



## Research article

# Description of *Gaertnera luteocarpa* (Gentianales: Rubiaceae), with two subspecies, a new forest shrub species from Liberia, Ivory Coast and Ghana

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**Abstract.** *Gaertnera luteocarpa* sp. nov., with two subspecies, is described and illustrated. The new species resembles *G. spicata* K.Schum. but has yellow, not reddish, fruits. With *G. cooperi* and *G. aurea* it shares the ruminant endosperm.

**Keywords.** Rubiaceae, *Gaertnera*, Ghana, Ivory Coast, Liberia.

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## Introduction

The Paleotropical genus *Gaertnera* Lam. comprises 69 species of shrubs and small trees according to the taxonomical revision by Malcomber & Taylor (2009). The 12 species that they recognize for continental Africa are all endemic. Only five of these grow in the forests west of Nigeria, *G. aurea* Malcomber, *G. cooperi* Hutch. & M.B.Moss, *G. liberiensis* E.M.A.Petit, *G. longivaginalis* (Schweinf. ex Hiern) E.M.A.Petit and *G. paniculata* Benth., with the new species described here this number will be six.

Almost 20 years ago I found in Ankasa Forest in south-west Ghana a yellow fruiting *Gaertnera* shrub. It was thought at that time to be *G. cooperi* with immature fruits, because of its robust leaves and branchlets, and because the mature fruits of *G. cooperi* are known to be dark purple. In the revision the fruits of all species of *Gaertnera* are described as “(as far as observed) all black or violet-black at maturity” (2009: 587). The plant from Ankasa was re-identified by Taylor for the revision as *G. aurea* (on MO herbarium sheet), probably by eliminating other possible species (the key in the revision only works with flowering plants). Recently, I collected another yellow fruiting *Gaertnera*, now in Sapo National Park in Liberia, and realised that the large sweet tasting yellow fruits of both plants (Figs 1–2) were in fact mature and not similar to the fruits of *G. cooperi* (Fig. 3B) or *G. aurea*. The collection and photos of a red fruiting *G. spicata* K.Schum. from Gabon by O. Lachenaud (Fig. 3A) confirms that, at least in continental Africa, the colour of the fruits in *Gaertnera* is indeed more variable than concluded in the revision. The colour of the fruit is not the only character that separates the abovementioned species from *G. cooperi* and *G. aurea*. The compact, almost spicate inflorescence and the large size of the mature fruits, in which it resembles *G. spicata*, are other characters. With *G. cooperi* and *G. aurea* it shares the ruminant endosperm, a rare character in African *Gaertnera* species (Malcomber & Taylor 2009: 581) and not present in *G. spicata*. There are, in my opinion, clearly 2 new and

closely related taxa involved here but, because there are very few open flowers and mature fruits, it is hard to be sure whether they are different species or subspecies. More flowering and fruiting material is needed to get a better idea of their differences. For the moment, I think it is best to describe them as subspecies, *G. luteocarpa* sp. nov. subsp. *luteocarpa* and *G. luteocarpa* sp. nov. subsp. *sinoensis* subsp. nov. This new species adds a bit more variation to an already very variable genus (Malcomber & Taylor 2009: 590).

The new species was already mentioned a few years ago by William Hawthorne as *Gaertnera* sp. A (Hawthorne & Jongkind 2006: 646).

## Materials and Methods

The available material of *Gaertnera* from the BR, K, P, and WAG herbaria was studied. The herbarium, where the specimens are located, is indicated by the international code (herbarium acronym) registered in Index Herbariorum (Thiers, continuously updated). Photos were seen from plants in the FHO herbarium cited here. *Gaertnera luteocarpa* spec. nov. has recently been studied in the field on several occasions. Preliminary assessments of the IUCN Red List categories of threat were performed using the IUCN criteria through the RBG Kew website <http://geocat.kew.org>.

## Results

Order Gentianales Juss. ex Bercht. & J.Presl

Family Rubiaceae Juss. nom. cons.

Genus *Gaertnera* Lam. nom. cons.

