

A REVISION OF THE GENUS *PARKIA* R. BR. (MIM.) IN AFRICA

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SUMMARY

1. In Africa occur 4 species of *Parkia* R.Br. (and two varieties); a fifth species introduced.
2. A key to these closely related taxa is given.
3. The taxa are described and the descriptions accompanied by references to literature, a survey of economic use, of biological or ecological facts, vernacular names are given, and the specimens examined cited.
4. The name *P. clappertoniana* Keay ought not to replace *P. africana* R.Br.
5. Seed-characters are decisive in distinguishing among 3 species.

As a boy I first became acquainted with the genus *Parkia*. My family customarily migrated to and from the shore area of the Red Sea in Eritrea according to the season and the availability of food for the cattle. Those of the party too weak or too tired for walking on this long and arduous journey were tied in their full length on the back of an animal and so, protected by some cloth against the sun, travelled, resting or sleeping most of the time. We, the children, not infrequently were carried in that way. I remember that, as a boy, journeying with my people and being tied to the back of a mule, I had a first glimpse of *Parkia*, when gazing upwards and seeing bunches of large pods dangling at the end of the spreading branches of a tree. We ate the pulp and used the seeds in our food and I recall the sourish taste of that dish.

This happened nearly twenty years ago and, of course, I then had no inkling of the scientific name or botanical identity of *Parkia* but when, after a year's stay at Kew owing to the support by the British Council, I continued my training as a systematic botanist at Wageningen, Netherlands, I readily accepted professor De Wit's proposal to revise the genus of which I had such early recollections. I wish to thank him for his advice and help.

Although in matters of nomenclature this revision differs from Keay's recent work on *Parkia*, it owes much to his publications.

My best thanks are tendered to the directors and keepers of the following herbaria, who sent me material on loan or enabled me to examine the material preserved in their institute: Berlin-Dahlem (B), British Museum (BM), Brussels (BR), Coimbra (COI), Florence (FI), Göttingen (GOET), Hamburg (HBG), Kew (K), Leiden (L), Lisboa (LISC and LISU), Munich (M), Paris (P), Uppsala (UPS), Utrecht (U), Vienna (W), and Wageningen (WAG).

Economic importance. The seeds of the African Locust Bean (*Parkia biglobosa* and *P. africana*), are rich in fats, phosphates, and particularly in sugars (Goris and Crété in Compt. rend. Acad. Paris 146, 1908, p. 187; see also Burkill, Dict. Econ. Prod. Mal. Pen. 2, 1935, p. 1669). Pobéguin (Essai Fl. Guin. franc. 1906, p. 39) reported 47 % of fatty substances to be present in the seeds. Though a clear yellow oil can be obtained (± 16 %) of the seeds (Bull. Imp. Inst. 20, 1922, p. 462), the oil is not produced as a source of edible fat but the seeds, being roasted and shelled, serve as a seasoning or side-dish, and by continued roasting turn into a kind of "coffee". Pobéguin (*l.c.*) found that after fermentation in water-containing holes, the seeds were roasted; this processing yields a blackish kitchen-fat, traded in Guinea as "soumara" (or "soumbara"). Millen (in herb.) found the seeds sold in markets at Lagos, as "Irugba" or "locust seed", and used for "thickening soup". Various kinds of fermentation — by the addition of salt the progress of fermentation can be stopped — are applied to obtain different products. Those are traded, or carried by the African traveller, to be added to his usually very one-sided and deficient daily fare of cooked grains, and so provide valuable fats, proteins, and minerals, which are otherwise insufficiently represented in his diet.

The sweetish or sourish pulp is also eaten or "made into a pleasant drink" (G. Don, Gen. Syst. 2, 1832, p. 396). The shells of the pods may contain a poisonous substance as there are reports that they are used (*P. biglobosa*, *P. africana*) to poison fish (e.g. Jumelle in Ann. Mus. Col. Marseille 25, 1917, p. 22). This certainly is not commonly practised. Burkill (*l.c.*) refers to a report that burned pods would deepen the indigo dye and cited de Wildeman, who found that macerated pods impart a blue colour to the water (Not. Pl. ut. Congo 2, 1906, p. 142).

The fruit of *P. bicolor* (Hutch. et Dalz., Usef. Pl. Trop. W. Afr. 1955, p. 217) is very rarely eaten but it is repeatedly reported (e.g. Cooper in Liberia, Aubréville in Ivory Coast, Lebrun in Congo) that monkeys are keen on the pods so possibly they may be edible.

The seeds are much in demand in Indonesia (*P. speciosa* Hassk.) and in tropical SW Asia generally and are eaten in much the same way as in Africa, raw or roasted, but not fermented. They are the "doura" of the Soudan, the "peteh" beans of Java, the latter warmly appreciated by all experienced eaters of tropical food and readily perceived by every new-comer by their characteristic heavy and repulsive smell which accompanies the addicts. Both in Africa and Asia the juice of bark, pods, leaves or seeds is frequently, if locally, used for various complaints and this suggests that some medicinally active substance may be present in *Parkia* (e.g. dried and pulverized bark is applied as a dressing for wounds and an extract of leaves and bark is in Guinea used as an eye-lotion). As to the chemical properties of the genus, it may be noted that in widely different places, different parts of the plant were said to smell like onions or garlic (flowers, wood, seedlings).

Parkia-wood is locally used (Congo) for making roof-slats or for

furniture, also (Liberia) for making canoes, planks, and building purposes but it is not very durable though easily worked. It is nowhere in high esteem. Ants may attack the wood of young trees easily and there are both from Asia and Africa reports of insect attacks on young living trees growing under unfavourable conditions (cf. Heyne, Nutt. Pl. Indon. 1950, p. 725).

Biology. Bats visit the flowers (see also Corner, Ways. Trees Mal. 1, 1940, p. 414). The dangling, free-hanging flower-heads at the periphery of the crown is a character commonly found in cheiropterogamous plants.

An examination of the herbarium specimens of African *Parkia* suggests that various degrees of fertility may be reached by flowers in a single inflorescence, that the flowers are protandrous, and that some trees are far more productive of pods than others. It may be said that the ways of pollination and fertilization in *Parkia* deserve closer observation and study in the living tree. Corner (l.c.) noted (*Parkia speciosa* Hassk.): "why the pods develop only from the last few flowers which open on a head is not understood." Heyne (l.c. p. 725) mentions a javanese custom not to plant seeds from the upper part of the pod, as these would develop into trees with retarded pod production.

Prof. dr. L. van der Pijl, who kindly informed me of literature references (see also Evol. 15, 1961, p. 56-59) concluded that bats are pollinators of *Parkia* in Java (Flora 1936, p. 13). Docters van Leeuwen observed visiting both bats and night-flying bees (Trop. Nat. 1933, p. 199; Ann. Jard. bot. Buitenzorg 48, 1938, p. 43; see further Notes to *Parkia africana*).

Historical data. Robert Brown named *Parkia* in 1826 after Mungo Park, born in 1771 in SE Scotland (Fouldshields nr Selkirk). Park was educated at Edinburgh and supported by Sir Joseph Banks. As a surgeon he visited India and Sumatra, and both in 1795-1797, and 1804-1806 explored the Niger basin. An attack by the population resulted in his being drowned in the river (see for further biographical details Fl. Mal. I, 1, 1950, p. 400, and literature cited there).

Generic description for the African species of *Parkia* R. Br.

Parkia Robert Brown in Denham & Clapperton, Narr. Trav. Disc. Africa, App., 1826, p. 234; Jacquin, Select. Stirp. Am. Hist. 1763, tab. CLXXIX, fig. 87 (sub *Mimosa*); Beauvois, Fl. d'Oware Benin 2, 1816-1818, p. 53, tab. 90 (sub *Inga*); Sabine in Hort. Soc. London Transact. 5, 1824, p. 444 (sub *Inga*); G. Don, Gen. Syst. 2, 1832, p. 396; Wight & Arn., Prodr. 1834, p. 279; Bentham in Hook. J. Bot. 4, 1842, p. 328; in Transact. Linn. Soc. 30, 1875, p. 347, 350, 360, 361-2; in B. & H., Gen. Pl. 1, 1862, p. 588; Oliver, Fl. Trop. Afr. 2, 1871, p. 324; Taubert in Engl. Pr. Nat. Pflzfam. III, 3, 1894, p. 123; Chevalier in Bull. Mus. Hist. nat. Paris 1910, p. 169-174; Aubréville, Fl. for Côte d'Ivoire 1, 1936, p. 194; 2nd ed. 1, 1959, p. 236; Fl. for Soud.-Guin. 1950, p. 249; Andrews, Fl. Pl. Anglo-Eg.

Sudan 2, 1952, p. 158; Gilbert & Boutique in Fl. Congo belge Ruanda-Urundi 3, 1952, p. 141; Cufodontis, Enum. Pl. Aeth. Sperm. in Bull. Jard. bot. Bruxelles, suppl. 1955, p. 210; Brenan in Fl. E. Trop. Afr., Leg.-Mim. 1959, p. 7.

Flowers massed (often more than 1000) in large pendent double flowerheads (upper part globose and consisting of bisexual flowers, lower part cylindrical to turbinate and consisting of ♂ or neuter flowers); flowers sessile on the swollen and clavate top of the peduncle; often several heads together at the end of the branches. Bracts free or connate, separately or shed together (and then circumscissile at base) a more persistent bracteole subtending each flower.

Calyx tubular, more or less bilabiate, two lobes being much larger and fleshier than the three others; lobes imbricate.

Corolla sympetalous, the 5 petals either connate or separate at base, connate in the middle and/or upper part, and free at the top ("corolla 5-lobed"), linear(-spatulate), valvate or subimbricate in bud.

Stamens 10, only at base connate and there joined to the corolla which is at its base also joined to the base of calyx, resulting in a pseudo-pedicel.

Anthers glandless, rarely in the sterile flowers (lower inflorescence) with a minute apical gland; pollen arranged in biseriate massulae, which escape by a longitudinal slit in the anther; massulae globular, consisting of 30-40 grains.

Ovary stipitate, with numerous ovules; style filiform; stigma terminal, inconspicuous.

Pod strap-shaped, flat or swollen, straight of falcate, coriaceous to almost woody, seeds usually imbedded in copious mealy pulp, exalbuminous.

Leaves bipinnate: leaflets sessile by a long narrow transverse joint, usually small and numerous, 1-nerved or tri-palmately nerved; petiole and rachises often provided with some glands.

Medium or large, spreading, often deciduous trees.

Type species: *Parkia biglobosa* (Jacq.) Bth.

Notes. *Parkia* is a circumtropical genus; several species occur in tropical America and tropical Asia; 4 species in Africa, widespread and somewhat variable. A single introduced rarely grown, species (*P. roxburghii* G. Don) in Africa.

Parkia is a natural taxon, immediately distinguishable in *Mimosaceae* by its remarkable pendent double inflorescences and valvate calyxlobes. The African species are closely allied.

When proposing the genus *Parkia* for the first time (1826), Robert Brown described and named one species in the new genus, *Parkia africana* R. Br. He cited some synonyms though stating that he was not certain of their being specifically identical. The name *Parkia africana* R. Br. was considered to be contrary to the Code and so rejected by Keay (see notes *Parkia africana*).

Erdtman noted that *Parkia*-pollen occurs in "polyads" (Pollen

Morph. Pl. Tax. 1952, p. 226). When magnified 50–60 times the polyads may be observed as globular massulae of \pm 30–40 closely packed small pollen-grains.

The pollen appears to ripen just before the dehiscence of the anther and two rows of polyads appear, escape and, very soon, are shed. The young bisexual flower contains just after the opening of the corolla a short style, which may lengthen until it exceeds the previously lengthening and stretching stamens. Herbarium specimens suggest that the pollen (and the anthers) of a flower are shed before the style reaches its full length. It seems, however, that a number of flowers in bisexual inflorescence (perhaps all, sometimes) never reach full fertility, the style remaining short until the flower drops.

The so-called "pedicel" results from the adherence and fusion of calyx, corolla and stamens in their basal part, and is not a short stalk jointed to the base of the flower or, eventually, a small stalk ending in the calyx. The flowers are therefore morphologically correct termed "sessile" by Gilbert & Boutique (Fl. Congo belge et Ruanda-Ur. 3, 1952, p. 141), and by some earlier authors.

The only botanist who drew attention to the value of seed characters in the taxonomy of *Parkia*, seems to have been A. Chevalier (see notes to *P. bicolor*). This is rather unexpected, as the seeds in particular attracted human interest since time immemorial and so might be supposed to be the best known part of the plant. It may be significant that Chevalier was engrossed by economic botany and so turned his attention to the seeds but, at any rate, the seed of African *Parkia* provides highly satisfactory distinguishing characters and allow specific identification of three of the four species.

Some *Parkia* species appear to grow in widely different ecological stations (cf. notes to *P. bicolor* and *P. filicoidea*). One might suppose that introduced species would easily gain a foothold in the vegetation, supported by their apparent ability to thrive under various conditions. So far, introductions proved not highly successful, however (see notes to *P. biglobosa* and *P. roxburghii*).

Systematy of African Parkia. Seed-characters are decisive in distinguishing among *P. biglobosa*, *P. bicolor*, and *P. filicoidea*. The seeds of *P. biglobosa* and *P. africana*, however, are similar.

This stresses the close affinity between *P. biglobosa* and *P. africana* and the doubt expressed by R. Brown when proposing the genus *Parkia* in 1826, whether these taxa were specifically different, is not entirely removed.

In this present revision *P. biglobosa* and *P. africana* have been adopted as species, a segregation largely based on the practical consideration that they can be distinguished by leaf-characters, although sometimes intermediates occur. The theoretical view based on practical experience, that a single character of foremost importance in segregating subordinate taxa (here species in the genus by a seed-character) will nearly always lose its governing force in certain sections within the taxon of higher rank, adds to the probability of a more natural

arrangement in African *Parkia* if *P. biglobosa* and *P. africana* are considered to be different species though possessing morphologically indistinguishable seeds.

The leaf-characteristics are often accompanied by a difference in the corolla, though there are many exceptions. It is further to be noted that intermediate leaf-characters between *P. biglobosa* and *P. africana* are apparently, and perhaps strictly, confined to San Tome and the opposite continental Dahomey-region. This geographical accent to the occurrence of transitions between *P. biglobosa* and *P. africana*, whose distributional areas overlap widely, also lends strength to the view that they may be accepted at specific rank.

Key to the species and varieties of *Parkia* R.Br.

Corolla-lobes shorter than half the length of the corolla, often much shorter. Testa with an ovate pleurogram, otherwise smooth and tightly enclosing the smooth, whitish or yellowish cotyledons.

