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A new species of *Pseudoblepharispermum* (Asteraceae, Plucheeae) from NE Somalia

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Abstract

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A new species of the genus *Pseudoblepharispermum* Lebrun & Stork (Asteraceae), up to now including *Pseudoblepharispermum bremeri* Lebrun & Stork and *Pseudoblepharispermum mudugense* Beentje & D.J.N. Hind, is described from two herbarium specimens housed at FT, collected in 1954 near the Indian Ocean coast of Bari Region, NE Somalia. These specimens formed an unidentified remaining part of a collection given to FT by the Italian geologists G. Merla, A. Azzaroli and V. Fois, who had led a geologic expedition in the former Migiurtinia (current Bari Region) on behalf of an Italian oil company. The new species *Pseudoblepharispermum tuddense* Baldesi & Pignotti is more similar to *Pseudoblepharispermum bremeri* from S Ethiopia than to *Pseudoblepharispermum mudugense* from central Somalia. Close examinations of macro- and micro-characters were carried out for the new species and compared with the features of *Pseudoblepharispermum bremeri*. Diagnostic characters are listed to support the taxonomic distinction between the new species and *Pseudoblepharispermum bremeri*.

Keywords

ASTERACEAE – Plucheeae – *Pseudoblepharispermum* – North East Somalia – Taxonomy – New Species

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Introduction

The genus *Pseudoblepharispermum* Lebrun & Stork (Asteraceae) currently includes two species: *P. bremeri* Lebrun & Stork (type species of the genus and described from the Ogaden in southern Ethiopia; LEBRUN et al., 1981), and *P. mudugense* Beentje & D.J.N. Hind (from central Somalia; BEENTJIE & HIND, 2002). The genus was therefore restricted to the horn of Africa (TADESSE, 2004; BEENTJIE, 2006) and remains so with the present new addition. Initially, it was not ascribed to any tribe due to its contradictory characters (LEBRUN et al., 1981). Later ANDERBERG (1991) placed it in the tribe *Plucheeae* (Benth.) A. Anderb. It is characterized, like its two nearest genera in the tribe *Plucheeae* – *Triplocephalum* O. Hoffm. and *Sphaeranthus* L. – by primary flower heads gathered in secondary heads (synflorescences). On the other hand, whereas members of *Triplocephalum* and *Sphaeranthus* are herbs, those of *Pseudoblepharispermum* are more or less extensively lignified shrubs.

Both *P. bremeri* and *P. mudugense* were described from single herbarium specimens collected respectively 9 and 23 years before their description (LEBRUN et al., 1981; BEENTJIE & HIND, 2002), and both are still known only from their type localities. This seems to be a trend in this genus, as the new proposed species is described here from only two herbarium specimens that remained unidentified at FT for many decades. The material had been collected by the Italian geologists Giovanni Merla, Augusto Azzaroli and Vittorio Fois during an expedition to north-eastern Somalia organized in 1954 by the Institute of Geology of the University of Florence on account of “Mineraria Somala”, a Somali branch of the Italian oil company “AGIP Mineraria”. The aim of the expedition was to study the geology of the area and explore for oil (AZZAROLI, 1957; ROOK, 2016). Nonetheless, the three geologists took the opportunity to collect 716 interesting plant specimens on the expedition and hand them over to the former Erbario Coloniale Italiano, now Centro Studi Erbario Tropicale (FT), which still houses the collection. Most specimens of this collection were studied soon after the acquisition and incorporated in the main herbarium.

The first author, while going through the undetermined Somali collections of FT – still including unidentified collections of Merla, Azzaroli & Fois – came across two specimens, collected at different dates and at different localities, although not far from each other of a suffruticose Asteraceae, which he ascribed to the genus *Pseudoblepharispermum*. The clear-cut distinction between these specimens and the only previously known Somali species of the genus, the endemic *P. mudugense*, consisted primarily in the rounded-obovate vs. linear leaves. Less obvious at first glance seemed the differences between these specimens and the other known species of *Pseudoblepharispermum*, the Ethiopian *P. bremeri*, because both have flat leaves. Nonetheless, while leaves of the Merla

et al. specimens are small, rounded/obovate-obtuse/emarginate, *P. bremeri* has larger, ovate-acute leaves. Closer examination of minute floral characteristics revealed a series of micro-characters allowing us to describe a third species in the genus *Pseudoblepharispermum*: *P. tuddense* Baldesi & Pignotti.

