

# Rhodes grass from Africa is alternative forage crop

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By Padma Nagappan



Rhodes grass grows very well in the saline soil and high temperatures of the Imperial Valley.

Photo/University of California

Rhodes grass is native to Africa, and widespread in tropical and subtropical countries, where it's grown as a forage crop. Now it's being adopted by farmers in Imperial County, after a successful field trial proved its potential.

Oli Bachie, an agronomist with University of California Cooperative Extension and county director for Imperial County, was approached by Selected Seeds, an Australian company, to test Rhodes grass in the low desert. He conducted a trial for two-and-a-half years starting in 2015, on about a fifth of an acre.

"We thought it may thrive in the climate of the low desert and work well as animal feed, and be a solid new forage crop," Bachie said.

Since Imperial County has saline soil, he tested Rhodes grass and found it had high tolerance for salinity. It withstood competition from weeds by establishing itself quickly and outpacing weed growth. It also proved to be tolerant to nematodes, the microscopic parasites referred to as roundworms by some, which attack the roots of vegetable crops like carrots and can hurt alfalfa.

Bachie tested two varieties of Rhodes grass, Gulfcut and Reclaimer, both classified as *chloris gayana* or *chloris abyssinica*, for adaptability to the low desert and for yield and nutrient composition.

"It's definitely very adaptable for the low desert. It survived, worked well and produced good nutrient biomass. In the first year, we harvested it six times," he said.

The two varieties produced 18 tons to 19 tons per acre in the first year. In the second year, he did only four cuttings, which resulted in about 10 tons per acre on average for both varieties.

The frequency of harvest is constant, but because of the funding considerations for his trial, he had not finished the cycle of cuttings for the second year when he had to collect data.

"The crop is perennial, so it does decline over time, which is normal," he explained.

When compared to the data for other forage crops that was put out by the Imperial County crop and livestock report, alfalfa had a yield of 7.19 tons per acre, Bermuda grass had 7.9 tons per acre and Klein grass had 10 tons per acre.

In terms of nutrition, there was no difference in the biomass and nutrition composition for either variety of Rhodes grass. Bachie said he analyzed crude protein percentage for the first three cuttings and both varieties averaged 12 to 14 percent.

In comparison, alfalfa has about 17 to 29 percent crude protein, depending on when it is cut. Growers decide based on buyer demand for alfalfa—if cattle ranchers want more biomass, they grow alfalfa for longer, but if they want higher protein content, they harvest it sooner.

Bachie said Rhodes grass is well suited as horse feed, and it's also an excellent fit for livestock.

"So yield is better for Rhodes grass, but protein is better for alfalfa, which is not a grass; it's a leguminous crop like beans and peas that have high protein content," he said.

When compared to other forage crops, Bermuda grass has about 8 to 12 percent crude protein, and corn silage has about 6 to 9 percent protein. Bachie used data from the county agricultural commissioner's office for all other crop comparisons, and only analyzed Rhodes grass for nutrition and biomass as part of his trial.

Grasses are classified into categories like C3 and C4, depending on the number of carbon molecules in their composition that plants use to capture carbon dioxide for photosynthesis.

All species have the primitive C3 pathway with three carbon molecules, while C4 is additionally present in the more evolved species. C3 crops are suitable for cold weather and wet or dry environments, while C4 crops are more suited for warm or hot weather with moist or dry conditions.

Rhodes grass is a C4 grass, which gives it an advantage over C3 crops like alfalfa. When the temperature gets too hot on a given day, a C4 crop can actually shut off the stomata through which the plants breathe, so it

stops transpiring and therefore doesn't lose water. The extra carbon molecule enables it to dissociate and continue photosynthesis internally.

"This makes Rhodes grass an efficient water user, because it can photosynthesize for the whole day without losing water, compared to C3 crops like alfalfa," Bachie said.

However, his recently completed trial did not include measuring water use, which he hopes will be possible in a future, longer trial. He also plans to measure cost of production in the future, so he can develop a crop guideline for Rhodes grass. UC produces crop guidelines that include the recommended water pressure, amount of irrigation water, and costs, but this trial did not have sufficient resources to collect all of that information.

Rhodes grass produces stolons, or horizontal connections that take root along its length to form new plants. It is tufted and clustered and stands like rhizomes, so once it germinates and establishes itself, it covers the land and competes effectively against weeds, which makes Rhodes grass highly productive.

Bachie noted that it germinates within seven days and covers the whole area within three months of planting. At maturity, the plant stands about two to four feet tall.

There were no problems with pests in his trial, because it's still a very new crop for the low desert, and pests have not specialized in it.

"What makes it a successful story is that it's already been adapted by two commercial growers in Imperial Valley, because its advantages have been clearly understood," he said.

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