Leaflets 35–65 on each side of the rhachis of a pinna; median leaflets 10–12 mm long and 2–3 mm wide. Pinnæ 8–16 on each side of the leaf-rhachis 3. ***biglobosa***

Leaflets 14–30 on each side of the rhachis of a pinna; median leaflets (10–) 12–18 (–20) mm long, (2½–) 3–5 (–6½) mm wide. Pinnæ 6–11 on each side of the leaf-rhachis 1. ***africana***

Corolla-lobes decidedly longer than half the length of the corolla. Testa without pleurogram, smooth or wrinkled, detached from the smooth or wrinkled olive-green cotyledons. Pubescence on the leaf-rhachis, if present, brown.

Leaflets 30–55 on each side of the rhachis of a pinna, opposite, the median ones 4½–10½ (–12½) mm long, 1–2 (–3) mm wide; pinnæ 10–26 pairs. Testa smooth.

Sterile flowers bluish-red to ashy-purple, fertile flowers red or pink. Testa not far removed from the cotyledons, though entirely detached 2. ***bicolor* var. *bicolor***

Sterile and fertile flowers equal in colour or very nearly so, pink or reddish-pink. Testa enclosing the cotyledons as a wide, entirely detached bag 2. ***bicolor* var. *agboensis***

Leaflets 12–28 on each side of the rhachis of a pinnae, opposite to alternate, the median ones 12–38 mm long, 4–14 (–20) mm wide; pinnæ 5–11 pairs. Testa wrinkled.

Pods cylindrical or nearly so, depressed between seeds 4. ***filicoidea* var. *filicoidea***

Pods laterally compressed, not or scarcely depressed between seeds 4. ***filicoidea* var. *hildebrandtii***

1. ***Parkia africana*** R. Brown in Denham et Clapperton, Narr. Trav. Disc. Africa, App. 1829, p. 234. — **Fig. 1.**

— *Parkia intermedia* Oliver (non Hasskarl, 1844), Fl. Trop. Afr. 2, 1871, p. 324; Ficalho, Pl. Ut. Afr. Port. 1884, p. 172; Hiern, Cat. Afr. Pl. Welw. 1, 1896, p. 305; Chevalier in Bull. Mus. Nat. Hist. Nat. Paris 1910, p. 171; Sudania 2, 1914, p. 31; Henr. in Bul. Soc. Brot. 27, 1917, p. 187.

— *Parkia filicoidea* Welwitsch ex Oliver, Fl. Trop. Afr. 2, 1871, p.

324, *pro parte quoad specimen* Barter 1136; Hutch. & Dalz., Fl. W. Trop. Afr. I, 1928, p. 352.

— *Parkia oliveri* Macbride in Contr. Gray Herb., New Ser. III, 59, 1919, p. 19; Baker f., Leg. Trop. Afr. III, 1930, p. 482; Exell, Cat. Vasc. Pl. San Tome 1944, p. 169, Suppl. 1956, p. 18.

— *Parkia filicoidea* Welw. ex Oliv. var. *glauca* Baker f., Leg. Trop. Afr. 1930, p. 781.

— *Parkia clappertoniana* Keay in Bull. Jard. bot. Bruxelles 25, 1955, p. 209; Aubréville, Fl. for. Côte d'Ivoire, 2nd ed. 1959, p. 236.

Spreading, widely branching, up to 22 m tall tree. Twigs at first densely brown puberulous, finally with an ashy-grey-brown bark.

Petiole 5–12½ cm long, ribbed, whitish puberulous like the rhachises which are slightly ribbed, with an elliptic glandlet on the upper side, the top of the rhachises with a gland between the two uppermost pairs of leaflets. Rhachis 13–27 cm long, often the top more than 1 cm produced and tail-like beyond the uppermost insertions of the pinnae.

Pinnae more or less alternating, (6–) 8–11 on either side of the rhachis. Secondary rhachises increasing from 6–14 cm, and decreasing again towards the leaf-top.

Leaflets alternating to opposite, (14–) 16–30 pairs, linear to narrowly oblong, (2½–) 3–5 (–6½) mm wide; base asymmetrical, proximal half auriculate, distal half obtuse. the base comparatively narrower than in *P. filicoidea*, top blunt to rounded, often acute-tipped, margin ciliate, especially in lower half, nerves on both surfaces slightly prominent, the midrib usually clearly visible on the upper surface by its light colour.

Peduncle 10–35 cm long, 1–4 flower-heads about 5 cm in diam. to a peduncle. Bracteoles in the upper inflorescence linear, top ladle-shaped, brown puberulous outside, often decidedly shorter than the flowers.

Lower inflorescence: flowers neuter or male, curved, calyx and corolla, and particularly the stamens shorter than in the upper inflorescence.

Upper inflorescence: flowers on ± 2 mm long pseudo-pedicels. Calyx almost 10 mm long. Corolla 11–12 mm long, minutely puberulous on the lobes, lobes short, less than half its length, often much shorter, corolla in the middle entire and in the basal part again split into 5 narrow strips, sometimes entire (especially Sudan specimens).

Stamens 10, 1½ cm long. Anthers oblong, early shed, 1½ mm long. Style glabrous, thread-like, finally exerted. Stigma inconspicuous, the truncate ending of the style.

Pods sub-cylindrical to somewhat laterally compressed, not or very slightly depressed between seeds, (8½–) 12–28 (35) cm long, 1–2½ cm wide, glabrous, often slightly falcate. Seeds small, globular-ovoid, laterally somewhat compressed, glossy, smooth but provided with an ovate, lateral pleurogram; testa spotted or dark, hard, glossy, enclosing the cotyledons tightly; cotyledons white or creamy. Pulp light yellow to reddish, soft, spongy, clinging to the seed.

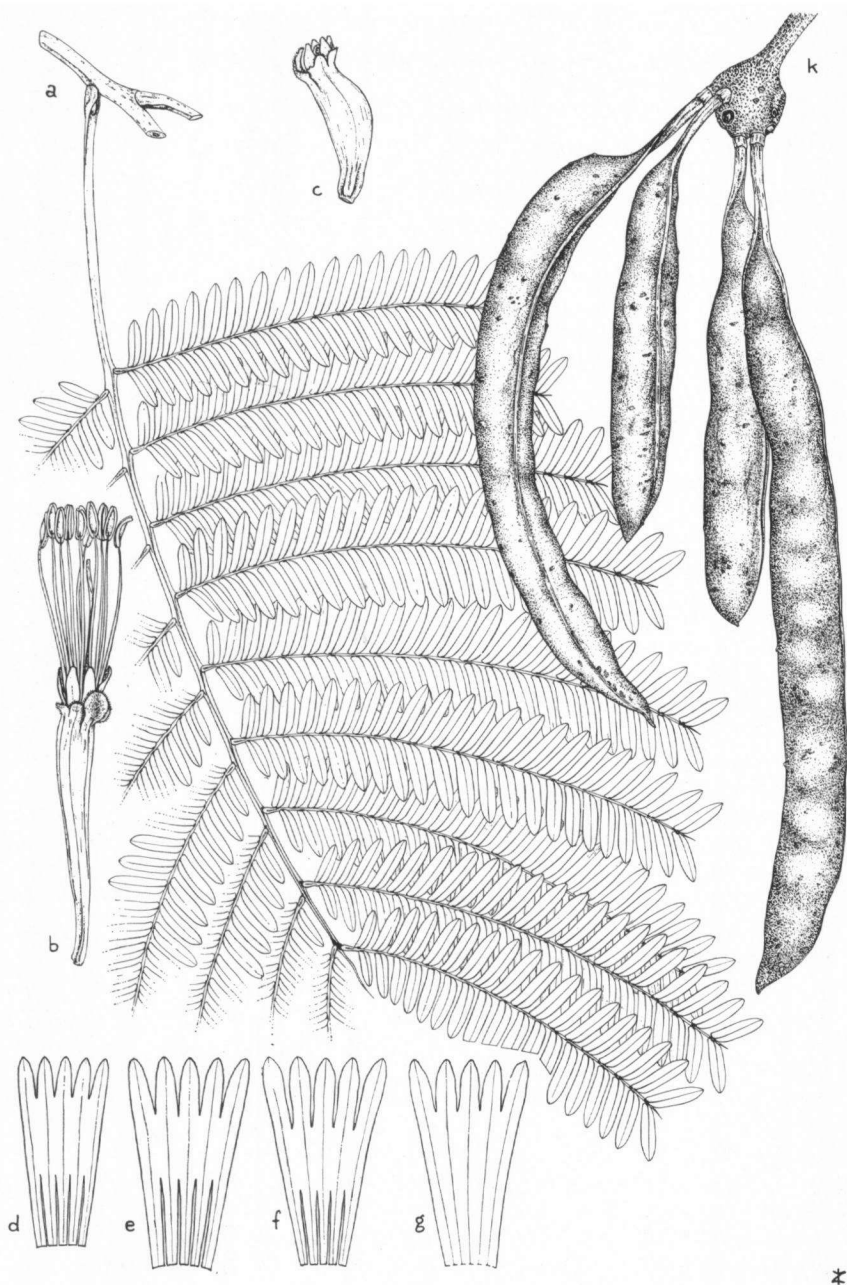


Fig. 1. *Parkia africana* R.Br. — a: leaf ($\times \frac{1}{2}$); b: fertile flower ($\times 3$); c: sterile flower ($\times 3$); d: corolla opened, Onochie FHI 34652, isotype of *P. clappertoniana* ($\times 3$); e: corolla opened, Batten Poole 102, K; f: corolla, opened, Mann 1099, type of *P. oliveri*; g: corolla opened, Knobleiher, Ethiopia; k: pods ($\times \frac{1}{2}$). — a, b, c, and k: Onochie FHI 34652.

Type: Nigeria, Clapperton s.n. (BM).

Distribution. Senegal to Sudan, Cameroon, Dahomey, San Tomé, ?Annobon, Togo, to Lac Tchad.

Ecology. In the NW Equ. Prov. of the Sudan, Hoyle noted (January 1939) that the anthers were "rose-pink, opening dark green" and pendulous flower-heads appeared from "dwarfish shoots behind leaves".

In Ghana Irvine described (*l.c.*, p. 348) the "bark brownish grey, with longitudinal fissures; slash reddish brown". It flowers there in January to February.

Parkia africana flowers in Nigeria already in December and ripe pods are found in the second half of February (Onochie). In the Okene district it grows in savannah country, esp. near large piles of rocks, on the shady sides of small outcrops.

In Cameroon Latilo and Daramola found the slash dark brown of trees growing in open savannah. Letouzey observed it as a common savannah tree in the M'Doyena district, and the savannah is generally its true habitat e.g. in Nigeria where Onochie found it nr Ilorin Town in open woodland, with *Andropogon* and *Ctenium*. He described it as having a rough, dark grey bole, woody rectangular scales flaking off to leave dark chocolate scars; the leaf-rhachis pink to red (Onochie).

Parkia oliveri has been regarded as an endemic species on San Tomé. Chevalier (*l.c.*, 1910) stated (transl.): "*P. intermedia* Oliv. was only known from the island of San Tomé, where Welwitsch and Mann collected it long ago. I found it in 1905 there, near the town of San Tomé. In the forests in the south of the island it is completely absent and in the north it is only seen in the plantations of cacao and coffee and in deforested areas, which were formerly under cultivation and at present represented by savannah. It would seem, therefore, that the tree was in the past introduced by the Portuguese like so many other fruit-bearing trees and if so, it is only an introduced species."

Although it is difficult to judge without a personal knowledge of the vegetation of San Tomé, it seems to me that Chevalier's argument is not quite convincing. *P. oliveri* may have been introduced on San Tomé but this does not prove that it did not occur there already for natural reasons. Its absence in the forests (if truly and entirely absent; Welwitsch found it "not frequent in edges of forests on Monte Caffé) is no indication for the absence on San Tomé of *P. oliveri* as it is, first of all, a savannah tree. It seems quite possible that *P. oliveri* occurs naturally both on the continent and on San Tome, probably also on Annobon.

Baker and Harris (Evol. 11, 1957, p. 449) studied *Parkia africana* (sub nomen *P. clappertoniana*) in Ghana as regards pollination. The top part of the hanging inflorescence (morphologically the basal part) consists of sterile, nectar producing flowers which collects in a ring-shaped depression preceding the large globose lower part of the

hanging inflorescence consisting of fertile flowers. Baker and Harris found that up to 5 cm³ nectar may be produced by a single inflorescence in one night. The flowers, they say, emit a weak fruity scent. They confirm the occurrence of protandry, as I found by examining herbarium specimens of all African species of *Parkia*. There is a change in colour from red through purple to pink. Anthesis appears to take place an hour or so before dusk and most of the pollen disappears within 12 hours.

Though bees started visiting close to dusk (17.30–1800) “by such large numbers that a “conspicuous” droning could be heard” (*Apis mellifica* L.), Baker and Harris judged it “unlikely that they were of any significance as pollinators”. They succeeded in proving frequent visits of fruit-eating bats (*Epomophorus gambianus* Jentink and, later, *Nanonycteris veldkampii* (Jentink) Matschie) which lapped the nectar. They are unable to prove that bats are effective as pollinators, though “it can be concluded that the visits of the bats are, at least, not harmful”. With reference to the notes on pollination in the introductory part of the present revision, I wish to suggest that further progress in establishing the process of pollination on *Parkia* cytological and anatomical research in the developing flowers, the pollen, stigma, and ovary and early stages of the growing ovary, ought to be attempted.

Vernacular names. I suggest that many of the vern. names used for *P. biglobosa* are also used for *P. africana*. Perhaps the following names apply specially to *P. africana*:

GHANA: duwaduwa (Hausa).

NIGERIA: dorowa (Katsina); igba (Yoruba).

SAN TOME: (u)luba, luwa.

CONGO: abeinbili (Azande).

Uses. It often is not possible to decide which data found in the literature refer to *P. biglobosa* and which to *P. africana*. Presumably, both species are used for the same purposes in many cases.

Irvine (Woody Pl. Ghana 1961, p. lxxx) reported that 100 g. “dadawa cake”, (fermented seeds), produced 395 calories, 10.1 g water, 28.5 g. protein, 16.8 g. fat, and 32.4 g. carbohydrate. There was no calcium, iron, vitamin A, thiamin, riboflavin, nicotinic acid or ascorbic acid found to be present. The pulp and seeds, unprepared, lacked the latter substances and produced less calories and half as much protein, fat and carbohydrates. Russell (in Irvine, *l.c.*, p. lxxxvi) found, when investigating the chemical composition of fodder shrubs and trees, a very high protein content of the seeds —31.8 %; (see also Brünick, in Bull. Imp. Inst. London, 30, p. 461, and Mc Cullock, Rep. Med. Health Ser., Nigeria 1933, p. 118). Irvine stated:

“The dehusked kernels are boiled to form a paste which is allowed to ferment. After 2–3 days they are pressed into strongly smelling cakes or balls (Hausa: dadawa). Cooking removes the unpleasant odour. They keep well, are a common soup basis, a food, and a seasoning (Dag.: Kpalagu). Comparatively rich in food value, they tend to take the place of cheese in the European diet.”

