

A Taxonomic Revision of *Chamaecrista* (Caesalpinioideae, Cassieae, Cassiinae) in Southern Africa

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Abstract—The southern African species of *Chamaecrista* were all treated under *Cassia* in Gordon-Gray's treatment for the *Flora of Southern Africa*. However, given the subsequent generic recircumscriptions in the subtribe Cassiinae, and the expanded collections of these taxa, there is a need to revisit the taxonomy of the group. The present study aimed to conduct a detailed taxonomic revision of the species of *Chamaecrista* indigenous to the flora of southern Africa region. Extensive fieldwork was carried out to study the taxa in their natural environment and morphological characters were additionally studied using herbarium material. The revision presented here includes comprehensive descriptions, a key to the species, nomenclature, typifications, diagnostic characters with illustrations, and geographical distribution maps of all recognised taxa. Eleven species of *Chamaecrista* are recognised for the flora of southern Africa, two of which are described as new, i.e. *Chamaecrista grandiglandulata* and *C. gordon-grayei*. In addition, one new subspecies is described, namely *C. gordon-grayei* subsp. *longipedicellata*, while *Chamaecrista comosa* var. *capricornia* is raised to the rank of subspecies, viz. *Chamaecrista comosa* subsp. *capricornia*. The typifications published here include lectotypes designated for *Chamaecrista plumosa* and *C. stricta*, neotypes designated for *C. capensis* var. *flavescens*, *C. comosa*, and *C. plumosa* var. *diffusa*, and an isolectotype designated for *C. stricta*.

Keywords—*Cassia*, *Chamaecrista grandiglandulata*, *Chamaecrista gordon-grayei*, new species, *Senna*.

Chamaecrista (L.) Moench is a large diverse genus consisting of trees, shrubs, or herbs (Lewis 2005), found largely in open grasslands (Brenan 1967; Gordon-Gray 1977; Brummitt et al. 2007). The genus is most diverse in South America with ca. 272 spp. (see Rando et al. 2021), Africa with ca. 36 spp., Australia with ca. 12 spp., and Madagascar with ca. six spp. (Lewis 2005). The genus has a significant ecological importance because it is one of the genera in Caesalpinioideae that is able to fix nitrogen through roots bearing bacterial nodules (Irwin and Barneby 1982; De Faria et al. 1984; Naisbitt et al. 1992; Lewis 2005).

The species of *Chamaecrista* were previously included within the large polymorphic genus *Cassia* L., until it was divided into three genera (viz. *Cassia* s.s., *Chamaecrista*, and *Senna* Mill.) in the subtribal classification of the Cassiinae by Irwin and Barneby (1982). This subdivision of *Cassia* was later supported by molecular analyses (Lewis 2005; Acharya and Panda 2010; Acharya et al. 2011; Tripathi and Goswami 2011; Mishra et al. 2016; Souza et al. 2021), phenetic analyses (Boonkerd et al. 2005) and several taxonomic studies (Randell 1990; Dulberger et al. 1994; Singh 2001), however, the relationship among the genera remains unclear (Doyle et al. 1997, 2000; Marazzi et al. 2006; De-Paula and Oliveira 2012; Souza et al. 2021). Although Bruneau et al. (2001) and Herendeen et al. (2003) indicated that the subtribe Cassiinae is not monophyletic, *Chamaecrista* and *Senna* are regarded as monophyletic groups, with *Cassia* as a distinct clade (Doyle et al. 1997, 2000; Kajita et al. 2001). However, Bruneau et al. (2001), Herendeen et al. (2003), and Conceição et al. (2009) regarded *Chamaecrista* as a separate group and *Cassia* and *Senna* as sister genera. The most recent phylogenetic study indicated *Vouacoupa americana* Aubl. as sister to *Chamaecrista* (Souza et al. 2021).

The monophyly of the genus *Chamaecrista* has been confirmed in several studies (Doyle et al. 1997, 2000; Kajita et al. 2001; Conceição et al. 2009; Souza et al. 2019, 2021). Traditionally the genus was divided into six morphologically diagnosable sections (*C.* section *Absus* (Collad.) H.S.Irwin and Barneby, *C.* section *Apoucouita* (Benth.) H.S.Irwin and Barneby, *C.* section *Calciopsis* H.S.Irwin and Barneby, *C.* section *Chamaecrista*, *C.* section *Grimaldia* (Schrank) H.S.Irwin and Barneby, and *C.* section *Xerocalyx* (Benth.) H.S.Irwin and Barneby), four subsections, and 39 series. The sectional classification of the genus was based largely on the type of glandular hairs, presence or absence of extrafloral nectaries, and the structure of the inflorescence (Irwin and Barneby 1982). In a recent revision of the infrageneric classification of the genus (Souza et al. 2021) four sections are now recognised based on morphological and molecular evidence. In its revised circumscription the genus comprises sections: 1) *C.* section *Absus* (with three subsections, *Absus*, *Viscosa* and *Zygophyllum*), 2) *C.* section *Apoucouita*, 3) *C.* section *Baseophyllum* (Collad.) H.S.Irwin and Barneby, and 4) *C.* section *Chamaecrista* (Souza et al. 2021). Souza et al. (2021) did not retain the series that were formerly proposed by Irwin and Barneby (1982). The African taxa are accommodated in *C.* sections *Absus* and *Chamaecrista* (Souza et al. 2021).

The species of the genus *Chamaecrista* in Africa have been treated in several floristic studies, viz. *Flora of Tropical Africa* (Oliver 1871), *Flora of Tropical East Africa* (Brenan 1967), *Flora of Southern Africa* (Gordon-Gray 1977) and *Flora Zambesiaca* (Brummitt et al. 2007). In southern Africa, the genus *Chamaecrista* has, until now, been considered to comprise eight species, distributed widely in South Africa (mainly Limpopo, Gauteng, Mpumalanga, KwaZulu-Natal, and Eastern Cape) (Gordon-Gray 1977). Gordon-Gray (1977) provided a sound

taxonomic foundation for *Chamaecrista* in her treatment of the southern African *Cassia* species. In her treatment, however, *Chamaecrista* species were all still treated under *Cassia*, which is now outdated and in need of revision given the subsequent generic subdivision. Several species complexes also remain problematic.

This study aims to present a taxonomic revision of *Chamaecrista* in southern Africa, including detailed descriptions and illustrations, key to the species, nomenclature and typifications, as well as known geographical distribution.

MATERIALS AND METHODS

Herbarium collections of *Chamaecrista* from the following herbaria were studied either on loan or on site: BNRH, NBG (including SAM), NH, NU, PRE, and WIND (abbreviations according to Thiers 2021). Eleven species of *Chamaecrista* indigenous to the flora of southern Africa region were studied, two of which are described as new. The distribution of each species was mapped using herbarium material together with the information from field notes. The specimens examined for each taxon were recorded using the Quarter Degree Reference System for South Africa (Edward and Leistner 1971).

Extensive field work was carried out to study the taxa in situ. Eight of the eleven species were observed in their natural environment

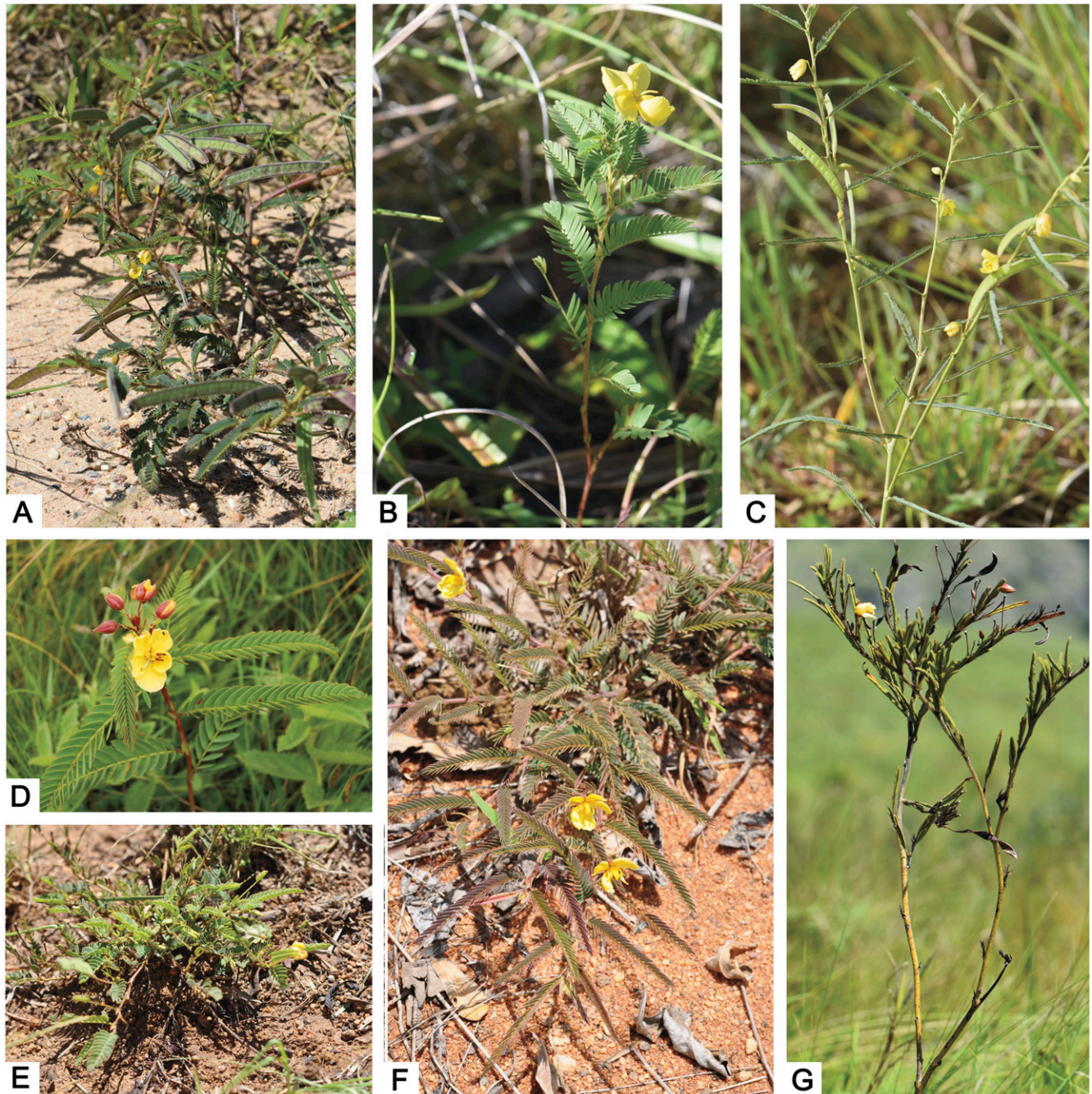


FIG. 1. General morphology of *Chamaecrista*. A. Habit of *C. mimosoides* showing a low-growing growth form. B. Habit of *C. capensis* var. *flavescens* showing a large flower. C. Habit of *C. grandiglandulata* branching in the upper half, showing short pedicels and small pale flowers. D. Habit of *C. comosa* subsp. *comosa* showing broad leaflets, 2–5 mm wide. E. Habit of *C. biensis* showing a prostrate or decumbent growth form and small flowers. F. Habit of *C. stricta*, growth form and small flowers. G. Habit of *C. plumosa* var. *erecta*. Photographs A–D, G taken by Liada Musandiwa, E–F taken by Anthony Magee.

during field visits, providing crucial insights into species concepts. The individuals were randomly sampled, the size of the samples varied according to their availability and accessibility. Herbarium specimens together with the field notes provided adequate data for those species that were not observed in the field. The taxonomic species concept follows morphology, as defined by Stace (1989) and Stuessy (2009). Concepts for subspecies and varieties follow Stace (1989). Voucher specimens are housed at the Compton Herbarium (NBG). Photographs were taken to record habitat and certain features of gross morphology. Permits were acquired from the relevant conservation authorities before collecting specimens.

Measurements of vegetative and reproductive structures were taken from specimens across the distribution range of each species to account for variation between the subpopulations. At least five measurements per specimen were taken for vegetative traits and at least three measurements per specimen were taken for reproductive traits where possible. Measurements are given as length \times width in the descriptions. Mature flowers selected from material-rich herbarium specimens were rehydrated, dissected, and mounted in glycerol. Specimens from which dissections were made are listed in Appendix 1. The following floral characters were measured: length of pedicels, length of bracts, length and width of sepals, length and width of petals, length of stamens, length of ovaries, and length and width of pods. Extrafloral nectaries were visualised under a ZEISS stemi 305 stereomicroscope with a ZEISS AxioCam 105 colour camera.

RESULTS AND DISCUSSION

Vegetative Morphology—**HABIT AND BRANCHES**—Species of *Chamaecrista* are single or multi-stemmed perennial or annual herbs usually ca. 0.3–0.8 m high, but *C. gordon-grayei* Musandiwa & Boatwr. and *C. grandiglandulata* Musandiwa & Boatwr. can reach heights of up to 1.5 m, and *C. plumosa* var. *erecta* (Schorn & Gordon-Gray) Lock up to 1.8 m. *Chamaecrista biensis* (Stey.) Lock and *C. capensis* (Thunb.) E.Mey var. *capensis* are low growing plants, with multiple decumbent or prostrate stems arising from a woody rootstock (Fig. 1E). Some taxa of *Chamaecrista*, such as *C. capensis* var. *flavescens* E.Mey., *C. grandiglandulata*, and *C. plumosa* var. *erecta* are usually single stemmed with branching only in the upper half (Fig. 1B, C, G). Branches are either glabrous, subglabrous, or covered with short curved and/or long patent hairs. *Chamaecrista absus* is the only species with a glandular vestiture in southern Africa.

LEAVES—Leaves of *Chamaecrista* are paripinnate, with multiple leaflets (rarely two in *C. absus* (L.) H.S.Irwin & Barneby), slightly tapering distally (Fig. 2). The size, shape and number of leaflets is an important diagnostic character when distinguishing species. The leaf rachises of the species are channelled along the upper surface, or rarely crested with an upright wing of tissue forming a ridge along the mid-line of the upper surface (e.g. in *C. gordon-grayei*, *C. grandiglandulata*, *C. mimosoides* (L.) Green, and *C. plumosa* E.Mey.).

The leaves are characterised by the presence of extrafloral nectaries on the petioles (rarely on the rachis between the lower pair of leaflets in *Chamaecrista falcata* Musandiwa & Boatwr.), except in *C. absus*. The extrafloral nectaries are an important character to distinguish between species of *Chamaecrista*. They vary widely among the species in their shape and size (Fig. 3). The nectaries are either sessile (in *C. comosa* E.Mey., *C. grandiglandulata*, *C. plumosa*, *C. stricta* E.Mey., and *C. mimosoides*), subsessile, or raised on short (in *C. biensis* and *C. capensis*) or well developed stalks up to 1.5 mm long (in *C. falcata*). The extrafloral nectaries in *C. falcinella* var. *parviflora* (Steyaert) Lock and *C. gordon-grayei* are sessile and/or subsessile.

Reproductive Morphology—**INFLORESCENCES AND FLOWERS**—The inflorescences in *Chamaecrista* are usually supra-axillary or axillary and vary in the length and number of flowers. The largest flowers are found in *C. capensis* (10–17 mm long),

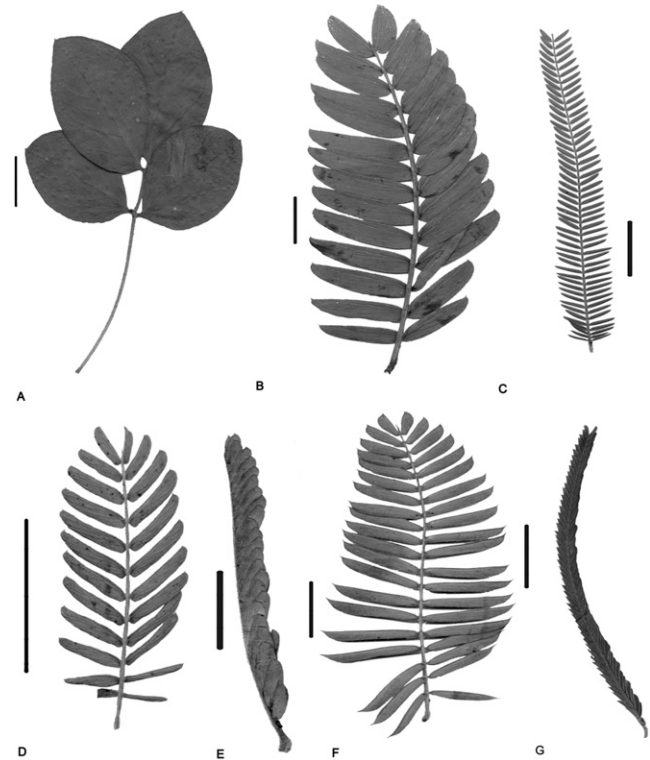


FIG. 2. Variation in size, shape and number of leaflets of the *Chamaecrista* species. A. *C. absus* showing a leaf with only two leaflets. B. *C. comosa* subsp. *comosa* showing a large leaf bearing wide leaflets. C. *C. stricta* showing a leaf with narrow leaflets. D, F. *C. capensis* var. *capensis* and *C. capensis* var. *flavescens* showing short leaves bearing wide linear to linear-oblong leaflets. E. *C. plumosa* var. *erecta* showing a leaf with leaflets that are obliquely linear, often with white hairs on the margins. G. *C. grandiglandulata* showing a leaf with multiple small leaflets. Vouchers: A. Cocteer 18 (NBG). B. Nemando and Musandiwa 22 (NBG). C. Brennan 14186 (NBG). D. Nemando and Musandiwa 42 (NBG). E. Musandiwa 18 (NBG). F. Nemando and Musandiwa 19 (NBG). G. Brennan 14218 (NBG). Scale bars = 1 cm.

C. comosa (7–20 mm long), and *C. plumosa* (7–17 mm long), while those of the remaining species are less than 10 mm long. The bracts resemble the stipules and are often triangular (narrowly falcate in *C. falcinella* var. *parviflora*). Bracteoles are paired, located above the upper half or towards the top of pedicels below the sepals. The length of the pedicels range from as short as 3 mm in *C. absus* and *C. mimosoides* to as long as 55 mm in *C. falcata*. The pedicels are usually covered with short, curved or long patent hairs. The sepals are often pubescent on the outer surface. The petals are usually obovate, and most often bright yellow, occasionally pale yellow in *C. stricta* and *C. grandiglandulata*. There are eight to 10 stamens present, with the exception of *C. absus* that has only five. The anthers are often in two or three series, straight or slightly curved, and filaments are mostly \pm 1 mm long. Ovaries are densely covered with greyish to whitish hairs and the style is slightly curved or straight and glabrous.

FRUITS—The pods in *Chamaecrista* are fairly uniform in structure. They are generally flattened, straight or slightly curved, and many-seeded. Within the southern African species the pods may vary slightly in size and degree of hairiness. *Chamaecrista* species in southern Africa have pods that range from 20–63 mm long. *Chamaecrista absus* is the only southern African species within the genus with glandular pods.

