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# New Species of *Commelina* (Commelinaceae) from the Flora of Tropical East Africa

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**ABSTRACT.** Four new species and one new subspecies of *Commelina* are described from the flora of Tropical East Africa (Kenya, Uganda, and Tanzania). *Commelina melanorrhiza* Faden, *C. nairobiensis* Faden, and *C. albiflora* Faden are endemic to Kenya. *Commelina aurantiiflora* Faden & Raynsford occurs in Tanzania and Zambia. *Commelina foliacea* Chiovenda subsp. *amplexicaulis* Faden ranges from Uganda and Kenya to Malawi and Zambia. Chromosome numbers are provided for all of these taxa, three for the first time.

With more than 120 species, the flora of Tropical East Africa (Kenya, Uganda, and Tanzania) is the richest in species of Commelinaceae of any country or regional flora worldwide. In my treatment of the Commelinaceae for *Upland Kenya Wild Flowers* (Faden, 1974), five species of *Commelina* could not be identified and were designated by letters. Since then, knowledge of three of them (species "A," "C," and "E") has increased sufficiently to describe them. A fourth new species, known from Tanzania and Zambia and studied in cultivation, is also described herein. Lastly, the variation in *Commelina foliacea* Chiovenda is discussed and found to be circumscribed best by recognizing two subspecies, one of them new. The districts and divisions of the *Flora of Tropical East Africa* (U1-4, K1-7, T1-8), used for the distributions within Uganda, Kenya, and Tanzania, follow Polhill (1988).

***Commelina melanorrhiza*** Faden, sp. nov. TYPE: Kenya (K1). Samburu Dist.: Ngeng River Valley and route to Leiturr, near Ketich Forest Station, Mathews Range Forest, 1°14'N, 37°18'E, 5,500 ft. [1,675 m], dry forest with *Cordia africana* and *Croton megalocarpus* emergents and *Haplocoelum* present on rocky outcrop, forest floor and forest road edge, 20 June 1987, A. Faden 87/3 (holotype, US sheet no. 3120251). *Commelina* sp. "C" of Faden (1974: 657) in Agnew's *Upland Kenya Wild Flowers*. Figure 1.

Herba perennis radicibus tuberosis et nonnunquam fusiformibus, atris vel fuscis, surculis annuis, plerumque prostratis, 6–28 cm longis, foliis distichis laminis petiolatis vel sessilibus, lanceolato-ellipticis ad ovata, 1.5–7 cm longis, (0.8–)1–2.5 cm latis, spathis infundibuliformibus, subsessilibus, in extremitatibus ramulorum dense aggregatis, 1–1.5 cm longis, 0.8–1.3 cm latis, subglabris ad parce hirsutis, cincinno superiore plerumque bene evoluto, ex spatha exserto, unifloro, floribus perfectis et staminatis, petalo inferiore minuto, linearo-lanceolato vel linearo-ob-lanceolato, capsulis trilocularibus, trivalvibus, loculis 1-spermis, seminibus subglobosis, 1.6–2 mm diametro, farinosis, crista peripherali incrassato materiae pale brunneae composita munitis.

Shortly rhizomatous perennial with annual shoots. Roots tufted, tuberous, sometimes fusiform, 3–5 mm thick, black or dark brown. Shoots tufted, prostrate (to ascending, in cultivation), 6–28 cm long, not rooting. Internodes to 8 cm long, with a line of pubescence continuous with the line of fusion of the sheath above, sometimes sparsely puberulous elsewhere. Leaves distichous, sheath 0.3–1.7 cm long, lacking auricles at the apex, puberulous along the line of fusion and sometimes sparsely so elsewhere, ciliate or ciliate with white hairs at the apex, lamina petiolate or sessile, lanceolate-elliptic to ovate, 1.5–7 cm long, (0.8–)1–2.5 cm wide, apex acute to acuminate, base strongly oblique, both surfaces subglabrous to sparsely puberulous, the abaxial usually more pubescent, adaxial surface scabrous, abaxial not scabrous, margins scabrous.

Spathes funnelform, subsessile (peduncles to 5 mm long), densely crowded in bracteate clusters at the ends of the shoots, 1–1.5 cm long, 0.8–1.3 cm high, subglabrous to sparingly hirsute, fused for at least half their width; upper cincinnus often well developed, exserted from the spathe, 1-flowered, with a sparsely puberulous peduncle, this cyme sometimes not developed; lower cincinnus 2–5-flowered.

Flowers perfect (lower cyme) and staminate (upper cyme), ca. 1.5 cm wide. Pedicels glabrous, that of the staminate flower 5.5–8 mm long, those of the perfect flowers shorter. Sepals green with hyaline





Figure 1. *Commelina melanorrhiza* Faden. —A. Habit. —B. Leaf. —C. Spathe and perfect flower. —D. Perfect flower, front/side view. —E. Perfect flower, side view. —F. Capsule before dehiscence, front view. —G. Capsule before dehiscence, side view. —H. Capsule after dehiscence and seed shed. —I. Seed, dorsal view. —J. Seed, ventral view. —K. Seed, side view. All from *A. Faden* 87/3.



margins, glabrous, upper sepal ca. 2–2.5 mm long, lower sepals fused for about  $\frac{2}{3}$  their length, 3–4 mm long. Paired petals 7–8.5 mm long, limb ovate, 4–5 mm long, 6–7.5 mm wide, lilac, mauve, or pale purple to pale blue, apex rounded to emarginate, base cordate to broadly cuneate, claw 3–3.5 mm long, white; medial petal minute, linear-lanceolate to linear-oblongate, ca. 1 mm long, white. Stamens equal or the middle sometimes lacking an antherode, filaments creamy yellow, ca. 3.5–5 mm long, antherodes cruciform, 6-lobed or variously reduced, ca. 0.7–1 mm long, bright yellow. Stamens with filaments creamy yellow, lateral stamens with filaments  $\pm$  parallel in perfect flower and somewhat divergent in staminate flower, ca. 4–4.5 mm long, gently sigmoid, anthers elliptic, ca. 1 mm long, connective grayish, sutures blue-black, pollen dirty yellow; medial stamen with filament ca. 4.5 mm long, strongly arcuate-ascending and bright yellow at apex, anther saddle-shaped, ca. 2 mm long, connective yellow, sutures blue-black, pollen concolorous with lateral anther pollen. Ovary sessile, subglobose, ca. 1 mm long, glabrous, trilobular, the locules 1-ovulate; style strongly arcuate-decurved, recurved at the apex, ca. 6 mm long, creamy yellow; stigma capitate, lilac.

Capsules trivalved, trilobular, 2.5–3 mm long, 2.5–3.5 mm wide, stramineous, glabrous, locules all smooth, dehiscent, 1-seeded. Seeds subglobose but less convex to almost planar on the ventral surface, 1.6–2 mm diam., not strongly apiculate, with a peripheral, thickened ridge of soft, light brown tissue encircling the seed (interrupted by the embryotega) and smaller patches of the same material scattered on the dorsal surface, testa otherwise smooth, dark brown, farinose.

