

Boston Fern Production  
by Bill Fonteno

Ferns have been a staple in foliage plant production for many years. In fact some of the very first foliage plants commercially produced in the United States were Boston-type ferns. At one time they were the most popular indoor plants. Then as other plant-cultural systems were developed, the ferns had to share their popularity with other foliage plants. Today popularity of all types of ferns is increasing.

The luxuriant Boston-type or sword ferns are in the genus Nephrolepis and include approximately thirty species in tropical and subtropical areas in both the Old and New World. Many are durable and versatile as interior plants. The most popular types are cultivars of Nephrolepis exaltata such as: 'Bostoniensis,' 'Bostoniensis Compacta,' 'Fluffy Ruffles,' 'Verona,' and 'Bostoniensis Aurea.' Another species N. biserrata and N. bisserata 'Furcans' are also widely grown.

Most plants are propagated from small rooted plantlets produced by runners from a mother plant. Some fern specialists grow large beds or benches of stock plants and harvest the plantlets periodically. Other growers will simply remove the small plantlets from finished baskets or large pots just prior to sale. Some cultivars do not always produce new plants which are true-to-type; the grower must be watchful for these variants and rogue out those plants early in the production cycle. Several growers are now purchasing tissue cultured plants. These plants are generally more expensive but start off quickly and finish earlier with greater crop uniformity than runner-propagated plants.

Plants are potted in a medium containing at least 50% organic matter. Ferns do best in a mix with good aeration and drainage yet one which does not dry out quickly. Many of the commercially available mixes are adequate. Common examples of on-site prepared mixes are (by volume): peat:pine bark:sand (1:1:1), peat:pine bark (1:1), peat:perlite (1:1) and pine bark:peat:sand (3:1:1). The pH should be kept between 5.5 and 6.5.

Longevity in the home for ferns is greatly influenced by fertility in production. High fertility generally results in a large top and a small root system. Growers should maximize their root systems for best indoor survival. This can be accomplished with a moderate feeding program like: 200 ppm N through constant liquid feed or incorporation of a slow release fertilizer such as Osmocote (14-14-14) at 10 lbs/cu. yd. However, since nitrogen is the key element in growing ferns a ratio of N, P and K of 2:1:1 or 3:1:2 might result in a lower fertilizer cost than 1:1:1. If a constant liquid feed is desired nutrient levels can be 150-200 ppm nitrogen, 50-75 ppm phosphorus and 100-150 ppm potassium.

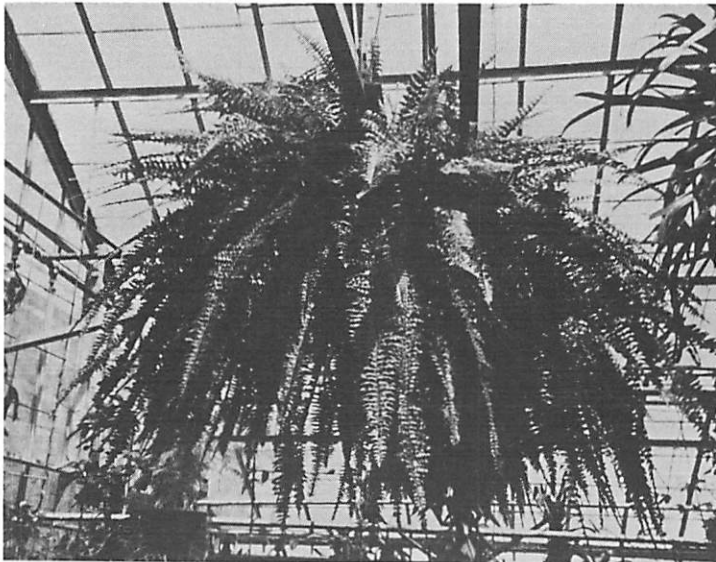
High light generally results in pale, light green foliage, fewer fronds, and even sun scalding. Light levels of 2500 to 3000 foot candles (approximately 70% shade in July in North Carolina) are recommended.