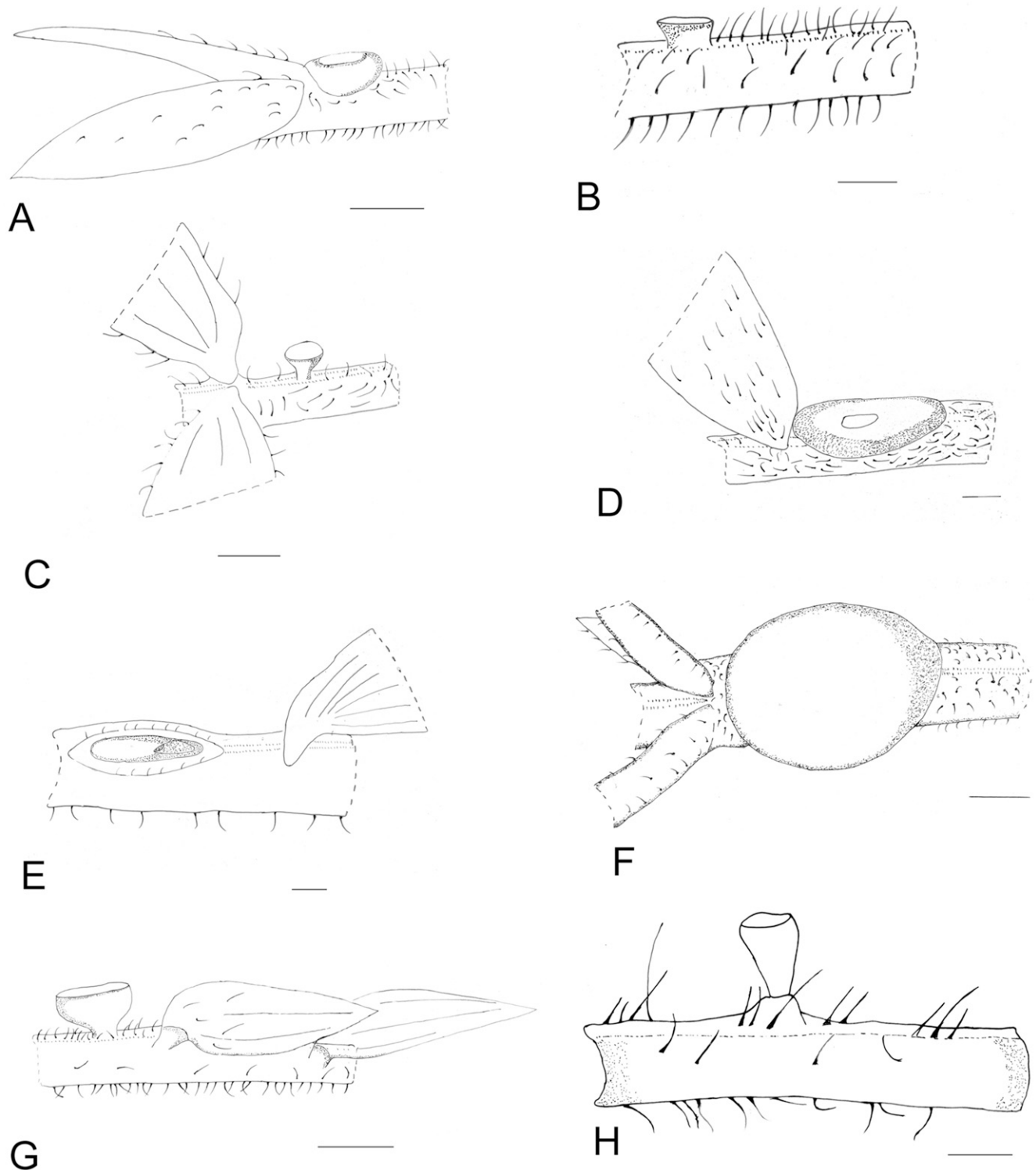


FIG. 3. Extrafloral nectaries of *Chamaecrista* species. A. *C. mimosoides*, sessile, circular or circular-elliptic. B. *C. capensis* var. *capensis*, circular, sub-sessile or attached on small stalk. C. *C. biensis*, circular, concave, sub-sessile or raised on small stalk. D. *C. comosa* subsp. *capricornia*, elliptic, sessile, spreading over the petiole. E. *C. comosa* subsp. *comosa*, sessile, slightly sunken in petiole. F. *C. grandiglandulata*, large, sessile, elliptic, overlapping the sides of petiole. G. *C. gordon-grayeri* subsp. *longipedicellata*, sub-sessile to sessile, circular. H. *C. falcata*, extrafloral nectaries, long stalked, concave on top. Vouchers: A. Burt & Hilliard 3215 (NU). B. Walker 119 (PRE). C. Phelan 1120 (PRE). D. Burger 292 (PRE). E. Arnold 792 (NU). F. Ward 1219 (NH). G. De Winter and Wiss 4423 (PRE). H. Ward 2439 (PRE). Scale bars = 5 mm.

SEEDS—The seeds in *Chamaecrista* species are usually rhomboid and vary from light brown to black. The surface is smooth, sometimes with dark brown or light brown dots.

TAXONOMIC TREATMENT OF *CHAMAECRISTA* IN SOUTHERN AFRICA

CHAMAECRISTA (L.) Moench., Meth. Pl. Bot. Marburg.: 272 (1794); H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35(2): 664 (1982); Brummitt in Fl. Zambesiaca 3(2): 121 (2007). TYPE species: *Chamaecrista nictitans* (L.) Moench.

Annual or perennial herbs (in southern Africa), up to 1.8 m high. Stems erect or semi-erect, simple or sub-simple, sometimes with a woody base; branched at or above ground level, glabrous or sub-glabrous, eglandular or rarely glandular (in *C. absus*), reddish to purplish on one side (in *C. plumosa*), often with short curved and/or long straight, patent greyish or whitish hairs. Leaves paripinnate, 7–150 × 3–25 mm, slightly tapering distally; rachis channelled or crested; stipules straight, or curved, often

narrowly triangular; extrafloral nectaries often present on petiole, sometimes between the pairs of leaflets (in *C. falcata*), sessile, subsessile or raised on distinct stalks, often brown or dark brown. Leaflets in numerous pairs, rarely 2 (in *C. absus*), oblong or obovate, linear, rarely falcate (in *C. falcata*), base often oblique, apex acuminate or mucronate, midrib sometimes excentric towards the anticost margin, glabrous or subglabrate or with long or short scattered hairs, margins often ciliate. Inflorescence usually axillary or supra-axillary, often 1 to 3 flowered, sometimes up to 8-flowered; bracts and bracteoles resembling stipules; bracteoles 2, above the middle or towards the top of pedicels. Pedicels often 3–30 mm long, rarely up to 45 or 55 mm long in *C. capensis* and *C. falcata*, respectively, slightly longer at fruiting, often with short and long patent hairs. Sepals 5, ovate, often with spreading hairs. Petals 5, obovate. Stamens 9 or 10, rarely 5 (in *C. absus*). Ovaries densely covered with long or short curved hairs. Pods (15)20–65 × 3–8 mm, flattened, straight or slightly curved, often with appressed hairs. Seeds 2.5–5.0 × 1–3 mm, rhomboid or elliptic, flattened, brown, or light brown to blackish.

KEY TO THE SPECIES OF *CHAMAECRISTA* IN SOUTHERN AFRICA

1. Leaflets in two pairs; plants glandular; stamens 5 *C. absus*
1. Leaflets in more than two pairs; plants eglandular; stamens 8 to 10 2
 2. Leaf rachis crested, with an upright wing of tissue forming a ridge along the mid-line of the upper surface 3
 3. Perennial herbs; stems glabrous to glabrescent or with appressed curved or straight hairs, stems often purplish or reddish on one side (*C. plumosa*) 4
 4. Prostrate and diffusely branched herbs, multi-stemmed, forming spreading mats to 0.4 m in diameter; glabrous to glabrescent, or with appressed curved greyish hairs; leaves 10–45 mm *C. plumosa* var. *plumosa*
 4. Erect herbs to 1.8 m tall; often single-stemmed, stems unbranched or few branched in the upper half, glabrous or densely covered with straight greyish or yellow hairs; leaves 15–90 mm *C. plumosa* var. *erecta*
 3. Annual herbs; stems pubescent with short curved, appressed hairs, stems green or becoming blackish 5
 5. Extrafloral nectaries large, 1–2 mm in diameter, overlapping the sides of the petiole *C. grandiglandulata*
 5. Extrafloral nectaries small, 0.2–0.8 mm in diameter, not overlapping the sides of the petiole 6
 6. Flowers pale yellow; extrafloral nectaries sessile; widely spread in eastern provinces of South Africa and Swaziland (Eswatini) *C. mimosoides*
 6. Flowers bright yellow; extrafloral nectaries sub-sessile (rarely sessile), restricted to Namibia and extends beyond the region to Zimbabwe, absent in South Africa (*C. gordon-grayei*) 7
 7. Pedicels ≤ 10 mm long at flowering, ≤ 15 mm long at fruiting *C. gordon-grayei* subsp. *gordon-grayei*
 7. Pedicels ≥ 15 mm long at flowering, ≥ 15 mm long at fruiting *C. gordon-grayei* subsp. *longipedicellata*
 2. Leaf rachis channelled along the upper surface 8
 8. Extrafloral nectaries present on petiole and between leaflet pairs, raised on distinct stalks 1.0–1.5 mm long; leaflets falcate *C. falcata*
 8. Extrafloral nectaries present on petiole only, sessile, or sub-sessile, or raised on small stalks less than 1 mm long; leaflets linear, oblong, obovate or elliptic 9
 9. Stipules narrowly falcate *C. falcinella*
 9. Stipules narrowly triangular 10
 10. Annual herbs; flowers pale yellow; pedicels ≤ 10 mm long *C. stricta*
 10. Perennial herbs; flowers bright yellow; pedicels ≥ 10 mm long 11
 11. Extrafloral nectaries circular and concave, short stalked 12
 12. Inflorescences 1 or 2 flowered; flowers generally small (to 10 mm long) *C. biensis*
 12. Inflorescences 2 to 4 flowered; flowers generally large (to 17 mm long) (*C. capensis*) 13
 13. Perennial herbs, to 0.3 m high; multi-stemmed; stems glabrous or covered with short hairs, sometimes with few long scattered greyish hairs *C. capensis* var. *capensis*
 13. Perennial herbs, to 0.6 m high; usually single-stemmed and branching in the upper half; stems with long and short intermixed greyish or yellowish hairs *C. capensis* var. *flavescens*
 11. Extrafloral nectaries elliptic, sessile (*C. comosa*) 14
 14. Extrafloral nectaries sunken in rachis channel; restricted to coastal regions of KwaZulu-Natal and Eastern Cape *C. comosa* subsp. *comosa*.
 14. Extrafloral nectaries not sunken in rachis channel, spreading over the petiole; distributed in drier inland areas of northern South Africa (Limpopo, North West, Mpumalanga, and Gauteng) to Swaziland (Eswatini) and extends beyond the region to Zimbabwe, not occurring in coastal regions *C. comosa* subsp. *capricornia*

1. *CHAMAECRISTA ABSUS* (L.) H.S. Irwin & Barneby, Mem. New York Bot. Gard. 35(2): 664 (1982); Brummitt in Fl. Zambesiaca 3(2): 125 (2007). *Cassia absus* L., Sp. Pl. 1: 376 (1753); Oliv. in F. T. A. 2: 297 (1871); Steyaert in F.C.B. 3: 507 (1952); Brenan in F.T.E.A. Legum.-Caesalp.: 81 (1967); Gordon-Gray in F.S.A. 16(2): 95 (1977); Brummitt in Fl. Zambesiaca 3(2): (2007). TYPE: INDIA. Aegyptio,

Linn. No. 528.4 (lectotype: LINN, designated by De Wit (1956)).

Annual herbs to 0.55 m tall, whole plant glandular. Stems erect, slightly woody at base, densely covered with fine, short, curved and straight scattered hairs. Leaves paripinnate, 15–55(70) × 10–45(95) mm; stipules linear, 2–4 × 0.5 mm, covered with long

soft hairs; extrafloral nectaries on the petiole lacking; rachis faintly channelled, with linear extrafloral nectaries between each pair of leaflets, ± 1 mm long. Leaflets 2-jugate, $7\text{--}45 \times 3\text{--}35$ mm, with black pitted dots on lamina, elliptic to obovate, base oblique, rounded at apex, uppermost pair usually the largest; margin ciliate. Inflorescence terminal, 1–8 flowered; flowers $4\text{--}6 \times 3\text{--}4$ mm; bracts $\pm 3 \times 1.0\text{--}1.5$ mm, ovate, cordate at base, apex acuminate; bracteoles 2, glandular. Pedicels with long straight hairs, at flowering 3–5 mm long, at fruiting 5–8 mm long. Sepals 5, oblanceolate, $4\text{--}6 \times 1\text{--}2$ mm, glandular on the outside. Petals 5, broadly obovate, $\pm 6 \times 1.5\text{--}2.0$ mm, yellow or reddish. Stamens 5, straight or slightly curved, anthers in two series, 1(2) small 1.5–2.0 mm long, (3)4 large 3 mm long, filaments ± 2 mm long. Ovary ± 5 mm densely covered with white hairs; style glabrous, 2 mm long, slightly curved. Pods oblong, $30\text{--}50 \times 6\text{--}8$ mm, glandular, flattened, straight to slightly curved, with scattered straight hairs. Seeds $3\text{--}5 \times 3\text{--}4$ mm, elliptic, sub-rhomboid, flattened, shiny, black or brown.

Diagnostic Characters—*Chamaecrista absus* is unique among the species of *Chamaecrista* in southern Africa, distinguished by its glandular stems, two pairs of leaflets (Fig. 2A), the absence of extrafloral nectaries on the petiole, and 5 stamens. The flowers are small with yellow or reddish petals. Usually, 5 or up to 6 stamens have been recorded for this species (e.g. Brummitt et al. 2007), whereas other *Chamaecrista* species in southern Africa have 8 to 10 stamens. The pods are glandular, with scattered hairs.

Distribution and Ecology—*Chamaecrista absus* is widespread in tropical Africa, South Asia, and Australia (Brummitt et al. 2007). In southern Africa, *C. absus* is widespread and common from Namutoni in Namibia, extending to Botswana (Maun and Gaborone) and beyond the region to Zimbabwe. The species is also common in South Africa, largely distributed in the Limpopo Province, along to Mpumalanga and extending to Rustenburg in the North West Province (Fig. 4). It grows in open grassland or forest areas, often on rocky or sandy soil at elevations below 1550 m. Flowering from December to July.

Additional Specimens Examined—**Namibia.** —1714 (**Ruacana Falls**): Etoto hill, on S slope (–CA), 7 Mar 2003, *Schubert* SS60 (PRE); ca. 60 km NW of Oshakati on the Ruacana Road (–DA), Mar 1975, *Vahrmeijer* 2613 (PRE). 1715 (**Ondangwa**): Ogongo Agricultural Collage (–CB), 26 Feb 1978, *Van Jaarsveld* 2986 (NBG). 1717 (**Omboloko**): communal land, E of Plot 1 outside Agriculture extension office fence (–CA), 6 Apr 2000, *TPS798* (WIND). 1718 (**Nkurenkuru**): Calcrete Road between Mpambi and Mpungu Vlei, ca 10 km S of Okavango River (–AD), 7 Feb 1999, *Burke* 994 (WIND); Omuramba at Dikweya (–CB), 8 April 2002, *Uiras* MU760 (PRE). 1720 (**Sambo**): Ndonga camp at the junction of Omuramba Omatako and Okavango River (–CD), 12 Dec 1956, *De Winter* 4617 (WIND). 1723 (**Singalamwe**): near Kwando River, at the turn off to Bum Hill campsite (–CD), 5 Mar 2006, *Horn* HOR2/384 (WIND). 1724 (**Katima Mulilo**): Ikowe, along Mulapos and Pools (–AA), 6 Nov 1972, *Mcferran* 28 (PRE); Forestry Reserve, W of Katima Mulilo (–AD), 12 Feb 1988, *Maggs* 231 (WIND); ca. 11.26 km S of Katima Mulilo on road to Ngoma (–DC), 22 Feb 1958, *Killiok & Leistner* 3022 (WIND); Bukana to Lusikili (–DA), 1 Mar 1982, *Muller* 1837 (WIND). 1816 (**Namutoni**): next to the main road Oshivelo/Ondwangwa (–BD), 26 Mar 1999, *Mannheimer* 687 (PRE); 17 km from Tsumeb on road to Otavi (–DB), 9 Feb 1974, *Grobbeelaar* 1895 (PRE); 8 km from Tsumeb on road to Otavi (–DB), 9 Feb 1974, *Grobbeelaar* 1907 (PRE); 40 miles (ca. 64.3 km) SE of Ondangwa on road to Namutoni (–DD), 13 Feb 1959, *De Winter & Giess* 6950 (PRE). 1817 (**Tsitsabis**): farm Sachsenheim (–CA), 2 Apr 2002, *Uiras* MU524 (PRE); along the main road from Farm Sachsenheim to Oshivelo (–CA), 3 Apr 2002, *Uiras* MU526 (PRE). 1819 (**Karakuwisa**): along the road next to Mile 46 Research Station at Observatory (–AD), 8 Feb 2002, *Strohbach* BS5330 (WIND); between Chassie and Gautscha Pan (–BA), 19 Dec 1952, *Maguire* 2119 (PRE). 1821 (**Andara**): Popa Falls Rest Camp (–BA), 21 Feb 1988, *Hines* 956 (PRE); southern Border of Mahango Game Reserve on the floodplain margin

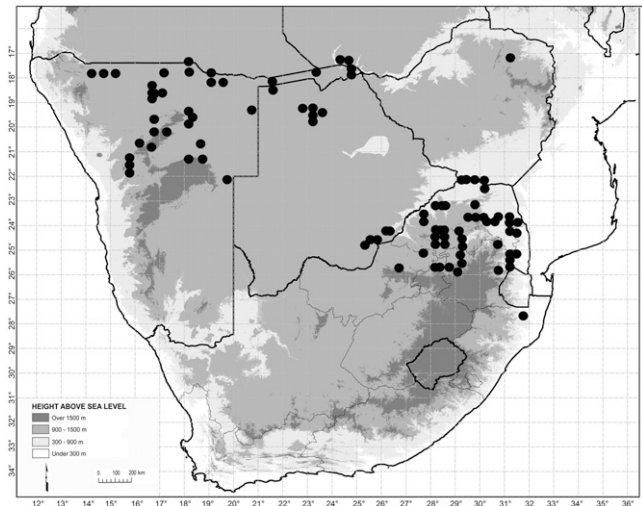


FIG. 4. Known distribution of *Chamaecrista absus* in southern Africa.

(–BC), 22 Feb 1988, *Hines* 983 (PRE). 1916 (**Gobaub**): near Merwe Farm, ca. 20 km W of Otavi on road to Outjo (–DB), 9 Mar 1997, *Germishuizen* 9529 (PRE). 1918 (**Grootfontein**): 13 miles (ca. 20.9 km) from Grootfontein to Tsumeb (–AC), 3 Apr 1965, *Tolken & Hardy* 934 (PRE); 15 km W of Grootfontein after Tsumeb (–CA), 3 Apr 1965, *Giess* 8572 (PRE); Farm Olievenhof, GR 215 Palmenflache (–CB), 26 Apr 1963, *Giess, Volk & Bleissner* 6513 (WIND). 1920 (**Tsumkwe**): ca. 8 km E of the Dorsland Boom (–BC), 21 Jan 1987, *Hines* 898 (PRE). 2016 (**Otjiwatongo**): Farm Jan Helpman (–BB), 29 Apr 2001, *Strohbach* 931 (WIND); Otjikango Farm, 48 km turn off on road to Kalkfeld (–CA), 13 Mar 1997, *Germishuizen* 9778 (PRE); Farm Okonjima (–DC), 26 Mar 2004, *Hoffman* LH1102 (WIND). 2017 (**Waterberg**): Tjozondjupa (–AB), 20 Jun 2008, *Lushetile* 170 (WIND). 2018 (**Gunib**): Omuramba Omatako (–DA), 9 May 2001, *Uiras* MU312 (WIND). 2115 (**Karibib**): Omaruru (–BA), 14/15 Feb 1958, *Merxmuller & Giess* 1592 (PRE); Farm Okandjou, 105.30 km NW of Omaruru (–BC), 26 April 1968, *Wanntorp* 1038 (PRE); Ameib Ranch (–DC), 15 Mar 1988, *Goldblatt & Manning* 8817 (PRE). 2118 (**Steinhausen**): Farm Kalidona OK 277 (–AC), 23 Apr 1961, *Gaerdes* 4 (WIND). 2219 (**Eiseb**): next to road Elandsbult-Babi Babi area (–BD), 19 Mar 1999, *Theron* 4a (WIND).

