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Stargrass for Forage

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Stargrass is a native of tropical Central Africa. Its scientific name is *Cynodon aethiopicus* W.D. Clayton and J.R. Harlan; synonyms are *C. nlemfuensis* Vanderyst and *C. plectostachyus* (K.Schum.) Pilger. Vegetative material was introduced from Kenya to Puerto Rico in 1957. Puerto Rican selections were introduced into Florida in 1972 for further evaluations and distributed in the Florida and Southwestern U.S. The exact date of introduction into Hawaii is not known, but Bishop Museum records document *C. aethiopicus* on Oahu in 1945 and on Hawaii in 1962.

Description

Stargrass is a robust perennial that spreads by long, above-ground stolons. The leaf sheaths and both surfaces of the leaves are hairy. The flowering head is topped by a whorl of four to six seed spikes. Few viable seeds are produced. The stems and flower are light red to purple, and the leaves are a dark green-purple blend.

Adapted environment

Stargrass is not widely distributed in Hawaii, but it has the potential to be a productive forage in a wide range of environmental zones and soil types. As with other *Cynodon* species, stargrass grows from sea level to more than 3000 feet elevation in areas having rainfall of a minimum 15 inches to more than 80 inches.

Cultivars in Hawaii

The most predominant variety in Hawaii is 'Florico', more commonly referred to as "Puerto Rican stargrass." 'South Point' stargrass is another cultivar, limited at present to its geographic location on the island of Hawaii.

Establishment

Stargrass is propagated only by vegetative means, by sprigging mature stem and stolon pieces at a rate of 1000–1500 pounds of planting material per acre. The propagules can be planted by hand or scattered and disked into the soil. The field should be well prepared, and growing conditions at the time of sprigging should be favorable.

Management

Tropical pasture grasses in Hawaii are most productive during warm seasons and at lower elevations, and stargrass is no different. Stargrass cannot withstand continuous heavy grazing. Maintaining a vigorous sward requires grazing rotations of 28–42 days during the spring and summer growing seasons and withdrawing livestock in time to obtain higher levels of pasture residual (stubble height) for the regrowth period. Longer rest periods are required during cool seasons and at higher elevations. One concern with stargrass is its potential for high hydrocyanic acid content, which occurs within the first 4-week regrowth period following heavy applications of nitrogen fertilizer (>100 lb/A).

Fieldwork in Hawaii

Field plots (10 x 100 ft) were established at three CTAHR research stations (Mealani, Waiakea, and Waimanalo). The plots were harvested at regrowth intervals of 4, 8, and 12 weeks at each of the three locations. A "maintenance" level of fertilizer was applied, consisting of 2.25 lb of urea and 2.1 lb of muriate of potash per plot every 3 months (equivalent to 390 lb of urea and 365 lb of muriate of potash per acre per year). Testing the soil before any fertilizer application is strongly recommended.

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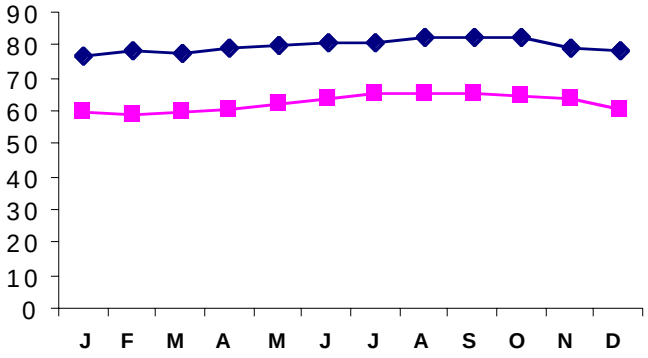
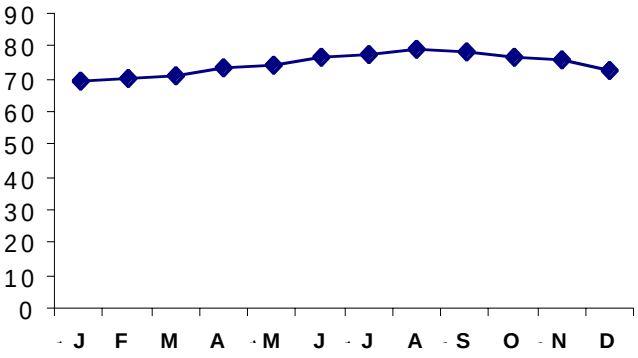
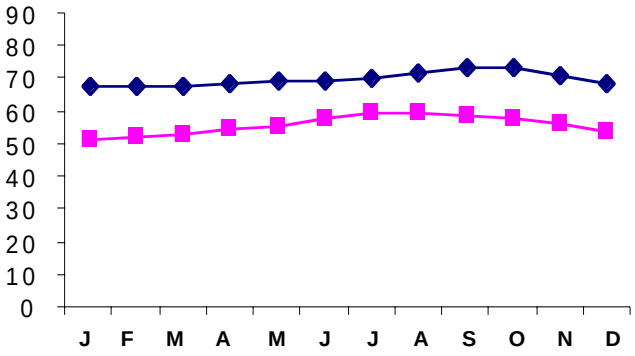
Average maximum and minimum temperatures (°F) at Waiakea Research Station, 1988–1994.