**Habitat.** Forest, bushland and moist thickets, 760–1,675 m.

**Chromosome number.**  $2n = 30$  (from *A. Faden* 87/3 & 87/20).

**Distribution.** Endemic to central and northern Kenya (K1, 4).

*Commelina melanorrhiza* is very distinctive because of its thick, black or dark brown tuberous roots. It bears a strong but superficial resemblance to small plants of *C. benghalensis* because of its short, proportionally broad leaves and small, funnelform, clustered spathes. However, because of its very reduced medial petal, one-ovulate/one-seeded ovary and capsule locules, its true affinities are with *C. bracteosa* Hasskarl and *C. erecta* L. From the former it differs by its tuberous roots, annual shoots, densely clustered, subsessile spathes, and seeds with an encircling ridge of soft material. From *C. erecta*

it differs by its usually prostrate shoots, smaller and proportionally broader leaves that are mostly acute (vs. acuminate), less pubescent spathes, and all the capsule locules smooth and dehiscent (vs. two smooth and dehiscent and one verrucose and indehiscent in most populations). From both it differs by its well-developed upper cyme, lack of auricles at the summit of the sheath (auricles not always obvious in *C. bracteosa*), and usually smaller shoots. The lilac, mauve, or pale purple flowers present in many populations should also serve to separate *C. melanorrhiza* from the other two species.

This species has been known to me for more than two decades, but it is only the recent collections of my wife, Audrey J. Faden, that have enabled me to complete its description.

**Paratypes.** KENYA. **K1. Northern Frontier Distr.:** Muret River Valley, lower reaches, on a pass through the Mathews Range from Ketich Forest Station, 1°12'N, 37°23'E, ca. 5,000 ft. [1,525 m], shady damp areas in moist thickets along elephant trail, 22 June 1987, *A. Faden* 87/20 (US); near Wamba on edge of Wamba Mountain, Lekanto Lugga, ca. 1°00'N, 37°22'E, 4,000–4,500 ft. [1,220–1,370 m], shady damp area near lugga edge with *Commelina africana*, 25 June 1987, *A. Faden* 87/41 (US); Marsabit, 4,400 ft. [1,340 m], forest area, roadside through forest, red loam, 16 Dec. 1932, [no collector] 1910/56 (K). **K4. Kitui Distr.:** Thika–Kitui road at Tiva River, steep slope near river, 1°18'S, 37°56'E, 1,110 m, basement complex, sandy soil, degraded *Acaacia-Commiphora* open bushland, 11 Nov. 1965, *J. B. Gillett* 16961 (EA, K). **Machakos Distr.:** Kibwezi, 3,000 ft. [915 m], cultivated bushland with *Adansonia* on sand over basement complex, 11 Dec. 1967, *A. D. Q. Agnew* 9872 (NAI). **Meru Distr.:** Meru National Park, riparian forest on the Rojwero river near the W boundary of the park, 2,500 ft. [760 m], floor of riverine forest, permanent shade, 14 May 1972, *J. Ament & F. C. Magogo* 210 (EA).

***Commelina nairobiensis* Faden, sp. nov. TYPE:**

Kenya (K4). Kiambu Dist.: Nairobi–Thika road, ca. 200 m Thika side of Nairobi City boundary, 1°12'S, 36°54'E, ca. 1,550 m, drainage ditch in center strip of dual carriageway, 20 Dec. 1970, *R. B. Faden, A. Evans & F. Msafiri* 70/901 (holotype, US; isotypes, BR, EA, K, MO, UPS). *Commelina* sp. “A” of Faden (1974: 660) in Agnew’s *Upland Kenya Wild Flowers*. Figure 2.

Herba perennis basibus surculorum tumidis, moniliformibus, foliis anguste lanceolatis, lanceolato-ellipticis, ellipticis vel ovato-ellipticis, 2–8.5 cm longis, 1–2.5 cm latis, margine valde undulata, spathis solitariis, 1.5–2.6 cm longis, 0.9–1.3 cm latis, hirsuto-puberulis, pedunculo 0.9–3.5(–6) cm longo, cincinnis superiori bene evolutis, ex spatha exserto, unifloro, floribus perfectis et staminatis, petalis superioribus 10–15 mm longis, 9–14 mm latis, petalo inferiore ovato, 5–6 mm longo, 4–5 mm lato,



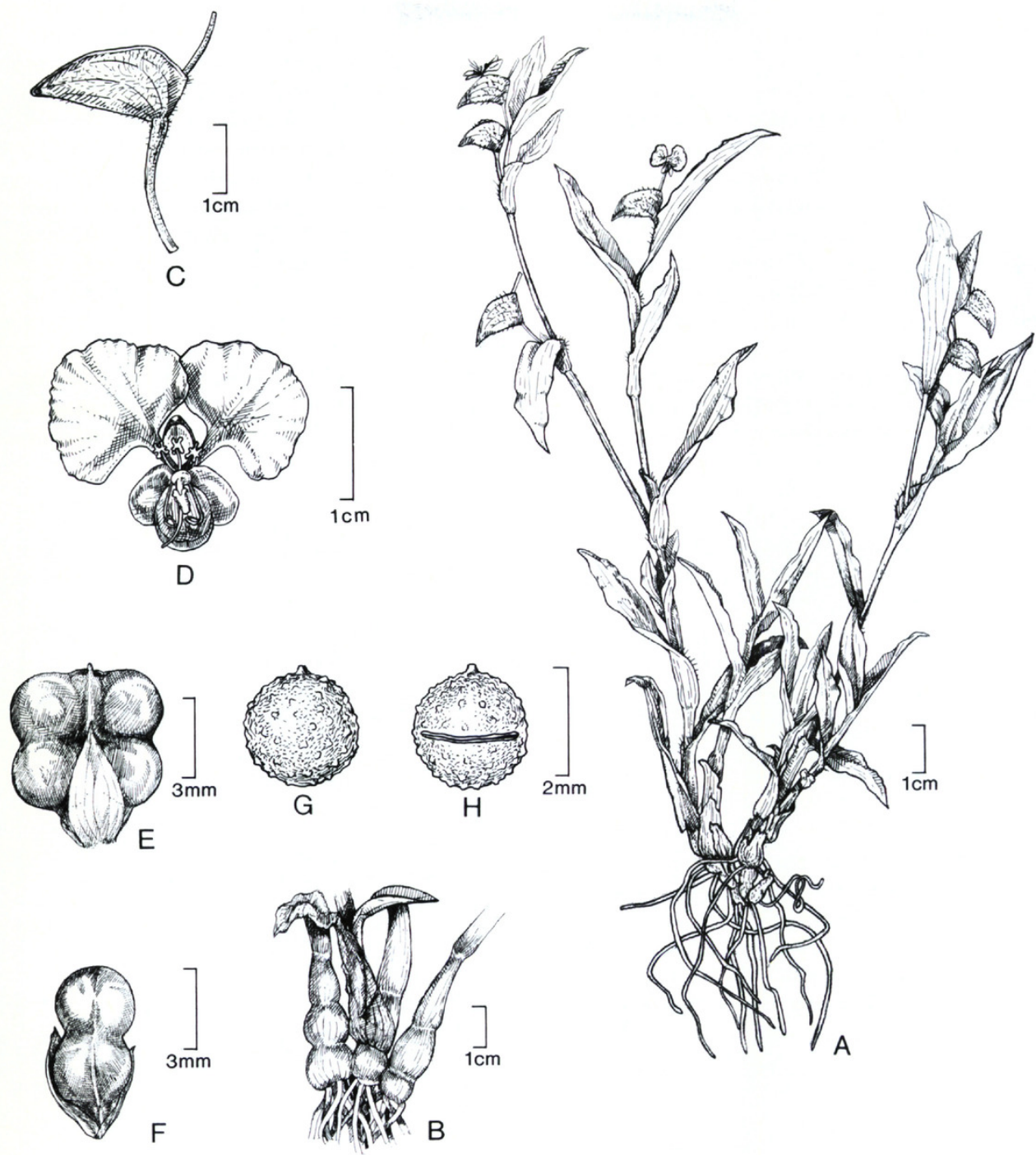


Figure 2. *Commelina nairobiensis* Faden. —A. Habit. —B. Base of plant. —C. Spathe. —D. Perfect flower, front view. —E. Capsule, dorsal view. —F. Capsule, side view. —G. Seed, dorsal view. —H. Seed, ventral view. All from Faden & Faden 77/294 except B, which is from Faden et al. 74/674.

