Trifolium spp. African perennial

Scientific name

Trifolium burchellianum Ser.

Subordinate taxa:

Trifolium burchellianum Ser. subsp. *burchellianum*;

Trifolium burchellianum Ser. subsp. *johnstonii* (Oliv.) J.B. Gillett

Trifolium burchellianum Ser. subsp. *johnstonii* (Oliv.) J.B. Gillett var. *johnstonii*

Trifolium burchellianum Ser. subsp. *johnstonii* (Oliv.) J.B. Gillett var. *oblongum* J.B. Gillett

Trifolium semipilosum Fresen.

Subordinate taxa:

Trifolium semipilosum Fresen. var. *brunellii* Thulin

Trifolium semipilosum Fresen. var. *glabrescens* J.B. Gillett

Trifolium semipilosum Fresen. var. *intermedium* Thulin

Trifolium semipilosum Fresen. var. *semipilosum*

Synonyms

***Trifolium burchellianum* Ser. subsp. *johnstonii* (Oliv.) J.B. Gillett var. *johnstonii*:** *Trifolium basileianum* Chiov.; *Trifolium johnstonii* Oliv.

***Trifolium semipilosum* var. *semipilosum*:** *Trifolium semipilosum* Fresen. var. *kilimanjaricum* Baker f.

Family/tribe

Family: *Fabaceae* (alt. Leguminosae) subfamily: *Faboideae* tribe: *Trifolieae*.

Morphological description

***T. burchellianum*:** Herbaceous stoloniferous/rhizomatous, tap rooted perennial. Stems glabrous or glabrate, prostrate (sometimes ascending to 60 cm) developing nodal roots. Leaves glabrous or nearly so, trifoliolate on long petioles; leaflets cuneate-obovate, cuneate-oblong or cuneate-elliptic, less often oblong, emarginate (sometimes truncate or rounded) at the apex, 2.5–5.0 × 1.9 cm, margin serrulate to denticulate. Inflorescence many-flowered, globose capitulum, 1.5–3 cm across; peduncle longer than the subtending leaf, pilose towards the top; pedicels stout, 2–2.5 mm long, erect in fruit, glabrous; calyx glabrous except for a few hairs at the margin; corolla purple (rarely white), standard 8–13 mm long. Pod ± 5 mm long, 3 mm wide; 1–2-seeded. Seeds dark brown, irregularly oval, approximately 2.1 × 1.8 mm; c. 700,000

T. burchellianum an herbaceous stoloniferous/rhizomatous, tap rooted perennial (APG 63666)

T. burchellianum inflorescences (APG 63665)

Floriferous sward of *T. burchellianum* (APG 63665)

T. burchellianum inflorescence a globose capitulum

T. burchellianum seedhead a cluster of ripe pods

T. burchellianum pod and seed

T. burchellianum seeds

T. semipilosum with *Paspalum dilatatum*; prominent silver splash on leaflet midrib (CPI 27218/cv. Safari)

T. semipilosum pilose lower half of underside of lateral leaflet; hairy petiole, no leaf marking

T. semipilosum purple or brownish crescent across the leaflet also found

T. semipilosum with *Axonopus fissifolius*. Peduncle mostly longer than surrounding petioles.

T. semipilosum inflorescence comprising few to many flowers in globose capitulum

seeds per kg. Subsp. *johnstonii* has larger flowers and leaflets than subsp. *burchellianum*. Var. *oblongum* has stout ascending stems, becoming almost woody, up to 3 mm thick, and up to 1 m high.

