Table 4. Effects of seeding rate and month of overseeding on 'La. S-1' White clover ground cover in April, 1982.

Planting month	Pure live seed/m² 1500	1000	500
	..... Cover (%)[z]		
September	78 a	84 a	78 a
January	77 a	57 b	37 c
November	76 a	73 ab	64 ab
October	70 a	68 ab	56 bc
December	63 ab	63 b	45 bc
February	44 b	27 c	12 d

[z]Retransformed means within columns separated by the Waller-Duncan k-ratio t-test, 5% level. Means between columns joined by a common line are not significantly different using Duncans multiple range test, 5% level.

in density and color when compared to that from normal fertilization rates of 2.5 to 5 g N/m²/month.

The practice of overseeding winter legumes into bermudagrass fairways is impractical if high quality bermudagrass is desired the following summer. If, however, fertilizer costs become prohibitive, this practice should be reevaluated, especially for use on golf course roughs and other bermudagrass areas receiving low maintenance.

Table 5. Tifway bermudagrass growth rates as affected by residual N fixed by 'La. S-1' White clover seeded during the previous winter months.

Planting month	Bermudagrass clipping yields June	July	Aug.	Mean
	..... kg/ha/day			
September	17.1 a[z]	29.2 a	15.3 ab	20.5 a
October	9.5 f	27.3 b	15.5 ab	17.4 b
February	11.7 c	21.3 d	17.6 a	16.9 bc
January	12.3 b	22.6 c	12.1 bc	15.7 cd
November	10.5 d	18.7 e	16.3 ab	15.2 d
December	9.8 e	18.1 f	10.0 c	12.7 e
March	6.4 g	15.4 g	8.0 c	9.9 f

[z]Mean separation within columns by the Waller-Duncan k-ratio t-test, 5% level.

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ARALIAS IN FLORIDA HORTICULTURE[1]

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Abstract. **The common name "Aralia" has been used in Florida and in the nursery industry for a variety of plants, most of which are now placed in the genus** Polyscias. **The common names used for many cultivars are appropriate in describing leaf form but there is confusion over the species within the genus to which each belongs. A collection assembled at AREC Fort Lauderdale has given some insight into these relationships and will form the basis for a more detailed study. Major cultivars are described.**

There are two sides to the story of Aralias in Florida horticulture: one, the use of a plant for hedges so common and reliable that its good qualities hardly register; the other, the recognition by interiorscapers of the value of relatives of this ugly duckling for dark, hot locations which few other plants will tolerate.

The plant used for hedges, *Polyscias guilfoylei* (Bull.) L. H. Bailey, is a common sight in the New World tropics and through much of the Pacific as a screen or a boundary marker (1). In south Florida it can form a narrow dense, leafy hedge up to 10 ft in height and only a few feet wide. The main trunks may be 6 to 8 inches in diameter but can continue to form branches at any point along their length and maintain a fastigiate growth habit unless the leafy tops become too lush to be held upright. Plain green and green and white-variegated cultivars are common and either may sport to the other form. Not many nurseries find it a worthwhile plant to grow since branches of any size root easily, and most hedges are planted with prunings from neighbors' plants.

Fancy-leaved cultivars of this species and several others, however, are important nursery plants. They are marketed in any size from a small plant in a 6-inch pot to massive specimen plants, and are a major crop for a number of Florida growers. They come in a wide range of leaf forms and variegations, and the trunks and branches can take on picturesque shape making them popular as specimen plants or focal points for a planting.

All commercially grown species are intolerant of waterlogged, poorly aerated soil, but if grown under a carefully controlled watering regime will maintain their exotic appeal and stay healthy for long periods under poor light and with severe heat build-up (W. West, personal communication).

Providing good soil aeration and maintaining tempera-

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tures above 55°F are the main precautions necessary for successful culture, although the plants are subject to alternaria leaf spot and to nematode, aphid, and mite attacks. These problems are easily recognized and can be controlled in most cases with standard techniques. Fertilization is determined by the light conditions under which the plants are growing.

The problem with these plants is not their culture but their correct names. Confusion exists in much horticultural taxonomy, and these aralias have a classic case history of how to generate such confusion: they are native to an area (the Pacific islands) that is relatively poorly known botanically, and difficult of access; they are frequently used garden plants in many tropical areas; they are genotypically unstable and vegetatively propagated so that "sports" become fixed; their time of introduction, sources and number of separate introductions into the western hemisphere are not known and finally the cross fertility and breeding behaviour of the group has never been fully explored.