Botswana. —1922 (**Nukaneng**): Xamatshaa Island (–BB), 18 Feb 1975, *Smith* 1263 (PRE). 1923 (**Maun**): Okavango Delta, 12 km on road from Moremi to Chobe (–AA), 29 Jan 1994, *Roodt* 39 (PRE); Chiefs Island (–AC), 26 Dec 1973, *Biggs* M469 (PRE); on road from Moremi to Chobe (–BC), 29 Jan 1994, *Roodt* 39 (PRE); Island, Boro Floodplain (–CA), 22 Feb 1974, *Biggs* M512 (PRE). 2425 (**Gaborone**): Polokwe Hills (–CD), 12 Apr 1995, *Acoccks* 43 (PRE); river bank north west of Runtu (–DA), 4 Mar 1956, *Marais* 1128 (PRE); Gaborone Dam (–DB), 3 Feb 1996, *Vega & Roduhr* 2 (PRE). 2426 (**Mochudi**): Bechuanaland Protectorate (–AC), Apr 1914, *Harbor* 6584 (PRE); Mochudi (–AC), Oct 1914, *Harbor* 14079 (PRE); Bechuanaland Protectorate (–AC), without date, *Rogers* 13835 (PRE).

Zimbabwe. —1731 (**Harare**): Makabuzi hillside (–AB), 19 Jan 1963, *Moll* 520 (NU).

South Africa. —LIMPOPO: 2229 (**Waterpoort**): Greefswaldt (–AB), 8 Jan 1974, *Theron* 2886 (PRE), 8 Jan 1974, *Theron* 2897 (PRE); Messina, ca. 56 miles (ca. 90.1 km) NW of Farm Greefswald (–AB), 8 Jan 1974, *Pienaar* 383 (PRE); Messina, ca. 56 miles (ca. 90.1 km) NW of Farm Greefswald (–AB), 8 Jan 1974, *Pienaar* 373 (PRE); Breslau farm 3.2 km, near Pontdrift (–AC), 7 May 2000, *Straub* 788 (PRE); Matolege E of Groot Kop (–BB), 20 Jan 2006, *Van der Walt* 273 (PRE). 2230 (**Messina**): Albasini Dam (–AA), 4 Apr 1971, *Stephen* 1587 (PRE); Messina (–AC), May 1918, *Rogers* 20789 (PRE); Waterberg (–AC), 15 Oct 1929, *Turner* 2 (PRE). 2327 (**Ellisras**): Ellisras, Matimba (–DA), 27 Feb 1984, *Westfall* 1664 (PRE); Ellington Ranch, Toulon farm (–DA), 25 Mar 1990, *Schmidt* 300 (PRE); 33 km S of Ellisras on road to Thabazimbi (–DC), 1 May 2004, *Meyer* 4387 (PRE). 2328 (**Baltimore**): Swartwater, Farm Doornkraal LR 015 (–AA), 5 Feb 2004, *Sebothoma & Winter* 507 (PRE); Swartwater, Farm Doornkraal LR 015 (–AA), 5 Feb 2004, *Sebothoma & Winter* 497 (PRE); Calmar Ranch, Farm (–BA), 2 Mar 2004, *Bester* 4730 (PRE); Calmar Ranch, Calmar Farm (–BA), 3 Mar 2004, *Steyn* 461 (PRE). 2329 (**Pietersburg**) [**Polokwane**]: Louis Trichardt [Makhado] (–BB), Mar 1919, *Breijer* 19555 (PRE); Soutpansberg, Blouberg Nature Reserve (–DA), 6 Jan 1988, *Klopper* 527 (PRE); 23 km from Duiwelskloof on road to Pietersburg [Polokwane] (–DB), 20 Mar 1980, *Germishuizen* 1349

(PRE). **2330 (Tzaneen):** Duiwelskloof [Modjadiskloof] (–CA), Mar 1960, *Scheepers SKF165* (PRE); Letaba (–CA), 6 Feb 1960, *Scheepers 891* (PRE); Letaba Estate, Tzaneen (–CC), 13 Apr 1965, *Grobbelaar 16282* (PRE); Sibasa (–CD), Mar 1920, *Junod 21210* (PRE); Hans Merensky Nature Reserve (–DA), 20 Dec 1983, *De Beer 142* (PRE). **2331 (Phalaborwa):** Punda Maria (–CA), 30 Apr 1953, *Schiff 2956* (PRE); Silongwe 23 LU, 10 km N of Phalaborwa (–CC), 12 Feb 1984, *Retief 230* (PRE); Kruger National Park, Letaba River (–CD), 1 Dec 2006, *Siebert & Siebert 152* (PRE). **2428 (Nylstroom):** Farm Doornkraal (–AA), 5 Feb 2004, *Sebothoma 507* (PRE); Nylstroom, Visgat, Farm Waterhoutkloof (–AA), 15 Mar 1987, *Westfall 2252* (PRE); 15 km from Vaalwater on road to Melkrivier side (–AB), 08 Mar 1978, *Germishuizen 706* (PRE); 9 km NE of Vaalwater on road to Malkrivier (–AC), 5 Mar 1985, *Welman 518* (PRE); 25 miles (ca. 40.2 km) along turnoff to Sterk River Settlement from National road between Naboomspruit & Potgieterstruik (–BA), 17 Mar 1972, *Clarke 361* (PRE); Nylstroom Sterkriver Dam Nature Reserve (–BC), 10 Feb 1972, *Jacobsen 2213* (PRE); Vaalwater, Mooimeisiesfontein farm (–BD), 23 Mar 1991, *Glen 2607* (PRE); Warmbaths (–BC), Mar 1909, *Leendertz 6532* (PRE); Waterberg (–CD), Jan 1906, *Bolus 11858* (PRE); hills around Warmbaths [Bela-Bela] (–CD), Apr 1945, *Gerstner 5303* (PRE); Nylsvley, between Naboomspruit and Nylstroom (–DA), 9 Mar 1976, *Grobbelaar 2041* (PRE); 8 miles (ca. 12.8 km) from Nylstroom on road to Naboomspruit (–DA), 15 Mar 1971, *Coetzer 18* (NBG); Nylstroom Nature Reserve (–DA), 9 Mar 1978, *Grobbelaar 02422 (01245)* (PRE). **2429 (Zebedie):** Fenceline, ca. 18 km WSW of Phalaborwa (–AA), 16 Jan 2009, *LWP 1755* (PRE); Roadtan, Farm Sedan (–CB), 9 Feb 1993, *Meyer 23* (PRE); Lebowa (–CD), 5 May 1981, *Ellery 155* (PRE). —NORTH WEST: **2526 (Zeerust):** 7 km W of Lindleyspoort along road to Straatsdrif (–DA), 25 Feb 1975, *Van der Meulen 230* (PRE). **2527 (Rustenburg):** Beestekraal Game Reserve (PPC property) ca. 40 km N of Brits (–BA), 28 May 1989, *Barker 625* (PRE). —GAUTENG: **2528 (Pretoria):** Rooikop Bushveld (–CA), 12 Dec 1932, *Smuts & Gillett 2050* (PRE); Rooikop Bushveld (–CA), 1 Jan 1933, *Smuts & Gillett 2531* (PRE); Farm Vaarwaterkrans, 25.2 km from Pretoria (–CB), 28 Feb 1980, *Retief & Herman 150* (PRE); Bronkhorstspuit, Kranspoort Farm W bank of Wilge River (–DB), 15 Jan 1995, *Glen 3741* (PRE). —MPUMALANGA: **2430 (Pilgrims Rest):** Rietvlei Farm W of Blyderivierspoort Dam (–DA), 8 Mar 2000, *Meyer 2701* (PRE). **2431 (Acornhoek):** Kruger National Park (–AD), Mar 1975, *Gertenbach 5026* (PRE); Kruger National Park (–BC), Mar 1975, *Gertenbach 5051* (PRE). **2529 (Witbank):** Kwa-Ndebele, Farm Goederede (–AC), 16 Mar 1981, *Du Toit 175* (PRE); Laskop Dam (–AD), 5 Mar 1944, *Mogg 17263* (PRE); Laskop Dam Nature Reserve (–CC), 17 Mar 1969, *Theron 2083* (PRE). **2530 (Lydenburg):** 5 km from Barberton on road to Nelspruit (–DD), 9 Mar 1989, *Germishuizen 5090* (PRE). **2531 (Komatipoort):** Kruger National Park, near Shabin Kop (–AA), 14 Jan 1953, *Acoccks 16665* (PRE); Kruger National Park (–AB), 11 Feb 1953, *Van der Schiff 2080* (PRE); ca. 8 km East of Malalane on Komatipoort road (–AC), 20 Jan 1966, *Buit 3618* (NU); 25.7 km South of Skukuza on Malalane road (–AC), 7 Feb 1949, *Codd & De Winter 5110* (PRE); Kaapmuiden (Cape Mouth) 2 km from Kudu Lodge on road to Komatipoort (–CB), 11 Mar 1989, *Germishuizen 5127* (PRE). KwaZulu-Natal. **2731 (Louwsburg):** Nongoma, Bululwane (–DB), 25 Apr 1975, *Rensburg 28* (NU).

2. *CHAMAECRISTA BIENSIS* (Steyaert) Lock, Kew Bull. 43(2): 335 (1988); Brummitt in Fl. Zambesiaca 3(2): 130 (2007). *Cassia katangensis* (Ghesq.) Steyaert var. *biensis* Steyaert, Bull. Jard. Bot. État 20: 260 (1950). *Cassia biensis* (Steyaert) Mendonça & Torre., Bol. Soc. Brot. Sér. 29(2): 33 (1955); Schreiber in F.S.W.A. 59: 11 (1956); Gordon-Gray in F.S.A. 16(2): 100 (1977). TYPE: ANGOLA. Bie Province, Dec 1932, *Gossweiler 9* (holotype: BR [BR08918918]–image!).

Perennial herbs, to 0.5 m tall. Stems producing multiple branches from a woody rootstock, prostrate or decumbent, pubescent, with small curved appressed hairs. Leaves bipinnate, 10–65 × 5–20 mm, oblong to linear oblong, tapering slightly distally; stipules straight, 5–10 mm long, base oblique, apex acuminate; rachis channelled; extrafloral nectaries on petiole, circular, concave, ± 0.3 × 0.2–0.5 mm, attached with short stalk. Leaflets 6–25-jugate, 5–10 × 1–2 mm, linear oblong, base oblique, apex apiculate, margin ciliate, midrib strongly excentric towards anticous margin. Inflorescence axillary, 1–2 flowered; flowers 5–10 × 4–6 mm, bract ± 3 mm long, base oblique, apex acuminate; bracteoles 2, glabrous,

towards top of pedicels. Pedicels with short, straight or curved hairs, 15–20 mm at flowering, 20–25 mm at fruiting. Sepals 5, ovate, 4–8 × 2–3 mm, pubescent on the outer surface. Petals 5, obovate 7–10 × 3–5 mm, bright yellow. Stamens 10, straight or slightly curved, anthers vary in size, often in two (5 medium and 5 large) or three series (3 small, 4 medium, and 3 large), 2–7 mm long, filaments very short, 1 mm long. Ovary 6–9 mm long, densely covered with white hairs, slightly curved or straight, glabrous. Pods 20–50 × 3–5 mm, flattened, straight or curved, with small curved suppressed hairs. Seeds 2.5–4.0 × 1–2 mm, rhomboid, flattened, brown to light brown.

Diagnostic Characters—*Chamaecrista biensis* shares a low growth form and leaf structure with *C. capensis* (particularly *C. capensis* var. *capensis*). However, *C. biensis* can be distinguished by its extrafloral nectaries on the petiole attached by a very short stalk, ± 0.3 × 0.2–0.5 mm (Fig. 3C) (well developed in *C. capensis*) and short pedicels 15–25 mm (up to 45 mm in *C. capensis*) bearing small flowers 5–10 × 4–6 mm (large flowers 10–17 × 5–15 mm in *C. capensis*).

Distribution and Ecology—The species is widespread from the north-eastern parts of Namibia, extending to South Africa with a wide distribution in the North West Province through to the Northern Cape, Emalaheni (Witbank) in Mpumalanga and along the drier northern parts of the country across to Botswana (Fig. 5). *Chamaecrista biensis* grows on sandy or well-drained soil at elevations below 1530 m. Flowering from October to March.

Additional Specimens Examined—Namibia. —1817 (Tsitsabis): along the main road from farm Sachsenheim to Oshivelo (–CA), 3 Apr 2002, *Uiras MU547* (PRE). 1819 (Karakuwisa): Cigarrete, NE of Karakuwisa (–BA), 25 Jan 1953, *Maguire 2331* (NBG). 1918 (Grootfontein): Taranaki, 80 km from Grootfontein on road to Rundu (–BA), 5 Mar 1995, *Germishuizen 7510* (PRE); on road to Sonap Research Station, 4 km from Taranaki farm (–BB), 6 Mar 1995, *Germishuizen 7617* (PRE). 1919 (Kanovlei): on road to Tsumkwe, 50 km NE of Grootfontein (–AC), 7 Mar 1995, *Germishuizen 7643* (PRE). 1920 (Tsumkwe): southern Bushmanland, Revele BL 3.2 km W of Kremetartkop (–DD), 26 Feb 1986, *Hines 578* (PRE). 2017 (Waterburg): Waterburg (–AA), 21 Dec 1970, *Rutherford A12* (PRE). 2116 (Okahandja): Thorn tree farm 80 km from Okahandja on road Otjiwarongo (–BD), 6 Mar 1983, *Germishuizen 2596* (PRE). 2118 (Steinhausen): Hennopsrus farm, on R16 road to Steinhausen (–BB), 5 Mar 1997, *Germishuizen 9360* (PRE); Kaokoveld (–BD), Oct 1972, *Giess 9781* (PRE). 2217 (Windhoek): Windhoek (–CA), 1 Feb 1976, *Giess 13927* (PRE). 2218 (Omaheke): Omaheke, road D1793, 21 km N of junction with D1792 (–CB), 22 Apr 1998, *Kolberg HK 915* (PRE); Hennopsrus Farm, on R16 road to Steinhausen (–BB), 5 Mar 1997, *Germishuizen 9360* (PRE). 2219 (Sandfontein):

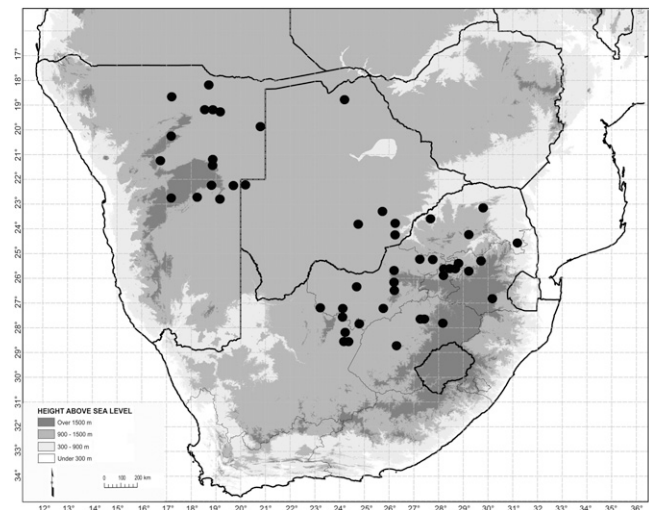


FIG. 5. Known distribution of *Chamaecrista biensis* in southern Africa.

Sandfontein (–CC), 21 Feb 1955, *De Winter 2443* (PRE); 5 km from turn off on road to Rietfontein from Buitepos/Gobabis road (–BC), 6 Mar 1997, *Germishuizen 9493* (PRE).

Botswana. —1824 (**Kachikau**): 1.75 km South of the Seronga/Savuti track junction near the Sandridge gap (–CC), 21 Jan 1979, *Smith 2631* (PRE). 2220 (**Kalkfontein**): 6 km North of Okwa Valley along the track between Ncojane and Mamuno (–AC), 31 May 1905, *Skarpe S-448* (PRE). 2326 (**Kgatlang**): Masana Ranch (–CD), 10 Nov 1978, *Hansen 3545* (PRE). 2324 (**Mahalapye**): Dinojane to Salajwe road on sand (–DD), 10 Dec 1987, *Barnard 409* (PRE). 2325 (**Lephepe**): central Kalahari, Dinojane (–BC), 12 Dec 1986, *Barnard 218* (PRE). 2426 (**Mochudi**): Bochudi (–AC), Jan-Apr 1914, *Harbor 6585* (NBG).

South Africa. —LIMPOPO: 2327 (**Ellisras**): Njala Nature Reserve (–DA), 5 Feb 1994, *Swartz PPS 94–22* (PRE). 2329 (**Pietersburg**) [**Polokwane**]: Pietersburg [Polokwane] (–BB), Mar 1919, *Breijer 19556* (PRE). 2429 (**Zebediela**): Sunningdale Private Nature Reserve (–AC), 3 Jan 1970, *Hofmeyer 158* (PRE). —NORTH WEST: 2526 (**Zeerust**): Zeerust (–CA), Oct 1972, *Leendertz 11303* (PRE); Zeerust (–CA), Jan 1928, *Thode 1402* (PRE). 2527 (**Rustenburg**): Saulspoort, Kwa-Ramoga in kloof on side of Mountain (–AA), 28 Nov 1977, *Germishuizen 00486 (20032)* (PRE); Klipvoordam (–BB), 8 Jan 1978, *Peters, Gericke and Burelli 3536* (PRE). 2529 (**Witbank**): Stoffberg, next to R555 road (–BD), 14 Jan 2018, *Musandiwa 8* (NBG). 2624 (**Morokweng**): ca. 12 km N of Stella, on road to Papiesvlakte (–BD), 3 Mar 1998, *Smook 10067* (PRE). 2626 (**Klerksdorp**): *Witstinkhoutboom* (–AB), 28 Jan 1926, *Liebenberg 26* (PRE). 2627 (**Potchefstroom**): Meyer street, near military base (–CA), 9 Dec 2011, *Komape, Mabe and Siebert KMS265* (NBG). 2724 (**Taung**): Zoet Vley (–AA), 10 Nov 1988, *Speedy 208* (PRE); near Vryburg, Farm Palmyra, 97 km northwest of Vryburg (–CA), 5 Feb 1948, *Rodin 3499* (PRE); Andalusia (–DD), 7 Jan 1941, *Herre 60661* (PRE). 2725 (**Bloemhof**): Leeuwfontein, 10 km W of Wolmaransstad (–BB), 17 Dec 1974, *Van Wyk 742* (PRE). —GAUTENG: 2528 (**Pretoria**): Bultfontein Verena (–BD), 27 Dec 1972, *Grobbelaar 1679* (PRE); Christianville, Springbokvlakte road, NW of Montana Secondary School (–CA), 6 Feb 2005, *Bester and Archer 5645* (PRE); Arcadia (–CA), Jan 1926, *Smith 2089* (PRE); Wonderboom Reserve (–CB), 17 Nov 1944, *Waterfall 3536* (NBG); Verwoerdburg, De Hoeve Farm (–CC), 1 Feb 1776, *Victoria 12* (NU); Farm Annoda, 56 km N East of Pretoria (–DA), 20 Oct 2005, *Meyer 4542* (PRE). —MPUMALANGA: 2431 (**Acornhoek**): beyond Blyde River Nature Reserve camp (–CA), 21 Jan 1968, *Hilliard 6031* (NU). 2529 (**Witbank**): Loskopdam-Donkerhoek (–CA), 11 Feb 1968, *Theron 1673* (PRE). 2630 (**Carolina**): Nooitgedach (–CD), 31 Dec 1926, *Henrici 1388* (PRE). Free State: 2727 (**Kroonstad**): Klipspruit (–CA), Feb 1928, *Pont 294* (PRE); Klipspruit (–CA), Jan 1928, *Pont 352* (PRE). 2728 (**Frankfort**): 6 km from Reitz on the road to Rietpan (–CD), 25 Jan 1983, *Retief 888* (PRE). 2826 (**Brandfort**): Glen (–CD), Mar 1926, *Glen School of Agriculture 3449* (PRE). Northern Cape: 2723 (**Kuruman**): 11.3 km from Kuruman on road to Hotazel (–AD), without date, *Brenda 602* (PRE). 2824 (**Kimberly**): Barkly West, Panplaas (near Boetsap) (–AB), 20 Feb 1974, *Hanekom 2233* (PRE); Rooipoort NW corner of Rooipoort farm (–CA), 19 Feb 1991, *Phelan 1120* (PRE); Barkly West, Vaalbos National Park (–CB), 23 Feb 1994, *Zietsman 2365* (PRE).

