

# The genus *Tetradenia* Benth. (Lamiaceae). I. African species

L. E. CODD\*

## ABSTRACT

The genus *Iboza* N. E. Br. is placed as a synonym of *Tetradenia* Benth. and the following new combinations are made: *T. barberae* (N.E. Br.) Codd, *T. brevispicata* (N.E. Br.) Codd and *T. riparia* (Hochst.) Codd.

## INTRODUCTION

During studies in Lamiaceae for the Flora of Southern Africa it became apparent that the African genus *Iboza* N.E. Br. (1910), in which five species were originally upheld, is not generically distinct from *Tetradenia* Benth. (1830), based on a single species from the Malagasy Republic. A comparison of the two genera was facilitated by the fact that both male and female plants of a *Tetradenia* were collected by Mr D. S. Hardy and Prof. W. Rauh during their visit to the Malagasy Republic in 1969 and have flowered regularly in winter in the PRE nursery.

As well as all having a similar facies and inflorescence structure, with very small, dioecious flowers, the species now included in *Tetradenia* have a characteristic floral pattern (see Figs 2, 4 & 6):

(c) in the male flowers there is a non-functional ovary (though *T. barberae* may be an exception in this regard) and 4 shortly exerted somewhat spreading stamens, 2 of which are ascending on each side of the upper lobe and 2 descending on each side of the lower lobe.

(d) in the female flowers there are no signs of stamens or staminodes and the style is relatively deeply bifid.

(e) the disc is produced into 1 or 2 conspicuous lobes which exceed the ovary in height (apparent also in male flowers).

(f) There are small gland-like structures at the nodes (2 below each petiole) which have not been observed in any other genus in the Lamiaceae, but which are present in all the species now included in *Tetradenia* (Fig. 1).

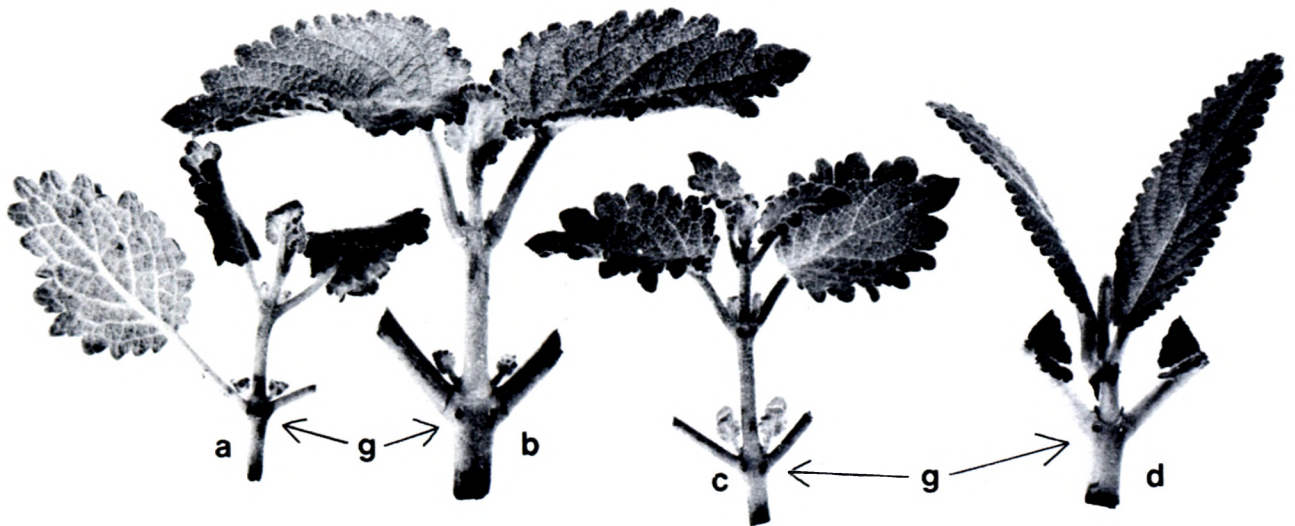


FIG. 1.—Young stems of *Tetradenia* spp. showing nodal (subpetiolar) 'glands' (g), all natural size. a, *T. brevispicata* (Codd 8778, from Brits); b, *T. riparia* (Codd 8398, from Soutpansberg); c, *T. riparia* (De Winter 3597, from S.W. Africa/Namibia); d, *T. sp.* (Hardy & Rauh 2910, from Malagasy Republic).

(a) the calyx is divided nearly to the base below and consists of an upper ovate lobe and two lateral oblong lobes which are emarginate or bifid.

(b) the corolla limb is somewhat spreading and 4-lobed, with the upper lobe bifid or bilobed (sometimes giving the superficial appearance of a 5-lobed corolla), with 2 oblong lateral lobes and an oblong, slightly concave lower lobe which is slightly longer than the other three.

The nearest ally of *Tetradenia* appears to be *Mentha*, from which it differs in the more shrubby habit, dioecious flowers, and the shape of the calyx and corolla.

## TETRADENIA

*Tetradenia* Benth. in Bot. Reg. sub t.1300 (1830); Lab. 164 (1833); in DC., Prodr. 12: 159 (1848); in Benth. & Hook. f., Gen. Pl. 2,2: 1180 (1876); Briq. in Natürl. Pfl.Fam. 4, 3a: 331 (1897). Type species: *T. fruticosa* Benth.

