

Table 1. Incidence of woody plant species within 2-yr-old plantations of *Leucaena leucocephala*, *Conocarpus erectus*, and *Acacia auriculiformis*.

Tree species	Mean no. of invasive woody plants/8 m ² quadrat (SD) ^z			
	<i>Ficus aurea</i>	<i>Schinus terebinthifolius</i>	<i>Baccharis halimifolia</i>	volunteer <i>Leucaena leucocephala</i>
<i>L. leucocephala</i> K8 cultivar	4.0 (4.4)	9.0 (1.7)	0.3 (0.6)	0.0
<i>L. leucocephala</i> K28 cultivar	6.3 (2.9)	2.7 (0.6)	1.3 (0.6)	1.3 (1.5)
<i>A. auriculiformis</i>	3.7 (2.3)	6.7 (5.0)	1.0 (1.0)	1.0 (1.0)
<i>C. erectus</i>	0.0	1.3 (2.3)	0.0	0.0

^zEach value is the mean of 3 quadrats, 8 m² each in area. Values in parentheses are standard deviations.

native, both are aggressive and are found commonly in disturbed areas, underscoring the fluidity of the term "weed." It is also noteworthy that the relative abundance of volunteer leucaena, where encountered, was numerically very close to the groundsel tree and that neither volunteer leucaena nor groundsel tree were as abundant as strangler fig or Brazilian pepper tree under these experimental conditions (Table 1).

Although the data generated in this study clearly show very little weed potential for leucaena, it should be stressed that both the K8 and K28 cultivars are relatively "domesticated" forms of leucaena. It would not be reasonable to expect similar results from "wild" forms of leucaena and it is also quite possible that different cultural conditions than those used in the current study might have yielded different

results. Nevertheless, the results of this work indicate very low weed potential for the K8 and K28 cultivars of leucaena when grown under biomass cultivation conditions.

Literature Cited

1. Long, R. W. and O. Lakela. 1971. A flora of tropical Florida. University of Miami Press, Coral Gables, Florida.
2. Morton, J. F. 1976. Pestiferous spread of many ornamental and fruit species in south Florida. Proc. Fla. State Hort. Soc. 89:348-353.
3. Patterson, J. and G. Stevenson. 1977. Native trees of the Bahamas. Jack Patterson, Hope Town, Abaco, the Bahamas.
4. Ruskin, F. R. 1979. Tropical legumes: resources for the future. National Acad. Sci., Washington, D.C.
5. U.S. Dept. Agr. 1971. Common weeds of the United States. Dover Publications, Inc., New York.
6. Viemeyer, N. and B. Cottom. 1977. Leucaena: promising forage and tree crop for the tropics. National Acad. Sci., Washington, D.C.

Proc. Fla. State Hort. Soc. 97:241-244. 1984.

NOBODY LOVES THE BISCHOFIA ANYMORE

JULIA F. MORTON
Morton Collectanea,
University of Miami,
Coral Gables, FL 33124

Additional index words. *Bischofia javanica*, bishopwood.

Abstract. The bishopwood tree (*Bischofia javanica* Blume) was introduced and promoted by E. N. Reasoner and Dr. Henry Nehrling who greatly admired a large specimen at Reasoner's Royal Palm Nurseries, Oneco. Dr. Charles Torrey Simpson spoke well of the tree in 1914 but in his book, Ornamental Gardening in Florida (1926), he wrote: "It seems to be an excellent host for a smutty scale and now I am trying to destroy it by girdling but it refuses to die." Despite this warning, the tree was widely sold as an ornamental after WW II. Soon it became obvious that the tree becomes too big too soon; is not only subject to scale and leaf spot, but has aggressive surface roots; fruiting branches successively die back leaving holes in the crown; seedlings volunteer in cultivated and natural areas. Removal and disposal of overgrown trees is troublesome and costly, but the wood should be salvaged, being durable in water and excellent for docks and piling, and it is useful as firewood.

