Uvariopsis dicaprio (Annonaceae) a new tree species with notes on its pollination biology, and the Critically Endangered narrowly endemic plant species of the Ebo Forest, Cameroon

George Gosline [Equal first author, 1] , **Martin Cheek** [Corresp., Equal first author, 1] , **Jean Michel Onana** [2, 3] , **Eric Ngansop Tchatchouang** [3] , **Xander M van der Burgt** [1] , **Lorna MacKinnon** [1] , **Léo-Paul M J Dagallier** [4]

[1] Science, Royal Botanic Gardens, Kew, Richmond, Surrey, United Kingdom

[2] Faculty of Science, Department of Plant Biology, Université de Yaoundé I, Yaoundé, Cameroon

[3] National Herbarium of Cameroon, IRAD, Yaoundé, Cameroon

[4] DIADE, Univ Montpellier, CIRAD, IRD, Montpellier, France

Corresponding Author: Martin Cheek
Email address: m.cheek@kew.org

Background. The Ebo Forest area is a highly threatened centre of diversity in the Littoral Region of Cameroon, globally important for conservation with many threatened species including 68 threatened species of plant, yet not formally protected. The tropical African evergreen forest tree genus *Uvariopsis* Engl. & Diels (Annonaceae) is characterised by unisexual, usually cauliflorous flowers with a uniseriate corolla of four petals, and two sepals. Cameroon is the centre of diversity of the genus with 14 of the 19 known species. **Methods.** The herbarium collection *MacKinnon* 51 from Ebo is hypothesized to represent a new species to science of *Uvariopsis*. This hypothesis is tested by the study of herbarium specimens from a number of herbaria known to hold important collections from Cameroon and surrounding countries. **Results.** We test the hypothesis that *MacKinnon* 51 represents a new species to science, using the most recent dichotomous identification key, and comparing it morphologically with reference material of all known species of the genus. We make a detailed comparative morphological study focussing on three other Cameroonian species, *Uvariopsis solheidii, U. korupensis* and the sympatric *U. submontana*. In the context of a review of the pollination biology of *Uvariopsis,* we speculate that in a genus otherwise with species with dull, flesh-coloured (pink, red to brown) flowers pollinated (where known) by diptera, orthoptera and blattodea (flies, crickets and cockroaches), the glossy, pale yellow-green flowers of *Uvariopsis dicaprio*, with additional traits unique in the genus, may be pollinated by nocturnal moths. Based on *MacKinnon* 51, we formally name *Uvariopsis dicaprio* Cheek & Gosline (Annonaceae) as new to science, and we describe, and illustrate, and map it. Restricted so far to a single site in evergreen forest in the Ebo Forest, Littoral Region, Cameroon, *Uvariopsis dicaprio* is provisionally assessed as Critically Endangered using the IUCN 2012 standard because the

forest habitat of this species remains unprotected, and there exist imminent threats of logging and conversion to plantations. **Discussion** We show that the highest density of species of the genus (12), and of narrow endemics (5), is found in the Cross-Sanaga Interval of SE Nigeria and Western Cameroon. A revised key to the 14 Cameroonian species of *Uvariopsis* is presented. We review the other seven narrowly endemic and threatened species unique to the Ebo forest of Cameroon and discuss the phytogeographic affinities of the area. **Conclusions** *Uvariopsis dicaprio* adds to the growing list of species threatened with extinction at Ebo Forest due to current anthropogenic pressures.

1   *Uvariopsis dicaprio* (Annonaceae) a new tree species with notes on its pollination biology, and
2   the Critically Endangered narrowly endemic plant species of the Ebo Forest, Cameroon .
3
4   George Gosline[1], Martin Cheek[1], Jean Michel Onana[2,3], Eric Ngansop[2], Xander van der Burgt[1],
5   Lorna MacKinnon[1], Leo-Paul M. J. Dagallier[4]
6
7   [1] Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AE, U.K.
8   [2] IRAD-National Herbarium of Cameroon, P.O. Box. 1601, Yaoundé, Cameroon
9   [3] Faculty of Science, Department of Plant Biology, University of Yaoundé I,
10 Yaoundé, Cameroon
11 [4] DIADE, Univ Montpellier, CIRAD, IRD, Montpellier, France.
12
13 Corresponding author:
14 Martin Cheek[1]
15
16 Email address: m.cheek@kew.org

Abstract

Background. The Ebo Forest area is a highly threatened centre of diversity in the Littoral
Region of Cameroon, globally important for conservation with many threatened species
including 68 threatened species of plant, yet not formally protected. The tropical African
evergreen forest tree genus *Uvariopsis* Engl. & Diels (Annonaceae) is characterised by
unisexual, usually cauliflorous flowers with a uniseriate corolla of four petals, and two sepals.
Cameroon is the centre of diversity of the genus with 14 of the 19 known species.
Methods. The herbarium collection *MacKinnon* 51 from Ebo is hypothesized to represent a new
species to science of *Uvariopsis*. This hypothesis is tested by the study of herbarium specimens
from a number of herbaria known to hold important collections from Cameroon and surrounding
countries.
Results. We test the hypothesis that *MacKinnon* 51 represents a new species to science, using
the most recent dichotomous identification key, and comparing it morphologically with reference
material of all known species of the genus. We make a detailed comparative morphological study
focussing on three other Cameroonian species, *Uvariopsis solheidii, U. korupensis* and the
sympatric *U. submontana.*
In the context of a review of the pollination biology of *Uvariopsis,* we speculate that in a genus
otherwise with species with dull, flesh-coloured (pink, red to brown) flowers pollinated (where
known) by diptera, orthoptera and blattodea (flies, crickets and cockroaches), the glossy, pale
yellow-green flowers of *Uvariopsis dicaprio,* with additional traits unique in the genus, may be
pollinated by nocturnal moths.
Based on *MacKinnon* 51, we formally name *Uvariopsis dicaprio* Cheek & Gosline
(Annonaceae) as new to science, and we describe , illustrate and map it.
Restricted so far to a single site in evergreen forest in the Ebo Forest, Littoral Region, Cameroon,
Uvariopsis dicaprio is provisionally assessed as Critically Endangered using the IUCN 2012
standard because the forest habitat of this species remains unprotected, and there exist imminent
threats of logging and conversion to plantations.
Discussion We show that the highest density of species of the genus (12), and of narrow
endemics (5), is found in the Cross-Sanaga Interval of SE Nigeria and Western Cameroon. A
revised key to the 14 Cameroonian species of *Uvariopsis* is presented.
We review the other seven narrowly endemic and threatened species unique to the Ebo forest of
Cameroon and discuss the phytogeographic affinities of the area.
Conclusions *Uvariopsis dicaprio* adds to the growing list of species threatened with extinction at
Ebo Forest due to current anthropogenic pressures.

Key Words: cauliflorous, conservation, Cross-Sanaga Interval, moth-pollination, threatened
species.

Introduction

A long-running survey of plants in Cameroon to support improved conservation management has
been in course since 1992. The survey is led by botanists from the Royal Botanic Gardens, Kew
and IRAD (Institute of Agricultural Research for Development)-National Herbarium of
Cameroon, Yaoundé. The study has focussed on the Cross-Sanaga interval (Cheek *et al.,* 2001,
2006) which contains the area with the highest plant species and generic diversity per degree
square in tropical Africa (Barthlott *et al.,* 1996, Dagallier *et al.,* 2020). The herbarium specimens
collected in these surveys formed the foundations for a series of Conservation Checklists (see