***T. semipilosum*:** Herbaceous, stoloniferous perennial, initially prostrate with pilose stems of ca. 2 mm diameter radiating from the crown and taproot, rooting freely at the nodes and forming dense mats; stem apices ascend through taller grass to about 45 cm. Leaves trifoliolate; leaflets orbicular, elliptical, or oblong to cuneate-obovate 0.4–2.4 cm long and 0.4–2 cm wide; glabrous above, sometimes with leaf markings of silver splash on the midrib and/or purple or brownish crescent across the leaflet; pilose at the margins and on the midrib beneath and also on the undersides of the lower (outer) half of the lateral leaflets (except sometimes in var. *glabrescens*); petiole pilose, usually 12–18 cm long depending on defoliation pressure. Inflorescence globose, approximately 2 cm across, comprising 4–40 flowers, on pilose peduncles, mostly longer than the petiole; papilionate flowers white to pale pink (sometimes purple-red), 8–10 mm long. Pods oblongoid, 5–6 mm long and 2–2.5 mm wide, containing 2–6 seeds. Seeds irregularly discoid or mango-shaped, approximately 1.5 mm across, dull yellow, light brown, olive grey or even black in colour, often mottled. 0.7 to 1 million seeds/kg. Readily distinguished from *Trifolium repens* which has glabrous leaves and stems, yellow to golden seeds, and an average of 1–1.7 million seeds/kg. *T. repens* also competes for light with associated grasses by elongation of the petiole and, although this also occurs in *T. semipilosum*, it is primarily achieved by ascending stems. Var. *glabrescens* differs in having more obovate-emarginate leaflets with larger, sharper teeth on the margin and with a few hairs only on the midrib beneath.

T. semipilosum seed head a cluster of ripe pods

T. semipilosum pods and seeds

Seeds

T. semipilosum line illustration

T. semipilosum pasture, south-east Queensland Australia (cv. Safari)

T. semipilosum pasture in humid upland tropics, north Queensland Australia (cv. Safari)

Common names

***T. burchellianum*:**

Africa: moqophi, moroko (Sesotho, Lesotho), usithathi (Zulu), wildeklawer (Afrikaans) (ssp. *burchellianum*)

English: African clover, Burchell's clover, cape clover, wild clover (ssp. *burchellianum*); Uganda clover (ssp. *johnstonii*)

***T. semipilosum*:**

English: Kenya clover, Kenya white clover (English)

Europe: trèfle africain, trèfle du Kenya (French); trevo do Quenia (Portuguese)

Distribution

T. burchellianum

Native:

Africa: Angola; Ethiopia (s.); Kenya; Lesotho; South Africa (Cape Province, KwaZulu-Natal); Tanzania; Uganda

T. semipilosum

Native:

Africa: Eritrea; Ethiopia; Kenya; Tanzania; Uganda

Asia: Yemen

Uses/applications

Forage

These species have greatest potential as a permanent component of mixed grass-legume pastures, as an alternative to white clover (*T. repens*) in more intensive systems. *T. semipilosum* is particularly adapted to more acid soils and warmer environments.

Other

These species can also have a role as ornamental/ground cover in moderately shaded situations in the subtropics and upland tropics. *T. burchellianum* is also considered to have medicinal value by tribal people in southern Africa.

Ecology

Soil requirements

T. burchellianum is found on sand, loams and clay loams, mostly with a slightly acid pH ± 6. *T. semipilosum* has been collected in soils with pH ranging from 4.0 to 8.0 (av. 6.0) in Ethiopia, and from 5.4 to 7.0 (av. 6.6) in Kenya and Tanzania. Soil textures at collection sites range from sand through silt, loam and gravely clay loam to clay. 'Safari' is adapted to soils with pH 5.0–7.5. Available soil P levels should be >20 ppm. It has a slightly lower Ca requirement than that *T. repens*, is more tolerant of soluble Al and Mn, but may be more susceptible to Zn deficiency.

Moisture

T. burchellianum grows in moist situations (marshy vleis and riverbanks) in lower rainfall (625–800 mm/yr) coastal lowland subtropics, and in well-drained soils in higher rainfall upland tropics (1,000-2,500 mm/yr). Drought tolerance is fair, but poorer than that of *T. semipilosum* which, although not as drought tolerant as many deeper rooted tropical legumes, can survive lengthy dry periods and is considered more drought tolerant than *T. repens*. Annual rainfall at collection sites of *T. semipilosum* in Ethiopia range from 700 to 1,800 mm (av. 1,070 mm), and from 450 to 2,000 mm (av. 1,070 mm) in Kenya and Tanzania. 'Safari' has been useful in areas with between 800 and 1,600 mm mean annual rainfall. However, 'Safari' is less tolerant of waterlogging than *T. repens*. Flood tolerance is only moderate, being similar to that of *Listia bainesii* and *Grona heterophylla*.

