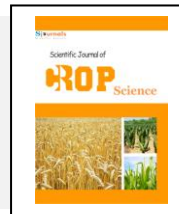


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ROP ScienceJournal homepage: www.Sjournals.com**Original article****Phytogeography of the genus *Sesamum* L (*pedaliaceae*) in Nigeria, West Tropical Africa****C.U. Aguoru^{a*}, B.E. Okoli^b, J.O. Olasan^b**^a*Department of Biological Sciences, University of Agriculture, Makurdi, Nigeria.*^b*Department of Plant Science and Biotechnology, University of Port Harcourt, Nigeria.*

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ABSTRACT

The geographical distribution patterns of *Sesamum L* species occurring in Nigeria was studied with a view to providing information on their locations within the country for ease of access during need for them. Nigeria was divided into six (6) zones (A-F) for ease of reference and coverage. For thirty six months (36) months, trips were undertaken to various zones as divided for collection of samples. Visual assessments were also made and notes taken on areas of collection. Eight (8) herbaria were also visited with the aim of collecting information on areas of collection by collectors and determinavits. On the whole, a total of forty(40) specimens were examined. The results indicated that *S. alatum* occurred in the much drier regions of the area of the study and was therefore regarded as being xerophytic. The other three species, *S. indicum*, *S. radiatum* and *S. angutifolium* were thickly populated and occurred more in the middle belt zone (E) of the study area where the amount of rainfall is not too high, though *S. indicum* appeared to be ubiquitous in its occurrence. The species were observed to be adapted to specific ecological zones of the country. The study revealed also that *S. alatum* fresh specimen was difficult to come by indicating a form of threat and therefore requires conservation. The information generated on distributional pattern could separate the species under investigation into two groups; *S. alatum* on one side and the other three on another. The detailed information on distribution study of *Sesamum* species in Nigeria is available for the first time. The

implication of the findings in this study to ease of access, agronomic, scientific and medicinal plant research is discussed. Efforts should be geared towards the protection of the wild species for genetic improvement of the highly cultivated *S. indicum*.

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1. Introduction

Sesamum L is of the sub-family Asterideae in the family Pedaliaceae and order Schrophuriales (Hutchinson and Dalziel, 1958; Kidir, 1978). Sesamum L is a neglected genus (IPGRI, 2004). There is controversy on the number of species in the genus. Bedigian, (1984) says the genus has over 25 species, Burkill (1997) says about 25 species, Busari et al., (2005) says about 19 species. All agreeable species in the genus are believed to be of Africa origin (Nayar, 1995) from where they spread through Asia to India where secondary centers of diversity exist (Bedigian, 2003). The genus is represented in Nigeria by four species (Hutchinson and Dalziel, 1958) viz: *S. indicum* L; *S. alatum* Thorn; *S. radiatum* Schum and Thorn; *S. angustifolium* (Oliv) Engl. Nutritionally and medicinally, the leaves, seeds and seed coats of Sesamum L species are believed to be rich in essential oils, amino acids, calcium (Brar and Ahuja, 1979; Kamal-ELdin, 1993; Johnson et al., 1979). FAO (2004) ranked Nigeria 6th world largest producer of Sesamum indicum one of the species of the genus found in Nigeria. Early identification or separation of species in the genus in the field is difficult (Bedigian, 2003). Geographical distribution of every taxon maintains a particular pattern. This has been found to be useful in agronomic, biosystematics and taxonomic studies. The coincidence or not of area occupied by related taxa has a bearing on their classification (Edeoga et al., 1998; Akobundu and Agyakwa, 1998). In spite of the data and information above, numerous agronomic and economic importance of the Sesamum L species, there is dearth of information on the distribution pattern and areas of occurrence of the various Sesamum species in Nigeria for easy access for collection in time of need. This study and paper therefore is aimed at establishing and documenting the geographical distribution and occurrence of the various Sesamum L species in Nigeria, tropical western Africa. This is with a view to providing information for their agronomic, research and systematic accessibility for improvement of related species and also to categorize the various species according to the level of rainfall requirement which has bearing on sections of Nigeria where they are present, and to establish whether any of the species is threatened and therefore recommend for conservation.

2. Material and methods

Study Area: The study area Nigeria is located on the gulf of guinea in western tropical Africa with neighbours as Benin republic, Niger republic, Cameroun and Chad. Nigeria has a total population of about 162, 470, 737 (World Bank, 2011) and occupies a total area of 356,667 sq. mile (923, 768 sq.km) (World Bank, 2012). For ease of access, the entire country was divided into six zones (A, B, C, D, E, and F).

