Much is already being done along these lines. In Hawaii, California, and Florida many types of orchids are being grown now in more natural conditions than ever before. Many orchids which until now were considered greenhouse plants are at present being cultivated out-of-doors. Some types are even grown as field crops. Many other types are now grown in lathhouses or under shade trees in gardens. In areas where cold weather is little or no problem, greenhouses are being replaced by lathhouses and for more exact control of watering, lathhouses are being equipped with glass tops in order to run off rainfall.

Lathhouses are becoming quite popular in Hawaii and Florida because they have an open, fresh, well ventilated atmosphere, much more like natural conditions than the stuffy, closed conditions of a greenhouse. Greenhouses in climates like ours can be a definite liability. They incline to heat up excessively under the tropical sun and to counteract this they must be heavily shaded. The floor must be damped down often in order to build up humidity which also helps cool down the house. Unfortunately, however, this extra shading and increased humidity is not beneficial to the plants as it results in tall soft growth which is shy to flower and very subject to fungal and bacterial diseases.

Another branch of orchid culture is also receiving a great deal of attention these days. In Hawaii and here in Florida a great deal of experimental work has been done on hydroponic feeding of orchids. This feeding is done not by growing plants in beds as with most hydroponic systems but merely by watering the plants in their individual pots with a mixture of fertilizer in the water.

All of these advances in the culture of orchids have shown real results and growers are beginning to see the light. In general, these advances have resulted in larger, stronger, and heavier growth—growth that is made more quickly and more often and this in turn results in more flowers, both in number of blooms per growth and in number of growths per year. Also by supplying these better conditions growers have been able to cut down the length of growing time needed to mature seedlings. Under traditional methods it takes seven to eight years to bloom a seedling. Many growers here in Florida are now blooming Cattleya seedlings in five to six years. Down at the "Orchid Jungle" we are averaging somewhere between four and four and one-half years from seed to first bloom on Cattleyas and every year or so we manage to cut this by a few more days or weeks.

All of these deviations from the traditional methods are merely the result of the application of common sense. Anyone can do as well if they have the strength to question tradition and make a break from it, if potentially better methods show up.

Somehow though, it seems to be particularly hard to make this break, and those that do, find it a hard row to hoe because traditionalists boo and scoff at every turn.

The trend is definitely started, however, and snowballing as it goes. It won't be long. I'm sure, until the common sense approach will overshadow traditional methods. When this happens, the orchid business will really come into its own — a golden era for sure, when every gardener and housewife grows orchids as casually as they do roses, hibiscus and African violets today.

WHAT GRASS TO PLANT WHERE

Roy A. Bair
Belle Glade

In this Atomic Age of scientific marvels the man in the street has become confused by the procession of miracles coming from the physicist, the chemist, and the plant breeder.

Sales resistance is abdicated in favor of gullibility provided only that the new, harmless cigarette, or the vitamin complex for rejuvenating aged bodies, or the perfect lawn grass variety is offered with appropriate ballyhoo as being the product of brilliant, exhaustive, and extensive scientific endeavor.

This pathetic faith in miracles makes it easy for rascals to sell "the perfect lawn grass" which of course does not exist and probably cannot, for several reasons which will be noted in the discussion of the several lawn varieties.
THE ZOYSIA GROUP

The various strains and varieties of Zoysia have been more widely used for promotional misrepresentation, although no other lawn species in Florida has been exempt.

The common Manila grass (Zoysia matrella) has been widely represented under various trade names as the perfect lawn grass for all soils and situations from Washington, D.C., to Key West. Several desirable characteristics of this grass have been exaggerated to the point of downright misrepresentation, when it is claimed that this species requires no watering, fertilizing, or mowing, and is immune to attacks by insect pests and fungus diseases.

The facts are these. On poor but open soil, where the roots are well aerated, and where plenty of calcium (lime) is present, Zoysia will thrive on a low supply of water.

In this drought resistance there are inherent disadvantages. This species will not be satisfactory in low marshy locations where there is too much water. It is not adapted to the "acid" sands of Florida away from the coasts, and in compacted soils of high organic content, such as muck, St. Augustine and Bermuda grasses will over-run it.