capsulis bilocularibus, loculis 2-spermis, seminibus sphaericus vel subsphaericus, ca. 2–3 mm diametro, verrucosis.

Perennial herb with swollen, moniliform, stem bases somewhat resembling orchid pseudobulbs. Roots 1–1.7 mm thick, of uniform diameter throughout their length, lacking tubers. Flowering shoots erect to ascending, 20–60 cm tall; internodes sparsely to densely hirsute, glabrescent, to 16 cm long. Leaves reduced upwards on the flowering shoots, sheaths

1–2.5 cm long, puberulous to densely hirsute, ciliate with white hairs at the apex, lamina usually not petiolate, or sometimes the lower ones shortly (rarely longly) so, narrowly lanceolate to lanceolate-elliptic, elliptic or ovate-elliptic, 2–8.5 cm long, 1–2.5 cm wide, apex acute to acuminate, base cuneate and often distinctly oblique (lower leaves) to cordate and  $\pm$  amplexicaul (upper leaves), both surfaces puberulous or occasionally subglabrous, the adaxial often



hirsute as well, margins strongly undulate, scabrous apically.

Spathes solitary (not clustered), 1.5–2.6 cm long, 0.9–1.3 cm high, green, hirsute-puberulous, fused at the base for 6–8 mm, usually somewhat falcate, peduncle 0.9–3.5(–6) cm long, increasing in length post-anthesis and tending to spread at right angles to the stem; upper cincinnus well developed (rarely absent), its peduncle 1.4–1.9 cm long, long-exserted from the spathe, puberulous, producing one flower; lower cincinnus several-flowered.

Flowers perfect (lower cincinnus) and staminate (upper and lower cincinnus), 1.5–2.5 cm wide. Pedicels glabrous, 3–9 mm long, that of the upper cincinnus 7.5–9 mm long. Sepals free, glabrous, hyaline white or greenish white, tinged with blue, upper sepal lanceolate to ovate-elliptic, 5 mm long, 2–2.5 mm wide, lateral sepals lanceolate-elliptic to oblong-elliptic, 5–5.5 mm long, 3–4 mm wide. Paired petals sky blue to dark blue, rarely white, 10–15 mm long, 9–14 mm wide, limb broadly ovate to ovate-reniform, 7–9.5 mm long, apex rounded, base truncate to cordate, claw 3–4 mm long. Medial petal ovate, the same color as the paired petals, 5–6 mm long, 4–5 mm wide. Staminodes subequal, filaments 4–5.5 mm long, blue tipped with white or yellow, antherodes  $\pm$  6-lobed, yellow, 1–1.3  $\times$  1–1.5 mm. Lateral stamens with filaments divergent, slightly sigmoid, ca. 8 mm long, blue, anthers elliptic to ovate-elliptic, 1.5–1.9 mm long, connective pale blue, anther sacs dark blue to violet, pollen dirty yellow. Medial stamen with filament 6–7 mm long, blue, anther saddle-shaped, 2.5–3 mm long, connective yellow, with brown to blue-black sutures or anther sacs, pollen yellow. Ovary green,  $\pm$  discoid, style 8–9 mm long, blue, stigma capitate, violet.

Capsules bilocular,  $\pm$  quadrate, 5–6 mm long and wide, locules 2-seeded. Seeds spherical or subspherical, ca. 2–3 mm diam., dark brown, verrucose, with raised pale warts and sometimes short ridges, farinose.

**Habitat.** Seasonally wet grassland, especially on black-cotton soil, 1,465–1,800 m; common around Nairobi.

**Chromosome number.**  $2n = 24$  (from Faden & Faden 77/294).

**Distribution.** Endemic to central Kenya (K4, 6).

*Commelina nairobiensis* is a characteristic component of the black-cotton soil flora in the vicinity of Nairobi and along the Nairobi–Thika road. It is easily recognized by its erect habit, dark blue (very rarely white) flowers, swollen shoot bases, and its preference for seasonally wet soils in its very narrow range. However, it belongs to a difficult species

group. Other blue-flowered, Kenyan species with quadrate capsules and more or less spherical seeds are: *C. latifolia* A. Richard, which is widespread, *C. eckloniana* Kunth, which is very local in shaded, riverine situations in the vicinity of Thika, and *C. echinosperma* K. Schumann, (“*Commelina* species B” of Faden, 1974), which is local in western Kenya. *Commelina latifolia*, which may also have somewhat swollen shoot bases when it grows on black-cotton soil, e.g., Faden & Faden 74/733 (EA)—it also grows in many other habitats—differs in having a more sprawling or clambering habit, more distinctly and regularly amplexicaul leaves, usually no upper cincinnus, more or less smooth seeds, and a smaller, usually white medial petal. *Commelina eckloniana* is a more sprawling, decumbent plant that lacks the swollen shoot bases. *Commelina echinosperma* K. Schumann grows in better drained habitats and differs from *C. nairobiensis* most clearly by its tuberous roots and the absence of swollen shoot bases. It also has echinate seeds. The single Kenyan population studied (Faden & Evans 69/719, EA), had flowers with a much larger lower petal than in *C. nairobiensis*—the petals were subequal—and small, clavate, unlobed antherodes.

A single white-flowered plant of *C. nairobiensis* was found in a large population and was pressed under a separate number (Faden 68/885A). The chromosome number obtained for *C. nairobiensis*,  $2n = 24$ , is unique among East African species and is very rare in the genus as a whole.