### Key to the species in Upper Guinea (forest area west of Nigeria)

(Largely based on the key in Malcomber & Taylor 2009)

1. Stipules 4-lobed, with several to numerous setae at the apex of the stipule rim, each 0.5–9 mm long ..... 2  
– Stipules 2 to 4-lobed or without lobes, without setae at apex of the stipule rim ..... 3
2. Leaves 6–12 × 1.5–3 cm; petiole < 1 cm long. Corolla in bud white.....  
..... *G. liberiensis* E.M.A.Petit (only known from type with flower buds)  
– Leaves 18–29 × 5–9 cm; petiole 1.5–3.2 cm long. Corolla in bud red.....  
..... *G. spicata* K.Schum. (only known from Gabon)
3. Stipules with ridges or wings not extending below the petioles, the stems merging smoothly into the petiole base or the base encircled by a thin, ciliolate, skirt-like flap ..... 4  
– Stipules with ridges or wings extending below petiole as a thickened, well-developed wing or flange encircling petiole base ..... 5
4. Corolla tube 2.5–4 mm long, lobes 1.5–2.5 mm long. Stipules drying chartaceous .....  
..... *G. paniculata* Benth.  
– Corolla tube 4–6 mm long, lobes 2.5–5 mm long. Stipules drying membranous .....  
..... *G. longivaginalis* (Schweinf. ex Hiern) E.M.A.Petit
5. Corolla tube 8–11 mm long, lobes 3.5–6 mm long, the lobes inflated and cucullate at apex, in bud the lobes forming an urceolate cap. Mature drupes violet-black, 5–10 mm long.....  
..... *G. cooperi* Hutch. & M.B.Moss  
– Corolla tube 1.8–9 mm long, lobes 0.8–5 mm long, the lobes flattened at apex or with an adaxial hook or flange, in bud the lobes forming a smoothly tapered, acute apex. Mature drupes purplish or yellow ..... 6

6. Corolla tube 1.8–3.3 mm long, lobes 1.8–2.7 mm long. Mature drupes violet-black, 5–10 mm long ..... *G. aurea* Malcomber  
– Corolla tube *c.* 9 mm long, lobes *c.* 5 mm long. Mature drupes yellow, 18–20 mm long .....  
..... *G. luteocarpa* sp. nov., 7
7. Stipular tube densely pale hairy. Fertile branchlets 4 mm wide (when dry) .....  
..... *G. luteocarpa* subsp. *luteocarpa*  
– Stipular tube glabrous. Fertile branchlets 2 mm wide (when dry) .....  
..... *G. luteocarpa* subsp. *sinoensis* subsp. nov.

*Gaertnera luteocarpa* Jongkind sp. nov.

[urn:lsid:ipni.org:names:77147376-1](http://urn:lsid:ipni.org:names:77147376-1)

Figs 1–2, 4

*Gaertnera* sp. A, Hawthorne & Jongkind, *Woody plants of Western African forests: a guide to the forest trees, shrubs and lianes from Senegal to Ghana*: 646 (2006).

### Diagnosis

Resembling *G. spicata* K.Schum., with almost similar spicate inflorescences, but differing by its yellow, not red, fruits, ruminant endosperm and by the absence of setae on the edge of the stipular tube.

### Etymology

The species is named after its yellow fruits.

### Type

IVORY COAST. Région du Bas-Sassandra, km 41 Sassandra-San Pedro road, fl. bud and fr., 16 Nov. 1968, *Breteler 6052* (holo-: WAG; iso-: BR, K, MO n.v., PRE n.v., W n.v.)