64 below). So far, over 100 new species and several new genera have been discovered and
65 published, new protected areas have been recognised and the results of analysis are feeding into
66 the Cameroon Important Plant Area programme (https://www.kew.org/science/our-
67 science/projects/tropical-important-plant-areas-cameroon), based on the categories and criteria of
68 Darbyshire *et al.,* (2017).
69
70 In connection with preparation of a Conservation Checklist of the plants of the Ebo Forest,
71 Littoral Region, a plant specimen (*MacKinnon* 51, Fig. 1 – 3) was identified as an *Uvariopsis*
72 Engl. & Diels which resembled no other species known in the genus. In this paper we test the
73 hypothesis that it is a new species to science endemic to Ebo and name the new species as
74 *Uvariopsis dicaprio.* We also review other endemic and near-endemic plant species of the Ebo
75 Forest (see Discussion).
76
77 *Uvariopsis* (Annonaceae, subfamily Annonoideae, tribe Monodoreae (Chatrou *et al.,* 2012; Guo
78 *et al.,* 2017) is a highly distinctive and easily recognised genus, since most of its species have
79 unisexual flowers, a calyx with two basally connate sepals, and the petals in a single whorl of
80 four (very rarely three, see below). Annonaceae are otherwise characterised by bisexual flowers
81 with trimerous perianths (van Heusden 1992). Most species of the genus *Uvariopsis* are
82 cauliflorous small trees, the flowers being produced from the trunk, although some species are
83 ramiflorous or bear axillary flowers (Kenfack *et al.,* 2003, Couvreur *et al.,* 2021 in press).
84
85 Nineteen species are currently accepted in *Uvariopsis.* Five species have been published in the
86 21st Century: *Uvariopsis korupensis* Gereau & Kenfack (Gereau & Kenfack 2000), *U.*
87 *submontana* Kenfack, Gosline & Gereau (Kenfack *et al.,* 2003) and *U. etugiana* Dagallier &
88 Couvreur (Couvreur *et al.,* in press) all from Cameroon, *U. citrata* Couvreur & Niang. (Couvreur
89 & Niangadouma 2016) from Gabon and *U. lovettiana* Couvreur & Q. Luke (Couvreur & Luke
90 2010) from Tanzania. In addition a sixth species, *Uvariopsis tripetala* (Baker f.) G.E.Schatz, was
91 transferred to the genus from the monotypic *Dennettia* Baker f. (Kenfack *et al.,* 2003), although
92 it is likely that *Dennettia* should be reinstated (Cheek *et al.,* 2021a). The genus is centred in
93 Cameroon, where 13 of the 19 species occur, followed in species diversity by Gabon, with six
94 species. The most widespread species of the genus is *Uvariopsis congensis* Robyns & Ghesq.
95 which occurs from Cameroon to South Sudan, Zambia and Kenya. Several species are rare,
96 being known from only one or two specimens and have restricted ranges, these include *U.*
97 *etugiana* (Cameroon endemic) and *U. citrata* (Cameroon & Gabon), both known from two
98 specimens, and *U. sessiliflora* (Mildbr. & Diels) Robyns & Ghesq. endemic to Cameroon and
99 known from a single specimen.
100
101 The genus is distributed throughout continental tropical African evergreen forests, from Guinea
102 in the West to Tanzania in the east, and as far south as northern Zambia. The species usually
103 occur at low altitude, exceptions including *U. submontana* and *U. lovettiana* which occur in
104 submontane or cloud forest in Cameroon and Tanzania respectively (Kenfack *et al.,* 2003;
105 Couvreur & Luke 2010). Species are usually small trees in high quality, undisturbed forest and
106 appear not to be pioneers. They usually occur at low frequency. For example, in the Mefou
107 Proposed National Park of Central Region Cameroon, only a single mature individual with one
108 juvenile of one species of the genus, *U. solheidii* (De Wild.) Robyns & Ghesq., was found in the
109 course of many weeks of botanical surveys by numerous botanists collecting thousands of

110 specimens (Cheek *et al.,* 2011). However, in rare ecological circumstances, some species can
111 become locally dominant e.g., *U. tripetala* (*Dennettia tripetala*) in the understorey of maritime
112 lowland evergreen inselberg forest in Guinea (Couch *et al.,* 2019), and also, *U. congensis* locally
113 subdominant in forests in western Uganda where it flowers synchronously and is dispersed by
114 primates (Dominy & Duncan 2005; Gosline pers. obs. March 2016).

115
116

Materials & Methods

118
119 *The electronic version of this article in Portable Document Format (PDF) will represent a*
120 *published work according to the International Code of Nomenclature for algae, fungi, and plants*
121 *(ICN), and hence the new names contained in the electronic version are effectively published*
122 *under that Code from the electronic edition alone. In addition, new names contained in this work*
123 *which have been issued with identifiers by IPNI will eventually be made available to the Global*
124 *Names Index. The IPNI LSIDs can be resolved and the associated information viewed through*
125 *any standard web browser by appending the LSID contained in this publication to the prefix*
126 *"http://ipni.org/". The online version of this work is archived and available from the following*
127 *digital repositories: PeerJ, PubMed Central, and CLOCKSS.*

128 Fieldwork and specimen collection was as previously described in Cheek *et al.,* (2021), under the
129 same system of agreements, permits and approvals. The herbarium specimen was made using
130 the Schweinfurth method, that is, initially preserved in ethanol until it could be dried in the
131 standard way (Bridson & Forman 1998) The first duplicate was deposited at YA, the remainder
132 sent to K for identification and distribution following standard practice.

133
134 Herbarium citations follow Index Herbariorum (Thiers *et al.,* continuously updated). Specimens
135 were viewed at EA, K, P, WAG, and YA. The National Herbarium of Cameroon, YA, was
136 searched for additional material of the new species, but without success. Images for specimens at
137 WAG were studied at https://bioportal.naturalis.nl/?language=en and those from P at
138 https://science.mnhn.fr/institution/mnhn/collection/p/item/search/form?lang=en_US. We also
139 searched JSTOR Global Plants (https://plants.jstor.org/ accessed March 2021)
140 for additional material, and finally the Global Biodiversity Facility (GBIF, www.gbif.org
141 accessed March 2021). We compared our material with reference material of all other species in
142 the genus. Binomial authorities follow the International Plant Names Index (IPNI 2021). The
143 conservation assessment was made using the categories and criteria of IUCN (2012), adopting
144 the 4 km^2 cell-size preferred by IUCN. Since a single site is known for the species, it was not
145 feasible to calculate a convex polygon for the extent of occurrence. Herbarium material was
146 examined with a Leica Wild M8 dissecting binocular microscope fitted with an eyepiece
147 graticule measuring in units of 0.025 mm at maximum magnification. The drawing was made
148 with the same equipment using Leica 308700 camera lucida attachment. The botanical terms
149 follow Beentje & Cheek (2003), and format of the description follow the conventions of Kenfack
150 *et al.,* (2003) and Couvreur & Luke (2010). The map was made using QGIS 3.12
151 (https://www.qgis.org).

152
Results
154 **Comparative morphology**

155 The new *Uvariopsis dicaprio* has leaves exceeding 15 cm long, cauliflorous flowers with
156 pedicels exceeding 10 mm long, petals free, exceeding 7 mm long, which grouped it with the
157 other species of *Uvariopsis* in Cameroon (Couvreur et al. in press). *Uvariopsis dicaprio* is
158 similar to *U. solheidii* by the flower buds conical that in *U. dicaprio* can vary from ovoid-conical
159 to pyramidal. The two species can be separated using the differential characters in Table 1 below
160
161 However, based on morphology, *Uvariopsis dicaprio* is closely similar to two other
162 Cameroonian species, *U. korupensis* and *U. submontana.* These four species, including *U.*
163 *solheidii,* share the following features: they are all cauliflorous with well-developed (1.5 – 8 cm
164 or more long) pedicels, flowers which in bud are ovoid-conic, and more-or-less pyramidal (most
165 strongly so in *Uvariopsis dicaprio* where the angles of the pyramid become wing-like: Fig. 1),
166 petal shapes are more or less ovate-lanceolate, rather than orbicular as in most species of the
167 genus. The four species can be compared and separated from each other using the characters in
168 Table 1.
169
170 The petals of *Uvariopsis dicaprio* do not seem to reflex at anthesis exposing the staminal dome
171 as they do in the other species, rather they open only slightly, concealing the staminal dome (Fig.
172 1). Moreover, the petals are only thinly leathery in texture, with an inner surface that is smooth,
173 and not thick and fleshy with a tuberculate inner surface as in the other three species. Another
174 difference is that the outer surface of the petals is mostly naked, with only a very few widely
175 scattered hairs, not appressed-pubescent as in the other species (Fig. 3, Table 1). In leaf-blade
176 dimensions *Uvariopsis dicaprio* fits within the ranges of those of most of the other species, and
177 also in petal dimensions where it fits closest to the ranges of *Uvariopsis korupensis* and
178 *Uvariopsis submontana.* Vegetatively *Uvariopsis dicaprio* differs from all three other species in
179 having a much lower range of secondary nerves (5 to 8 (– 9) versus 8 to 20), and can
180 immediately be distinguished from them by having glabrous young stems, petioles and abaxial
181 midribs (versus appressed pubescent or tomentose) (Table 1).
182
183 *Uvariopsis dicaprio* additionally has several features that appear unique in the genus that are
184 presented in the notes section following the description below.
185
186 The new species can be separated from all other Cameroonian species of *Uvariopsis* using the
187 key presented below, modified from Dagallier in Couvreur *et al.,* (in press).
188
189
190 **Key to the species of *Uvariopsis* (and *Dennettia*) in Cameroon**
191
192
193 1. - Crushed leaves emitting a strong citrus scent .... *U. citrata*
194   - Crushed leaves without citrus scent 2
195 2. - Leaf blades 7.2 – 15.5(– 18) cm long; pedicel 0 – 7(– 9) mm long............................. 3
196   - Leaf blades (11.1 –)16.3 – 38(– 61.5) cm long, pedicel (3 –)8 – 60(– 450)mm long 6
197 3. - Flowers cauliflorous, pedicel 0 – 2 mm long .... *U. sessiliflora*
198   - Flowers ramiflorous, pedicel (0 – 2) – 3 – 11 mm long, sometimes cauliflorous 4
199 4. - Flowers bisexual, petals 3 (– 4) ....*Dennettia tripetala*
200   - Flowers unisexual, petals 4 5

