

Full Length Research Paper

Biodiversity of Sapindaceae in West Africa: A checklist

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This paper aims at documenting species belonging to the family Sapindaceae in West Africa. Samples were collected for 2 years (May 2008 to April 2010) using random sampling from various sites including botanic gardens and forest reserves. 104 taxa were observed encompassing 26 genera: *Allophylus* (16), *Aporrhiza* (3), *Blighia* (3), *Cardiospermum* (3), *Chytranthus* (10), *Deinbollia* (12), *Dodonaea* (1), *Eriocoelum* (6), *Ganophyllum* (1), *Glennia* (1), *Haplocoelum* (1), *Harpullia* (1), *Laccodiscus* (2), *Lecaniodiscus* (2), *Lepisanthes* (1), *Lychnodiscus* (4), *Majidea* (1), *Melicoccus* (1), *Nephelium* (1), *Pancovia* (10), *Paullinia* (1), *Placodiscus* (15), *Radlkofera* (4), *Sapindus* (2), *Schleichera* (1), and *Zanha* (1). Four of these taxa, *Ganophyllum*, *Haplocoelum*, *Laccodiscus* and *Lepisanthes*, are reported for the first time in West Africa. Also, most of the taxa are native to the region with exception to *Melicoccus bijugatus*, *Nephelium lappaceum* and *Cardiospermum corindum* which are naturalized species. 11 of the taxa are yet to be identified at the species level and they are suspected to be new. All taxa are arranged alphabetically within 2 subfamilies and 11 tribes.

Key words: Biodiversity, forest, tropical Africa, soapberry.

INTRODUCTION

West Africa is a geographical sub-region that encourages a wide range of natural vegetation including tropical humid forests, dry forests and savannah. The dry and humid regions correspond to the transition zone of the Sahel as well as the regional centre of Sudanese endemism (Bellefontaine et al., 2000) and the Guineo-Congolese endemism Centre (IUCN, 1996), respectively. Although, rain forests in West Africa are less biodiverse with low endemism compared to those in central Africa (IUCN, 1996), among the 50 most biodiverse countries in the world are Côte d'Ivoire, Ghana and Nigeria (WCMC 1994). For instance, about 4,600 plant species are found in Nigeria and approximately 200 of these are endemic to the country. Due to the climate (countries of the Sahelo-Sudanese zone), large populations (for example, Nigeria Benin and Togo), agricultural clearing or long-term export of wood products (for example, Côte d'Ivoire), the amount of forest resources in West African countries are limited (approximately 11% of the total land area). According to Adeyemi et al. (2012a), members of the family

Sapindaceae are one of the most important forest species to be conserved and valued in Africa due to their multiple uses, high nutritional content and medicinal value. They exist as trees and shrubs, and tendril-bearing vines with about 140 to 150 genera and 1400 to 2000 species worldwide (Adeyemi, 2011). They are geographically distributed in the temperate and tropical regions of the world. The majority of species are native to Asia, although there are a few in South America, Africa and Australia (APG II, 2003). In 1958, Hutchinson and Daziel reported 18 genera while Burhill (2000) recorded 22 genera in West Africa, 13 of which are widely spread throughout Nigeria (Keay et al., 1964).

Knowledge and quality of information on forest resource vary by country, however information and data on forest resources in West Africa are dated, obsolete and/or partial mainly due to the fact that evaluation is rarely carried out. For example, only a few countries carried out an evaluation of their forest resources at the national level during the 1990s (Benin, Burkina Faso, Guinea-Bissau, the Gambia and Nigeria). Other West African countries made earlier national forest assessments (Senegal, 1985; Sierra Leone, 1986; Chad, 1988; Togo, 1975; Liberia, 1981) (FAO, 2000). Hence, there is need for the compilation of clear records of

