

H-7531 performed similarly to casoron except it caused moderate to severe injury to boxwood.

Amiben was effective against grassy weed species and injured only wax privet causing a noticeable leaf curl.

TD 66 did not provide adequate weed control and also resulted in contact injury to foliage of all test species except podocarpus and juniperus.

R-1856 did not adequately control the weed species present in this test although it caused no plant injury.

The following is a list of weed species found in the experimental area.

#### GRASSY WEEDS

1. *Eleusine indica*
2. *Dactyloctenium aegyptium*
3. *Echinochloa colona*
4. *Digitaria sanguinalis*
5. *Paspalum ciliatifolium*
6. *Eragrostis amabilis*

#### BROADLEAVED WEEDS

1. *Vernonia ovalifolia*
2. *Euphorbia preslii*
3. *Euphorbia maculata*
4. *Bidens pilosa*
5. *Desmodium tortuosum*
6. *Alysicarpus vaginalis*
7. *Physalis angulata*
8. *Amaranthus hybridus*
9. *Mollugo verticillata*
10. *Cassia tora*
11. *Euphorbia hirta*
12. *Sida rhombifolia*
13. *Melothria pendula*

14. *Galactia sp.*
15. *Ipomea pandurata*
16. *Crotalaria lanceolata*
17. *Acalypha gracilens*
18. *Borreria ocimoides*
19. *Oxalis sp.*
20. *Richardia scabra*
21. *Hyptis mutabilis*

#### SEDGE WEEDS

1. *Bulbostylis cappilaris*
2. *Cyperus cuspidatus*
3. *Cyperus compressus*
4. *Cyperus rotundus*

#### SUMMARY

An experiment was initiated May 24, 1961, and terminated July 27, 1961, to test effectiveness of 17 preemergence herbicides in different formulations and concentrations in the production of 9 species of field grown woody ornamental plants. Test plants were rooted 4-6" cuttings.

Casoron at 4 and 8 pounds active ingredient per acre gave outstanding control of broadleaved, sedge and grassy weeds without injury to any of the 9 woody ornamental plant species in the experiment.

H - 7531 also gave very good weed control but caused moderate to severe damage to *Buxus microphylla*.

#### LITERATURE CITED

1. Chapell, W. E. 1961. Category B, Project 3, Weeds in Horticultural Crops. Research Report SWC Vol. 14: 53-55.
2. Fulmer, J. P. 1961. Category B, Project 3, Weeds in Horticultural Crops. Research Report SWC Vol. 14: 53-55.
3. Schramm, R. J. 1961. Category B, Project 3, Weeds in Horticultural Crops. Research Report SWC Vol. 14: 53-55.

## ORNAMENTAL PLANTS WITH TOXIC AND/OR IRRITANT PROPERTIES. II.

JULIA F. MORTON

Director, Morton Collectanea

University of Miami

Coral Gables

This paper is presented as a supplement to *Ornamental Plants with Poisonous Properties* which appears in the Proceedings of this Society, Vol. 71, 1958, and which discusses some 40-odd of our principal plant hazards. That paper and other educational efforts aimed at this problem

have helped to expand the layman's and physician's awareness of the possibility of plant poisoning and have led to suspicion of plant-causation in numerous instances of external or internal injury. Frequently the aid of the writer has been sought in confirming the suspicion, identifying and supplying toxicological details concerning the guilty species. All such cases, whether major or minor, have been recorded and it is believed that presentation of evidence accumulated on certain more or less harmful plants not covered in the 1958 paper would further contribute both to the

avoidance of injury and the recognition of causative factors in time to forestall or counteract adverse effects.

It has become increasingly apparent that no unappealing or unlikely plant portion, above or below ground, can be dismissed as unworthy of children's attention, and we cannot foresee their reasoning. Within the past year, a small tot was given some of the root of a *Dieffenbachia* plant to eat because he and his comrades were playing "animal" and that was considered a logical animal food. At another time, some children actually dug up and ate seeds of *Jatropha multifida* which had been planted by a neighbor. And a boy, aware of the toxicity of the seed of *Abrus precatorius*, chewed and swallowed one because, as he explained, he was pretending to "commit suicide." Neither can the browsing tendencies of adults be discounted; women, particularly, seem prone to eat strange seeds and fruits out of sheer curiosity.