The bishopwood tree, *Bischofia javanica* Blume (syns. *B. trifolia* Hook.; *Andrachne trifoliata* Roxb.) is a member of the widespread and largely sinister family, Euphorbiaceae.

Proc. Fla. State Hort. Soc. 97: 1984.

Among its few alternate names in English are: Java cedar, red cedar, West Indian cedar and vinegar wood. In India, it is called paniala, kainjal, boke, joki and several other dialectal names. In Malaya, it is nira or thirippu; in Burma, tayokthe; in Samoa, oa; in Fiji, tongogongo, no-ghor or koka (1, 2, 4, 5, 9, 10).

Description

The tree is fast-growing, erect, to 60 ft, with cylindrical trunk to 12 ft in circumference. The bark is light-brown to grayish, shallowly and narrowly fissured, the surface readily flaking. Evergreen in humid climates, deciduous in areas of low rainfall, the alternate, spirally-set leaves have rather rubbery petioles up to 7 inches long, flattened on the upper-side, tinged with maroon at the base and apex, and the blade is divided into 3 (or sometimes 4-5), leathery, elliptic or obovate, pointed, recurved leaflets, to 6 inches long and 3 inches wide, irregularly saw-toothed, dark-green above, paler beneath, with conspicuous veins and midrib, the latter flat and white on the upper surface, tinged maroon beneath. Petiolules are more or less maroon-tinted, the lateral ones are very short and the terminal up to 3 inches long. Old leaflets turn orange before they fall.

Male and female flowers are borne on separate trees. The blooms are very small, 5-parted, pale-green or greenish-white, profuse, in loose axillary panicles or racemes. Fruits are round, to 3/8 inch wide, brown-scurfy, with juicy, greenish flesh, in pendent strands from 4 inches to 4 ft

in length (3, 5, 10, 14). They are considered edible in Fiji. There are 3-4 seeds, smooth, glossy, wedge-shaped with one rounded side, light-brown, small, averaging 2,500 per oz. (8).



F.g. 1. Bishopwood (*Bischofia javanica* Blume) has trifoliate leaves with finely toothed leaflets, sprays of tiny flowers, and bunches of brown-skinned, spherical, juicy fruits. (Photo by Julia Morton).

Origin and Distribution

Bishopwood is native to the Chinese provinces of Kwangtung, Fukien, Kweichow, Yunnan and Hupeh; also to Burma, India, the Andaman Islands, Malaysia, tropical Australia and Polynesia (2, 13, 21). In India, it is said, "Where tigers abound, they are usually found clearing their claws by digging them into the soft, astringent bark of the paniala. Inhabiting swamps, river banks and moist localities, the paniala, as its very name suggests, is a tree that grows where there is plentiful moisture." "The paniala can stand shade and moderate frosts, but no drought. It can struggle through weeds characteristic of moist localities. The tree coppices well and throws up good healthy shoots." "The paniala can be easily propagated by means of transplants raised from seed in nurseries." (8). Throughout its natural range it may occur from sea-level to an altitude of 5,000 ft and is often associated with teak (21). In southern Florida, the rainfall is sufficient to satisfy the tree on non-swampy, well-drained limestone as well as on sand and marl.

History and Status in Florida

The tree was introduced by E. N. Reasoner and planted at his Royal Palm Nurseries at Oneco (16). It was first mentioned in the Proceedings of the Florida State Horticultural Society in a paper by Charles Torrey Simpson presented at the 25th Annual Meeting of May 14-16, 1912. He referred to it as "A rapid-growing tree with handsome trifoliate leaves which flourishes finely here." (18). Reasoner merely listed it among tropical trees for southern Florida in his paper at the 27th Annual Meeting in 1914 (17). He wrote the famed plantsman, Dr. Henry Nehrling, that it was a tree of "great beauty" and "an ideal shade tree." Dr. Nehrling visited the nursery and was greatly impressed by the tree. He reported that he was "at once struck by its distinct beauty, its outstanding individuality and its fine form"; that "it was one of the most beautiful, one of the densest and noblest exotic trees" it had ever been his good fortune to see. He planted a specimen at his Palm Cottage Gardens in Gotha, found its growth disappointingly open and leggy but it proved hardy. "The heavy freeze in early February, 1917, only killed back some of its branches and it soon fully recuperated." Later, he planted a seedling in his garden at Naples but it died from waterlogging. He recommended its

planting as a "shade and avenue tree in extreme southern Florida." (16).