### Description

Shrub 2–3 m high. Most leaves distichous and evenly arranged on plagiotrophic branches. Twigs glabrous, with a pronounced ridge around the petiole base. Leaves glabrous; blade 6–25 × 2–7 cm, elliptic to elliptic oblong, apex acuminate, base cuneate; midrib prominent at both sides; secondary veins 6–12 pairs, tertiary venation conspicuously subparallel; petiole 0.5–6 cm long. Stipules tubular, ending in 4 lobes, glabrous or pale hairy, tube *c.* 2 cm long. Inflorescence terminal, densely flowered, not or very shortly branched, congested; bracts 2–5 mm long, triangular to lanceolate. Flower 5-merous, almost sessile; calyx cup-shaped, truncate, *c.* 1 mm high, glabrous or with small hairs on the edge; corolla white, glabrous outside, with acute apex in bud, tube 9 × 2–3 mm, white hairy inside above the insertion of the stamens, glabrous below this point, hairs exerted from the mouth, lobes 5 mm long, glabrous; stamens completely included in the corolla tube; ovary superior. Drupes subglobose with flattened apex, smooth, 2–2.5 cm in diameter, yellow, pulp whitish and sweet, with 2 pyrenes; pyrenes more or less plano-convex, 10 mm in diameter and 5 mm in cross-section, rugose, endosperm ruminant.

### Distribution and habitat

Undergrowth of evergreen lowland forest. Known from the south-east of Liberia to the south-west of Ghana.