In addition to undeniably poisonous species, I have included below a number of plants, not actually toxic, which have caused discomforts because of highly volatile properties. A few plants with toxic constituents but not so far reported as causing undesirable physiological reactions in South Florida, have been added as commonly accessible and potentially injurious. Some popular plants bearing edible fruits but having toxic properties in seeds or other parts have been omitted, as have certain native species not classifiable as ornamentals. These will be dealt with at another time.

For brevity's sake, only slight mention is made of the uses of the following plants in folk medicine, though these often provide clues to active principles, and it is interesting to note that similar practices may be encountered in South Florida today, as the influx of residents from the West Indies and tropical America is accompanied by a renewed, transplanted herbalism. This very fact may actually increase the incidence of plant poisoning from indiscreet application.

New knowledge regarding South Florida's toxic plants is being gained from the so-called "screening" programs which have been undertaken by scientists in Washington and elsewhere in the search for sapogenins, alkaloids, or other elements. Hundreds of specimens are being systematically collected here and tested locally and in the North for carcinogenic activity.

No attempt has been made to group the following plants according to type of human in-

jury inflicted since most cause undesirable reactions both externally and internally. They are simply presented in alphabetic sequence by botanical name.

*Adenanthera pavonina* L. RED SANDALWOOD; CIRCASSIAN BEAN. The handsome, red seeds are used in necklaces and other novelties. Roasted and shelled, they are sometimes eaten in Java and Malaya. However, the raw seeds are stated to be intoxicant and especially poisonous internally if powdered. They contain 2.24% *lignoceric acid*; have been found only slightly effective as insecticide. The seeds, leaves, wood, bark and roots are employed in native medicine. The leaves are said to be astringent; the root emetic.

*Allamanda cathartica* L. YELLOW ALLAMANDA. This plant was classified by Grosourdy, in *El Médico Botánico Criollo* (1864), as wholly poisonous and he warned that the latex and leaf decoction should be administered with prudence. The latex was formerly given in Colombia as an emetic and vermifuge but has been abandoned as too potent. In Cuba, the latex is employed as a drastic purge and an infusion of the leaves, in large doses, as an emetic and purgative. In India, 1 to 2 grains of the bark is regarded as an "excellent hydragogue cathartic" but all parts of the plant, in quantity, are declared violently emetic and cathartic. While children in Florida often lick a bit of the sap from a stem or chew a flower, they generally swallow too little to produce adverse effects. In one instance, in June of this year, two 6-year-old Miami boys spent some time sucking on allamanda stems, later became nauseated and, the following day, evidenced high temperature, swollen lips, dryness of mouth and thirst. The allamanda is not a common cause of dermatitis, but the sap may cause rash on very sensitive skin. A child, after picking many flowers, wiped her sticky fingers on her side and, the next day, the side displayed an itching rash. A local woman who got the sap in her eye said it "burned like fire."

*Arecastrum romanzoffianum* Becc. (syn. *Coccoloba plumosa* Hook.) QUEEN PALM. The pulpy covering of the fruits, while fibrous and sticky, is sweet and commonly nibbled by children. Ripe seeds are used in novelties. Unripe seeds reportedly have caused scouring and death of calves in New South Wales. Despite the popularity of this palm in Florida and its abundant production of fruits, which fall to the ground and form a bright "puddle" around the base, no instances of toxicity have been reported here.

*Caladium bicolor* Vent. and *C. picturatum* Koch. FANCY-LEAVED CALADIUMS. All parts of these plants but particularly the leaves and bulb, when raw, contain irritant crystals of calcium oxalate. When cooked, both the leaves and bulbs have been eaten as vegetables in tropical America and the West Indies. The powdered leaves are used as insecticide in the Philippines.

*Calonyction aculeatum* House. MOONFLOWER. Young leaves and calyces and immature seeds are sometimes cooked and eaten, and fresh or dried flowers are used in soup in the East Indies. The stems have served for stringing tobacco leaves for drying. An extract from the vine has been used to coagulate *Castilla* latex. However, handling or trimming this vine has caused dermatitis in Florida.