Material and methods

Minute macroscopic characters were observed with an Olympia assembled stereoscope, and microscopic characters were observed with a Nikon Eclipse E200 light microscope (LM). Pollen morphology was observed under LM and scanning electron microscope (SEM). Before LM analysis, pollen was dehydrated, acetolyzed (ERDTMAN, 1969) and immersed in a 50% water/glycerol solution. Before SEM analysis, acetolyzed pollen was washed in acetone, critical point dried, and gold-coated. Pollen measurements were taken under LM from more than 30 grains. The following parameters were measured: length of polar axis, length of equatorial axis, length and width of colporus, length and width of endocolpus, length and width of spine pollen. Terminology is according to PUNT et al. (1994).

Taxonomic treatment

Pseudoblepharispermum tuddense Baldesi & Pignotti, **sp. nov.** (Fig. 1, 3).

Holotypus: SOMALIA. **Reg. Bari:** Migiurtinia, “Uadi Tudi” [Wadi Tuddi], “Bender Beila” [Bandarbeyla] presso la foce, [9°30'N 50°48'E], 19.IV.1954, fl., Merla, Azzaroli & Fois s.n. (FT [FT006212]).

Pseudoblepharispermum tuddense Baldesi & Pignotti a *P. bremeri* J.-P. Lebrun et Stork synflorescentiis terminalibus hemisphaericis, involucrio secundario cupuliformi, flosculorum apice externe pubescente, acheniis epapposis, setulis acheniorum apice circinatis arcte affinis, sed caulibus valde lignosis, habito hemisphaerico fere pulvinato, culmorum et foliarum indumento densius latiusque albo-tomentoso, summa cellula trichomatum diastoles forma atque apice adpresso apiculato, foliis crassiusculis obovato-rotundatis, cuneatis, obtusis vel laeviter emarginatis, flosculorum masculorum perianthii tubo glabro, antheris breviter caudatis differt.

Cushion shaped *suffrutex*, 17–18 cm tall, strongly lignified except for the distal 1–2 cm long ends of the young, white-tomentose, angular shoots. Older, wooden stems progressively etomentose, the epidermis turning to irregularly quadrangular, elongated grey bark plaques. *Leaves* irregularly crowded to opposite at the apex of young shoots, alternate on older stems, petiolate, petiole adaxially canaliculate 3–10 mm long, blade rounded to obovate and up to 12 × 8 mm, attenuate-cuneate,



Fig. 1. – *Pseudoblepharispermum tuddense* Baldesi & Pignotti. **A.** Habit; **B.** Leaf surface hair, with comma-shaped distal cell; **C.** Anthers, with visible short tails at their base; **D.** Hermaphrodite, functionally male floret. [Merla, Azzaroli & Fois s.n., FT006212] [Drawing: L. Vivona]

