Table 5. Estimated effect on total costs for 1-gal. containers of pfitzer juniper in Climatic Zone 9 with changes of 5%, 10%, 15%, 20%, 25%, 50%, 75%, and 100% in the cost of various production inputs, 1980.

Item	Percent rise in cost of input							
	5	10	15	20	25	50	75	100
	Percent increase in cost per container[z]							
Operator's salary	.58	1.17	1.75	2.25	2.83	5.67	8.58	11.42
Supervisory labor	.33	.67	1.00	1.33	1.67	3.25	4.92	6.50
Wages	1.00	2.00	3.00	4.00	5.00	10.00	15.08	20.08
Land	.08	.17	.17	.25	.33	.67	1.00	1.42
Rate of interest	.83	1.58	2.42	3.23	3.33	8.33	12.08	16.17
	Cost per container							
Operator's salary	1.207	1.214	1.221	1.227	1.234	1.268	1.303	1.337
Supervisory labor	1.204	1.208	1.212	1.216	1.220	1.239	1.259	1.278
Wages	1.212	1.224	1.236	1.248	1.260	1.320	1.381	1.441
Land	1.201	1.202	1.202	1.203	1.204	1.208	1.212	1.217
Rate of interest	1.210	1.219	1.229	1.239	1.240	1.300	1.345	1.394

[z]Percentages may differ from expected arithmetic relationship because of rounding.

the expected continuation of inflation, a series of 8 different levels of input cost increases, ranging from 5% to 100%, is shown.

If it is assumed that each factor was to increase at the same percentage (with no change in the others), the largest rise in output cost would come about from wage increases. For example, a 25% rise in the cost of wages would result in a 5% increase (i.e., 6¢) in the cost per container. The factor bringing about the next highest increase in costs is the interest rate. A 25% increase—from 15 to 18.75% —would result in a 3.33% increase in the cost per unit of output. This would mean a cost rise from $1.20 to $1.24 per plant.

The operator's level of salary ranks third in affecting the cost per unit of output. A shift upward of 25%—from $17,500 to $21,875—would result in a 2.8% increase in the cost per container, which would rise from $1.20 to $1.234.

Although an important element in affecting cost, supervisory labor ranks in fourth place among the five factors analyzed. A 25% increase in the cost of supervisory labor—from $10,000 to $12,500—would result in an increase of 1.67% in the cost per unit of output. This would mean a shift from $1.20 to $1.22 per output unit.

Among the input units considered in the hypothetical case in question a change in cost of land has the smallest impact on cost per unit of output. A 25% rise in the price of land—from $2,500 to $3,125 per A.—would mean an increase of 0.33% in the per unit cost of output. It would bring about a rise in prices of only 0.4¢ per plant.

The implications of the relatively small impact of an increase in the price of land on costs per unit are that other factors may be more important than the price of land in the decision process. A favorable location which would minimize the cost of transportation, movement of labor and management, and other productive resources as well as the final product may more than offset the higher initial costs and carrying charges of the land.

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RINGSPOT OF SCAEVOLA[1]

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Additional index words. cucumber mosaic virus.

Abstract. Scaevola frutescens **is a perennial shrub of the family Goodeniaceae which is valuable in landscaping where a salt-tolerant planting is required. Recently, a chlorotic and necrotic ringspot was detected in plantings of this shrub in South Florida. Leaf symptoms appeared at first as subcircular, translucent areas which became chlorotic and/or necrotic along the periphery. Surveys indicate that this disease is widespread in South Florida. Host range, electron microscopy, inclusion body examination, and immunodiffusion tests indicated that the causal agent is cucumber mosaic virus (CMV) but that it is not identical to other CMV strains to which it was compared, nor is it serologically related to peanut stunt virus (PSV) or tomato aspermy virus (TAV), both members of the cucumovirus group. This may be the first instance of CMV infecting a member of the Goodeniaceae.**

[1]Contribution No. 514, Bureau of Plant Pathology.