Gardeners like to have names for their plants, and nurserymen love to advertise new material which only they have to offer, so that common names have proliferated. There is nothing wrong with this. Scientific names, on the other hand, must be applied with precision and in a consistent manner if they are to serve their purpose of ensuring accurate communication.

The generic name for most of these plants is now generally accepted to be *Polyscias* although a few nurseries, hunting for novelty, will occasionally use *Panax* or *Aralia*. Since earlier taxonomists published species in the genera *Aralia, Arthrophyllum, Botryopanax, Cuphocarpus, Eupteron, Gelibia, Grotefendia, Irvingia, Kissodendron, Nothopanax, Palmervandenbroekia, Panax,* and *Paratropia,* which are all now thought to be species of *Polyscias,* the picture has cleared at least to this extent. The common name "aralia" is used for a number of genera in the family Araliaceae, in particular for species of *Aralia, Dizygotheca* and *Polyscias*. The name "Lacy Lady Aralia" is also used for *Evodia suaveolens* Sheff. var. *ridleyi* (Hochr.) Backh., a species that belongs to the citrus family, Rutaceae.

Within the genus *Polyscias* the situation appears simple at first glance. Those books that give keys to the species or provide descriptions, all cite 4 species (2, 3, 4) with clear cut characters to separate them. It is only when the key fails to provide a name for a cultivar time after time that suspicion hardens into certainty that there is more to the story. Collecting cultivars from the West Indies, Central America, Florida and even one from the teaching collection of Ohio State University, proved to be the easy part of checking out the forms in cultivation. After growing some 40 accessions under standard conditions for almost 3 yr some groupings became obvious. It was also possible to associate these with scientific names by going back to the original species descriptions.

One group whose mature leaves had 3 to 5 almost round leaflets belongs to the species *Polyscias pinnata* J. R. & G. Forst (5). A similar group which rarely makes more than one leaflet per leaf, and which usually shows a definite cupping is *P. scutellaria* (Burm. f.) Fosberg. These 2 species have been known as *P. balfouriana* (Hort. Sand.) L.H. Bailey which is a later name and thus cannot be used. *Polyscias guilfoylei* shows a range from the common hedge plant with leaves somewhat resembling those of a rose, through types whose leaves have white fringed margins or are a dark green and crumpled, to some with ragged fishtail shape leaflets or very much dissected leaves. The fernleaf aralias, *P. filicifolia* (C. Moore) L. H. Bailey, have pinnate leaves somewhat resembling a fern frond, while *P. fruticosa* (L.) Harms in its typical form has very much divided (two or three times pinnate) leaves which may be much reduced in some cultivars. These groups account for the 4 species which have appeared in keys since the time of Bailey's 'Manual of Cultivated Plants' (2).

The remaining accessions include some that belong in the species *P. crispata* (Bull.) Merr., one collection of *P. grandifolia* Volkens and one of *P. obtusa* (Bl). Harms. Some others appeared to form a range intermediate between *P. fruticosa* and *P. crispata,* or *P. pinnata.* They may be hybrids, although for the moment they are listed below under the species which they most closely resemble. The species assigned to *P. crispata* may also prove to be hybrids when flowering material is available.

Artificial key to Polyscias cultivated in Florida

1. Leaflets more or less round, apex rounded or emarginate
   2. Leaves rarely having more than one leaflet, often cupped
      3. Leaves green ..... *P. scutellaria*
      3. Leaves reddish green ..... *P. scutellaria* 'Plum'
   2. Leaves of mature shoots with 3 or more leaflets
      4. Leaflets usually 3 or 5, the terminal one undivided, usually larger than others
         5. Leaves green ..... *P. pinnata* 'Dinner Plate'
         5. Leaves variegated
            6. Leaflets with a white edge .... *P. pinnata* 'Marginata'
            6. Leaflet variegation not confined to margin
               7. Leaflet with a lighter green patch at center ..... *P. pinnata* 'Evergreen'
               7. Leaflets heavily splashed with greenish white and yellow green ..... *P. pinnata* 'Pennockii'
      4. Leaflets more than 3, usually deeply divided, the terminal leaflet with two major lobes and one or more central rudimentary lobes
         8. Leaflets on mature branches wider than 8 cm
            9. Leaves variegated *P. crispata* 'Palapala'
            9. Leaves green ..... *P. crispata* 'Chicken Gizzard'
         8. Leaflets of mature branch less than 6 cm wide
            10. Leaf texture coarse, veins whitish ..... *P. crispata* 'Delight'
            10. Leaf texture soft, veins not obviously lighter colored .... *P. crispata* 'Celeryleaf'