“An aqueous extract of the empty pods, and sometimes the bark

also, possibly due to tannin present, is used, especially when mixed with cow dung, to harden laterite walls and floors and indigo pits, to form a firm waterproof layer on the outside of huts, and to give a gloss to pottery after firing.

Growth is slow. According to Chevalier the trees begin to flower after 8–10 years and are only small trees at that time. Full development is reached after 30–50 years, Chevalier supposes.

CHEVALIER (*l.c.* 1910, p. 173) advises to encourage the cultivation of *Parkia africana* and *P. biglobosa*. They produce valuable fruit, their roots spreading widely keep the soil well and over a large area and so they counteract the effects of winter erosion. The soil seems to benefit from their presence (*Bacterium radicola?*). If planted the trees ought to be placed at intervals of 30–40 m and the crown should be kept open which makes it possible to cultivate *Zea*, *Sorghum* or *Pennisetum*, among the trees. Chevalier further reported that the baked and shelled grains are used in Dahomey to prepare a seasoning dish: afiti, a very different product from the soumbara of the Sudan. To prepare "afiti" the fermentation lasts one night only, after which period salt is added. The putrid smell of soumbara is not noticeable in afiti. CHEVALIER (*l.c.* 1910, p. 171) points to the important traffic and trade in these products among the Africans, which he believes to equal in value the trade in Cola-nuts, especially when it is realized that the area in which afiti and soumbara are made and demanded is very much larger than the area of Cola-trade.

In the region of Fouta-Djalou, and in the Beyla and Kankan districts, the husks of the pods are used for catching fish. The rotting and shredded husks impart a blackish colour to the water. The fish are killed, not stupefied and rapidly decompose. Much damage has done to the fish in the Sudanese streams by this method (Chevalier).

Irvine judges the wood of "little value, though easily worked". Locally it is used for house posts, mortars and bowls, or as fuel. The fibrous residue after pounding the roots makes a scrubber or sponge sold in local markets (N. Ghana and Togo). Irvine believes that *P. africana* may be useful as an avenue tree because it grows well from seed and it is transplanted easily.

Kerharo and Bouquet report that the pods (husks) are used to poison fish (Plantes méd. tax. Côte d'Iv. — Haute Volta, 1950) in the Ivory Coast, which confirms Chevalier's remarks.

Specimens examined. SUDAN. Seriba Ghattas: Schweinfurth 1884 (BM, GOET, K, W); NW Equat. Prov., 2½ days march NW Said Bundas, 480 km W of Wau: Hoyle 506 (BM); Bahr Ghasal: de Heuglin 75 (BM); Gourma Prov.: Konobiri: Chevalier 24343 (P).

GHANA. Ashanti, Amansare: Chipp 514 (K); Kwahu, W of Abene: Chipp 631 (K); Shai Plains: Johnson 578 (K).

DAHOMY. Cercle d'Abomey: Chevalier 23153 (P); Cercle de Zagnanado: Chevalier 23026 (P).

TOGO. Kete Krachi: Kitson s.n. (BM holotype of *P. filicoidea* var. *glauca* Bak. f.).

NIGERIA. without loc.: Barter 1136 (K); North Nigeria, 20 km downstreams Jebba, Niger valley: Kamphorst 32 (WAG); Zaria Prov., Samaru: Baldwin 12005 (K); North Nigeria: Elliot 54 (K); Ilorin Prov., Ilorin: Onochie FHI 34652 (K);

holotype of *Parkia clappertoniana* Keay; B, BM, BR, P); Katsina: I. O. Ahmed FHI 26211 (BM, K), 26212 (BR, K); Ibadan, Forestry Arb., relict tree: Onochie FHI 34653 (BM, BR, K, P); Okene, Igbiwa Dion: OK 31 (BM); Sokoto Prov., Kaura Namoda: Keay FHI 16205 (K); Kano-Katsina rd (Kano 45 miles): Keay FHI 21150 (K); Oyo Prov., Ljio: Talabie FHI 33760 (K); Jos Plateau: Batten Poole 102 (K); Lagos, Olobe Meyi: Foster 162 (K), Ross 60 (K); South Nigeria: Ross c.s. R 115 (K); Lagos, Dawodu 3 (K); SW Nigeria: Hamblen N 34 (K).

CAMEROON. Victoria Bot. Gard.: Maitland 271 (K); Kongola: Mildbread 9003, III Afr. Exp. (BM, K); Ngoroje to Mayo Salbe: Latilo et Daramola FHI 34493 (BR, K); N'Doyena distr.: Letouzey 2405 (P); Tibati-Niandoida: Letouzey 2384 (P).

SAN TOME. Welwitsch 1788 (BM); Praia da Nazareth: Ribeiro 1, 7 (BM, COI), 41 (COI); Boa Entrada and distr.: Chevalier 13478, 13480 (BM, P), 13481 (P).

EQUATORIAL AFRICA. Chari-Chad: Chevalier 7911 (P), 7959 (P); Ketou, Kom (Chari central): Chevalier 8510 (P); Dar-Banda: Chevalier 7160 (P); Oubangui, Haute Ombella, M'Brous, Dati a Kono: Chevalier 5853 (P).

CONGO. Bar Uele: Dewulf 714 (BR).

ETHIOPIA. without loc.: Knobler (de Heuglin) 1863 (W; new record for Ethiopia).

Notes: In 1955 (Bull. Jard. bot. Brux. 25, p. 212) Keay rejected the name *P. africana* R. Brown (1826) declaring: "Unfortunately Brown's epithet *Parkia africana* is a *nomen illegitimum*, because he cited several synonyms, including *Inga biglobosa* Willd. He was, moreover, intentionally including some of the earlier descriptions in his diagnosis of *P. africana*".

As regards Keay's second point, concerning Brown's intentionally including earlier descriptions, Brown's description may be cited here: "*Parkia africana*, pinnis sub-20-jugis, pinnulis sub-30-jugis obtusis intervalla equantibus, cicatricibus distinctis parallelis, glandula ad basin petioli, rachi communi eglandulosa, partialium jugis (2-3) summis glandula umbilicata".

This description may or may not contain bits of earlier descriptions; it is certainly no copy. The description is not sufficient to distinguish clearly between *P. biglobosa* and "*P. africana*"; the larger part applies to both. The statement that the jugae (pinnae) are less than 20 also may point to either species (although there is a light preference for *P. biglobosa*, which has 8-16 pairs of pinnae, whereas "*P. africana*" (= *P. clappertoniana* = *P. oliveri*) has (6) 8-11 pairs.

Brown further stated that the leaflets are "sub-30-jugis" and it is to be noted that both in Keay's key (Fl. W. Trop. Afr., 2nd ed.) and in the key in the present revision, *P. biglobosa* is attributed with 35-65 pairs of leaflets, whereas "*P. africana*" has at most 30 pairs. Brown's description, though it may be judged to be unsatisfactory can only be applied to "*P. africana*" and not to *P. biglobosa* as it was and is generally interpreted and it contains the only key-character.

Brown described in this Appendix to Denham and Clapperton's Narrative first of all Clapperton's specimens and in the protologue referred to a specimen collected by Clapperton; there can be no doubt that Brown regarded the specimen collected by Clapperton, now preserved in the British Museum, as the basis for his *Parkia africana*. As a result, there can be no doubt as to the taxonomic identity of *Parkia africana* R. Brown.

However, Brown having described *P. africana*, continued by quoting: "*Inga biglobosa*. Palis. de Beauv. Flore d'Oware 2 p. 53, tab. 90. Sabine in Hort. Soc. Transact. 5. p. 444. De Cand. Rodr. 2. p. 442. *Inga Senegalensis*. De Cand. Prodr. 2. p. 442. *Mimosa taxifolia*. Pers. syn. 2. p. 266. n. 110".

The citing of these earlier synonyms in conjunction with the first publication of *Parkia africana* was Keay's reason to reject the name *Parkia africana*.

It is to be realized that *Inga senegalensis* DC. rests entirely on *Mimosa taxifolia* Pers. and that there is no possibility to establish the identity of the latter (see Notes to *P. biglobosa*). Brown's reason not to adopt either "*senegalensis*" or "*taxifolia*" becomes perfectly understandable.

In the introduction to *Parkia*, Brown showed himself not at all certain of the specific identity of *Parkia biglobosa* with *Parkia africana*. He referred to (*l.c.*, p. 233): "*Inga biglobosa*, or a species very nearly related to it", and said "*Inga senegalensis* of M. De Candolle may also belong to the same species (*I. biglobosa*)" and concluded "It is possible, however, that some of the plants here mentioned, though very nearly related to each other . . . may be specifically distinct";

Asked for his advice concerning the legitimacy of the name *Parkia africana* R.Br., Dr. F. A. Stafleu, assistant-editor of *Taxon*, agreed that it seemed difficult to reach a clear decision. His final view was that R. Brown, after all, had cited earlier synonyms. He advised, in accordance with Keay's decision, to reject the name but admitted that if Brown had put a question mark with his citations of synonyms, the name *Parkia africana* R.Br. would have become legitimate and available as a correct species name. On further consideration Dr. Stafleu's view, although it was at first agreed to follow it as the best way under the circumstances, appeared not entirely convincing.

It could not be denied that R. Brown had selected the name *Parkia africana* for his new species because he questioned the identity of the cited synonyms. The protologue clearly expresses this doubt. R. Brown's judgment is to-day still entirely acceptable. The uncertainty concerning *Mimosa taxifolia* Persoon and *Inga senegalensis* DC. persists, and *Parkia biglobosa* (Jacq.) Bth. and *Parkia africana* R.Br. are so closely related that they are kept apart in this revision only with some doubt, a view exactly in accordance with R. Brown's stated judgment.

The species name *Parkia africana* can only be rejected for the purely technical reason that earlier synonyms are cited with the first publication of the name. It is not an ambiguous name and certainly not a source of error, and it is not a superfluous name. There is nothing in the Code that prescribes that a question mark should accompany cited earlier synonyms if their identity is held in doubt; doubt in this case is expressed in the accompanying text (protologue) by R. Brown.

Although it is not strictly relevant to the argument, it could be advocated to retain *P. clappertoniana* Keay and reject *P. africana* R.Br. now that the former name was adopted and answers all requirements for a clear understanding of the taxon. But *P. clappertoniana* has to be replaced by *P. oliveri* Macbride in that case.

The problem was put before the meeting of the section systematics of the Royal Netherlands Botanical Society.

The meeting decided unanimously for retaining *Parkia africana* R. Brown, seeing that Brown's intention was to name his taxon *P. africana* and that he selected this name because he supposed that earlier names, which might seem available, belonged to possibly different taxa; that he delimited by his description the species satisfactorily and because a type specimen was available; that he avoided adopting the earlier names cited because he (rightly) doubted their identity, as was made clear in the protologue. The meeting agreed unanimously to these points, which were formulated by Prof. dr. J. Lanjouw, prof. dr. M. A. Donk, and Prof. dr. C. G. G. J. van Steenis, and fully endorsed by the present author.

The leaves in some specimens from San Tomé (Ribeiro leg., BM) have $2\frac{1}{2}$ mm wide and 12 mm long leaflets and so agree as in their measurements to leaves of *P. biglobosa*. The number of the jugae in the San Tomé specimens varies between 7 and 10 and these specimens can only be distinguished from *P. biglobosa* on account of the number of pairs of leaflets which is just below 30. Chevalier collected on the same island (no 13478, P) leaf-specimens showing similar transitional characters (11 pairs of pinnae, 30 pairs of leaflets to a penna, leaflets 2– $2\frac{1}{2}$ mm wide and \pm 11 mm long). Chevalier 18.905 (Lt Marc, Wahligouya, Sudan, P) is a specimen of *P. biglobosa* with 4–9 jugate leaves.

The difference in length of the corolla-lobes in *P. biglobosa* and *P. africana* (= *P. clappertoniana*) suggested by the drawings published in 1955 (see Fig. 2) is certainly present in the specimens from which

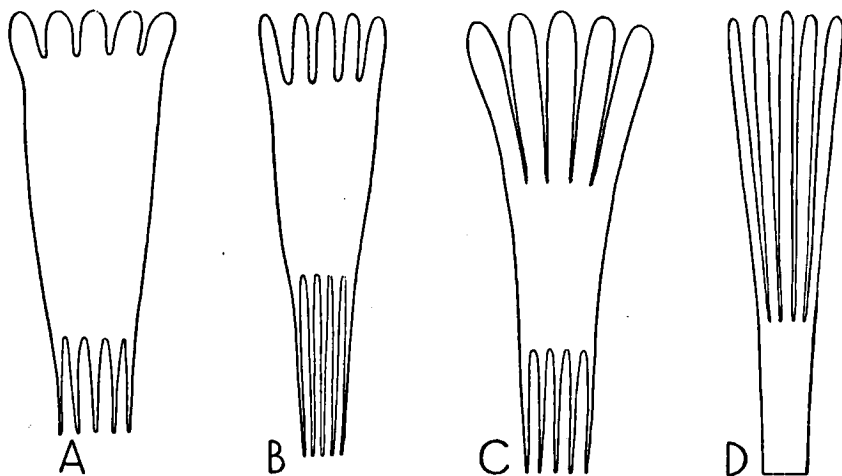


Fig. 2. Drawings of corolla tubes in *Parkia*, published in Bull. Jard. bot. Brux. 25, 1955, p. 211. A: *P. biglobosa* (Jacq.) Bth.; B: *P. clappertoniana* Keay; C: *P. oliveri* Macbride; D: *P. filicoidea* Welw. ex Oliv. (all \times 6).

the drawings were made, but this difference is not constantly correlated with the leaf-characteristics of these species. As an example may be cited De Wit no 7690 (WAG), which when named according to the key in the 2nd ed. of the Flora of West Tropical Africa undubitably is referable to *P. biglobosa*, but the corolla of De Wit no 7690 exactly matches the drawing of the corolla of "*P. clappertoniana*". That drawing apparently induced Aubréville to adopt the shape of the corolla-lobes in his 2nd ed. of the Fl. for. Côte d'Ivoire as a key character, fortunately as the second choice, but nevertheless leading into error.