obtuse to emarginate, completely covered by a dense, thick white tomentum; veins indistinguishable above except for the slightly furrowed midvein, faintly emergent below. Indumentum made up of short 3–4 celled trichomes; distal cell of each trichome inflated, apiculate, comma-shaped, the distal cell segment appressed. *Synflorescences*: terminal heads, solitary on 4–13 mm canaliculate peduncles, irregularly hemispherical to elliptic, 10–13 mm in diam.; secondary receptacle convex, secondary involucre often plano-concave due to the congestion of primary capitula on the synflorescence, 2–3 seriate; *secondary phyllaries* apparently laterally fused in the proximal third by their thick white indumentum, oblong-obovate, rounded at apex, 3–4 mm long. *Primary capitula* up to several tens in each synflorescence, congested, on short, tiny primary receptacles, each surrounded by a 1–3-seriate external primary involucre and a 1–3 seriate internal primary involucre. *External primary phyllaries* ligulate, 1.5–2 mm long, stramineous, rounded at apex, with sparse yellow sessile or subsessile glands, densely tomentose along the median nerve and at the apex. Hairs of external phyllaries similar to leaf hairs. *Internal primary phyllaries* ligulate, 3–4 mm long, stramineous to more or less extensively blackish streaked, with few sessile yellow glands, distally tomentose. Some phyllaries conduplicate, surrounding single hermaphrodite florets. Subterminal trichomes of internal phyllaries slender with scarcely swollen, straight apical cell; apical trichomes similar to leaf trichomes but swollen apical cell mostly straight. *Flowers* 4–5 in each capitulum: 3–4 hermaphrodite, but functionally male flowers and 1 female flower. *Female florets*: *perianth* filiform, 1.5 mm, golden yellow [?], 3-lobed, the thin lobes glabrous to sparsely hairy; *ovary* rufous, tomentose by antrorse rufous, 0.3–0.4 mm long, apically circinate hairs, epappose; *stigma* exerted, 2(–3)-fid, smooth. *Cypsela* (probably immature) narrowly obovoid, 2×0.6 – 0.7 mm, irregularly tomentose by antrorse, 0.3–0.4 mm long, apically circinate, rufous hairs, epappose except for the very dense antrorse circinate hairs simulating a pappus (false pappus) at fruit apex. *Hermaphrodite, functionally male florets*: *perianth* 3–4 mm long, 0.6–1 mm large at apex, golden yellow [?], 5-lobed, glabrous except for the tomentous lobes. Hairs of perianth short with swollen, mostly straight apical cell. *Anthers* 1.5 mm, shortly tailed, with acute bases. *Pollen*: spheroidal to subprolate (polar axis 22.5–32.5 μ m; equatorial axis 20–35 μ m), trizonocolporate (colpori 15–22.5 \times 1.25–5 μ m; lalongate endocolpi 2.5–10 \times 1.25–5 μ m); exine perforate, echinate (spinae 2–3.75 μ m long, 3.75–5 μ m broad, perforate at base, tapering toward the smooth, non-perforate apex). *Stigma* exerted, simple or shortly 2-fid, densely papillose; *ovary* rudimentary 0.6–0.7 mm long, peg-like with few 0.3–0.4 mm long antrorse circinate and/or straight tawny hairs.

Etymology. – The specific epithet is derived from the name of the temporary stream Wadi Tuudi, which is the Somali spelling according to GEONAMES (2020).

Distribution, ecology and phenology. – The two known specimens were collected along the North-eastern coast of Somalia, north of the coastal town of Bandarbeyla, in the vast Bari Region, belonging to the Puntland State of Somalia (Fig. 2).

The geologic substrate in the area is sedimentary, constituted mainly of Middle-Late Eocene limestone (Karkaar limestones; ABBATE et al., 1994), here and there covered (i.e., at the surface substituted) by more recent marls (Oligocene to Middle Eocene) with presence of clays, sandstones, and gypsum (e.g., the Iskushuban formation; ABBATE et al., 1994). The two other known species occur both on gypsum and *P. tuddense* may also be present on this substrate.

The local climate is classified as very arid. Semidesert grassland or shrubland dominate the landscape (see ULLAH & GADAIN, 2016), and the transition to true desert, which occupies most of Bari Region, takes place not far away to the North-west of the new species collection localities. In his vegetation map of the whole horn of Africa, PICHI SERMOLLI (1957) recognised three main vegetation types in the area: (1) Coastal vegetation in a broad sense, i.e. associations subjected to the direct influence of the sea, greatly variable depending on kind of substrate, coast morphology, as well as presence of estuaries; (2) Steppe with grasses, perennial herbs and suffrutices, also a highly variable type of vegetation, with changing percentages of the three main components, but identifiable by a stable ground-cover less than 50%, only exceeded after the germination of annuals at seasonal rainfall; (3) Subdesert scrub with trees and succulents, where shrubs and suffrutices are quite scattered or, sometimes, gathered in small stands, trees are usually isolated, and succulents are scattered but constantly present. PICHI SERMOLLI (1957) admitted a large extent of interdigitation and the occurrence of intermediate stages among these kinds of vegetation in the field. The vegetation at Wadi Gurguuris probably represented an element of the steppe, of the sub-desert scrub, or a transition between them while the vegetation of Wadi Tuudi estuary is probably under ocean influence with elements of coastal vegetation.