1. Leaflets ovate to lanceolate, apex acute to obtuse
   11. Leaves more than once-pinnate (at least some with this character on a mature plant)
      12. Terminal leaflet with a blunt apex
         13. All leaflets much divided .... *P. guilfoylei* 'Roseleaf Ming'
         13. Only basal leaflets of leaf much divided
            14. Leaflets on mature branches less than 3 cm long: veins not markedly parallel at base of leaflet: plant usually variegated ..... *P. guilfoylei* 'Victoriae'
            14. Leaflets on mature branches more than 3 cm long: veins at base of leaflet lying closely parallel for some distance: plants usually green: leaf shape suggesting a fishtail ..... *P. guilfoylei* 'Fishtail'
      12. Terminal leaflet with an acute apex
         15. Leaflets almost linear: branching occasional, giving an open appearance to plant ..... *P. fruticosa*

15. Leaflets rhomboid; plants dense with many side branches
    16. Leaves bipinnate
        17. Leaves green ..... *P. fruticosa* 'Elegans'
        17. Leaves variegated *P. fruticosa* 'Silver Queen'
    16. Leaves tripinnate ..... *P. fruticosa* 'Plumata'

11. Leaves once pinnate (at times only deeply pinnatifid)
    18. Leaves of mature plant less than 8 cm long, mostly deeply pinnatifid: plant very densely branched .... *P. fruticosa* 'Emerald Globe'
    18. Leaves pinnate, more than 8 cm long: plants not densely branched
        19. Terminal leaflet with 3-5 deep rounded lobes ..... *P. obtusa*
        19. Terminal leaflet not 3-5-lobed, or if lobed the lobes not rounded
            20. Terminal leaflet lanceolate with acute apex, or if somewhat ovate then the petiolules of the upper pair of leaflets very short
                21. Leaflets opposite but some leaves with two pairs of leaflets borne at the same point on the rachis .... *P. filicifolia* 'Tomatoleaf'
                21. Leaflet pairs borne singly on the rachis
                    22. Base of leaflets attenuate .... *P. filicifolia*
                    22. Base of leaflets truncate .... *P. grandifolia*
            20. Terminal leaflets ovate-elliptic, apex blunt to acuminate: petiolule of upper pair of leaflets usually longer than 1 cm
                23. Leaflet margins evenly serrate
                    24. Leaflet more or less smooth surfaced
                        25. Leaves green ..... *P. guilfoylei*
                        25. Leaves variegated
                            26. Leaves with white margins *P. guilfoylei* 'Marginata'
                            26. Leaves tricolor green over whole leaflet *P. guilfoylei* 'Variegata'
                    24. Leaflet surface, strongly puckered (bullate), leaf crumpled, dark green .. *P. guilfoylei* 'Blackie'
                23. Leaflets with ragged margins
                    27. Margins of at least some leaflets laciniate ..... *P. guilfoylei* 'Laciniata'
                    27. Margins of leaflets strongly toothed to incised ..... *P. guilfoylei* 'Rita Barrow'

Descriptions of Species and their Cultivars Grown in South Florida

Polyscias crispata (Bull.) Merr.
'Chicken Gizzard' or 'Celeryleaf Aralia'

Dense, much branched plants whose rounded leaflets are divided into 2 or more lobes which may overlap. The terminal leaflet usually has 2 major lobes with 1 or 2 much smaller lobes between them. 'Palapala' (Plant Pat. 3775) is a green and gold variegated form of 'Chicken Gizzard'. 'Celeryleaf' has smaller leaves with deeply divided lobes, and 'Delight' is similar although of a harder texture.

Polyscias filicifolia (C. Moore) L. H. Bailey
Fernleaf or Filigree Aralia

Erect growing plants with pinnate leaves somewhat resembling fern fronds. The leaflets are several times longer than wide and may be almost smooth margined to almost pinnatifid. In some collections younger leaves are more deeply cut than mature foliage. 'California Gold' and 'Golden Prince' appear to be identical, with a strong yellow cast to their mature foliage in full sun. Tomatoleaf Aralia probably belongs to this species.