Another question is the difference between *Parkia oliveri* Macbride (described for San Tomé) and *P. clappertoniana*. Keay did not specify these but it would seem that on San Tomé an endemic species, *Parkia oliveri* Macbride, occurred. In the drawing accompanying Keay's publication in 1955, *P. clappertoniana* and *P. oliveri* are shown to possess different corolla's.

The type specimen of "*P. clappertoniana*" has $\pm 1\frac{1}{2}$ mm long corolla-lobes; the type of *P. oliveri* ± 3 mm long lobes, but Batten Poole 102 (K) has $\pm 2-2\frac{1}{2}$ mm long lobes which is a perfect intermediate.

Ribeiro 7, collected on San Tomé, has $1\frac{1}{2}$ mm long corolla-lobes and so matches exactly the corolla of the type of *P. clappertoniana* Keay. On the other hand, Schweinfurth 1884 (Sudan; see Bull. Jard. bot. Bruxelles 25, 1955, p. 211) has ± 1 mm long corolla-lobes and so is, as to its corolla, a perfect match to *P. biglobosa* (as pictured; see fig. 4). A very noteworthy character of the corolla in Schweinfurth 1884 is, that the tube is not split in the basal part, and in that respect it agrees with *P. filicoidea* (as pictured; see Fig. 2).

It may be concluded, that insofar as the drawings published in 1955 suggest specific characteristics, they are to be interpreted with caution. For a general concept of the corolla-characters in the species of *Parkia* they are satisfactory (provided that *P. oliveri* and *P. clappertoniana* are adopted as one single species), but it must be kept in mind that the length of the corolla-lobes varies and is only to a limited extent correlated with the other specific characters. In Fig. 1 some corolla's are pictured as an illustration of their transitional characters, in other words, to show the range of variation in the corolla of *P. africana*.

In his description of *P. clappertoniana*, Keay (l.c., 1955) made reference to a prolonged top of the leaf-rhachis. This top can be observed as a 1-2 cm long subulate or tail-like ending of the rhachis beyond the insertion of the uppermost pair of pinnae (see Fig. 1, a). A similar "tail" is found in specimens of *P. africana* R.Br. of San Tomé and of Dahomey, and it may also be observed in some specimens of *P. biglobosa* (e.g. Sierra Leone, Afzelius, "Anne Tobay"; UPS), though it would seem to be less frequently present in the latter species. I never noticed the tail in *P. bicolor* or in *P. filicoidea*.

2. ***Parkia bicolor*** A. Chevalier in Bull. Soc. bot. France 55, Mém. 8, 1908, p. 34; Chevalier in Bull. Mus. Hist. Nat. 1910, p. 170, 173; Hutch & Dalz., Fl. W. Trop. Afr. 1 (2), 1928, p. 353, 2nd ed. 1 (2), 1958, p. 487; Baker f., Leg. Trop. Afr. 1930, p. 782; Aubréville, Fl. for. Côte d'Ivoire 1, 1936, p. 194, 196; tab. 73, 2nd ed. 1, 1959, p. 238, tab. 77; Pellegrin, Legum. Gabon 1948, p. 7. Gilbert & Bout. in Fl. Congo belge Ruanda-Urundi 3, 1952, p. 144, tab. 10; Andrews, Fl. Pl. Anglo-Eg. Sudan 2, 1952, p. 159; Hutchinson & Dalziel, Usef. Pl. W. Trop. Afr. 1955, p. 217; Exell & Mendonça, Consp. Fl. Angolensis 2, 1956, p. 256; Irvine, Woody Pl. Ghana 1961, p. 347.

Fig. 3.

— *Parkia zenkeri* Harms in Notizbl. Bot. Gart. Berlin, App. XXI, 1911, p. 34.

— *Parkia klainei* Pierre ex de Wildeman in Ann. Mus. Congo 5 sér., 2, 1907, p. 129, *nomen nud.*; Pellegrin, Fl. Mayombe 1, 1924, 111; Heitz, For. Gabon 1943, p. 145, pl. 46.

Var. bicolor

Spreading, heavy-branched, up to 30 m tall, usually slightly and narrowly buttressed tree. Twigs at first densely brown puberulous, finally glabrous.

Petiole up to 10 cm long, ribbed, brown puberulous like the rhachises which are angulate and flatly grooved above. A large, flat, level gland often present on the base of the petiole; top of the rhachises between the insertions of the leaflets often with flat, (stalked) glands. Rhachis up to 30 cm long.

Pinnæ opposite or alternate, (11–) 14–18 (–26) pairs. Secondary rhachises increasing from 4 to 13 cm, decreasing towards the top of the leaf to 6 cm.

Leaflets opposite, (30–) 40–46 (–50) pairs, linear to linear-oblong, 5–10 (–12) mm long, 1–2 (–4) mm wide; base asymmetrical, auriculate in one half and obtuse in the other, top obtuse or rounded, margin ciliolate (near top); nerves on both surfaces inconspicuous, midrib on the upper surface indicated by a light-coloured line (in dried leaves).

Peduncle 4–6 (–10) cm long, 3–5 flower-heads (\pm 5 cm long, $2\frac{1}{2}$ cm wide) to a peduncle. Bracts (in the upper part of the inflorescence) linear, gradually widening towards the ladle-shaped puberulous top, about as long as the flower.

Lower inflorescence: flowers neuter or male; calyx slightly shorter than the corolla, tubular, 6–7 mm long. Corolla glabrous, membranous, split downwards to far below the middle into 5 narrowly ligulate lobes. Stamens 8–10, $\pm 1\frac{1}{4}$ cm long; anthers producing sometimes some pollen and often provided with an minute apical glandlet.

Upper inflorescence: flowers on \pm 2 mm long pseudo-pedicels. Calyx and corolla like in the lower inflorescence but the, on top minutely puberulous, corolla almost 1 cm long. Stamens 10, $1\frac{1}{2}$ cm long. Anthers linear, early shed, $\pm 1\frac{1}{2}$ mm long. Style glabrous, thread-like, finally exserted. Stigma inconspicuous, terminal.

Pods strap-shaped, laterally compressed, somewhat depressed

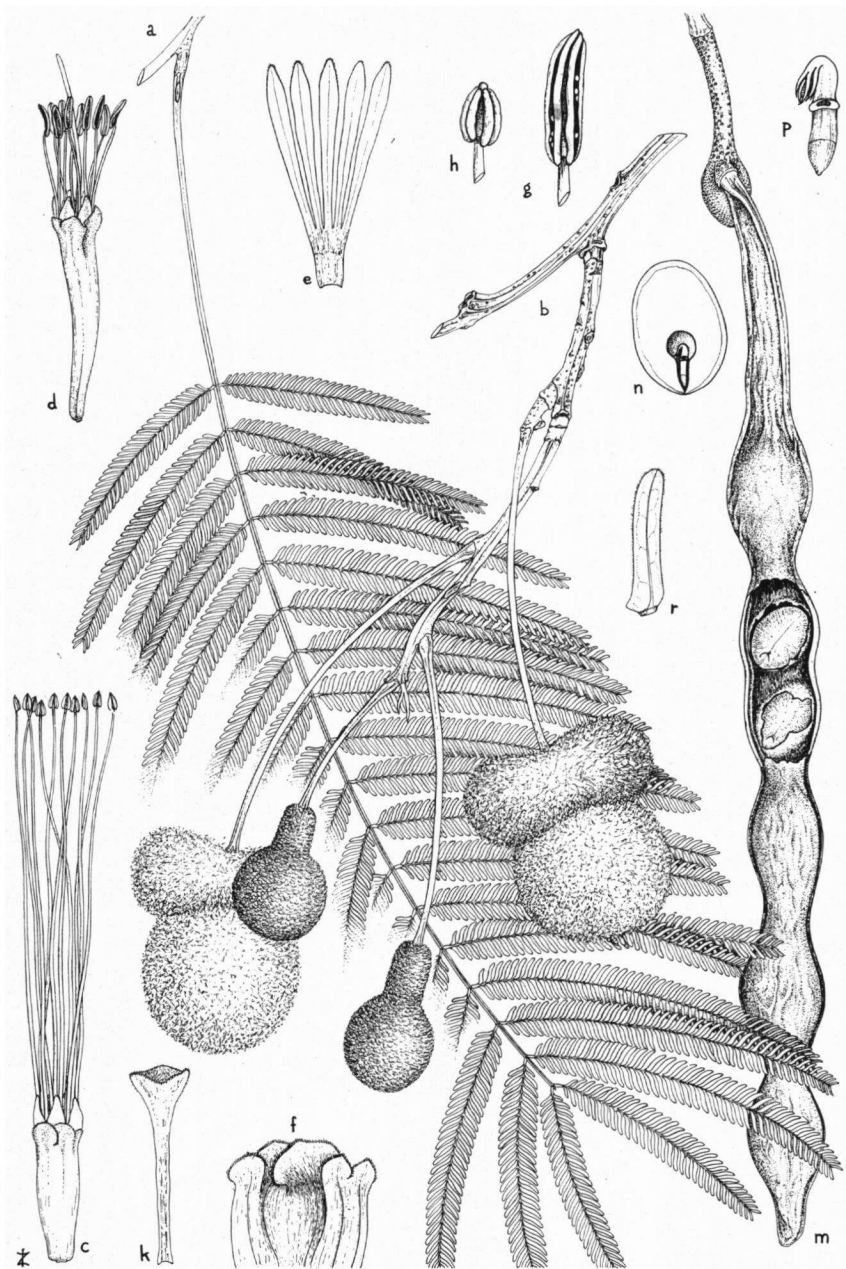


Fig. 3. *Parkia bicolor* A. Chevalier var. *agboensis* (Chev.) Hagos et de Wit stat. nov. — a: leaf ($\times \frac{1}{2}$); b: inflorescences ($\times \frac{1}{2}$); c: sterile flower (lower infl.) ($\times 3$); d: fertile flower (upper infl.) ($\times 3$); e: corolla (opened) ($\times 3$); f: top part of calyx, inside ($\times 6$); g: anther of fertile flower ($\times 12$); h: anther of sterile flower ($\times 12$); k: bracteole, adaxially ($\times 3$); m: pod ($\times \frac{1}{2}$); n: length view, between cotyledons ($\times 1$); p: embryo ($\times 3$); r: leaflet ($\times 3$). — a-k and r: de Wit 9032; m-p: Leeuwenberg 2783.

between the seeds but hardly indented along the suture, 25–40 cm long, 1½–2 cm wide. Seeds imbedded in yellowish mealy pulp, the smooth, olive green cotyledons detached from the smooth membranous testa.

Type: Guinea. Chevalier 13389 (P) and 13547 (P; BR, K, isosyntypes). Kindia district, in gallery forest on river banks, no 13389, in March 1905 flowering, and no 13547, in May 1905 bearing fruit (*teste* Chevalier).

Distribution. Western Africa, S of the Sahara, and Central Africa.

Ecology. *P. bicolor* is a common, sometimes even very common, tree of the west and central African rain forest, common also in gallery forest or in deciduous forest. It is nowhere found in pure stands and always occurs as solitary specimens. It is possible that var. *bicolor* is confined to the drier areas (gallery forests, deciduous forests) and that var. *agboensis* is a taxon of the fully developed rain forest but if so, this can only be demonstrated by field observations (colour of the flowers).

At first sight the inflorescences of var. *bicolor* and var. *agboensis* seem very different but on examining a range of specimens it appears that the only difference is in the colour of the flowers. In var. *agboensis* the flowers of the lower and the upper inflorescence are equal in colour, both pink, usually red or orange tinged. The flowers of the lower inflorescence of var. *bicolor* are violet to bluish-pink, in contrast to the pink or ashy-pink upper inflorescence. The stamens of the lower infl. are perhaps always longer in var. *agboensis* than in var. *bicolor* but this needs further control.

There is no sufficient evidence to accept var. *agboensis* as a species but it certainly may be adopted as a variety. The possibility cannot be excluded that further study (pods, seedlings, genetics) may prove that it ought to have specific rank, as proposed originally by Chevalier. Many specimens cited here under var. *bicolor* actually belong in var. *agboensis* but this cannot be ascertained in the herbarium specimens (see further Notes to var. *agboensis*).

P. bicolor penetrates deep into the savanna region along marshy valleys and in gallery forests. Schnell found it "very frequent in dense forest" in some ravines of Mt Nimba, up to 1300 m alt. (Mém. I.F.A.N. 2, 1952, p. 479). Voorhoeve (no 223, WAG) collected it as a "high buttressed" tree in high forest (Liberia). Leeuwenberg (no 2783, WAG) repeatedly observed in the rain forest of the Ivory Coast rather high and conspicuous buttresses but in general collector's notes in the more southern parts of its distribution lead to think that towards the south the buttresses are less developed (narrow and 1.20 m high: Pierlot in S. Kivu) or even absent. Flowers and leaves may be seen together but often the flowers appear before the leaves (Nov.-Febr.). Trees carrying ripe fruits often stand bare.

Bertin described the bark as grey and brownish tinged, flaky. In Ghana, Irvine (Woody Pl. Ghana 1961, p. 347) found it "smooth, dark red-brown or blackish grey", the slash "dirty yellow with dark streaks."

The flowers smell more or less like yeast of beer; the wood has a fetid odor says Cooper (Liberia) or smells like onions (Pierlot, in S. Kivu). It stains a knife blue (Chipp, in Ghana).

Aubréville stated that the size of the leaflets changes with the age of the tree. Young trees have larger leaflets (Ivory Coast). This is also seen in coppice shoots, collected by Ejiofor at Calabar (Nigeria) which bear wider leaflets and less pinnæ which increase in length from base to top of the leaf; normally the pinnæ are longest about the middle of the leaf. Deighton observed (Sierra Leone) that the leaves did not close at night, which is confirmed by Irvine (Ghana). In the southern part of its area of distribution the pods tend to become larger and flatter; there the sutures are often somewhat swollen and may be red.

Monkeys are often seen to eat the pods, which are at first yellow or orange (Leeuwenberg, no 2783) and then become purple or black. The pulp has a very sweet taste just before the pods are ripe but at full maturity the pulp is like a grey layer round the seeds and as a rule very numerous insect larvae crawl inside the pod (Chevalier *l.c.* 1910, p. 173).