*Calophyllum inophyllum* L. MAST-WOOD; erroneously "ALEXANDRIAN LAUREL." The half-ripe fruits are reportedly poisonous except for the endosperm which is eaten after pickling. The seeds contain 70 to 75% oil (called domba oil) containing a lactone, *calophylloide*, *calophyllic acid* and *inophyllic acid*. The oil is rubefacient and irritant; used externally for skin diseases and as a stimulant, especially in treating rheumatism. Dried kernels are exported from Tahiti to France where the oil is used in cosmetics. The leaves contain *saponin* and *hydrocyanic acid* and are used as fish poison. *Inophyllic acid* has been isolated from the bark. Resin from the tree is emetic and purgative; is used externally in ointments, etc. Sap injected intravenously is fatally toxic and was used by Samoans as arrow poison. Floridians tempted to eat the seeds have been warned not to do so. No instances of poisoning here are known.

*Calotropis procera* Dry. and *C. gigantea* Dry. GIANT MILKWEED. Milky sap is caustic and irritant on skin; may cause swelling and ulceration; internally, it is purgative and emetic. It contains the bitter principle, *calotropin* (or *gigantoin*), a cardiotoxic glycoside, used on arrows and for homicide, suicide and as fish poison. Four other glycosides, *calactin*, *calotoxin*, *uscharin* and *uscharidin*, are present, also a powerful bacteriolytic enzyme similar to *papain*. One dram of *Calotropis* sap will cause a dog to foam at mouth and die in 15 minutes. In India, it has been used in infanticide, being forced down the throat of girl babies. Like other parts of these plants, it has various external and internal medicinal uses and it may also serve as a depilatory.

The leaves have been mixed with food to poison humans or cattle. Dried, they are sometimes smoked to relieve asthma. The root bark is emetic.

*Capsicum frutescens* L. CHILI PEPPER. Fruits contain *capsaicin* and *capsicin*. Handling the crushed fruits may cause burning rash, swelling and redness. Contact with the face is especially painful and inflames eyes and nostrils. Many Florida children have found that eating the fresh fruits causes acute burning sensation in lips, mouth and throat and gastro-intestinal irritation. A quantity taken internally is emetic and purgative and colors the urine. In Malay torture, the peppers are burned and victims are exposed to the smoke which is highly irritant to mucous membranes. For external relief, vinegar is recommended. The dried or pickled fruits (as cayenne or chili pepper) are used sparingly as a condiment; the leaves are cooked as a vegetable.

*Caryota mitis* Lour., TUFTED FISHTAIL PALM; and *C. urens* L., TODDY FISHTAIL PALM. The fruit pulp and juice, containing stinging crystals, are externally irritating and internally quite toxic. Floridians cleaning seeds for propagation have found that the painful skin inflammation lasts for hours. It is reported that deliberate poisoning has been caused by putting whole fruits into drinking water. The seed kernel is edible, as is the terminal bud, or "cabbage," when cooked. The fibers at the bases of the leaf-stalks of *C. urens* are a source of dermatitis.

*Catharanthus roseus* G. Don (syn. *Vinca rosea* L.). MADAGASCAR PERIWINKLE. This popular ornamental which has run wild in South Florida is toxic to livestock. The leaves are bitter, astringent and emetic; the root bark is employed as a febrifuge and the roots as a purge and vermifuge, depurative and hemostat. In South Africa, a leaf extract called "Covinca" is sold as a diabetes remedy. It is said, however, to have little, if any, effect on the blood sugar level but it is purgative and has a mild digitalis-like action. The plant has yielded at least 18 alkaloids including the much-publicized carcinogenic *vincaleucoblastine*, marketed by Eli Lilly under the drug trade name of "Velban" for the treatment of Hodgkin's disease and certain tumors. More recently, Indian scientists have isolated from the root bark *alstonine*, having hypotensive and sedative value.

*Clusia rosea* Jacq. PITCH APPLE; COPEY. Fruits reportedly poisonous if eaten but appar-

ently no one has ventured to do so in Florida. Yellow sap of entire plant is a drastic purgative. Resin obtained from trunk and mature fruits is prized as a purge and, in Cuba and Venezuela, is sold in powdered form as an external application for sore muscles surrounding fractures, dislocations, etc. It is used not only on humans but also on racehorses. A decoction of the flowers, bark and fruit rind is used as a bath for rheumatics.

