Sour Paspalum -

Tropical Weed or Forage?

ALAN A. BEETLE

Highlight: Where carpetgrass (Axonopus compressus) will grow, sour paspalum (Paspalum conjugatum) has no place and is probably a sign of poor management. However, in areas of poor or sour soils, in shade and in times of drought, sour paspalum comes into its own throughout the tropics as a valuable component of the total forage resource.

Paspalum is a rather large genus "numbering nearly 400" species (Chase, 1929).

Sour paspalum (Paspalum conjugatum) stands by itself in this genus as suggested by Chase (1929) who created for it, alone, the Section Conjugata (Fig. 1). Its most unusual character is the vigorously stoloniferous habit allowing, at times, for a rapidly formed perennial ground cover.

Sour paspalum has been assumed to be native where it occurs in the Americas, from Florida to Texas and southward to Peru, Bolivia, and northern Argentina, from sea level to 4,000 ft elevation. The grass was first described from a specimen collected in Surinam (Dutch Guiana).

Sour paspalum has been assumed, however, to be introduced wherever it occurs in the Old World tropics (Fig. 2) and Pacific Islands. The early trade routes were between Australia, Singapore, and Africa. Probably both carpetgrass (Axonopus compressus) and sour paspalum, being of similar distribution and ecology, were spread at the same time to the same places.

Where there are cognate forms of plant names (as with tea or coffee or guineagrass) the plant has been spread along the route of commerce. Within Gabon, cognate forms are used from tribe to tribe for this grass (gesinga, esinga, gisinga, bissinda, isinga, Nkakatsitsinga, singa). There does not seem to be a parallel between any of the continents or between other countries.

suggests a grass common near dwellings, that sour paspalum is easily recognized, and also is somewhat useful, or there would be no need to give it a common name. Following is an alphabetical list of common names used for sour paspalum with the country of origin for each:

Worldwide, the variety and abundance of common names

Bissinda (Gabon), bitter grass (Philippines), camalote de antena (Mexico), cañamazo (Cuba), cañamazo hembro (Cuba), cañamazo amargo (Cuba), capim amargoso (Brazil), capim marreca (Brazil), capim papuão (Brazil), carabao grass (Philippines), cintillo (Peru), cô dang (Indochina), calapé (Philippines), djuba-gové (Gabon), ésinga (Gabon), gamalote (Costa Rica), gésinga (Gabon), gisinga (Gabon), grama de antena



Fig. 1. Paspalum conjugatum. Spikelets ×5. This plant is drawn from Mexican material and represents var. conjugatum. (Original drawing by Clayton Marlow.)

The author is professor of range management, Plant Science Division, University of Wyoming, Laramie. The research is published with approval of the director, Wyoming Agricultural Experiment Station, as Journal Article 631.

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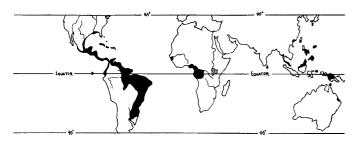


Fig. 2. Worldwide distribution of sour paspalum.

(Mexico), grama froquilha (Brazil), guépico (Argentina), herbé creole (Seychelles Islands), hilo grass (Hawaii), horquetilla (Puerto Rico), horquetilla blanca (Puerto Rico), isinga (Gabon), mauuhilo (Hawaii), mauu malahini (Hawaii), Nkakatsitsinga (Gabon), niga-gusa (Hawaii), obur (Gabon), ogasawara-suzumenohie (Japan), olala (Gabon), pata de gallina (Columbia and Peru), papuão (Brazil), reh-n-wai (Ponape), singa (Gabon), sourgrass (British West Indies), sour paspalum (USA) suzume-no-naga-bie (Japan), tarurco (Peru), Torurco (Columbia and Peru), Torvará (Costa Rica), Utodu-a-mboka (Gabon), z'herbe sûre (Haiti).

Ecology

As with many range plants, there is no way to fit sour paspalum into one ecological niche. This grass may appear in communities which are (1) successional, (2) disclimax, or (3) climax. In each of these cases the management approach to sour paspalum may be quite different.