Evrard found *P. bicolor* in Congo growing in *Guibourtia*-forest subject to floods (Maringa-Lopori), in marsh forest (Ifale), and in half-deciduous forest (Lingomo-Djola). Pierlot observed it at 1250 m alt. (1° 20' S – 28° 32' E) in closed, moist, half-deciduous forest together with *Cynometra alexandri*, *Grossera multinervis*, *Strombosia grandifolia*, and *Staudtia gabonensis*. At 2° S – 28° 28' E, at 950 m alt. it occurred in old forest with *Khaya*, *Piptadeniastrum*, and *Staudtia*. These widely different growing conditions are confirmed by other observers *e.g.* Ejiofor who found *P. bicolor* at Calabar (Nigeria) in high forest accompanied by *Homalium*, *Erythrophloeum*, *Piptadeniastrum*, *Berlinia*, and *Fagara*, or De Wit who collected it in low deciduous forest on an at that time seemingly bone-dry slope near granitic outcrops on Mt Tonkui at an alt. of nearly 1000 m (Ivory Coast).

Vernacular names. GUINEA: toumbou neri Sussu, (meaning "the neri of worms" whereas *P. biglobosa* is "neri"; *teste* Chevalier).

LIBERIA: guor luh (Gio).

IVORY COAST: ananjui (Agni), asama (M'bonoi), dogo (Bondoukou), N'dousan-mihia (Ebrié), la or lo (Abé, Attié), pouopo or pouapotou (Kroumen), rondo or ronga (Mossi).

NIGERIA: irugba or iruiba (Benin).

GABON: bolondo (Douala), ekombolo or atoul (Baboleo), tome (Pahouin), tombi (Mabia).

CONGO: lilembe (Yangambi), luboko (Boma), luki (Boma), lulele (S. Kivu), ofiloli (Yangambi), wambamba (Lokunda, Éala).

ANGOLA: singa (Chiaca), samu (Belize-Luali).

COMMERCIAL NAME: lo (Ivory Coast), tsoumbou (Gabon).

Uses: The wood is described by Bertin (Les bois de la Côte d'Ivoire 1918, p. 20, 37, 42, 65, 86) whose findings may be summarized as follows. It is suitable for constructions (building) and available in large quantity, being light and soft-grained. Above the buttresses,

the trunk averages 1 m in diam., and is 14 m free of branches. The felled bole is very liable to split. Sapwood and heartwood not widely different, greyish with brown sections, and rather knotty and spotted. The wood is soft and easily worked, keeps nails well. In general, Bertin judges it to have value although it tends to split. Specific gravity 0,5 (Aubréville: 0,45).

It is not easy to explain the considerable differences between these data and Bertin's report on "*P. klainei*" (Miss. for. col. 4, Bois Cameroun, 1920, p. 210–211). The specific gravity is 0,7–0,9, the wood "hard", and it is recommended to be used below water-level, for railroads, furniture and heavy constructions.

Hutchinson & Dalziel (l.c. p. 217) stated that the sapwood is white and veined, the heart brown, fairly light.

The fruit-pulp is sometimes eaten (Irvine, Ghana) and the fresh fruit is reported as a bait in fishing (Chipp, Ghana), but these uses are local and highly incidental.

Specimens examined: GUINEA. Kindia distr.: Chevalier 13547 (P., *syntype*; BR, K, *isosyntypes*).

SIERRA LEONE. Njala: Deighton 1071 (BM, K); Mayamba: Deighton 1922 (K); Boundary Comm. 1891–1892, Scott Elliot (K); Nongowa Chiefdom, Neaboi Valley, Kambui for. res.: Jordan 2001 (K).

LIBERIA. Dukwia riv.: Cooper 185 (BM, K), 338 (BM, K); Eastern Prov., Losseh Pah: Voorhoeve 223 (WAG).

IVORY COAST. Aubréville 876 (BR, K, P); Banco for. res.: Aubréville 387 (HBG, K, P; ?var. *agboensis*); Fort Binger: Herb. Alleizette, de Byam 1914 (L); Sassandra, 56–61 km NW: Leeuwenberg 2437 (WAG), 2783 (WAG); Davo distr.: Leeuwenberg 2802 (WAG); Man distr., Mt Tonku: de Wit 9156 (WAG); Azaguié, chem. de fer km 42: Chevalier 22292 (BR, K); chem. de fer 52 km: Fleury, herb. Chevalier 33031 (P); chem. de fer 64 km: Fleury, herb. Chevalier 33034 (P); Gare de Makougné, km 75: Chevalier 16154 (P); Douégoué for. res.: De Wit 9077 (WAG); Anguédédou for. res.: de Wilde 1041 (WAG); Pays Adioukrou, Dabou: Chevalier 16981 (P); Assoukoffiero, region du N'Zi: Chevalier 20134 (P).

GHANA. Abitifi Kwahu: Irvine 1659 (K); Ancoba riv. mouth: Chipp 23 (K).

NIGERIA. Benin, Degema: Unwin 27 (K), Talbots 3694 (BM); Sapoba: Kennedy 2073 (B, BM, BR, K, P); Calabar: Ejiofor FHI 21896 (K); Ibadan, nr Forest School: Onochie FHI 35271 (K); Keay & A. Binuyo FHI 37285 (K); Eastern prov.: Adu 107 (K); Eket distr.: Talbots 3047 (BM), 3060 (BM, K), 3061 (BM); Oban: Talbot 1467 (BM, K), 1909 (BM); Talbots 1350 (BM, BR, K); Lagos Bot. Sta.: Millen 42 (K).

CAMEROON. Bipinde: Zenker 3498 (BM, BR, GOET, L, M, W. – *isosyntype* of *P. zenkeri* Harms), 4157 (BM, BR, GOET, L, M, W).

GABON. Pierre 103, 103bis (1899) (BR, P); Libreville distr. serv. for. Gabon: Le Testu 1431 (BM,); Diobomagola, Orimbo riv., Ogowé basin: Fleury 26561 (P); Pellegrin 8 (BR, P); Heitz 32 (BR, P); Lac Zouangl: Pobiguin 43 (BR, P); Tchibanga: Le Testu 1431 (BM, P).

CONGO. Gilbert 606 (BR), 975 (BR); Ghésquière T 92 (BR); arbre en obs. 2276: Donis 2148 (BR), 2858 (BR); Maringa-Lopori confl.: Evrard 4899 (BR); Limongo-Djola rd: Evrard 5754 (BR); Befale: Evrard 4062 (BR); Yangambi for. res. arbre en obs. 02464: Gilbert 7606 (BR); arbre en obs. 02636: Gilbert 8772 (BR), 9825 (BR); Yangambi: Gilbert 10580 (BR); Yangambi, 7 km SE: Jean Louis 3811 (BM, BR); Plateau Isalowe: Jean Louis 2346 (BM, BR), 4083 (BM, BR), 4318 (BM, BR), 5590 (BR), 7703 (BM, BR); Ishunga-Kakeyi, 1°20'S – 28°23'E: Pierlot 2314 (BR); Kisantu: Callens 4825 (BR); Kavumu-Walikale, 2°S – 28°28'E: Pierlot 907 (BR); Walikale-Kaleka: Lebrun 5323 (BR); Iambo (Flandria): Hulstaert 1547 (BR); Eala: Léonard 732 (BM, BR,

FI, LISC, M); Lebrun 1502 (BR); Pynaert 1399 (BR); Goossens 4480 (BR); Laurent 1828 (BR, base of *P. klainei*); Stanleyville: Liegeois 12 (BR); Equateur, Bantoie-Boyeka: Jean Louis 2161 (BM, BR, COI); Boma: Wagemans 757 (BR); Inkisi riv.: Dewèvre 470 (BR; see notes); Yaosuka rd, arbre en obs. 516: Gilbert 1278 (BR); S Kivu, Mingazi, 1°59'S-28°26'E: Pierlot 3321 (BR); Kinkoko valley: Donis 1593 (BR); Mayombe: Flamigni 10048 (BR); Boende: Hulstaert 386 (BR); Kasai, Kakenga-Ter Mwaka: Dechamps 182 (BR).
ANGOLA. Cabinda, Buco Zau, Chiaca, junto ao rio Chaica: Monteiro, Santos et Murta 377 (LISC); Alte Mayombe, rio Belize et Luali, in hygrophilous forest: Gossweiler 7568 (BM, COI, K).

Notes. Harms published in 1911 (*l.c.*) a new species, *Parkia zenkeri*. He based it on Zenker 3498, Büsgen 432, and Krücke 13. Of one of these specimens duplicates are preserved (Zenker 3498). They belong without any doubt in *P. bicolor*, though Harms stated that *P. zenkeri* was characterized "by the relatively short and broad leaflets". A comparison of the original description of *P. zenkeri* and the description of *P. bicolor* given here shows also that this supposed difference does not exist.

Parkia klainei Perre ex de Wildeman appeared as a *nomen nudum* (without any description) in Etudes flor. Bas et Moy. Congo II (1907, *l.c.*), but a specimen was cited preserved at Brussels: Laurent 1828. This establishes with certainty the identity of *P. klainei*, which appears to be a later name for *P. bicolor* Chev.

It was pointed out by Gilbert & Boutique (*l.c.* p. 145) that Dewèvre 470 is the base for the record of *P. biglobosa* in Congo (Micheli in Th. Dur. et de Wild., Bull. Soc. Roy. Bot. Belg. 37, 1, 1898, p. 54; Ann. Mus. Congo belge, Bot., Sér. III, 1, 1901, p. 9 and Th. v. H. Dur., Syll. Fl. Congo 1909, p. 183). They suggested to refer the specimen to *P. bicolor*, which is correct.

var. agboensis (Chev.) Hagos et De Wit nov. stat. — **Fig. 3.**
— *Parkia agboensis* Chevalier in Bull. Soc. Bot. France 2, Mém. 8, 1908, p. 35 (basionym).

Petiole and rhachises brown puberulous, ribbed, secondary rhachises carinate below and ribbed or flatly grooved above. Petiole 6–8 cm long, with a large, elliptic or oblong, level gland near the base, the secondary rhachises often carrying flat glands between the 2–3 uppermost pairs of leaflets. Rhachis 16–23 cm long.

Pinnae opposite or nearly so, 14–18 (22) pairs. Secondary rhachises increasing from 4 to 12 cm, decreasing towards the upper leaf to 6 cm.

Leaflets opposite, 35–46 (50) pairs, linear-oblong, 5–8 mm long, 1–2 mm wide.

Lower inflorescence: flowers neuter or male; calyx \pm 6 mm long, corolla slightly exserted, glabrous, membranous, split nearly to the base into 5 narrow, ligulate lobes. Stamens 8–10, $1\frac{1}{2}$ – $2\frac{1}{2}$ cm long, anthers small, often irregularly developed, mostly with a minute apical glandlet on the connective pink to red, like the upper.

Upper inflorescence: flowers bisexual: calyx nearly 10 mm long, corolla slightly puberulous on top. Stamens 10, up to $1\frac{1}{2}$ cm long, anthers basifix, $1\frac{1}{2}$ mm long. Pods like var. *bicolor*.

Type: **IVORY COAST**. Chevalier 16925 (P), and Chevalier 16981 (P). In primary forest (no 16925) at Agbo, near the railway bridge of the Agniéby (fl. 5–10 Jan. 1907), and (no 16981) on the banks of the lagoon at Dabou, bearing fruit in Febr. 1907 (teste Chevalier).

Vernacular names. **IVORY COAST**: asama (Mbonoi); lo (Abé); dogo (Bondoukou).

Specimens examined. **IVORY COAST**. Adiopodoumé distr., Banco for. res.: de Wit 9032 (WAG); de Wilde 1050 (WAG); Davo riv., 56 km Sassandra: Leeuwenberg 2419 (WAG).

Notes. Chevalier described and named *Parkia agboensis* simultaneously with *Parkia bicolor* (l.c.). He stated that *P. agboensis* differed in having more pinnæ to the leaf (16–22), more leaflets to the pinnæ (35–50 pairs), and the leaf-rhachises were “delicately puberulous”. He found “*Parkia agboensis*” common in moist parts of the primary forest and one of its most characteristic trees, up to 30 m high, the trunk up to 1 m in diam. Each pod contains 15–25 seeds, according to Chevalier, who noted that the seeds were surrounded by a somewhat wry, inedible, yellow-red pulp, eaten by monkeys. The descriptive notes, added by Chevalier, refer to 18–20 mm long and 12 mm wide, more or less egg-shaped seeds “which are surrounded by a very thin membranaceous testa, entirely detached from the embryo, that is lodged in it like in a bag.” Chevalier’s description is illustrated here in Fig. 3. The seed-characters are highly valuable in distinguishing *P. bicolor* (both varieties) from allied species.

Most probably — but the herbarium specimens allow no judgment of the colour of the flowers — a large number of specimens cited as var. *bicolor* should be placed under var. *agboensis*, and it may appear that var. *agboensis* is, as Chevalier suggested, characteristic of the moist primary forest. See further Notes to var. *bicolor*.

3. ***Parkia biglobosa*** (Jacq.) Benth in Hook. Journ. Bot. 4, 1842, p. 328; Oliver in Fl. Trop. Afr. 2, 1871, p. 324; Pobéguin, Essai Fl. Guinée fr. 1906, p. 38, 39, 113, 237, tab. 50; Baker f., Leg. Trop. Afr. 1930, p. 782; Hutchinson & Dalziel, Fl. W. Trop. Afr. 1, 2, 1928, p. 352, 2nd ed. 1, 2, 1958, p. 487; Usef. Pl. W. Trop. Afr. 1955, p. 218; Aubréville, Fl. for Côte d’Iv. 1, 1936, p. 194, 2nd ed. 1, 1959, p. 236; Andrews, Fl. Pl. Anglo-Eg. Sudan 2, 1952, p. 159; Irvine, Woody Pl. Ghana 1961, p. 347. — **Fig. 4.**

— *Mimosa biglobosa* Jacquin, Sel. Stirp. Am. Hist. 1763, p. 267–8, tab. 179. fig. 871.

— *Inga biglobosa* (Jacq.) Willd. Sp. Pl. 4, 1806, p. 1025; Beauvois, Fl. Oware Benin 2, 1816–1818, p. 53, tab. 90; Sabine in Transact. Hort. Soc. 5, 1824, p. 444.

—? *Mimosa taxifolia* Persoon, Syn. Pl. 2, 1807, p. 266.

—? *Inga senegalensis* De Candolle, Prodr. 2, 1825, p. 442.

Large, spreading, heavy-branched, up to 30 m tall tree. Twigs finally glabrous, covered by a brown bark.