The flowering period seems to extend at least from January to the end of April.

Conservation status. – According to ULLAH & GADAIN (2016), no up-to-date information is available on the status (habitat integrity vs. fragmentation) of the semi-desert grassland and shrubland occurring along the eastern Somali coast from the Horn of Africa to the south of Mogadishu. Anyway, this habitat is traditionally used for grazing and firewood collection, and displacement of population from urban areas beset by war to the coast is expected to cause over-use of

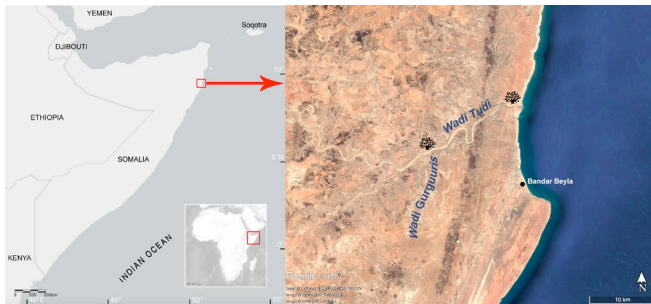


Fig. 2. – Distribution map of *Pseudoblepharispermum tuddense* Baldesi & Pignotti.

plant resources and growing habitat fragmentation (ULLAH & GADAIN, 2016). *Pseudoblepharispermum tuddense* is only known from two locations dating back to nearly 70 years from an area that is poorly collected. The range of the new species is probably relatively well circumscribed in the eastern Somali coast in an area where habitat quality is deteriorating, which results in continuing decline of the new species Extent of Occurrence (EOO) and Area of Occupancy (AOO). *Pseudoblepharispermum tuddense* can therefore be assessed for its risk of extinction as “Vulnerable” [VU B1ab(i,ii,iii,iv,v)+2a b(i,ii,iii,iv,v)] (IUCN, 2012).

Notes. – The new species appears to be morphologically closer to *P. bremeri* than to *P. mudugense* due to synflorescence macro-morphology and to its flat leaves, in contrast to the linear, revolute leaves of the latter (Table 1).

On the other hand, the outline and texture of the leaves – beside the habit – are what makes the new species macroscopically differ from its morphologically closest congeneric, *P. bremeri*, in that in the new species they are smaller, thicker,

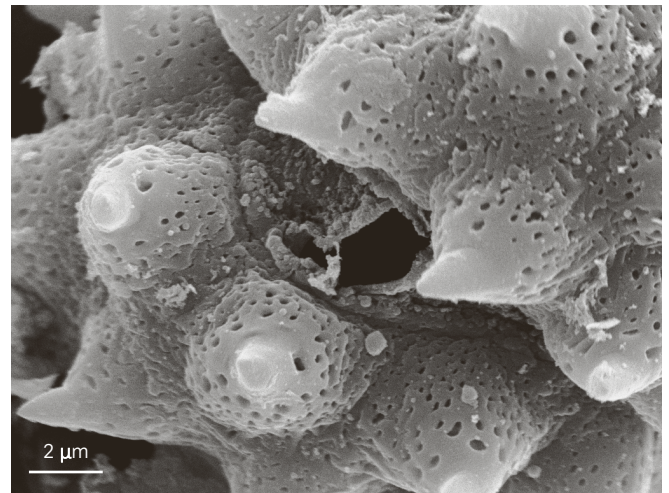


Fig. 3. – Pollen grain of *Pseudoblepharispermum tuddense* Baldesi & Pignotti, detail of spinae and colpi.

rigid vs. limp, rounded-obovate vs. oblong to ovate, obtuse to emarginate vs. mainly acute, with faint vs. prominent midvein. The habit is also noticeably different, as the new species has the appearance of a cushion-like dwarf shrub, in contrast to the more untidy appearance of *P. bremeri*, in which slender, scarcely lignified young stems overtop the lignified parts. Notably, the two species also differ in some minute diagnostic traits, appreciable in both vegetative (leaf indumentum) and reproductive organs (flowers).