*Cocculus laurifolius* DC. LAURELLEAF SNAILSEED. The leaves contain the alkaloids *cocculidine* and *cocculine*. The bark and wood contain *coclaurine* (which has a *curare*-like action and has been used as an arrow poison in Malaya), also *laurifoline*, *trilobine*, etc. The plant is used medicinally in Indo-China. No incidents of toxicity are known to have occurred in Florida.

*Codiaeum variegatum* Blume. LEAF-CROTON (commonly called "CROTON" and often confused with the highly toxic purging croton, *Croton tiglium* L., of the Old World.) The bark and roots are acrid and cause burning in mouth if chewed. There is much variation in the acidity of leaves of different varieties, certain yellow ones being reportedly sweet and edible when young. These are cooked as vegetables in the East Indies. Mature leaves may be irritant though the plant is rarely a cause of dermatitis, despite much handling of foliage for decoration and cuttings for propagation. Generally, the sap is avoided because it leaves indelible stains on clothing and tablecloths. Only minor incidents involving children have been reported: A 3-year-old child chewed a flower and felt only a slight irritation in the mouth; a smaller child swallowed a whole leaf which was retrieved intact after a dose of ipecac and there were no ill effects.

*Crinum* spp. CRINUM LILY. Raw bulbs cause vomiting and catharsis. In Brazil, they are held to be as toxic as those of *Hippeastrum* species. *Lycorine* (which is emetic), *crinidine* and other alkaloids have been found in the bulbs of various species. In the Philippines, an ointment is made from the bulb of *C. asiaticum* L.

*Erythrina herbacea* L. (syn. *E. arborea* Small). EASTERN CORAL BEAN; CHEROKEE BEAN. The attractive red seeds are made into necklaces and other novelties. In Mexico they are used for poisoning rats and dogs. They contain the alkaloids *erysodine*, *erysopine*, *erysovine*, *erysothiopine*, *erysothiovine*, and *hypaphorine*. The

young leaves and the flowers may be safely cooked and eaten.

*Erythrina variegata* var. *orientalis* Merr. (syn. *E. indica* Lam.) CORAL TREE. The leaves are eaten cooked as a vegetable. The seeds are edible after boiling or roasting but are toxic raw and are sometimes used for poisoning animals. They contain *saponin* and the inert alkaloid *hypaphorine* which is present also in all other parts of the plant. In southeastern Asia, the seeds are employed internally and externally in the treatment of cancer. Two years ago, a 65-year-old Miami woman ate one seed and was ill the following day. *Hydrocyanic acid* is found in the leaves, stems, roots and fruit. The leaves and bark contain *saponin* and the toxic alkaloid *erythrinine* which acts as a depressant on the central nervous system, like *cytisine*. The bark is astringent and used as a febrifuge, dysentery remedy and in ophthalmia.

*Euphorbia cotinifolia* L. RED SPURGE. Because of its attractive, dark-red foliage, this shrub has recently been introduced into the nursery trade in South Florida. Some who have planted it as a hedge have removed it because it is a prime contact poison. Simply touching the leaves can produce an overall rash in sensitive individuals. The milky sap is highly irritant, commonly induces inflammation and blistering and, in the eye, can cause at least temporary blindness. In tropical America, it has been used by savages for homicide and fish poisoning. Sometimes it is used to cauterize wounds and is given as a purgative in very small doses. The seeds are violently purgative.

*Euphorbia milii* Desm. (syn. *E. splendens* Bojer). CROWN-OF-THORNS. This well-armed shrub, with its stems thoroughly clothed with sharp spines, one would consider repellent to children. However, this past August a mother reported that two children, aged 4 and 4½, were pulling off the scarlet bracts and flowers and sucking the milky latex. The sap is caustic, like that of other species of *Euphorbia* and has been used to check the flow of blood from a cut, etc. Our common native weed, *E. heterophylla* L., PAINTED LEAF, or WILD POINSETTIA, also has abundant, irritant, milky sap which is used medicinally in tropical America.

*Grevillea robusta* A. Cunn. SILKY OAK. The flowers and fruits contain *hydrocyanic acid*. The sap reportedly caused inflammation of the eyelids

of a gardener in New South Wales. In Western Australia, persons subject to asthmatic attacks suffer when in contact with the tree at any time of the year and particularly if they should climb it. A wholly innocuous resin, like gum arabic, exudes from the trunk. In Hawaii, the flowers of *G. banksii* R.Br. are a common source of dermatitis.