**Paratypes.** KENYA. **K4. Fort Hall Dist.:** Thika, S of the Horticultural Research Station road, between road and *Eucalyptus* grove, 5,000 ft. [1,525 m], seasonally flooded grassland, 12 Dec. 1968, Faden 68/896 (EA, K). **Kiambu Dist.:** Ngong plains, Magadi Road, mile 12 from Nairobi, grassland on black-cotton soil, 13 Jan. 1964, Agnew & Zadock 5324 (EA, NAI) [EA sheet has “Agnew & Musumba”];  $\frac{1}{4}$  mi. toward Nairobi from Thika Road Baptist Church, W side of road, 5,500 ft. [1,675 m], 12 Dec. 1968, seasonally flooded grassland, Faden 68/885 (EA, K, US); same data as preceding but white-flowered plant, Faden 68/885A (EA); 1 mi. N of Kalimoni Station on Nairobi–Thika Road, W side of road, 12 Dec. 1968, Faden 68/889 (EA, K); Thika, between Chania High School and M. P. Shah Hostel, behind Salvation Army School, 4,800 ft. [1,465 m], seasonally flooded grassland, 25 Dec. 1968, Faden 68/959 (EA). **Machakos Dist.:** Kilima Kiu, 5,400 ft. [1,645 m], in grass, May [1967?], Tweedie 6787 (NAI). **Nairobi Dist.:** Nairobi, N of Kirichwa Road, 1,720 m, rainfall ca. 800 mm, shaded grassy slopes with shallow soil over lava rock, 1 May 1966, Gillett 17301 (EA); Nairobi, 5,500 ft. [1,675 m], 1950, Hale 46 (K); Nairobi, ca. 5 km W of the town, 1,700 m, grassy fallowland, laterite soil, 18 May 1959, Maas Geesteranus 4674 (K); Nairobi South “b,” 5,500 ft. [1,675 m], 20 Apr. 1974, Mumiukha 298 (EA); ca. 7 mi. E of center of Nairobi, beside Embakasi Airport road, 5,500 ft. [1,675 m], on black soil



near a wet zone, 12 Dec. 1967, *Mwangangi* 296 (EA, K); Eastleigh Estate, S of Eastleigh Community Centre, grassland on wet zones in black-brown soil, associated with many grass species, *Anthericum*, *Aspilia*, *Bidens pilosa*, *Galinsoga parviflora*, *Erucastrum arabicum*, etc., ca. 1,650 m, 19 May 1971, *Mwangangi* & *Mukenya* 1586 (EA, K, US). **Nyeri Dist.:** Zawadi Estate, ca. 7 km on Nyeri-Kiganjo road, ca. 0°24'S, 36°59'E, 1,650–1,770 m, mowed, seasonally swampy grassland, 1 June 1974, *Faden*, *Faden* & *Evans* 74/674 (EA, K, MO). **K6. Kajiado Dist.:** 3.5–4 km toward Nairobi from Kiserian on Magadi-Nairobi, crossing of Nol Chora stream, 1°25'S, 36°32'E, 1,800 m, roadsides and grassland on black-cotton soil with the common species being *Bothriochloa* sp., *Setaria sphacelata*, *Themeda triandra*, and *Stachys hildebrandtii*, 27 June 1971, *Faden* & *Evans* 71/509 (EA, K, US); road to Masai Lodge from Magadi road, ca. 1°23'S, 36°47'E, ca. 1,675 m, black-cotton soil, *Faden* & *Faden* 77/294 (F); Magadi road, SE of Ngong Hills, 1,800 m, grassland, 30 May 1967, *Strid* 4178A (NAI).

***Commelina albiflora* Faden, sp. nov.** TYPE: Kenya (K5). Kakamega Dist.: Kakamega Forest, Kibiri Block, ca. 0°11'30"N, 34°52'E, *Celtis mildbraedii*-*Croton meglacarpus* forest, being cleared, 18 Mar. 1977, *R. B.* & *A. J. Faden* 77/900 (holotype, US; isotypes, EA, F, K). *Commelina* sp. "E" of Faden (1974: 657) in Agnew's *Upland Kenya Wild Flowers*; Faden & Suda (1980: 304).

Herba perennis decumbens foliis distichis, lamina petiolata, lanceolata ad lanceolato-ellipticam, 3.5–7 cm longa, 1.5–2.5 cm lata, pagina superior interdum vinaceoguttata, spathis pedunculis 0.8–1 cm longis, solitariis, gibbosis, puberulis, 1.7–2.2 cm longis, 1(–1.5) cm latis, marginibus connatis supra basim, cincinnis superiore absentibus, cincinnis inferiore 3–4 flores efferentibus, floribus 1.3–1.8 cm latis, albis, capsulis trilocularis, loculis 1(–0)-spermis, seminibus ellipsoideis, 3.3–3.5 mm longis, 2.6–3 mm latis, testa brunnea laevi ad leviter scrobiculatam.

Decumbent perennial with glabrescent internodes. Leaves distichous, sheaths puberulous, 1–1.7 cm long, sparsely ciliate at apex, laminae shortly petiolate, lanceolate to lanceolate-elliptic, 3.5–7 cm long, 1.5–2.5 cm wide, apex acuminate, base usually strongly oblique, sometimes subcordate, adaxial surface dark green, lustrous, usually minutely scabrous, sometimes with 1 or more maroon spots, margins undulate, scabrid.

Spathes solitary, terminal, becoming leaf-opposed with age, 1.7–2.2 cm long, 1(–1.5) cm high, green, gibbous, filled with mucilage when young, puberulous, apex obtuse,  $\pm$  mucronate, sometimes slightly falcate, base truncate to subcordate, margins fused above the base, peduncle 0.8–1 cm long, puberulous. Upper cincinnus lacking, lower cincinnus 3–4-flowered.

Flowers perfect, 1.3–1.8 cm wide; pedicels 3–3.5 mm long, glabrous. Sepals  $\pm$  free, upper sepal

oblong to oblong-elliptic, 3.5–4 mm long, 2.3–2.5 mm wide, greenish white, paired sepals broadly oblong-elliptic to ovate or obovate-elliptic, 4–4.7 mm long, 3–3.5 mm wide, hyaline white. Paired petals 9.5–11 mm long, 8.5–9.5 mm wide, white, limb broadly ovate to ovate-reniform, 6–7 mm long, 8.5–9.5 mm wide, apex rounded, base truncate to cordate, claw 3.5–4 mm long; medial petal cup-shaped, ovate to spatulate, 4–5 mm long, 3 mm wide, white. Staminodes subequal, filaments 5–5.5 mm long, white, antherodes cruciform, 1–1.4 mm long, connective white, lobes pale yellow. Lateral stamens with filaments gently sigmoid, divergent above the middle, 7–7.5 mm long, anthers lanceolate-elliptic, 1.3–1.5 mm long, white or cream-colored, the connective sometimes tinged greenish yellow, pollen white; medial stamen with filament white, 5–6 mm long, anther similar to the laterals but lanceolate-oblong and more saddle-shaped, 1.7–1.8 mm long, pollen white. Ovary sessile, ca. 2 mm long, dorsal locule 1-ovulate, ventral locules usually 2-ovulate (rarely 1-ovulate?), the basal ovules smaller than the apicals and apparently always aborting; style  $\pm$  sigmoid, bending out of the floral midplane, white, 8.5–9 mm long, stigma usually  $\pm$  capitate, white (sometimes flecked with purple).

Capsules greenish brown or the dorsal locule spotted with maroon, typically 3-seeded, with the dorsal locule ovule and apical ventral ovules maturing (frequently 1–2 of these aborting), obovoid to transversely oblong, 4–7.5 mm long, 5–6 mm wide, dorsal locule indehiscent, ventral locules typically dehiscent (tardily dehiscent or indehiscent when dorsal locule empty). Seeds ellipsoid, 3.3–3.5 mm long, 2.6–3 mm wide, testa brown, smooth to shallowly scrobiculate, minutely farinose, hilum curved.