201   5. -   Young branches glabrous or very sparsely pubescent, petals free .... *U. congensis*
202   -   Young branches densely to sparsely pubescent, petals basally fused ……………… *U.*
203   *zenkeri*
204   6. -   Petals basally fused 7
205   -   Petals free 10
206   7. -   Petals 3 .... *U. congolana*
207   -   Petals 4 8
208   8. -   Flower buds globose, monocarps verrucose .... *U. pedunculosa*
209   -   Flower buds conical to pyramidal, monocarps smooth 9
210   9. -   Sepals 5 – 10 mm long, flowers completely covering base of trunk, generally occurring
211   above 800 m a.s.l. .... *U. submontana*
212   -   Sepals 2 – 4 mm long, flowers partially covering base of trunk, generally occurring below
213   800 m a.s.l. .... *U. korupensis*
214   10. -   Flowering pedicels 3 – 8 mm long 11
215   -   Flowering pedicels 10 – 160 mm long 12
216   11. -   Petals linear, 25 – 45 mm long, more than 6 times longer than wide .... *U. bakeriana*
217   -   Petals elliptic to ovate, 10 – 14 mm long, less than 6 times longer than wide …………. *U.*
218   *etugiana*
219   12. -   Flower buds globose .... *U. dioica*
220   -   Flower buds conical or narrowly ovoid to pyramidal.. 13
221   13. -   Stems and petioles tomentose, lateral nerves 8 – 13 on each side of the midrib; flowers
222   wine brown .... *U. solheidii*
223   -   Stems and petioles glabrous; lateral nerves 5 – 8(– 9) on each side of the midrib; flowers
224   green-yellow .... *U. dicaprio*
225
226
227

228 ***Uvariopsis dicaprio*** *Cheek & Gosline* **sp. nov.** Type: Cameroon, Littoral Region, Yabassi, Ebo
229 Forest, 4° 20' 44" N, 10° 24' 33" E, 849 m alt. Dicam Trail 2000 m from Bekob camp, male fl.
230 25 March 2008, *MacKinnon* 51 (holotype K001381842; isotypes MO, YA).
231
232 Syn. *Uvariopsis ebo nom. nud.* (Gosline *et al,.* 2021: 5).
233
234 Diagnosis. Similar to *Uvariopsis solheidii* (De Wild.) Robyns & Ghesq., differing in the stem,
235 petioles and abaxial midrib glabrous (versus tomentose); number of secondary nerves on each
236 side of the midrib 5 – 8 (versus 8 – 13); petals yellow-green, (14 –) 16 x (5.5 –) 9 mm (versus
237 wine brown, 7 – 10 x 2.5 – 5 mm).
238
239 *Cauliflorous, probably monoecious understorey tree* 3 – 4 m tall. Trunk terete, lacking flutes or
240 prop roots, 1.8 – 2.5 cm diameter at 1.5 m above the ground, bark smooth, dark-brown, with
241 sparse, longitudinal lines of white lenticels (Fig. 1), the crown sparsely branched (Fig. 2). Leafy
242 stems with 3 – 4 leaves per season's growth, terete, internodes (1.2 –) 1.5 – 2.8 (– 4.3) cm long,
243 0.15 – 0.2 cm diam., pale yellow-green, later orangish brown, glabrous. Axillary buds dome-
244 shaped 0.5 – 0.75 x 1 mm, bud-scales numerous, linear, spreading, densely hairy, hairs simple,
245 appressed, c. 0.5 mm long, colourless or red brown. *Leaves* distichous, with punctations (minute
246 translucent glands in the interior of the blade), lacking scent when crushed (collection metadata,

247 *MacKinnon* 51), blades oblanceolate 17.7 – 20.2 (– 23) x (6.4 –) 7 – 7.9 cm, acumen narrowly
248 triangular (0.5 –) 1 – 1.3 cm long, base broadly acute with convex edges, minutely cordate, blade
249 mounted above petiole, margins undulate-sinuous (live & dried), midrib impressed on adaxial
250 surface, inconspicuous, below a groove; on abaxial surface subcylindrical, 1 – 1.2 mm diam.,
251 conspicuous; secondary veins 5 – 8 (– 9) on each side of the midrib, brochidodromous, arising at
252 c. 50° from the midrib, initially straight, then curving in the outer third, uniting with the
253 secondary nerve above to form a looping inframarginal nerve, attaining 3 – 4 mm from the
254 margin; intersecondary nerves sometimes present, tertiary nerves raised, conspicuous, forming a
255 reticulum with cells 4 – 5 mm long, quaternary nerves inconspicuous; glabrous (except in bud
256 when densely orange-brown hairy, hairs c. 0.1 mm long). Petiole stout, shallowly canaliculate, c.
257 4 (– 5) mm long, 1.9 – 2.1 mm diam., narrowing at base and apex, adaxial groove shallow, c. 0.5
258 mm wide, glabrous. *Female inflorescences* unknown. *Male inflorescences* cauliflorous, scattered
259 along the trunk from near ground level to the top of the trunk 2.5 – 3 m above the ground, each 1
260 – 7-flowered (Fig. 1 & 2). Peduncles patent, c. 2 x 2 mm, pale brown, glabrous, bearing sub-
261 umbellate, radiating, 1-flowered partial-peduncles. Partial-peduncles 0.5 – 2 x 0.9 – 1.2 mm,
262 terminating in 1 – 2 bracts subtending a pedicel. Bracts oblong-elliptic, 1.5 x 0.5 – 0.6 mm, apex
263 acute, outer surface about 50% covered in appressed white hairs c. 0.15 – 0.2 mm long, inner
264 surface glabrous. *Male flowers*. Pedicels 1.8 – 2.5 cm long, 0.1 cm diam., articulated with the
265 partial-peduncle, with (0 –) 1 (– 2) scattered, bracteoles in the proximal few mm. Bracteoles
266 similar to the bracts, ovate-oblong, shortly sheathing, (1 –) 1.25 x 1 mm, outer surface with
267 sparse scattered simple appressed translucent hairs 0.05 – 0.2 mm long, buds narrowly ovoid to
268 pyramidal, c.16 x 11 mm. *Sepals* 2, opposite, drying pale brown, reflexed, semi-orbicular, 1 – 1.5
269 x 2.1 – 2.5 mm, glabrous. *Petals* 4, uniseriate, free, thinly leathery, pale, glossy, yellow-green
270 when live (Fig. 1), drying black, lanceolate-oblong, (14 –) 16 x (5.5 –) 9 mm, not fleshy but c.
271 0.25 – 0.3 mm thick, apex rounded, base rounded, outer surface sparsely and inconspicuously
272 hairy, hairs 7 – 9 per mm² (5% of surface covered), simple, translucent, appressed, c. 0.1 mm
273 long, apices rounded. Inner surface of petals smooth, non-tuberculate, with a shallow elliptic-
274 oblong excavation c. 8 x 5 mm, the margin of the excavation raised, the apex with a ridge
275 extending along the midline to the petal apex, glabrous apart from a few scattered erect, minute
276 white hairs 0.05 mm long at the excavation apex. Staminal dome 3.5 – 4 mm long, 3.5 – 4 mm
277 diam., consisting of stamens and a receptacular torus. Stamens shortly cylindrical-angular, c. 0.5
278 x 0.1 (– 0.2) mm, connective with two lateral extrorse longitudinal anther cells, each exceeding
279 the connective. Apical connective appendage absent. Female flowers, fruit and seed unknown.
280 Fig. 1 –3.
281
282 **DISTRIBUTION.** Cameroon, (Fig. 4) endemic to the Ebo Forest of the Littoral Region on
283 present evidence.
284 **HABITAT.** *Uvariopsis dicaprio* is so far only known from lower submontane forest (850 m
285 elev.). below the elevation for the upper montane forest indicator species *Podocarpus latifolius*
286 (Thunb.) R.Br. ex Mirb. The geology is ancient, highly weathered basement complex, with some
287 ferralitic areas in foothill areas which are inland, c. 100 km from the coast. Altitude varies from
288 c. 200 m to 1200 m elevation. The wet season (successive months with cumulative rainfall >100
289 mm) falls between March and November and is colder than the dry season. Average annual
290 rainfall at Bekob measured 2010 – 2016 is 2336 mm (Abwe, Ebo Forest Research Programme,
291 Cameroon pers. comm., Abwe & Morgan 2008, Cheek *et al.,* 2018a).