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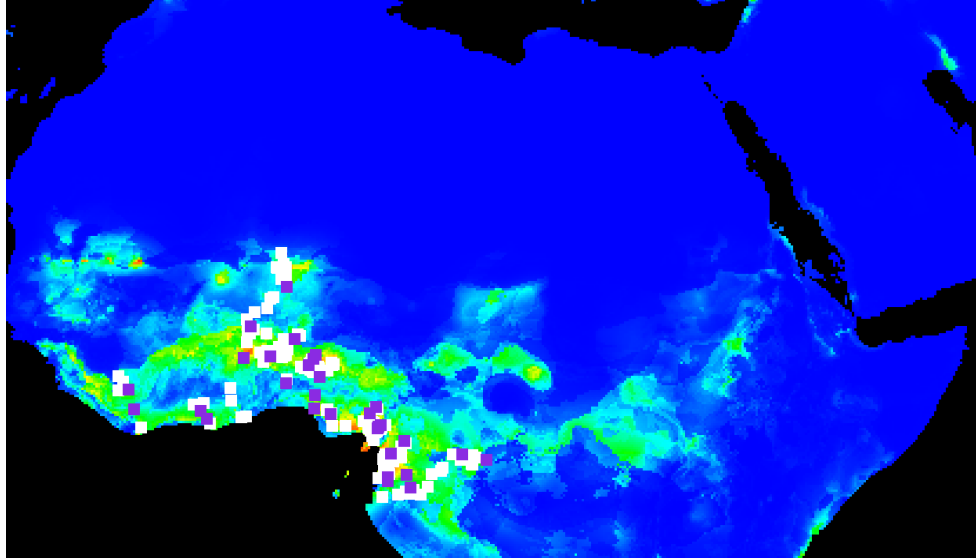


Figure 1. Distribution of Sapindaceae in the sampling sites (white dots show the presence locations).

members of Sapindaceae in the region for conservation purposes. Although several researchers have worked on the description of Sapindaceae (including Radlkofer, 1933; Müller and Leenhouts, 1976; Leenhouts, 1978; Adema et al., 1994; Klaassen, 1999), there is no checklist of the Sapindaceae in West Africa. Although several researchers have worked on the description of Sapindaceae (including Radlkofer, 1933; Müller and Leenhouts, 1976; Leenhouts, 1978; Adema et al., 1994; Klaassen, 1999; Thomas and Harris, 1999), there is no checklist of the Sapindaceae in West Africa.

MATERIALS AND METHODS

Fresh plant samples were collected monthly for 2 years using random sampling (cluster) from fields, botanic gardens and forest reserves in Benin, Burkina-Faso, western Cameroon, Ghana, Nigeria and Togo, and this was complemented with herbarium samples (Figure 1). All subjects are selected from naturally occurring groups (clusters) that exist in the population (that is, countries).

Voucher specimens were prepared and sent to the Forestry Herbarium, Ibadan for authentication. These were then deposited at the University of Lagos Herbarium (LUH) for reference purpose.

RESULTS

Sample authentication was done by Mr. B. O. Daramola at the Forestry Herbarium, Ibadan. A total of one hundred and four taxa were identified belonging to twenty six genera, *Allophylus* (15.1%), *Aporrhiza* (2.8%), *Blighia* (2.8%), *Cardiospermum* (2.8%), *Chytranthus* (9.4%), *Deinbollia* (11.3%), *Dodonaea* (0.9%), *Eriocoelum*

(5.7%), *Ganophyllum* (0.9%), *Glennia* (0.9%), *Haplocoelum* (0.9%), *Harpullia* (0.9%), *Laccodiscus* (1.9%), *Lecaniodiscus* (1.9%), *Lepisanthes* (0.9%), *Lychnodiscus* (3.8%), *Majidea* (0.9%), *Melicoccus* (0.9%), *Nephelium* (0.9%), *Pancovia* (9.4%), *Paullinia* (0.9%), *Placodiscus* (14.2%), *Radlkofera* (3.8%), *Sapindus* (1.9%), *Schleichera* (0.9%) and *Zanha* (0.9%). Some of the taxa could not be identified beyond the generic level due to the materials available. All taxa are arranged alphabetically within subfamilies, tribe and genera following Muller and Leenhouts' (1976) method (Table 1).