**Habitat.** Moist forest in shaded situations, frequently along streams; 1,500–1,680 m in altitude.

**Chromosome number.**  $2n = 30$  (see Faden & Suda, 1980).

**Distribution.** Known only from the vicinity of the Kakamega Forest in western Kenya (K3, 5).

*Commelina albiflora* resembles the West African species *C. cameroonensis* J. K. Morton, *C. macrosperma* J. K. Morton, and *C. longicapsa* C. B. Clarke in its white flowers and forest habitat. It differs from *C. cameroonensis* by the absence of red hairs from the sheath and by its solitary, pedunculate spathes; from *C. macrosperma* by its larger spathes and flowers and higher chromosome number (see Faden & Suda, 1980); from *C. longicapsa* by its much smaller, distichous, lanceolate to lanceolate-elliptic leaves with oblique bases, and its solitary spathes; from *C. cameroonensis* and *C.*



*macrosperma* by its smooth or nearly smooth seeds; and from all three by its spotted leaves (present in at least some plants in the population) and three-seeded capsules. The capsule and seed arrangement in *Commelina albiflora* are similar to those of the mainly West African *C. congesta* C. B. Clarke, but that species has sessile leaves, funnel-shaped, subsessile spathes that are frequently clustered, and usually pink-tinged flowers.

*Commelina albiflora* appears to be endemic to the Kakamega Forest and vicinity in western Kenya, where it is locally common but by no means abundant. This forest is well known for its West African floristic and faunistic affinities, containing many species at their easternmost occurrences (Faden, 1970). Characteristically, the Kakamega Forest also is quite low in endemism, nearly all of its species being known from Uganda and further west. Extensive fieldwork in Ugandan forests in 1969 failed to turn up this species, and Ogwal did not include it in her account of the *Commelina* species of Uganda (Ogwal, 1977). A search through the herbarium of the Jardin Botanique National de Belgique, Brussels (BR), in 1976 did not yield any additional specimens of this species.

*Commelina albiflora* is the only consistently pure white-flowered species of *Commelina* in Kenya, and perhaps in the entire flora of Tropical East Africa (Kenya, Uganda, and Tanzania) area, hence the specific epithet.

**Paratypes.** KENYA. **K3. Nandi Dist.:** Sirwa Farm, W of iron bridge on R. Yala on Kapsabet–Kisumu road, forest undergrowth, Nov. 1971, *Tweedie* 4165 (K). **K5. North Kavirondo Dist.:** Kakamega Forest, Kibiri Block, S side of Yala River, 0°11'N, 34°52'E, wet evergreen forest with *Croton megalocarpus* and *Celtis mildbraedii* dominant emergents, *Bequaertiodendron oblanceolatum*, *Uvariopsis congensis*, and *Craibia brownii* common understory trees, *Dracaena fragrans*, *Acalypha* sp., *Rinorea brachypetala*, and *Brillantaisia* sp. common shrubs, 21 Jan. 1970, *Faden et al.* in *Faden* 70/20 (EA, K); forest along the Isiukhu River S to SSW of Wibakale on Kambiri–Vihiga road, 0°21'N, 34°53'E, lowland wet evergreen forest with *Croton megalocarpus* and *Olea welwitschii* dominant upperstory trees and *Pachystela brevipes* (riparian), *Dracaena fragrans*, *Rawsonia lucida*, *Alchornea laxiflora*?, *Rinorea poggei*, *Bequaertiodendron oblanceolatum* common understory trees and shrubs, forest floor, especially on steep banks, 27 Dec. 1969, *Faden & Rathbun* in *Faden* 69/2115 (EA); NW Kakamega Forest, 0°22'N, 34°52'E, roadside in rainforest with many creepers and undershrubs, 6 May 1971, *Mabberley* 1100 (K).

***Commelina aurantiiflora*** Faden & Raynsford, sp. nov. TYPE: Zambia. Ndola Dist.: just N of Garneton (Itimbi), S of the Kafue River, ca. 8 km NW of Kitwe, ca. 12°43'S, 28°10'E, ca. 1,250 m, edges of laterite outcrops in miombo

woodland, growing in very shallow soil (1–3 cm deep) over the laterite, 4 Feb. 1973, *R. B. & A. J. Faden, W. L. Handlos & D. B. Fanshawe* 74/184 (holotype, US; isotypes, EA, K, MO, SRGH) [EA and SRGH sheets pressed from cultivation 18 Aug. 1982]. Figure 3.

Herba annua plerumque ramosissima, foliis laminis sessilibus, oblongo-ellipticis, anguste ellipticis vel lanceolato-ellipticis, 2–6 cm longis, 0.3–1.4 cm latis, spathis solitariis, 1–1.8 cm longis, 0.5–0.85 cm latis, margine basi connato, pedunculo 0.7–2(–2.7) cm longo, cincinno superiore absenti, floribus perfecti, petalis superioribus aurantiis vel armeniis, petalo inferiore minuto, albo, capsulis trilobularibus, trivalvibus, loculo dorsali 1(–0)-spermis, loculis ventralibus 2(–1)-spermis, seminibus dorsiventraliter complanatis, 1.5–2 × 1.5–1.8 mm, laevis verrucis parvulis, sparsis, albidus vel cinereis notatis.

Unbranched to densely branched annual with prostrate to erect shoots 2–20 cm long, rooting only at the base. Leaves spirally arranged on primary shoot, distichous on lateral shoots, sheaths 3–8.5 mm long, puberulous along the line of fusion, with pubescence continuing onto internode below, often sparsely to densely hirsute elsewhere, ciliate at the apex, lamina sessile, oblong-elliptic to narrowly elliptic or lanceolate-elliptic, 2–6 cm long, 0.3–1.4 cm wide, apex acute, mucronulate, base rounded to cuneate, often amplexicaul, adaxial surface glabrous or sparsely hirsute, with a deeply impressed costa, abaxial surface with a line of hairs along the costa, at least basally, rarely glabrous or with a few additional scattered hairs, margin ciliate, at least basally, rarely eciliate, scabrous at the apex.

Spathes solitary, terminal, becoming leaf-opposed, 1–1.8 mm long, 0.5–0.85 mm high, fused basally, puberulous along the line of fusion, otherwise glabrous, peduncle 0.7–2(–2.7) cm long, with a line of hairs continuous with the fused edge of the spathe, upper cincinnus lacking, lower cincinnus 1–2(–3)-flowered.