292   **CONSERVATION STATUS.** *Uvariopsis dicaprio* is currently known from a single specimen
293   with all male flowers at a single location inside the mid-eastern part of the Ebo Forest (Fig. 4).
294   Less than 50 mature individuals have been observed (Bethan Morgan pers. comm. to Cheek,
295   March 2021), despite the species being highly conspicuous in flower (Fig. 1) and situated on a
296   major footpath close to a research camp used by many biologists over the last 15 years.
297   Since 2006, botanical surveys have been mounted almost annually, at different seasons, over
298   many parts of the formerly proposed National Park of Ebo. About 2500 botanical herbarium
299   specimens have been collected, but this species has not yet been seen elsewhere in the c. 2000
300   km² of the Ebo Forest. However, the area outside the two research camps, especially the western
301   edge, has not been fully surveyed for plants. While it is likely that the species will be found at
302   additional sites within the Ebo Forest, there is no doubt that it is genuinely range-restricted as are
303   some other species of *Uvariopsis* in Cameroon (see introduction). Botanical surveys and other
304   plant studies for conservation management in forest areas north, west and east of Ebo resulting in
305   tens of thousands of specimens being collected and identified have failed to find any additional
306   specimens of this species (Cheek *et al.,* 1996; Cable & Cheek 1998; Cheek *et al.,* 2000; Maisels
307   *et al.,* 2000, Harvey *et al.,* 2004; Cheek *et al.,* 2004; Cheek *et al.,* 2010; Harvey *et al.,* 2010;
308   Cheek *et al.,* 2011).
309
310   The area of occupation of *Uvariopsis dicaprio* is estimated as 4 km² using the IUCN preferred
311   cell-size. The extent of occurrence is the same. In February 2020 it was discovered that moves
312   were in place to convert the forest into two logging concessions (e.g.
313   https://www.globalwildlife.org/blog/ebo-forest-a-stronghold-for-cameroons-wildlife/ and
314   https://blog.resourceshark.com/cameroon-approves-logging-concession-that-will-destroy-ebo-
315   forest-gorilla-habitat/ both accessed 12 April 2021). Such logging would result in timber
316   extraction that would open up the canopy and remove the intact habitat in which *Uvariopsis*
317   *dicaprio* is found. Additionally, slash and burn agriculture often follows logging trails and would
318   negatively impact the population of this species. Fortunately the logging concession was
319   suspended in August 2020 due to representations to the President of Cameroon on the global
320   importance of the biodiversity of Ebo
321   (https://www.businesswire.com/news/home/20200817005135/en/Relief-in-the-Forest-
322   Cameroonian-Government-Backtracks-on-the-Ebo-Forest accessed 12 April 2021). However, the
323   forest habitat of this species remains unprotected and threats of logging and conversion of the
324   habitat to plantations remain, and mining is also a threat. *Uvariopsis dicaprio* is therefore here
325   assessed as Critically Endangered, CR B1+2ab(iii), D.
326   **PHENOLOGY.** Flowering has been observed in late March and early April (Bethan Morgan
327   pers. comm. 2021).
328   **ETYMOLOGY.** This threatened and spectacular tree is named for the American actor and
329   conservationist Leonardo DiCaprio, who, through several months in 2020, lobbied extensively
330   on social media (e.g. https://www.instagram.com/p/B_0LSAhFRue/?hl=en ;
331   https://twitter.com/leodicaprio/status/1257729388314943490?lang=en both accessed 12 April
332   2021) to draw attention to threats for the numerous rare Ebo species from the logging concession
333   that had been announced at Ebo earlier that year. The concession was cancelled in August 2020,
334   surely partly due to his efforts.
335   **VERNACULAR NAMES & USES.** None are known.
336   **NOTES.**. The distal half of the petals and the margins of the proximal half are flat, wing-like and
337   held against each other (applanate) in bud. In section therefore, the distal part of the corolla will

338 appear cross-shaped (see Fig. 1). This seems to be an extreme form of the petal structure and
339 pyramidal flower bud shape seen in the probably closely related Cameroonian species *Uvariopsis*
340 *korupenis* and *U. submontana* (see results, above). *Uvariopsis dicaprio* is further distinct from all
341 other species of the genus in that a distinct peduncle is present that bears several branches
342 (partial-peduncles) each of which bears and is articulated with a single pedicel (Fig. 3). Other
343 cauliflorous species of *Uvariopsis* have few to many-flowered fasciculate inflorescences, a
344 peduncle not being observed, the pedicels arising directly from a perennial woody burr. In non-
345 cauliflorous species of *Uvariopsis* the inflorescences consist of a single, axillary flower.
346 It was first intended to name *Uvariopsis dicaprio* as *U. ebo* and this name was used in the
347 bioRxiv pre-print (Gosline *et al,.* 2021: 5). However, such pre-prints have no standing as
348 publications for nomenclatural purposes according to the Code (Turland et al. 2018) because
349 they not intended by the authors as the final publication. Therefore *Uvariopsis ebo* is classed as a
350 *nominum nudum.*
351
Discussion
353 **Pollination biology in *Uvariopsis* and *Uvariopsis dicaprio*.**
354 Unusual and distinctive features of *Uvariopsis dicaprio* within the genus include the colour,
355 shape and texture of the corolla. Bright, glossy, pale yellow-green petals are otherwise unknown
356 in a genus where the petals are otherwise dull shades of pink to purple and brown. Unlike in all
357 other species of the genus known, the petals are not thick and fleshy but thinly leathery. The
358 centre of the proximal half of each petal is concave before anthesis, forming a globose chamber
359 for the staminal dome with the other three petals (Fig. 1). On the inner surface of the petal, the
360 concave area is demarcated by an inverted U-shaped, distinct, raised, broad ridge which seems to
361 be the point of contact with those of the other sepals, sealing the chamber. Such a structure has
362 not been reported or observed in other species of the genus.
363
364 A striking feature of *Uvariopsis dicaprio* is the presentation and colour of the flowers. Of the 14
365 species of the genus in Cameroon, 11 are cauliflorous. All of these except *U. dicaprio* have
366 petals which are shades of pink, red, purple to brown. Cauliflorous *Uvariopsis* species present
367 their flowers more or less perpendicular to the trunk; the flowers of *U. dicaprio* are pendant and
368 with the corolla opening only slightly (see results), and facing the ground (Fig. 1). All species of
369 *Uvariopsis* other than *U. bisexualis* Verdc. are monoecious. The majority of Annonaceae species
370 are protogynous hermaphrodites, most often beetle pollinated, some exhibiting thermogenesis
371 (Gottsberger, 2012). In the monoecious *U. bakeriana* (Hutch. & Dalziel) Robyns & Ghesq. and
372 *U. congolana* (De Wild.) R.E.Fr. the female flowers mature before the male (Gottsberger,
373 Meinke & Porembski, 2011), and our evidence for *U. dicaprio* suggests the same sequence. In
374 *U. submontana, U. korupensis, U. congolana, U. dioica,* and *U. pedunculosa,* the male flowers
375 are higher on the trunk, with the female flowers clustered towards the base of the trunk. In *U.*
376 *dioica* and *U. korupensis* the female pedicels are generally less than 10 cm long and in *U.*
377 *korupensis* the fleshy fruits mature in dense concentrations at the base of the trunk where they
378 can attract ground-dwelling animals.
379 In *Uvariopsis congolana,*(Diels) Robyns & Ghesq. and *U. pedunculosa* (Diels) Robyns & Ghesq.
380 the female globular flowers are born on slender pedicels to c. 50 cm long embedded in the leaf
381 litter. This habit is also exhibited by *Isolona cauliflora* Verdc. Gottsberger, Meinke &
382 Porembski (2011) studied the visitors to *U. pedunculosa* (identified as *U. congolana*) and
383 concluded that pollination likely was by small litter-flies (not beetles). "It is suspected that this

384   predominantly sapromyiophilous species has a pollination system mimicking fungi and/or
385   carcass, and that the pollinating flies normally live on fungi and/or carcass." They also conclude
386   that *U. bakeriana* is pollinated by dung-flies. Mertens *et al.,* (2018) studied *U. dioica* and found
387   minimal visitation by Lepidoptera but more by nocturnal crickets and cockroaches. In all three
388   species of *Uvariopsis* where pollination studies have been done, the researchers have described
389   the pollinators as scarce and unpredictable, and thermogenesis has not been observed.
390   In this context, it seems likely that *U. dicaprio* has found a different pollinator from its sister
391   taxa. The bright pale yellow-green flowers suggest nocturnal pollinators. The similarly glossy,
392   yellow-green flowers of the Asian, widely cultivated ylang-ylang, *Cananga odorata* (Lam.)
393   Hook.f. & Thomson are pollinated by nocturnal moths and small beetles (Parrotta, 2014). We
394   speculate that the flowers of *Uvariopsis dicaprio,* unique in the genus, may also be adapted for
395   moth pollination, otherwise unrecorded in indigenous African Annonaceae (Gottsberger 2012).
396   Concerted field monitoring to observe pollinators is needed during the flowering season of
397   *Uvariopsis dicaprio* to test this hypothesis.
398
399   **The centre of diversity of *Uvariopsis***
400   With the recognition in this paper of *Uvariopsis dicaprio,* 20 species are now accepted in
401   *Uvariopsis* (see introduction). The highest species diversity for any country is found in
402   Cameroon, now with 14 species, and with six of these nationally endemic. However, the
403   biogeographic area with highest species diversity is the much smaller area of the Cross-Sanaga
404   Interval which includes 12 species, of which five are globally endemic including *Uvariopsis*
405   *dicaprio*. The Cross-Sanaga Interval appears to be the main centre of diversity of *Uvariopsis.*
406   Numerous other plant genera have their centre of diversity in the interval (Cheek *et al.,* 2001)
407   and some are endemic to it, e.g. *Medusandra* Brenan (Peridiscaceae formerly Medusandraceae,
408   Breteler *et al.,* (2015), Soltis *et al.,* (2007)). The fleshy orange-red fruits of *Uvariopsis* are
409   consumed by primates, which are thought to disperse their seeds (Dominy & Duncan, 2005). The
410   high level of endemism of *Uvariopsis* species to the Cross River Interval may therefore be linked
411   to the high number of primate species that are also endemic to the interval, bounded by the rivers
412   Cross and Sanaga that represent barriers to primates. Ten species of primate are confined to the
413   Interval (Kingdon 2015).
414
415   **The range of *Uvariopsis dicaprio* and other endemic species in the Ebo Forest area.**
416   Abwe & Morgan, (2008) and Cheek *et al.* (2018a) give overviews of habitats, species and the
417   importance for conservation of the highly threatened Ebo Forest to which *Uvariopsis dicaprio* is
418   restricted on current evidence. Sixty-eight globally threatened plant species are currently listed
419   from Ebo on the IUCN Red List website (iucnredlist.org/ accessed 12 April 2021) and the
420   number is set to rise rapidly as more of Cameroon's rare species are assessed for their
421   conservation status as part of the Cameroon TIPAs programme. The discovery of a new species
422   to science at the Ebo Forest is not unusual. Numerous new plant species have been published
423   from Ebo in recent years. Examples of other species that, like *Uvariopsis dicaprio,* appear to be
424   strictly endemic to the Ebo area on current evidence are presented in Table 2:
425
426   With the exception of *Crateranthus cameroonensis* Cheek & Prance which is widespread over a
427   large part of eastern Ebo, each of the eight species listed have on current evidence, a single small
428   discreet range of no more than 8 km^2 (usually far smaller) within the Ebo Forest area (see the
429   references cited in Table 2). These species are not concentrated together in one or several spots

