

***Blotiella confusa* Jongkind & W. de Winter, sp. nov.  
(Dennstaedtiaceae), a new species from lowland tropical West  
Africa, and its distinction from *B. reducta* (C.Chr) R.M.Tryon**

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**ABSTRACT**

*Blotiella reducta* (C.Chr.) R.M.Tryon was originally described as a small fern from the Guinean Highlands of West Africa, but over time it has become a taxonomically confusing mixture of highland and lowland plants. In this publication we describe a new species, *Blotiella confusa* Jongkind & W. de Winter, sp. nov. based on most of the lowland material previously identified as *B. reducta*, and we restrict *B. reducta* to its original concept. A revised identification key for all African species of the genus is provided.

**RÉSUMÉ**

*Blotiella confusa* Jongkind & W. de Winter, sp. nov. (Dennstaedtiaceae), une nouvelle espèce de basse altitude de l'Afrique tropicale de l'Ouest, bien distincte de *B. reducta* (C.Chr) R.M.Tryon.

L'espèce *Blotiella reducta* (C.Chr.) R.M.Tryon, qui fut d'abord décrite comme une petite fougère d'altitude en Afrique de l'Ouest, est devenue au cours du temps un mélange confus de plantes des hautes et basses terres. Dans cet article nous proposons un nouveau nom, *Blotiella confusa* Jongkind & W. de Winter, sp. nov. pour les spécimens de basse altitude et nous redonnons à *B. reducta* son acception originelle. Une clé d'identification révisée de toutes les espèces africaines du genre est fournie.

**KEY WORDS**

Dennstaedtiaceae,  
*Blotiella*,  
Africa,  
altitudinal distribution,  
identification key,  
new species.

**MOTS CLÉS**

Dennstaedtiaceae,  
*Blotiella*,  
Afrique,  
répartition altitudinale,  
clé d'identification,  
espèce nouvelle.

## INTRODUCTION

*Blotiella* R.M. Tryon is a genus of about 15 species in tropical and southern Africa, Madagascar and the Mascarenes; one species occurs in America (Kramer 1990).

When Christensen (1911: 370-372) described *Lonchitis reducta* C.Chr., a species now recognized as *Blotiella reducta* (C.Chr.) R.M. Tryon, he described it as a small fern growing on rocks in shady, humid areas. Years later Tardieu-Blot (1953: 81-83) cited a few additional specimens and added a good illustration to the description. In the same publication she and Alston described a related species, *L. tisserantii* Alston & Tardieu, now treated as *B. tisserantii* (Alston & Tardieu) Pic.Serm. She compared these two species with relatives from tropical Africa, among them another species found in West Africa she treated as *L. natalensis* Hook. Our new *Blotiella confusa*, sp. nov. is largely the same as *L. natalensis* sensu Tardieu-Blot. However true *L. natalensis* Hook., now known as *Blotiella natalensis* (Hook.) R.M. Tryon, is today known to be restricted to East Africa, southern Africa and Madagascar and does not occur in West Africa (Verdcourt 2000).

In 1959 Alston made some changes in the genus when his treatment of "Ferns and fern allies" was published for the Flora of West Tropical Africa. He included West African material that Tardieu-Blot earlier identified as *L. natalensis* in his circumscription of *L. reducta*. Since that treatment *L. reducta* has included both small, highland plants growing on rocks in humid habitat, and much larger forest plants growing at lower altitude. For the Flore du Gabon Tardieu-Blot (1964) clearly accepted Alston's circumscription and even expanded the concept of *L. reducta* to accommodate central African lowland forest plants. The diagnostic characters of *L. reducta* were becoming so vague that even plants from the mountains of East Africa were incorrectly identified as this species in herbaria. Additionally the concept of *B. reducta* has become even more confused because in herbaria the small parts of frond of a large *Blotiella* fern can resemble the complete frond of *B. reducta*. Parts of fronds of the common and very variable *B. currorii* (Hook.) R.M. Tryon, identified in herbaria as other species in the genus, worsened the confusion. When poorly fertile, a small part of a frond of *B. currorii* may key out as one of the other species.

In the field it is impossible to confuse *B. confusa*, sp. nov. (Fig. 2A, B) and *B. reducta* (Fig. 2C-E). *Blotiella reducta* is always a small fern, growing in rocky places at high altitude, and with simple pinnate fronds, whereas *B. confusa*, sp. nov. is a much larger fern, from closed lowland forest, and with 2-3 pinnate fronds that may reach up to 2.5 m long at maturity. Neither species has been found in upland forest, so there seems to be a geographical and altitudinal gap between the two.