Watering can be accomplished by hand, tube or mat with good results. Care should be taken to prevent pots and especially hanging baskets from drying out as root injury is more likely then due to increased soluble salts buildup.

Since these are tropical plants, temperature should be relatively high. Minimum night temperatures should be 65°F with a minimum day temperature of 75°F. Night temperatures as high as 80°F and day temperatures as high as 95°F are usually not damaging; however, they would be uneconomical during the colder months. If the medium temperature is kept at 65-71°F then the air temperature may be dropped slightly to 63°F. Ferns are sensitive to chilling injury and will stop growing at temperatures below 60°F. Temperatures of 50-55°F may cause internal plant damage and will reduce growth rate. Chilling damage often occurs during exposure to low temperature during the loading and unloading phases of shipping causing plant longevity for the consumer.

Increased longevity in the home can be realized if the plants are acclimatized before sale by following these steps (initiate 4 weeks before sale): (1) leach pots to remove excess fertilizer and do not fertilize again, (2) reduce light levels to at least 90% shade (1,000 fc), (3) gradually reduce watering frequency to 2-3 times per week but do not allow the pots to dry out.

Ferns will continue to be a popular sales item as long as we can provide the consumer with good quality, conditioned plants.



Boston fern: A pioneer in the foliage plant industry

THE NORTH CAROLINA FLOWER GROWERS' SHORT COURSE WILL BE HELD IN RALEIGH ON SEPTEMBER 27-29. A STRONG PROGRAM IS PLANNED.

## DESCRIPTION

Adult - Female fern scales are oystershell- or pear-shaped, flat, light brown with the crawler cast skin a paler brown. Sometimes the second stage armor is also paler than the adult armor. They are 1.5 to 2.5 mm long. Males are tiny, two winged, gnatlike insects which are easily overlooked.

Egg - Armored scale eggs are usually oval and about 0.2 mm long. They are laid in groups under the mother's armor.

Crawler - Fern scale crawlers are about 0.2 mm long, flat and yellow with red eyes. The legs and antennae are well developed.

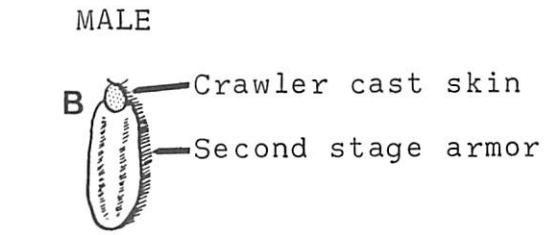
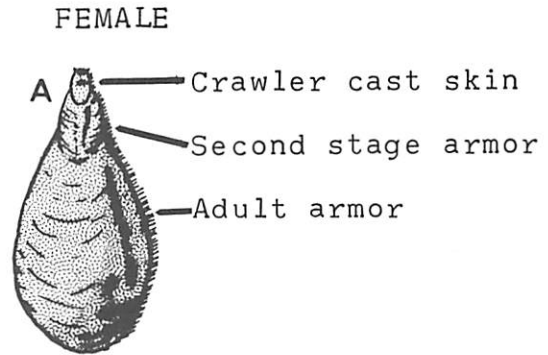
Nymph - Female second stage nymphs secrete an oval, pale brown armor about 0.8 mm long. Male second stage nymphs secrete a snow white armor which has three long ridges. Mature male second stage nymphs are about 1 mm long.

## BIOLOGY

Distribution - Fern scales are found in greenhouses and homes on ferns and in the Coastal Plain and Piedmont on liriopie in North Carolina.

Host Plants - Fern scales primarily infest true ferns and liriopie in North Carolina. However, this pest has been recorded from numerous foliage plants, citrus, and other woody ornamental trees and shrubs in Florida.