430   but are scattered from the far West to the East of the forest, none of the species, apart from the
431   *Crateranthus,* sympatric with any of the others.

432

433   Further species described from Ebo have proved not to be endemic but to have also been found
434   further west, in the Cameroon Highlands, particularly at Mt Kupe and the Bakossi Mts (Cheek *et*
435   *al.,* 2004). Examples are *Gilbertiodendron ebo* Burgt & Mackinder, *Myrianthus fosi* Cheek
436   (Harvey *et al.,* 2010), *Salacia nigra* Cheek (Gosline & Cheek 2014) and *Talbotiella ebo*
437   Mackinder & Wieringa (Mackinder *et al.,* 2010).
438   Additionally, several species initially thought endemic to Mt Kupe and the Bakossi Mts and
439   adjoining areas in the Cameroon Highlands have subsequently been found at Ebo, e.g. *Coffea*
440   *montekupensis* Stoff. (Stoffelen *et al.,* 1997), *Costus kupensis* Maas & H. Maas (*Maas-van der*
441   *Kamer et al.,* 2016)*, Deinbollia oreophila* Cheek (Cheek & Etuge 2009), *Microcos magnifica*
442   Cheek (Cheek 2017), and *Uvariopsis submontana* Kenfack, Gosline & Gereau (Kenfack *et al.,*
443   2003). It is considered likely that additional Kupe species may yet be found at Ebo such as
444   *Brachystephanus kupeensis* I.Darbysh. (Champluvier & Darbyshire 2009), and *Impatiens frithii*
445   Cheek (Cheek & Csiba 2002) since new discoveries are still frequently being made in the Ebo
446   Forest. Therefore, it is possible that *Uvariopsis dicaprio* might yet also be found in the
447   Cameroon highlands, e.g., at Mt Kupe. However, this is thought to be only a relatively small
448   possibility given the high level of survey effort at Mt Kupe: if it occurred there, it is highly likely
449   that it would have been recorded already since it is so spectacular when in flower that it would be
450   difficult to overlook.

451

Conclusions

453   Such discoveries as this new species underline the urgency for making further such discoveries
454   while it is still possible since in all but one of the cases given above, the species have very
455   narrow geographic ranges and/or very few individuals, and face threats to their natural habitat,
456   putting these species at high risk of extinction.

457

458   About 2000 new species of vascular plant have been discovered each year for the last decade or
459   more. Until species are known to science, they cannot be assessed for their conservation status
460   and the possibility of protecting them is reduced (Cheek *et al.,* 2020). Documented extinctions of
461   plant species are increasing, e.g. *Oxygyne triandra* Schltr. and *Afrothismia pachyantha* Schltr. of
462   South West Region, Cameroon are now known to be globally extinct (Cheek & Williams 1999,
463   Cheek *et al.,* 2018c, Cheek *et al.,* 2019). In some cases, species appear to be extinct even before
464   they are known to science, such as *Vepris bali* Cheek, also from the Cross-Sanaga interval in
465   Cameroon (Cheek *et al.,* 2018d) and elsewhere, *Nepenthes maximoides* Cheek (King & Cheek,
466   2020). Most of the 815 Cameroonian species in the Red Data Book for the plants of Cameroon
467   are threatened with extinction due to habitat clearance or degradation, especially of forest for
468   small-holder and plantation agriculture following logging (Onana & Cheek, 2011). Efforts are
469   now being made to delimit the highest priority areas in Cameroon for plant conservation as
470   Tropical Important Plant Areas (TIPAs) using the revised IPA criteria set out in Darbyshire *et*
471   *al.,* (2017). This is intended to help avoid the global extinction of additional endemic species
472   such as *Uvariopsis dicaprio* which will be included in the proposed Ebo Forest IPA.
473   With only one locality known, *Uvariopsis dicaprio* represents another narrowly endemic
474   Cameroonian species threatened with extinction due to deforestation for oil palm plantations,

475   small-scale agriculture, mining and logging, widespread threats posing extinction risks to plant
476   species in Cameroon (Onana & Cheek 2011, Cheek *et al.,* 2018a).
477

Acknowledgements

479   This paper was completed as part of the Cameroon TIPAs (Tropical Important Plant Areas)
480   project at RBG, Kew, which is supported by Players of People's Postcode Lottery. Formal
481   redlisting of this species will be supported by the John S. Cohen Foundation. Ekwoge Abwe and
482   Bethan Morgan and their team at the Ebo Forest programme are thanked hugely for making
483   available the specimen and photos on which this paper is based and for expediting our botanical
484   surveys in the Ebo Forest of Cameroon over several years which allowed us to give context
485   about the Ebo Forest in this paper. San Diego Zoo Wildlife Alliance are thanked for facilitating
486   use of the photos. We thank Janis Shillito for typing the manuscript and Megan Griffiths for
487   drawing Figure 3. The heads of IRAD (Institute of Research in Agronomic Development)-
488   National Herbarium of Cameroon, Yaoundé, successively Jean-Michel Onana, Florence Ngo
489   Ngwe, Eric Nana and Jean Betti Lagarde, are thanked for co-ordinating the co-operation with the
490   Royal Botanic Gardens, Kew. The authors would like to thank anonymous reviewers for
491   comments on an earlier version of this manuscript.
492
493

References

495   Abwe EE, Morgan BJ. 2008. The Ebo Forest: four years of preliminary research and
496   conservation of the Nigeria-Cameroon chimpanzee (*Pan troglodytes vellerosus*). *Pan Africa*
497   *News* 15: 26–29. DOI: 10.5134/143494.

498   Alvarez MG, Cheek M, Sonké B. 2021. *Kupeantha yabassi* (Coffeeae-Rubiaceae), a new
499   Critically Endangered shrub species of the Ebo Forest area, Littoral Region, Cameroon. *Kew*
500   *Bulletin*. *In press.*

501   Barthlott W, Lauer W, Placke A. 1996. Global distribution of species diversity in vascular plants:
502   towards a world map of phytodiversity. *Erkunde* 50: 317–328.

503   Beentje H, Cheek M. 2003. *Glossary*. Balkema, Lisse, Netherlands.

504   Breteler FJ, Bakker FT & Jongkind CC. 2015. A synopsis of *Soyauxia* (Peridiscaceae, formerly
505   Medusandraceae) with a new species from Liberia. *Plant Ecology and Evolution*. 148(3), 409 –
506   419. https://doi.org/10.5091/plecevo.2015.1040
507
508   Bridson DM, Forman L. 1998. *Herbarium handbook.* Richmond: Royal Botanic Gardens, Kew.

509   Cable S, Cheek M. 1998. *The Plants of Mt Cameroon, a Conservation Checklist*. Richmond:
510   Royal Botanic Gardens, Kew.

511 Champluvier D, Darbyshire I. 2009. revision of the genera *Brachystephanus* and *Oreacanthus*
512 (Acanthaceae) in tropical Africa. *Systematics and Geography of Plants* 79: 115–192. DOI:
513 10.2307/25746.

514 Chatrou LW, Pirie MD, Erkens RH, Couvreur TL, Neubig KM, Abbott JR, Mols JB, Maas JW,
515 Saunders RM, Chase MW. 2012. A new subfamilial and tribal classification of the pantropical
516 flowering plant family Annonaceae informed by molecular phylogenetics. *Botanical Journal of*
517 *the Linnean Society*. 169(1): 5-40.

518 Cheek M. 2017. *Microcos magnifica* (Sparrmanniaceae) a new species of cloud forest tree from
519 Cameroon. DOI: 10.7717/peerj.4137.

