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Two new citations of Orchidaceae for Togo flora: *Microcoelia macrorhynchia* (Schltr.) Summerh. & *Tridactyle filifolia* (Schltr.) Schltr.

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Abstract
The floristic inventory carried out in the southernmost part of the Monts Togo over the last two years (2016-2018) has made it possible to identify two new species for the Togolese flora. *Microcoelia macrorhynchia* (Schltr.) Summerh. and *Tridactyle filifolia* (Schltr.) Schltr., thus increasing diversity to four for the genus Tridactyle and two for the genus Microcoelia. These two epiphytic species have been discovered on the Danyi uplands and in the Litimé plain in ecological zone IV, one of Togo's most threatened biodiversity hotspots. These two new citations bring the national diversity of Orchidaceae to 92 species.

Keywords: *Microcoelia*, *Tridactyle*, Orchidaceae, biodiversity, Togo

1. Introduction
The Togolese flora has been explored by botanists since colonial eras and accentuated since the founding of the University of Lomé. The synthesis of these works made it possible to edit the analytical flora of Togo in 1984 by Brunel and collaborators. Since then, Togo's flora has has seen several additions in terms of new species: 188 species (Akpagana *et al*., 1994) [4], 87 species (Adjossou, 2009) [2], 4 species (Woegan, 2013) [14], 103 species (Radji *et al*., 2013) [10], 1 species (Abotsi *et al*., 2015) [1]. These new citations coming from the research work of national botanists, cover the major plant groups such as Spermaphyta, Pteridophyta, Phycophyta and Bryophyta. The current status of knowledge of Togo's florais far from being mastered and remains an area to be deepened (Radji, 1997, Kokou 1998, Kokou *et al*., 1999, Kokou *et al*., 2000) [11, 7, 8, 9, 10]. The two new references presented in this study belong to the genera widely used in West Africa. This includes Microcoelia, the largest genus of aphyllous plants in Africa. It contains 41 species, of which 30 have valid systematic names according to the plant list (2013). First described by John Lindley in 1830, Microcoelia is derived from the Greek words "mikros" (small) and "koilia" (abdomen), referring to the globular outcrop of *Microcoelia exilis*, the type species of the genus. Moreover, the genus *Tridactyle*, widely distributed in the tropical zone, was originally described by Rudolf Schlechter in 1914. This genus includes 47 species (The plant list, 2013) that have scientifically valid names. In recent studies, the presence of these two genera has been reported in ecological zone IV but the last herbarium collections of them in Togo national herbarium date back to 1983 and the numerous botanical surveys carried out in this zone reveal very little data on the Orchidaceae family. This area, which is a biodiversity hotspot in Togo, is now highly anthropized and relict forest islands continue to be converted into coffee / cocoa plantations or food fields (Adjossou 2009, Soussou 2009) [2, 12].
The purpose of this work is to complete the inventory of floristic diversity in Togo and to increase data on the diversity of the Orchidaceae family. This study is a first step in a vast programme designed for the entire national territory.

2. Methodology
2.1 Geographic location
Called by Ern (1979) Ecological Zone IV (EZ IV), the area of this study is located in the southern part of the Togo Mountains between 6 °15 and 8°20 North latitude and 0°30 and 1°00 East longitude. With an area of 4,620 km² (Fig: 1), it is limited to the South and East by Ecological Zone III (Central Plain Zone) to the North by Ecological Zone II (Northern Mountain zone), and to the West by Ghana.

2.2 Data collection
2.2.1 Floristic inventory
The method used in the floristic inventory was random sampling.
The harvests was carried out in all directions and the different formations taken into account were: semi-deciduous forest, savannah, plantations, summer fallows, agro forests and gallery forests.

2.2.2 Identification
The scientific identification of the harvested species was carried out using the flora of Brunel *et al*. (1984) [5] and Akoegninou *et al*. (2006) [3] and confirmed using the herbarium collections of GBIF www.gbif.org) and Droissart (www.orchid -africa.net).