DISCUSSION

Members of Sapindaceae were largely found in lowland forest; however, a few taxa were recorded in the highland and mountains, that is, *Allophylus bullatus*, *Schleichera trijuga* and *Sapindus saponaria*; this is in conformity with the report of Adeyemi et al. (2012b). In contrast to the record given by Burkill (2000), our sampling revealed four additional taxa, *Ganophyllum*, *Haplocoelum*, *Laccodiscus* and *Lepisanthes* in West Africa. Also, 18 genera were encountered in Nigeria; this is in contrast to the record presented by Keay et al. (1964). Most of the taxa are native to the region with exception to *Melicoccus bijugatus*, *Nephelium lappaceum* and *Cardiospermum corindum* which are naturalized species. The genus *Allophylus* (16) recorded the highest number of taxa followed by *Placodiscus* (15) and *Deinbollia* (12). A number of taxa are suspected to be new species (*Allophylus* sp, *Chytranthus* sp1, *Chytranthus* sp2, *Deinbollia* sp, *Laccodiscus* sp, *Pancovia* sp1, *Pancovia*

Table 1. A Check-list of family Sapindaceae in West Africa.

Kingdom:	Plantae		
Sub Kingdom:	Embryobionta		
Division:	Magnoliophyta		
Class:	Magnoliopsida		
Subclass:	Rosidae		
Super order:	Rosanae		
Order:	Sapindales		
Family:	Sapindaceae Juss.		
Subfamily	Tribe	Genus	Species
	Dodonaeeae Kunth	<i>Dodonaea</i> L.	<i>Dodonaea viscosa</i> (L.) Jacq.
Dodonaeoideae Burnett	Doratoxyleae Radlk.	<i>Ganophyllum</i> Blume <i>Zanha</i> Hiern.	<i>Ganophyllum giganteum</i> (Chev.) Hauman. <i>Zanha golungensis</i> Hiern.
	Harpullieae Radlk.	<i>Harpullia</i> Roxb. <i>Majidea</i> J. Kirk ex Oliv.	<i>Harpullia zanguebarica</i> (Oliv.) Radlk. <i>Majidea fosterii</i> (Sprague) Radlk.
		<i>Aporrhiza</i> Radlk.	<i>Aporrhiza nitida</i> Gilg. <i>Aporrhiza talbotii</i> Bak. <i>Aporrhiza urophylla</i> Gilg.
		<i>Blighia</i> Koenig	<i>Blighia sapida</i> Koenig. <i>Blighia unijugata</i> Bak. <i>Blighia welwitschii</i> (Hiern) Radlk.
	Cupanieae Reich.	<i>Eriocoelum</i> Hook. f.	<i>Eriocoelum kertstingii</i> Gilg. ex Engler. <i>Eriocoelum microspermum</i> Radlk. ex De Wild. <i>Eriocoelum macrocarpum</i> Gilg. ex Radlk. <i>Eriocoelum oblongum</i> Keay <i>Eriocoelum pungens</i> Radlk. ex Engl. <i>Eriocoelum racemosum</i> Bak.
Sapindoideae Burnett		<i>Laccodiscus</i> Radlk.	<i>Laccodiscus ferrugineus</i> (Bak.) Radlk. <i>Laccodiscus pseudostipularis</i> Radlk.
		<i>Lychnodiscus</i> Radlk.	<i>Lychnodiscus brevibracteatus</i> R. Foulloy <i>Lychnodiscus danaensis</i> Aubreville and Pellegrin. <i>Lychnodiscus grandifolius</i> Radlk. <i>Lychnodiscus reticulatus</i> Radlk.
	Lepisantheae Radlk.	<i>Chytranthus</i> Hook. f.	<i>Chytranthus angustifolius</i> Exell. <i>Chytranthus atrovioleaceus</i> Bak. ex Hutch. & Dalz. <i>Chytranthus carneus</i> Radlk. <i>Chytranthus cauliflorus</i> (Hutch. and Dalz.) Wickens. <i>Chytranthus gilleti</i> De Wild. <i>Chytranthus macrobotrys</i> (Gilg) Exell and Mendonca. <i>Chytranthus setosus</i> Radlk. <i>Chytranthus</i> sp1 <i>Chytranthus</i> sp2 <i>Chytranthus talbotii</i> (Bak.) Keay
		<i>Glenniea</i> Hook. f.	<i>Glenniea africanus</i> (Radlk.) Leenh.

Table 1. Contd.