## MATERIAL AND METHODS

Herbaria in Meise (BR), Kew (K), Paris (P) and Wageningen (WAG) were visited for this study. The first author studied *B. confusa* sp. nov., *B. reducta* and *B. currorii* in the field in Guinea and Liberia.

## SYSTEMATICS

Family DENNSTAEDTIACEAE Pic.Serm.

Genus *Blotiella* R.M. Tryon

*Blotiella confusa* Jongkind & W. de Winter, sp. nov.  
(Figs 1; 2A, B)

*The new B. confusa resembles B. tisserantii from central Africa, but the pinnules of the latter species are more slender. The fronds of B. tisserantii are always 2-pinnate and smaller, whereas those of B. confusa are 2- to 3-pinnate and larger. The lanceolate undivided wing along the costa, the rounded lobes, and the acuminate to attenuate pinna-apex set the new species apart from other species in the genus that are 2- and 3-pinnate.*

TYPE. — Côte d'Ivoire. c. 15 km NE of Bianouan, 18.IV.1962, Leeuwenberg 3971 (holo-, WAG; iso-, B, K, MO, P).

PARATYPES. — Guinea. Béréguizi plateaux, 20.XII.1949, Adam 7549 (P[P00693603]); col de Voroa, 5.IV.1949, R. Portères s.n. (P).

Sierra Leone. Bandakarfaya, 380 m, 21.I.1966, Adam 23215 (P); Gola Forest, 7.III.1945, Deighton 4094 (K); Gola Forest, 11.V.1955, Jordan 2076 (K).

Liberia. Balama, 250 m, 15.IV.1985, Fay 1242 (K); Sapo National Park, 105 m, 1.II.2010, Jongkind 9352 (WAG); along Zwedru-Greenville road, 150 m, 18.XI.2010, Jongkind 9771 (WAG).

Côte d'Ivoire. Forêt de l'Angédédou, 21.VIII.1948, des Abbayes 364 (P); Banco Forest Reserve, 13.VI.1975, W.J. van der Burg 543 (WAG); Dabou-Hourotte, V.1900, A. Jolly 232 (P); Banco Forest, 8.XII.1972, J. de Koning 880 (BR, MO, WAG), 27.VI.1973, J. de Koning 1802 (BR, E, MO, WAG), 27.VII.1973, J. de Koning 2018 (MO, WAG), 11.IX.1974, J. de Koning 3933 (WAG), 3.X.1974, J. de Koning 4042 (BR, MO, WAG); Taï Forest, 160 m, 8.II.1984, Hepper & Maley 8165 (K); Forêt de l'Angédédou, 40 m, 24.XII.1958, Leeuwenberg 2286 (K, P, WAG).

Ghana. Bobiri Forest, 10.IV.1951, Adams 554 (P); Neung Forest Reserve, 6.IX.1950, P. Cudjoe 40 (K); Kumasi(?), 1895, Cummins 110 (K); just outside Ankasa Forest Reserve, 9.XI.1982, Hepper, Enti & Abbiw 7437 (K); Assin Cocoa Station, 1957, West-Skinn 92 (K).

HABITAT AND DISTRIBUTION. — Tropical lowland forest up to 550 m from Sierra Leone and Guinea to Ghana.

Many specimens do not have the altitude given on the sheet but it is clear that on and around most mentioned collecting localities there is no place above 250 m. An exception are the specimens from Guinea that are probably collected on an altitude between 450 m and 550 m.

## DESCRIPTION

Rhizome stout, short creeping to erect, with ferruginous acicular hairs. Fronds tufted, spirally arranged, often large, up to 2.5 m long but usually much shorter; petiole about 1/3 of the length of the frond, sulcate adaxially, with several vascular bundles in a U-shaped stele, yellowish-brown, darker at the base, proximally with fulvous, acicular hairs, c. 3 mm long, with dilated, persistent bases, distally predominantly with soft, pale, multicellular hairs with dark septae, and also with ferruginous acicular hairs and with several hairs that are pale and multiseptate at the base and dark, cylindrical, and stiff at their apices; lamina about 2/3 of the length of the frond, 1-3-pinnate, usually pubescent or hairy at least abaxially; veins anastomosing, raised on both surfaces, costae and veins bearing hairs abaxially that are similar to those of the rachis but without the swollen bases and becoming