It was planted in Miami and must have been distributed by the United States Department of Agriculture, for there was a 20-ft tree at the Agricultural Station in Bermuda in 1915 (6) and one over 60 ft high at the Agricultural Experiment Station in Mayaguez, Puerto Rico, in 1923 (7).

By 1926, Dr. Simpson was disenchanted. In his book, *Ornamental Gardening in Florida*, he wrote: "It seems to be an excellent host for a smutty scale and now I am trying to destroy it by girdling but it refuses to die. It might make a shade tree for roads but I think we have much better ones." (19). Nevertheless, Gaines B. Wilson, of Miami, in a paper presented before the 50th Annual Meeting of the Florida State Horticultural Society in 1937, included *Bischofia javanica* among the trees in his "Recommended and Proven List", as "Handsome, rapid-growing, with dense head of dark green glossy foliage. Introduced years ago but rarely planted" (24).

Sturrock and Menninger included *Bischofia javanica* in their *Shade and Ornamental Trees for South Florida and Cuba* (1946) (22), and Nixon Smiley had nothing negative to say of it in his chapter on Shade Trees in *Subtropical Gardening in Florida* (1951) (20). In fact, this tree was actively promoted by nurserymen and landscapers over the several years of rapid real estate development immediately after World War II.

Growing Awareness of Undesirability

Gradually, it became apparent that the tree is a prime host for several foliage diseases and pests. Inspectors from the Florida State Division of Plant Industry's Bureau of Plant Inspection have recorded leaf spot diseases caused by *Phyllostica* sp. and *Cercospora bischofiae* Yamamoto, and green scurf, or algal leaf spot, caused by *Cephaleuros virescens* Kunze (23). They have also identified heavy infestations of tessellated, or palm, scale (*Eucalymnatus tessellatus*); pyriform scale (*Protospulvinaria pyriformis*); oleander scale (*Phenacaspis cockerelli*); false oleander scale (*Pseudaulacaspis cockerelli*); coconut scale (*Aspidiotus destructor*), and Florida red scale (*Chrysomphalus aonidium*). (11, C. Dowling and G. Gwin, Bur. Plant Inspection, personal communications). On the honeydew excreted by scale insects there develops the sooty mold that offended Dr. Simpson. Other pests commonly found on this tree are the Keys whitefly (*Aleurodicus dispersus*), mealy bugs, and thrips (G. Gwin, Bur. Plant Inspection, personal communication). In Asia, the tree is sometimes attacked by a small boring beetle that penetrates to the heartwood (12).



Fig. 2. The bishopwood tree is a prime host for several foliage diseases and pests, and sooty mold develops on honeydew excreted by scale insects. (Photo by Julia Morton).

In addition, it became evident that the tree was outgrowing its allotted space in home gardens, that it has aggressive, far-reaching surface roots; also that branches that bear fruit die back and in succeeding years other branches fruit and die back, leaving large gaps in the crown, and the tree becomes progressively more unsightly. Topping the tree and rapid regrowth produce a temporary improvement until the resumption of the branch fruiting-and-dying cycle. Eventually the property owner cuts the tree down entirely and, like Dr. Simpson, must take drastic steps to overcome vigorous sprouting from the stump.



Fig. 3. An 11-year-old bishopwood tree with one-half bearing heavily. The leaves on the bearing branches are yellowish; on the non-bearing branches, deep-green. (Photo by Julia Morton).

Another serious disadvantage of the bishopwood tree is that its fruits are eagerly consumed by migrating robins and the resulting bird-distribution of seeds gives rise to volunteer seedlings, especially in hedges and shrubbery of cultivated grounds, but also as invaders in hammocks and other natural areas (15).