3. CHAMAECRISTA CAPENSIS (Thunb.) E.Mey., *Comm. Pl. Afr. Austr.* 1: 158 (1836); Brummitt in *Fl. Zambesiaca* 3(2): 131 (2007). *Cassia capensis* Thunb., *Prodr. Pl. Cap.* 1: 79 (1794); Thunb. in *Fl. Cap. ed. Schult.* 388 (1823); Vogel in *Syn. Gen. Cassiae* 64 (1837); Steyaert in *Bull. Jard. Bot. Brux.* 20: 250 (1950); Gordon-Gray in *F.S.A.* 16(2): 98 (1977). TYPE: SOUTH AFRICA. Eastern Cape, Stutterheim (3227), between Loerie and Sundays (Sondags) River [Kunukama River] (–AD), *Thunberg s.n.* (holotype: UPS [UPS-THUN9935]–image!).

Perennial herbs, to 0.6 m high. Stems prostrate, erect to semi-erect, single or multi-stemmed, arising from a woody rootstock, often branched in the upper half, glabrescent or covered with short and/or long greyish or yellow hairs. Leaves paripinnate, 20–50 × 10–25 mm, linear or linear oblong, glabrous or with greyish hairs, slightly tapering distally; stipules, up to 14 mm, base oblique, apex acuminate, narrowly to broadly triangular, surface sub-glabrous or with short and long patent hairs; extrafloral nectaries towards the top of petioles, circular, concave, sub-sessile or attached with

short stalk, sometimes lacking; rachis channelled. Leaflets (5)11–24-jugate, 2–10 × 1–3 mm, linear to linear oblong, base rounded to oblique, apex mucronate, margin with long hairs. Inflorescence axillary or supra axillary; flowers, 10–17 × 5–15 mm, (1)2–4 flowered; bract 2–4 mm long, base oblique, apex acuminate; bracteoles 2, glabrous, up to 4 mm long, towards top of pedicels. Pedicels with short curved and long patent hair, at flowering 18–40 mm, at fruiting, 18–45 mm long. Sepals 5, ovate, 6–10 × 2–4 mm, with short and long spreading hairs. Petals 5, bright yellow, 9–17 × 3–10 mm, obovate. Stamens 10, straight or slightly curved, anthers in two series, 5 small 2–4 mm long, 5 large 6–8 mm long, filaments very short, 1 mm long. Ovary up to 7 mm long, slightly curved, glabrous. Pods straight or slightly curved, (20)30–50 × 3–5 mm, flattened, with long or short greyish hairs, densely covered with long hairs when pods are young. Seeds ± 4 × 2 mm, rhomboid, flattened, brownish to blackish.

Diagnostic Characters—*Chamaecrista capensis* shares long pedicels with *C. falcata*, but is distinguished from that species by its small, circular extrafloral nectaries that are sub-sessile or attached to a short stalk (Fig. 3B) (long stalked in *C. falcata*), linear to linear oblong leaflets (falcate in *C. falcata*), multiple and narrow leaflets (fewer and wider leaflets in *C. falcata*), and large flowers (10–17 × 5–15 mm in *C. capensis* vs. 7–9 × 8–10 mm in *C. falcata*).

Two varieties are recognised:

3a. CHAMAECRISTA CAPENSIS (Thunb.) E.Mey. var. CAPENSIS Gordon-Gray, *F.S.A.* 16 (2): 98 (1977).

Perennial herbs to 0.3 m long. Stems prostrate or decumbent, multiple stemmed, with short appressed or long scattered greyish hairs. Leaves with circular or concave extrafloral nectaries raised on small stalk. Leaflets (5)14–22-jugate. Pedicels at flowering (18)20–38 mm long.

Diagnostic Characters—*Chamaecrista capensis* var. *capensis* has prostrate or decumbent stems, with appressed or short hairs, sometimes with a few long scattered hairs, and extrafloral nectaries that are raised on a small stalk.

Distribution and Ecology—*Chamaecrista capensis* var. *capensis* is widespread from Pomfret in North West, through Nkandla and Port Edward in KwaZulu-Natal, to Peddie in the Eastern Cape extending to Pilgrim's Rest in Mpumalanga (Fig. 6). Grows in grassland in loamy soil, at elevations below 1600 m. Flowering from October–March.

Additional Specimens Examined—South Africa. —NORTH WEST: 2523 (**Pomfret**): near Bathurst (–CB), 18 Nov 1928, *Hutchinson 1559* (PRE). —MPUMALANGA: 2430 (**Pilgrims Rest**): Blyde Nature Reserve (–DB), 7 Mar 2000, *Lotter 772* (PRE). KwaZulu-Natal: 2630 (**Carolina**): Sonstraal farm ca. 9 km from turnoff on Waverly road (–BB), 11 Jan 1984, *Germishuizen 2944* (PRE); 21 km from Panbult on road to Amersfoort (–CD), 12 Jan 1984, *Germishuizen 2990* (PRE). 2831 (**Nkandla**): Nkadla forest (–CA), 2 Jan 1964, *Hilliard 2649* (NU). 3130 (**Port Edward**): Umtamvuna Nature Reserve (–AA), 19 Mar 2018, *Musandiwa 19* (NBG); Mzamba Engonyama River (–AA), 08 Jan 1987, *Abbott 3445* (NH). —EASTERN CAPE: 3226 (**Fort Beaufort**): Alice, Seymour near Brambledene (–DD), 7 Jan 1944, *Barker 2895* (NBG). 3227 (**Stutterheim**): NE of Stutterheim (–BC), 17 Mar 1995, *Victor 922* (PRE). 3325 (**Port Elizabeth**): Steynsburg (–DC), 16 Feb 1909, *Paterson 479* (PRE); Port Elizabeth (–DC), 10 Jan 1949, *Theron 574* (PRE). 3326 (**Makhanda**): Boknesstrand, ca. 7 km SW of Kenton-on-Sea (–DA), 11 Nov 1984, *Burrows 2503* (PRE); Boknesstrand (–DB), 5 Nov 2017, *Nemando and Musandiwa 42* (NBG); Port Alfred (–DB), 31 Dec 1942, *Barker 2178* (NBG). 3327 (**Peddie**): East London (–AA), Dec 1981, *Hilner 154* (PRE).

3b. CHAMAECRISTA CAPENSIS var. FLAVESCENS E.Mey., *Comm. Pl. Afr. Austr.* 1: 158 (1836). *Cassia capensis* var. *flavescens* (E.Mey) Vogel, *Syn. Gen. Cassiae* 64 (1837); Gordon-Gray

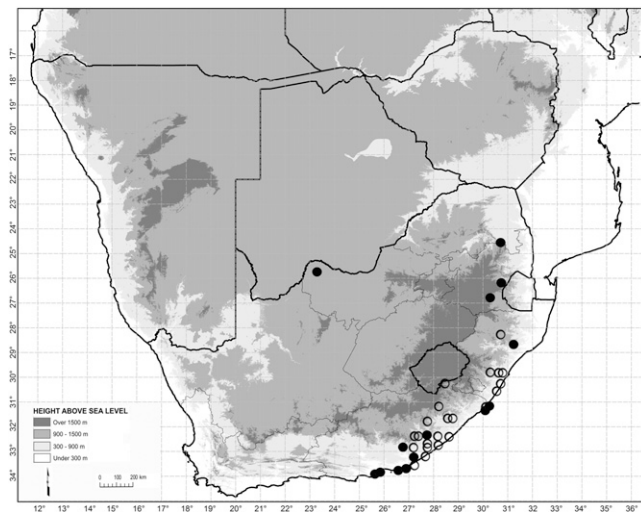


FIG. 6. Distribution of *Chamaecrista capensis* var. *capensis* (●) and *Chamaecrista capensis* var. *flavescens* (○) in southern Africa.

in F.S.A. 16(2): 99 (1977). TYPE: SOUTH AFRICA. Eastern Cape Province, Amabele, *De Vries* 51A (neotype: PRE!, designated here). Note: The original Drège collection (South Africa, Transkei [Eastern Cape], between Gekau (Geua) and Bashee Rivers [Mbashe], *Drège s.n.* (B?)) cited by Meyer could not be located and so we here designate a collection of De Vries as neotype as it closely matches the original description and is the most complete specimen.

Cassia capensis var. *keiensis* Steyaert, Bull. Jard. Bot. Brux. 20: 251 (1950). TYPE: SOUTH AFRICA. Eastern Cape, King William's Town, Kei Road, *Dyer* 1703 (holotype: K [K00417584]-image!; isotypes: PRE!; GRA-image!).

Perennial herbs, to 0.6 m high. Stems prostrate, decumbent or erect, single or few stemmed, arising from woody rootstock, branching on the upper half, with long, straight or curved greyish or yellow hairs. Leaves with circular extrafloral nectaries, attached with very small stalk, sometimes lacking. Leaflets 11–24-jugate. Pedicels at flowering 18–40 mm long.

Diagnostic Characters—*Chamaecrista capensis* var. *flavescens* was established within *C. capensis*, which is distinguished from *C. capensis* var. *capensis* by erect stems that are branching in the upper half, with short and long patent hairs intermixed, greyish or yellow indumentum, and extrafloral nectaries that are raised on a small stalk or sometimes lacking.

Distribution and Ecology—*Chamaecrista capensis* var. *flavescens* is widespread in KwaZulu-Natal from Pietermaritzburg to Port Edward, extending to Lady Frere to Peddie in the Eastern Cape (Fig. 6). Grows in grassland in well drained sandy soil, at elevations below 1300 m. Flowering from October–March.

Additional Specimens Examined—South Africa. —KwaZulu-Natal: 2830 (Dundee): Indaleni near Richmond (–BC), 3 Jan 1948, *Barker* 5182 (NBG). 2930 (Pietermaritzburg): 8 km from Richmond along Hela Hela Road (–CC), 23 Jan 1974, *Stirton* 711 (NU); Camperdown (–DC), 12 Feb 1968, *Gordon-Gray* 6145 (NU); Pietermaritzburg (–DC), 15 Feb 1973, *Strey* 11105 (NU). 3028 (Maclear): Maclear Community Plantation (–AB), 1 Nov 2017, *Nemando and Musandiva* 19 (NBG). 3030 (Port Shepstone): Umzinto, Vernon Crookes Nature Reserve (–BC), 8 Feb 1984, *Balkwill & Cadman* 1198 (NU); cliff above Otterburn halt (–DA), 22 Feb 1964, *Hilliard* 2751 (NU). 3130 (Port Edward): Umtamvuna Nature Reserve, Beacon Hill (–AA), 05 Feb 1984, *Abbott* 1709 (NH). —Eastern Cape: 3127 (Lady Frere): 25 km from Cala at turn off to Engcobo (–DB), 12 Jan 1997, *Sebothoma* 29 (PRE). 3128 (Umtata): Maclear commonage ca. 2 km NNE of Maclear (–AA), 12 Nov 1993, *Bester* 1634 (PRE); Umtata aerodrome (–DA), 15 Feb 1976, *Cooper* 180

(PRE); Umtata Waterfalls (–DB), 31 Dec 1920, *Schonland* 3804 (PRE); Umtata Campus (–DB), 7 Nov 2001, *Nombekela* 49 (NH). 3227 (Stutterheim): Thomas River (–AD), 8 Dec 1944, *Macfarlane* 3490 (NBG); ca. 19.3 km N of Stutterheim on road to Grahamstown (–AD), *Grobbelaar* 639 (PRE); 3.2 km from Keiskama Hoek on road to Debenek (–CA), 18 Mar 1948, *Story* 3369 (PRE); between Lovedale and Hogsback (–CA), 12 Dec 1942, *Barker* 2272 (NBG); Amabele (–DA), 14 Jan 1940, *De Vries* 51A (PRE); Berlin, King William's Town (–DC), 5 Jan 1944, *Barker* 2738 (NBG); King William's Town (–DC), Nov 1892, *IRS* 1514 (NBG). 3228 (Butterworth): ca. 16 km before East London from Butterworth (–AC), Oct 1973, *Arnold* 564 (NU); Kei mouth (–BC), Mar 1890, *Flanagan* 54 (PRE); Mooiplaats (–CA), 27 Nov 1945, *Compton* 17764 (NBG). 3327 (Peddie): East London (–BA), Dec 1926, *Smith* 3757 (PRE); Komga (–CA), 4 Mar 1956, *Theron* 1882 (PRE).

4. *CHAMAECRISTA COMOSA* E.Mey., Comm. Pl. Afr. Austr. 1: 160 (1836); Brummitt in Fl. Zambesiaca 3(2): 142 (2007). *Cassia comosa* (E.Mey.) Vogel, Syn. Gen. Cassiae 65. (1837); Ghesquiere in Bull. Jard. Bot. 9: 153 (1932); Steyaert in Bull. Jard. Bot. Brux. 20: 251 (1950); Brenan in F.T.E.A Legum.-Caesalp.: 89 (1967); Gordon-Gray in F.S.A. 16(2): 96 (1977). TYPE: SOUTH AFRICA. KwaZulu-Natal Province, Port Edward, 500 m from the sea opposite Hills, *Grobbelaar* 1534 (neotype: PRE!, designated here). Note: The original Drège collection (South Africa, Eastern Cape, between Umzimvubu River [Omsamwubo] and Umsikaba River [Omsamcaba], *Drège* (?B)) cited by Meyer could not be located as most of his collections housed at B are presumably largely destroyed, so we here designate a collection of Grobbelaar as neotype as it is the most complete with mature flowers and fruits.

Perennial herbs, to 0.6 m high. Stems erect, simple or sub-simple, glabrous to pubescent or densely covered with whitish to yellowish spreading hairs, arising from a woody rootstock. Leaves paripinnate, 20–150 × 10–25 mm, oblong to linear oblong, slightly tapering distally; stipules 5–15 × 1–4 mm, narrowly triangular, base oblique, apex acuminate, margin ciliate; extrafloral nectaries at or below the top of petiole, 1.2–6.0 × 0.4–4.0 mm, sessile, elliptic, depressed in the middle, often with dark centre; rachis channelled, channel margin ciliate. Leaflets (5)11–36-jugate, 4–17 × 2–5 mm, oblong, base oblique, apex rounded to obtuse, margin hairy. Inflorescence supra-axillary, 2–6 flowered; flowers 6–17 × 7–20 mm; bracts 3–4(5) mm long, base oblique, apex acuminate; bracteoles 2, glabrous, towards top of pedicels. Pedicels glabrous or with spreading hairs, at flowering 10–26 mm long, at fruiting 15–27 mm long. Sepals 5, ovate, 6–12 × 3–5 mm, with spreading hairs on the outer surface. Petals 5, obovate, 7–15 × 4–8 mm, bright yellow. Stamens 9, straight or slightly curved, anthers in two series, (5)6 medium ± 5 mm long, 3(4) others often the largest, up to 9 mm long, filaments very short ± 1 mm long. Ovary ± 10 mm long, densely covered with white hairs, style glabrous, slightly curved. Pods 33–65 × 3–7 mm, spreading pubescent, straight, flattened. Seeds 3–5 × 1–3 mm, rhomboid, flattened, light brown to blackish, margin often with a thin line.

Diagnostic Characters—*Chamaecrista comosa* is one of the most easily recognisable species of *Chamaecrista* in southern Africa. It shares large flowers with *C. capensis* but is readily distinguished by the long leaves, up to 150 mm (to 50 mm long in *C. capensis*), with leaflets 2–5 mm wide (1–3 mm wide in *C. capensis*) and large, sessile extrafloral nectaries, 1.2–6.0 × 0.4–4.0 mm, depressed in the middle or sunken in on the rachis (circular, concave, sub-sessile or attached with short stalk in *C. capensis*).

Note—Meyer (1836) described *Chamaecrista comosa* for its large, sessile extrafloral nectaries, large leaves bearing broad

leaflets, and large flowers. In his treatment of the African and Asian species of *Chamaecrista* Steyaert (1950) recognised two varieties (viz. *Chamaecrista comosa* var. *capricornia* and *Chamaecrista comosa* var. *lanata*). *Chamaecrista comosa* var. *lanata* was established based on its lanate indumentum and *C. comosa* var. *capricornia* for its smaller morphology. Gordon-Gray and Schorn (1975) later included *Chamaecrista comosa* var. *lanata* within *C. comosa* var. *comosa*, a decision that is supported by the present study. Following examination of available herbarium material, two varieties were recognised; one that occurs in coastal areas and one that occurs in drier areas. Based on field studies and examination of herbarium material *C. comosa* var. *capricornia* and *C. comosa* var. *comosa* need to be raised to subspecific level on the basis of different habitat preferences (*C. comosa* var. *comosa* is restricted to open grassland with high water table on granite derived soil or sand, and *C. comosa* var. *capricornia* in grassland in drier areas usually on sandy soil (Gordon-Gray and Schorn 1975)), distribution patterns (i.e. *C. comosa* var. *comosa* is restricted to the coastal areas of KwaZulu-Natal and Eastern Cape, while *C. comosa* var. *capricornia* has a more northern distribution extending beyond the region to Zimbabwe), and morphological differences (*C. comosa* var. *capricornia* is smaller in its general morphology).

Two subspecies are recognised:

4a. CHAMAECRISTA COMOSA E.Mey. subsp. COMOSA. *Cassia comosa* var. *comosa* Steyaert, Bull. Jard. Bot. Brux. 20: 251 (1950); Gordon-Gray in F.S.A. 16 (2): 97 (1977).

Cassia comosa var. *lanata* Steyaert, Bull. Jard. Bot. Brux. 20: 252 (1950). TYPE: SOUTH AFRICA. Mtunzini, Myezaan Zulu Reserve, near Ngonyi, Wood 3855 (holotype: K [K000417586]-image!, isotype: NHI).

Perennial herbs, to 0.5 m tall. Stems simple, single stemmed, arising from woody rootstock. Leaves paripinnate, 30–150 × 10–20 mm; leaflets 6–36-jugate, 6–17 × 2–5 mm; stipules 8–14 mm; large, sessile extrafloral nectaries, sunken in rachis channel. Pedicels 10–25 mm long. Pods 44–65 × 4–7 mm.

Diagnostic Characters—*Chamaecrista comosa* subsp. *comosa* is distinguished by large, sessile extrafloral nectaries that are sunken in on the rachis (Fig. 3E), and larger general morphology (i.e. leaves 30–150 × 10–20 mm; leaflets 6–17 × 2–5 mm; stipules 8–14 mm, pedicels 10–25 mm long, and pods 44–65 × 4–7 mm).

Distribution and Ecology—*Chamaecrista comosa* subsp. *comosa* is widely distributed in the coastal regions of KwaZulu-Natal from Mtubatuba, through Port Edward, extending to Butterworth in the Eastern Cape (Fig. 7). It grows in open grassland with a high water table on granite soil or sand at altitudes below 1000 m. Flowering from September–March.