\*Botanical Research Institute, Department of Agriculture, Private Bag X101, Pretoria 0001, South Africa.

*Iboza* N.E. Br. in Fl. Cap. 4,1: 298 (1910); Dyer, Gen. S. Afr. Flow. Pl. 1: 533 (1975). Lectotype (Phillips, Gen. S. Afr. Flow. Pl. 650, 1951): *I. riparia* (Hochst.) N.E. Br. (= *Moschosma riparia* Hochst.)

*Moschosma* Auct., non Reichb.

Perennial shrublets, soft shrubs or small trees, usually leafless or nearly so at flowering stage; stems brittle or semisucculent, at first softly glandular-pubescent and somewhat quadrangular, glabrescent and terete with age. *Leaves* small or large, those subtending inflorescence branches or secondary branches smaller towards the apex, often semisucculent, variously pubescent, crenate-dentate, aromatic. *Inflorescence* paniculate, terminal and on lateral branches, often diffusely branched, the ultimate branches spike-like (referred to as 'flower-spikes'); bracts small, ovate-deltoid to broadly ovate, imbricate in the bud stage, caducous or semipersistent. *Flowers* dioecious or occasionally bisexual (*T. barberae*), in whorls of 4–10, sessile or shortly pedicellate, dense or lax, mauve or whitish. *Calyx* minute, campanulate, 3-lobed, divided nearly to the base below, the upper lobe ovate, lateral lobes oblong, bifid or emarginate; in female flowers the calyx enlarges at maturity and the upper lobe becomes erect. *Corolla* small, tubular or funnel-shaped; limb spreading, asymmetrical, 4-lobed, lobes oblong, rounded, the upper lobe emarginate or bifid, the lowest lobe usually the longest, flat or slightly concave. *Stamens* 4, free, erect or spreading, absent in female flowers. *Disc* 1- or 2-lobed. *Ovary* present but usually infertile in male flowers (1 or 2 seeds per male flower occasionally found in *T. barberae*); style exerted, deeply bilobed in female flowers. *Nutlets* oblong-triangular.

Three species are recognized in Southern Africa, one of which, *T. riparia*, is very variable and extends to Angola and through east tropical Africa to Ethiopia; in addition to the type species, *T. fruticosa*, two further species from the Malagasy Republic were described by Briquet, but no material of these two species has been seen and so they are omitted from the present treatment. They will be dealt with in a subsequent article.

and dense and seem to vary as much within a species as between species.

The floral characters are very similar in all the species and are not of much diagnostic value. In the male flowers a small infertile ovary develops (occasionally fertile in *T. barberae*), whereas in female flowers there are no signs of stamens or staminodes. Bentham, who had only a single male specimen when he described *T. fruticosa*, gave the impression that the flowers were functionally hermaphrodite.

The structure of the calyx is basically the same in all species, but shows some variation in the degree of toothedness of the lateral lobes. This is best seen in the female flowers where the calyx enlarges somewhat when in fruit.

The corolla tube tends to be funnel-shaped in male flowers and smaller and more tubular in female flowers, and there is some variation between species in the length of the tube. The slightly asymmetric limb of 4 lobes (the upper lobe being emarginate or bifid may produce the effect of a 5-lobed limb) is much the same in male and female flowers of all species, with the lowest lobe longer than the others and usually shallowly concave.

Bentham drew attention to the similarity between his species and *Moschosma riparia* Hochst. but kept them in separate genera on the basis of the greater development of the disc in *T. fruticosa*. It appears that in *T. fruticosa* the disc is purple-coloured and 2-lobed whereas in the African species it is colourless and usually 1-lobed. The lobes exceed the ovary in height.

When N. E. Brown described *Iboza*, he correctly separated it from *Basilicum* Moench (= *Moschosma* Reichb.) on the dioecious flowers and the entirely different calyx and corolla, but overlooked the little-known *Tetradenia* Benth., possibly because the description implied that the flowers were hermaphrodite.

All the indigenous species are used medicinally by native tribes in the treatment of colds and chest complaints.

#### KEY TO SPECIES

- Leaves small, ovate, 10–15 × 5–10 mm, bullate-rugose above, veins very prominent beneath; bracts ovate-deltoid, as long as broad ..... 1. *T. barberae*
- Leaves small or large, if less than 20 × 10 mm then not bullate-rugose above; bracts broader than long, rounded or abruptly apiculate at the apex:
- Leaves ovate-rotund, 12–30 × 10–30 mm (occasionally larger), under surface finely velvety with sessile glands and no multicellular hairs; male flower spikes 10–20 mm long ..... 2. *T. brevispicata*
- Leaves variously shaped, usually longer than above, under surface sparsely to densely pubescent with stalked glands and/or multicellular hairs; male flower-spikes 10–80 mm long ..... 3. *T. riparia*

These species may be fairly readily separated on vegetative characters but, in the herbarium, many flowering specimens lack leaves, or those present may be the upper leaves subtending inflorescence branches and hence smaller than usual. The male inflorescences, and especially the length and density of the 'flower-spikes' (ultimate branchlets of the inflorescence), may be of assistance in separating species, but the female 'flower-spikes' are all short

#### 1. *Tetradenia barberae* (N.E. Br.) Codd, comb. nov.

*Iboza barberae* N.E. Br. in Fl. Cap 4,1: 302 (1910). Type: 'Orange River Colony', Mrs Barber 7 (K, holo.!).