The leaf-indumentum in the new species is very thick, made up by few-celled trichomes with 1–2(–3) basal cells and a terminal longer, bulging and comma shaped appressed cell, with a distinct apiculus. This represents a clear diagnostic character from *P. bremeri*, which has leaf trichomes with

Table 1. – Diagnostic characters distinguishing the three species of *Pseudoblepharispermum* Lebrun & Stork.

	<i>P. tuddense</i>	<i>P. bremeri</i>	<i>P. mudugense</i>
Habit	cushion shaped suffrutex, with short herbaceous young stems, 15 cm high	richly branched suffrutex, with slender herbaceous young stems, up to 30 cm high	branched suffrutex, with slender herbaceous young stems, +/- 30 cm high
Leaf shape	flat, thick and rigid, up to 12 × 8 mm, rounded-obovate, obtuse to emarginate	flat, limp, up to 35x12 mm, narrowly oblong-ovate, acute to obtuse	linear, revolute
Leaf indumentum	thick, hairs with appressed, swollen, comma-shaped, apiculate distal cell	T-shaped hairs	sparsely puberulous, with few sessile glands
Hermaphrodite floret, perianth tube	glabrous	with long bristles in the median part	glabrous
Hermaphrodite florets, perianth lobes	hairy; hairs with swollen, ellipsoid, mostly apiculate distal cell	hairy; hairs with slender cylindrical, not apiculate distal cell	sparsely puberulous, with few sessile glands
Anthers	shortly tailed	with round bases	shortly tailed
Female florets, perianth lobe	glabrous or with few trichomes with swollen, ellipsoid, mostly apiculate distal cell	glabrous or sparsely pilose with few sessile glands	glabrous
Female florets, perianth tube	glabrous or few trichomes extending from the lobes	glabrous	glabrous

asymmetrically T-shaped terminal cells, with the two ends of the terminal cell slightly different, long and pointed and short and rounded (LEBRUN et al., 1981: 421, tab. 2, fig. 2). The thickness of the indumentum and small size of the trichomes make it difficult to appreciate their shape on the plant, and the observation of detached hairs on slides through a light microscope is crucial (Fig. 1B).

Floral characters are also hard to observe due to the densely packed inflorescences and the consequent miniaturization of all parts. A good quality stereomicroscope is necessary to appreciate the differences in the floral organs. Like *P. bremeri*, the new species bears hermaphrodite, functionally male florets and female florets. In the hermaphrodite, functionally male florets, the perianth tube is glabrous in contrast to that of *P. bremeri*, where long setae arise from the median part of the tube (as seen in LEBRUN et al., 1981: 421, tab. 2, fig. 6). In *P. tuddense* the perianth lobes are densely hairy (Fig. 1D) like in *P. bremeri*, but the trichomes differ in the swollen, ellipsoid, mostly apiculate distal cell (vs. slender cylindrical, non-apiculate distal cell in *P. bremeri*) and the anthers (Fig. 1C) are shortly but distinctly tailed (vs. anthers with round bases).

Pollen of *P. tuddense* (Fig. 3) does not seem qualitatively differ from pollen of *P. bremeri* as shown in LEBRUN et al. (1981: 423, tab. 3, fig. 4, 5). Pollen of *P. bremeri* also appears spheroidal, echinate, with ectoapertures represented by colpi. Perforations of exine are distributed as in *P. tuddense*. On the other hand, it is not clear whether the endoapertures in *P. bremeri* are endocolpi, as in *P. tuddense*, or endopori, since no LM photos, which would permit to distinguish the outline of endo- and ectoapertures, were published by LEBRUN et al. (1981). Moreover, since LEBRUN et al. (1981) did not provide pollen measurements and did not place scale bars on the two SEM pollen images, pollen dimensions of *P. bremeri* cannot be reliably extrapolated from that publication.

Paratypus. – SOMALIA. **Prov. Bari:** Migiurtinia, fascia costiera, testata dell'Uadi Gurguris [Gurguuris] a nord della pista Dudo – Bender Beila [Dhuudo – Bandarbeyla], [9°32'N 50°40'E], 9.I.1954, fl., Merla, Azzaroli & Fois s.n. (FT).

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