Successional

In the American tropics the abandoment of cultivated land may lead to a number of relatively rapid changes in the plant cover. Immediately preceding or concurrent with the last harvest will be a cover of annual grass such as junglerice barnyardgrass (Echinochloa colonum), common goosegrass (Eleusine indica), southern sandbur (Cenchrus echinatus), feather lovegrass (Eragrostis amabilis), or swollen chloris (Chloris barbata), followed by stoloniferous grasses such as sour paspalum, molasses grass (Melinis minutiflora), and carpetgrass, which in turn are succeeded by rhizomatous grasses such as bahiagrass (Paspalum notatum), dallisgrass (Paspalum dilatatum), cogon satintail (Imperata cylindrica), West Indies smutgrass (Sporobolus indicus), and St. Augustinegrass (Stenotaphrum secundataum).

Fruits cling easily to any surface because of the ciliate margins of the glume and lemma within which they are closely wrapped. Thus this species spreads rapidly and soon appears after any soil disturbance in the tropics.

Because both carpetgrass and bahiagrass are more palatable than sour paspalum, grazing management may tend to emphasize the sour paspalum stage. It is this role that sour paspalum plays in succession following cultivation that leads to its being referred to as a "common weed." Even without grazing, the sour paspalum stage between annuals and rhizomatous perennials may last for a period of several years.

Disclimax

The fact that sour paspalum is less palatable than other grasses enables it to crowd them out. Livestock eat sour

paspalum only when it is kept closely cropped, or when it is grazed prior to flowering. It has been reported (McClelland, 1915) that when the heavy growth produced during rainy seasons is eaten in quantity it disturbs the digestion of cattle.

The management of this grass may involve burning or mowing to keep the more palatable young growth available.

If the area is a true disclimax, then proper grazing will allow for the recovery and dominance of dallisgrass, or other climax grasses.

Climax

In rainy seasons sour paspalum makes a heavy growth on poor soils or sour (acid) soil and especially under shade. This seems to be the true climax position of sour paspalum where it is not the dominant of the community but nevertheless a conspicuous and integral part of the understory of moist, tropical savannas.

Uses

Forage

The experience in Puerto Rico summarized by Alberts and Garcia-M. (1943) appears to be typical of the use of sour paspalum for forage. Sour paspalum "is never seeded or planted because its palatability is low—cattle prefer most other common grasses to cintillo. If animals are placed in fields that contain a predominance of this species of grass they graze such other more palatable species as may be available first, and then when they become hungry they take cintillo. Where the stand consists entirely of this species, cattle will graze it in patches. They will return again to these patches to graze the fresh green herbage that has developed and let the ungrazed area go to seed. Animals will eat the plants before they have formed the inflorescences but after that time they shun them." According to Whyte et al. (1959) "seeds tend to stick in the throats of livestock and choke the animals."

The following table compares the published chemical analyses (%) for sour paspalum, the first and earliest being on a dry matter basis.

	N free					
	Protein	Fat	extract	Ash	Lime	Moisture
McClelland, 1915	4.71	2.30	54.39	8.25	0.26	79.47
Pepa, 1927	2.46	0.92	8.51	2.47		79.47
Suratos, 1933	1.78	0.68	11.38	3.10		76.12
Avila de Araujo, 1943	2.46	0.60	5.98	1.15		86.76

Because the protein content of sour paspalum is only about half that which one might except from such northern grasses as perennial ryegrass (Lolium perenne) or orchardgrass (Dactylis glomerata), and because sour paspalum is less palatable than most other grasses when it occurs in mixtures, it has a poor reputation as a forage grass.

While it would appear on the surface that light applications of nitrogen fertilizer would greatly increase both the palatability and the productivity of this grass, no reports of fertilizer application have been found in the literature.

Golf Grounds

From Florida to Texas and in the West Indies, sour paspalum may make an excellent fairway cover if the moisture conditions are good and this cover can easily be maintained by regular mowing. Here it may be compared in color and texture to carpetgrass. However, this grass has a tendency to invade putting greens where it is not desirable.

Plantation Cover

Because of its shade tolerance and aggressive nature, sour paspalum makes a natural (self-establishing and self-perpetuating) and uniform cover for plantations. Plantations where such stands have been found include abaca (Musa textilis), palm savanna (Acrocomia sclerocarpa), rubber (Hevea brasiliensis), banana (Musa paradisiaca), and coconut (Cocos nucifera). After cultivation this cover may appear naturally, but if desired a stand may be obtained by planting vegetative cuttings.