Twiggy shrublet 0.6–1 m tall; stems woody, terete, grey-brown, at first minutely tomentellous, lacking stipitate glands or long multicellular hairs. *Leaves* shortly petiolate; blade small, ovate, 8–15 × 5–10 mm, bullate-rugose and finely glandular-

scabrous above, conspicuously veined and densely glandular-tomentellous beneath, apex obtuse, base truncate, margin crenate, thickened below; petiole 3–5 mm long. *Inflorescence* evidently coetaneous with the leaves, occasionally simple, usually with 1–3 pairs of branches near the base; terminal male flower-spikes dense, 30–95 mm long, lateral 15–55 mm long; rhachis finely and densely glandular-hispidulous; bracts ovate-deltoid, acute, 3–3.5 × 2.5–3 mm, densely tomentellous, dotted with red sessile glands; verticils usually 6-flowered; pedicels 0.5 mm long. *Calyx* 1.5 mm long, densely glandular-hispidulous, strongly ribbed; upper lobe ovate, obtuse; lateral lobes deeply toothed, giving the impression of a 5-toothed calyx, teeth 0.5 mm long. *Corolla* 3 mm long, densely pubescent without; tube narrowly funnel-shaped. *Stamens* exerted. *Disc* with 1 lobe developed beyond the infertile ovary. *Style* exerted, shortly bifid. *Female flowers* not seen, but occasional seeds are formed in the male flowers (Fig. 2).

A xerophytic shrublet of karroid Fish River scrub. The type specimen was recorded from the 'Orange River Colony', but this may be an error. The only other two gatherings seen were collected at the same time, in March 1966, as shown below.

CAPE.—3327 (Peddie): Kaffir Drift (–AC), *Tsuanne* A1126; *Bayliss* 3248.

Evidently a rare and distinct species, widely separated from other members of the genus. It is characterized by the uniform short dense tomentum on all parts, lacking stipitate glands and long multicellular hairs, the sparsely branched male inflorescence with relatively long, dense flower-spikes, the small ovate prominently nerved leaves which are present at flowering time, and the deeply toothed lateral calyx lobes, giving the calyx a 5-toothed appearance. The fact that 1 or 2 seeds per flower are occasionally formed in what appear to be essentially male flowers requires further study in the field. The species may be transitional between the hermaphrodite and dioecious condition. The presence of seeds can be detected by a slight increase in the size of the calyx after flowering.

2. *Tetradenia brevispicata* (N.E. Br.) Codd, comb. nov.

*Iboza brevispicata* N.E. Br. in Fl. Cap. 4.1: 302 (1910). Type: Transvaal, Wonderboom Farm near Pretoria, *Burt Davy* 1844 (K. holo.).

Twiggy shrub or small tree 0.6–2 (–3) m tall; stems slender, woody terete, greyish-black, at first finely glandular-tomentellous, lacking stipitate glands or long multicellular hairs. *Leaves* rather small ovate-rotund to rotund, 12–30 (–55) × 10–30 (–50) mm, finely glandular-scabrous above, densely