*Haemanthus multiflorus* Martyn. BLOOD LILY; POWDERPUFF LILY. The bulb contains the alkaloids *lycorine*, *chlidanthine*, *haemanthidine*, *haemultine* and *hippeastrine*. It is used as fish poison and is reportedly toxic to pigs. Medicinally, it has been used as a stimulant in debility and as an ointment for ulcers. Bulbs of other species of this genus have caused poisoning of humans and animals in Africa.

*Hippeastrum vittata* Herb. (syn. *Amaryllis vittata* Ait.) AMARYLLIS. The bulbs contain several alkaloids: *haemanthamine*, *hippeastrine*, *homolycorine*, *lycorine*, *tazettine* and *vittatine*. In the Redlands area, in 1960, three children put salt on amaryllis bulbs, thinking they were onions, and ate them. One child vomited and then fell asleep. All three were promptly subjected to stomach lavage to avoid further ill effects.

*Hymenocallis* spp. SPIDER LILY. Bulbs of this genus are reputedly hazardous to grazing animals and are listed as toxic by the Southern California Pharmaceutical Association. The bulb of *H. littoralis* Salisb. (syn. *H. americana* Roem.) contains the alkaloid *lycorine* (which is emetic) and *tazettine* (which has slight hypotensive activity).

*Lagerstroemia indica* L., CRAPE MYRTLE, and *L. speciosa* Pers. (syn. *L. flos-reginae* Retz.), QUEEN'S CRAPE MYRTLE. The bark, leaves and flowers are diuretic and cathartic. The root is astringent and used as a stimulant and febrifuge. The seeds are drastically purgative and said to be narcotic. The old leaves and dried ripe fruits of *L. speciosa* contain an insulin-like principle and a decoction is taken for diabetes. Cuttings of the Queen's crape myrtle, blooming profusely when only 2 feet high, and now being distributed as shrubs, should prove irresistible to small children and accidents may be expected.

*Lantana camara* L. COMMON LANTANA. This plant has been long recognized as highly toxic to grazing animals. Its active principle, *lantanine* (or *Lantadene A* and *B*), is broken down in the

liver, produces *phylloerythrin* which goes into the bloodstream causing photosensitization, first of areas unprotected by hair; then jaundice, yellowing of mucous membranes of eyes, mouth, cracking of skin, etc., and, in acute cases, death. Contact with the prickly plant often causes dermatitis in humans. The ripe fruits are eaten by natives of the tropics wherever the plant occurs. There has been little warning concerning toxic effects on humans apart from the statement by F. M. Bailey in Queensland in 1906 that "children have frequently been made ill by eating the fruits." Yet, in Tampa, in June, 1961, one child died of neuro-circulatory collapse from chewing and swallowing a quantity of unripe, green berries, and the life of another who had swallowed an amount without chewing was barely saved. A mild leaf decoction is a tropical remedy for rheumatism, colds and indigestion; stronger, it is given as a snakebite antidote. The pounded leaves are applied as poultices.

*Ligustrum* spp. PRIVET. In New South Wales, it is reported that species of *Ligustrum* have caused fatal poisoning of animals and children. Ingestion of the leaves and fruits results in purging, loss of power in limbs, dilated pupils and death. In New Zealand, there are occasional instances of fatalities of horses and cattle from *L. vulgare* L. In England, years ago, two children ate the black fruits of this species, suffered violent purging and died. A third child, having only tasted the fruits, was not ill. The flowers are a cause of respiratory allergy. In Florida, privet hedges are kept closely trimmed; only occasional plants are allowed to attain full size, bloom and fruit. No cases of human poisoning have been reported to the writer.

*Melaleuca leucadendron* L. CAJEPUT. This is not literally a poisonous species but the common practice in South Florida of planting this compact, erect tree very close to dwellings and frequently right outside a window, has revealed it to be a common respiratory irritant, especially when in full bloom. A highly sensitive individual in the immediate vicinity of a number of trees in bloom may experience a fine, burning rash, especially on the face, and sometimes headache and nausea. A small boy was covered with rash from head to foot after handling a branch and licking a cluster of seedpods which he called a "lollipop," unlikely as this may seem. When a tree was being dug up, the roots touched a woman's wrist and produced rash and blisters. The irritant factor is apparently the cajeput oil

which is commercially distilled from the fresh leaves and twigs and used in medicine as a counterirritant, stimulant and rubefacient. It contains 45 to 56% *cineole*, *dl-pinene*, *terpineol*, etc. It is applied to skin complaints as a parasiticide and, internally, it is given as a powerful stimulant, carminative, sudorific, etc. An overdose causes gastro-intestinal irritation and inflammation of the kidney. The oil is an effective mosquito repellent, volatilizing slower than citronella. Honey from cajuput nectar is foul-tasting and 5% contamination of orange-blossom honey makes the latter unsalable.