Species of *Scaevola* are perennial herbs or shrubs which belong to the family Goodeniaceae. This family contains about 14 genera and 320 species, most of which are indigenous to Australia, tropical Africa, Polynesia, and New Zealand (9). Two species, *Scaevola frutescens* (Mill.) Kurt Krause, and *S. plumieri* (L.) Vahl, are currently grown in the coastal areas of southern Florida. *S. frutescens* is particularly valuable in landscaping where a salt tolerant planting is required.

Recently, a chlorotic and necrotic ringspot was detected in plantings of *S. frutescens* in South Florida. Leaf symptoms appeared at first as subcircular, translucent areas which became chlorotic and/or necrotic along the periphery. They may also take the form of oak-leaf patterns on Scaevola leaves (Fig. 1). Symptoms are most readily observed during the fall and winter months, and in fact, plants may appear healthy at other times of the year. Similar symptoms were noted in 1946 in the Kailua area of Oahu, Hawaii, but apparently no studies were initiated (7). Surveys indicate that the disease is widespread in South Florida.

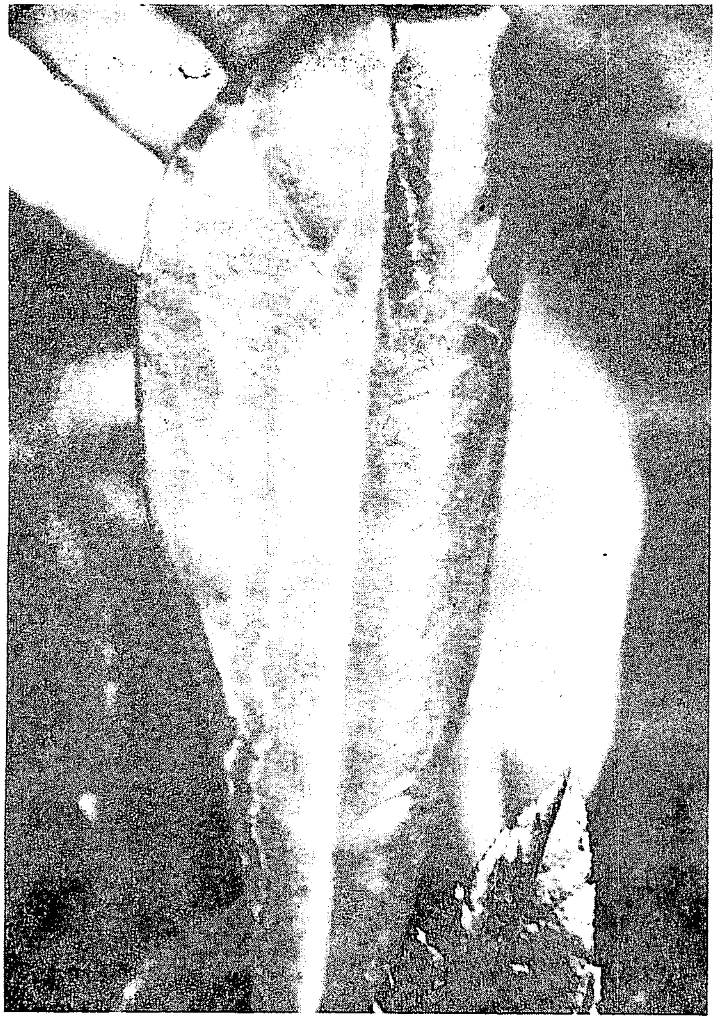

Fig. 1. Leaf of *Scaevola frutescens* with chlorotic oak-leaf pattern caused by cucumber mosaic virus.

Initial mechanical inoculations with symptomatic *S. frutescens* tissue resulted in local lesions on *Chenopodium amaranticolor* Coste & Reynier and *Vigna unguiculata* (L.) Walp. [cowpea ('Knuckle Purple Hull'] and systemic mottle on *Cucumis sativus* L. [cucumber ('Marketeer')] and *Nicotiana* X *edwardsonii* Christie & D. W. Hall. This indicated that the ringspot was caused by cucumber mosaic virus (CMV). This study was initiated to verify the causal agent and to determine the strain of CMV which might be involved.