Polyscias fruticosa (L.) Harms — Ming Aralia

Typical plants have twice-pinnate or even more compound leaves with narrow segments. 'Plumata' is 3 times pinnate with divided leaflets. Other forms have almost linear leaflets. Plants branch freely, particularly those similar to 'Elegans', the Parsley Aralia. One cultivar, 'Emerald Globe' is dwarfed with tiny leaves that are merely pinnatifid. "Silver Queen' (Plant Pat. app. for) is a white-variegated cultivar.

Polyscias grandifolia Volkens

An upright plant with once-pinnate leaves having up to 15 leaflets whose margins are almost smooth. This plant is not often found in Florida.

Polyscias guilfoylei (Bull.) L. H. Bailey — Roseleaf Aralia

Strong growing plants with an upright habit often used for hedges in either a green or a green and white variegated form. Several cultivars are grown: they appear to have arisen spontaneously and may revert to the "roseleaf" form. 'Blackie' with dark green, crumpled leaves has been sold as "Black Aralia", "Aralia amazonica" and "Dowsett Crispa" as well as "Spinach Aralia". 'Fishtail' has divided leaflets, the largest of which are shaped like tattered fins or tails of fish. 'Laciniata' and 'Lace Edge' appear to be identical with white lacy margins to the leaflets. 'Marginata' and 'Variegata' are names sometimes used for the variegated forms of the common hedge plant. 'Rita Barrow' has broad creamy white serrate margins.

Polyscias obtusa (Bl.) Harms — Oakleaf Aralia

Each leaflet, particularly the terminal, is shaped like the lobed leaf of a northern oak. Two forms are found, differing in leaf texture and amount of lobing.

Polyscias pinnata J.R. and G. Forst. — Dinnerplate Aralia

Erect plants distinguished by their orbicular leaflets. Most have 3 to 5 leaflets with the terminal leaflet larger than the rest. Leaves on young shoots may have a single leaflet and mature trunks occasionally produce leaves with 7 leaflets. 'Dinnerplate' with dark green leaves is the largest of the cultivars. 'Evergreen' has smaller leaves with lighter green centers and 'Pennockii' is tricolor green, gold, and cream in irregular patches. 'Tricochleata' or 'Marginata' leaflets have white margins. This cultivar is sometimes offered as "Geraniumleaf".

This species and the one which follows have been known as *P. balfouriana*, but since this name was published later than the others the rules of botanical nomenclature do not

allow it to be used for either. All of the cultivars may prove to belong to one species when the full range of variation in the wild is known, but the cultivated material does separate consistently into two groups on the number of leaflets present. The names suggested by Stone (6) have been used for these.

Polyscias scutellaria (Burm. f.) Fosberg

The leaves are unifoliolate in all but the most mature plants. The orbicular leaflet is often cupped. A reddish leaved cultivar is known as 'Plum', 'Bavaria', or 'Fabian'.

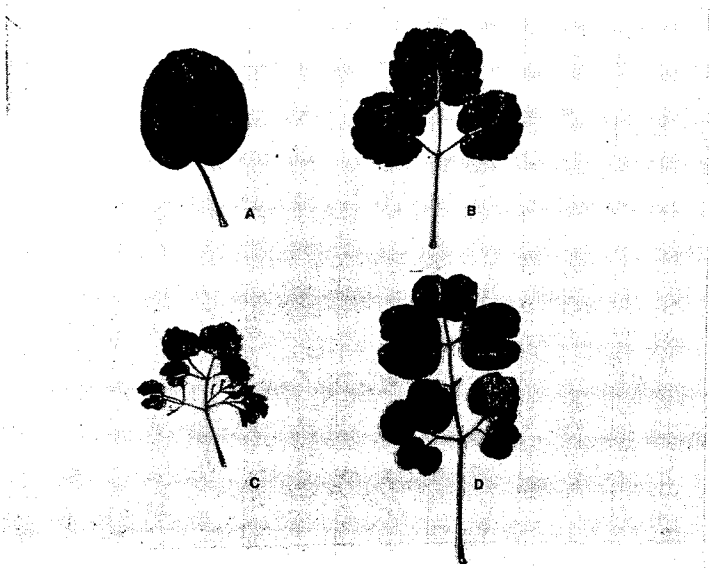

Fig. 1. Leaves of cultivars of *Polyscias*. A) *P. scutellaria*. B. *P. pinnata* 'Evergreen'. C) *P. crispata* 'Delight'. D) *P. crispata* 'Chicken Gizzard' (one pair of leaflets removed) (Leaf size not necessarily to scale)