*Mirabilis jalapa* L. FOUR O'CLOCK. The powdered seeds have been used as a cosmetic in the Orient but they are reported, in Haiti and elsewhere, to be toxic if taken internally. In Hawaii, the seeds are made into necklaces. The fresh roots are considered poisonous; they contain *oxymethylantraquinone* and the cathartic alkaloid *tribonelline*. In Guatemala and in other areas the dried and pulverized root is taken in sweetened water as a purge. The leaf juice is used medicinally, externally and internally. In South Africa, the nocturnal odor of the flowers is believed to stupefy or repel mosquitoes.

*Moringa oleifera* Lam. HORSERADISH TREE. The leaves, flowers, young pods and immature seeds are cooked and eaten in many parts of the tropics. However, the fresh leaves are diuretic and purgative. Crushed leaves are sometimes used as poultices but may burn or blister the skin. The ripe seeds yield ben oil, valued as a watch lubricant, and for pomades and culinary purposes. The peeled root is made into a pungent, horseradish-like condiment. In native medicine, the root, its bark and oil are employed as counterirritants, rubefacients and vesicants. The root bark contains the alkaloids *moringine* and *moringinine*, resembling *ephedrine* in effect on the heart and the sympathetic nerve endings. The flowers and roots contain the antibiotic and fungicidal property, *pterygospermin*.

*Pedilanthus tithymaloides* Poit. SLIPPER-FLOWER; REDBIRD "CACTUS." The abundant milky sap throughout the plant is caustic and may cause rash and even blistering of the skin. It is acutely painful and injurious in the eye. A Miami woman, not long ago, suffered intense eye inflammation from this source. In the West Indies, a few drops of the sap are added to milk to induce vomiting. Eating leaves or any other part of the plant will cause vomiting and

diarrhea. An infusion of the stems, leaves, roots or seeds is given in native medicine as an emetic or purge.

*Phoenix canariensis* Hort. CANARY DATE PALM, and *P. loureiri* Kunth., PIGMY DATE PALM. Punctures by the sharp thorns on the petioles of these palms are commonly experienced by nursery and landscape workers and are a frequent cause of claims against employers' accident insurance. The painful swellings,\* sometimes long-lasting, that result especially from the sharp spines of the Canary date may be due to the breaking-off and retention of a spine-tip in the wound. Such material is not revealed by x-ray since it is the same density as human tissue. Deep punctures could be infected with surface bacteria carried in by the thorn. But there may also be some irritant chemical property present. Burkill says that the leaves of *P. dactylifera* L., the common date palm, contain *coumarin*. Poona Agricultural College reports that the fronds of *P. sylvestris* Roxb. are "occasionally poisonous."

*Phoradendron flavescens* Nutt. AMERICAN MISTELTOE. This plant is gathered and sold for Christmas decoration in Florida, Alabama and other southern states. The berries have caused fatalities among children who have consumed them in quantity. An extract of the leaves is toxic to mosquitoes. The alkaloid *tyramine* has been found in this plant and in *P. californicum* Nutt. and *P. villosum* Nutt. The Indians of California believed that *P. flavescens* possessed particular medicinal value when growing on the buckeye tree. They chewed the leaves for toothache and used them to make a "tea" to cause abortion. Long ago, the plant was investigated for its stimulant property which was recommended for cardiac treatment. The fruits of the European mistletoe (*Viscum album* L.) contain *phenethylamine* and *tyramine* and cause vomiting and purging if eaten.

