

Tropical Forages

Indigofera schimperi

Scientific name



Indigofera schimperi Jaub. & Spach

Subordinate taxa:

Indigofera schimperi Jaub. & Spach var. *baukeana* (Vatke) J.B. Gillett

Indigofera schimperi Jaub. & Spach var. *schimperi*

Synonyms

Indigofera schimperi Jaub. & Spach: *Indigofera tettensis* Klotzsch

var. *baukeana*: Basionym: *Indigofera baukeana* Vatke

Family/tribe

Family: *Fabaceae* (alt. *Leguminosae*) subfamily: *Faboideae* tribe: *Indigofereae* subsection: *Alternifoliolae*.

Morphological description

Suffruticose perennial, decumbent, ascending or erect, 0.3–1.3 m tall, suckering from the roots during periods of good moisture. Silvery indumentum on young stem, leaf rachis and inflorescence peduncle and axis. Leaves pinnate, comprising 5–10 leaflets inserted alternately along the rachis; stipules linear-lanceolate, to 9 mm long, with dry membranous margins and fine, tapering tips; rachis sub-cylindrical, channelled above, to ± 6 cm long, including a petiole of ± 3 mm, prolonged up to 5 mm beyond lateral leaflets; leaflets lanceolate-elliptic or obovate, apiculate, 1–4 cm long and 2 cm wide, with fine appressed hairs on both surfaces (strigulose). Inflorescence a many-flowered raceme 5–20 (–30) cm long including a peduncle of 1–2 cm; bracts reddish, ovate, subulate, ± 1 mm long, caducous; pedicels to 1 mm long, reflexed after flowering; calyx white strigulose, 2–3 mm long; lobes triangular, 1–2 times as long as the tube; corolla very pale to deep pink or purplish, densely glistening yellow strigulose outside; standard greenish to yellowish with pink stripes; stamens 4–10 mm long. Pods silky when young, straight, somewhat curved or bent sharply at the base, sub-tetragonal, 18–36 mm long and ± 2 mm wide, rather densely white strigulose, up to 12-seeded; endocarp not spotted. 300,000–400,000 (–600,000) seeds/kg.

var. *baukeana*: plants erect, 0.4–1.3 m tall. Larger flowers (stamens 7–10 mm long), pods usually bent sharply at the base so that they stand away from the stem. Intermediates showing one but not both of these characters occur.

var. *schimperi*: plants decumbent or ascending to 0.3 m (rarely erect to 1 m tall). Smaller flowers (stamens 4–7 mm long).

Common names

Africa: hanuhanis (Kenya); kapiyebiye (Malawi); dharjo, dharqo, geed-guduuka (Somalia)

English: Schimper's indigo

Distribution

var. *baukeana*

Native:

Africa: Kenya; Tanzania; Zimbabwe; Namibia



Ascending to erect form, Queensland Australia (CPI 52621)



Decumbent form with *Dichanthium aristatum* cv. Floren at right



Leaves comprising 5–10 finely hairy leaflets; stipules linear lanceolate (CPI 52621)



Inflorescence a many-flowered raceme



Seeds



Pasture, SE Queensland Australia (CPI 52621)



Not as palatable as many other legumes, central Queensland Australia



Extremely drought-hardy, south central Queensland Australia

var. *schimperi*

Native:

Africa: Angola; Botswana; Djibouti; Eritrea; Ethiopia; Kenya; Malawi; Mozambique; Namibia; Somalia; South Africa (Transvaal); Sudan; Swaziland; Tanzania; Uganda; Zambia; Zimbabwe

Asia: Saudi Arabia; Yemen

Uses/applications

Forage

Legume for long-term pastures and leys in sub-humid to semi-arid environments.

Environment

No record found.

Other

Somali folk medicine; root mixed with salt to treat temporary impotence.

Ecology

Soil requirements

Largely found on neutral to alkaline black, cracking clays. Not adapted to acid soils. Moderate salt tolerance, less than that of *Macroptilium atropurpureum*, *M. lathyroides* and *Desmanthus bicornutus* and similar to that of *Stylosanthes scabra*.