	<i>Lepisanthes</i> Blume	<i>Lepisanthes senegalensis</i> (Juss. ex Poir.) Leenh.
		<i>Pancovia atroviolaceus</i>
		<i>Pancovia bijuga</i> Willd.
		<i>Pancovia floribunda</i> Pellegrin.
		<i>Pancovia harmisiana</i> Gilg.
	<i>Pancovia</i> Willd.	<i>Pancovia laurentii</i> (De Wild.) Gilg ex De Wild.
		<i>Pancovia sessiliflora</i> Hutch. & Dalz.
		<i>Pancovia</i> sp.1
		<i>Pancovia</i> sp.2
		<i>Pancovia</i> sp.3
		<i>Pancovia turbinata</i> Radlk.
		<i>Placodiscus angustifolius</i> Radlk.
		<i>Placodiscus attenuatus</i> J.B. Hall
		<i>Placodiscus bacoensis</i> Aubrév. and Pellegr.
		<i>Placodiscus boya</i> Aubrév. and Pellegr.
		<i>Placodiscus bracteosus</i> J.B. Hall
		<i>Placodiscus caudatus</i> Pierre ex Radlk.
		<i>Placodiscus glandulosus</i> Radlk.
	<i>Placodiscus</i> Radlk.	<i>Placodiscus leptostachyus</i> Radlk
		<i>Placodiscus opacus</i> Radlk.
		<i>Placodiscus oblongifolius</i> J. B. Hall
		<i>Placodiscus pseudostipularis</i> Radlk.
		<i>Placodiscus pynaertii</i> De Wild.
		<i>Placodiscus</i> sp.1
		<i>Placodiscus</i> sp.2
		<i>Placodiscus turbinatus</i> Radlk.
		<i>Radlkofera calodendron</i> Gilg.
	<i>Radlkofera</i> Gilg.	<i>Radlkofera</i> sp.1
		<i>Radlkofera</i> sp.2
		<i>Radlkofera</i> sp.3
Melicocceae	<i>Melicoccus</i> P. Browne.	<i>Melicoccus bijugatus</i> Jacq.
Nephelieae Radlk.	<i>Nephelium</i> L.	<i>Nephelium lappaceum</i> L.
		<i>Cardiospermum corindum</i> L.
		<i>Cardiospermum grandiflorum</i> Sw.
		<i>Cardiospermum halicacabum</i> L.
Paullinieae Kunth ex DC.	<i>Cardiospermum</i> L.	<i>Paullinia pinnata</i> L.
	<i>Paullinia</i> L.	
		<i>Deinbollia angustifolius</i> D.W. Thomas
		<i>Deinbollia grandifolia</i> Hook. f.
		<i>Deinbollia insignis</i> Hook. f.
		<i>Deinbollia kilimandscharia</i> Taub.
		<i>Deinbollia maxima</i> Gilg.
		<i>Deinbollia mezilii</i> D.W. Thomas and D. J. Harris
		<i>Deinbollia molluscula</i> Radlk.
Sapindeae Kunth ex DC.	<i>Deinbollia</i> Schumach. and Thonn.	<i>Deinbollia pinnata</i> (Poir.) Schum. and Thonn.

Table 1. Contd.

			<i>Deinbollia pycnophylla</i> Gilg ex Radlk. <i>Deinbollia pynaerti</i> De Wild. <i>Deinbollia</i> sp. <i>Deinbollia voltensis</i> Hutch.
		<i>Sapindus</i> L.	<i>Sapindus saponaria</i> L. <i>Sapindus trifoliatus</i> L.
		<i>Haplocoelum</i> Radlk.	<i>Haplocoelum gallaense</i> (Engler) Radlk.
Schleichereae Radlk.		<i>Lecaniodiscus</i> Planch. ex Benth.	<i>Lecaniodiscus cupanioides</i> Planch. <i>Lecaniodiscus punctatus</i> J. B. Hall.
		<i>Schleichera</i> Willd.	<i>Schleichera trijuga</i> Willd.
Thouinieae Blume emend. Radlk.		<i>Allophylus</i> L.	<i>Allophylus abyssinicus</i> (Hochst.) Radlk. <i>Allophylus africanus</i> P. Beauv. <i>Allophylus bullatus</i> Radlk. <i>Allophylus cobbe</i> (L.) Raeusch. <i>Allophylus conraui</i> Gilg ex Radlk. <i>Allophylus chaunostachys</i> Gilg. <i>Allophylus grandifolius</i> (Bak.) Radlk. <i>Allophylus hirtellus</i> (Hook. f.) Radlk. <i>Allophylus macrobotrys</i> Gilg. <i>Allophylus megaphyllus</i> Hutch. and Dalz. <i>Allophylus nigericus</i> Bak. <i>Allophylus rubifolius</i> Engl. Abh. Preuss. <i>Allophylus spicatus</i> Radlk. <i>Allophylus</i> sp. <i>Allophylus talbotii</i> Bak. <i>Allophylus zenkeri</i> Gilg. ex Radlk.