Temperature

T. burchellianum occurs from near sea level to 3,700 m asl (rarely in the alpine zone), and from 34° S to 8° N, in areas with average annual temperatures from about 12 to 20 °C, and which are often subject to frost. *T. burchellianum* is less frost tolerant than *T. repens* but is still not affected by grass temperatures as low as -9 °C. *T. semipilosum* occurs naturally in the high-altitude tropics, from about 1,000 to >3,000 m asl, with average annual temperatures from 16 to 21 °C. In the low altitude subtropics, it has been grown from 25 to 31° latitude. This species has a long growing season, providing moisture is adequate. In the subtropics where there is seasonal demarcation, the main growing seasons are spring/early summer and autumn, with minimal growth in mid-summer and winter. It is less tolerant of frost than *T. repens* but shows more vigorous summer growth. It is discoloured by moderate frosts and cut by heavy frosts, resuming slow growth once frosts cease.

Light

T. burchellianum has moderate shade tolerance, reportedly better than that of *T. repens*, partly by virtue of its ability to grow up to the light when growing in taller grass. Observations suggest that *T. semipilosum* cv. 'Safari' has moderate shade tolerance, although less than that of *T. repens*.

Reproductive development

Flowering response patterns are unclear for *T. burchellianum*. In a controlled environment study, subsp. *burchellianum* proved to be a long day plant, but is influenced by the need for low night temperatures. Subsp. *johnstonii* did not flower in response to any daylength or night temperature treatment. In the field in the subtropics, both subspecies exhibit a similar response, commencing flowering in mid-spring, and continuing through to mid-summer. Quantitative short-day types have been identified. *T. semipilosum* has a quantitative, short-day flowering response, which is enhanced by low night temperatures. In the southern hemisphere lowland subtropics, 'Safari' commences flowering at low density in April, continuing until October, with a peak in August.

Defoliation

Although irregularly distributed in grazed lands in its native range, *T. burchellianum* is common in areas regularly cut as low as 1–3 cm. *T. semipilosum* requires periods of heavy grazing, especially in summer, for persistence. This ensures that stolons stay close to the ground, giving rise to more nodal rooting. Under lenient grazing, growing tips ascend through taller grasses and, with constant stolon turnover, ultimately lose contact with the soil, leading to a decline in the stand. Under intensive defoliation, it can form a low, dense sward. This species, which occurs naturally with *Cenchrus clandestinus*, is not as readily overtopped by taller companion species such as *T. repens*. In the humid subtropics or upland tropics, pastures can be grazed at 5–6 head/ha during the warm season to utilise the companion grass and reduce grass competition to the legume, and at 2–3 head/ha during the cool season to maintain sward structure and optimise production. DM yield of *T. semipilosum* cut at 3.8 cm was 87% greater than when cut at 7.5c m, with only minor impact of cutting interval (4 or 8 weeks).

Fire

No information is available for *T. burchellianum*. Burning in spring usually does little or no harm to *T. semipilosum* and can improve the stand by softening hard seed and increasing seedling regeneration. Soil seed reserves in established stands are often of the order of 5,000–10,000 seeds/m² (~40–80 kg/ha), which gives significant potential for stand replenishment.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

High levels of hard seed are encountered in *T. burchellianum*, sometimes >90%. Mechanical or concentrated acid scarification can be used to improve germination. This species requires a different rhizobium strain (*e.g.* CB 727 in Australia) from those used for *T. repens* or *T. semipilosum*. While establishment is slow, it has been successfully established from late summer to mid-winter. In the absence of firm establishment data, a similar approach to that used for *T. semipilosum* could be used.

For *T. semipilosum* hard seed levels, which are usually high in hand-harvested seed, are generally broken down sufficiently in the harvesting and threshing process to achieve the ideal 25–75% germination rate needed for sowing. It is highly specific in its rhizobial association, requiring strain CB 782 (Australia), CC 2408A (Malawi) or the equivalent of *Rhizobium leguminosarum* bv. *trifolii* for effective nodulation. It is best sown in autumn into a well-prepared, fine, firm, weed-free seedbed, either onto the surface or with minimal soil cover, followed by rolling. This late-season planting results in less competition from warm season grasses during establishment. In the upland tropics, sowing immediately after the start of the wet season is best, minimising grass competition by heavy grazing or mowing once the ground is covered. Sowing rates of 2–3 kg/ha of seed are used. Seedlings and young stands are vigorous, but sometimes suffer setbacks often doubtfully attributed to rugose leaf curl disease. Establishment is slower and less reliable than in *T. repens*.