Moisture

Occurs in areas with annual rainfall of 250–1,100 mm, with uni- and bi-modal distribution, and dry season to 8 months. Extremely drought tolerant, but also tolerant of temporary waterlogging and short term flooding. *Var. schimperi* more tolerant of impeded drainage than *var. baukeana*.

Temperature

Natural distribution extends from about 18° N in the Sudan to 26° S in South Africa. It occurs from near sea level to 2,100 m asl, with different ecotypes extending over a range of environments with average annual temperature ranging from 17 to 26 °C.

Light

Largely found in open grassland, but also in grassy areas in mopane (*Colophospermum mopane*) and mixed *Acacia* woodland, suggesting a preference for full light, but a tolerance of light shade.

Reproductive development

Flowers March-April in the southern hemisphere subtropics, and again in spring after frost. *Indigofera spicata*, another member of section *Alternifoliae*, is cleistogamous. *I. schimperi* appears to behave similarly, judging by the uniformity of plants within an accession.

Defoliation

Regrows rapidly after cutting and grazing.

Fire

No information available.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Establishment is variable especially on clay soils. The seed size is small and it flows freely and falls into the surface mulch. Emergence from seed sown deeper than 2–3 cm is poor and is generally slower than for other legumes such as *Desmanthus*. Emerged seedlings have a high rate of survival.

Fertilizer

I. schimperi is largely found on "black cotton soils", from which it might be inferred that it requires at least moderate fertility.

Compatibility (with other species)

I. schimperi competes poorly as a seedling with a range of introduced and native grasses, but once established has a high survival rate and a long plant life. Seedling recruitment often takes 2–3 years but is then adequate to maintain and increase plant densities. It has a strong lateral root system and survives and regrows under severe moisture stress. It is relatively unpalatable and for this reason can

dominate pastures if grazing is not controlled.

Companion species

Grasses: *Bothriochloa* spp., *Chloris gayana*, *Cenchrus ciliaris*, *Dichanthium* spp.

Legumes: *Clitoria ternatea*, *Desmanthus* spp., *Stylosanthes seabrana*

Pests and diseases

While there is no record of serious fungal or insect damage, seed beetles (*Bruchidius malindiensis* and *B. subdolos*, Coleoptera: Chrysomelidae: Bruchinae) have been recorded in seed in native populations in Kenya.

Ability to spread

Although it has no apparent characteristics that will aid spread it is a highly persistent and productive legume and sets seed even under severe moisture stress. Also it has this ability to sucker from its extensive lateral root system.

Weed potential

It has significant weed potential mainly because of its high survival and largely low palatability to grazing livestock. Commercialisation has been withdrawn in Queensland, Australia, and control measures in experimental sowings have been undertaken.

Feeding value

Nutritive value

Crude protein content can vary from <10% in the stem to >20% in the leaf. ADF ranged from 28% (leaf) to 36% (stem).

Palatability/acceptability

Poor palatability but is eaten under some conditions. There are some differences in palatability between accessions with CPI 73608 and CPI 16055 sometimes being grazed more readily than the other accessions.

Toxicity

I. schimperi contains no indospicine and no other toxicities are known.

Production potential

Dry matter

In experimental plots, annual yields of up to 4,500 kg/ha have been measured although growth is sometimes slow in the establishment year.

Animal production

I. schimperi displayed good chemical composition and no problems in feeding trials with rats, but was poorly accepted in grazing trials with cattle and supported poor weight gains.

Steer liveweight-gains over 2 grazing periods at Gayndah in Queensland, Australia, ranged from 0.27 to 0.38 kg/head/day compared with 0.41–0.56 kg/head/day for other legumes.

Genetics/breeding

2n=16.

Seed production

No information available.

Herbicide effects

Susceptible to a range of broadleaf herbicides including metsulphuron-methyl and fluroxypyr although results can be variable.