520 Cheek M, Achoundong G, Onana J-M, Pollard B, Gosline G, Moat J, Harvey YB. 2006.
521 Conservation of the Plant Diversity of Western Cameroon. In: Ghazanfar SA, H.J. eds.
522 *Proceedings of the 17th AETFAT Congress, Addis Ababa*. Ethiopia, 779–791.

523 Cheek M, Alvarez-Aguirre MG, Grall A, Sonké, B, Howes MJR, Larridon I. 2018b. *Kupeantha*
524 (Coffeeae, Rubiaceae), a new genus from Cameroon and Equatorial Guinea. *PLoS ONE* 13:
525 0199324. DOI: 10.1371/journal.pone.0199324.

526 Cheek M, Cable S, Hepper FN, Ndam N, Watts J. 1996. Mapping plant biodiversity on Mt. In:
527 Maesen, Burgt, Rooy eds. *The Biodiversity of African Plants (Proceedings XIV AETFAT*
528 *Congress*. Cameroon: Kluwer, 110–120. DOI: 10.1007/978-94-009-0285-5_16.

529 Cheek M, Csiba L. 2002. A new epiphytic species of *Impatiens* (Balsaminaceae) from western
530 Cameroon. *Kew Bulletin* 57: 669–674. DOI: 10.2307/4110997.

531 Cheek M, Etuge M. 2009. A new submontane species of *Deinbollia* (Sapindaceae) from Western
532 Cameroon and adjoining Nigeria. *Kew Bulletin* 64: 503–508. DOI: 10.1007/s12225-009-9132-4.

533 Cheek M, Etuge M, Williams S. 2019. *Afrothismia kupensis* sp. nov. (Thismiaceae), Critically
534 Endangered, with observations on its pollination and notes on the endemics of Mt Kupe,
535 Cameroon. *Blumea - Biodiversity, Evolution and Biogeography of Plants* 64: 158–164.

536 Cheek M, Feika A, Lebbie A, Goyder D, Tchiengue B, Sene O, Tchouto P, Burgt X. 2017. A
537 synoptic revision of *Inversodicraea* (Podostemaceae. *Blumea* 62: 125–156. DOI:
538 10.3767/blumea.2017.62.02.07.

539 Cheek M, Gosline G, Onana J-M. 2018d. *Vepris bali* (Rutaceae), a new critically endangered
540 (possibly extinct) cloud forest tree species from Bali Ngemba, Cameroon. *Willdenowia* 48: 285–
541 292. DOI: 10.3372/wi.48.48207.

542 Cheek M, Harvey YB, Onana J-M. 2010. *The Plants of Dom*. Bamenda Highlands, Cameroon: A
543 Conservation Checklist. Richmond: Royal Botanic Gardens, Kew.Cheek M, Harvey Y, Onana J-
544 M. 2011. *The Plants of Mefou Proposed National Park*. Yaoundé, Cameroon: A Conservation
545 Checklist. Richmond: Royal Botanic Gardens, Kew.

546 Cheek M, Luke WRQ, Gosline G. 2021a. *Lukea* gen. nov. (Monodoreae-Annonaceae) with two
547 new threatened species of shrub from the forests of the Udzungwas, Tanzania & Kaya Ribe,
548 Kenya. bioRxiv (pre-print). https://doi.org/10.1101/2021.05.14.444227

549 Cheek M, Mackinder B, Gosline G, Onana J-M, Achoundong G. 2001. The phytogeography and
550 flora of western Cameroon and the Cross River-Sanaga River interval. *Systematics and
551 Geography of Plants* 71: 1097–1100. DOI: 10.2307/3668742.

552 Cheek M, Nic Lughadha E, Kirk P, Lindon H, Carretero J, Looney B, Douglas B, Haelewaters
553 D, Gaya E, Llewellyn T, Ainsworth M, Gafforov Y, Hyde K, Crous P, Hughes M, Walker BE,
554 Forzza RC, Wong KM, Niskanen T. 2020. New scientific discoveries: plants and fungi. *Plants,
555 People Planet* 2: 388. DOI: 10.1002/ppp3.10148.

556 Cheek M, Onana JM, Chapman HM. 2021. The montane trees of the Cameroon Highlands,
557 West-Central Africa, with *Deinbollia onanae* sp. nov. (Sapindaceae), a new primate-dispersed,
558 Endangered species. *PeerJ* 9:e11036 https://doi.org/10.7717/peerj.11036
559

560 Cheek M, Onana J-M, Pollard BJ. 2000. *The Plants of Mount Oku and the Ijim Ridge,
561 Cameroon, a Conservation Checklist*. Kew: Royal Botanic Gardens, Kew.

562 Cheek M, Pollard BJ, Darbyshire I, Onana J-M, Wild C. 2004. *The Plants of Kupe, Mwanenguba
563 and the Bakossi Mountains*. Cameroon: A Conservation Checklist. Richmond: Royal Botanic
564 Gardens, Kew.

565 Cheek M, Prenner G, Tchiengué B, Faden RB. 2018a. Notes on the endemic plant species of the
566 Ebo Forest, Cameroon, and the new, Critically Endangered, *Palisota ebo* (Commelinaceae. *Plant
567 Ecology & Evolution* 151: 434–441. DOI: 10.5091/plecevo.2018.1503.

568 Cheek M, Tchiengué B, van der Burgt X. 2021b. *Taxonomic revision of the threatened African
569 genus Pseudohydrosme Engl*. DOI: 10.7717/peerj.10689.

570 Cheek M, Tsukaya H, Rudall PJ, Suetsugu K. 2018c. Taxonomic monograph of *Oxygyne*
571 (Thismiaceae), rare achlorophyllous mycoheterotrophs with strongly disjunct distribution.

572 Cheek M, Williams S. 1999. A Review of African Saprophytic Flowering Plants. In: Timberlake,
573 Kativu eds. *African Plants. Biodiversity, Taxonomy & Uses. Proceedings of the 15th AETFAT
574 Congress at Harare*. Zimbabwe, 39–49.

575 Cheek M, Xanthos M. 2012. *Ardisia ebo* sp. nov. (Myrsinaceae), a creeping forest subshrub of
576 Cameroon and Gabon. *Kew Bull* 67: 281–284. DOI: 10.1007/s12225-012-9362-8.

577 Couch C, Cheek M, Haba PM, Molmou D, Williams J, Magassouba S, Doumbouya S, Diallo
578 YM. 2019. *Threatened habitats and Important Plant Areas (TIPAs) of Guinea, west Africa.*
579 Royal Botanic Gardens, Kew. London.

580 Couvreur TLP, Dagallier L-PMJ, Crozier F, Ghogue J-P, Hoekstra PH, Kamdem NG, Johnson
581 DM, Murray N, Sonké B.. *in press.* Flora of Cameroon – Annonaceae. *Phytokeys*

582 Couvreur TL, Luke WRQ. 2010. A new species of *Uvariopsis* (Annonaceae), endemic to the
583 Eastern Arc Mountains of Tanzania. *Blumea-Biodiversity, Evolution and Biogeography of Plants*
584 55: 68–72.

585 Couvreur TL, Niangadouma R. 2016. New species of *Uvariopsis* (Annonaceae) and
586 *Laccosperma* (Arecaceae/Palmae) from Monts de Cristal, Gabon. *PhytoKeys* 1:8.

587 Dagallier LP, Janssens SB, Dauby G, Blach-Overgaard A, Mackinder BA, Droissart V, Svenning
588 JC, Sosef MS, Stévart T, Harris DJ, Sonké B. 2020. Cradles and museums of generic plant
589 diversity across tropical Africa. *New Phytologist* 225(5):2196-213.

590 Darbyshire I, Anderson S, Asatryan A, Byfield A, Cheek M, Clubbe C, Ghrabi Z, Harris T,
591 Heatubun CD, Kalema J, Magassouba S, McCarthy B, Milliken W, Montmollin B de, Nic
592 Lughadha E, Onana JM, Saıdou D, Sarbu A, Shrestha K, Radford EA. 2017. Important Plant
593 Areas: revised selection criteria for a global approach to plant conservation. *Biodiversity*
594 *Conservation* 26:1767–1800. DOI: 10.1007/s10531-017-1336-6.

595 Dominy NJ, Duncan BW. 2005. Seed-spitting Primates and the Conservation and Dispersion of
596 Large-seeded Trees. *International Journal of Primatology* 26:631–649. DOI: 10.1007/s10764-
597 005-4370-2.

598 Gereau RE, Kenfack D. 2000. Le genre *Uvariopsis* (Annonaceae) en Afrique tropicale, avec la
599 description d'une espèce nouvelle du Cameroun. *Adansonia* ser. 3, 22: 39–43.

600 Gosline G, Cheek M, Kami T. 2014. Two new African species of *Salacia* (Salacioideae,
601 Celastraceae. *Blumea* 59:26–32. DOI: 10.3767/000651914x682026.