Petiole 9–10 (12) cm long, slightly ribbed, glabrescent or greyish

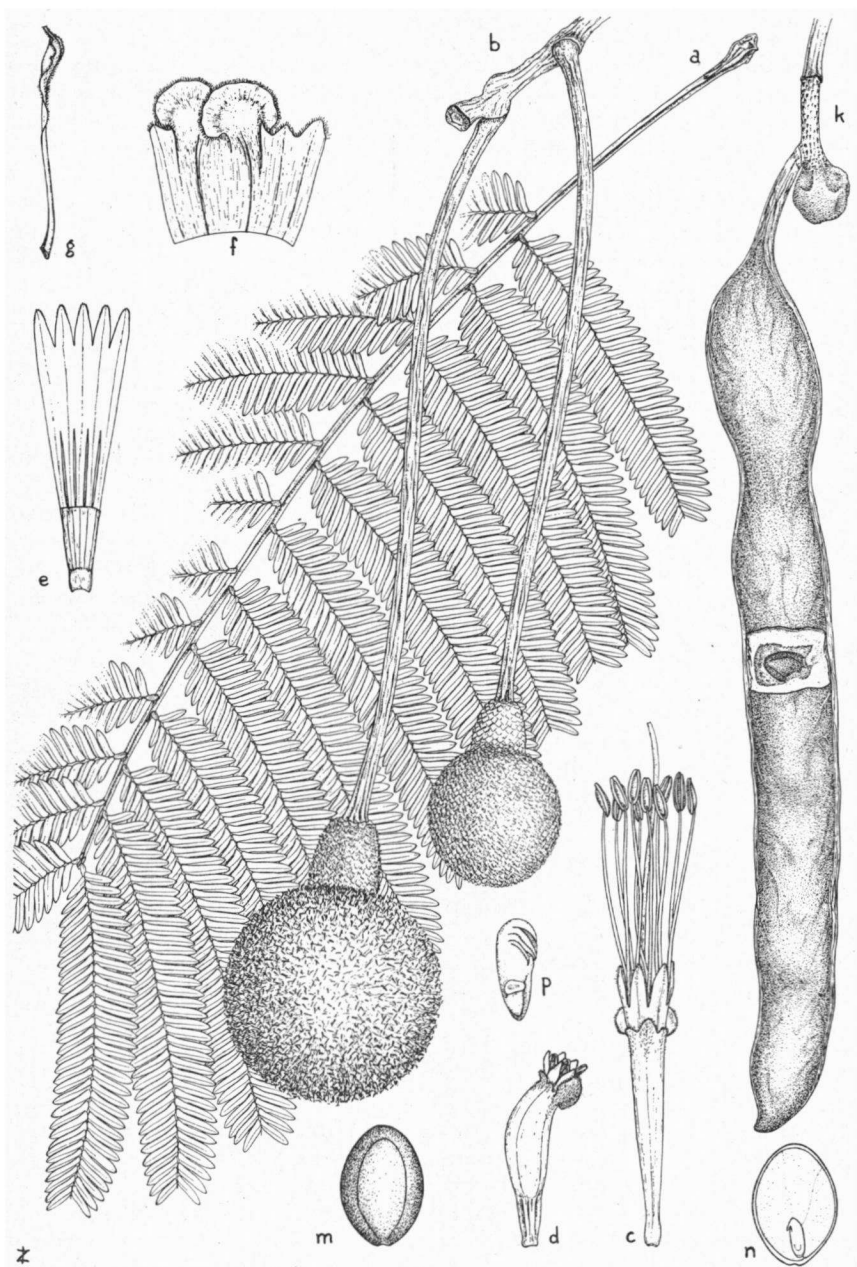


Fig. 4. *Parkia biglobosa* (Jacq.) Bth. — a: leaf ($\times \frac{1}{2}$); b: inflorescence ($\times \frac{1}{2}$); c: fertile flower ($\times 3$); d: sterile flower ($\times 3$); e: corolla opened ($\times 3$); f: inside of upper part of calyx ($\times 6$); g: bract, side view ($\times 3$); h: pod ($\times \frac{1}{2}$); m: seed ($\times 1\frac{1}{2}$); n: length section, seed ($\times 3$); p: embryo ($\times 3$). — a-g: de Wit, 7690; k-p: Leeuwenberg 3263.

puberulous like the sharply ribbed (or angulate), sometimes also nearly terete rhachises. A large, flat, level gland usually present at the base of the petiole, top of the sec. rhachises between the insertions of the uppermost pairs of leaflets often with glandlets. Rhachis 19–24 cm long.

Pinnæ more or less alternating, 10–13 (16) on each side of the rhachis, sec. rhachises increasing and decreasing from 6 to 12 cm from the base to the top of the leaf.

Leaflets opposite, firmly chartaceous, (30–) 32–38 (50) pairs, linear-oblong, 10–14 mm long, (2–) $2\frac{1}{2}$ – $3\frac{1}{2}$ mm wide, base asymmetrical, auriculate in one half and obtuse in the opposite half, top rounded and with an acute tip, glabrous or greyish glabrescent and often minutely ciliate on edge; nerves inconspicuous, excepting sometimes the midrib on the upper surface.

Peduncle \pm 6 cm long, stalks of the flower-heads 17–26 cm long. Bracteoles in the upper part of the inflorescence linear, gradually widening towards the ladle-shaped puberulous top, nearly as long as the flower.

Lower inflorescence: flowers neuter or male; calyx slightly shorter than the corolla, \pm 10 mm long. Corolla \pm 11 mm long, shortly lobed (lobes not exceeding one quarter of the length of the tube). Stamens 10, anthers somewhat smaller but producing pollen, glandless. Ovary aborted.

Upper inflorescence: flowers on 2–3 mm long pseudo-pedicels. Calyx 10–12 mm long, corolla distinctly longer than the calyx, up to 14 mm, glabrous, but minutely puberulous on top, lobes 2– $2\frac{1}{2}$ mm long, above the junction with calyx and stamens at base, usually again split (4 slits). Stamens 10, $1\frac{1}{2}$ –2 cm long, connate in lower half. Anthers linear, $1\frac{1}{2}$ mm long. Style $1\frac{1}{2}$ cm long, glabrous, thread-like, finally exserted. Stigma inconspicuous, terminal.

Pods linear-oblong, subcylindrical to laterally compressed, not depressed between seeds.

Embryo enclosed by a tight testa, cotyledons white or slightly tinged. Testa smooth, with a linear ovate pleurogram.

Type. Select. Stirp. Americ. Hist. 1763, tab. 179, fig. 87, pp. 267–268, Jacquin auct.

Distribution. West Tropical Africa, S of the Sahara; not in Congo (see Notes to *P. bicolor*); in savanna regions.

Ecology. Schnell (Vég. Fl. Mont. Nimba, Mém. I.F.A.N. 2, 1952, p. 479) found it in the savanna's in the Beyla district and on the spurs of the Fon massif, but absent in all savanna's of the Nimba region, whereas Pobéguin (*l.c.* 1906) judged it very common in the whole of Guinea. Aubréville (*l.c.* 1936, p. 192) met with this species in the whole of W Africa in all savanna's, especially in ancient cultivated areas. It is not felled when new grounds are brought under cultivation. The flat-topped crown is characteristic in the vegetation surrounding

sudanese villages. Aubréville confirmed this view in 1950 (Fl. for. Soud.-Guin., p. 249) adding that it is a species of the ancient dry guinean forest, where it dominated together with *Pterocarpus erinaceus*. In remnants of that forest in Guinea (e.g. at Télimélé, Galonal), where no savanna is found but the ground covered by forest undergrowth, it abounds. De Wit found it immediately to the north of the forest zone, in the Baoule savanne (north of N'Douci), growing among *Borassus* palms (Ivory Coast).

Deighton noted (Freetown, Sierra Leone) that the leaves close at night, which is confirmed by Irvine (Ghana; *l.c.* p. 348). Up to a dozen ripe pods occur on a head. Beauvois noticed that the wood smelled like onions (Senegal).

Vernacular names. SENEGAL AND GUINEA: *néré* (Bambara & Malinke; *néré nunku* is the pulp in the pods); *nerré* (Fula); *houlle*, *oul*, *ouli* (Wolof, Sénoufo); *néte* (Mandingo, Bambara, Malinke); *néri* (Susu, Malinke); *enokay* (Diola); *naingué*, *tchiqué* (Sénoufo); *yif* (None; Sésère de Thies).

GAMBIA: *ato* (Kombo).

PORT. GUINEA: *gante* (Balanta); *ulele* (Pepel).

GAMBIA: *netto* (Mandingo); *nette* (Wolof).

SIERRA LEONE: *gumwi* (Mende); *a-bei*, *koe-bei* (*e-bei* or *tsoe-bei* in plural).

IVORY COAST: *kpale* (Baoule); *dorona* (Kaoussa); *dossa* (Djerma); *ioro* (Cado).

GHANA: *du* (Bemoba, N. Terr.); *dua* (Dagarti); *duaga* (Mossi).

Unwanted names: in Gambia "monkey cutlass"; in Sierra Leone "St John's Bread" (confusing reference to *Ceratonia siliqua*).

Uses. Hutchinson and Dalziel gave a detailed account of the available data (*l.c.*, p. 218) on the usefulness of the West African Locust bean. The farinaceous reddish pulp and the seeds are both used as food in the same manner as those of *P. filicoidea*; when dried the pulp contains 60 % of sugars and is eaten with rice and meat. It is used to prepare a fermented liquor (Brown and Massey). The fermented product of the seeds is in Sierra Leone known as "kinda" (from *k-enda*, Timne). Later the word changed to "kainda" and was used for the tree or the timber. Pobéguin stated that if unripe fruit is eaten, a severe colic follows.

Seeds were roasted to produce a coffee (*café du Soudan*). A blackish, greasy, unattractive looking extract from the seeds (47 % fatty substances, acc. to Pobéguin) is "*nététou*" or "*nerétou*", "*soumara*" or "*soumbara*", and used as a food or seasoner in Senegal, Guinea and Sudan; prof. De Wit informs me that he saw these black fist-sized balls often sold in markets in the Ivory Coast. Burnt husks are known as "*khata*" (Senegalese), and added to tobacco to increase its pungency; mixed with indigo the dye becomes more effective. Bark and fruits were locally (and rarely) used to poison fish (Susu and Rio Nunez people). The bark, used for tanning, imparts a red colour to the leather, less pronounced than mangrove bark tanning.

The mealy pulp was or is made into a refreshing drink (already referred to by Clapperton) and mixed with honey children find it an emollient and delightful, especially when feverish. A decoction of the macerated bark is a healing bath, and hot extracts are applied in Senegal, Gambia, and Guinea as a mouthwash and to relieve tooth-

ache. A decoction of leaves and roots is a lotion for sore eyes in Gambia. The ashes of the tree are used in soap and in snuff-making (Portères).

Specimens examined. SENEGAL: Perrottet in 1827, no 261, s.l. in herb. Delessert (BM, K, M, W); Leprieur s.l. in Herb. Maire (B, P); Thiès: Berhaut 73 (BR); Kayes: Legagneux s.n. (Herb. Alleizette, L).

GAMBIA. Kombo: Dawe 14 (K).

PORT. GUINEA. Bissau, Pussubé: J. Espirito Santo 1166 (COI, LISC).

SUDAN. Diendenia: Chevalier 424 (BR, P); San: Chevalier 1105 (BR, P); Sigiuri: Chevalier 292 (K, P); Faymy: Chevalier 3119 (P); Wahligouya: Lt Marc (herb. Chevalier) 18905 (P; intermediate to *P. africana*).

SIERRA LEONE. "Anne Tobay": Afzelius s.n. (UPS); Rio Panghas: Afzelius s.n. (UPS). Freetown, Heddles Farm: Deighton 1061 (K). Niger Exp.: Barter s.n. (K); Musaia: Deighton 5480 (K); Sierra Leone Boundary Comm.: Scott Elliot 3857 (BM), 4771 (BM, K).

LIBERIA. Bopolu: J. A. White s.n. (WAG, MONROVIA).

IVORY COAST. Bondoukou: Aubréville 717 (K); Séguéla 2 km., 6°40'W–8°N, Leeuwenberg 3263 (WAG); N'Douci, southernmost part of Baoule savanne: De Wit 7690 (WAG).

GHANA. Pong, S of Wa: Kitson 698 (K).

Notes. Jacquin (*l.c.*) described and pictured only flowers of "*Mimosa biglobosa*". The pod, which "was said to be edible" he did not see. Nothing is stated about the leaves and it may be supposed that the tree was leafless at the time Jacquin saw it in "Martinico". Pobéguin (*l.c.*) noted in Guinea that the flowers appear before the leaves. Jacquin (and later Beauvois in Santo Domingo) reported the tree from the West Indies (Martinique). It is a somewhat disturbing fact that there exists no later record of the occurrence of *Parkia* on those islands. The trees are large and conspicuous and often cultivated for their pods: they cannot have been overlooked. The fact that *Parkia* was not observed in any of the West Indian islands in the past 150 years is further confirmed by its absence in numerous flora's on the islands which I consulted, and by Dr W. T. Stearn (British Museum) and Mr. G. R. Proctor, of the Institute of Jamaica, who declared to possess no knowledge of the occurrence of *Parkia* in Jamaica, or on any other Caribbean island. The Kingston Herbarium contains no specimen of *Parkia* from a W. Indian island and no specimen is present in the herbaria of the British Museum, at Paris or at Kew. The absence of the genus *Parkia* in the West Indian islands is to be regarded as an established fact.

Prof. Rechinger, at Vienna, kindly informed me that no W. Indian specimen of *Parkia* is preserved in the Jacquin Herbarium. Although this state of affairs may raise the question whether some error was made in the protologue of *Parkia (Mimosa) biglobosa*, it would seem justified to accept Jacquin's statements, and their subsequent taxonomic interpretation unchanged and completely. So, a *Parkia*, observed by Jacquin on Martinique, certainly was an introduced species. Beauvois, when visiting Santo Domingo some 25 years later, also saw a *Parkia* there, probably the same species and certainly also an introduced one. His suggestion that slaves brought the tree from West Africa — where he had seen it — is entirely reasonable. Moreover, Beauvois sailed on a slaver to the W. Indies and was in a position

to have observed that slaves took living plant-seeds with them. In addition to the fortunate circumstance that any *Parkia*, observed in the W. Indian islands must be an introduced species — *Parkia* is a common genus on the S. American continent — Jacquin's drawing (enlarged and reproduced here, Fig. 5) is clear and accurate. Although it allows no differentiation between *Parkia biglobosa* (Jacq.) Bth., as currently known and as accepted in this revision, and *P. africana* R.Br., the drawing of the short-stamened, curved, sterile flower is so characteristic (cf. Fig. 5 and 4) that there is sound reason to accept and maintain the usual delimitation of *P. biglobosa*. It may be remarked

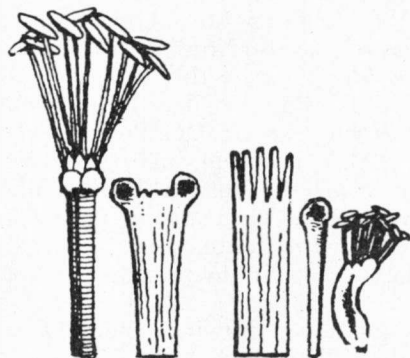


Fig. 5. Drawings by Jacquin in Sel. Stirp. Am. Hist. 1763, tab. 179, fig. 87. Left to right: fertile flower, calyx, corolla, bracteole and sterile flower.

that the corolla, drawn by Jacquin (see Fig. 5) is much closer to the corolla of "*Parkia clappertoniana*" (= *P. africana*) as drawn in Keay's paper (Jard. bot. Bruxelles 25, 1955, p. 211; reproduced here, see Fig. 1) than to the drawing of the corolla of *P. biglobosa* (Keay, l.c., see Fig. 1) but the length of the corolla-lobes in *P. biglobosa* varies and is not decisive in distinguishing between these two species (see also below, and further Notes to *P. africana*).