Another attractive characteristic of Zoysia illustrates "you can't have your cake and eat it too." The established lawn requires only infrequent mowing because growth is very slow. But growth is also so slow that a lawn planted by sprigging usually requires 2 to 3 years to fill in solid. During this period the home owner must wage an unceasing battle with broad-leaved weeds and weedy grasses which are faster growing and can easily destroy the Zoysia. Applications of fertilizer will aggravate the situation, at this stage, by stimulating the weeds more than the lawn grass.

Unfortunately, these weed seed lie dormant in every topsoil in Florida. Some of these seed remain viable for many years, and then germinate readily when they are brought to the surface during the preparation of the lawn base.

Chemical sterilization of the entire lawn base before planting has not yet been completely successful in eliminating weeds.

During the past 15 years every Zoysia lawn contractor we have talked to has dropped this variety like a hot potato because of the resentment of his impatient customers who may or may not have been informed in advance of the slowness of this grass in establishment.

Zoysia is apparently immune to chinch bugs, but is relished by grubs, fall armyworms and sod webworms, any of which can severely damage large areas of the lawn unless treated with insecticide.

A serious fungus disease, said to be caused by a Helminthosporium has threatened Zoysia lawns with destruction in the Lower East Coast area until it was found that applications of neutral copper or of Dithane would hold the fungus in check.

In addition to these advantages and drawbacks, Zoysia tolerates more shade and more salt spray than any other lawn grass in Florida. If cut regularly with a heavy, sharp mower, at less than 1 inch height, this grass can make a lawn of unsurpassed beauty.

All of the above comments are pertinent to a fine-leaved, somewhat faster growing strain, known as New Strain Zoysia. Since this strain is of the same texture and color as Velvet Bermuda, mixtures of the two have been planted on partially shaded lawns. Eventually the Velvet Bermuda predominates in the full sun portions of the lawn, and the New Strain Zoysia under the trees and shrubs.

Another Zoysia, known as Z-57, is attracting probably more interest in Florida than it deserves because it can be planted from seed while the others are propagated vegetatively. This selection is assumed by its originators to be a natural cross between Z. japonica Z. matrella. In appearance and performance it has more closely resembled japonica, which has been much inferior to matrella in South Florida. Z-57 is slower growing and more subject to fungus attacks.

BITTER BLUE ST. AUGUSTINE

A dozen years ago most lawn contractors were convinced they had a chinch bug resistant lawn grass in the new Bitter Blue variety. Our observations at that time led to the conclusion that the chinch bugs enjoyed living in this strain almost as much as in the common St. Augustine. The apparent resistance of the Bitter Blue lay in its greater activity on poor soils, where it grew faster than a moderate infestation of chinch bugs could consume it.

In every location in Florida where we have planted 23 strains of St. Augustine side by
side, the Bitter Blue has outgrown all the others.

A few years ago most of the St. Augustine in Florida was of the common type and it is not unreasonable to assume that a race of chinch bugs had arisen which preferred the common type, just as cattle do.

Now that thousands of lawns are planted to Bitter Blue, there is evidence that another race of chinch bugs now exists which prefers this newer strain. We have recently observed badly infested Bitter Blue on the Lower East Coast growing beside bug-free common St. Augustine. Insecticide dealers in that area are convinced that this new race of chinch bugs, unlike the older one, thrive in wet soil and "eat Chlordan for dessert."

This apparent adaptation of chinch bugs to Bitter Blue spotlights a problem which will constantly recur. When a new crop is introduced into an area, it is often free from diseases and insect pests for a few seasons. Then, suddenly, an indigenous fungus, scale, or pest, adapts itself to the new crop. Thus, while we can recommend Velvet Bermuda or Zoysia as free from chinch bugs this year, we may find the picture entirely changed next year. This unstable situation will probably always be more aggravated in Florida than in any other state because we never have the periodic frozen soils which decimate the pest populations farther north. Probably no thoughtful plant pathologist or entomologist expects man to keep more than one jump ahead of the fungi and the bugs.

The gray leaf spot disease (Grisea piricularia) has been present on St. Augustine for a long time, but recently has increased in virulence. Possibly 50 per cent of the lawn losses ascribed to chinch bugs should have been blamed to this fungus. Unfortunately, fungicides such as neutral copper or Dithane will only hold the fungus in check by frequent applications, not eliminate it. Failure to spray will mean loss of the lawn.