*Pithecellobium dulce* Benth. MANILA TAMARIND. The pulpy white (or occasionally reddish) arils surrounding the seeds are sweet and edible. The bark is used in the Philippines for tanning but contains irritant principles which cause eye inflammation, irritation and swelling of eyelids and blurring of vision. Four years ago, a man in Coral Gables, who cut off a seedling with a 2-inch stem which was growing up in his hedge, suffered a large, purplish, spongy

\*In one instance, a man's wrist was accidentally pricked at noon and by 4 P.M. his arm was swollen to the elbow.

welt where the cut end came in contact with his forearm. This tree was formerly common along streets in South Florida but many have been destroyed by hurricanes or removed because of their spininess or aggressive root system. At their former sites, one must be alert for persistent root-shoots or seedlings which are very thorny and as perilous as barbed-wire.

*Plumbago capensis* Thunb. CAPE PLUMBAGO; LEADWORT. Roots, leaves and stems contain *plumbagin* and oil of plumbago. Externally, these parts, but especially the root, may blister the skin of sensitive individuals. However, a small Miami child chewed a bit of foliage, experienced no burning in the mouth, and apparently swallowed none of the material. Internally, the plant is reputedly a severe irritant poison. The root is valued in the tropics for medicinal uses.

*Plumeria* spp. FRANGIPANI. The milky latex is somewhat caustic and, if allowed to remain on the skin, may cause rash or even blistering in highly sensitive individuals. It is applied externally as a rubefacient, especially in cases of rheumatism, and is also applied to skin diseases. Three to four drops are administered as a purgative; larger amounts are poisonous as the latex acts as a gastro-intestinal irritant. It contains *crotonic acid* and *lupeol*, the calcium salts of *plumieric acid*. The bark of *P. acuminata* Ait. contains *plumierid* and is given as a cathartic. Frangipani leaves are sometimes smoked to relieve asthma. A few months ago, a Miami woman reported that her Pekinese dogs, and especially one of them, habitually chew the tube of fallen frangipani flowers, then become ill and vomit.

*Poinciana pulcherrima* L. (syn. *Caesalpinia pulcherrima* Swartz). DWARF POINCIANA. The unripe seeds are reportedly edible. Mature seeds are high in tannin, astringent, and given to counteract dysentery. The leaves are purgative, contain *hydrocyanic acid* and are cast into streams for fish poisoning. They have caused fatalities in rabbits. The root is regarded as toxic. Infusions or decoctions of flowers, leaves, bark or root are widely used medicinally as purgatives, emmenagogues, etc., in the tropics. The powdered flowers are employed as insecticide.

*Quisqualis indica* L. RANGOON CREEPER. The young shoots are eaten raw or cooked. The ripe seeds taste like coconut and are eaten sparingly after removal of ovary wall and seedcoat. Some

individuals may consume as many as 20; others are made ill by eating only 2 or 3. The seeds contain a purgative oil and *oleic* and *palmitic acids* and *sitosterol*. In quantity, they are soporific. The young, dried fruits are sold in the Orient, where they are valued as a vermifuge and for other medicinal uses. Large doses cause hiccups; overdoses produce unconsciousness.

*Rhoeo spathacea* Stearn (syn. *R. discolor* Hance). BOAT-LILY; OYSTER PLANT; MOSES-IN-A-BOAT. Floridians handling or weeding in a bed of these plants have experienced dermatitis, probably from the juice of the leaves which are easily broken. In Cuba, this species is prominent as a medicinal herb. The leaves, flowers and entire plant are astringent and used to staunch bleeding. A decoction of the leaves and flowers is taken for coughs and pulmonary complaints. In Mexico, it is used as a cosmetic to tint the face, its irritant action heightening the color.

*Sapindus saponaria* L. SOAPBERRY. The fruits contain 37% *saponin*; when crushed, will foam in water and, in tropical America, are used as a soap substitute, but they may cause a severe skin rash in sensitive individuals. The fruit is sometimes employed in folk medicine and for stupefying fish. The seeds are reportedly toxic; when powdered they are used as insecticide, as is an infusion of the bark. The root decoction is regarded as astringent and tonic but dangerous. The seeds are used in necklaces and rosaries and played with like marbles.

*Seindapsus aureus* Engl. (syn. *Pothos aureus* Lind.) HUNTER'S ROBE. The juice is irritant and a frequent cause of dermatitis. Local nurserymen who cut up stems for propagation commonly complain of "Pothos poisoning." An elderly Miami lady who tried to break an overhanging stem of a young potted plant and found it tough, bit it in two; later experienced not only irritation of lips and tongue but pronounced diarrhea.