sp2, *Pancovia* sp3, *Placodiscus* sp1, *Placodiscus* sp2, *Radlkofera* sp1, *Radlkofera* sp2, *Radlkofera* sp3) due to the fact that they could not be identified beyond the generic level even after comparison with already existing records. However, further work needs to be done in order to ascertain their true identity. This work can be seen as an updated record of Sapindaceae in West Africa and would serve as a valuable resource in conservation programmes.

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REFERENCES

- Adema F, Leenhouts PW, van Welzen PC (1994). Sapindaceae, Fl. Malesiana, 11(I): 419-768.
- Adeyemi TO (2011). Molecular Systematics and DNA barcoding of African Sapindaceae. Unpublished Ph.D. Thesis submitted to the University of Lagos, Nigeria. p. 345.
- Adeyemi TO, Ogunidipe OT, Olowokudejo JD (2012a). Species distribution modelling of Family Sapindaceae in West Africa. Int. J. Bot., 8(1): 45-49
- Adeyemi TO, Ogunidipe OT, Olowokudejo JD (2012b). Distribution and DNA conservation of Sapindaceae Juss. in Western Africa. Int. J. Bot., 8(1): 31-37
- Angiosperm Phylogeny Group (APG II) (2003). An update of the angiosperm phylogeny group classification for the orders and families of flowering plants: APG II. Bot. J. Linn. Soc., 141: 399-436.
- Bellefontaine R, Gaston A, Petrucci Y (2000). Management of natural forests of dry tropical zones. FAO Conservation Guide Rome. p.32.
- Burkhill HM (2000). *The Useful Plants of West Tropical Africa*. 5, Edition 2. Royal Botanic Gardens Kew, London, p.686.
- Food and Agriculture Organization of the United Nations (FAO) (2000). *Actes de l'atelier sous-régional sur les statistiques forestières et perspectives pour le secteur forestier en Afrique/FOSA sous région ECOWAS*. Yamoussoukro, Côte d'Ivoire, FAO, Rome.
- Hutchinson J, Daziel JM (1958). Flora of West Tropical Africa. 1, Part 2. Crown Agents for Overseas Government and Administrations, Millbank, London, p. 828.
- International Union for Conservation of Nature and Natural Resources (IUCN) (1996). *Atlas pour la conservation des forêts tropicales*

- d'Afrique*, J.-P. de Monza, éd.
- Keay RWJ, Onochie CFA, Stanfield DP (1964). Nigerian Trees. Volume II Department of Forest Research, Ibadan. p.495.
- Klaassen R (1999). Wood anatomy of the Sapindaceae. IAWA J., 2 : 1–214.
- Leenhouts PW (1978). Systematic notes on the Sapindaceae-Nephelieae. Blumea, 24: 395-403.
- Müller J, Leenhouts PW (1976). A general survey of pollen types in Sapindaceae in relation to taxonomy. In: Ferguson IK, Müller J (Eds.) The evolutionary significance of the exine. Academic Press, London, pp. 407–445.
- Radlkofer L (1933). Sapindaceae. In: Engler A (Ed.) *Das Pflanzenreich: Regni Vegetabilis Conspectus (IV) 165 (Heft 98ah)*. Leipzig, Verlag von Wilhelm, Engelmann, pp. 983-1002.
- Thomas DW, Harris DJ (1999). New Sapindaceae from Cameroon and Nigeria, Kew Bull., 54: 951–957.
- World Conservation Monitoring Center (WCMC) (1994). Priorities for conserving global species richness and endemism. WCMC Biodiversity Series World Conservation Press. p.3.