Fertilizer

T. burchellianum is often found growing in low phosphorus soils. It can still respond to P applications, as does *T. semipilosum*, and the addition of calcium on some very acid soils has been necessary for effective nodulation. *T. semipilosum* can survive in soils of low to moderate fertility, but only thrives in more fertile soils. Annual applications of 10–20 kg/ha P are usually adequate to maintain appropriate levels of available soil P.

Compatibility (with other species)

T. burchellianum combines effectively with other species, particularly lower sward-forming grasses. In the short term, *T. semipilosum* is more able than *T. repens* to coexist with taller tropical grasses, but both are susceptible to prolonged periods of lenient management that is more appropriate for tall grass persistence. It can form stable mixtures with sward-forming species, providing defoliation pressure is maintained.

Companion species

Grasses: *Axonopus fissifolius*, *Bothriochloa pertusa*, *Cenchrus clandestinus*, *Cynodon dactylon*, *Digitaria didactyla*, *Paspalum dilatatum, P. notatum*

Legumes: *T. burchellianum, Lotus uliginosus*, *Trifolium repens*, *T. semipilosum, Vigna parkeri*

Pests and diseases

Stands of *T. semipilosum* can decline due to disease attributed to rugose leaf curl (rlc) disease caused by a phytoplasma, a problem less likely in *T. burchellianum*. However, the symptoms frequently ascribed to rlc, mostly in establishing stands, are not typical of the disease and may well be due to another cause. *T. semipilosum* is susceptible to several viruses although these are not common in the field (alfalfa mosaic virus, and a host-oriented strain of pea mosaic/bean yellow mosaic potyvirus). Root and stolon rots caused by *Pythium* spp. are often present, but largely only become a problem in leniently grazed stands when shoots grow upwards, and the degree of stolon rooting declines. It is also susceptible to *Colletotrichum* spp. but appears to be resistant to clover rust caused by *Uromyces trifolii-repentis* and to clover burn or pepper spot caused by *Leptosphaerulina trifolii* (*Sphaerulina trifolii*). Botrytis head blight (*Botrytis cinerea*) can infect developing pod clusters, particularly during showery weather in spring. Red spider mite (*Tetranychus* spp.) and root knot nematodes (*Meloidogyne* spp.) have been the two main pests of *T. burchellianum* in cultivation in southern Africa. Slugs (Gastropoda) can eat a significant proportion of *T. semipilosum* leaf material, especially after prolonged wet weather. Pygmy crickets also cause leaf damage, while amnemus weevils (*Amnemus quadrituberculatus* Curculionidae) and root knot nematodes (*Meloidogyne* spp.) attack the roots.

Ability to spread

Once established, stolon spread of *T. semipilosum* can be significant. Despite setting large amounts of seed, 'Safari' has shown little tendency to spread beyond the planted area, possibly due to the lack of spread of the specific rhizobium. *T. burchellianum* has failed to naturalise in most areas where it has been introduced.

Weed potential

Neither species has shown much potential for weediness except in cultivation.

Feeding value

Nutritive value

In vitro DM digestibility for both species is slightly lower than for *T. repens* (approx. 70–74% vs. 74–80%) but is still satisfactory. Crude protein levels in DM average around 21–24%, while those of *T. repens* ranged from 23 to 26%; N and P concentrations are also similar to those of *T. repens*. The chemical composition of 'Safari' resembles that of *T. repens*, except that the sodium content is lower (0.05–0.09% vs. 0.15–0.40%). Ca levels may be higher than in *T. repens*, 1.36 vs. 1.03%.

Palatability/acceptability

Both species are highly palatable and well grazed by cattle.

Toxicity

T. burchellianum contains no prussic acid and has a low level of fraction I or 18S protein, a protein which, in high levels, is often associated with the stable foam responsible for bloat. While bloat can occur in cattle grazing *T. semipilosum*, the risks appear to be less than with *T. repens*. There is no evidence of oestrogenic activity, which can result in poor reproductive performance in livestock, associated with some *Trifolium* species.

Production potential

Dry matter

DM yields of 1–2 t/ha have been measured in sown stands of *T. burchellianum*, compared with yields in the 2–5 t/ha range for *T. semipilosum*, each with a similar amount of grass. Annual dry matter yields of up to 8.5 t/ha have been recorded for *T. semipilosum*.