*Setcreasea purpurea* Boom. PURPLE QUEEN. This plant is easily broken and its juice causes an instant, stinging red rash, which is more pronounced on parts of the body not ordinarily exposed, as has been found by Florida home gardeners carrying, planting or weeding around it while shirtless.

*Solanum seaforthianum* Andrews. BRAZILIAN NIGHTSHADE. The fruits contain *solanine*. In Australia, they have made children ill and have proved toxic to poultry, rabbits, sheep and

other animals. Eating seedlings caused the death of a kangaroo. No instances of poisoning have been reported to the writer in Florida.

*Vanilla planifolia* Andr. VANILLA. This plant is occasionally grown in slathouses in South Florida and several individuals have acquired a stinging skin irritation, lasting several hours, after cutting back the vine. O. W. Barrett, in *Tropical Crops*, states that the juice contains crystals of *calcium oxalate* which irritate the skin of workers harvesting the vanilla pods. Dr. C. E. Delchamps, of the University of Miami, chewed a portion of one of our native leafless vanilla orchids and experienced an acute burning sensation in the mouth after a slight delay.

*Vitex trifolia* L. and var. *variegata* Moldenke. VITEX. These aromatic plants, commonly planted as hedges in South Florida, cause respiratory irritation, especially when being trimmed and afterward while the cuttings still are lying on the ground. Some people suffer not only asthma-like symptoms but also dizziness, head-

aches and nausea. Children sometimes chew the leaves but desist because of the burning taste. In the Far East, the leaves are placed in irrigation water in rice fields to protect the plants from pests, and dry, powdered leaves are used to repel insects from stored grain and clothes. The leaves are burned to drive away mosquitoes. The leaves and twigs contain *cincol*, *1-d-pinene*, *camphene*, *terpinyl acetate* and a *diterpene alcohol*. The leaves and fruits have various medicinal uses, as poultices, in medicinal baths, etc. The fruit is regarded as a nervine, cephalic and emmenagogue.

*Zephyranthes* spp. ZEPHYR LILY; RAIN LILY. In Brazil, the bulbs are regarded as toxic as those of the genus *Hippeastrum*. Various alkaloids, including *lycorine* and *haemanthamine*, have been derived from the bulbs of different species. *Z. atamasco* Herb. has proved fatally toxic to grazing animals and poultry. No instances of human poisoning are known to the writer, but the bulbs should be kept out of reach of children.

## EFFECTS OF CONTAINER SIZE, TIME IN CONTAINER AND TRANSPLANTING METHOD ON GROWTH OF PODOCARPUS MACROPHYLLA MAKI, RHODODENDRON INDICUM 'FORMOSA' AND LIGUSTRUM JAPONICUM

R. D. DICKEY

*University of Florida*

Gainesville

Many production problems confront growers of container grown woody ornamental nursery stock in Florida. There is little research information on effect of container size and time plants remain in containers on their growth while in containers, or the effect of these factors on their subsequent growth after planting in the field.

### MATERIALS AND METHODS

An experiment was initiated April 9, 1960, to test effects of 3 container sizes, 3 times in containers and 3 transplanting methods on growth of 3 woody ornamental plant species while in containers and afterwards in the field.

The variables were container size (quart, gal-

lon and 2 gallon metal containers), time in containers (8, 14 and 20 months), 3 plant species (*Ligustrum japonicum* Thunb.—wax privet, *Rhododendron indicum* Sweet 'Formosa' and *Podocarpus macrophylla maki* Endl.) hereafter referred to as ligustrum, podocarpus and 'Formosa' azalea and 3 transplanting methods (planted as they came from containers, pot-bound roots removed and 1-inch deep vertical cuts on periphery of ball).

The experiment was set up as a split-plot with a 3x3x3 factorial of container size, time in containers and plant species as whole plot treatments and 3 transplanting methods as sub-plot treatments. There were 3 replications and the experimental units were 9 plants for whole plot treatments and 3 plants for sub-plot treatments.

Rooted cuttings of the 3 species were potted, one plant to a can, in quart (oil can—58 cu. in.), gallon and 2 gallon containers (6" and 8" Lerio cans—145 and 295 cu. in., respectively) in a soil mixture of 1/3 imported peat, 1/3 No. 8 perlite