602 Gosline G, Cheek M, Onana J-M, Ngansop E, van der Burgt X, Dagallier L-PJM. 2021.
603 *Uvariopsis ebo* (Annonaceae) a new, Critically Endangered tree species from the Ebo Forest, Cameroon
604 and a key to the Cameroonian species of *Uvariopsis.* BioRxiv (pre-print)
605 DOI: https://doi.org/10.1101/2021.03.26.437154

606 Gottsberger G, Meinke S, Porembski S. 2011. First records of flower biology and pollination in
607 African Annonaceae*: Isolona, Piptostigma, Uvariodendron, Monodora* and *Uvariopsis*. *Flora -*

608 *Morphology, Distribution, Functional Ecology of Plants* 206:498–510. DOI:
609 10.1016/j.flora.2010.08.005.

610 Gottsberger G. 2012. How diverse are *Annonaceae* with regard to pollination? *Botanical Journal*
611 *of the Linnean Society* 169:245–261. DOI: 10.1111/j.1095-8339.2011.01209.x.

612 Guo X, Tang CC, Thomas DC, Couvreur TL, Saunders RM. 2017. A mega-phylogeny of the
613 Annonaceae: taxonomic placement of five enigmatic genera and support for a new tribe,
614 Phoenicantheae. *Scientific Reports.* 7(1):1-1.

615 Harvey YB, Pollard BJ, Darbyshire I, Onana J-M, Cheek M. 2004. *The Plants of Bali Ngemba*
616 *Forest Reserve*. Cameroon: A Conservation Checklist. Richmond: Royal Botanic Gardens, Kew.

617 Harvey YB, Tchiengue B, Cheek M. 2010. The plants of the Lebialem Highlands, a conservation
618 checklist. Richmond: Royal Botanic Gardens, Kew.

619 IPNI continually updated. *The International Plant Names Index.* The Royal Botanic Gardens, Kew,
620 Harvard University Herbaria & Libraries and Australian National Botanic Gardens. Available at
621 http://www.ipni.org (accessed 29 April 2021).

622 IUCN 2012. *IUCN red list categories: Version 3.1.* Gland, Switzerland and Cambridge, U.K:
623 IUCN Species Survival Commission.

624 Kamer H, Maas PJM, Wieringa JJ, Specht CD. 2016. Monograph of African *Costus. Blumea -*
625 *Biodiversity, Evolution and Biogeography of Plants* 61: 280–318. DOI:
626 10.3767/000651916X694445.

627 Kenfack D, Gosline G, Gereau RE, Schatz G. 2003. The genus *Uvariopsis* in Tropical Africa,
628 with a recombination and one new species from Cameroon. *Novon* 13: 443–449. DOI:
629 10.2307/3393377

630 King C, Cheek M. 2020. *Nepenthes maximoides* (Nepenthaceae) a new, critically endangered
631 (possibly extinct) species in species Sect. *Alatae* from Luzon, Philippines showing striking
632 pitcher convergence with *N. maxima* (Sect. Regiae) of Indonesia. DOI: 10.7717/peerj.9899.

633 Kingdon J. 2015. *The Kingdon field guide to African mammals*. Bloomsbury Publishing.

634 Mackinder BA, Wieringa JJ, Burgt XM. 2010. A revision of the genus *Talbotiella* Baker f.
635 (Caesalpinioideae: Leguminosae). *Kew Bulletin* 65: 401–420. DOI: 10.1007/s12225-010-9217-0.

636 Maisels FM, Cheek M, Wild C. 2000. Rare plants on Mt Oku summit, Cameroon. *Oryx* 34: 136–
637 140. DOI: 10.1017/s0030605300031057.

638 Mertens J, Tropek R, Foryuy F, Maicher V, Janeček S. 2018. Communities of flower visitors of
639 *Uvariopsis dioica* (Annonaceae) in lowland forests of Mt. Cameroon, with notes on its potential
640 pollinators. *African Journal of Ecology* 56:146–152. DOI: 10.1111/aje.12429

641 Onana J-M. 2011. *The vascular plants of Cameroon, a taxonomic checklist with IUCN*
642 *Assessments*. Richmond: Royal Botanic Gardens, Kew.

643 Onana J-M, Cheek M. 2011. *Red data book of the flowering plants of Cameroon, IUCN global*
644 *assessments*. Richmond: Royal Botanic Gardens, Kew.

645 Parrotta JA. 2014. *Cananga odorata,* in Roloff A, Weisgerber H, Lang UM, Stimm B, Schütt P.
646 (eds). *Enzyklopädie der Holzgewächse: Handbuch und Atlas der Dendrologie.* Wiley-VCH
647 Verlag GmbH & Co.

648 Prance GT, Jongkind CCH. 2015. A revision of African Lecythidaceae. *Kew Bulletin* 70: 6: 13.
649 DOI: 10.1007/s12225-014-9547-4.

650 Soltis DE, Clayton JW, Davis CC, Wurdack KJ, Gitzendanner MA, Cheek M, Savolainen V,
651 Amorim AM, Soltis PS. 2007. Monophyly and relationships of the enigmatic family
652 *Peridiscaceae. Taxon* 56: 65-73.

653 Sosef MSM, Wieringa JJ, Jongkind CCH, Achoundong G, Azizet Issembé Y, Bedigian D, Van
654 Den Berg RG, Breteler FJ, Cheek M, Degreef J. 2005. Checklist of Gabonese Vascular Plants.
655 *Scripta Botanica Belgica* 35.

656 Stoffelen P, Cheek M, Bridson D, Robbrecht E. 1997. A new species of *Coffea* (Rubiaceae) and
657 notes on Mt Kupe (Cameroon. *Kew Bulletin* 52: 989–994. DOI: 10.2307/3668527.

658 Thiers B. continuously updated. Index Herbariorum: A global directory of public herbaria and
659 associated staff. *New York Botanical Garden's Virtual Herbarium*. Available at
660 http://sweetgum.nybg.org/ih/ (accessed June 2021).

661

662 Turland NJ, Wiersema JH, Barrie FR, Greuter W, Hawksworth DL, Herendeen PS, Knapp S,
663 Kusber W-H, Li D-Z, Marhold K, May TW, McNeill J, Monro AM, Prado J. Price MJ, Smith
664 GF. (ed.) 2018**. *International Code of Nomenclature for algae, fungi, and plants (Shenzhen*
665 *Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017.–*
666 Glashütten: Koeltz Botanical Books. [= Regnum Veg. **159**].
667
668 van Heusden ECH. 1992. Flowers of Annonaceae: morphology, classification, and evolution.
669 *Blumea* Supplement 7: 1-218.

670

Figure 1

Uvariopsis dicaprio.

Cauliflorous inflorescences on trunk. Photo Lorna MacKinnon.

Figure 2

Uvariopsis dicaprio

Trunk apex with cauliflorous flowers and canopy. Photo Lorna MacKinnon.

Figure 3

Uvariopsis dicaprio

A habit, cauliflorous inflorescences on trunk; **B** leafy branch, one season's growth; **C** inflorescence, showing pedicel articulations, bracts and bracteoles; **D** flowers, with one petal folded back to show the staminal dome; **E** detail of sparse hairs on abaxial petal surface; **F** stamen, side view; **G** junction of base of leaf with stem, showing dome-like axillary bud. All drawn from *MacKinnon* 51 (K) by MEG GRIFFITHS.