The only fact, somewhat difficult to explain is, perhaps, that after the records by Jacquin and Beauvois, the genus or the species seems to have disappeared from the West Indies. On the other hand, this may confirm the circumstance that *Parkia* species generally appear to be not really successful as introduced plants. In Africa e.g. trials with *P. roxburghii* G. Don met with no success worth mentioning.

Repeatedly reference was made to the occurrence of *P. biglobosa* in Congo. This rests on an erroneous identification (see Notes to *P. bicolor*).

When publishing *Inga senegalensis* (Prodr. 2, 1825, p. 442) De Candolle made no reference to *Mimosa senegalensis* Lmk (Enc. 1, 1788, p. 19), which proved not to belong in *Parkia* (cf. also R. Brown l.c.). On the other hand, De Candolle referred to *Mimosa taxifolia* Pers., an earlier name. Apparently De Candolle did not accept the epithet

"taxifolia" for a new combination in *Inga* because *Inga taxifolia* Kunth already existed (cf. Prodr. 2, 1825, p. 439). *Inga senegalensis* DC. was placed by De Candolle as a "*species non satis nota*" and Persoon's description was copied. The name *Inga senegalensis* DC., therefore, is nothing more than a new name for *Mimosa taxifolia* Persoon (Syn. Pl. 2, 1807, p. 266). Although Persoon referred with doubt to *Mimosa senegalensis* Lmk., there is no evidence that De Candolle wished to return to Lamarck's epithet, and "*senegalensis*" may have been chosen by De Candolle on account of Persoon's statement that *M. taxifolia* occurred in Senegal. It is not sure, actually, whether Persoon had a species of *Parkia* before him when publishing the name. At any rate, Persoon's description contains no information pointing to either *P. biglobosa* or *P. africana* (see also Notes there) but, as his plant occurred in Senegal, it may have been either. Prof. dr Baehni at Geneva informed me that the De Candolle Herbarium contains nothing that could be referred to *Inga senegalensis* DC. Persoon referred to a specimen in Herbarium Jussieu. Miss Lourteig, maître de recherches at Paris, kindly informed me that the Jussieu Herbarium contains nothing that could possibly have any bearing on Persoon's *Mimosa taxifolia*. It seems best to refer with doubt both *Mimosa taxifolia* Pers. and *Inga senegalensis* DC. to the synonymy of *P. biglobosa* (Jacq.) Bth.

According to the published drawings (Bull. Jard. Bot. Bruxelles 25, 1955, p. 211) reproduced here (Fig. 6), De Wit no 7690 (Côte d'Ivoire, Baoule Borassus-savanne, N. of N'Douci), would belong in "*P. clappertoniana*", on the strength of the appearance of the corolla-lobes. If this specimen is named according to Keay's key (Fl. W. Trop. Africa, 2nd ed., 1 (2), 1958, p. 487) it is, however, inevitably referred to *P. biglobosa*; the size and shape of the leaflets, and the number of pinnae are all entirely within the limits set for *P. biglobosa* (as accepted by Keay, by botanists in general, and in this revision). The drawings (Fig. 6, A, B) indicating a difference in length of the corollalobes between *P. biglobosa* and "*P. clappertoniana*" nevertheless correctly illustrate the specimens cited. Though it may be maintained that the leaf-characters of these species to some extent are correlated with the length of the corolla-lobes, there exists certainly no strict correlation. Until by more additional data (genetics, micro-anatomy & c.) further differences will be demonstrated, the leaf-characters are the only means of distinction between *P. biglobosa* and "*P. clappertoniana*" (= *P. africana*).

3. ***Parkia filicoidea*** Welwitsch ex Oliver, Fl. Trop. Afr. 2, 1871, p. 324; Durand, Syll. Fl. Cong. 1909, p. 183; Chevalier in Bull. Mus. Hist. Nat. Paris 1910, p. 173; Pellegrin, Fl. Mayombe 1, 1924, III, and Legum. Gabon 1948, p. 7; de Wildeman, Pl. Bequaertianae 3 (1), 1925, p. 89, lit!; Hutch. & Dalz., Fl. W. Trop. Afr. 1, 1928, p. 352, 2nd ed. (Keay) 1 (2), 1958, p. 487; Baker f., Leg. Trop. Afr. 1930, p. 781; Aubréville in Fl. for Côte Iv. 1, 1936, p. 196, tab. 72; Fl., 2nd ed. 1, 1959, p. 236, 238, tab. 76, Fl. for. Soud.-Guin.

1950, p. 249; Gossweiler & Mendonça, Carta Fitogeogr. Angola 1939, p. 80, 87, 108; Glover, Provis. checklist Br. It. Somaliland 1947, p. 193; Brenan and Greenway, Check Lists Fr. Br. Emp. 5, Tang. Terr. II, 1949, p. 3465; Eggeling and Dale, Indig. Trees Uganda 1951, p. 227; Gilbert et Bout. in Fl. Congo belge Ruanda-Ur. 3, 1952, p. 141; Andrews, Fl. Pl. Anglo-Eg. Sudan 2, 1952, p. 158; Gossweiler in Agron. Aug. 7, 1953, p. 245; Cufodontis in Bull. Jard. Bot. Bruxelles, Suppl. 1955, p. 211; Exell & Mendonça, Consp. Fl. Ang. 2, 1956, p. 256; Brenan in Fl. Trop. E. Afr., Leg. I, Mimos. 1959, p. 7. — **Fig. 6.** — *Parkia hildebrandtii* Harms in Engl. bot. Jhrb. 26, 1899, p. 261, ib. 30, 1901, p. 318.
— *Parkia bussei* Harms in Engl. bot. Jhrb. 33, 1902, p. 154; Gilbert et Bout. in Fl. Congo belge Ruanda-Ur. 3, 1952, 144.

var. *filicoidea*

Spreading, 25–30 (35) m tall, often narrowly buttressed forest tree; crown rather open, finally flat; bark as a rule grey, sometimes flaky. Young twigs rusty puberulous to glabrescent.

Petiole 9–11 cm long, sharply ribbed but also sometimes subterete and shallowly ribbed, brown puberulous like the rhachises, which are occasionally almost narrowly winged. Usually 1 or 2 contiguous, (narrowly) oblong, flat and level glands in the lower half, often near the base. Rhachis 9–15 cm long, with a (depressed) gland between the insertions of the upper pairs of pinnae.

Pinnae opposite or almost so, (4) 6–10 (14) pairs, sec. rhachises up to 15 cm long, carrying (depressed) glands between the insertions of (many) upper pairs of leaflets.

Leaflets opposite, 11–17 (28) pairs, oblong to subelliptical, 1–3½ cm long, ½–1½ (2½) cm wide, chartaceous to (rarely) subcoriaceous, base asymmetrical, auriculate in one half and obtuse in the other, top broadly rounded, glabrous but near the base the margin ciliolate and the midrib on the upper surface sometimes puberulous; venation distinct, especially the midrib and two longitudinal nerves, often the lower surface very much lighter green than the upper, glossy surface. Peduncle 10–35 cm or more long, flower heads 4–9 cm long, 3–7 cm wide, lower turbinate, much narrower than the globular upper, red or pinkish-brown (“vieux-rose”), unpleasantly smelling. Bracteoles linear, gradually widening near the broadly rounded top, outside brown pubescent, otherwise glabrous or nearly so, sometimes with a puberulous rim downwards, about as long as the flower.

Lower inflorescence: calyx and corolla decidedly shorter than in the upper inflorescence; flower not curved.

Upper inflorescence: flowers on \pm 2 mm long pseudo-pedicels. Calyx 10–12 mm long, silky brown pubescent outside on the lobes, the fleshy cushions on the inside base of the large calyx lobes puberulous. Petals 10–13 (15) mm long, very narrowly ligulate, outside very minutely puberulous on the edge of the top of the lobes, connate near the base, lobes longer than half the corolla which is comparatively widely exerted from the calyx. Stamens up to 13 mm long, glandless. Ovary

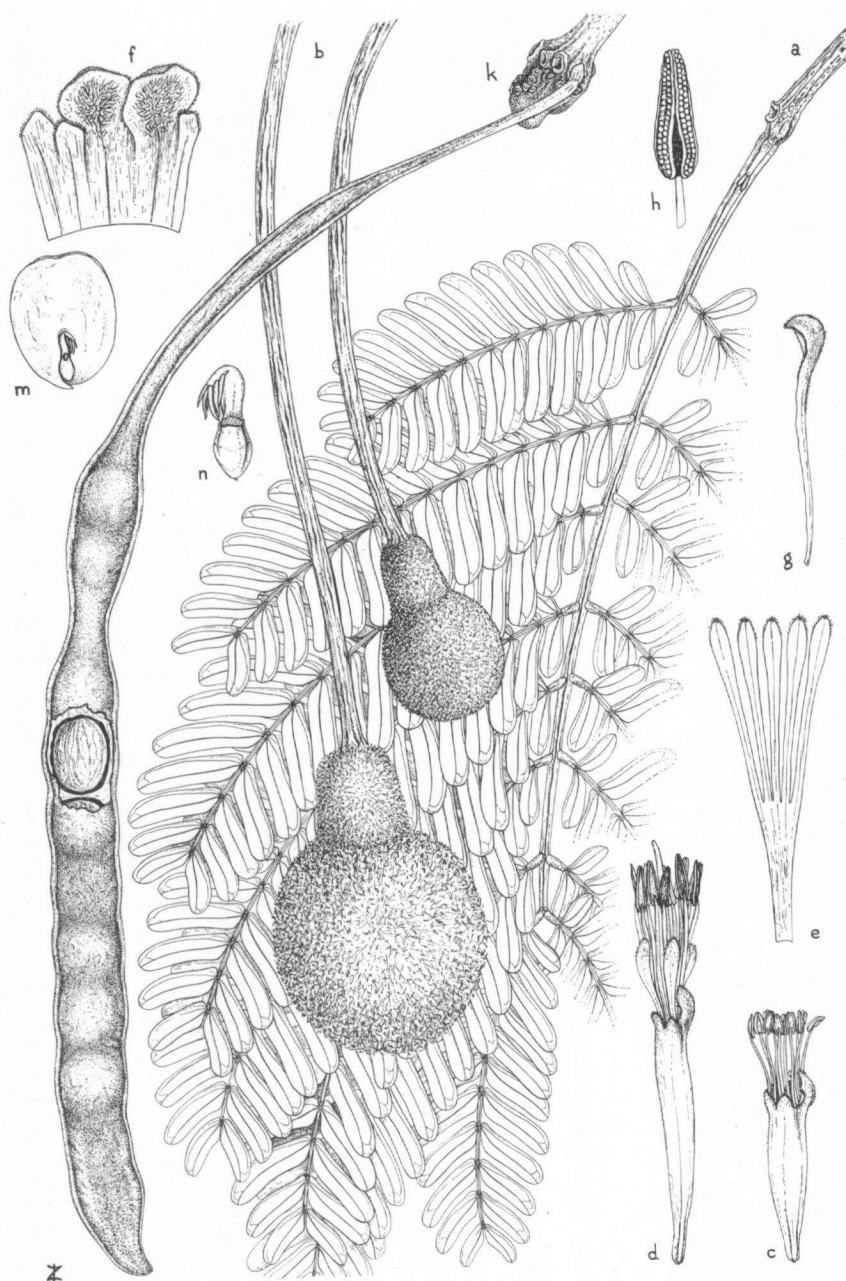


Fig. 6. *Parkia filicoidea* Welw. ex Oliver. — a: leaf ($\times \frac{1}{2}$); b: inflorescences ($\times \frac{1}{2}$); c: sterile flower ($\times 3$); d: fertile flower ($\times 3$); e: corolla ($\times 3$); f: inner top part of calyx ($\times 6$); g: bracteole ($\times 6$); h: anther ($\times 9$); k: pod and seed ($\times \frac{1}{2}$); m: seed (section) and embryo ($\times 1$); n: embryo ($\times 2$). — a, b, d–h: Jean Louis 9154; c: Laurent 1069; k–n: Jean Louis 2360.

on a slender stipe, style finally slightly exerted from the stamens.

Pods linear, swollen over the seeds and often slightly constricted between them (submoniliform), glabrous, empty in the apical part, somewhat fleshy, up to 50 (75) cm long and up to 2 cm wide; stipe 4–5 cm long. Seeds $\pm 1\frac{1}{2}$ cm long, ovoid, testa closely surrounding the cotyledons but detached and not tight, wrinkled, in herb. specimens like tobacco.

Type: Angola, Cuanza Norte, Pungo Andongo, Welwitsch 1787 (LISU, lecto.; BM, K, LISG, isolecto.).

Distribution. Ghana, Togo, Cameroon, Gabon, Congo, Angola, N. Rhodesia, Mozambique, Tanganyika, Uganda,? Ethiopia (see Notes to var. *hildebrandtii*).

Ecology. In Ghana, *P. filicoidea* was found by Keay (Ashanti) in secondary forest associated with *Ceiba*, *Cola gigantea*, *Chlorophora*, *Antiaris*, *Ximenia americana* and *Aframosia laxiflora*. Hoyle found it repeatedly in gallery forest in SW Sudan.

Parkia filicoidea is a common rainforest tree throughout Congo, often observed along watercourses or river-banks. Jean Louis found it in primary marsh forest near Yaekala (no 3380), and in ombrophilous, but dry, forest near Yangambi (no 3835), or in primary forest on "terre ferme" with *Scorodophloeus zenkeri* (no 154) (confirmed by Leonard 281). It may also occur in the savanne (Kindu-Katakokombo) or in gallery forest.