Flowers perfect, 9–10.5 mm wide. Sepals glabrous, upper ovate-elliptic, 2.5–3.5 mm long, lower sepals fused into a cup, 2.6–4.3 mm long, sometimes with petaloid appendages. Paired petals 5.8–6.5 mm long, 4.4–5.3 mm wide, limb reniform to ovate-reniform, 3–3.5 mm long, orange (RHS color #24C: *Faden et al.* 74/184 in cultivation) (RHS Colour Chart, 1966) or buff-orange, claw ca. 3 mm long, purple, lower petal linear to lanceolate, 1.2–1.7 mm long, white. Staminodes 3, subequal, filaments purple, ca. 2–3 mm long, antherodes 6-lobed or somewhat reduced, white to cream, ca. 0.4–0.5 mm long × 0.7 mm wide. Lateral stamens with filaments ca. 4–5 mm long, purple, anthers ovate to broadly elliptic, ca. 0.5–0.6 mm long, blue-black or black



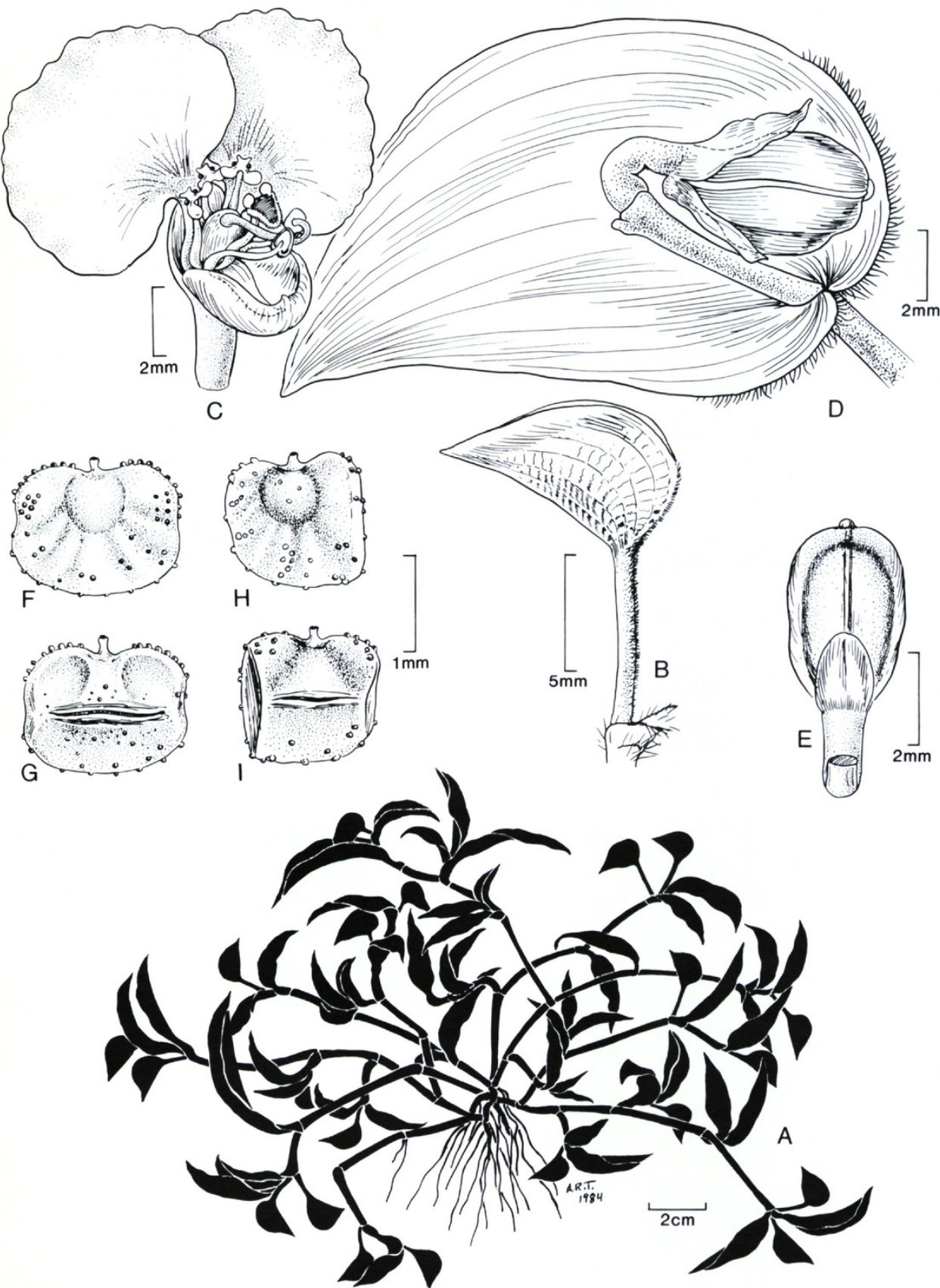


Figure 3. *Commelina aurantiiflora* Faden & Raynsford. —A. Habit. —B. Spathe. —C. Perfect flower, front/side view. —D. Spathe opened, showing capsule in side view. —E. Capsule before dehiscence, dorsal view. —F. Dorsal locule seed, dorsal view. —G. Dorsal locule seed, ventral view. —H. Ventral locule seed, dorsal view. —I. Ventral locule seed, ventral view. All from Faden et al. 74/184.



and yellow, pollen yellow; medial stamen with filament ca. 4 mm long, purple, anther saddle-shaped, ca. 1.2–1.3 mm long, connective purple in center, yellow-white at apex and with two yellow-white basal lobes, anther sacs blue-black, pollen yellow. Ovary trilocular, 5-ovulate, ca. 1.5 mm long, style ca. 3.5–4 mm long, purple, stigma capitate.

Capsules trilocular, trivalved, oblong-elliptic in outline, pale brown to gray-green, 4–5 mm long, 2–2.5 mm wide, dorsal locule 1(–0)-seeded, ventral locules 2(–1)-seeded. Seeds dorsiventrally compressed, mostly trapezoidal, ca. 1.5–2 × 1.5–1.8 mm, testa gray-brown with dark brown spots and streaks, smooth with very small, scattered, white to gray warts.

**Habitat.** Woodland and wooded grassland, sometimes growing in sand or in very shallow soil over laterite.

**Chromosome number.**  $2n = 28$  (from Faden *et al.* 74/184).

**Distribution.** Southern Tanzania (T7) and northern Zambia.

*Commelina aurantiiflora* was described in conjunction with Anthony Raynsford, a then high school student in Washington, D.C., who undertook this as a summer study project and is therefore recognized as coauthor of this account. The maximum dimension given for the peduncle length is from a cultivated plant. In fact, a peduncle up to 4 cm long was measured, but because the specimen was not pressed, this figure has been omitted from the description.

Although the flower color in cultivated plants of the type collection definitely fell within the orange range of the RHS Colour Chart, collectors have described it in various ways: “pinkish-buff” (Fashawe in NDO F12,194), “yellow” (Bjørnstad AB 1430a), “buff-orange” (Faden & Faden 74/121), “buff” (Faden *et al.* 74/184), or even “white” (Richards 872). How much this reflects true variation, as opposed to the difficulty in describing the color, is unknown. Other species with similar flower colors have sometimes been described as apricot- or peach-colored.

*Commelina aurantiiflora* belongs to a well-defined group of savanna and woodland annuals that is widespread in Africa. It includes *Commelina aspera* Benth and *C. nigritana* Benth, both of which may occur with the new species in Zambia. The group is characterized by fused spathe margins, small apricot, orange, or buff-orange flowers, fused lower sepals, a very reduced medial petal, and the basic chromosome number  $x = 14$ . Both of those species differ from *C. aurantiiflora* by their falcate

spathes, narrow leaves, and three one-seeded capsule locules. [Five-seeded capsules are present in *C. nigritana* var. *gambiae* (C. B. Clarke) Brenan, but that form is confined to West Africa.] *Commelina aspera* further differs in being more erect and in having clustered, subsessile spathes and smooth, spherical seeds. *Commelina nigritana* var. *nigritana* has larger seeds than *C. aurantiiflora*, with each seed having two transverse pits on the dorsal surface.