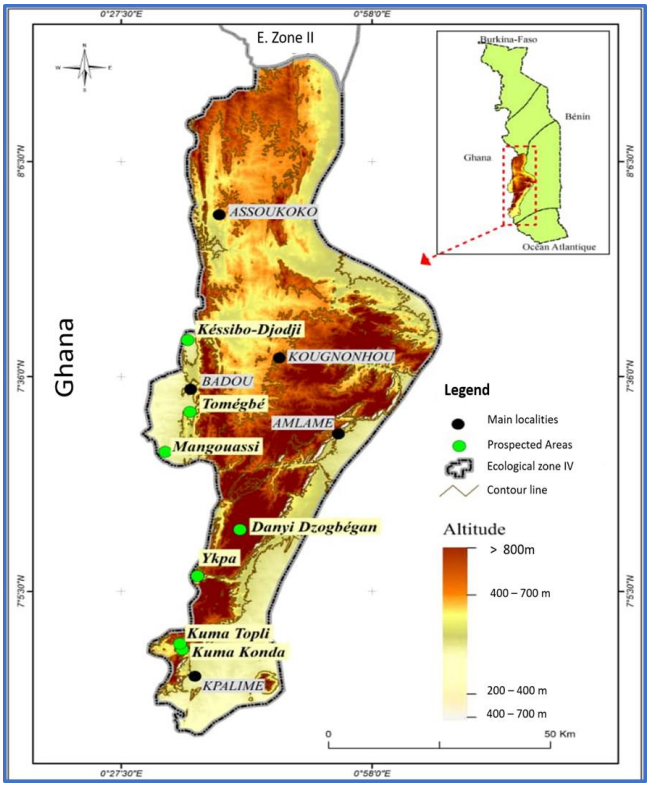

Fig 1: Location of the study area. Source: Global Mapper (SRTM Plateaux)

3. Results and Discussions

3.1 *Microcoelia macrorhynchia* (Schltr.) Summerh.

3.1.1 Description and Geographic Distribution

a) Material

TOGO15460, collection Sodjinou, Koda, sample No. 580 of the National Herbarium of the University of Lome-Togo, harvested on 26/07/2018; WAG.1138072, J.J. Wieringa collection, R. M. A. P. Haegens, sample No. 2165 from Cameroon, harvested on 10/02/1994; WAG.1138076, F.M. Van Der Laan collection sample No. 413 from DR Congo harvested on 21/09/1981; P00388791, collection Dr. Perez-Vera, sample No. 635 from Ivory Coast harvested on 11/01/1974; MNHN-P-P00388789, W. Sanford collection, sample No. 5764 from Nigeria harvested on 13/02/1969; WAG.1138077, J. Bokdam collection, sample No. 2826 from Côte d'Ivoire, harvested on 14/06/1968; WAG.1138074, H. Breyne collection, sample No. 322 from the DR Congo harvested on 28/08/1966; BM000539890, George Latimer Bates collection, sample No. 1429 from Cameroon; MNHN-P-P00388790, collection H. Pobéguin from Gabon harvested in 1913.

b) Taxonomic Description

Microcoelia macrorhynchia (Schltr.) Summerh. (Fig: 2) is an herbaceous epiphytic plant with a short stem and few smooth and slightly flattened roots. The leaves are reduced to acuminate scales. Inflorescence erect or suspended can contain up to 20 flowers. The flowers are whitish with a yellow-green patch at the base of the lip, the spur is brownish. The dorsal sepal is acute; asymmetrical lateral sepals, ovate with curved apex. The petals are also asymmetrical, oval, obtuse or subacute. The label is lobed to a more or less semicircular contour, toothed with margins finely cut, bent and folded at the top.

Fig 2: Different stages of maturity of *Mcrocoelia macrorhynchia* flowers: (A and B: blooming shapes of the feathers, C: feathers in the juvenile state (flower buds), D: old flowers and beginning of fruit formation).

c) Distribution

This species has been reported in Cameroon, Central African Republic, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Democratic Republic of Congo, Togo, Uganda and Zambia.

It is a widespread species mainly in dense humid forests, gallery forests but also in secondary forests and plantations. It is often found on small branches, exposed to light or sunlight. The average altitude of distribution is from 200 to 1100m. Microcoelia is one of the largest genera of African Aphyllus Orchid, yet *Microcoelia macrorhynchia* is only reported in 11 countries. This present signaling extends its range to 12 countries including Togo. *M. macrorhynchia* follows *M. konduensis* (De Wild.) Summerh. in the genre in Togo. Indeed, in Togo, *Microcoelia macrorhynchia* is positioned on the main trunk or small branches especially on trees with rough or leafy bark. The species is most commonly found in coffee plantations and cocoa.

3.1.2 Synonymy

Angraecum macrorhynchium Schltr. Bot. Jahrb. Syst. 38: 22 (1905).

Angraecum marcrorrhynchium Schltr. Westafr. Kautschuk-Exped.: 284 (1900), invalid name

Encheiridion macrorhynchium (Schltr.) Summerh. Bot. Mus. Leafl. 11: 162 (1943).