Fig. 2. Leaves of cultivars of *Polyscias*. A) *P. filicifolia*. B) *P. obtusa* (one pair of leaflets removed). C) *P. grandifolia* (Leaf size not necessarily to scale).

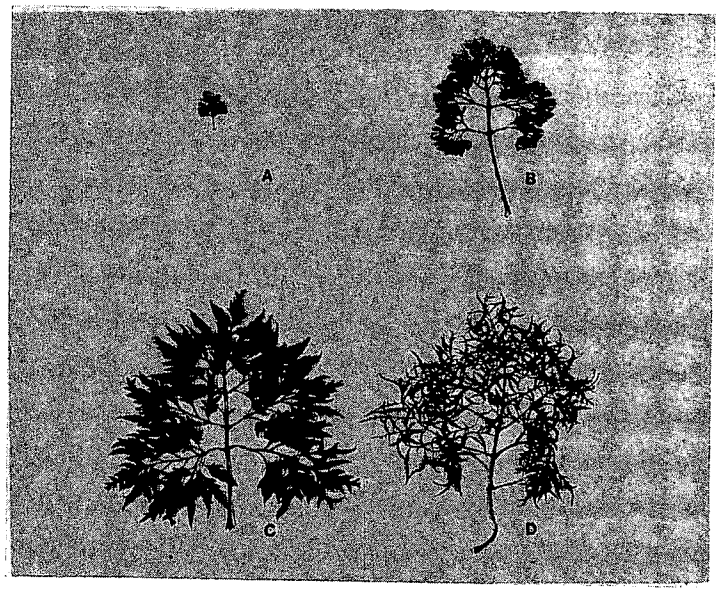

Fig. 3. Leaves of cultivars of *Polyscias*. A) *P. fruticosa* 'Emerald Globe' B) *P. fruticosa* 'Elegans' C) *P. fruticosa* (one pair of leaflets removed). D) *P. fruticosa 'Plumata'* (Leaf size not necessarily to scale).

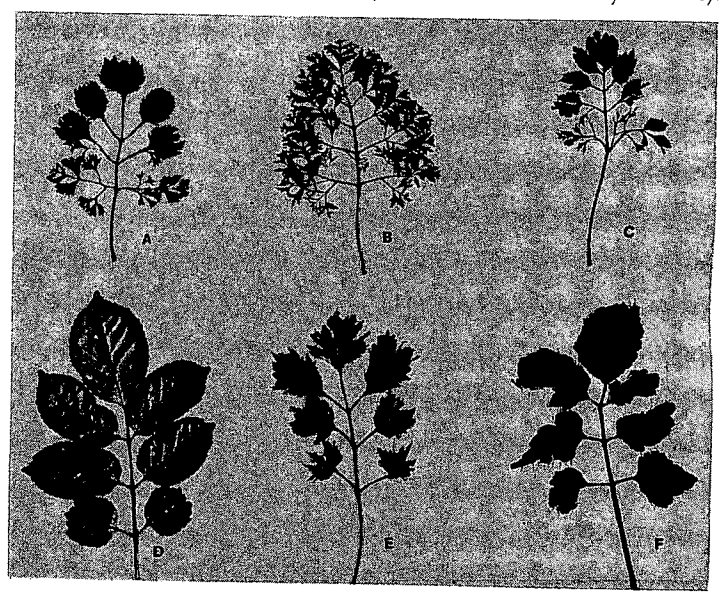

Fig. 4. Leaves of cultivars of *Polyscias*. A) *P. guilfoylei* 'Fishtail' B) *P. guilfoylei* 'Roseleaf Ming' C) *P. guilfoylei* 'Victoriae' D) *P. guilfoylei* 'Variegata' E) *P. guilfoylei* 'Rita Barrow' F) *P. guilfoylei* 'Laciniata' (Leaf size not necessarily scale).

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