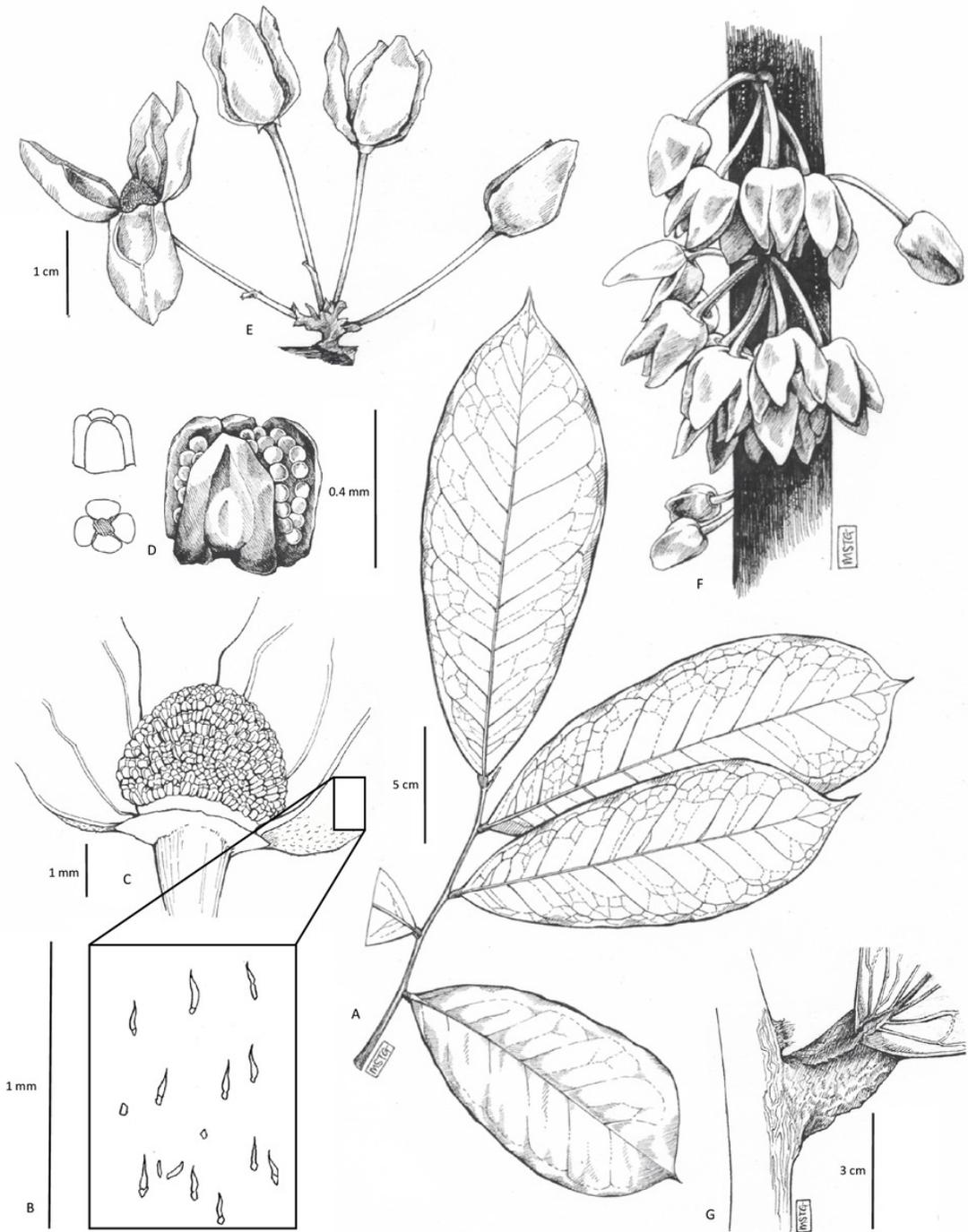
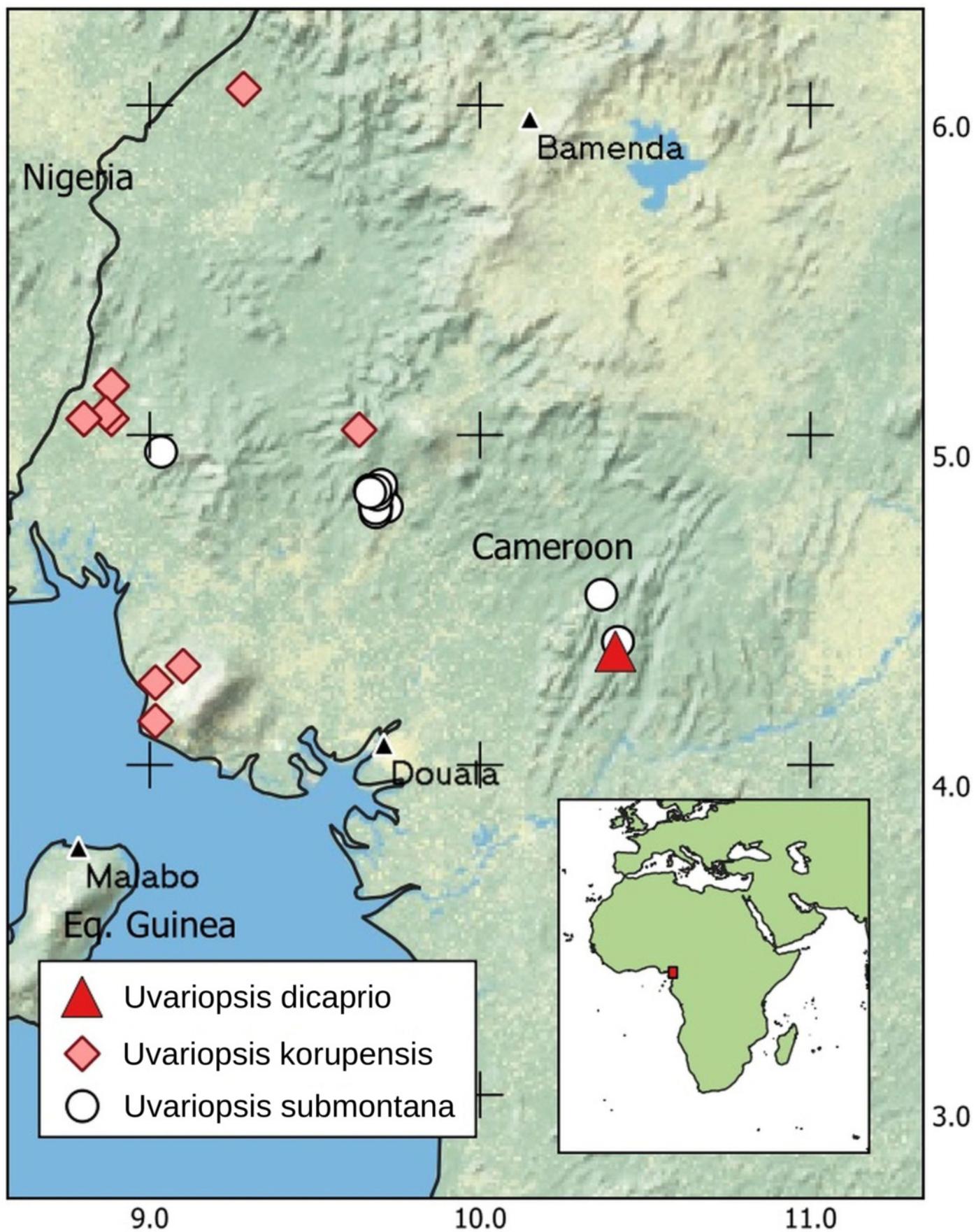



Figure 4

Global Distribution of *Uvariopsis dicaprio, together* with *U. korupensis* and *U. submontana*

Differential characters separating *Uvariopsis dicaprio, U solheidii, U. korupensis* and *U.submontana.*

Data for *Uvariopsis solheidii* taken mainly from Couvreur *et al.* (2021) and Cheek *et al.* (2011), for *Uvariopsis korupensis* Gereau & Kenfack (2000), and for *Uvariopsis submontana* (Kenfack et al. 2003).

Character	*Uvariopsis solheidii*	*Uvariopsis dicaprio*	*Uvariopsis korupensis*	*Uvariopsis submontana*
Indumentum of stem, petiole and abaxial midrib	Tomentose	Glabrous	Appressed pubescent	Appressed pubescent
Leaf-blade dimensions (cm)	16.6 – 29 x 5 – 9.5	17.7 – 20.3 (– 23) x (6.4 –) 7 – 7.9	30 – 52 x 9 – 14	6 – 38 x 5 – 11
Number of secondary nerves on each side of midrib	8 – 13	5 – 8 (– 9)	13-20	9 – 18
Number of flowers per inflorescence	1 – 3	(1 –)4 – 7	2 – 3	6 – 50
Flower shape (mature bud)	Ovoid-conic	Ovoid-conic to pyramidal	Ovoid-conic to pyramidal	Ovoid-conic to pyramidal
Petal colour	Wine brown	Yellow-green	Pink-purple	Pink-Purple
Petal dimensions (mm)	7 – 10 x 2.5 – 5	(14 –)16 x (5.5 –) 9	10 – 25 x 5 – 10	7 – 15 x 5 – 7
Petal texture	Thick, fleshy	Thin, leathery	Thick, fleshy	Thick, fleshy
Inner surface petals	Tuberculate?	Smooth	Tuberculate	Tuberculate
Outer surface petals	Appressed-pubescent	Mostly naked, hairs few, widely scattered	Appressed-pubescent	Appressed-pubescent
Petals at base	Free	Free	United	United

Plant species globally endemic on current evidence to the area of the Ebo forest, Littoral, Cameroon.

Extinction risk assessment (IUCN Red List status from iucnredlist.org/ accessed 12 April 2021).

Species name	Family	Reference	Habit	IUCN status
Ardisia ebo Cheek	Primulaceae	Cheek & Xanthos (2012)	Herb	Critically Endangered
Crateranthus cameroonensis Cheek & Prance	Lecythidaceae	Prance & Jongkind (2015)	Tree	Critically Endangered
Inversodicraea ebo Cheek	Podostemaceae	Cheek *et al.* (2017)	Rheophyte	Critically Endangered
Kupeantha ebo M.Alvarez & Cheek	Rubiaceae	Cheek *et al.* (2018b)	Small tree	Critically Endangered
Kupeantha yabassi M.Alvarez & Cheek	Rubiaceae	Alvarez *et al.* (2021)	Shrub	Critically Endangered (provisional)
Palisota ebo Cheek	Commelinaceae	Cheek *et al.* (2018a)	Herb	Critically Endangered
Pseudohydrosme ebo Cheek	Araceae	Cheek *et al.* (2021)	Herb	Critically Endangered (provisional)
Uvariopsis dicaprio Cheek & Gosline	Annonacaeae	This paper	Tree	Critically Endangered (provisional)