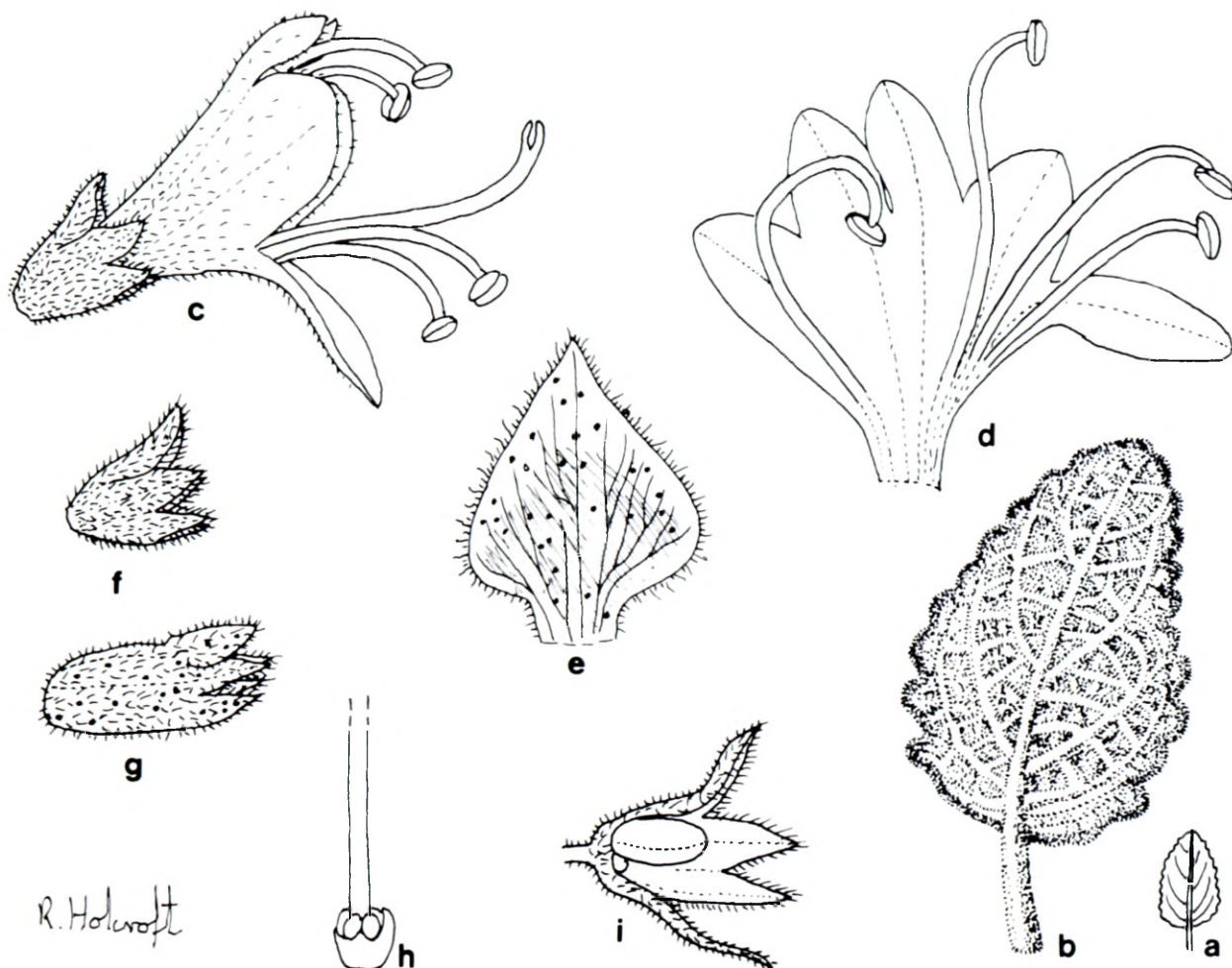


FIG. 2.—*Tetradenia barberae*. male plant a, leaf, ×1; b, leaf, ×5; c, flower, ×9; d, open flower, ×9; e, bract, ×9; f, young calyx, ×9; g, old calyx, ×9; h, ovary, ×12; i, calyx with an occasional nutlet, ×9 (*Bayliss* 3248).

glandular-tomentellous beneath, the lower surface being obscured by a short cobwebby tomentum lacking stipitate glands, the nerves often fairly prominent; apex rounded, base rounded to subcordate, margin crenate to deeply crenate-dentate; petiole 4–15 mm long. *Inflorescence* appearing after most of the leaves are shed, consisting of spikes or small panicles borne terminally and in the axils of the upper leaves, often for some distance along the stem; male and female flower-spikes dense, the male 10–20 (–25) mm long, the female shorter; rhachis densely glandular-hispidulous; bracts broadly ovate, acute, 1,5–1,75 × 1,5–2 mm, shortly tomentellous and gland-dotted, caducous; verticils usually 6-flowered; pedicels 0,5 mm long. *Calyx* densely glandular-hispidulous, 1 mm long, those of female flowers increasing in fruit to 2 mm long; upper lobe ovate, obtuse; lateral lobes shortly bifid. *Corolla* white to mauve, 2 mm long, pubescent without; tube narrowly funnel-shaped. *Stamens* slightly exerted. *Disc* 1(–)-lobed. *Style* exerted by 1 mm; style branches 0,4 mm long in female flowers, shorter in male flowers. *Nutlets* oblong, pale brown, 0,6 mm long (Figs. 3, 4).

Found in central and northern Transvaal, southwestern Botswana and near Bulawayo in Zimbabwe; on dry, wooded, quartzite or granite slopes.

ZIMBABWE.—2028: near Bulawayo (–AD), *Sim* 19297.

BOTSWANA.—2425 (Gaborone): 8 km S.E. of Gaborone, *Mott* 396.

TRANSSVAAL.—2329 (Pietersburg): Blouberg (–AA), *Schlieben* 8616; 50 km N.E. of Pietersburg (–DA), *Fries, Norlindh & Weimarck* 2023; 29 km E. of Pietersburg (–DD), *Van Vuuren* 1266. 2429 (Zebediela): Pyramid Estate near Potgietersrus (–AA), *Galpin* 8833; Lulu Mts (–DD), *Barnard & Mogg*



FIG. 3.—*Tetradenia brevispicata*, part of male inflorescence, slightly enlarged (*Keytel* 744).