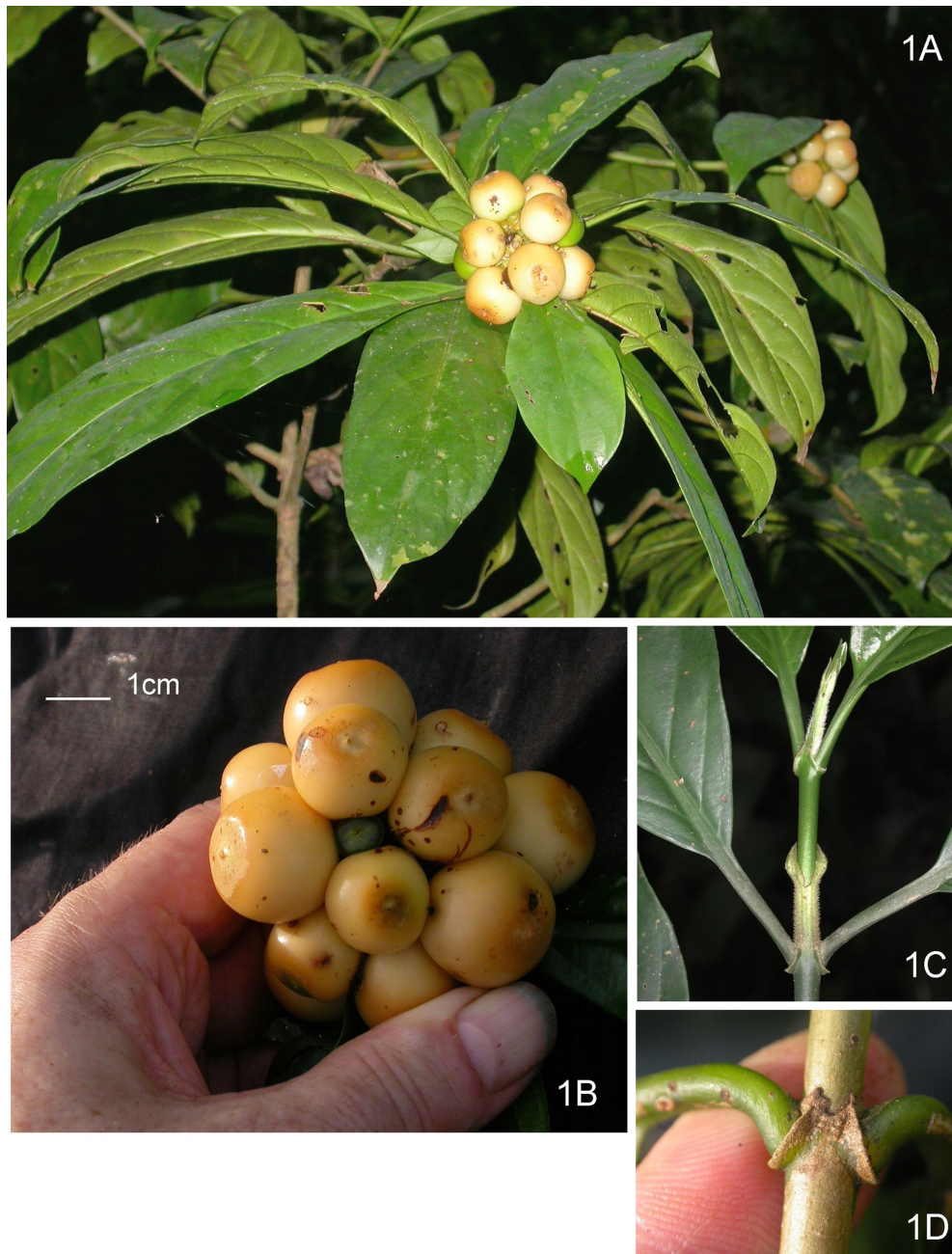
### Conservation status

The “Extent of Occurrence” (EOO) is 20 649 km<sup>2</sup> and the “Area of Occupancy” (AOO) is 36 km<sup>2</sup>, the first counts as “Near Threatened” and the second as “Endangered”. The AOO is based on a cell width of 2 km. The calculation of the EOO as one continuous area is (much) too high looking at the big gap between the western occurrences and the eastern ones. Most forest that could be found inside the EOO a century ago has been removed since. All eastern specimens were collected in the Ankasa Reserve and

that is the only place where the species is not rare. Because *G. luteocarpa* sp. nov. is, when flowering or fruiting, a conspicuous plant it should not be easy overlooked in the forest and it can be expected that it is really a rare species that is only becoming more rare because of the ongoing deforestation. Therefore I propose “Endangered” for this new species (B1 & B2 ab(iii) IUCN 2015).

#### Note

The plagiotropic branching with distichous leaves has been seen by the author in the field for all *Gaertnera* species he encountered in West Africa.



**Fig. 1.** *Gaertnera luteocarpa* sp. nov. subsp. *luteocarpa*. **A.** Habit in fruit. **B.** Fruits. **C.** Stipules. **D.** Twig showing ridges around base of petiole. A, B & D from Hawthorne & Gyakari 205a063; C from Hawthorne & Gyakari 201a223. Photos W.D. Hawthorne.

*Gaertnera luteocarpa* Jongkind subsp. *luteocarpa*  
(Figs 1, 4)

**Diagnostic characters**

Fertile branches twice the size of the other subspecies (4 mm wide in dry state). Stipular tube densely pale hairy.

**Distribution**

Undergrowth of evergreen lowland forest often on swampy places. South-west Ghana and south Ivory Coast.

**Additional specimens studied**

GHANA. Western Region, Ankasa River Forest Reserve, fr., 4 Jan. 1969, *Enti & Hall GC 39103* (GC n.v., K); *ibid.*, young fr., 29 Dec. 1966, *Hall & Enti GC 36155* (K); *ibid.*, young fr., 12 Nov. 1967, *Hall GC 37121* (K); Ankasa River Reserve, 24 Apr. 2001, *Hawthorne & Gyakari 201a223* (FHO); *ibid.*, 3 Mar. 2003, *Hawthorne & Gyakari 203a123* (FHO); *ibid.*, 28 Feb. 2005, *Hawthorne & Gyakari 205a063* (FHO); near Ankasa Game Reserve, fr., 28 Feb. 1995, *Jongkind, Abbiw & Markwei 2077* (MO, WAG)

**Conservation status**

The EOO is 1398 km<sup>2</sup> and the AOO is 20 km<sup>2</sup>, both count as “Endangered”. The AOO is based on a cell width of 2 km. This calculation of the EOO as one continuous area is much too high looking at the big gap between the most western occurrence and all other ones. Most specimens were collected in the Ankasa Reserve and that is the only forest area where this subspecies is found more than once. Most forests connecting the two locations of the subspecies has disappeared in recent years. Like for the species itself I propose “Endangered” for this subspecies (B1 & B2 ab(iii) IUCN 2015).