Damage - Infested fern plants are disfigured primarily by the presence of the male second stage



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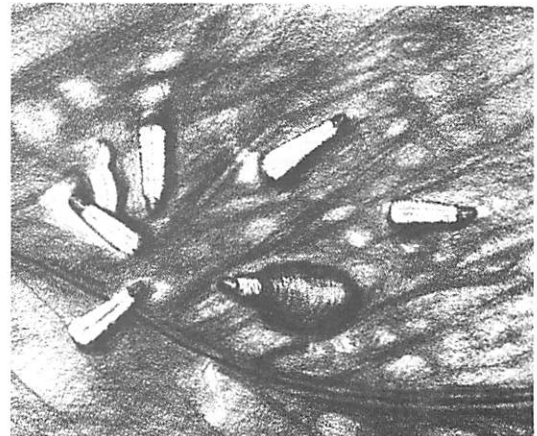
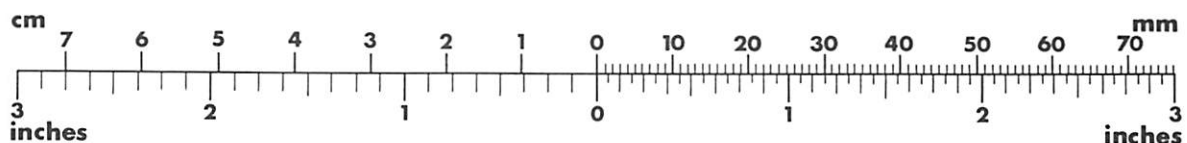


Fig. A-C, Fern scales. A-B, Female and male. C, Infestation on Boston fern.

nymph which has a conspicuous white armor. Ferns in commercial production sometimes tolerate a tremendous scale population with little noticeable reduction in vigor or quality. Feeding by female scales causes chlorotic spots on some fern species and on liriopie.



\**Pinnaspis aspidistrae* (Signoret),  
Diaspididae, HETEROPTERA

Life History - Little is known about the biology of fern scales specifically. Female scales lay their eggs under the armor. The female dies after the last egg is laid. Tiny crawlers hatch from the eggs and eventually emerge from under the mother's armor. The crawlers move about until they begin to feed by inserting their long mouthparts into the leaf and sucking out sap. The insect molts into a second stage which begins to secrete a waxy material from under the rear of the first stage (crawler) cast skin. Eventually these insects molt into the adult stage. Female scales begin to secrete the adult armor at the rear of the second stage armor. Males emerge from their second stage armor as tiny, gnatlike insects which crawl or fly to female scales to mate. The armor remains fastened to the plant long after the insect leaves it or dies. When populations become dense, females tend to lay male eggs so that heavily infested plants become conspicuously spotted by second stage male armor. Fern scales are sometimes parasitized by tiny wasps which may help to keep populations low on out door plants.

## CONTROL

Try to purchase plants from a supplier who does not have a fern scale infestation. When fern scales are encountered, some commercial fern growers use a combination of summer oil (such as Volck or Oil-I-Cide) and malathion at half the normal rate (that is 2 tablespoons of summer oil and 1 teaspoon of malathion per gallon of water) in order to avoid phytotoxicity to ferns. Two thorough treatments 2 weeks apart should give good control. Ferns are notoriously sensitive to pesticides. Whenever treating ferns and other sensitive plants, treat at a time that the pesticide will be dry on the foliage before the plants are exposed to

full sunlight. However, Temik 10 G can be used at the labeled rate (1/8 teaspoon per 6 inch pot) without damage to these plants. Some growers have found that Guthion gives adequate control without phytotoxic symptoms. However, Guthion is not labeled for greenhouse use.

## References

- Dekle, G.W. 1976. Florida armored scale insects. Florida Dep. Agr. Consumer Services Div. Plant Ind. Arthropods of Florida 3. 345 pp.
- Westcott, C. 1973. The Gardener's Bug Book. Doubleday Co. Inc., Garden City, NY 689 pp.

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The above insect note is intended to be inserted as an update into the Extension publication, Insect and Related Pests of Flowers and Foliage Plants.