910; *Mogg* 16907; 16978; Magnet Heights (–DD), *Barnard & Mogg* 847. 2430 (Pilgrims Rest): Schoonoord (–CA), *Barnard* 223; *Van Warmelo* 37. 2527 (Rustenburg): near Rustenburg (–CA), *Pegler* 924; *Collins* sub *TRV* 10522; *Story* 990;

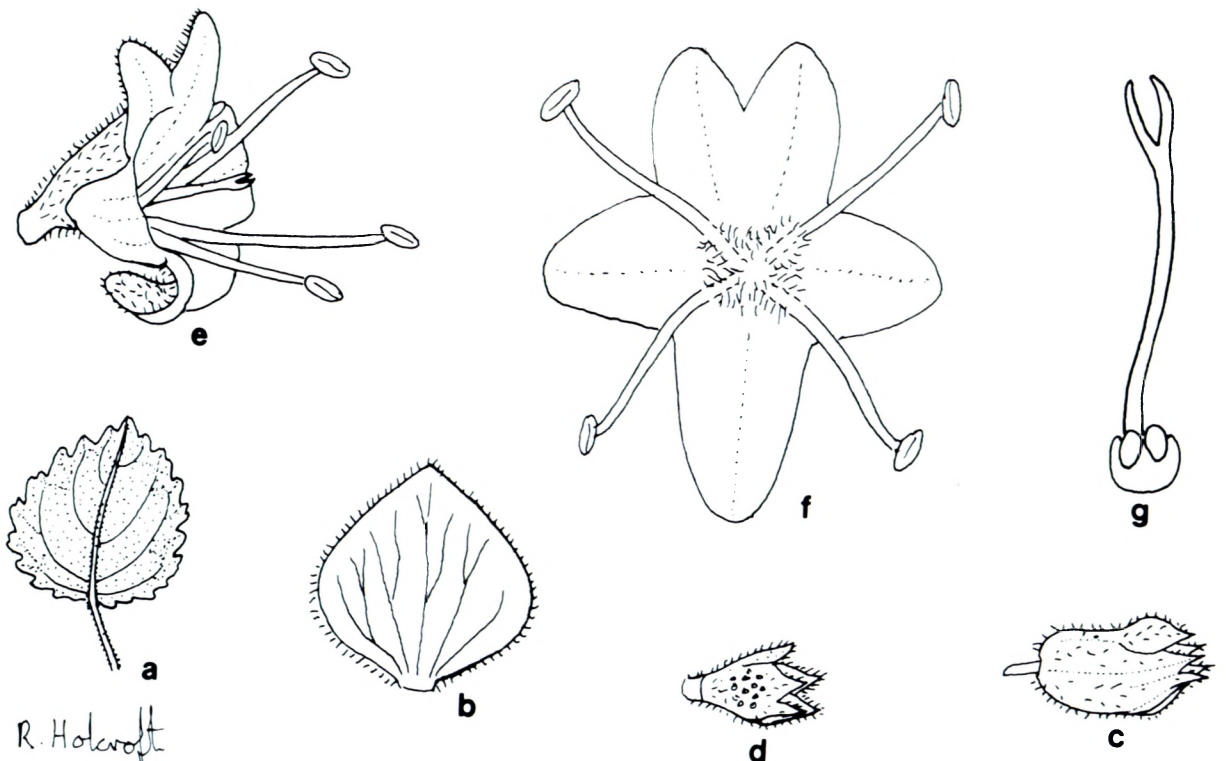


FIG. 4.—*Tetradenia brevispicata*. a, leaf, ×1; b, bract, ×8; c, mature female calyx, ×8; d, male calyx, ×8; e, male flower, ×8; f, male flower, excluding abortive ovary, ×8; g, ovary of female flower, ×20 (c and g from *Pole Evans* 3730a, remainder from *Keytel* 744).

Jacksonstuijn (-DA), *Van Vuuren 312*; near Brits (-DB). *Codd 8778*. 2528 (Pretoria): Wonderboompoort (-CA), *Lanham sub TRV 37660*; *Louw 759*; *Rehmann 4508(Z)*. 2529 (Witbank): 6 km N. of Lebethal Mission, Groblersdal District, *Mönnig 46*.

The species is characterized by the slender, twiggy stems with greyish-black bark, the relatively small roundish deeply crenate-dentate leaves with a fine dense tomentum on the under-surface, and the short dense male flower-spikes. The flowering period is mainly from June to September when the plants are leafless. It was first collected by Rehmann at Wonderboompoort in November–December 1879 but his specimens lacked flowers and were included in *Plectranthus grandidentatus* by Gürke (Codd in *Bothalia* 11: 397, 1975).

### 3. *Tetradenia riparia* (Hochst.) Codd, comb. nov.

*Moschosma riparium* Hochst. in *Flora* 28: 67 (1845); Benth. in DC., *Prodr.* 12: 49 (1848); Briq. in *Natürl. Pfl.Fam.* 4,3a: 368 (1897); Wood & Evans, *Natal Pl.* 1: tt.1,2 (1898); Bak. in *Fl. Trop. Afr.* 5: 354 (1900); Eyles in *Trans. R. Soc. S. Afr.* 5: 466 (1917). *Basilicum riparium* (Hochst.) Kuntze, *Rev. Gen. Pl.* 2: 512 (1891). *Iboza riparia* (Hochst.) N.E. Br. in *Fl. Cap.* 4,1: 300 (1910); Everett in *Jl. N.Y. bot. Gdn* 36: 12 (1935); Phillips in *Flower. Pl. S. Afr.* 20: t.767 (1940); Martineau, *Rhod. Wild Flow.* 69 (1953); Brenan in *Mem. N.Y. bot Gdn* 9: 39 (1954); Andrews, *Flow. Pl. Sudan* 3: 212 (1956); Letty, *Wild Flow. Transv.* 289, t.144,3 (1962); Compton, *Fl. Swaz.* 67,158 (1966); Launert & Schreiber in *Prodr. Fl. S.W. Afr.* 123: 14 (1969); Ross, *Fl. Natal* 306 (1972); Gibson, *Wild Flow. Natal* t.90,6 (1975). Type: Natal, *Krauss 331* (MO!).