Additional Specimens Examined—South Africa. —KwAZULU-NATAL: 2732 (Ubombo): Ubombo, St. Lucia Eastern (–DC), 21 Sep 1982, *Cawood* 149 (NH). 2830 (Dundee): Ubisana Valley (–BA), 21 Oct 1966, *Venter* 2741 (PRE); Mtunzini, Hamewith (–CC), 18 Nov 1919, *Mogg* 5858 (PRE). 2831 (Nkandla): 5 km from Eshowe, Eyrie Farm (–CD), 12 Oct 1975, *Stirton* 5343 (PRE); Eshowe outside Hlinza forest (–CD), 24 Oct 1974, *Stirton* 1289 (PRE); just outside Hlinza Forest (–CD), 10 Dec 1973, *Stirton* 423 (NU); W Empangeni (–DB), 27 Aug 1949, *Lawm* 320A (PRE); Ngoya Mts (–DC), 11 Dec 1968, *Strey* 8301 (PRE); Ngoye Forest Reserve (–DD), 24 Oct 1974, *Stirton* 1275 (PRE); Mtunzini (–DD), 1 May 1919, *Mogg* 4301 (PRE). 2832 (Mtubatuba): Mtubatuba, W of St. Lucia Estuary (–AA), 30 Nov 1959, *Ward* 5 (NU); Dukuduku forest (–AD), 4 Oct 1961, *Hitchins* 75 (NU); Lughawe, St. Lucia (–AD), 21 Dec 1973, *Grobbelaar* 1824 (PRE); St. Lucia estuary (–AD), 30 Nov 1959, *Feely & Ward* 5 (PRE); Mpathe Valley, near Mpathe forest (–AD), 24 Oct 1971, *Ward* 7313 (PRE); north coast Lake Nhlabane (–CB), 3 Jan 1992, *Ward* 11595 (NU). 2931 (Stanger): Ngoye forest (–BA), 21 Nov 1965, *Hilliard* 3179 (NU). 3030 (Port Shepstone): first sugar farm from Isingolweni on road to Port Edward (–CC), 7 Nov 1974, *Stirton* 1375

(PRE); Beacon Hill (–CC), 2 Nov 1981, *Van Wyk* (PRE); Margate (–CD), 15 Dec 1936, *Mogg* 13291 (PRE); ca. 8 km from Port Edward on Isingolweni road (–CD), 1 Sep 1963, *Hilliard* 1655 (NU); Wichmann's Farm, St. Michaels on sea (–CD), 28 Dec 1968, *Ross* 1877 (PRE); Uvongo, S coast Sky-line Farm (–CD), 6 Nov 1967, *Mogg* 36557 (PRE); Southbroom (–CD), 25 Oct 1975, *Stirton* 5635 (PRE); coastal grassland (–DC), 6 Nov 1980, *Stirton* 8075 (PE). 3130 (Port Edward): 500 m from the sea opposite Hills (–AA), 9 Dec 1971, *Grobbelaar* 1534 (PRE); Clearwater (–AA), 7 Sep 1982, *Abbott* 265 (PRE); Umtamvuna Nature Reserve (–AA), 2 Nov 2017, *Nemando and Musandiwa* 22 (NBG); Port Edward (–AA), 25 Oct 1975, *Stirton* 5641 (PRE). —EASTERN CAPE: 3129 (Port St. Johns): Lusikisiki, 12 miles (ca. 19.3 km) in Pondoland coastal sourveld (–BC), 13 Jan 1947, *Acocks* 13247 (PRE); Transkei, Mkambati Nature Reserve (–BD), 1 Oct 1984, *Shackleton* 48 (PRE); Mkambati Nature Reserve, NE of Education Centre (–BD), 13 Dec 1986, *Smook* 6119 (PRE). 3228 (Butterworth): at turn off to Mzamba River mouth, 5 km S of Port Edward (–CA), Oct 1973, *Arnold* 792 (NU); turn off to Mzamba River mouth, S of Port Edward (–CA), Oct 1972, *Arnold* 792 (PRE).

4b. *Chamaecrista comosa* subsp. *capricornia* (Stayaert) Musandiwa & Boatwr., stat. nov. *Cassia comosa* var. *capricornia* Steyaert, Bull. Jard. Bot. Brux. 20: 252 (1950); Brenan in F.T.E.A Legum.-Caesalp.: 90 (1967); Gordon-Gray in F.S.A. 16(2): 97 (1977); Lock in Kew Bull 43(2): 336 (1988). TYPE: ZAIRE [DEMOCRATIC REPUBLIC OF CONGO]. Katanga, Elizabethville, 15 May 1950, *Rogers* 10184 (holotype: BR, [BR0000008917614]-image!).

Perennial herbs, to 0.6 m tall. Stems simple or sub-simple, or branched from the woody rootstock. Leaves paripinnate, 30–90 × 10–20 mm; leaflets 5–34-jugate, 4–13 × 2–4 mm; stipules 5–10 mm; large, sessile extrafloral nectaries, often spreading over the sides of the petiole. Pedicels 10–20 mm long. Pods 33–55 × 4–5 mm.

Diagnostic Characters—*Chamaecrista comosa* subsp. *capricornia* is distinguished by large, sessile extrafloral nectaries that are often spreading over the sides of the petiole (Fig. 3D), and smaller general morphology (i.e. leaves 30–90 × 10–20 mm; leaflets 4–13 × 2–4 mm; stipules 5–10 mm; large, pedicels 9–20 mm long and pods 33–55 × 4–5 mm).

Distribution and Ecology—*Chamaecrista comosa* subsp. *capricornia* is an inland species, distributed in the drier, northern parts of South Africa, from Tzaneen through Rustenburg to Pretoria and Johannesburg in Gauteng Province, extending beyond the region to Zimbabwe (Fig. 7). It grows in grasslands in drier areas, usually on sandy soil, at an altitude below 1820 m. Flowering from October–February.

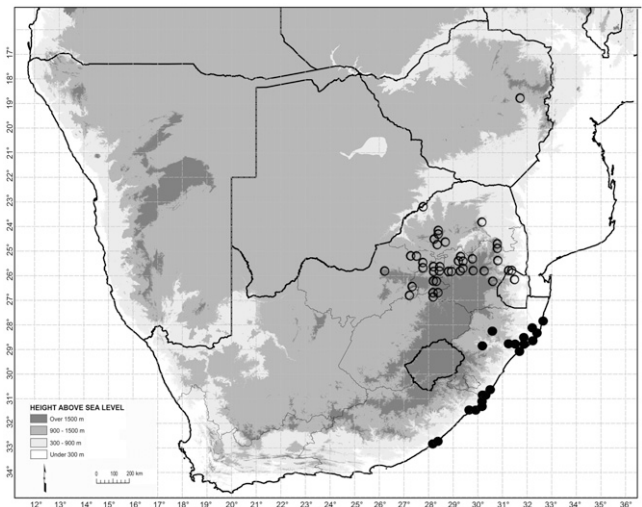


FIG. 7. Known distribution of *Chamaecrista comosa* subsp. *comosa* (●) and *Chamaecrista comosa* subsp. *capricornia* (○) in southern Africa.

Additional Specimens Examined—South Africa. —LIMPOPO: **2327 (Ellisras):** at bridge over Palala River, 5 km from Palala (–BB), 8 Mar 1978, *Germishuizen* 00726 (PRE). **2330 (Tzaneen):** New Agatha Forest Reserve (–CC), 13 Nov 1918, *McCallum* 548 (PRE). **2428 (Nylstroom):** Tafelkop Private Nature Reserve at Geelhoutkop and Melkriver (–AB), 19 Feb 1972, *Coetzee* 1035 (PRE); Heuningfontein, Ratelhoek Farm (–AD), 7 Dec 1985, *Westfall* 2037 (PRE); near Loubadspruit bridge on road between Nylstroom and Alma (–CA), without date, *Welman* 506 (PRE); between Warmbaths and Nylstroom, 1 mile (ca. 1.6 km) along Vaalkop road (–CD), 22 Apr 1970, *Clarke* 39 (PRE); Vaalwater Farm Driefontein (–DA), without date, *Westfall* 1531 (PRE). —NORTH WEST: **2526 (Zeerust):** Grasfontein (–CC), 16 Dec 1929, *Sutton* 344 (PRE). **2527 (Rustenburg):** Buffelskloof farm (–AA), 30 Nov 1977, *Germishuizen* 582 (PRE); Rustenburg Kloof (–AB), 27 Dec 1949, *Steyn* 895 (NBG); Brits (–DB), 24 Feb 1958, *Van Vuuren* 471 (PRE). **2626 (Klerksdorp):** Schoonspruit, 5 km from Ventersdorp on road to Koster (–BD), 27 Nov 1986, *Germishuizen* 3955A (PRE). **2627 (Potchefstroom):** Carletonville, A. Bairley Nature Reserve (–AD), Apr 1983, *Van Wyk* 154 (PRE); Gerhardsminnebron (–CA), 25 Nov 1976, *Botha & Ubink* 1835 (PRE); Arboretum (–CA), 31 Jan 1996, *Cilliers* 2020 (PRE). —GAUTENG: **2528 (Pretoria):** Botanical Garden, Brummeria (–CA), 4 Jan 1967, *Todd* 4 (PRE); Fountain Valley (–CA), 15 Nov 1928, *Repton* 104 (PRE); Wonderboom S, Pretoria (–CA), 14 Nov 1969, *Coetzee* 6 (PRE); Roodeplaat Dam Nature Reserve (–CB), 27 Dec 1979, *Rooyen* 2238 (PRE); Willow on turnoff to Garsfontein (–CB), 8 Nov 1977, *Germishuizen* 00464 (PRE); Groenkloof (–CC), 15 Feb 1922, *Phillips s.n.* (PRE); Cornwall Hill Ridge (–CC), 3 Feb 2009, *Masupa* 2 (PRE); Cornwall Hill Ridge (–CC), 3 Feb 2009, *Ramantswana* 4 (PRE); Olievenhoutbos extension 13 (–CC), without date, *Masombuka* 15 (PRE); Cornhill Ridge (–CC), 3 Feb 2009, *Ramalekana* 18 (PRE); 31.1 km E of Pretoria (–CD), 14 Jan 1959, *Mauve s.n.* (NU); 18 miles (ca. 28.9 km) from Pretoria on road to Welbekend (–CD), 30 Jan 1971, *Clarke* 138 (PRE); Waterkloof Heights, SE of Pretoria (–CD), 24 Jan 1970, *Clarke* 126 (PRE); Garsfontein (–CD), Feb 1977, *Liebenberg* 8626 (PRE); Goedvertroude Farm 499 JR (–DD), 6 Nov 2009, *Masupa* 68 (PRE); Goedvertroude Farm 499 JR (–DD), 6 Nov 2009, *Masupa* 32 (PRE); Goedvertroude Farm 499 JR (–DD), 6 Nov 2009, *Masupa* 38 (PRE). **2628 (Johannesburg):** Johannesburg (–AA), 24 Jan 1976, *Burger* 292 (PRE); Mulders Drift road (–AA), 13 Mar 1927, *Young* 26450 (PRE); Kensington Ridge (–AA), Dec 1932, *Neydorn s.n.* (PRE); Melville Koppies Nature Reserve (–AC), 4 Feb 2014, *Kondlo, Magoale, Mogale, & Konanani* 2902 (PRE); Ashburry station (–CA), 29 Nov 1925, *Smith* 1351 (PRE); Suikerbosrand (–CB), 23 Dec 1971, *Bredenkamp* 539 (PRE); Melville Koppies (–CC), 27 Dec 1971, *Macnae s.n.* (NBG). —MPUMALANGA: **2430 (Pilgrims Rest):** on road from Machadodorp to Sabie via Houtbosloop (–DB), 16 Jan 1969, *Hilliard* 5954 (NU); Blyde River Nature Reserve (–DD), 21 Jan 1969, *Hilliard & Burt* 6029 (PRE). **2529 (Witbank):** 10 km from Grobersdal on road to Nebo (–AB), 4 Mar 1986, *Germishuizen* 3734 (PRE); Kwa-Ndebele, Farm Goederde (–AC), 16 Mar 1981, *Du Toit* 207 (PRE); Loskop Dam (–AD), 19 Dec 1966, *Theron* 855 (PRE); Mapoch's Cave (–BB), 18 Jan 2005, *Suelankomo* 232 (PRE); Middleburg, Doornkop 273 (–CB), 14 Feb 1968, *Du Plessis* 398 (PRE); Middleburg, Doornkop 273 J.S. (–CB), 29 Oct 1968, *Du Plessis* 951 (PRE); Farm Doornrug ca. 16 km West of Witbank next to the N4 (–CC), 18 Dec 2003, *Nkonki* 74 (PRE); ca. 15 km N of Belfast on road to Stofberg (–DB), 30 Jan 1996, *Jordaan* 3100 (PRE). **2530 (Lydenburg):** Witklip (–BD), 13 Dec 1973, *Kluge* 370 (PRE); along R541 towards Machadodorp ca. 15.4 km directly NNW of Badplaas (–CD), 27 Nov 2017, *Bester* 13905 (PRE). **2630 (Carolina):** 20 km from Lochiel on road to Badplaas (–BA), 6 Mar 1986, *Germishuizen* 3860 (PRE); **2531 (Komatipoort):** Barberton (–CC), Nov 1913, *Rogers* 12862 (PRE); Komatipoort (–CC), Dec 1913, *Rogers* 13722 (PRE); Kangwane, Songimvelo Game Reserve (–CC), 9 Dec 1992, *Germishuizen* 5767 (PRE); Kangwane, Songimvelo Game Reserve (–CC), 9 Dec 1992, *Germishuizen* 5686 (PRE).

Swaziland (Eswatini). —**2631 (Mbabane):** ca. 20.9 km turn off to Pigg's Peak from Mbabane (–AB), 19 Jan 1966, *Hilliard* 3561 (NU).

Zimbabwe. —**1831 (Marondera):** Nyanga village (–DA), 2 Jan 1975, *Nicholas* 302 (NU).

5. *CHAMAECRISTA FALCATA* Musandiwa & Boatwr., *Phytotaxa* 413(4): 275 (2019). TYPE: SOUTH AFRICA. KwaZulu-Natal Province, Hlabisa (2832): Hluhluwe-Imfolozi Park [Umfolozi Game Reserve], (–AA), 11 Nov 1954, *Ward* 2439 (holotype: PRE!, isotype: NU!).

Perennial herbs, \pm 0.3 m tall. Stems decumbent or prostrate, multiple branching from woody rootstock, erect to semi-erect covered with short curved and long patent hairs. Leaves

paripinnate, 10–50 \times 10–25 mm, tapering distally; stipules, 3–9 mm long, triangular, base oblique, apex acuminate, margin with long hairs; rachis channelled; rachis extension 2–4 mm long; extrafloral nectaries in upper half of the petiole or slightly above the middle, sometimes on rachis of lower leaflets, with a distinct stalk 1.0–1.5 mm long, dark brown, 0.02–0.03 mm in diameter, concave at the top. Leaflets 4–15-jugate, 3–15 \times 1.5–4.0 mm, falcate, base oblique, apex acuminate, top surface with long scattered hairs, bottom surface glabrous, margin with curved or straight hairs; midrib strongly excentric towards anticous margin. Inflorescences axillary; 1–2 flowered; bract hairy, base oblique, apex acuminate, \pm 3 mm long; bracteoles 2, narrowly triangular, base oblique, apex acuminate, with long patent hairs, above the upper half of the pedicel or towards top of pedicels. Pedicels with long scattered straight or curved hairs, at flowering (20)30–45 mm long, at fruiting (22)30–55 mm long. Sepals 5, narrowly lanceolate, 6–8 mm long. Petals 5, sub-equal, 8–9 \times 4–5 mm, obovate, bright yellow. Stamens 10, with very short filaments, \pm 2 mm long, straight or slightly curved, anthers in three series, 5 small \pm 3 mm long, 2 medium \pm 4 mm long, slightly broader than the rest, 3 large \pm 5 mm long. Ovary \pm 10 mm long, densely hairy with straight or curved greyish hairs; style glabrous, narrow. Pods straight or slightly curved in the middle, 15–50 \times 3–5 mm, flattened, with short curved hairs. Seeds not seen.

Diagnostic Characters—*Chamaecrista falcata* is distinguished by its long stalked extrafloral nectaries (1.0–1.5 mm), long pedicels (30–45 mm long at flowering), and widely spaced leaves and broadly falcate leaflets (> 1.5 mm wide). The species has previously been confused with *C. capensis* but is readily distinguished from the *C. capensis* varieties by the long stalked extrafloral nectaries 1.0–1.5 mm long (Fig. 3H) (less than 1 mm in *C. capensis*), fewer and wider leaflets (more and narrower leaflets in *C. capensis*) and small flowers (large in *C. capensis*). The species shares the stalked extrafloral nectaries with *Chamaecrista grantii* Standl., but differs in the falcate leaflets (oblong in *C. grantii*), extrafloral nectaries on longer stalks, 1.0–1.5 mm (less than 1 mm in *C. grantii*), the strongly excentric leaflet midribs (rarely so in *C. grantii*) and the smaller petals (8–9 \times 4–5 mm in *C. falcata* vs. 10–14 \times 6–9 mm in *C. grantii*).

Distribution and Ecology—The species is currently known only from the summer rainfall region of South Africa. It occurs in the Waterberg in Limpopo, and in the Hluhluwe-Umfolozi Park (formerly known as Hluhluwe-Imfolozi Game Reserve) in KwaZulu-Natal in grasslands on rocky or sandy soil at elevations below 240 m (Fig. 8). Flowering from November to January.

Additional Specimens Examined—South Africa. —LIMPOPO: **2428 (Nylstroom):** 7 miles (ca. 11 km) E of Magalakwin causeway (–BB), 10 Jan 1955, *Mogg* 24430 (PRE). —KWAZULU-NATAL: **2732 (Ubombo):** 16 km from Jozini on road to Ingwavuma (–AC), 28 Nov 1978, *Germishuizen* 01016 (PRE). **2832 (Mtubatuba):** Hluhluwe Game Reserve (–AA), 11 Nov 1954, *Ward* 2439 (PRE, NU); Gunjaneni (–AB), 16 Nov 1955, *Ward* 2709 (NU).

6. *CHAMAECRISTA FALCINELLA* (Oliv.) Lock in *Kew Bull.* 43: 336 (1988). *Cassia falcinella* Oliv. in *F.T.A.* 2: 282 (1871); Bak. f., *Leg. Trop. Afr.* 3: 641 (1930); Steyaert in *F.T.B.* 3: 520 (1952); Brenan in *Kew Bull.* 14: 178 (1960), in *F.T.A. Legum. Caesalp.*: 90 (1967). TYPE: TANZANIA. Bukoba district, Karagwe, *Grant* 445 (holotype: K [K00232433]–image!).

This species occurs widely from central tropical to southern Africa (Gordon-Gray 1977). Three varieties are recognised, of which only one, *C. falcinella* var. *parviflora*, occurs in

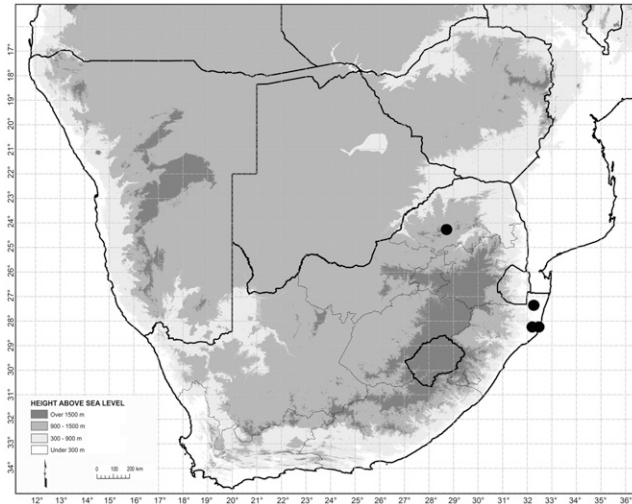


FIG. 8. Known distribution of *Chamaecrista falcata* in southern Africa.