Of all the known adapted species in use in Florida, Bitter Blue withstands light frosts better without injury, and is second only to Zoysia in tolerance to shade and to salt spray. Because this grass will grow better on poor soil than any other variety, it would be the best all-round lawn grass for Florida lawns were it not for the myriads of chinch bugs which now preclude its growth in many areas. Even if an insecticide of dependable lethality is found, no effective practical results can be obtained unless all the lawns in a community can be treated simultaneously. Several commercial lawn maintenance firms are obtaining complete kills with dangerous applications of Parathion, but they report reinestation from neighboring lawns within 8 days.

When the 1947 floods covered most of the Bitter Blue sod nurseries in the Davie area, several unscrupulous characters came up to the Everglades and contracted to sell Rose-lawn St. Augustine, a cow type of grass, to unsuspecting lawn contractors and home owners. Millions of feet of this cow St. Augustine have been sold on both coasts. This strain will produce more beef per acre than any other grass in the United States, but when it is mowed at lawn height, it becomes yellow, thin, and fails to form a true turf. At present there seems to be no law or agency in Florida to insure the sale of grass without misrepresentation. The newly revitalized Florida Nurserymen and Growers' Association is taking steps to correct this problem.

**Centipede Grass**

Centipede grass is another fallen angel which has disappointed those who once believed they at last had found the wonder grass. Like the Zoysias it shares the glamour of origin in the Orient, where any mystic aggregation of virtues is possible. For 25 years this grass has displayed unique ability in growing well where it is not wanted, and of failing where it is wanted.

This species is the temperamental lowbrow of the lawn grasses. It demands low fertility and frequently dies promptly if well fertilized. Centipede cannot stand prosperity. High nitrogen causes it to yellow. Complete fertilizer stimulates it to excessive growth, resulting in a mat which in turn kills the plants by "shading itself out." Or, if the grass lacks iron, required by this variety in unusual quantities, ordinary fertilizers may kill it quickly.

The possibility of iron deficiency is sometimes discarded after iron sulfate or copperas applications on an alkaline soil have failed to green up yellowed Centipede grass. The fact is that copper sulphate oxidizes to become unavailable to plant roots when it comes in
contact with soil calcium. The possibility of iron deficiency should not be abandoned until after a spray application of iron on the leaves has failed to turn them green.

This variety grows more slowly than Bitter Blue and, consequently, requires less mowing.

It requires well drained locations, with plenty of air-space in the soil around the roots, but water must be applied frequently to keep it green. During cool weather it becomes dormant and brown.

Instability in appearance has been the greatest objection to Centipede. The lawn is beautiful one week and unsightly the next. When iron shortage or overfertilization are not involved, the difficulty is due to fungus diseases or to insect pests.

In warm, muggy weather Centipede is extremely vulnerable to several fungi, which may kill large patches of lawn unless sprayed promptly with fungicides.

Sod webworms and fall armyworms also may yellow and then kill this species unless timely applications of insecticides are made, although chinch bugs are said to leave it alone. We have observed a lawn only a few miles away from this room where the Centipede was killed by root-knot, caused by nematode.

Centipede will not grow in shade, and the leaves brown quickly in salt spray or during drought.

Home owners who want a green lawn during the winter season should not consider this variety unless an overplanting of winter grass is planned.

**Ryegrass for the Winter Lawn**

The common or Italian ryegrass is used extensively in Florida by overseeding each fall on Centipede lawns. Properly managed, this winter grass will maintain a green appearance on a lawn which would otherwise appear dead and brown for several months.

During cool weather the root system of ryegrass is very profuse and very active, while the permanent grass is dormant or nearly so and unable to compete on even terms for fertilizer, water, or sunlight. A large number of permanent lawns is ruined each winter by too heavy seeding of ryegrass.

For the sake of his permanent lawn the homeowner should be willing to forego a dense carpet of winter grass and plan, instead, a thin seeding which will give a green appearance to the lawn. From 1 to 2 pounds of seed to each 100 square feet of lawn should be sufficient.

If thicker seeding is insisted upon, the permanent lawn can be protected in three ways. The ryegrass must be mowed often at a height of 1 to 1½ inches to prevent shading the established grass. The lawn must be watered frequently and fertilized adequately to provide enough water and nutrients for both grass varieties.

Our lawn problems would be much simplified had Nature seen fit to endow some one lawngress to grow equally well at temperatures ranging from 20 degrees to 100, but such a happy versatility simply does not exist. One species likes hot weather only, another cold, and never the twain shall meet in one grass, apparently.