Animal production

While there are no data available for *T. burchellianum,* its persistence under intensive grazing and high nutritive value suggest it can have a significant impact on livestock production despite the apparently modest vegetative production. *T. semipilosum* can produce over 470 kg liveweight gain/ha/yr at a stocking rate of about 2.5 head/ha and has produced higher summer and autumn milk yields in the lowland subtropics than *T. repens*.

Genetics/breeding

Both are out-crossing species.

T. burchellianum subsp. *burchellianum* 2*n* = 6*x* = 48; subsp. *johnstonii* var. *johnstonii* 2*n* = 48, 96; subsp. *johnstonii* var.*oblongum* 2*n* = 48, 96.

T. semipilosum is mostly a diploid spcies (2*n* = 2*x* = 16), although a tetraploid type (2*n* = 4*x* = 32) has been identified (see 'Promising accessions'). *Trifolium semipilosum* var. *glabrescens* cv. Safari is an out-crossing and self-stertile diploid (2*n* = 2*x* = 16). It does not cross with *T. repens* (2*n* = 2*x* = 32).

Seed production

Seed yields of *T. burchellianum* may be as high as 390 kg/ha, varying among ecotypes and averaging from 100–150 kg/ha/yr. Year to year variation can be greater than ecotype differences. *T. semipilosum* requires the presence of honey bees (*Apis mellifera*) for successful pollination and seed production. Crops should be managed to maximise inflorescence density and stolon health. In the southern hemisphere, this can be achieved by keeping the area grazed or mown until around April (subtropics) or July (the upland tropics). Harvest time is not critical since pods do not shatter readily, except under extremely dry conditions. Harvesting methods vary, including collection of material with a forage harvester for threshing through a stationary header, prior windrowing and pick-up threshing with the header or direct heading of the standing crop. Harvested seed needs drying before final cleaning. Yields of up to 400 kg/ha have been recorded from small areas, but commercial yields rarely exceed 200 kg/ha. Two harvests per year are possible under some circumstances.

Herbicide effects

No information available for *T. burchellianum*. Trifluralin can be used for pre-emergence broadleaf weed control in *T. semipilosum*, and 2, 4-DB post-emergence. Although *T. semipilosum* is adversely affected by low rates of glyphosate, it is not killed and gradually recovers.

Strengths

- High quality forage.
- Combine well with many tropical perennial grasses and tolerant of heavy grazing.
- Tolerant of low to moderate fertility soil.
- Moderate drought and heat tolerance.
- Frost tolerant, although sensitive to heavy frosts.

Limitations

- Limited productivity.
- Susceptible to root-knot nematode.
- Persistence and production can be erratic.
- High hard-seed content.
- Require specific inoculum.
- Slow and unreliable establishment.
- Poor winter growth.
- *T. semipilosum* adversely affected by disease (see Pests and Diseases section).

Selected references

Bogdan, A.V. (1956) Indigenous clovers of Kenya. East African Agricultural Journal 22:40–45. doi.org/10.1080/03670074.1956.11665061

Bogdan, A.V. (1977) Tropical Pasture and Fodder Plants. Longman Inc., New York, USA. p. 415–417.

Boonman, J.G. (1993) East Africa's grasses and fodders: Their ecology and husbandry. Springer Netherlands, Dordrecht, the Netherlands. p. 190–216. doi.org/10.1007/978-94-015-8224-7

Cook, B.G. and Shaw, K.A. (1985) Rugose leaf curl in Safari Kenya white clover. Tropical Grasslands 19:3–4. bit.ly/39K8nYA

Cook, B.G., Mulder, J.C. and Powell, B. (1985) A survey to assess the influence of environment and management on frequency, vigour and chemical composition of *Trifolium semipilosum* cv. Safari in south eastern Queensland. Tropical Grasslands 19:49–59. bit.ly/2JAaLq2

Davison, T.M., Frampton, P.J., Orr, W.N., Silver, B.A., Martin, P. and McLachlan. B. (1997) An evaluation of kikuyu-clover pastures as a dairy production system. 1. Pasture and diet. Tropical Grasslands 31:1–14. bit.ly/3bNp2fc

Garden, D.L. (1977) A comparison of African clovers and temperate legumes on the north coast of New South Wales. Tropical Grasslands 11:125–131. bit.ly/3bQ0Fxt

Gillet, J.B. (1971) Trifolieae. In: Milne-Redhead, E. and Polhill, R.M. (eds) Flora of Tropical East Africa. Crown Agents for Overseas Governments and Administrations, London, UK. p. 1027–1028.

