



Rhodesgrass

Hector Valenzuela¹ and Jody Smith²

Departments of ¹Tropical Plant and Soil Sciences and ²Natural Resources and Environmental Management

Leeward farmers who want to use a cover crop in their orchards may wish to try rhodesgrass (*Chloris gayana*), a pasture grass from West and South Africa. This sun-loving grass has good drought tolerance, making it a good choice for dry locations. Although seed is hard to come by, it can be established from sprigs and stolons, which grow fairly quickly under good conditions. A rhodesgrass cover can protect topsoil from damaging erosion and reduce weed competition in cash crops. Animals can graze rhodesgrass, providing additional revenue for the farm.

Characteristics

Rhodesgrass is a perennial grass adapted to the subhumid tropics and subtropics. It is stoloniferous and creeping (occasionally tufted). Its stem is fine and leafy and grows 1½–6 ft (0.5–2 m) tall. Its smooth leaves are 6–20 inches (15–50 cm) long and ½–⅓ (3–9 mm) wide. The panicle has 3–20 dense, spikelike floral racemes, each 1½–6 inches (4–15 cm) long; the floral spikelets have 3–4 florets. As a tropical grass with the C-4 type of photosynthesis, like corn and sugarcane, rhodesgrass efficiently uses solar radiation and the available soil moisture to quickly accumulate relatively high amounts of biomass, making it an ideal cover crop to increase soil organic matter content in areas that receive plentiful sunlight.

Environmental requirements

Rhodesgrass grows on a wide range of soils, from clays to sandy loams. It does not fare well on very heavy clays, but it grows well on loose textured soils, such those derived from volcanic ash. The soil pH range for rhodesgrass is between 5.0 and 8.3. Rhodesgrass grows best

Benefits provided by rhodesgrass

EXCELLENT for erosion control and weed suppression

GOOD for quick growth, although establishment may be relatively slow

TOLERATES drought and saline conditions, but not shade

FAIR forage production, nutritional quality, and palatability

USE IN plantation and orchard cropping systems such as macadamia, coffee, and papaya, and as “living sod” in vegetable production

ESTABLISH vegetatively, because seed is difficult to obtain in Hawaii due to quarantine requirements

with an annual rainfall of 24–40 inches (600–1000 mm). An established planting can withstand a dry season of up to six months. This pasture crop responds well to irrigation and is moderately tolerant of flooding, but it is not shade tolerant. It has high salt tolerance and can accumulate large amounts of sodium without harm. In Hawaii, rhodesgrass grows year round at elevations ranging from sea level to 3000 ft, according to the USDA Natural Resources Conservation Service (NRCS).

Cultivars

‘Katambora’, ‘Bell’, and ‘Nemkat’ resist and suppress the reniform nematode. ‘Bell’ and ‘Katambora’ are recommended by the Hawaii NRCS. Seed is generally imported from Australia and is subject to strict phytosanitary inspections. Rhodesgrass seed is difficult to clean, and shipments often do not pass inspection, so seed is currently considered not readily available in Hawaii.

Establishment

Seeding

If seed is available, broadcast a minimum of 40 lb/acre pure live seed, then harrow or roll to obtain a minimal soil cover. A good stand can be obtained by broadcasting seed onto a well prepared field and then leaving the soil undisturbed. Overhead irrigation following sowing will speed up establishment. Soil incorporation can reduce the germination rate, and the seed will not germinate if planted below 1 inch deep. Rhodesgrass seed is very small, light, and fluffy, and thus is difficult to handle.

A conventional way to plant rhodesgrass is to mix the seed with fertilizer (such as 0-8-8) and use a fertilizer spreader to broadcast it. Do not let the mixture stand for more than a day, because the seed can be damaged by the fertilizer salts. Apply as little fertilizer as possible, with its main purpose being to spread the seed. Conventional grain drills or pasture sod-drills have not been effective for planting rhodesgrass. To establish a vigorous stand, apply 50–60 lb/acre N when the seedlings are 4–8 inches tall.

Vegetative establishment

Plant sprigs or stolons at 40–80 bu/ac with a maximum 3 x 3 ft spacing. Establishment is most successful in a well prepared seedbed. The areas to be planted must be moist and irrigated, as the sprigs and newly established plants are susceptible to drought. Because initial growth and establishment of direct-seeded rhodesgrass is slow compared to faster growing grasses like oats or sorghum, it is important to select relatively weed-free fields. Some weed control will be required initially, before full ground cover is achieved.

Uses

Weed control

After rhodesgrass is fully established, its vigorous growth readily outcompetes and smothers most weeds. Its mat-like habit makes it useful for reduced-chemical or nonchemical weed management strategies. Plantings at CTAHR’s low elevation Waimanalo Research Station on Oahu (Table 1), demonstrated that with proper field management, a healthy stand of rhodesgrass can provide as effective and lasting weed control as several other cover crops. These demonstrations also showed that rhodesgrass clippings may be effectively used as an organic mulch to protect soil from erosion and suppress weed growth.