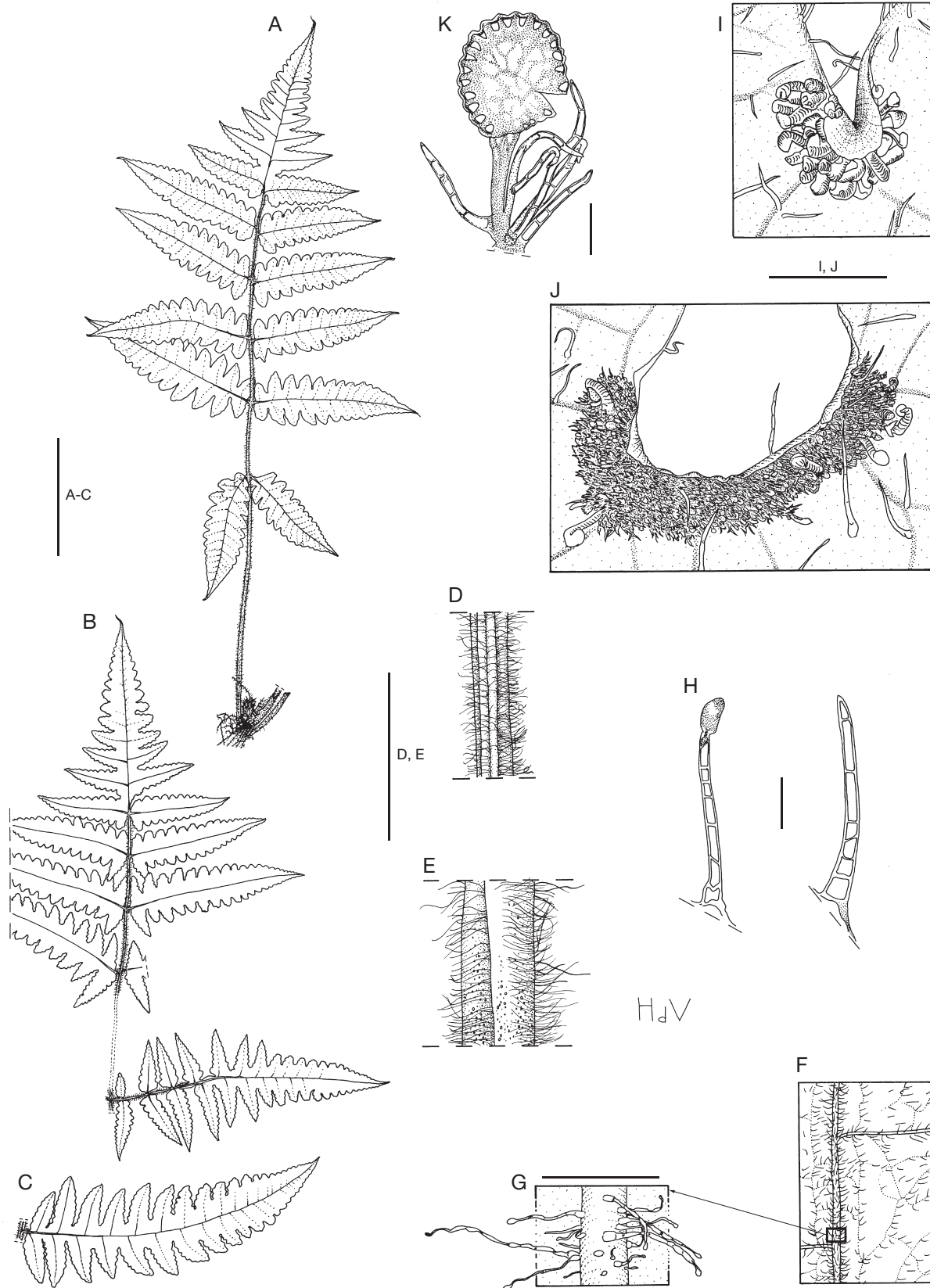


FIG. 1. — *Blotiella confusa* Jongkind & W. de Winter, sp. nov.: **A**, habit with a small frond; **B**, top parts of a larger frond and pinna from lower on rachis; **C**, primary pinna from other large frond to show variation; **D**, petiole in the middle; **E**, petiole near base; **F**, detail of frond from below; **G**, detail of **F**; **H**, hairs in detail; **I**, small sorus; **J**, larger sorus at the base of a sinus with most indusia dropped; **K**, sporangium and paraphyses. **A**, **B**, **D-I**, **K**, *Leeuwenberg 3971* (WAG); **C**, **J**, *Jongkind 9352* (WAG). Illustrated by Hans de Vries. Scale bars: **A-C**, 10 cm; **D-F**, 1 cm; **G**, **I**, **J**, 1 mm; **H**, **K**, 0.1 mm.

KEY TO THE 14 SPECIES OF *BLOTIELLA* R.M. TRYON IN CONTINENTAL AFRICA.