Further, apart from its nuisance aspect as a weed, the tree seems to have harmful properties. In the past few years veterinarians have been reporting illness in several dogs and cats that have chewed on the foliage of small specimens within their reach.

No experienced, responsible nurseryman would grow the tree today. Unfortunately, there are newcomers in the landscape trade who seek fast-growing trees of any kind and avail themselves of any left-over stocks of this species to achieve "instant" effects in new housing and commercial developments. The property owner finds out too late that he has acquired an undesirable tree and a disposal problem. One unhappy householder in Cooper City reported that two bishopwood trees planted by the builder's landscape contractor 12 ft from the house and 4 ft from the driveway had reached 25 ft in height in 3 yr and surface roots were "spreading in all directions". Such a situation is common and the householder has no recourse but to bear the cost of having the trees taken out and the disappointment and cost of having to replace these trees with suitable species properly located. The tree should never have been adopted for landscaping.

Proc. Fla. State Hort. Soc. 97: 1984.

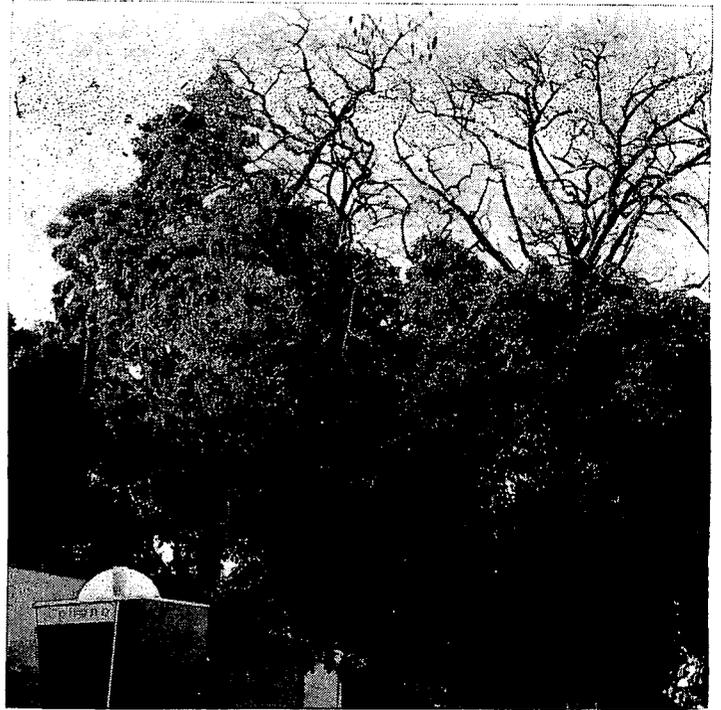


Fig. 4. Upper branches of this large bishopwood tree, receiving most light, have fruited heavily, a few at a time, over the years and have died successively. The tree is an ugly sight and a massive disposal problem. (Photo by Julia Morton).

Potential Economic Uses

The main asset value of the bishopwood tree is as a source of useful timber. It is cultivated in India, Burma, Taiwan (12), East Africa and South Africa (21) for its wood which somewhat resembles black walnut (12) but has a strong vinegar odor when freshly cut. The heartwood is dull red-brown, close-textured, usually with a wavy grain; hard, strong, medium-heavy (45 lb/ft³), medium durable indoors or out and especially under water. It is employed for piling, bridges, boats, wells, railway sleepers, buildings, furniture, carving and pencils (2, 5, 10, 12, 21). Durability is extended by preservative treatment but the heartwood is non-absorbent. When creosoted, sleepers last 15 yr, otherwise only 4-5 yr.

The wood is easy to work and takes a good polish. It does not warp if kiln-dried. Air-drying must be gradual, else it may warp and crack (2). Some local woodworkers are already taking advantage of the available wood when these trees are cut down and are pleased with bowls and other objects made from it. It is to be hoped that this utility will provide an additional incentive for removing bishopwood trees from cultivated and wild areas. Branches unwanted for carpentry should be salvaged for fuel. When thoroughly dry, the wood burns with intense heat (William Graves, Univ. of Fla. AREC, Homestead; personal communication).