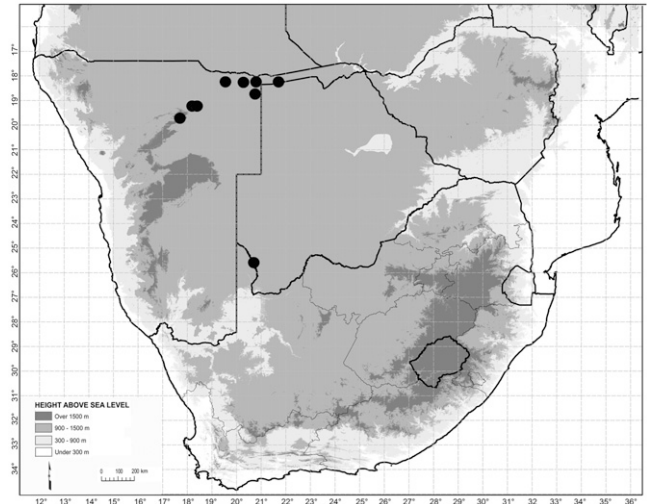


FIG. 9. Known distribution of *Chamaecrista falcinella* var. *parviflora* in southern Africa.

southern Africa. *Chamaecrista falcinella* var. *falcinella* is known from Kenya, Uganda, Tanzania, and Democratic Republic of Congo, and *C. falcinella* var. *intermedia* (Brenan) Lock from Tanzania and Zambia (Brenan 1967).

6a. CHAMAECRISTA FALCINELLA var. PARVIFLORA (Steyaert) Lock, Kew. Bull. 43: 336 (1988); Brummitt in Fl. Zambesiaca 3 (2): 132 (2007). *Cassia flacinella* var. *parviflora* Steyaert in Bull. Jard. Bot. État 20: 251 (1950); in F.C.B. 3: 521 (1952); Brenan in Kew Bull. 14: 179 (1960); Brenan in F.T.E.A., Legum.-Caesalp.: 91 (1967); Gordon-Gray in F.S.A. 16(2): 101 (1977). TYPE: RWANDA. Gabiro, *Becquet 613* (holotype: BR [BR0000008955234]-image!).

Annual herbs to 0.6 m high. Stems erect, slightly woody at the base, with long spreading and short curved hairs. Leaves paripinnate, 25–55 × 7–15 mm, oblong, slightly tapering distally; stipules 9–14 mm long, narrowly falcate, base oblique, apex acuminate, margin ciliate; extrafloral nectaries, sessile to sub-sessile, elliptic to circular, 0.5–1.0 × 0.3–0.5 mm; rachis channelled, with long straight or curved hairs. Leaflets 10–19-jugate, 4–15 × 2.5–4.0 mm, slightly curved towards the tip, narrowly oblong to ovate, base asymmetric, apex mucronate, midrib close to the end of one margin, margin pubescent or ciliate. Inflorescence supra-axillary, 1–3 flowered; flowers 5–7 × 4–7 mm long; bract narrowly triangular, base oblique, apex acuminate; bracteoles 2, with long curved hairs, towards top of pedicels. Pedicels with long curved spreading hairs, at flowering 10–25 mm long. Sepals 5, ovate, 5–9 × 1.5–2.0 mm, covered with short hairs. Petals 5, obovate. 4–6 × 2–5 mm. Stamens 10, straight or slightly curved, anthers in two series, 5 small 1.5–2.0 mm long, 5 large 4–5 mm long, filaments very short 1 mm long. Ovary ± 5 mm long, densely covered with white hairs, style ± 1 mm long, glabrous, slightly curved. Pods 20–50 × 4–5 mm, sparsely covered with long soft hairs or glabrescent. Seeds 2–3 × 1–2 mm, rhomboid, flattened, with dark dots at the top.

Diagnostic Characters—*Chamaecrista falcinella* var. *parviflora* is distinguished by the elliptic to circular, sessile to sub-sessile extrafloral nectaries. The species resembles *Chamaecrista biensis* in having small flowers and short pedicels, but can be distinguished by the narrowly falcate stipules (straight in *C. biensis*), and 10–19 leaflets (7–36 leaflets in *C. biensis*).

Distribution and Ecology—*Chamaecrista falcinella* var. *parviflora* is widespread in Namibia from Karakuwisa to Grootfontein extending to Mata Mata in the Northern Cape Province (Fig. 9). *Chamaecrista falcinella* var. *parviflora* grows in grasslands in sandy or well-drained soil at elevations below 1000 m. Flowering is from February–April.

Additional Specimens Examined—Namibia. —1819 (Karakuwisa): Cigarrete, NE of Karakuwisa (–BA), 8 Feb 1953, *Maguire 2437* (NBG). 1820 (Tarikora): near pan, Shakambu (–AA), 05 Apr 2006, *Horn HOR2/357* (WIND); Ndonga Camp at junction of Omuramba Omatako and Okavango River (–BA), 12 Feb 1956, *De Winter & Marais 4619* (PRE); 10 miles (ca. 16 km) north of Tamsos on road to Kapupahedi (–DA), 17 Feb 1956, *De Winter & Marais 4728* (PRE). 1821 (Andara): southern border of Mahango Game Reserve (–BC), 22 Feb 1988, *Hines 992* (WIND); 1917 (Atavi): north of Kombat on Farm Gauss (–DA), 02 Mar 1995, *Germishuizen 7309* (PRE). 1918 (Grootfontein): Grootfontein North (–AA), 04 Mar 1958, *Merxmuller 1788* (PRE); 12 miles (ca. 19.3 km) from Otovi Farm (–AA), 2 Apr 1965, *Hardy 2116* (PRE).

South Africa. —NORTHERN CAPE: (2520) (Mata Mata): Kalahari Park [Kgalagadi Park] (–DB), Feb 1978, *Van der Walt 5775* (PRE).

7. *Chamaecrista gordon-grayei* Musandiwa & Boatwr., sp. nov. TYPE: NAMIBIA. Andara (1821), Caprivi-Zipfel, Popa fälle [Popa Falls] Caprivi Zipfel [Caprivi Strip] (–BA), 9 Mar 1958, *Giess 2020* (holotype: WIND!).

Annual herbs to 1.5 m high. Stems erect or semi-erect, with curved hairs. Leaves paripinnate, 36–104 × 2–4 mm, slightly tapering distally; stipules 6–11 mm long, triangular, base oblique, apex acuminate; extrafloral nectaries, sessile or raised on small stalk, ± 0.5 × 0.2–0.4 mm circular; rachis crested. Leaflets 20–65-jugate, 15–90 × 0.2–0.3 base oblique, apex acuminate, tapering distally; margin glabrous to ciliate. Inflorescence supra-axillary, 1–2 flowered; flowers 4–5 × 4–6; bract glabrous, base oblique, apex acuminate; bracteoles 2, glabrous, towards top of pedicels. Pedicels with short hairs, at flowering 7–25 mm long, at fruiting 10–30 mm long. Sepals 5, narrowly lanceolate, 6–9 × 1–4 mm, with or without appressed hairs, on the outer surface. Petals 5, ovate, ± 6 × 2–6 mm; bright yellow. Stamens 9–10, slightly curved, anthers in three series, 2(3) small, 2–3 mm long, 4 middle, ± 4 mm long, 3(4) large, ± 5 mm long, with very short filament 1–2 mm long. Ovary ± 0.5 mm long, densely covered with greyish to whitish hairs, style glabrous, curved. Pods

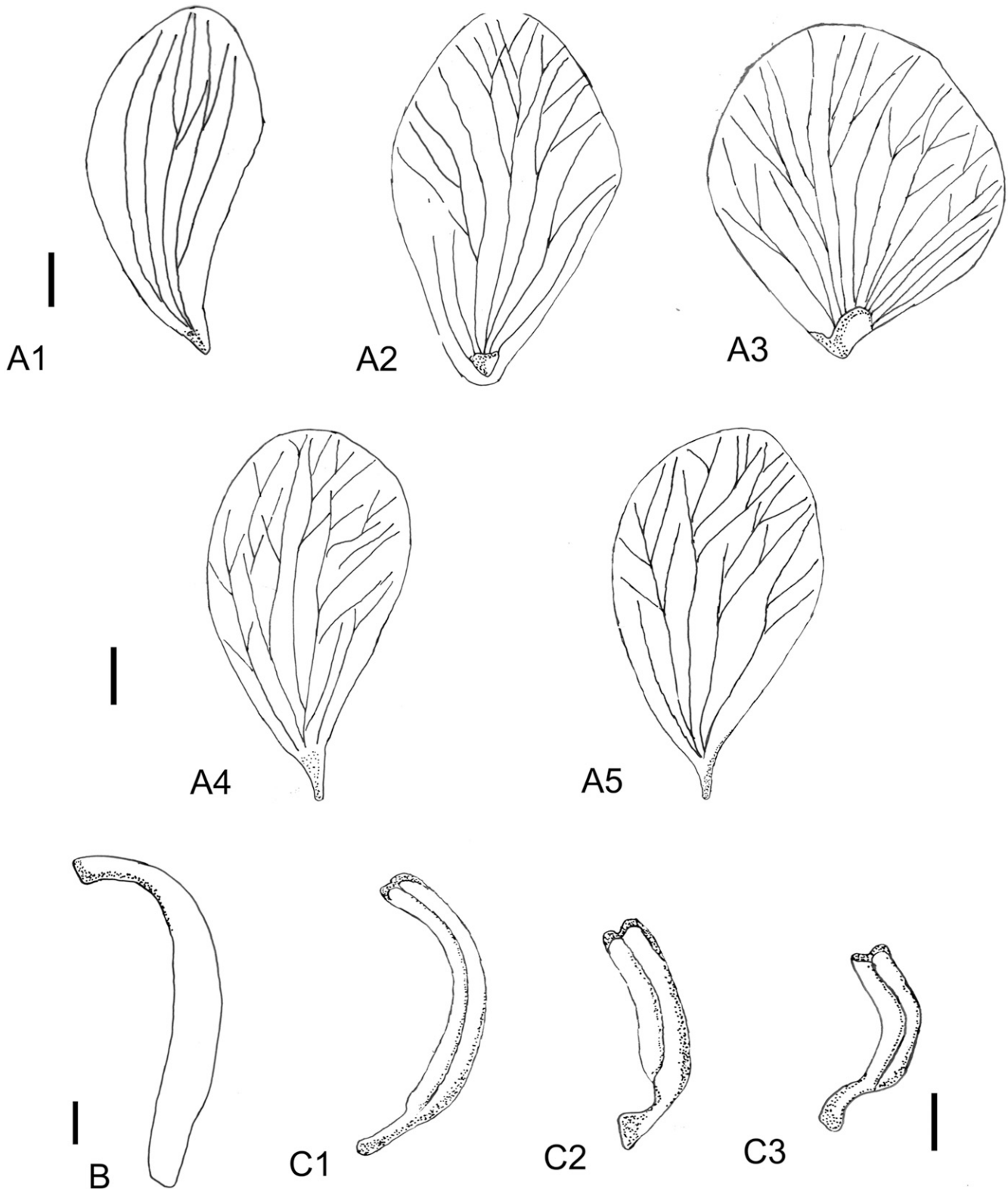


FIG. 10. Morphology of *Chamaecrista gordon-grayeri*. A1–A5. Petals. B. Ovary, densely hairy. C1–C3. Stamens, with anthers in three series. Voucher: *Muller & Giess 554* (WIND). Scale bars = 1 mm.

(30)50–63 mm long, straight, or slightly curved with suppressed hairs. Seeds not seen. Figure 10.

Diagnostic Characters—*Chamaecrista gordon-grayeri* shares the crested leaf rachis with *C. grandiglandulata* and *C. mimosoides*, but is distinguished from those species by the long

leaves (36–104 mm long), with sub-sessile to sessile, circular extrafloral nectaries (large extrafloral nectaries that overlap the sides of petiole in *C. grandiglandulata* and small, circular or circular-elliptic extrafloral nectaries in *C. mimosoides*), and bright yellow flowers.

Etymology—*Chamaecrista gordon-grayei* is named in honour of Dr. Kathleen D. Gordon-Gray (1918–2012) who showed remarkable passion for the southern African flora.

Two subspecies are recognised:

7a. *CHAMAECRISTA GORDON-GRAYEI* subsp. *GORDON-GRAYEI*.

Pedicels when flowering 7–10 mm long, at fruiting 10–15 mm long.

Diagnostic Characters—*Chamaecrista gordon-grayei* subsp. *gordon-grayei* is recognised for its short pedicels (7–10 mm long).

Distribution and Ecology—*Chamaecrista gordon-grayei* subsp. *gordon-grayei* is known from northern regions of Namibia from Tarikora to Andara, extending beyond the region to Harare in Zimbabwe (Fig. 11). Occurs in woodlands, on sandy soil at elevations below 1000 m. Flowering from January–February.

Additional Specimens Examined—**Namibia.** —1820 (**Tarikora**): Kavango, Bogani old point in the shallow water of the Okavango River (–BB), 25 Apr 1977, *Muller and Giess 544* (WIND). 1823 (**Siambisso**): Balezwa banks of Channel (–AB), 21 Feb 1988, *Maggs 665* (WIND).

Zimbabwe. —1731 (**Harare**): Harare (–AB), without date, *A student s.n.* (NU).

7b. *Chamaecrista gordon-grayei* subsp. *longipedicellata* Musandiwa & Boatwr., subsp. nov. TYPE: NAMIBIA. Andara, Omuramba Mahango between Bangani and Bechuanaland border, 25 Jan 1956, *De Winter and Wiss 4423* (holotype: PRE!, isotype: WIND!).

Pedicels when flowering 15–30 mm long, at fruiting 15–30 cm long.

Diagnostic Characters—*Chamaecrista gordon-grayei* subsp. *longipedicellata* is recognised by its long pedicels (15–20 mm long).

Distribution and Ecology—*Chamaecrista gordon-grayei* subsp. *longipedicellata* is known from Chirundi in Namibia through Katima Mulilo to Tsumkwe, extending to Siambisso in Botswana and beyond the region to Harare in Zimbabwe. Apparently absent from South Africa but with one record in Harare, Zimbabwe (Fig. 11). Occurs in woodlands, on sandy soil at elevations below 1000 m. Flowering from January–February.

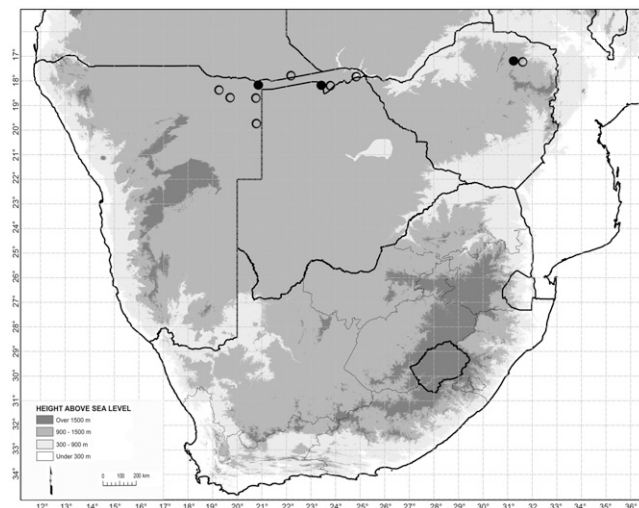


FIG. 11. Known distribution of *Chamaecrista gordon-grayei* subsp. *gordon-grayei* (●) and *Chamaecrista gordon-grayei* subsp. *longipedicellata* (○) in southern Africa.

Etymology—*Chamaecrista gordon-grayei* subsp. *longipedicellata* is named for its long pedicels.

Additional Specimens Examined—**Namibia.** —1722 (**Chirundi**): Caprivi Game Park, on road to Angola border from Divundu-Kongola main road (–CC), 20 Jan 2005, *Hochobes MH1122* (WIND). 1724 (**Katima Mulilo**): near Ngoma in Terminalia (–DC), 10 Feb 1988, *Maggs 197* (WIND). 1819 (**Karakuwisa**): Mile 46, observatory, plot 89 (–AD), 18 Feb 2003, *Strohbach BS5621* (WIND); at Camp just S of Mutumpo Observatory (–DA), 06 Feb 2002, *Strohbach BS5275* (WIND). 1820 (**Tarikora**): 10 miles (ca. 16 km) north of Tamsu on road to Kapupahedi (–DA), 17 Feb 1956, *De Winter & Marais 4728* (PRE). 1920 (**Tsumkwe**): ca. 48.2 km N of Gautscha Pan (–DA), 07 Feb 1958, *Story 6439* (WIND).

Botswana. —1823 (**Siambisso**): Burkea/Baikiaea woodland near Movombe village (–BA), 14 Feb 1983, *Smith 4034* (PRE).

Zimbabwe. —1731 (**Harare**): Cleveland Dam (–BA), 07 Feb 1976, *Daillecourt 25* (NU).

8. *Chamaecrista grandiglandulata* Musandiwa & Boatwr., sp. nov. TYPE: SOUTH AFRICA. KwaZulu-Natal Province, Mutubatuba (2832), ‘north coast Richards Bay Harbour’ (–CC), 23 Feb 1993, *Ward 12210* (holotype: PRE!, isotype NU!).

Annual herbs to 1.5 m high. Stems erect, arising from a woody rootstock, erect, usually branching above the middle, pubescent, with short curved hairs. Leaves paripinnate, 40–74 × 3–7 mm; slightly tapering distally, stipules triangular, 6–8(9) mm long, glabrous, base oblique, apex narrowly acuminate, margin with short hairs; extrafloral nectaries at or near top of petiole, large, overlaps the sides of petiole, 1–2 × 0.5–1.0 mm, sessile, oval to circular or elliptic, brown; rachis crested. Leaflets 40–74-jugate, base oblique, apex mucronate; margin with curved scattered hairs. Inflorescence supra-axillary, 1–2 flowered; flowers 6–10 × 5–8; bracts pubescent, base oblique, apex acuminate; bracteoles 2, glabrous or with short hairs, towards the top of pedicel. Pedicels with short or curved hairs, at flowering 5–7 mm long, at fruiting 7–10 mm long. Sepals 5, narrowly lanceolate, 5–6 × 1–4 mm, with short appressed hairs. Petals 5, oblong, 5–10 × 3–5 mm, pale yellow. Stamens 10, straight or slightly curved, anthers in two series, 6 small 2–4 mm long, 4 large, 5–10 mm long, with short filaments ± 1 mm long. Ovary ± 7 mm long, densely covered with greyish to whitish matted hairs, style curved, glabrous. Pods straight or slightly curved in the middle, 32–50 × 3–4 mm, flattened, with short or long fine hairs. Seeds 2.0–3.5 × 1.5–2.5, rhomboid, flattened, dark brown to blackish. Figure 12.

Diagnostic Characters—*Chamaecrista grandiglandulata* shares a crested rachis with *Chamaecrista gordon-grayei*, *C. mimosoides* and *C. plumosa*. It is readily distinguished by its short leaves 40–74 mm long (36–104 mm long in *C. gordon-grayei* and 30–85 mm long in *C. mimosoides*); large, sessile, elliptic extrafloral nectaries that overlap the sides of petiole, 1–2 × 0.5–1 mm (Fig. 3F) (circular, sessile or raised on small stalk, ± 0.5 × 0.2–0.4 mm in *C. gordon-grayei* and small, ± 0.5 mm long, sessile, rounded in *C. mimosoides*) and short pedicels bearing small pale yellow flowers (bright flowers in *C. gordon-grayei*).

Distribution and Ecology—*Chamaecrista grandiglandulata* is restricted to the coastal regions of KwaZulu-Natal in South Africa from Ubombo to Port Shepstone, occurring in open grassland at elevations below 500 m (Fig. 13). Flowering from September to July.

Etymology—This species epithet refers to the large, sessile, elliptic extrafloral nectaries characteristic of this species.