**Remark**

The holotype of *G. luteocarpa* sp. nov. was not recognized before as a *Gaertnera* species and for years misplaced in the herbarium as *Bertiera racemosa* (G.Don) K.Schum.

*Gaertnera luteocarpa* Jongkind subsp. *sinoensis* Jongkind subsp. nov.

[urn:lsid:ipni.org:names:77147377-1](http://urn:lsid:ipni.org:names:77147377-1)

(Figs 2, 4)

**Diagnosis**

Fertile branches half the size as of the other subspecies (2 mm wide in dry state). Stipular tube glabrous, not densely hairy.

**Type**

LIBERIA. Sino County, Sapo National Park not far from Camp 6, 5°18.5' N, 8°44.8' W, alt: 220 m, fr., 22 Nov. 2010, *Jongkind, Bilivogui & Daniels 9832* (holo-: WAG, iso-: BR).

**Etymology**

The subspecies is named after “Sinoe”, the river close to which it was seen for the first time.

**Distribution and habitat**

Known only from the south-east of Liberia.

**Additional specimens examined**

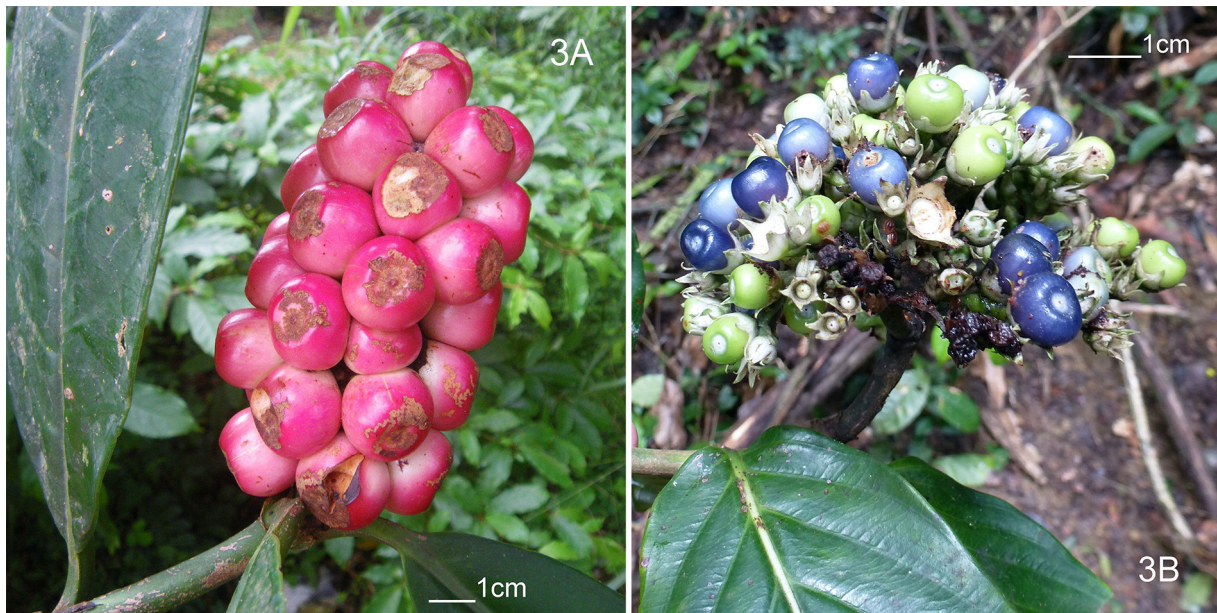
LIBERIA. Sino County, SSW of Jalay's Town near the Sinoe River, 5°20' N, 8°49' W, alt: 90–100 m, fl. bud, 10 Mar. 2009, *Jongkind, Bilivogui & Dorbor 8923* (WAG); c. 50 km east of Greenville, 5°04.61' N, 8°30.42' W, alt: 59 m, fl., 18 Mar. 2014, *Jongkind & Mulbah 12500* (BR, K, MO).