**Velvet Bermuda**

Not one of the common lawn or pasture grasses now in use is a true native of Florida, but Bermudagrass has been here since the earliest Spaniards came. For several hundred years this species has been producing variants. Probably 1,000 varieties or strains could be distinguished if a full-scale search were to be undertaken covering every county of the State.

When research was begun 12 years ago for the purpose of finding a new and better lawn grass for Florida, one of the principal objectives was to find a superior strain of some species which had already proven its adaptability on many types of soil throughout the State. We were able to find only 2 strains of Centipede, 23 of St. Augustine, but 125 kinds of Bermuda ranging from tall pasture types to ones with leaf blades so fine that only an expert could distinguish them from bentgrass. Among the more than 500 grasses tested were 60 strains of Kentucky bluegrass and twice this number of bentgrass selections.

All of these were planted side-by-side, mowed regularly, and observed for several years to determine their appearance and behavior during cold weather and hot, wet, and dry periods. Susceptibility or resistance to
the common insect pests and fungus diseases was determined for each grass.

After several years of testing, a few of the most promising strains were planted in observational nurseries on different soil types all over Peninsular Florida where they were under the professional eye of experienced golf course greenkeepers and park superintendents.

Three fine textured strains of Bermuda were outstandingly superior to all other species under trial and to the remaining 123 selections. These three, which have since become known as the “Velvet Bermudas,” are Everglades 1, Everglades 3, and Ormond.

The “also rans” in these trials included each of the much publicized varieties of Bermuda such as U-3, from Beltsville, Maryland, and Tifton 57, from Georgia.

The U-3 Bermuda is one of a series selected in the vicinity of Washington, D.C., because it was able to survive cold winters in which the ground was frozen. When U-3 was planted alongside the other Bermudas in South Florida, it was surprising to observe that the leaves of this variety were more easily injured by a light frost than on several local selections. There is no relationship between winter hardiness and frost tolerance.

Both U-3 and Tifton 57 are of inferior appearance to the Velvet Bermudas because of the susceptibility of the former to leaf-spot fungi in the humid Florida climate.

Velvet Bermuda is deep rooted while the common, seeded type is shallow-rooted. This deep rooting habit gives the lawn both drought resistance and the ability to continue some growth during cool weather. Although a hard frost will brown this grass, recovery begins at once as nutrients and water move into the root system in the deeper, warmer layer of soil. The golf course people have learned to speed up recovery of Bermuda after frost by spray applications of soluble fertilizer high in nitrogen.

The chinche bug resistance of Velvet Bermuda is the characteristic which has endeared it to dozens of people who have lost their Bitter Blue lawns to these pests.

Another characteristic, not shared by Centipede or Bitter Blue, is the ability of Velvet Bermuda to recover without applications of chemicals after fall armyworms, sod webworms, or fungi have attacked the lawn.

Unfortunately, there is no perfect grass, and Velvet Bermuda is subject to these pests, which are easily controlled by any one of several chemicals when unsightly spots appear in the lawn.

Velvet Bermuda falls short of being an all-purpose grass in two other respects. It grows well only in full sun and should not be planted in shade. Near the seashore it may be periodically browned by salt spray.

For uniformly beautiful appearance, Velvet Bermuda requires more nitrogen than the other lawn grasses, and more air around the roots. It should not be recommended unless the lawn owner is willing to mix the soil ingredients properly before planting.

For deep, healthy, drought resistant root systems with any lawn grass, about equal parts of weed-free muck and marl or clay should be thoroughly mixed with your sandy soils. If neither marl nor clay is available, 100 pounds of colloidal phosphate to each 100 square feet of lawn will act as a fair substitute. On acid soils, the addition of lime, also, will add to the ability of your lawn soil to hold fertilizer and water.

In summary, a ground cover of Velvet Bermuda can be maintained without danger of destruction by insect pests and fungi, even if no chemicals are applied, but the appearance will be variable. But, more than any other species, this grass has the ability to respond to good treatment.

**CHRYSANTHEMUMS BECOME AN IMPORTANT CUT FLOWER CROP IN FLORIDA**

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Any person, who has grown cut flowers in the northern sections of the United States, is only too familiar with the short outdoor growing season of the summer and the long, indoor