Additional Specimens Examined—**South Africa.** —KwaZULU-NATAL: 2732 (**Ubombo**): Baya Camp, Sibaya south western basin (–BC), 12 Dec 1985, *Ward 1219* (NH); Lake Sibayi (–BC), 13 Feb 1976, *Brenan 14218* (NBG); Mkuze Swamps, Ukhovu Pan area (–DC), 9 Sep 1972, *Ward 8102*

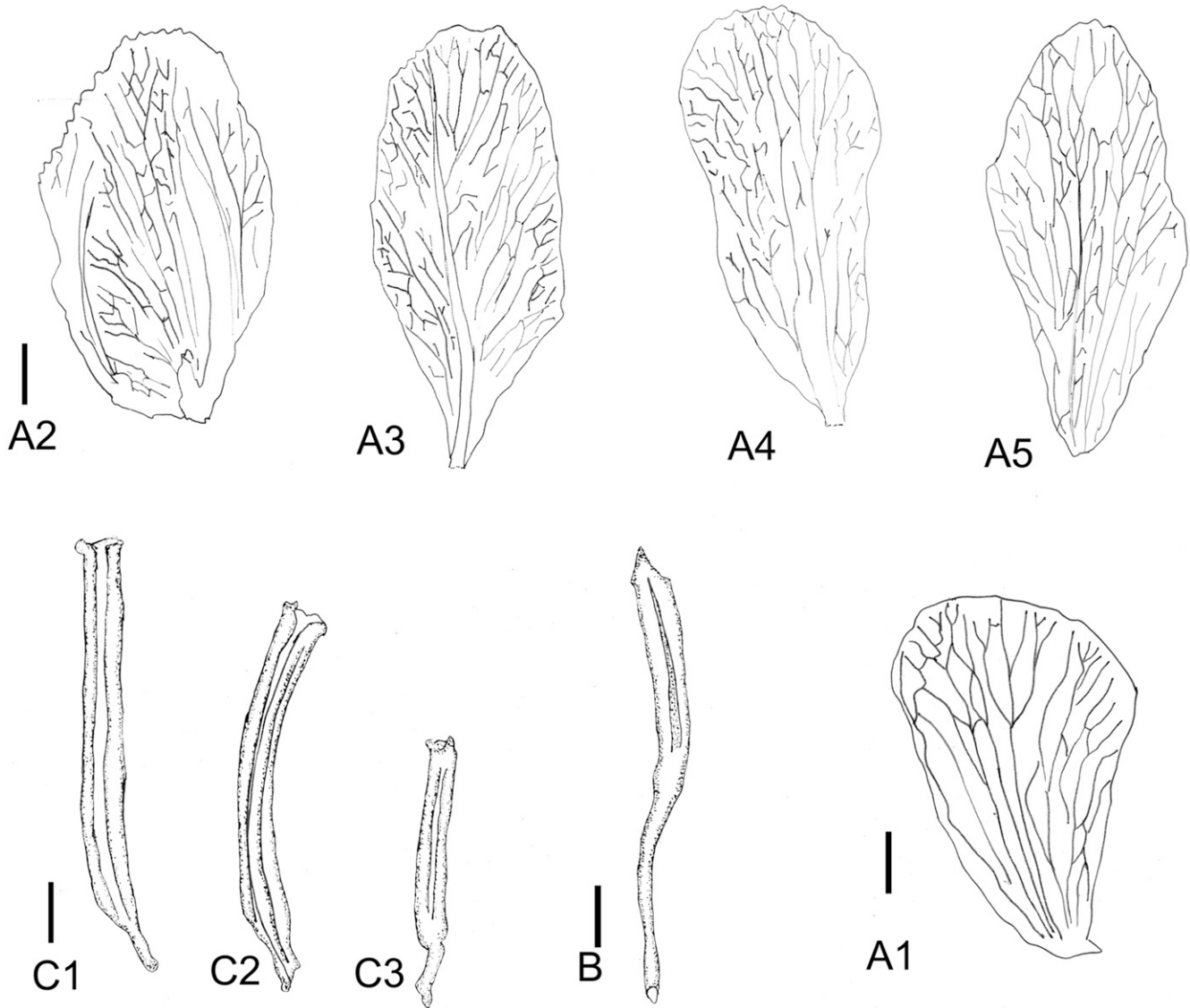


FIG. 12. Morphology of *Chamaecrista grandiglandulata*. A1–A5. Petals. B. Ovary, densely hairy. C1–C3. Stamens, with anthers in three series. Voucher: Schorn 33 (NU). Scale bars = 1 mm.

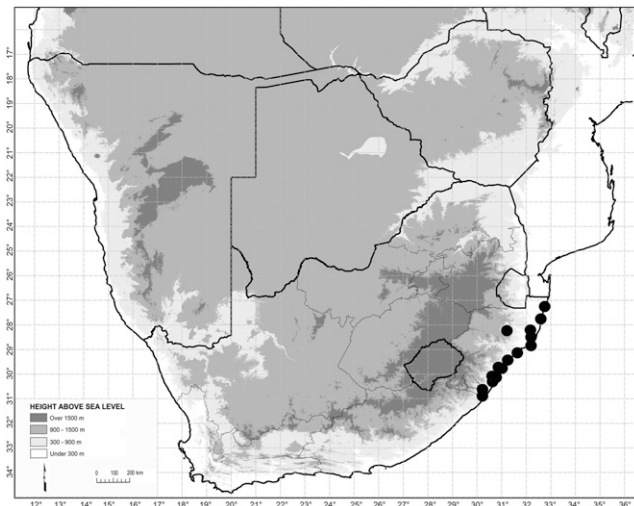


FIG. 13. Distribution of *Chamaecrista grandiglandulata* in southern Africa.

(NU). **2831 (Nkandla):** Egodeni, Hluhluwe Game Reserve, Zululand (–AA), 19 Mar 1972, *Nitchins 804* (NU). **2832 (Mtubatuba):** Khula village (–AA), 18 Mar 2018, *Musandiva 17* (NBG); Hluhluwe Game Reserve, Zululand (–AA), 28 Mar 1972, *Hutchins 804* (NU); Hlabisa, Dukuduku (–AC), 22 Jan 1965, *Strey 5710* (NU); Umfolozi, Richards Bay (–DD), 6 Jul 1974, *Ward 8652* (NU); Umfolozi, Richards Bay (–DD), 14 Jul 1929, *Rump s.n.* (NU); Mtunzini near river estuary (–DD), 22 Jan 1980, *Arnold 1408* (PRE). **2930 (Pietermaritzburg):** Westville Chiltan Hills (–DD), 10 Feb 1968, *Ward 6409* (NU); Greater Durban Metropolitan Area, Kloof extension 13 (–DD), 16 Apr 1995, *Ward 13069* (NU); Umlaas River (–DD), 6 Dec 1973, *Stirton 521* (NU). **2931 (Stanger):** Inyoni, Zululand (–BA), 10 Dec 1951, *Johnson s.n.* (NBG); Lower Tugela (–CA), 27 Mar 1964, *Ross 862* (NU); Merebank East (–CC), 7 Mar 1966, *Ward 5406* (NU); Wentworth (–CC), 29 Feb 1968, *Ward 6514* (NU). **3030 (Port Shepstone):** 8 km to Kingsburg (–BB), 24 Sep 1974, *Wood 199* (NU); Illovo beach (–BB), 7 Mar 1972, *Schorn 33* (NU); Koelwaters resort ca. 4 km from Ntwalume (–BC), 2 Apr 2003, *Bester 4050* (PRE); Uvongo and Depps road (–CB), 10 Mar 1970, *Strey 9706* (NU); St. Michaels on sea, 1.5 km inland (–CD), 23 Feb 1969, *Nicholson 772* (PRE); Margate (–CD), 6 Apr 1975, *Strey 11320* (NU).

9. *CHAMAECRISTA MIMOSOIDES* (L.) Green, *Pittonia* 4 (20): 27 (1899); Brummitt in *Fl. Zambesiaca* 3(2): 136 (2007). *Cassia mimosoides* L. Sp. Pl.: 379 (1753); Oliver in *F.T.A.* 2: 280

(1871); Baker, Legum. Trop. Afr.: 642 (1930); Steyaert in F.C.B. 3: 514 (1952); Mendonça & Torre in C.F.A. 2: 181 (1956); Keay in F.W.T.A., ed.2, 1: 453 (1958); Brenan in F.T.E.A., Legum.-Caesalp.: 100 (1967); Ross, Fl. Natal: 195 (1973); Gordon-Gray in F.S.A. 16(2): 104 (1977).
 TYPE: SRI LANKA. Zeylona, without date, *Hermann 154* (lectotype: BM [BM-000594576]–image!, designated by Larsen et al. 1980).

Annual herbs to 0.8 m high. Stems prostrate or decumbent, branching from the ground becoming rounded, with appressed short curved hairs. Leaves paripinnate, 30–85 × 2–7 mm, slightly tapering distally; stipules, 4–9 mm long, triangular, base oblique, apex acuminate; extrafloral nectaries at or near top of petiole, small, ± 0.5 mm long, sessile, rounded; rachis crested. Leaflets 23–62-jugate, base oblique, apex mucronate; margin ciliate. Inflorescence supra-axillary, 1(2) flowered; flowers 3–6 × 3–5; bract with short curved hairs, base oblique, apex acuminate; bracteoles 2, glabrous, towards the top of pedicel. Pedicels with short appressed or sometimes with long straight hairs, at flowering 3–8 mm long, at fruiting 6–10 mm long. Sepals 5, lanceolate, 4–6 × 1–3 mm, with short curved hairs. Petals obovate, 4–8 mm. Stamens 9–10, slightly curved, flattened, anthers in three series, 2(3) small 2–3 mm long, 4 medium ± 4 mm long, 4 large ± 5 mm long, filaments short (1–2 mm long). Ovary densely covered with greyish to whitish hairs, style curved, glabrous. Pods straight or slightly curved, 35–60 × 3–4 mm, flattened, with appressed hairs. Seeds not seen.

Diagnostic Characters—*Chamaecrista mimosoides* can be confused with *C. grandiglandulata* and *C. gordon-grayei* with which it shares a crested rachis, but can be distinguished from those species by its low growth form, and small, circular or circular-elliptic extrafloral nectaries on the petiole (Fig. 3G).

Distribution and Ecology—*Chamaecrista mimosoides* is widespread in tropical Africa and southern Asia (Gordon-Gray 1977; Brummitt et al. 2007). In southern Africa, *C. mimosoides* is widespread from Lydenburg in Mpumalanga, through Vryheid and Stanger in Kwa-Zulu Natal, to Port St. Johns in the Eastern Cape extending across to Mbabane in Swaziland (Eswatini) (Fig. 14), growing in grassland in shallow soil at elevations below 1100 m. Flowering from November to May.

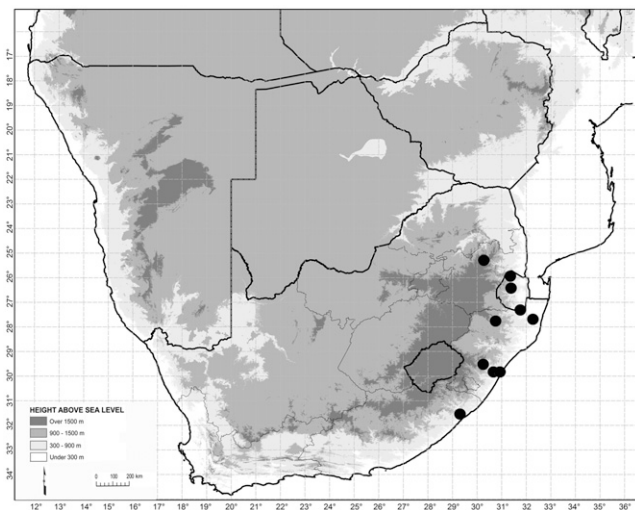


FIG. 14. Known distribution of *Chamaecrista mimosoides* in southern Africa.

Notes—The variation in *Chamaecrista mimosoides* has led various authors to recognise a number of different forms within the species. Brenan (1967) in his treatment of the Tropical East African species of the genus recognised seven forms. In southern Africa, however, Gordon-Gray (1977) recognised three separate forms. Form 1 was distinguished from typical *C. mimosoides* by its erect stems, often branching in the upper half (Fig. 1C), large, sessile, elliptic extrafloral nectaries that overlap the sides of the petiole, short pedicels and small pale flowers. This taxon is largely confined to the coastal areas of KwaZulu-Natal. Form 2 was distinguished by its low, rounded growth habit (Fig. 1A), small, circular-elliptic or circular extrafloral nectaries, and short pedicels bearing small pale yellow flowers. This taxon is widely distributed in KwaZulu-Natal, extending to the Eastern Cape and Mpumalanga Provinces. Form 3, distinguished by the small, subsessile to sessile extrafloral nectaries, and larger bright yellow flowers from other forms is known from Chirundi in Namibia through Katima Mulilo to Tsumkwe, extending to Botswana and beyond the region to Zimbabwe.

After examination of available herbarium material and field studies, the three forms are now recognised as separate species. Form 1, distinguished by its erect stems, branched in the upper half, the large, sessile, elliptic extrafloral nectaries that overlap the sides of petiole, short pedicels, and small pale flowers with 10 stamens and anthers that are divided into two series (6 small, 2–4 mm long; 4 large, 5–10 mm long) is now recognised as the separate species *Chamaecrista grandiglandulata* (described herein as new). Form 3, distinguished by small, subsessile to sessile extrafloral nectaries, and slightly larger bright flowers with 9–10 stamens divided into three series (2(3) small 2–3 mm long, 4 medium ± 4 mm long, 4 large ± 5 mm long) is now recognised as separate species *Chamaecrista gordon-grayei* (described herein as new). Gordon-Gray (1977) erroneously considered form 3 as the typical form of *Chamaecrista mimosoides*, however, this form differs from the type of *Chamaecrista mimosoides* by the subsessile to sessile extrafloral nectaries, and development of branched and long pedicels. In addition, we recognise two separate forms within *C. gordon-grayei* distinguished by short pedicels 7–10 mm long, and long pedicels 15–30 mm long. Of these forms, we relegate the form with long pedicels to subspecific level and recognise it as *C. gordon-grayei* subsp. *longipedicellata*. No other characters were found warranting the idea of raising the form with long pedicels to species rank.

Form 2, distinguished by small, circular extrafloral nectaries, and short pedicels bearing small pale yellow flowers with 9–10 stamens divided into three series (2(3) small 2–3 mm long, 4 medium ± 4 mm long, (3)4 large ± 5 mm long) resembles the lectotype of *Chamaecrista mimosoides* designated by Larsen et al. in Aubreville & Leroy (ed.), Fl. Cambodge Loas Viet-Nam 18: 105 (1980). We therefore recognised it as typical *C. mimosoides*. Future studies should investigate *Chamaecrista mimosoides* across its wide distribution range to determine whether it is in fact only one widespread taxon.

Additional Specimens Examined—**SOUTH AFRICA**. —MPUMALANGA: 2530 (Lydenburg): 20 km from Lydenburg on road to Dullstroom (–AC), 05 Mar 1979, *Germishuizen 1072* (NH). 2531 (Komatipoort): Barberton (–CC), Jul 1915, *Thorncroft 885* (PRE). —KWAZULU-NATAL: 2730 (Vryheid): Itala Nature Reserve (–DD), 23 Jan 1978, *McDonald 495* (NU). 2731 (Louwsburg): Jozini dam (–BD), 13 Dec 1965, *Burt 3215* (NU). 2732 (Ubombo): Nkuzi Game Reserve, Mougeue (Stand 4) (–CB), 10 May 1976, *Goodman 655* (NU). 2930 (Pietermaritzburg): Shongweni dam (–CB), 22 Feb 1966, *Morris 772* (NU); Isipingo flats (–DD), 20 Mar 1968, *Ward 6527*

(NU). **2931 (Stanger)**: Beachwood, Durban (–CC), 7 Dec 1956, *Lawson* 321 (NU). —EASTERN CAPE: **3129 (Port St. Johns)**: banks of Umgazana River (–CB), Apr 1976, *Gans* 43 (NU).

Swaziland (Eswatini). —**2631 (Mbabane)**: Komati old ferry (–AC), 18 Feb 1960, *Compton* 29826 (NH).

10. CHAMAECRISTA PLUMOSA E.Mey., *Comm. Pl. Afr. Austr.*: 159 (1836); Brummitt in *Fl. Zambesiaca* 3(2): 138 (2007). *Cassia plumosa* (E.Mey.) Vogel, *Syn. Gen. Cassiae* 64 (1837); Ross, *Fl. Natal*: 195 (1973); Gordon-Gray in *F.S.A.* 16(2): 103 (1977). TYPE: SOUTH AFRICA. Eastern Cape Province, 'between Bashee [Mbashe] River and Umtata', without date, *Drège s.n.* (lectotype: K, [K000417581]–image!, designated here). [Note: We could not trace any material in P and other herbaria, therefore we select the collection at K as lectotype].

Chamaecrista plumosa var. *diffusa* E.Mey., *Comm. Pl. Afr. Austr.*: 159 (1836). *Cassia plumosa* var. *diffusa* (E.Mey.) Vogel, *Syn. Gen. Cassiae* 65 (1837). TYPE: SOUTH AFRICA. KwaZulu-Natal Province, Hlabisa, Hluhluwe Game Reserve, *Ward* 1873 (neotype: PRE!, designated here).

Note—The original Drège collection (Cape Province [Eastern Cape] near Umzimkulu [Omsamcula], *Drège s.n.* (whereabouts unknown)) cited by Meyer could not be located as most of his collections were housed at B and largely destroyed, so we here designate a collection of Ward as neotype as it is the most complete collection with matured flowers.

Perennial herbs, to 1.8 m high. Stems single or multiple, erect or semi-erect, arising from woody rootstock, producing branches in the upper half, or prostrate and branched to form spreading mat, glabrous or with appressed curved or straight hairs, often reddish to purplish one side. Leaves paripinnate, 10–90 × 1–10 mm, slightly tapering distally; stipules triangular, 0.4–0.9 mm long, base oblique, apex acuminate, glabrous or pubescent; extrafloral nectaries at the top of petiole, sessile, circular, ovate or elliptic, 0.2–0.8 mm long, rachis crenate-crested. Leaflets 13–38-jugate, base oblique, apex acuminate, glabrous or pubescent, margin with white hairs. Inflorescence axillary, 1–3 flowered; flowers 7–17 × 5–10 mm long; bract often with short hairs; base oblique, apex acuminate, margin ciliate; bracteoles 2, glabrous or shortly pubescent, or covered with long appressed hairs. Pedicels densely or sparsely covered with appressed hairs, at flowering 10–30 mm long, at fruiting ± 25. Sepals 5, ovate, 7–10 × 1–3 mm, sparsely appressed pubescent. Petals 5, obovate, 7–15 × 5–9 mm, bright yellow. Stamens 10, straight or curved, anthers in two series, 6 small 3–4 mm long, 4 large 6–7 mm long, filaments very short, 1 mm long. Ovary 5–7 mm long, densely covered with greyish hairs, style glabrous, up to 5 mm long, slightly curved. Pods 25–60 × 3–5 mm, flattened, straight or slightly curved, sparsely appressed pubescent. Seeds 3–4 × 1.5–2.0 mm, rhomboid, flattened, dark brown to light brown.

Diagnostic Characters—*Chamaecrista plumosa* can sometimes be confused with *C. capensis* with which it shares the large flowers, but is readily distinguished by the crested rachis (channeled in *C. capensis*) and sessile, circular, ovate or elliptic, extrafloral nectaries (sub-sessile or raised in small stalk in *C. capensis*).

Two varieties are recognised:

10a. CHAMAECRISTA PLUMOSA E.Mey. var. PLUMOSA. *Cassia plumosa* (E.Mey.) Vogel var. *plumosa*, Schorn & Gordon-Gray in *J.S. Afr. Bot.* 41: 153 (1975); Gordon-Gray in *F.S.A.* 16(2): 104 (1977).