Living sod systems

In Hawaii, rhodesgrass has been evaluated in “living sod” systems with vegetables such as zucchini, cabbage, bulb onions, and eggplant. In a living sod system, cover crops are grown to suppress weed growth between rows of cash crops. The living sod reduces splashing of soil onto the companion crops, and farmers may experience less foliar and fruit disease and improved crop quality. Further benefits of living sod may include increased soil organic matter, creation of a beneficial insect habitat, erosion prevention, wind protection, better surface traction for equipment, and moisture conservation; cooler soil temperature beneath the mulch may promote soil microbial activity, improved water infiltration, and an overall better environment for root growth of the companion cash crop.

Herbicide trials conducted by CTAHR researchers have determined the proper rates needed to slow down the growth of rhodesgrass without killing it, which helps minimize its competition with the companion cash crop. On organic farms, where herbicides are not used, the growth of rhodesgrass can be manipulated by mowing or through other mechanical means.

Erosion control and soil quality improvement

Rhodesgrass is excellent for soil conservation, holding valuable topsoil on sloping fields. Significant soil qual-

Table 1. Weed control in cover crops at the Waimanalo Research Station. In Planting 1, covers were grown for 2 months, then mown and left on the surface as mulch.

	Planting 1		Planting 2	
	Weed % 2 mo after:		Follow-up planting	
	Sowing	Mowing	Age	Weed %
Bare ground	90	63		
Rhodesgrass	6	19	12 mo	<1
'Colt' canola	15	31		
Cowpea	1	39		
'Dwarf Essex' rape	9	70		
'Sudax'	2	2.5	12 mo	15
Common vetch + rye			4 wk	16
Hairy vetch + rye			4 wk	<1
Rye				6
Annual ryegrass			3 mo	2

ity benefits from using permanent cover crops such as rhodesgrass include improved soil structure, better water infiltration rates, lower soil temperatures during summer, and increased water-holding capacity. Yield of a summer (June 23) planting at the Waimanalo Research Station was about 25,000 lb/acre fresh weight 8 weeks after planting, when the plants were about 45 inches tall.

Rotational grazing

Rhodesgrass is considered a pasture grass and produces high quality herbage during the initial growth stages, but forage quality declines rapidly as the crop ages. Rhodesgrass pasture produces less liveweight gain per acre than some other tropical grasses, but planting it with legumes can result in better animal production.

Grass-legume mixtures

Crop diversification is a vital strategy for improving the sustainability of farms. Careful intercropping can minimize pest damage and maximize each plant's strengths.

Carefully selected grass-legume combinations can improve soil quality and nutrient levels as well as increase herbage quality in rotational grazing systems. Rhodesgrass grows well with a wide range of legumes, including stylo (*Stylosanthes guianenses*), cowpea (*Vigna unguiculata*), alfalfa (*Medicago sativa*), phasey bean (*Macroptilium lathyroides*), siratro (*M. atropurpureum*), and *Lotononis bainesii*.

Cover crop maintenance

Rhodesgrass responds well to N fertilizer after a basic pre-plant phosphorus application.

Management cautions

If seed is not available, the initial cost of vegetative establishment of rhodesgrass is high due to the labor cost. Rhodesgrass is not suitable for shaded conditions. Rhodesgrass seed will not germinate when planted be-



Sustainable Agriculture in Hawaii . . .

. . . integrates three main goals—environmental health, economic profitability, and social and economic equity. Sustainable farms differ from conventional ones in that they rely more on management practices such as crop diversification and crop rotation, agroforestry, integrated pest management, rotational grazing, and innovative marketing strategies. For further information on Sustainable Agriculture in Hawaii, contact:

Dr. Richard Bowen,
Hawaii SARE Program Coordinator
phone (808) 956-8708
e-mail: <rbowen@hawaii.edu>
<<http://www.ctahr.hawaii.edu/sustainag/>>

low a depth of 1 inch, so broadcast application or row planting without soil incorporation is recommended. When used as a pasture, rhodesgrass requires intensive management, including annual fertilizer applications and controlled, rotational grazing, otherwise the crop will thin out and be lost.

Pest problems

‘Katambora’ and ‘Nemkat’ are resistant to reniform nematode (*Rotylenchulus reniformis*). ‘Nzoia’ can experience major damage from *Helminthosporium* spp., causing dieback of leaves and shoot bases. ‘Masaba’ suffers from the smut *Fusarium gramineum*, which causes seed loss in wet years. Rhodesgrass is susceptible to root-knot nematode, an important pest of many vegetable and fruit crops. Other pests that attack or that multiply in rhodesgrass stands include armyworms, the lesser corn stalk borer, grass loopers, rodents, and mites.

For assistance:

Contact your nearest Cooperative Extension Service office for additional assistance in selecting appropriate cover crops and green manures for your farm and cropping situation. Help can also be obtained from the USDA Natural Resources Conservation Service field offices located on each island.

Visit CTAHR’s Sustainable Agriculture for Hawaii Program Website at <<http://www.ctahr.hawaii.edu/sustainag>> to find additional information about green manure and cover crops. The site also includes references and links to other useful on-line resources.