Medicinal and other folk uses

The astringent leaf juice is applied on sores in India (5). In Fiji, the leaf is eaten or the leaf decoction is imbibed to relieve tonsillitis (1). Japanese investigators report an ascorbic acid content of 136 mg/100 g (2).

The bark contains 16% tannin and yields a brown dye commonly used in Samoa for making designs on tapa cloth (9). In Fiji and the New Hebrides, the bark is boiled in salt water and placed on cuts. The inner bark is rubbed on urticaria caused by stinging hairs of nettle-like plants (1), [probably *Laportea* spp.]

Conclusion

The bishopwood is another example of the many mistakes made in the past in introducing and utilizing exotic fast-growing trees for landscaping in South Florida. These mistakes are being repeated to the detriment of the property owner, the community and the environment. It is time for nursery and landscaping professionals to promote the ideal of quality and suitability, rather than just speed of growth, in the choice of species for propagation and planting. It is time for South Florida landscaping to mature.

Literature Cited

1. Altschul, S. 1973. Drugs and foods from little-known plants. Harvard Univ. Press, Cambridge, Mass.
2. Anonymous. 1948. Wealth of India: Raw Materials. Vol. I. Coun. Sci. & Indus. Res., New Delhi.
3. Backer, C. A. and R. C. Bakhuizen van den Brink, Jr. 1963. Flora of Java (Spermatophytes only), Vol. I. N. V. P. Noordhoff, Groningen, The Netherlands.
4. Bailey, F. M. 1902. The Queensland flora. Pt. V. H. J. Diddams & Co., Brisbane.
5. Benthall, A. P. 1946. Trees of Calcutta and its neighborhood. Thacker Spink & Co. (1933) Ltd., Calcutta.
6. Britton, N. L. 1918. Flora of Bermuda. Charles Scribner's Sons, New York.
7. Britton, N. L. and P. Wilson. 1923-24. Botany of Porto Rico and the Virgin Islands. Vol. 5, Pts. 1-4. New York Acad. Sci., New York.
8. Chaturvedi, M. D. 1958. Where there's water, there's the paniala. Indian Farming 8(7):13.
9. Christopherson, E. 1935. Flowering plants of Samoa. Bul. 128.

10. Bernice P. Bishop Museum, Honolulu, Hawaii.
11. Dastur, J. F. 1951. Useful plants of India and Pakistan. 2nd ed. D. B. Taraporevala Sons & Co., Ltd., Bombay.
12. Dekle, G. W. 1976. Arthropods of Florida and neighboring land areas. Vol. 3: Florida armored scale insects. Florida Dept. Agr., Div. Plant Industry, Gainesville, Fla.
13. Howard, A. L. 1951. A manual of the timbers of the world. Macmillan & Co., Ltd., London.
14. Lee, S. 1935. Forest botany of China. Commercial Press, Ltd., Shanghai.
15. Long, R. W. and O. Lakela. 1971. A flora of tropical Florida. Univ. of Miami Press, Coral Gables, Fla.
16. Morton, J. F. 1976. Pestiferous spread of many ornamental and fruit species in South Florida. Proc. Fla. State Hort. Soc. 89:348-353.
17. Nehrling, H. 1944. My garden in Florida and miscellaneous horticultural notes. Vol. 1. The American Eagle, Estero, Fla.
18. Reasoner, E. N. 1914. Flowering trees for Florida. Proc. Fla. State Hort. Soc. 27:170-171.
19. Simpson, C. T. 1912. Native and exotic. Proc. Fla. State Hort. Soc. 25:184.
20. Simpson, C. T. 1926. Ornamental gardening in Florida. Published by the author, Little River, Fla.
21. Smiley, N. 1951. Subtropical gardening in Florida. Univ. of Miami Press, Coral Gables, Fla.
22. Streets, R. J. 1962. Exotic forest trees in the British Commonwealth. Clarendon Press, Oxford, England.
23. Sturrock, D. and E. A. Menninger. 1946. Shade and ornamental trees for South Florida and Cuba. Stuart Daily News, Inc., Stuart, Fla.
24. Wehlburg, C., S. A. Alfieri, Jr., K. R. Langdon, and J. W. Kimbrough. 1975. Index of plant diseases in Florida. Bul. 11. Fla. Dept. Agr. & Consumer Serv., Div. Plant Industry, Gainesville, FL.
25. Wilson, G. B. 1937. Shade tree planting in southern Florida. Proc. Fla. State Hort. Soc. 50:65.