*M. multiflorum* Benth. in DC., *Prodr.* 12: 49 (1848); A. Rich., *Tent. Fl. Abyss.* 2: 179 (1851); Gürke in *Engl., Pflanzenw. Ost-Afr.* C: 349 (1895); Briq. in *Natürl. Pfl.Fam.* 4,39: 368 (1897); Bak. in *Fl. Trop. Afr.* 5: 354 (1900); Eyles in *Trans. R. Soc. S. Afr.* 5: 466 (1917). *Basilicum multiflorum* (Benth.) Kuntze, *Rev. Gen. Pl.* 2: 512 (1891). *Iboza multiflora* (Benth.) E. A. Bruce in *Kew Bull.* 1940: 66 (1940); Agnew, *Upland Kenya Wild Flow.* 642 (1974). Isotypes: Ethiopia, near Djeladjeranne, *Schimper 766* (K!); 1688 (K!).

*M. myriostachyum* Benth. in Benth. & Hook. f., *Gen. Pl.* 2,2: 1173 (1876); Briq. in *Natürl. Pfl.Fam.* 4,3a: 368 (1897). *Basilicum myriostachyum* (Benth.) Kuntze, *Rev. Gen. Pl.* 2: 512 (1891); Hiern, *Cat. Afr. Pl. Welw.* 1,4: 858 (1900). Type: Zambezi region, no specimen cited.

*M. urticifolium* Bak. in *Fl. Trop. Afr.* 5: 353 (1900). *Iboza urticifolium* (Bak.) E.A. Bruce in *Kew Bull.* 1940: 66 (1940). Type: Tanzania, Mt Kilimanjaro, *Johnston s.n.* (K, holo.!).

*Iboza galpinii* N.E. Br. in *Fl. Cap.* 4,1: 300 (1910); Compton, *Fl. Swaz.* 67, 158 (1966). Type: Transvaal, near Barberton, *Galpin 972* (K, holo.; PRE!).

*I. bainesii* N.E. Br. in *Fl. Cap.* 4,1: 301 (1910). Type: "South African Gold Fields," *Baines s.n.* (K, holo.!).

Soft shrub or small tree 1–3 (–5) m tall, freely branched; stems semisucculent, brittle, rather stout, at first 4-angled and glandular-pubescent, becoming terete and glabrous with age; bark pale brown. *Leaves* petiolate; blade ovate-oblong to rotund, 35–80 (–100) × 35–70 (–90) mm, sparsely to densely glandular-pubescent on both surfaces, on the upper-surface usually shorter and more scabrid, on the under-surface mainly restricted to the veins or stipitate-glandular to densely white tomentose over the whole surface, veins often prominent below, apex rounded, base rounded or truncate to cordate, margin coarsely crenate to crenate-dentate; petiole up to 40 mm long, densely glandular-pubescent. *Inflorescence* a terminal, usually large panicle, diffusely branched and up to 300 × 200 mm in male

specimens, smaller and more compact in the female, appearing usually after the leaves are shed; inflorescence branches subtended by leaves becoming smaller towards the apex; male flower spikes dense to lax, 20–80 mm long; female flower-spikes dense, 10–25 mm long; rhachis densely glandular-pubescent; bracts broadly ovate, 1,5–2 × 2–2,5 mm, densely glandular-hispidulous, caducous; verticils 4–8 (usually 6)-flowered; pedicels 0–0,5 mm long. *Calyx* 1 mm long, densely glandular-hispidulous, expanding in female flowers to 2,5 mm. *Corolla* white to mauve, pubescent without; in the male 3–3,5 mm long, tube funnel-shaped; in the female 2–2,5 mm long, tube tubular-funnel-shaped. *Stamens* exserted. *Disc* colourless, 1-lobed. *Style* exserted by 1 mm; style branches 0,4 mm long in female flowers, shorter in male flowers. *Nutlets* oblong, pale brown, 0,6 mm long (Figs 5 & 6).