Prostrate and diffusely branched herbs, with several branches from the ground forming spreading mat 0.4 m in diameter. Stems glabrous or sub-glabrous, or with short appressed curved greyish becoming dense at the top parts, often reddish or purplish on one side. Leaves 10–45 × 1–10 mm.

Diagnostic Characters—*Chamaecrista plumosa* var. *plumosa* is distinguished by its short prostrate stems, with several branches from the ground forming a spreading mat to 0.4 m in diameter, glabrous or covered with curved appressed greyish hairs, and short leaves, up to 45 mm long.

Distribution and Ecology—*Chamaecrista plumosa* var. *plumosa* is widespread in KwaZulu-Natal from Ubombo through Mtubatuba to Port Shepstone (Fig. 15). Flowering from September to March.

Additional Specimens Examined—SOUTH AFRICA. —KWAZULU-NATAL: **2732 (Ubombo)**: Ingwavuma, Tongaland (–AB), 10 Dec 1968, *Pooley* 240 (NU); Ingwavuma, Malangeni E of Maputa (–BB), 19 Dec 1966, *Martin* 065 (NU); Lake Sibaya S Basin area (–BC), 5 Nov 1969, *Hart* 19 (NU); Mpilo Game Reserve (–CA), 19 Nov 1970, *Willo* 9 (PRE). **2832 (Mtubatuba)**: Hlabisa, Hluhluwe Game Reserve (–AA), 28 Nov 1953, *Ward* 1873 (PRE); Hlabisa, Hluhluwe Nature Reserve (–AA), 6 Oct 1983, *Phelan* 710 (NU); Hlabisa, Hluhluwe Nature Reserve (–AA), 1 Nov 1962, *Scott-Smith* 53 (NU); St Lucia E shores (–AD), 8 Dec 1974, *Smook* 630 (NU). **2930 (Pietermaritzburg)**: Farm Ambleside, New Hanover (–BC), 13 Feb 1976, *Abraham* 31 (NU); Shongweni Dam, Camperdown (–DC), 21 Feb 1966, *Morris* 713 (NU); Isipingo N (–DD), Oct 1948, *Ward* 555 (NU). **2931 (Stanger)**: Tugela River crossing main N. Coast road (–AB), 8 Dec 1973, *Stirton* 402 (NU); Lower Tugela (–AD), 29 Sep 1974, *Stirton* 1156 (PRE). **3029 (Kokstad)**: E Griqualand, near Clydesdale (–BD), Mar 1883, *Tyson* 1167 (NBG); Alfred Harding (–DB), 4 Jan 1964, *Lemox s.n.* (NU). **3030 (Port Shepstone)**: Umzinto Pennington S Coast (–BB), 5 Jan 6220, *Gordon-Gray* 6220 (NU); Oribi Gorge Nature Reserve (–CB), 6 Feb 1972, *Glen* 528 (NU).

10b. CHAMAECRISTA PLUMOSA var. ERECTA (Schorn & Gordon-Gray) Lock, *Kew Bull.* 43 (2): 337 (1988). *Cassia plumosa* var. *erecta* Schorn & Gordon-Gray in *J. S. Afr.* 41: 153 (1975); Gordon-Gray in *F.S.A.* 16 (2): 104 (1977). TYPE: SOUTH AFRICA. KwaZulu-Natal, Pietermaritzburg (2930), 'Camperdown, Inchanga', (–DC), 9 March 1972, *Schorn* 36 (holotype: NU!).

Perennial herbs to 1.8 m tall. Stems erect, often single stemmed or with few stems, simple or sub-simple, branching on the upper half, glabrous or covered with short, and/or long, straight greyish or yellow hairs. Leaves 15–90 × 2–10 mm.

Diagnostic Characters—*Chamaecrista plumosa* var. *erecta* is distinguished from *C. plumosa* var. *plumosa* by its erect stems

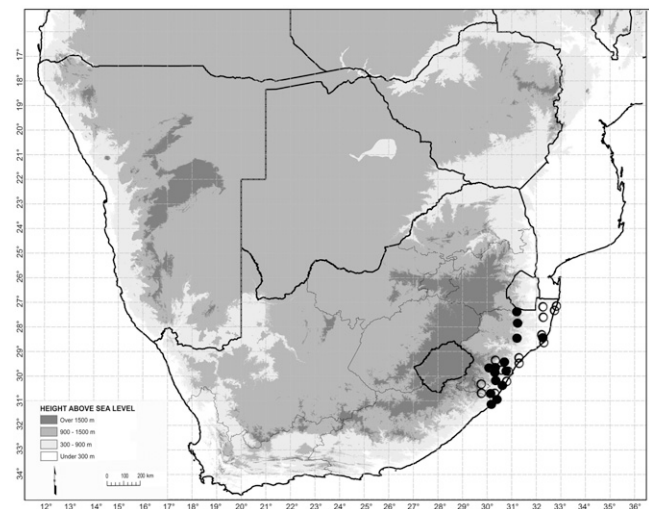


FIG. 15. Known distribution of *Chamaecrista plumosa* var. *plumosa* (○) and *C. plumosa* var. *erecta* (●) in southern Africa.

up to 1.8 m tall, branching in the upper half, with stems densely covered with short and/or long straight greyish or yellowish hairs and long leaves, up to 90 mm long.

Distribution and Ecology—*Chamaecrista plumosa* var. *erecta* is common in Louwsburg through Pietermaritzburg to Port Edward in KwaZulu-Natal. It occurs in grasslands at an altitude below 800 m (Fig. 15). Flowering from September to March.

Additional Specimens Examined—**South Africa.** —KwAZULU-NATAL: 2731 (Louwsburg): Tygerskloof Estate, Ngome area (–AD), 9 Feb 2001, Potgieter 425 (NU); Ngotshe, Ngome Forest (–CD), 11 Feb 1962, Tinley 743 (NU). 2831 (Nkandla): near Dhlizha Forest, Eshowe (–DA), 21 Jan 1963, Edwards 2870 (NU). 2832 (Mtubatuba): Hlabisa, Monzi Settlement (–AD), 7 Apr 1966, Strey 6568 (PRE). 2930 (Pietermaritzburg): Laager Farm, near Harburgh (–BD), 10 Dec 2005, Majola & Marimuthoo 2986 (NH); Maidstone, N coast (–CA), 14 Feb 1944, Hilliard 12 (NU, 2 Sheets); 4 km from Pietermaritzburg on the Greytown road (–CB), 10 Dec 1988, Edwards (PRE); Richmond, Tala Farm (–CD), 8 Mar 1966, Moll 3073 (PRE); Cato Ridge, inland of Durban (–DA), 2 Feb 2013, Styles 3960 (NH); Camperdown, Inchanga (–DC), 23 Feb 1966, Hilliard 3883 (NU); Camperdown Inchanga (–DC), 23 Feb 1964, Hilliard 2722 (NU); Pietermaritzburg (–DC), 16 Feb 1969, Strey 8367 (PRE); Greater Durban area, Queensburgh (–DD), 24 Feb 1993, Ward 12248 (NH). 3030 (Port Shepstone): Richmond road (–AB), 18 Dec 1947, Barker 5141 (NBG); S Coast, Paddock Altenburg (–CD), 26 Jan 1997, Von Fintel 406 (NH); Port Shepstone, Margate (–CD), 12 Feb 1973, Strey 11065 (NU). 3130 (Port Edward): UmTamvuna Nature Reserve, Beacon Hill (–AA), 19 Mar 2018, Musandiwa 18 (NBG); Beacon Hill (–AA), 8 Feb 1980, Nicholson 2057 (PRE).

11. CHAMAECRISTA STRICTA E.Mey., Comm. Pl. Afr. Austr. 1: 159 (1836); Brummitt in Fl. Zambesiaca 3(2): 138 (2007). TYPE: SOUTH AFRICA. Eastern Cape, Butterworth (3228), Bashee River [Mbashe River], (–BD), 07 January 1829, Drège s.n. (lectotype: K [K-000417579]–image!, designated here, isotype: HBG–image! [HBG520216], TUB–image! [TUB000962], MO–image! [MO-1515528]). [Note: The original Drège collection cited by Meyer could not be located as most of his collections were housed at B and largely destroyed, we therefore select the collection at K as lectotype as it bears the original locality description].

Cassia quarrei (Ghesq.) Steyaert, Steyaert in Bull. Jard. Bot. Brux. 20: 264 (1950); Brenan in F.T.E.A Legum.-Caesalp.: 95 (1967); Gordon-Gray in F.S.A. 16(2): 102 (1977). TYPE: ZAIRE [DEMOCRATIC REPUBLIC OF CONGO]. Katanga, Etoile, November 1932, Quarre 380 (lectotype: BR [BR-000008917386]–image!, designated by Steyaert (1950)).

Annual herbs to 0.8 m high. Stems erect, simple or sub-simple stems, finely pubescent, with small curved hairs. Leaves paripinnate, 20–100 × 10–22 mm, linear oblong, tapering distally; stipules 4–9 × 1.2–2.0 mm, base oblique, apex acuminate; extrafloral nectaries at the top of the petiole, 0.7–1.1 mm in diameter, sessile, broadly elliptic, dark centre; rachis channelled, channel margin ciliate. Leaflets 13–37-jugate, 3–9 × 1–2 mm, linear oblong, base oblique, apex acuminate to apiculate, margin entire or ciliate. Inflorescence supra-axillary, (1)2–3 flowered; flowers 4–6 × 4–6 mm; bracts up to 3 mm long, base oblique, apex acuminate; bracteoles 2, glabrous, towards top of pedicels. Pedicels with curled hairs and long patent hairs at flowering 6–10 mm long, at fruiting 10–14 mm long. Sepals 5, narrowly ovate, 4–7 × 1.0–1.5 mm, with small appressed hairs. Petals 5, obovate, 5.0–7.5 mm long, pale yellow. Stamens 8–9, straight or slightly curved, anthers in two series, (4)5 small 2–3 mm long, 4 large 4–5 mm long, filaments very short, ± 1 mm long. Ovary up to 4–6 mm long, densely pubescent with greyish hairs, style curved glabrous, ± 2 mm long. Pods 30–60 × 3–5 mm, flattened, slightly

curved, with short white to greyish hairs. Seeds 2–4 × 1–3, rhomboid, light brown with black dots at the top.

Diagnostic Characters—*Chamaecrista stricta* is distinguished by the channelled leaf rachis, the small extrafloral nectaries at the top of the petiole, 0.7–1.1 mm in diameter, sessile, broadly elliptic with a dark centre. *Chamaecrista stricta* shares the small pale flowers with *C. grandiglandulata* but is distinguished from that species by the channelled leaf rachis (crested in *C. grandiglandulata*), small, sessile extrafloral nectaries as opposed to large extrafloral nectaries that overlap the sides of the petioles, and 8–9 stamens (10 stamens in *C. grandiglandulata*) (Fig. 1F).

Distribution and Ecology—Widely distributed in Limpopo and across the drier regions of the country in North West and Mpumalanga Provinces extending to Port St. Johns in the Eastern Cape (Fig. 16). Grows in grasslands, on rocky areas at elevations above 1000 m. Flowering from January–May.

Additional Specimens Examined—**Zimbabwe.** —1731 (Harare): (–AB), 26 Feb 1954, Savory 14 (NU). 1829 (Kwekwe): Sable Park, 8 km from NE of Que-Que (–DD), 5 Apr 1977, Chipunga 132 (NU).

South Africa. —LIMPOPO: 2230 (Messina): 20 km NE of Louis Trichardt on Witvlag road (–AC), 03 Apr 1971, Stephen 1571 (PRE). 2328 (Baltimore): Lapalala Wilderness, Welgelegen Farm (–CD), 1 Feb 2004, Mathogoane 410 (PRE). 2329 (Pietersburg) [Polokwane]: Pietersburg Nature Reserve (–CD), 7 Feb 1980, Bredenkamp 388 (PRE). 2330 (Tzaneen): Provisional road bridge across Ramadiep River (–CA), 25 Jan 1958, Scheepers 54 (PRE); Magoebaskloof, turn off to Pietersburg [Polokwane] (–CC), 01 Apr 1964, Grobbelaar 88 (PRE). 2428 (Nylstroom): Sterkkrivier Nature Reserve (–BC), 11 Jan 1973, Jacobsen 2617 (PRE). 2429 (Zebediela): (Potgietersrust) [Mokopane] (–AA), 18 May 1953, Maguire 2526 (NBG). —NORTH WEST: 2527 (Rustenburg): Impala Bafokeng Mine, Norite koppie (–CB), 07 Apr 2009, Kurzweg K948 (PRE); Zwarttruggens (–DA), 24 May 1934, Sutton 846 (PRE); Scheerpoort (–DD), 20 Apr 1906, Leendertz 750 (PRE). 2627 (Potchefstroom): Potchefstroom (–DC), May/Jun 1927, Lawrence 07 (PRE). —GAUTENG: 2528 (Pretoria): Kwa-Ndebele, Farm Boekenhoutfontein (–BB), 17 Mar 1981, Du Toit 228 (PRE); Van Riebeeck Nature Reserve (–BC), 18 Jan 1967, Kok 138 (PRE); University of Pretoria (–CC), Oct 1972, Grobbelaar 122 (PRE). —MPUMALANGA: 2430 (Pilgrims Rest): Hoedspruit, Chester Farm (–BD), 02 Feb 1996, Burgoyne 4045 (PRE); 1 km from Blydepoort Ruskamp (–DB), 09 Feb 1975, De Feijter 93 (PRE). 2530 (Lydenburg): Marambane River, 7 km from Lydenburg on road to Burgersfort (–AB), 05 Mar 1986, Germishuizen 3791 (PRE). 2531 (Komatipoort): 8 km from Barberton on road to Havelock (–CC), Retief 2145 (PRE); between Barberton and Havelock, ca. 11 km from Barberton (–CC), 22 Feb 1977, Balsinhas 3115 (PRE). 2630 (Carolina): 3 km from Amsterdam on road to Lothair (–DA), 07 Mar 1986, Germishuizen 3910 (PRE). —KwAZULU-NATAL: 2730 (Vryheid): Mooihoek, Piet Retief (–BA), 18 Apr 1980, Devenish 1831 (PRE); 39 km S of Utrecht along road to Blood

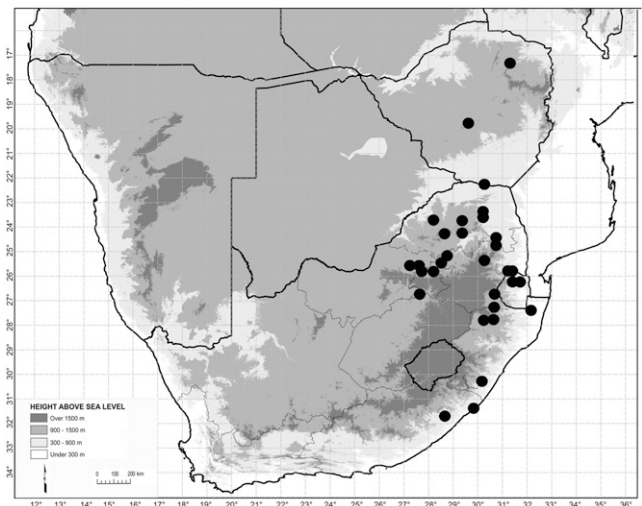


FIG. 16. Known distribution of *Chamaecrista stricta* in southern Africa.

River Monument (–CD), 22 Feb 1974, *Davidse 6826* (PRE); Bloedrivier Station (–DC), 25 Feb 2005, *Bester 5710* (PRE). **2732 (Ubombo)**: Lebombo Mountains, roadside near Jozini Hotel (–AC), 12 Feb 1976, *Brenan 14186* (PRE). **3030 (Port Shepstone)**: The Valley (–AA), 3 May 1950, *Barker 6140* (NBG). —EASTERN CAPE: **3128 (Umtata)**: Ngqeleni roadside (–DB), 24 Mar 1973, *Strey 11170* (NU, NH). **3129 (Port St. Johns)**: Mkambati Nature Reserve (–BD), 15 Jan 1997, *Makwarela 209* (PRE).

Swaziland (Eswatini). —**2631 (Mbabane)**: north bank of Komati River, E of Mhlatane River (–AB), 5 Mar 1993, *Germishuizen 6112* (PRE); Zwischen Pigg's Peak, Mbabane (–BA), 07 Feb 1995, *Werdermann & Oberdieck 2205* (PRE).

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AUTHOR CONTRIBUTIONS

JSB conceived the study. LM conducted the research and gathered the data as part of an M.Sc. study. LM, JSB, and ARM wrote the paper.

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APPENDIX 1. Voucher specimens of material used for floral dissections and measurements.

Chamaecrista absus (L.) H.S.Irwin & Barneby, *Acocks* 43 (PRE); *Barker* 625 (PRE); *Germishuizen* 5127 (PRE); *Grobbelaar* 1907 (PRE); *Marais*

1128 (PRE); Schubert 5560 (PRE). *Chamaecrista biensis* (Steyaert) Lock, De Winter 2443 (PRE); Musandiwa 8 (NBG); Smook 10067 (PRE); Van Wyk 742 (PRE). *Chamaecrista capensis* (Thunb.) E.Mey. var. *capensis*, Hilner 154 (PRE); Hutchinson 1559 (PRE); Lotter 772 (PRE); Musandiwa 19 (NBG); Theron 574 (PRE). *Chamaecrista capensis* var. *flavescens* E.Mey., Balkwill & Cadman 1198 (NU); De Vries 51A (PRE); Gordon-Gray 6145 (NU); Grobbelaar 639 (PRE); Nemando and Musandiwa 19 (NBG); Theron 1882 (PRE). *Chamaecrista comosa* E.Mey. subsp. *comosa*, Arnold 792 (NU); Grobbelaar 1534 (PRE); Hilliard 1655 (NU); Lawn 320A (PRE); Nemando and Musandiwa 22 (NBG); Stirton 1275, 1289 (PRE). *Chamaecrista comosa* subsp. *capricornia* (Steyaert) Musandiwa & Boatwr., Bester 13905 (PRE); Botha & Ubbink 1835 (PRE); Hilliard & Burt 6029 (PRE); Liebenberg 8626 (PRE); McCallum 548 (PRE); Todd 4 (PRE). *Chamaecrista falcata* Musandiwa & Boatwr., Germishuizen 01016 (PRE); Ward 2439 (PRE, NU); Ward 2709 (NU). *Chamaecrista falcinella* var. *parviflora* (Steyaert) Lock, De

Winter & Marais 4728 (PRE); Hardy 2116 (PRE); Hines 992 (WIND); Merxmuller 1788 (PRE). *Chamaecrista gordon-grayei* Musandiwa & Boatwr., subsp. *gordon-grayei*, Maggs 665 (WIND); Muller and Giess 544 (WIND). *Chamaecrista gordon-grayei* subsp. *longipedicellata* Musandiwa & Boatwr., Strohbach BS5275, BS5621 (WIND); Smith 4034 (PRE); Story 6439 (WIND). *Chamaecrista grandiglandulata* Musandiwa & Boatwr., Arnold 1408 (PRE); Bester 4050 (PRE); Nicholson 772 (PRE); Ward 1219 (NH). *Chamaecrista mimosoides* (L.) Green, Gans 43 (NU); McDonald 495 (NU); Morris 772 (NU); Thorncroft 885 (PRE); Ward 6527 (NU). *Chamaecrista plumosa* E.Mey. var. *plumosa*, Abraham 31 (NU); Scott-Smith 53 (NU); Smook 630 (NU); Stirton 1156 (PRE); Tyson 1167 (NBG). *Chamaecrista plumosa* var. *erecta* (Schorn & Gordon-Gray) Lock, Hilliard 2722 (NU); Nicholson 2057 (PRE); Strey 6568, 8367 (PRE). *Chamaecrista stricta* E.Mey., Bester 5710 (PRE); Bredenkamp 388 (PRE); Du Toit 228 (PRE); Germishuizen 6112 (PRE); Scheepers 54 (PRE); Strey 11170 (NU, NH).