Pierlot found at Kembe that seedlings (epigeous) emanated a faint smell like garlic. The bark of the fullgrown 27 m tall tree was grey, the trunk 14 m unbranched. He noted that the forest was characterized by *Cynometra alexandri*, *Fulbernardia seretii*, *Staudia gabonensis*. Michelson stated that *P. filicoidea* is rather frequent in the Ituri forest, and classed the grey bark in the "elephant-skin"-group, as it resembled more or less the bark of *Erythrophloeum guineense*. He was able to press a colourless sticky juice from the bark.

In Mozambique *P. filicoidea* was found on alluvial soil in gallery forest, associated with *Khaya* (Andrada no 1374); Barbosa (no 2725) noted *Chlorophora excelsa* and *Landolphia kirkii* in its neighbourhood. At Nampula it occurred on dry clayey soils. In Angola, Gossweiler & Mendonça found it in coastal forests at Amboim and Cuanza Norte, not more frequently than one tree in a hectare (2½ acres).

Angus described in N. Rhodesia the bark as "purplish grey" with pale brown longitudinal lenticels. It was a common tree in the evergreen forest on the shore of Lake Mweru (Angus, Bullock). In Tanganyika, Brenan and Greenway found the bark smooth and white and the flowers whitish to red.

In Uganda Eggeling and Dale reported it as occurring "only in closed forest". In Tanganyika it was "very common in evergreen secondary forest" (Ligua); Schmitz (no 2076) found it in narrow gallery forest on rocky soil.

Flowers and pods are generally seen between August and April.

The scent of the flower reminded Lebrun at Kindu of strong beer, on the other hand, Brenan and Greenway found the open flower smelling like cow manure (in N. Rhodesia) while Bates (in Cameroon) described the odour of the inflorescence as "penetrating and disagreeable". It even caused "a sore throat when inhaled." The colour of the flowers is generally said to be red to pink or purple but Bates saw in Cameroon "creamy white" flowers, which, as stated before, smelled exceptionally bad. The wood of those trees was, said Bates, "coarse and brittle, not hard." The pulp in ripe pods is reddish (Seret, in Congo). Hoyle found (Sudan) the leaves "very sensitive".

Vernacular names: SUDAN (Equat. Prov.): ngabarama (Zande).

CONGO: lilembe (Turumbu); nziango, bimili, sikoude (Azande; mombo (Bapere); kibila (Kibila); likondi (Babua); bagbali (Ngwaka); tshibanzabanza (Kanioka); bolembembe (Mondombe); mukungwa (Kiluba). In the Turumbu language: "Inaolo a One" was found to be used (Jean Louis), meaning "the cousin of the One" (One is *Tetrapleura*). In the same language it is referred to as "libele (or "lilembe") li bokwa kanga" (or "ngangi") lilembe being a name for *Albizia gummifera* and bokwakanga meaning: "which burns with big flames" (Jean Louis).

ANGOLA: canga or mucuti (Cabo Delgado); moundi (Quelimane).

N. RHODESIA: muzepa.

TANGANYIKA: mkundi (Zigua).

Uses. The wood is locally used. Michelson judged it as "extremely pretty". He found it used for furniture in the district of the waterfalls (Haute Lenda, Congo) where it had been confused with *Monopetalanthus*. It is, says Michelson, often a tree of considerable dimensions. The slash uncovers wood that glistens like a mirror and shows characteristic rays, so typical, that the species is recognized by slashing the trunk. Pierlot found (at Kembe, Congo) that the "satiny" straw-coloured sapwood was covered by a 4 mm thick pink layer. This pink layer was also observed in Tanganyika, S of Kigoma (Harley no 9472).

Specimens examined. SUDAN. SW Equ. Prov., gallery forest near source of Yubu riv.

Hoyle 724 (BM); Aloma plateau below Iwatoka, gallery forest on Yei riv.:

Hoyle 818 (BM); Equatorial Prov.; Sakure: Wyld 697 (BM).

GHANA. Ashanti, Awura for. res., S of Ejiera: Keay FHI 37595 (K); Atewa range for res. near Boma: de Wit & Morton A 2936 (WAG).

CAMEROON. Bitye, Yaoundé: Bates 1166, 1193 (BM); Bange-Mündug, Molundu distr., 15° E - 3° 15' N: Mildbraed 4614 (HBG).

CONGO. s.l.: Gilbert 1030, 1086 (BR); Flamigni 7062 (BR); Bequaert 2292 (BR); Gentil 103 (BR); Leontovich 14 (BR); Seret 800 (BR); Limbutu: Laurent 1069 (BR); Yangambi distr.: Donis 2360 (BR, K), Donis 3382 (BR), arbre en obs. 301; Jean Louis 154 (BR), 2360 (BM, BR, FI, K), 2706 (BM, BR); 6040 (BM, BR, COI, FI, K, arbr. obs. 44), 3835 (BR, COI, K); 9154 (BM, K); Hans 18: Gilbert 8164, 8383 (BR, arbre en obs. 2332), 8392 (BR, arbre en obs. 2659); Maudoux 573 (BR); Leonard 281 (BR); Yaekala-Yangole: Jean Louis 3380 (BR); Elisabethville: Quarre 4990 (B, BR); Kongala, Abumombazi: Thonner (BR); Uele riv.: Dewulf 1012 (BR); Yandja, left bank Yangambi falls: Bamps 374 (BR); Uere, Api: Robyns 1292 (BR); Bukama: Bequaert 157 (BR); Ponthierville: Claessens 172 (BR); Yambuya: Jean Louis 7710 (BM, BR); Yangole: Jean Louis 11991 (BM, BR); Lubi: Lescrauwaet 194 (BR); Kasai, Miwene: Jacques 48 (BR); Mondombe: Jespersen 9 (BR); Kiyaka-Kwango: Devred 2605 (BR); Penghe: Bequaert 2292 (K); Katanga, river Kipula: Detroyer 138 (BR); Sokudi, source Neduwe: Dubois 160 (BR); Lac Kwada: Evrard 531 (BR); Kembe, 1° 07' S - 28° 10' E; Pierlot 2093 (BR);

- Haute Lenda, haute Biaboye: Michelson 440 (BR); Brazzaville-Yakoma: Lebrun 2184 (BR); Brido: Lebrun 2447 (BR); Upemba Parc National: de Witte 02945, 04215 (BR); Kurukwata: Gilbert 2240 (BR); Haut Katanga, Lubudi distr.: Cabu 97 (BR); Kongolo-Ebombo riv.: Delvaux 654 (BR); Bundu-Zanga: Devred 1032 (BR); Thysville, M'Vuazi, river valley M'Buami: Dubois 244 (BR), 249 (L); M'Vuazi, Vuma forest: Devred 1123 (BR); Kindu-Katakombombo: Lebrun 6020 (BR); Katanga, Kaniama: Delvaux 181 (BR); Kaniama-Haut Lomami: Mullenders 1.180 (BR); Mukualo: Declercq 5 (BR); Mapanda, Kamina-Landoa, nr Lubilash: Desenfans 1983 (BR).
- ANGOLA. s.l. Welwitsch, Iter Angolensis 1787 ("Cuanza Norte, Pungo Andongo; lectotype in LISU, isoelectotypes at BM, K, LISC); Granja de S. Luiz-Cuzengo: Gossweiler 4829 (COI), 4829 a (BM); Dalatando-Cazengo, Estação Exp. Café: Gossweiler 10196 (BM, COI).
- N. RHODESIA. Abercorn distr., Kalambo riv.: Richards 11435 (BR, K); Lake Mweru, Kafulwe mission: Angus 695 (BM, BR, K); Lake Mweru littoral: Bullock 1230 (BR, K); Petauke distr., Changwe-Luangwu: Robson 968 (BM); Nchanga, Kafue riv.: Duff 192 (BM); Upper Luangwa valley: Verdoorn s.n. (BR, K); Brenan & Greenway 8096 (BM, BR, K).
- MOZAMBIQUE. Quelimane, 200 km inland: Faulkner 459 (BM, BR, UPS); Niassa, Ribaué-Malma, nr river Natete: Andrada 1402 (COI, LISC, P); Macondes, Mueta-Nairota: Andrada 1374 (COI, LISC); Cuamba-Mahua: Mendonça 828 (BR, K); Cabo Delgado, entre Mueta-Nairota: Barbosa 2222 (LISC); Muite-Mocuburi, Imala: Barbosa 2575 (LISC); Nampula: A. R. Torre 1101 (LISC).
- TANGANYIKA. s.l.: K. Peter 290 (BR, K); Mpanda distr., Mugombasi riv., 65 m S Kigoma: Harley 9472 (BR, K); Lindi, Lutamba Lake: Schlieben 5405 (B, BM, BR, M, LISC); Morogoro distr., Turiani: Bruce 78 (BM, BR, K), Burt 4750 (BM); Lukavu-Sampene, valley of the Lofoy: Schmits 2076 (BR); Kyimbila distr., N of Lake Nyasa: Stolz 1646 (BR, BM, UPS); Lukuga distr.: De Saeger 87 (BR); Mpanda distr.: Mahali Mts, 6° S - 30° E: Jefford, Juniper & Newbould 2464, 2558 (BR, K); East and West Usambara: Peter 48581, 19617 (= 48603), 16665 (= 48804), 16634 (= 48811), 13451 (= 49063), 10911 (= 49315), 8197 (= 49505), 7267 (= 49614) (B); Ob: Konde: W. Goetze 1487 (L).
- UGANDA: Isl. of Buvuma, Lake Nyanza: Bagshawe 643 (BM); Ntatafunvu: Dümmer 1095 (BM).

var. **hildebrandtii** (Harms) Chiovenda in Flora Somala 1932, p. 180.

Leaflets comparatively long and wide (1 cm by up to 2-2½ cm).

Pods heavy, laterally compressed and not or scarcely depressed between seeds, up to 35 cm long, 2-2½ (4) cm wide.

Type: Hildebrandt 1975 (March 1876; lost at Berlin).

Distribution.? Somaliland (Ethiopia) to Tanganyika and to Congo.

Specimens examined. CONGO. Kiala: Thiebaud 293 (BR); Katanga, Kaniama, Lukungwe: Herman 2112 (BR).

TANGANYIKA. Zigua: Semsei per Mr Gare FH 2906 (BR, K); W. Usambara: Peter s.n., O. IV, 52 (B).

Notes. *P. filicoidea* var. *hildebrandtii* is distinguished by its rather large leaflets and heavy flat pods. The combination was made by Chiovenda (*l.c.*) on account of a specimen collected by L. Senni (no 105) at Ola Uager, Oltregiuba. Senni 105 is preserved at Florence and consists of some small fragments of leaves and pods. These are too poor to be identified with certainty but represent probably *P. filicoidea*. There is no evidence that they would match Hildebrandt 1975.

Notes. *Parkia hildebrandtii* Harms was based on Hildebrandt 1975 collected at Mombasa. Harms pointed out (*l.c.*) that this specimen was erroneously identified as *Pentaclethra macrophylla* Bth. and so became the (unfounded) record of *Pentaclethra* in E Africa (Pflanzenwelt Ostafrikas C, 1895, p. 196 (this error was mended in Engler, Pfzw. Afr. I, 1910, p. 225; see also Brenan in Fl. Trop. E Afr., Leg-Mim. 1959, p. 9).

In Flore du Congo Belge et du Ruanda-Urundi 3, 1952, p. 144, Gilbert and Boutique accepted *P. bussei* Harms as a distinct species although they expressed some doubt as to its status. Brenan (in Fl. Trop. E. Africa, Leg.-Mim., 1959, p. 9) did "not consider *P. bussei* and *P. filicoidea* specifically separable, although they may perhaps be distinct varieties".

It appears that in *P. filicoidea* flat pods occur which are wider than the pods in *P. filicoidea s. str.* The flowers and leaves of the trees bearing flat pods cannot be distinguished from those from trees bearing swollen and narrower pods. For this reason Brenan's view seems preferable. The variety, therefore, is distinguishable only on the appearance of the pods. The taxon was first described as *Parkia hildebrandtii* Harms.

When publishing *P. filicoidea*, Oliver cited: "Upper Guinea, Niger Exp. Barter; Lower Guinea, Angola prov., Pungo Andongo Dr. Welwitsch; Mozambique distr., Shire Valley, Zambesi Land, Dr Kirk". The second specimen was designated as the lectotype by Brenan (*l.c.*), in accordance with Keay's remarks concerning Barter's specimen (Bull. Jard. bot. Brux. 25, 1955, p. 212).

P. filicoidea Welw. ex Oliv. var. *glauca* Baker (*l.c.*) is based on Kitson s.n., Kete Krachi, Togoland. This specimen, preserved in the BM, was said to differ on account of its leaflets being glaucous on the lower surface. This character is in *P. filicoidea* not sufficient for taxonomic segregation (see also *P. africana*).

In some cases it is not possible to distinguish between the leaves of *P. filicoidea* and *P. africana*: seeds, or also flowers or pods, are required in those cases. The record of *P. filicoidea* for Oubangui-Chari by Tisserant (Cat. Fl. Oub.-Ch., Mém. Inst. Et. Centrafr. 2, 1950, p. 73) probably rests on an error and ought to refer to *P. africana*.

Introduced species

Parkia roxburghii G. Don. (Gen. Syst. 2, 1832, p. 397).

— *Parkia biglobosa* Auctt.

— *Parkia javanica* (Lmk) Merr. et Auctt.

Pinnæ 15–40 pairs. *Leaflets* 20–80 (–115) pairs, more or less falcate. Flowers yellowish white.

Pods 3–4½ cm wide. *Testa* 1½–2 mm thick, finally black, very hard. Up to 25 m tall tree.

P. roxburghii G. Don was often called *Parkia javanica* (Lmk) Merr. (Sp. Blancoanae 1918, p. 169) but according to C. A. Backer (Bekn. Fl. Java, Em. Ed. 5, 1941, p. 34) there is no valid reason for rejection of the name *Parkia roxburghii* G. Don. It is, however, to be noted that Lamarck's description seems to lend support to Merrill's view (*cf.* Enc. 2, 1788, p. 466).

The tree is planted in East Africa along avenues or streets or in parks. Brenan and Greenway (Check Lists For. Trees Brit. Emp. 5, Tanganyika Terr. II, 1949, p. 346) found it "most unsuitable as it produces numerous buttress roots, which project from a few inches to a foot above the ground". They found it cultivated at Amani as a suggested shade tree for coffee. Gomez & Souza collected it at Lourenço Marques (no 3476, COI, FI, K), and Andrada (no 1459) at Niassa-Nampula, junto as Colégio das Irmãs (BM, COI).