Materials and Methods

Mechanical transmission tests were made by triturating symptomatic tissue from *S. frutescens* in 0.1 M phosphate buffer and rubbing it with sterile cheesecloth pads onto leaves of *N.* X *edwardsonii* previously dusted with 500-mesh Carborundum. These plants served as propagation species for additional inoculations of various indicator plants. Parallel inoculations were made in the same manner with isolates of CMV from *Morrenia odorata* (Hook. & Arn.) Lindl. and *Gladiolus* sp.

For examination under the electron microscope, leaf extracts were made using the dip method and stained with phosphotungstic acid.

Mesophyll tissue from infected plants of *N.* X *edwardsonii* was cleared for 30 minutes in ethylene glycol monomethyl ether and stained in 0.1% Azure A for examination of inclusion bodies under the light microscope (2).

Immunodiffusion studies were made using a medium of 0.8% Noble Agar, 0.5% sodium dodecyl sulfate, and 0.1% NaN_3. Scaevola CMV was tested against antisera of the Milbraith strain of CMV from two separate bleeding dates, peanut stunt (PSV), and tomato aspermy virus (TAV), all members of the cucumovirus group.

Results and Discussion

In several instances, the three isolates of CMV produced similar symptoms on the assay plants; for example, mosaic on cucumber and the hybrid tobacco, and local lesions on cowpea and *C. amaranticolor* (Table 1). These similarities implicate CMV as the Scaevola ringspot causal agent. However, in other instances, such as the lack of symptoms on *Lycopersicon esculentum* Mill. and *Phaseolus vulgaris* L. inoculated with the Scaevola isolate, the three isolates varied considerably.

Table 1. Host response to inoculation with three isolates of cucumber mosaic virus.

Host	CMV Isolate: Scaevola frutescens	Gladiolus sp.	Morrenia odorata
Cucumis sativus	M	M	M
Nicotiana X edwardsonii	M	M	M
Vigna unguiculata	LL	LL	LL
Chenopodium amaranticolor	LL	LL	LL
Petunia parodii	LL,M	LL,M	LL,YELLOWING
N. glutinosa	M	M	YELLOWING
Gomphrena globosa	—	LL	—
Lycopersicon esculentum	—	LL	M,FERNLEAF
Phaseolus vulgaris	—	—	—
Chrysanthemum morifolium	—	X	—
Datura stramonium	—	X	LL

— = No reaction.
X = Test not made.
LL = Local lesions.
M = Mosaic.

Particles of CMV were not observed in leaf dip preparations under the electron microscope. This is not unexpected because spherical virus particles may be confused for many naturally occurring plant organelles. With the light microscope, however, granular, aggregated inclusion bodies typical of CMV were observed. Hexagonal crystal-type inclusions, some of which were empty, were also observed. Inclusion bodies occurred infrequently in the plant tissue.

Homologous reactions occurred between known CMV antisera and antigens from *Petunia parodii* Steere plants infected with CMV from *S. frutescens*. Antisera from neither TAV nor PSV reacted with the CMV isolate in question.

In the literature on CMV strains and the relationship among PSV, TAV, and CMV, there is considerable conflict on host range, diagnostic species, serological specificity, RNA species, and particle size (1, 3, 4, 5, 6, 7, 8, 10, 11, 12). Therefore, the tendency has been to compare an unknown CMV isolate with known CMV strains and/or other cucumoviruses, including TAV and PSV. For this reason, the *Scaevola* isolate was compared to CMV isolates from *Morrenia* and *Gladiolus* and to TAV and PSV. TAV and PSV were ruled out as the causal agent as a result of symptoms produced on *Cucumis sativus, Datura stramonium* L., and *Nicotiana glutinosa* (10), and the lack of reaction in immunodiffusion tests.