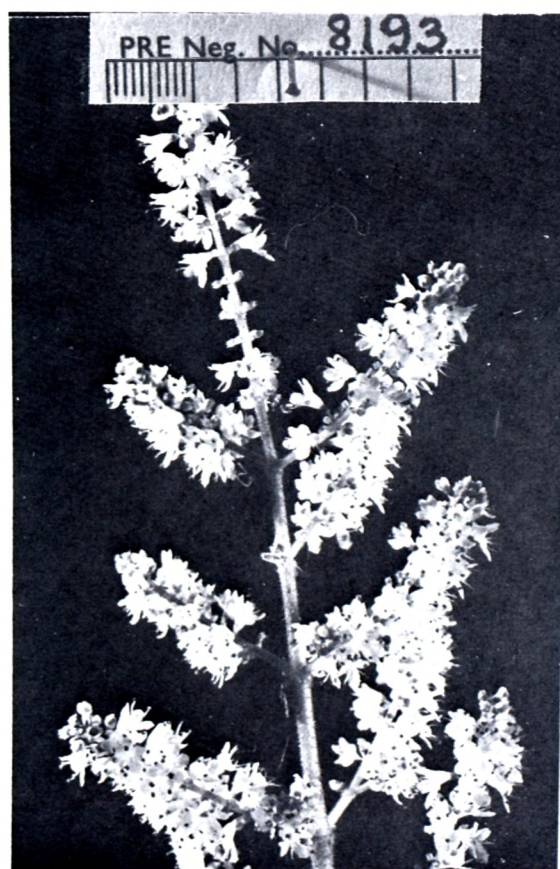


FIG. 5.—*Tetradenia riparia*, part of male inflorescence, slightly enlarged (Codd 8398).

Occurs in Southern Africa from coastal Natal to Swaziland, Transvaal, south-eastern Botswana and the northern half of South West Africa/Namibia, extending to Angola and through Mozambique, Zimbabwe and Zambia to Malawi, Tanzania, Kenya, Uganda, Sudan and Ethiopia. A selection of specimens from Southern Africa (usually one per degree square) is given below.

S.W.A.—1712 (Posto Velho): Otjihipa Mt (–BC), *Vahrmeijer and Du Preez 2562*. 1714 (Ruacana Falls): Ruacana Falls (–AC), *Leistner, Oliver and Vorster 322*. 1917 (Tsumeb): Farm Elandshoek (–DC), *Giess 15119*. 2114 (Uis): Brandberg (–AB), *De Winter 3597*. 2115 (Karibib): Farm Ameib. (–DC), *Giess*

15259. 2216 (Otjimbingwe): Farm Kaan Dam (-CC), *Giess 13523*. 2217 (Windhoek): Lichtenstein (-CC), *Dinter 4673*.

BOTSWANA.—2425 (Gaborone): East District (-BB), *Hansen 3435*. 2525 (Mafeking): *Lobatsi (-BA)*, *Miller B1095*.

TRANSVAAL.—2229 (Waterpoort): 13 km N. of Louis Trichardt (-DD), *Van Vuuren 1230*. 2230 (Messina): Entabeni Forest Station (-CC), *Codd 8398*. 2231 (Pafuri): Punda Maria (-CA), *Van der Schijff 3151*. 2327 (Ellisras): Farm Zwarthoek 597 (-DC), *Fourie 210*. 2329 (Pietersburg): University of the North (-DC), *Bredenkamp 1087*. 2330 (Tzaneen): Duiwelskloof (-CA), *Galpin 9724*. 2428 (Nylstroom): Rietspruit, N. of Nylstroom (-CB), *Vahrmeijer 1457*. 2430 (Pilgrims Rest): Shiluvane (-AB), *Junod 538*. 2525 (Mafeking): 40 km W. of Zeerust (-BD), *Snyman 145*. 2527 (Rustenburg): Rustenburg Nature Reserve, *Jacobsen 997*. 2530 (Lydenburg): Waterval Onder (-CB), *Burt Davy 390*. 2531 (Komatipoort): Barberton (-CC), *Galpin 972*. 2630 (Carolina): Carolina District, Arnheimburg (-AA?), *Roberts sub TRV 15852*.

SWAZILAND.—2631 (Mbabane): near Mbabane (-AC), *Compton 25131*; near Stegi (-BD), *Verdoorn 1677*; Hlatikulu (-CB), *Stewart sub TRV 9014*. 2731 (Louwsburg): Ingwavuma Poort (-BB), *Compton 30095*.

NATAL.—2732 (Ubombo): Lebombo Mts (-AC), *Ward 3449*. 2830 (Dundee): Insuzi Valley (-DB), *Acocks 12721*. 2831 (Nkandla): Eshowe District (-CD), *Venter 1675*. 2832 (Mtubatuba): Hluhluwe Game Reserve (-AA), *Ward 2625*. 2930 (Pietermaritzburg): Inanda (-BD), *Strey 8758; 8759*. 2931 (Stanger): near Durban (-CC), *Medley Wood 1001*. 3030 (Port Shepstone): Dumisa (-AD), *Rudatis 1048*; Gibraltar (-CB), *Strey 10967*.

A good deal of variation is included in the present concept of *T. riparia* but no pattern emerges and so infraspecific taxa are not upheld. In the typical form the under-surface of the leaf is thinly pubescent, with longish appressed hairs mainly on the veins. In the type of *Iboza bainesii* there is a dense white cobwebby tomentum which completely obscures the under-surface. There are, however, intermediate forms, often with numerous stipitate glands in addition to the multicellular hairs and sessile gland-dots. These are found in South West Africa/Namibia and the Transvaal, but in both