*Except for the West and Central Africa species this key is in the first place based on earlier publications (mainly Verdcourt 2000) and not on new research.*

1. Sori continuous along the leaf margin, or with irregular interruptions, but no regular discrete sori discernible ..... 2  
 — Sori discrete, suborbicular, oblong to reniform, or crescent-shaped in deep sinuses (in exceptionally fertile specimens the sori may become confluent, but then the original discrete sori are still discernible) ..... 4
2. Lamina 1-pinnate; pinnae undivided, their margins sinuate ..... *B. mannii* (Baker) Pic.Serm.  
 — Lamina 2-, or rarely 3-pinnate ..... 3
3. Pinnules sessile, adnate, or pinnae merely lobate. Fully developed lamina submembranaceous; widespread species ..... *B. currorii* (Hook.) R.M.Tryon  
 — Pinnules free, stalked 3-5 mm. Lamina coriaceous, lustrous; highland plant from Tanzania ..... *B. coriacea* Verdc.
4. Fully developed lamina simple pinnate (inspect full-grown leaves; in case of doubt follow the alternative lead) ..... 5  
 — Lamina pinnate-pinnatifid, or more divided ..... 6
5. Lamina 40-105 cm long, 20-65 cm wide, densely bristly-pubescent below; pinnae lobed to pinnatisect. Paraphyses ending in a long strong subulate rigid hyaline hair, equal to or a little longer than sporangia. Uganda, Tanzania and Burundi ..... *B. trichosora* Pic.Serm.  
 — Lamina 20-25(-40) cm long, 15(-20) cm wide, softly pubescent; pinna with round lobes, incised less than halfway from the margin to the costa. Paraphyses not ending in a rigid hyaline hair. Restricted to Guinea ..... *B. reducta* (C.Chr.) R.M.Tryon
6. Pinnae more or less uniformly incised from the apex to the base ..... 7  
 — Pinnae with incisions more deeply divided towards the base of the pinna ..... 9
7. Pinna-rachis alate only in the apical part; pinnules petiolulate to adnate, shallowly lobate, ending in a narrowed acuminate-caudate subentire apical part; costa adaxially densely covered with long acicular arched fulvous hairs, abaxially sparsely hairy; veinlets prominent on both sides. Montane forest in Rwanda & Burundi ..... *B. bouxiniana* Pic.Serm.  
 — Pinna-rachis alate to the base; pinnules different; costa with different indumentum ..... 8
8. Apex of the pinnules acuminate; pinnae oblong to lanceolate, apex acute; fronds herbaceous; pinnules pinnatifid, distant, the sinuses between them deep and broad; veinlets adaxially sunken, abaxially prominent ..... *B. glabra* (Bory) R.M.Tryon  
 — Apex of the pinnules acute but distinctly rounded; pinnae ovate, apex acuminate; fronds chartaceous; pinnules lobed; veinlets usually different ..... *B. crenata* (Alston) Schelpe
9. The undivided wings along the costae widest in the middle of the pinnae; first acroscopic pinnule or lobe of each pinnae about half as long as the corresponding basisopic lobe or pinnule, or even shorter; pinnules less than 40 mm long ..... *B. confusa* Jongkind & W. de Winter, sp. nov.  
 — The undivided wings along the costae widest near the apex of the pinnae; pinnae different; pinnules often longer .... 10
10. Pinnae sessile or adnate; apical segment of the lamina usually at least slightly longer than wide, or about as long as wide ..... *B. sinuata* (Alston) Pic.Serm.  
 — Pinnae, at least the proximal ones, long or short-petiolate; apical segment of the lamina comparatively longer ... 11
11. Pinnae petioles 7-10 mm long; pinnules with cordate base, subglabrous, petiolules 2.5-5 mm, at least some pairs of pinnules distinctly alternate; costa with abaxially, appressed black hairs. Kenya and Tanzania ..... *B. stipitata* (Alston) Faden  
 — Pinnae petioles clearly shorter; pinnules with a shorter petiolule or sessile, all pairs of pinnules (sub-) opposite; costa with different indumentum ..... 12
12. Lamina pinnatifid or 1-pinnate proximally; pinnatifid laminae with the lobes semicircular to lanceolate (occasionally one or two of the lowermost lobes free but not stalked); pinnate laminae with pinnae oblong to lanceolate, sometimes abruptly widened in the middle part; venation abaxially pale and strongly raised. Kenya and Tanzania ..... *B. hieronymi* (Kümmerle) Pic.Serm.  
 — Lamina 1-pinnate, 1-pinnate with a few lower pinnae having several free pinnules, or distinctly 2-pinnate; pinnae laminae regularly oblong to narrow triangular; venation different abaxially ..... 13
13. Petiole hairs with distinct thickened bases; fronds up to 1.5 m long, always 2-pinnate; pinnules 30-55 mm long. Central Africa, Uganda and north-west Tanzania ..... *B. tisserantii* Alston & Tardieu  
 — Petiole hairs without distinct thickened bases; fronds 1.5 to 2.5 m long, 1- to 2-pinnate; pinnules 45-75 mm long. East, Southern, and South-Central Africa ..... *B. natalensis* (Hook.) R.M.Tryon