Gussonea macrorhynchia (Schltr.) Schltr. Beih. Bot. Centralbl. 36 (2): 93 (1918).

3.2 *Tridactyle filifolia* (Schltr.) Schltr.

3.2.1 Description and Geographic Distribution

a) Material

TOGO15465, Sodjinou collection, sample No. 229 from the National Herbarium of the University of Lomé-Togo; TOGO15462, collection Sodjinou, sample N ° 359-3 of the National Herbarium of the University of Lomé-Togo; TOGO15459, collection Sodjinou, sample No. 273 of the National Herbarium of the University of Lomé-Togo; WAG.1140977, M. Reckmans collection, sample No. 9873 from Burundi; WAG.1140916, M. Reckmans collection, sample No. 9873 from Burundi; WAG.1140917, Delarge Nicolas collection, sample No. 108 from Burundi; WAG. 1477074 J. Bokdam collection, sample No. 4308 from

Congo Kinshasa; WAG.1140921 J. K. Morton collection, accession No. SL 3330 from Sierra Leone; WAG.1140922 J. K. Morton collection, accession No. SL 3330 from Sierra Leone; P00388487 Nicolas Halle collection, sample No. 2820 from Gabon hosted at the Herbier Muséum Paris; WAG.1140923 Collection H.De Saeger sample No. 1345 from the DR Congo; WAG.1140918 collection A. Stolz sample No. 517 from Tanzania; WAG.1140915 D. W. Thomas collection, J. Memba, P. Mambo, Mr. Etuge sample No. 7079 from Cameroon.

b) Description

Tridactyle filifolia (Schltr.) Schltr. (Fig: 3) is a hanging epiphytic herb, forming large tufts. The stem is thin and branched. The roots appear near the base of the stem. The leaves are sharply tapered. Inflorescences appear along the stem, very short with 2 to 3 flowers. The flowers are pale ocher or translucent dirty white, turning orange with age before wilting. The sepals are acutely lanceolate, the lateral sepals are oblique. The petals are linear-lanceolate and acute. The labellum is auriculate at the base, trilobal at mid-length; the middle lobe is triangular and the lateral lobes are serrated, spread out, about half the length of the middle lobe; the spur is filiform, curved.

Fig 3: General aspect of *Tridactyle filifolia*: A & D: tuft and hanging shape; B & C: blooming shapes of flowers and their positioning on the stem.

c) Distribution

Tridactyle filifolia has been reported in the following countries: Burundi, Cameroon, Central African Republic, Congo, Ethiopia, Gabon, Ghana, Guinea, Kenya, Liberia, Malawi, Nigeria, DR Congo, Rwanda, Sierra Leone, Sudan, Tanzania, Togo, Uganda and Zambia.

It is a species found in dense humid forests between 850 to 1600 m on average. But in Togo it was harvested at much lower altitudes, at a turn of 555 m; confirmed by the national herbarium specimens. *T. filifolia* is a species that has been listed for Togo at http://www.orchid-africa.net/espece_detail. asp? espPK=13935 but no national biodiversity strategy document mentions the presence of this species in the country. Neither the analytical flora of Togo nor the databases of the national herbarium make any reference to this species. None of the herbarium specimens to which we had access via international platforms come from Togo's collections. For this purpose, a question remains. Is it an extrapolation of the habitat of the species? All in all, this present discovery formally attests to the existence of this species in Togo and makes it possible to access the diversity within the genus at four species. This are *T. bicaudata* (Lindl.) Schltr. *T. gentilii* (De Wild.) Schltr. *T. tridentata* (Harv.) Schltr, to these three is added *T. filifolia* (Schltr) Schltr, whose herbarium specimens are deposited and regitered (Appendix) at the herbarium of the University of Lomé.

The hanging shape of the plant, the abundance of flowers and especially the very expressive color of the flowers are enough elements to take into account when valuing the species as an ornamental plant in a garden.

3.2.3 Synonymy

Angraecum filifolium Schltr. Westafr. Kautschuk-Exped.: 284 (1900).

Listrostachys linearifolia De Wild., Not. Pl. Util. Congo 1: 149 (1903).

Tridactyle linearifolia (De Wild.) Schltr. Beih. Bot. Centralbl. 36 (2): 146 (1918).

Tridactyle tridentata var. subulifolia Summerh. Kew Bull. 3: 287 (1948).