Ison, R.L. and Parson, A.E.B. (1992) Comparative growth and development of Kenya clover (*Trifolium semipilosum*) and white clover (*T. repens* cv. Haifa): II. Temperature and daylength effects on flowering. Tropical Grasslands 26:51–57. bit.ly/3bKEM2s

Ison, R.L., Parson, A.E.B. and Jacobs, B.C. (1992) Comparative growth and development of Kenya clover (*Trifolium semipilosum*) and white clover (*T. repens* cv. Haifa): I. Seedling and plant growth. Tropical Grasslands 26:40–50. bit.ly/2UFURAW

Jones, R.J. (1973) The effect of cutting management on the yield, chemical composition and *in vitro* digestibility of *Trifolium semipilosum* grown with *Paspalum dilatatum* in a subtropical environment. Tropical Grasslands 7:277–284. bit.ly/3dRRD4T

Jones, R.M. and Benjamin, A.K. (1992) *Trifolium semipilosum* Fresen. In: Mannetje, L.'t and Jones, R.M. (eds) Plant Resources of South-East Asia No. 4. Forages. Pudoc Scientific Publishers, Wageningen, the Netherlands. p. 226–228. edepot.wur.nl/327785

Jones, R.M. and Cook, B.G. (1981) Agronomy of Kenya White Clover - cultivar Safari. Information Service, Sheet No. 41–3. CSIRO Tropical Crops and Pasture, St Lucia, Australia.

Jones, R.M., Strijdom, B.W. and Theron, E.P. (1974) The indigenous South African clovers (*T. africanum* Ser. and *T. burchellianum* Ser.) and their potential as pasture legumes. Tropical Grasslands 8:7–16. bit.ly/2JCbYwW

Mannetje, L't. (1964) The use of some African clovers as pasture legumes in Queensland. *Australian* Journal of Experimental Agriculture and Animal Husbandry 4:22–25. doi.org/10.1071/EA9640022

Mannetje, L.'t and Pritchard, A.J. (1968) The effects of photoperiod and night temperature on flowering and growth in some African *Trifolium* species. New Phytologist 67:257–263. doi.org/10.1111/j.1469-8137.1968.tb06382.x

Pritchard, A.J. and Mannetje, L't. (1967) The breeding systems and some interspecific relations of a number of African *Trifolium* spp. Euphytica 16:324–329. doi.org/10.1007/BF00028938

Ryding, O. (1991) A study of the variation in *Trifolium burchellianum* ssp. *johnstonii* (Fabaceae). Nordic Journal of Botany 11:317–321. doi.org/10.1111/j.1756-1051.1991.tb01410.x

Stobbs, T.H. (1976) Kenya white clover (*Trifolium semipilosum*) - a promising legume for dairy production in sub-tropical environments. Proceedings of the Australian Society of Animal Production 11:477–480. livestocklibrary.com.au/handle/1234/6905

Wilson, G.P.M. and Bowman, A.M. (1993) *Trifolium* species on the New South Wales north coast: 2. African species. Genetic Resources Communication No. 19. CSIRO Tropical Agriculture, St Lucia, Australia. bit.ly/2WZZHui

Cultivars

T. burchellianum

None known.

T. semipilosum

'Safari' (CPI 27218) Released in Australia (1973). From the Kitale Seed Company, Kenya. Selected to extend warm season production of *Trifolium* spp. in the subtropics, particularly on acid soils. Less affected by a virus akin to bean yellow mosaic virus than other introductions.

'Kabete 4' Released in Kenya (pre-1965). A mixture of four clones selected for vigour and persistence; was available in Kenya, but it is no longer believed to be available.

Promising accessions

T. burchellianum subsp. *burchellianum*

CPI 24132. Selected in Australia. Institutional collection from Langebosch, South Africa.

CPI 22163. Selected in Australia. Institutional collection from Kenya.

T. semipilosum

CPI 57436 (K 6735). Selected in Australia. Institutional collection from Kenya. Tetraploid, morphologically more robust than 'Safari', but agronomically similar.