducers** Casablanca-type fans will increase the air flow through the vents and add beauty to the overall look of the greenhouse window. Fully tiltable mini-blinds — reflective on one side and heat absorbent satin black on the other — will reflect heat outward in the summer and conserve heat in the winter.

- **Cold Defrosters** A heater with a built-in thermostat and fan keeps the greenhouse interior comfortable, even during the coldest winter nights. It allows the florist to grow a wide variety of plants, including exotic tropicals.

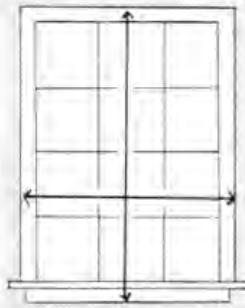
Finding the Right Size

The perfect size greenhouse window is one with width and height measurements that fall between the dimensions of the smallest and the largest sizes possible for the particular window you are working with.



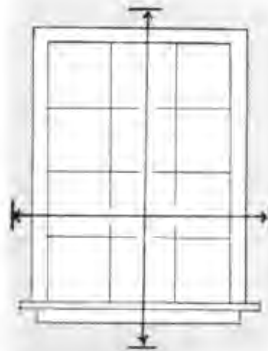
Smallest Possible Size

1. Measure the width and height of the outer window opening (where the screen fits).
2. Add 2" to the width and 1" to the height to allow for overlap. This gives you the size of the smallest greenhouse window you can install right on your window casing.



Largest Possible Size

1. Measure the outside width and height of the window frame.
2. Subtract 1" from the width and 1/2" from the height. This gives you the size of the largest greenhouse window you can install directly on your window casing.



To fit a larger window

To make the greenhouse bigger than the existing window, order one that is about 8" wider and higher than the casing. Fasten the greenhouse to 1" by 4" boards attached to the exterior of the shop.

Adjustments

If the window opening is too large, it can be made smaller by nailing wood strips to the top and/or sides of the window frame. If the window opening is too small, fasten the greenhouse to 1" by 4" (pre-painted or aluminum-covered) furring strips attached to the exterior of the building.

From *Florists' Review Design Portfolio*, Summer 1986, p. 6-7. Horticultural Publishing, Chicago, IL.