Table 1

Species	Collectors	Barcodes	Localities / geographical coordinates
Microcoelia macrorhynchia	Sodjinou, Koda	TOGO15460	**Ykpa** 236341 / 788606 ; 289m
Microcoelia macrorhynchia	Sodjinou	*Human_Observation*	**Tomégbé** 234886 / 831574 ; 245m
Microcoelia macrorhynchia	Sodjinou, Koda	*Human_Observation*	**Kessibo-Djodji** 234474 / 850377 ; 219m
Microcoelia macrorhynchia	Sodjinou	*Human_Observation*	**Mangouassi** 229299 / 821148 ; 221m
Tridactyle filifolia	Sodjinou	TOGO15459	**Kuma-konda** 232823 / 769417 ; 672m
Tridactyle filifolia	Sodjinou	TOGO15462	**Danyi-Dzogbegan** 245909 / 800675 ; 798m
Tridactyle filifolia	Sodjinou	TOGO15465	**Kuma-Tokpli**, 232319 / 770902 ; 555m

4. Conclusion

In comparison with previous studies, notably those of Brunel *et al* (1984) [5], this study added a complementary list of two new Orchidaceae species for the flora of Togo. This citation increases the diversity of Orchidaceae in Togo to 92 species with 4 species of the genus Tridactyle and 2 species of the genus Microcoelia. The ornamental horticultural valorization of these two new species is a preferential option

for the preservation of these species in Togo's ecological zone IV, national biodiversity hotspot which is under heavy human pressure. This area, which is very prolific in Orchidaceae in Togo, requires conservation management to ensure preservation and enhancement its biodiversity.

5. Reference

1. Abotsi K, Radji A, Rouhan G, Dubuisson J, Kokou K. The Pteridaceae family diversity in Togo. Biodiversity Data Journal. 2015; 3:e5078. doi: 10.3897/BDJ.3.e5078
2. Adjossou K. Diversité, structure et dynamisme de la végétation dans les fragments de forêt humide du Togo, les enjeux pour la conservation de la biodiversité. Th Doc Univ Lomé, 2009, 221 p.
3. Akoegninou A, Van Der Burg, W J, Van Der Maesen LJG. *Flore analytique du Bénin.* Backhuys Publishers, Leiden, Pays Bas, 2006 1034 p.
4. Akpagana K, Guelly AK. Koami Agodé. Espèces d'Angiospermes nouvelles pour la flore du Togo, Acta Botanica Gallica. 1994; 141(6-7):781-787. DOI: 10. 1080 / 12538078. 1994. 10515237.
5. Brunel JF, Hiepko P, Scholz H. Flore analytique du Togo. *GTZ éd, Eschborn*, 1984, 750 pp.
6. Ern h, Die Vegetation Toges. Gliederrung, Gefahrdung, Erbaltung. *Willdenowia.* 1979; 9:295-3 12.
7. Kokou K. Les mosaïques forestières au sud du Togo: biodiversité, dynamique et activités humaines. Thèse de doctorat en Biologie des populations et écologie, Université de Montpellier II, 1998, 140 pp.
8. Kokou K, Caballé G, Akpagana K, Batawila K. Les îlots forestiers au sud du Togo: Dynamique et relations avec les végétations périphériques. Revue d'Écologie. 1999; 2(54):301-313. [Terre vie]
9. Kokou K, Caballé G. Les îlots forestiers de la plaine côtière togolaise. Bois et Forêts des Tropiques. 2000; 263(1):39-51.
10. Radji R, Bandje A, Issifou L, Edorh T. et Kokou K. Diversité dynamique des assemblages phytoplanctoniques dans les écosystèmes aquatiques au Sud du Togo. *Afrique SCIENCE.* 2013; 09(2):67-77. ISSN 1813-548X, http://www.afriquescience.info
11. Radji AR. Contribution à l'étude de la diversité floristique du Togo: la flore horticole de la ville de Lomé et ses aspects économiques. Mémoire de DEA Biol. Vég. App., Univ. Bénin, Togo, 1997, 52 pp.
12. Soussou T. Dynamique forestière dans la plaine du litime sous pression anthropique au Togo. Th Doc Univ Lomé, 2009, 176 p.
13. The Plant List Version 1.1. Published on the Internet, 2013. http://www.theplantlist.org/ (accessed 1st January).
14. Woegan YA, Akpavi S, Dourma M, Atato A, Wala K, Akpagana K. *et al.* État des connaissances sur la flore et la phytosociologie de deux aires protégées de la chaîne de l'Atakora au Togo : Parc National Fazao-Malfakassa et Réserve de Faune d'Alédjo. Int. J Biol. Chem. Sci. 2013; 7(5):1951-1962. DOI : http://dx.doi.org/10.4314/ijbcs.v7i5.14