Taxonomy

Key to Variations

Racemes two, conjugate

Spikelets 1.2-1.4 mm long, leaves usually glabrous

Paspalum conjugatum var. parviflorum

Spiklets more than 1.4 mm long

Spiklets 1.5-1.8 mm long, leaves ciliate or sparsely pubescent, mostly on the upper surface

Paspalum conjugatum var. conjugatum

Spiklets of 1.9-2.2 mm long, leaves conspicuously pubescent on both surfaces

Paspalum conjugatum var. pubescens

Racemes three, two conjugate, a third below

Paspalum conjugatum f. tristachya

Paspalum conjugatum Bergius apud Swartz var. conjugatum

A stoloniferous perennial from extensively creeping, leafy stems, the culms up to 2m long and rooting at the nodes, frequently purple below, commonly forming a dense ground cover but not a sod or turf.

Culms geniculately ascending or suberect when flowering, 20 to 50 cm tall (rarely to 1 m tall), simple or sparingly branched, the nodes on the stolons usually conspicuously pilose, the others pubescent to glabrous, the internodes 1-15 cm long, compressed, wiry, glabrous.

Sheaths loose, compressed, ciliate on the margin, often pubescent on the collar, otherwise glabrous, those of the stolons short and broad, the ligule 1-1.5 mm long, membranaceous, with a dense line of hairs 1-2 mm long behind it, the blades flat, rather thin, 5-22 cm long, 15 mm wide slightly narrowed at the base, usually with a tuft of long hairs at the very base, the margin scabrous to short-ciliate, otherwise glabrous or sparsely papillose-pubescent on the upper or both surfaces. Racemes 2, widely divaricate, 8-12 cm long pared, often arcuate, slender, 4 to 15 cm long, rachis narrowly winged, about 0.8 mm wide, densely pubescent at the base.

Spikelets 1.4 to 1.8 mm long, 1-1.2 mm wide, ovate, pale yellow, the margin conspicuously ciliate-fringed, solitary, imbricate, flattened, concave-convex, subacute to abruptly apiculate, the pedicels flat. First glume wanting, the second glume and sterile lemma equal, very thin and closely appressed to the fruit, 2-nerved, the midnerves suppressed, the nerves of the glume papillose-ciliate with long fine hairs forming a delicate fringed margin to the spikelet, both glumes otherwise glabrous.

Lodicules 2, M shaped above; anthers 3, yellow, ca. 0.3 mm long; stigmas 2, white and feathery; about 1.5 mm long, pale, not strongly indurate.

Paspalum conjugatum var. pubescens Doell

A larger, coarser plant with heavily pubescent leaves on

both surfaces, blades commonly 15 to 20 cm, occasionally 25 cm long; racemes commonly 10 to 15 and occasionally as much as 20 cm long; spikelets 1.7-2.2 mm long, rather more copiously ciliate than usual in the species. Distributed from Mexico to Brazil.

Paspalum conjugatum f. tristachya (Vanderz) Beetle

This plant is similar to var. conjugatum except for the occasional third raceme. Rare in both Africa and South America, and recently collected in Mexico.

Paspalum conjugatum var. parvilorum Doell

Except for the small spikelets 1.5-1.6 mm long this plant is little different from var. *conjugatum*. However, the whole plant is nearly glabrous. Distributed from Florida to Uruguay and Bolivia; Hawaii, Malaysia.

Cytology

A diploid number of 40 is the only one reported for sour paspalum, and this has been confirmed by Delay (1950), Janaki Amal, E. K. as reported by Darlington and Wylie (1955), Senaratna (1956), Bor (1960), Larsen (1963), the material from Thailand, Tateoka (1965) the material from Uganda, Pohl and Davidse (1971) the material from Costa Rica. According to Juliano and Aldama, (1937, citing Schnarf, 1929) successive divisions of the microspore mother cells are the rule as is typical of most species in the Gramineae.

Conclusion

Sour paspalum is a variable grass in size and morphology. It has unusual and desirable characteristics such as its stoloniferous vigor. This grass could become increasingly useful if management can avoid its undesirable characteristics.

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