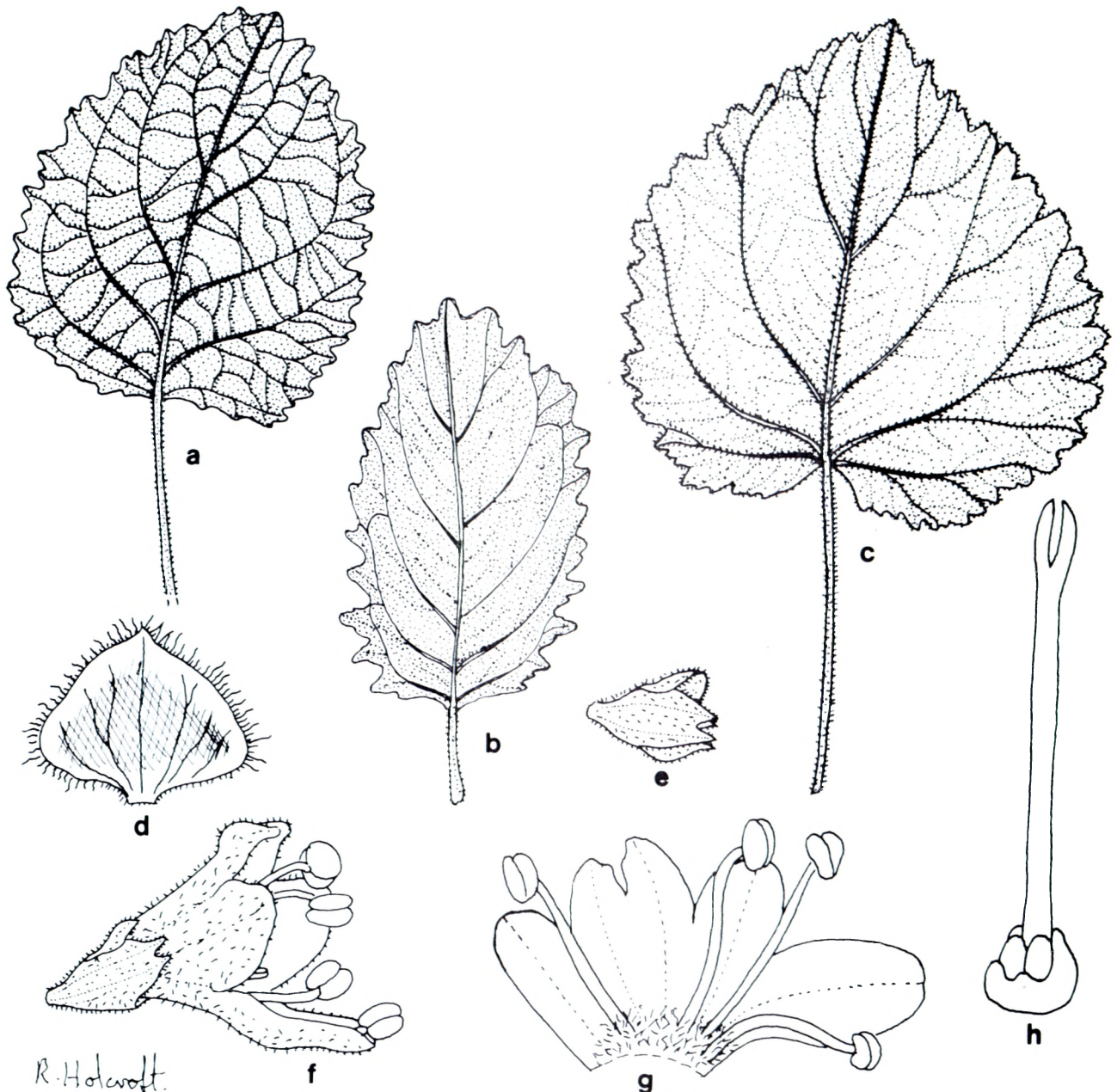


FIG. 6.—*Tetradenia riparia*. a, leaf,  $\times 1$  (*De Winter 3597*, S.W. Africa/Namibia); b, leaf,  $\times 1$  (*Junod 538*, northern Transvaal); c, leaf,  $\times 1$  (*Medley Wood 5760*, Natal); d, bract,  $\times 9$ ; e, calyx,  $\times 9$ ; f, flower,  $\times 9$ ; g, flower,  $\times 9$ ; h, abortive ovary and style,  $\times 12$  (d-h from *Codd 8398*, male plant).

territories specimens with sparse pubescence are found. The leaf-base varies from cordate to truncate or rounded independently of the degree of tomentum.

In the tropical African specimens seen there seems to be a possible link between sparse under-side leaf pubescence, lax male flower-spikes and mauve corolla on the one hand, as against densely tomentose under-side of the leaf, fairly dense male flower-spikes and whitish corolla on the other. However, most specimens either lack leaves, lack notes on corolla colour or have female flowers, and there appear to be intermediates. Also, there

seems to be no association between these characters and geographic distribution. Extensive field observations are required to ascertain if the complex can be subdivided into meaningful groups.

Because of its strongly aromatic leaves, it is sometimes referred to as Ginger-bush.

#### UITTREKSEL

*Die genus Iboza N.E. Br. word geplaas as 'n sinoniem van Tetradenia Benth. en die volgende nuwe kombinasies word gemaak : T. **barberae** (N.E. Br.) Codd, T. **brevispicata** (N.E. Br.) Codd en T. **riparia** (Hochst.) Codd.*