**Paratypes.** TANZANIA. **T7. Iringa Dist.:** Ruaha National Park, Mangangwe Ranger Post, 1,330 m, *Terminalia mollis*–*T. sericea*–*Combretum grandiflorum*–*C. zeyheri*–*Dalbergia nyassae*–*Julbernardia globifera* woodland, 8 Mar. 1972, A. Bjørnstad AB 1430a (EA). ZAMBIA. **Mpika Dist.:** Mpika–Kasama road, 36 km from junction of Great North Road and Kasama road, ca. 11°30'S, 31°20'E, 1,550 m, mopane-miombo transition wooded grassland, 24 Jan. 1974, Faden & Faden 74/113 (EA, K, MO, US); Mpika–Kasama road, 16 km toward Mpika from crossing of Chambeshi River, ca. 11°02'S, 31°08'E, 1,450 m, much disturbed *Brachystegia*–*Isobertia* wooded grassland on tan sand, 25 Jan. 1974, Faden & Faden 74/121 (MO, US). **Mbala Dist.:** Chilongowelo, 4,800 ft. [1,465 m], 4 Mar. 1952, Richards 872 (K). **Ndola Dist.:** Kitwe, 5 Feb. 1974, Fashawe in NDO F12,194 (K) [mixture with *Commelina aspera*].

**Commelina foliacea** Chiovenda subsp. **amplexicaulis** Faden, subsp. nov. TYPE: Tanzania (T6). Morogoro Dist.: Mkungwe Hill, NE part of Northern Uluguru Mountains, 6°52'S, 37°55'E, ca. 350 m, cultivated area at base of hill, 5 July 1970, R. B. Faden, A. Evans & T. Pócs 70/371 (holotype, US; isotypes, C, EA, K, MO) [US, C, and MO sheets from cultivation]. *Commelina foliacea* var. nov. of Ogwal (1977: 77; fig. 13, p. 78). *Commelina foliacea* subsp. “A” of Faden & Suda (1980: 304).

A subspecies typica foliis sessilibus basibus amplexicaulis differt.

Rhizomatous perennial with thick, yellow roots, shoots annual, leaves all sessile, amplexicaul. Spathes foliaceous, the two halves spreading at maturity, upper cincinnus producing a single male flower. Flowers blue, the paired sepals connate, the medial petal minute, white to green. Capsules trilocular, bivalved, 5-seeded, the dorsal locule strongly hump-backed. Seeds rugose-reticulate, farinose.

**Habitat of subspecies amplexicaulis.** Open, rocky hillsides, grassland, shady places by streams, and in cultivation.



*Chromosome number.*  $2n = 30$  (from Faden et al. 70/371) (Faden & Suda, 1980).

*Distribution of subspecies amplexicaulis.* Uganda (U1, 3, 4), western Kenya (K2), Tanzania (T2, 5, 6), Zambia, and Malawi.

*Paratypes.* KENYA. **K2. West Pokot Dist.:** near Sebit on Sebit-Parua road, along Sebit River,  $1^{\circ}24'N$ ,  $35^{\circ}22'E$ , ca. 1,550 m, 15 Mar. 1977, Faden & Faden 77/807 (F, US); Sebit, 5,000 ft. [1,525 m], 31 July 1969, Mabberley & McCall 88 (K) [mixture with *C. benghalensis*]. MALAWI. **Rumphi District:** St. Patrick's Parish, 3,000 ft. [915 m], 9 Feb. 1969, Pawek 1705B (K). TANZANIA. **T2. Mbulu Dist.:** Tarangire National Park, 8 mi. from Tarangire Camp, Richards 24831 (EA, K, in part). **T5. Dodoma Dist.:** Segala-Izava, 50 km E of Chenene, ca.  $5^{\circ}36'S$ ,  $36^{\circ}19'E$ , 4,200 ft. [1,280 m], Myoya & Rajabu 26 (EA). **T6. Morogoro Dist.:** Uluguru Mountains, road from Morogoro to Morningside, ca.  $6^{\circ}53'S$ ,  $37^{\circ}40'30"E$ , 1,245–1,275 m, 2 Apr. 1974, Faden & Faden 74/384 (K, MO); Uluguru Mountains, ca. 1,050 m, 22 Jan. 1933, Schlieben 3279B (K); Morogoro, University, 500 m, 6 May 1974, Wingfield 2668 (EA). UGANDA. **U1. Karamoja Dist.:** Lodoketemit catchment, 4,200–4,500 ft. [1,280–1,370 m], 12 July 1958, Kerfoot 425 (EA, K); Pian County, Lodoketemit, 4,200 ft. [1,280 m], 20 June 1962, Kerfoot 3830 (EA), 4,400 ft. [1,340 m], 20 May 1963, Kerfoot 4930 (EA, K), Kerfoot 4931 (EA, K) and 4932 (EA, K). **U3. Busoga Dist.:** Iganga, 18 Dec. 1985, Ogwal 131 (K), 18 Dec. 1983, Ogwal 133 (K). **U4. Mengo Dist.:** Kyadondo County, Gaba road, ca. 2 mi. from Gaba,  $0^{\circ}15'N$ ,  $32^{\circ}38'E$ , Aug. 1975, Ogwal 4 (EA). **Mubende Dist.:** Singo County, Watuba,  $1^{\circ}01'N$ ,  $31^{\circ}40'E$ , 1,066 m, 13 Apr. 1970, Katende K120 (K). ZAMBIA. **Eastern Prov.:** Sasare, road to copper mine, 700 m, Robson 871A (K).

*Commelina foliacea* is one of the most easily recognizable species of *Commelina* because of its large, leaflike spathes with spreading margins. Closer study has shown that it exhibits other distinctive features, such as thick, yellow roots arranged in two rows along a rhizome; flowers that are open in the afternoon; and a capsule with the dorsal locule humpbacked toward the capsule apex. Because of these distinctive attributes and ease of recognition, *C. foliacea* is one of the best species of *Commelina* to investigate morphological and ecological variation.

Over the years I have made a special effort to look for and collect *C. foliacea* at every opportunity. As a result of this endeavor—at least 27 collections made—*C. foliacea* has gone from being considered an uncommon species of limited ecological amplitude in Kenya to one of the most widespread and most ecologically diverse species of *Commelina* in the country. The species as a whole is now known to range from just above sea level to 2,250 m in elevation and to occur from dry bushland to moist

forest. In fact, there is no situation that appears too extreme for *C. foliacea* except the highest mountains and the most xerophytic or saline habitats.

In the course of this investigation the occurrence of plants with amplexicaul leaves was noted. At first they were considered curiosities, then possibly a closely related species. However, when living material was collected and brought into cultivation, the amplexicaul-leaved plants were found to exhibit all of the unusual characters of the typical form. Thus, they had to be conspecific. When the ranges of the two *C. foliacea* types were determined, they proved to be almost entirely allopatric (Fig. 4), so subspecies was deemed the appropriate rank for them. Subspecies *foliacea*—the nomenclatural type of the species (*Cufodontis* 698, FT) is from Ethiopia—ranges from southern Ethiopia to northern Tanzania. It occurs mainly east of the Rift Valley in Kenya and is disjunct in western Uganda. Subspecies *amplexicaulis* is found only west of the Rift Valley in Kenya. It is widespread in Uganda and occurs in isolated localities in central Tanzania, Malawi, and Zambia. No doubt, better collecting in Tanzania would prove it to be more widespread there.