FIG. 2. — **A, B**, *Blotiella confusa* Jongkind & W. de Winter, sp. nov.; **A**, *Jongkind 9771*, almost mature medium-size frond; **B**, *Jongkind 9771*, detail of part of frond bending down; **C-E**, *Blotiella reducta* (C.Chr.) R.M.Tryon; **C**, *Jongkind 11052*, Pic de Fon, Guinea; **D**, Nimba Mts, Guinea in 2011; **E**, *Jongkind 7899*, Nimba Mts, in old mine shaft. All photos by C. Jongkind.



increasingly curved to eventually nearly appressed near the margin; areoles with a few hairs; apex narrowly triangular, attenuate, the base (semi-)hastate, with *c.* 18 pairs of lobes; proximal lobes narrowly triangular to oblong, 10 × 2 cm, the apex acute to acuminate, the margin lobate with rounded lobes, the sinuses between them rounded, narrow, incised  $\frac{1}{3}$  to  $\frac{1}{2}$  of the distance to the costa; ultimate segments entire to sinuate or deeply lobed or crenate, distal lobes rounded, semicircular, gradually dissolving into a repand apical margin; rachis with *c.* 2 mm long, pale, dark-septate lax hairs with dilated, persistent bases. Pinnae: the proximal pair reduced to *c.* 14 × 4 cm, the second pair 20 × 7.5 cm, lanceolate, the base truncate to semicordate, the apex acuminate; the distal free pinnae 12.5 × 6 cm, lanceolate, widest in the middle, the base for *c.* 7 mm adnate on the basicopic side of the costa, 1 to 3 mm on the acroscopic side, the apex attenuate, the margin distally with round lobes measuring *c.* 5 mm long and 7 mm wide, the sinuses between adjacent lobes rounded, narrow, incised  $\frac{1}{3}$  to  $\frac{1}{2}$  of the distance to the costa, gradually more incised from the middle towards the base, the proximal pinnules free, the first acroscopic pinnule reduced. Pinnules deltoid-oblong, the apex rounded, the margin entire or with rounded lobes; less developed towards the apex of the frond and the pinnae, connate by a 1--3.7 cm wide wing along the costa, only the proximal pairs of the basal pinnae sessile and free. Sori marginal, confined to bases of sinuses; true indusium absent but reflexed margin of segment forms a membranous false indusium; false indusium crescent shaped, 2-3 mm long, to 6 mm long in the wider sinuses, located in the sinuses between the pinnules and the pinnule-lobes, and of the lamina-apex; paraphyses with a slightly enlarged, ovate to obpyriform apical cell. Spores monolete.

*Blotiella reducta* (C.Chr.) R.M.Tryon

*Contributions from the Gray Herbarium of Harvard University* 191: 100 (1962).

*Lonchitis reducta* C.Chr. *Feddes Repertorium specierum novarum regni vegetabilis. Beihefte* 9: 370 (1911).

REPRESENTATIVE SPECIMENS EXAMINED. — **Guinea.** Nimba Mts, top end of Zié River Valley, 1540 m, 22.VI.2007, *Jongkind* 7796 (K, P, WAG); Nimba Mts, old mine shaft, 1260 m, 1.VII.2007, *Jongkind* 7899 (K, WAG); Pic de Fon, 1255 m, 9.IX.2011, *Jongkind* 11052

(K, P, WAG); Pita et environs, 950 m, II.1910, *Pobéguin* 28 2247 (holo-, P[P00482720]; iso-, BM, P[P00482722]).

HABITAT AND DISTRIBUTION. — In Guinea, rocky places between 950 and 1600 m, usually sheltered from direct impact of rain by overhanging rocks.

NOTES

The description of the new species does not mean that all herbarium sheets from West Africa can now be easily identified with certainty because specimens of the fronds are sometimes clipped into pieces too small to be identified.

Several other specimens examined in this study may represent a hybrid or belong to another distinct undescribed species; additional complete collections are needed to determine the status of these specimens.

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