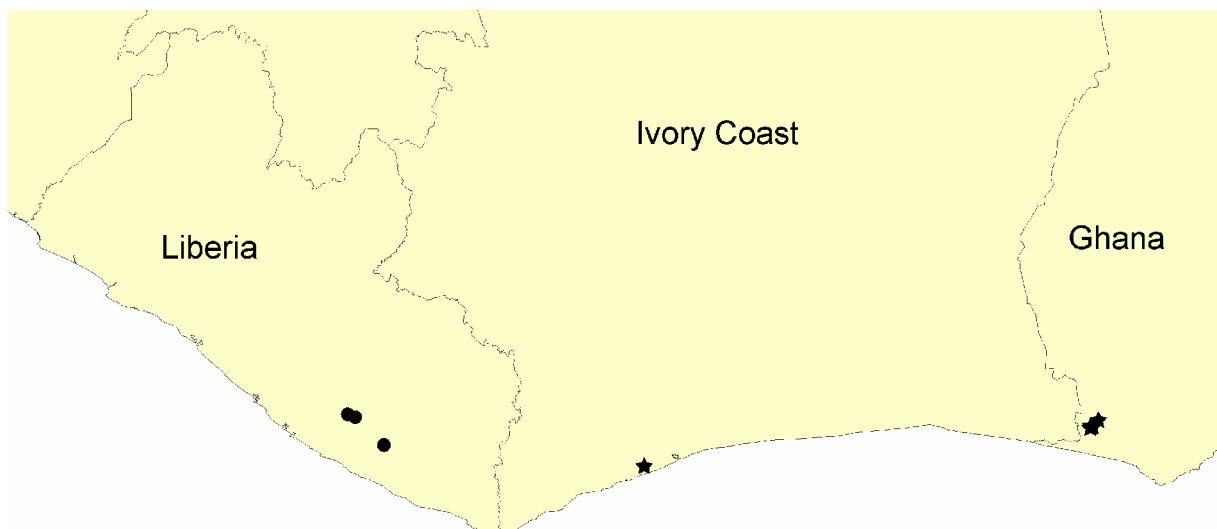
**Fig. 2.** *Gaertnera luteocarpa* sp. nov. subsp. *sinoensis* subsp. nov. **A.** Fruits and leaves. **B.** Close up of fruits. From *Jongkind, Bilivogui & Daniels 9832*. Photos C.C.H. Jongkind.

### Conservation status

The EOO is 54 km<sup>2</sup> and the AOO is 12 km<sup>2</sup>, both count as “Endangered”. The AOO is based on a cell width of 2 km. Only one of the specimens was collected in a protected area. Considering all the economical development planned in this part of Liberia, I propose “Endangered” for this subspecies (B1 & B2 ab(iii) IUCN 2015).



**Fig. 3.** A. *Gaertnera spicata* fruits. B. *Gaertnera cooperi* fruits. A from Lachenaud & Walters 1163. Photo O.L.S. Lachenaud. B from Jongkind, de Wet & Sambolah 12104. Photo C.C.H. Jongkind.



**Fig. 4.** Distribution map. *Gaertnera luteocarpa* sp. nov. subsp. *luteocarpa* (stars) and *G. luteocarpa* subsp. *sinoensis* subsp. nov. (dots).

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## References

- Hawthorne W.D. & Jongkind C.C.H. 2006. *Woody plants of Western African forests: a guide to the forest trees, shrubs and lianes from Senegal to Ghana*. Kew Publishing, Richmond.
- IUCN 2012. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN, Gland, Switzerland/Cambridge, U.K.
- Malcomber S.T. & Taylor C.M. 2009. A systematic revision of *Gaertnera* (Rubiaceae, Gaertnereae). *Annals of the Missouri Botanical Garden* 96 (4): 575-671. <http://dx.doi.org/10.3417/2002161>
- Thiers B. continuously updated. *Index Herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium [online]. New York Botanical Garden's Virtual Herbarium, New York. Available from <http://sweetgum.nybg.org/ih/> [accessed 11 Sep. 2014].

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