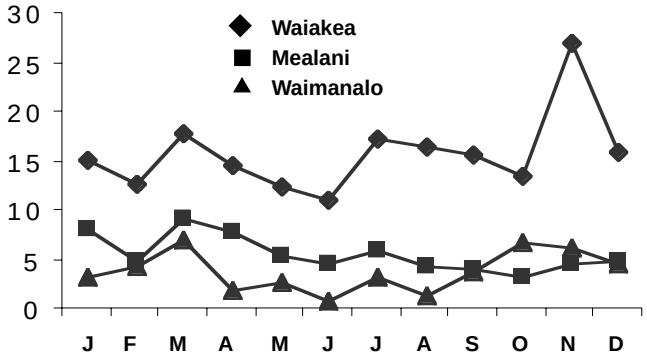
Average temperatures (°F) at Waimanalo Research Station, 1991–1994.



Average maximum and minimum temperatures (°F) at Mealani Research Station, 1988–1994.



Average monthly rainfall at three CTAHR research stations, 1991–1994.



Yield data for the three sites are shown in Table 1. The harvested forages were sent to CTAHR's Agriculture Diagnostic Service Center for tissue analyses, and those data are shown in Table 2.

Resistance to the yellow sugarcane aphid

More than 250 grasses were screened and scored on a 10-point scale, (0 = no damage, 9 = plant death) to evaluate tolerance of the yellow sugarcane aphid, *Sipha flava* Forbes. A resistance score was established for each grass tested. Two stargrasses were tested and found susceptible to aphid feeding damage; the scores were Puerto Rican stargrass 5.24 ± 0.50, and 'South Point' stargrass 5.27 ± 0.38 (mean ± standard error).

Acknowledgments

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References

Alderson, J., and W. Curtis Sharp. 1995. Grass varieties in the United States. U.S. Department of Agriculture. CRC Press, Inc., Baca Raton, FL.

Mislevy, P., W.F. Brown, R. Caro-Costas, J. Vincente-Chandler, L.S. Dunavin, D.W. Hall. R.S. Kalmbacher, A.J. Overman, O.C. Ruelke, R.M. Sonoda, A. Sotomayor-Rios, R.L. Stanley, Jr. and M.J. Williams. 1989. Florico stargrass. Florida Coop. Ext. Serv., Inst. of Food and Agricultural Sci., University of Florida, Circular S-361.

USDA, NRCS. 2002. The PLANTS Database, Version 3.5 (http://plants.usda.gov) National Plant Data Center, Baton Rouge, LA 70874-4490, USA.

Table 1. Yield of stargrass (lb/acre) in three locations at three regrowth periods (means of 39 samples ± standard error.)

Location	4-week	8-week	12-week
Mealani	$464.7^{a} \pm 76.9$	$1169.9^{a} \pm 154.6$	$2296.9^{a} \pm 223.2$
Waiakea	$687.7^{b} \pm 75.4$	$2206.3^{b} \pm 196.2$	$3891.0^{b} \pm 284.6$
Waimanalo	$1507.4^{c} \pm 176.2$	$3425.2^{c} \pm 356.9$	$4666.1^{c} \pm 308.4$

Means within columns with different superscripts are significantly different (P<0.01).

Table 2. Nutrient composition (%)of stargrass at different stages of growth.

Stage	Dry matter	Crude protein	NDF	ADF	P	K	Ca
Mean ± standard error							
4 wks	25.5 ± 2.50	12.8 ± 0.90	70.1 ± 0.46	33.4 ± 0.58	0.24 ± 0.03	1.78 ± 0.20	0.45 ± 0.02
8 wks	31.2 ± 1.39	8.2 ± 0.96	75.5 ± 0.63	37.1 ± 0.77	0.15 ± 0.01	1.04 ± 0.19	0.36 ± 0.02
12 wks	32.6 ± 1.52	5.6 ± 0.75	77.0 ± 0.48	39.7 ± 0.71	0.13 ± 0.01	1.18 ± 0.24	0.38 ± 0.03
Maximum-minimum values							
4 wks	18.9-34.6	6.8-17.9	66.7-76.4	29.0-38.0	0.17-0.13	1.17-2.29	0.38-0.52
8 wks	25.5-38.4	5.4-17.8	68.8-81.2	30.5-43.9	0.12-0.19	0.34-1.98	0.30-0.48
12 wks	28.7-38.2	2.5-11.0	72.1-82.3	32.7-47.1	0.11-0.17	0.46-1.80	0.26-0.47

NDF = neutral detergent fiber; ADF = acid detergent fiber; P = phosphorus; K = potassium; Ca = calcium