Proc. Fla. State Hort. Soc. 97:244-247. 1984.

ANTHRACNOSE OF ACACIA IN FLORIDA: OCCURRENCE AND FUNGICIDAL CONTROL¹

E. L. BARNARD

Divisions of Forestry & Plant Industry, FDACS,
P.O. Box 1269,
Gainesville, FL 32602

R. A. SCHROEDER

Division of Forestry, FDACS,
3125 Conner Boulevard,
Tallahassee, FL 32301

Additional index words. *Acacia cyanophylla*, *Colletotrichum gloeosporioides*, *Glomerella cingulata*.

Abstract. Several species of *Acacia* are grown in Florida as ornamentals. In recent years, more than a dozen reports of *Gloeosporium* sp. and/or *Colletotrichum* sp., associated with anthracnose-like symptoms on at least three *Acacia* spp., have appeared in the files of Florida's Division of Plant Industry. An additional report has been located in the files of the University of Florida Extension Plant Pathology Clinic. Reports are from Brevard, Charlotte, Highlands, Lee, Martin, Orange and Palm Beach Counties. An isolate of the pathogen from *Acacia cyanophylla* in Highlands County has been identified as *Glomerella cingulata* (anamorph = *Colletotrichum gloeosporioides*); the anthracnose pathogen apparently responsible for damage to *Acacia* spp. in Japan, Spain, New

Guinea, and India. Inoculations have proven the pathogenicity of this isolate to *A. cyanophylla*; providing the first confirmation of anthracnose of acacia in Florida. Trials indicate control may be achieved with a number of fungicides. Chlorothalonil appears most effective.

The nearly pantropical genus, *Acacia* Mill. (Leguminosae, subfamily Mimosoidae), is comprised of ca. 800 species of shrubs and small trees (8). *Acacia* spp. are used for timber, tannin, soil reclamation, windbreaks, fuel, conservation, and sometimes even cattle fodder where grazing is scarce (3, 8). Many species are used as ornamentals also, due in part to their often showy flowers. In the United States, acacias are grown as ornamentals in several warmer areas including the west coast, Hawaii, and southern Florida.

Few diseases significantly affect the use of acacias as ornamentals. However, losses of up to 90% of nursery seedling crops of *A. dealbata* Link. to anthracnose infections [diseases "having characteristic limited lesions, necrosis, and hypoplasia, generally caused by one of the Melanconiales", *sensu* Hawksworth *et al.* (6)] have been reported in Japan (7, 14). Indeed, anthracnose of acacia has been included in a listing of internationally dangerous forest tree diseases (14). Ito and Shibukawa (7) originally described the anthracnose pathogen as *Physalospora acaciae* Ito & Shibukawa (anamorph = *Colletotrichum acaciae* Ito & Shibukawa). The organism was later determined by Terashita (13) to be synonymous with *Glomerella cingulata* (Stonem.) Spaulding & Schrenk (anamorph = *C. gloeosporioides* (Penz.) Sacc.). Apparently, *G. cingulata* is responsible for damage to *Acacia* spp. in Spain, New Guinea, and India (1, 3) as well. Merlo (9), however, described a serious foliage disease of *A. Longi-*

¹Contribution No. 570. Bureau of Plant Pathology. Trade names are used in this article solely to provide specific information. Mention of a trademark or proprietary product does not constitute a guarantee or warranty of the product by the Divisions of Forestry and/or Plant Industry or imply its approval to the exclusion of other products that may also be suitable.