Two specimens from Mbulu District, Tanzania (Fig. 4, solid stars), show unusual features that do not agree with either subspecies. Greenway & Kirrika 11074 (K), from Lake Manyara, has leaves hirsute below, with an oblique base that is cuneate to rounded and neither petiolate (subsp. *foliacea*) nor amplexicaul (subsp. *amplexicaulis*). One shoot on Richards 24831 (K), from Tarangire National Park, has similar leaves that are yet more densely pubescent on both surfaces. The second shoot on the Richards sheet is, however, typical of subspecies *amplexicaulis* in all respects. The hairy shoot on Richards 24831 and Greenway & Kirrika 11074 represents either an unusual local variant of *C. foliacea* or else hybrids between *C. foliacea* and a species that has pubescent, distichous leaves. Because of their leaf pubescence, which does not occur in either subspecies of *C. foliacea*, these specimens are unlikely to be hybrids between the two subspecies.

It is noteworthy that the two subspecies of *C. foliacea* have been collected moderately close to one another only at the northern end of the Cherangani Mountains in Kenya (Fig. 4, arrow). This proximity is deceptive, however, because subspecies *foliacea* (Meyerhoff 13, K) was collected at about 1,070 m, at the base of the mountains, whereas subspecies *amplexicaulis* (Faden & Faden 77/807; Mabberley & McCall 88) was found on the northwestern shoulder of the Cheranganis, through the Marich Pass, at about 1,550 m. The vegetation



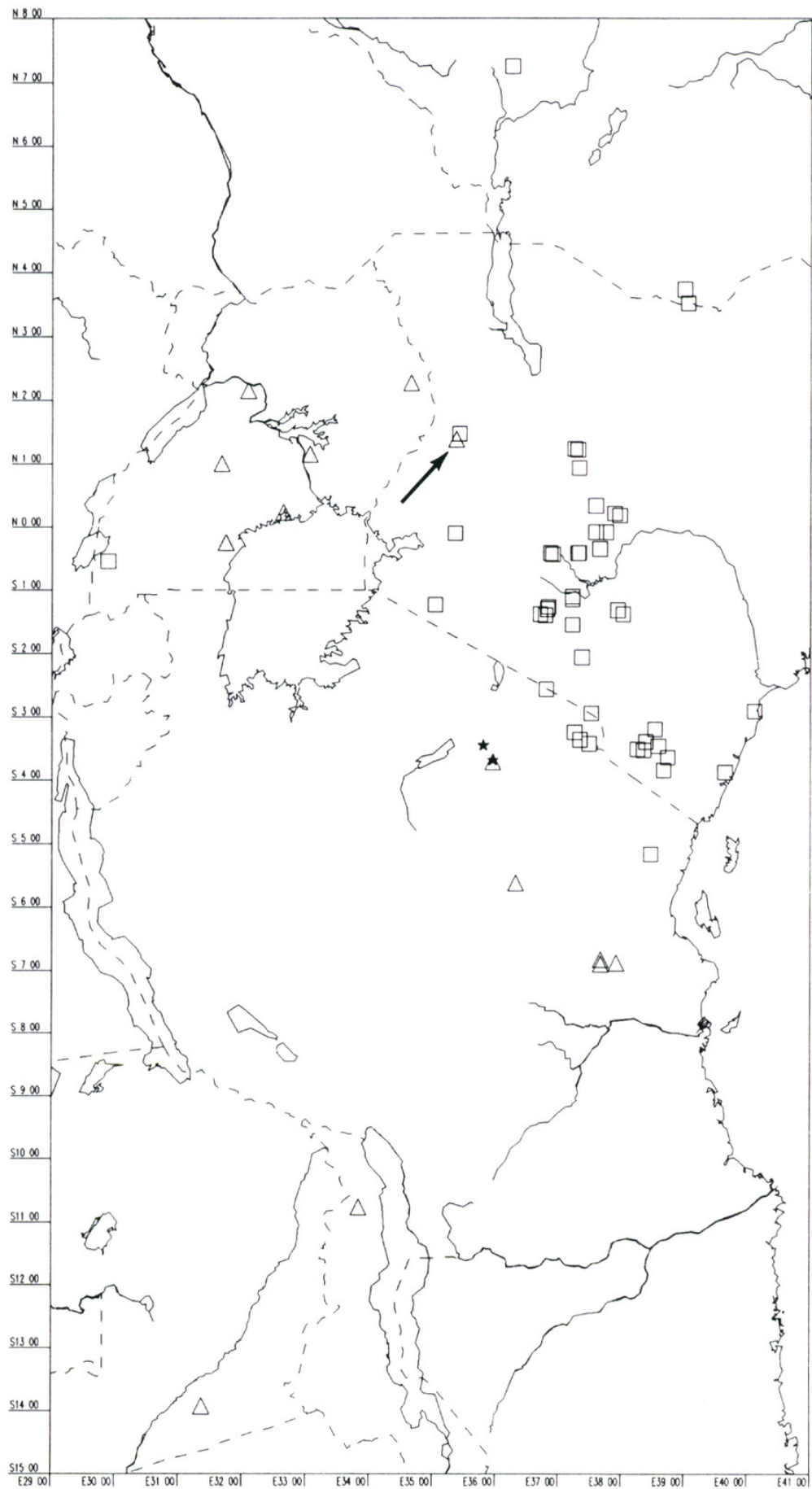


Figure 4. Distribution of *Commelina foliacea* Chiovenda. *Commelina foliacea* subsp. *foliacea* (open squares); *Commelina foliacea* subsp. *amplexicaulis* Faden (open triangles); *Commelina foliacea*, unnamed variant (solid stars).



would be quite different at these localities, although the habitat is not stated on the Meyerhoff specimen.

Ogwal (1977) referred to the amplexicaul-leaved plant as a "notorious weed of cultivation" in Uganda. Subspecies *foliacea* is not recorded from cultivation. Myoya and Rajabu (in sched.) recorded the vernacular name *Nhongo* (Kigogo) in central Tanzania for subspecies *amplexicaulis* and stated that the plant was used as a vegetable when young. Schlieben (in sched.) noted the vernacular name *Kikombata* (Kipogoro) for the same subspecies, also from Tanzania. The Pokot name *Rwanda* is given for subspecies *foliacea* in Kenya, and the boiled leaves are said to be eaten as a vegetable (in sched. Meyerhoff 13).

The conservation status of the just described taxa may be commented upon briefly. Among the four new species, *C. albiflora* should be considered threatened because the Kakamega Forest itself is under heavy pressure. *Commelina nairobiensis* is also restricted to a fairly small area that is densely populated. It certainly should be monitored in the future. The other two species, which grow in relatively remote areas, are, presumably, just undercollected, although I actively searched for *C. melanorrhiza* for many years without success. Perhaps it is just an uncommon species. Neither subspecies of *Commelina foliacea* is endangered or threatened throughout its range as a whole, but only in Tanzania

are both subspecies known from more than a single locality. Thus in some countries one or the other subspecies would have to be considered rare.

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