Although host range studies implicated CMV as the causal agent, the host range did not completely correspond to a known strain of CMV.

Host range, particle measurements, inclusion bodies, and serology indicate a strain of CMV as the causal agent, but the identity does not correspond with other known strains; thus, it will be tentatively described as CMV-strain Sc. A literature search failed in finding any other instance of CMV infecting a member of the family Goodeniaceae.

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EVALUATION OF POTTING MIXES DERIVED FROM URBAN WASTE PRODUCTS[1]

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Additional index words. Composted sewage sludge, incinerator ash.

Abstract. **Experimental potting mixes derived from 4 different ratios of composted sewage sludge, sifted incinerator ash, and coarse sand were evaluated against a commercially available medium composed of peat, sawdust, and sand. Each mix was used to grow 3 species of plants, dwarf oleander** (Nerium oleander), **jasmine** (Jasminum volubile), **and ligustrum** (Ligustrum japonicum, var. rotundifolium). **Ten individuals of each species were grown in each medium in 3 gallon containers for a 5 month period. Growth was evaluated monthly by use of a size index based on plant height and average diameter. Jasmine grown in the compost based media were comparable to those grown in the peat, sawdust, and sand mixture after 5 months. Ligustrum and dwarf oleander grew significantly ($P < 0.05$) faster in the compost media than in the peat, sawdust, and sand mix. After 5 months, the latter plants grown in the compost averaged > 25% larger than those grown in the conventional medium.**

Of all the varied forms of agriculture, ornamental horticulture is particularly well suited for urbanized areas. Horticulture is less susceptible to pressure caused by increased land values and can benefit by close proximity to expanding markets. The location of many ornamental plant growing operations either in or close to rapidly urbanizing areas presents certain unique opportunities for the utilization of urban wasteproducts that could otherwise, if improperly disposed, cause environmental quality degradation. Waste products such as sewage sludge have become increasingly difficult to dispose of using conventional means such as landfilling (9) but there have been numerous instances of agricultural or horticultural uses for this type of material, such as in the growing of sod (8), field crops (7, 11), and in tree nurseries (6). There are, however, certain problems that have prevented the more rapid agricultural exploitation of sewage sludge. Among these are various levels of physical instability, particularly with liquid sludges, presence of pathogenic organisms, particularly in sludges which have not been heat-treated, and high levels of toxic substances, such as heavy metals that may be especially serious in the case of food-chain crops.

Most of these problems can be effectively managed by composting the sludge and using it to grow plants that are not intended for human or animal consumption. This points to the ready potential for use of composted sludge in growing ornamental crops.

Media selection is an important aspect of ornamental plant production. Potting media generally consist of various combinations of mineral components such as sand, organic matter such as peat, muck, bark or sawdust, and other components such as vermiculite or perlite. The actual components may not be important for most plants, providing that porosity, water-holding capacity, and cation-exchange capacity of the mix fall within certain ranges (1, 5).

Since sludges are, in general, labile putrescible materials (3) heterotrophic decomposition and humification must occur before they can be used as a soil component in agriculture. Composting accomplishes this through aerobic microbiological action and the ultimate breakdown product, compost, is a stable, humus-like substance suitable for many agricultural uses (2). The use of tree bark compost as a container media has been investigated (4), and the use of sewage-refuse compost as a mulch in field-grown ornamental plants has been reported (10). The production and availability of large quantities of sewage sludge in urban areas is coupled with the need to find appropriate and productive uses for it. This study was conducted to evaluate composted sewage sludge in various combinations with sifted

[1]Florida Agricultural Experiment Station Journal Series No. 3453 Mention of any trademark or product name does not constitute an endorsement by the University of Florida. This research could not have taken place without the kind generosity of Raymond Oglesby who donated plant material and nursery space. I am also grateful to William R. Farrell of the Broward County Tree Nursery for providing composted sewage sludge and sifted incinerator ash, Rick Stratton of Oglesby Nursery for logistic support, and to Nina Carter for her expert technical assistance.