Strengths

- Adapted to semi-arid environments.
- Adapted to clay soils.
- Moderate salt tolerance.
- Persistent and productive.

Limitations

- Poor palatability.
- Animal growth rates inferior to other legumes such as *Desmanthus* and *Stylosanthes*.

- Difficult to manage grazing to reduce legume dominance.

Selected references

- Clem, R.L. and Hall, T.J. (1994) Persistence and productivity of tropical pasture legumes on three cracking soils (Vertisols) in north-eastern Queensland. *Australian Journal of Experimental Agriculture* 34:161–171. doi.org/10.1071/EA9940161
- Clem, R.L., Brandon, N.J., Conway, M.J., Esdale, C.R. and Jones, R.M. (2001) Early stage evaluation of tropical legumes on clay soils at three sites in central and southern inland Queensland. Technical Memorandum No. 7. CSIRO Tropical Agriculture, St Lucia, Australia.
- Delobel, A. and Le Ru, B. (2010) New African seed beetles associated with *Indigofera* (Coleoptera: Chrysomelidae: Bruchinae). *Genus (Wrocław)* 21:61–81. bit.ly/2QSkETT
- Frahm-Leliveld, J.A. (1960) Observations on chromosomes in the genus *Indigofera* L. *Acta Botanica Neerlandica* 9:286–293. doi.org/10.1111/j.1438-8677.1960.tb00658.x
- Gillett, J.B., Polhill, R.M. and Verdcourt, B. (1971) Leguminosae (Part 3) Subfamily Papilionoideae. In: Milne-Redhead, E. and Polhill, R.M. (eds) *Flora of Tropical East Africa*. Crown Agents for Overseas Governments and Administrations, London, UK. p. 313–314.
- Jones, R.M. and Rees, M.C. (1997) Evaluation of tropical legumes on clay soils at four sites in southern inland Queensland. *Tropical Grasslands* 31:95–106. bit.ly/2JoUtQC
- Jones, R.M. (1998) Evaluation of a range of tropical legumes on two clay soils in south east inland Queensland. Technical Memorandum No. 2. CSIRO Tropical Agriculture, St Lucia, Australia.
- Jones, R.M., Bishop, H.G., Clem, R.L., Conway, M.J., Cook, B.G., Moore, K. and Pengelly, B.C. (2000) Measurements of nutritive value of a range of tropical legumes and their use in legume evaluation. *Tropical Grasslands* 34:78–90. bit.ly/2WMzAqx
- Jones, R.M., Brandon, N.J. and Conway, M.J. (1996) *Indigofera schimperi* - a promising legume for permanent pastures on clay soils. *Tropical Grasslands* 30:138.
- Strickland, R.W., Lambourne, L.J. and Ratcliffe, D. (1986) The palatability, feeding value and apparent toxicity of 150 legume species fed to rats. Genetic Resources Communication No. 10. CSIRO Tropical Agriculture, St Lucia, Australia. bit.ly/33YYCUX

Cultivars

None released.

Promising accessions

Tested as a pasture legume on clay soils in central Queensland, Australia but withdrawn from commercialisation because of generally poor acceptance by grazing stock and the high risk of legume dominance.

CPI 16055 Selected in Australia. Origin Kabete, Kenya (1°14' S, 1,800 m asl, rainfall 900mm). Lower growing type that was more readily grazed than the other *I. schimperi*.

CPI 73608 Selected in Australia. Origin Pokot, Kenya. Tall open type grazed in preference to CPI 52621 and CPI 69495.

CPI 52621 Selected in Australia. Origin Matopos, Zimbabwe (20°23' S, 1,340 m asl, rainfall 600 mm). Selected for performance on vertisols in sub-humid subtropics.

CPI 69495 Selected in Australia. Origin Bulawayo, Zimbabwe (19°44' S, 1,150 m asl, rainfall 600 mm). Selected for performance on vertisols in sub-humid subtropics.

© Copyright 2020. All rights reserved.