A= Edo, Delta, Bayelsa, Rivers, Cross Rivers and Akwa Ibom states

B= Anambra, Imo, Abia, Ebonyi and Enugu states

C= Ogun, Osun, Ondo, Oyo, Ekiti and Lagos states

D= Taraba, Adamawa, Gombe, Bauchi, Borno and Yobe states

E= Benue, Niger, Kwara, Plateau, Kogi, Nasarawa states and Federal Capital Territory, Abuja.

F= Kaduna, Kano, Katsina, Kebbi, Jigawa, Sokoto and Zamfara states.

Distribution pattern studies: Distribution and occurrence pattern studies of the various Sesamum species studied were carried out through field trips to the various zones (A-F) for 36 months during which notes were taken on locations from which samples were collected. Visual assessments were also made. Notes were taken on collection locations of the various specimens deposited with the different herbaria visited (FHI; UI; IFE; UPH; UAM; ABU; UNICAL; BUK). Books, Floras and formal articles were also consulted with a view to obtaining information on the geographical distribution and occurrence pattern of the various species in the genus in Nigeria. Specimens collected during the various field trips were properly treated and deposited in the Federal University of

Agriculture, Makurdi Nigeria (UAM) herbarium for reference. Apart from FHI the other herbaria are yet to be indexed with index herbariora.

3. Results and discussion

Table 1 displays the specimens examined during the field trips and visits to the different herbaria. It shows clearly collectors, collection numbers and location/area where specimen was collected.

Figure 1 is map of Nigeria showing the 36 states and the Federal Capital Territory of Nigeria displaying the distribution pattern of the various *Sesamum* specimens studied. The table and figure show that the *Sesamum* species exhibit diversity in their spread. *S. alatum* is restricted in its distribution to the drier northern parts of Nigeria (F), others have a spread in the less dry zones of Nigeria. The concentration or presence of the other three species; *S. angustifolium*, *S. radiatum* and *S. indicum* were more in the middle belt (E) of the country. In two areas in zone E, Benue and Nasarawa states, *S. indicum* and *S. radiatum* were always found growing near each other in abandoned farm lands. *S. indicum* appears to have ubiquitous distribution pattern as it is found in almost all zones of the study. *S. alatum* may be regarded as xerophytic because of its occurrence in much drier zone of the study area, others may be termed mesophytic due to their zones of occurrence. When *S. indicum* occurs in the drier zone, it is usually near irrigated farms or burrow pits. The results have shown that the phytogeography of *Sesamum* L. species occurring in Nigeria could be of taxonomic importance as they could be separated based on that. While *S. alatum* is found in the dry zone and restricted to such environment, *S. radiatum*, *S. indicum* and *S. angustifolium* exhibit mesophytism. Even amongst the three mesophytes, *S. angustifolium* and *S. radiatum* are more restricted to the middle belt (zone E) whereas *S. indicum* has a wider spread both to the North east zones, South west, South East and South South zones of the country. The highest population concentration of the three mesophytes were observed in North Central (E) with Benue and Nasarawa states taking the lead (Table 1). These results show that they have preference for certain ecological zones of the country. This agrees with Busari et al. (2005); Bedigian (2006). They are all highly evolved dicotyledonous plants with obvious adaptive features fitted for their environment, nature and survival. All these species are annuals but *S. angustifolium* can survive to the second and third year by underground stumps. The locations of occurrence, in Nigeria, of these species are now made clearer and the very detailed geographical distribution based on fresh specimen is given for the first time. It appears *S. alatum* is under threat and requires conservation. This is necessary as a genetic resource for improvement of the highly cultivated species and for its medicinal value.

Table 1

Sources of *Sesamum* L. Species examined indicating collector/accession number, date collected and locality of collection.

S/No	Taxa	Collector/Accessory or Herbarium Number	Date collected	Locality
1	<i>S. angustifolium</i> (Oliv) Engl.	Ugbogu, Odewo and Lawrence FHI, 106386	22-6-2001	Sapoba forest Benin – Edo State
		J.A. Emwiogbon FHI 66581	2-6-73	Ngwo – Udi near Enugu, Enugu State
		J.A. Emwiogbon and J.C. Okafor FHI 69334	26-1-74	Near Oguta lake present Oguta L.G.A, Imo State
		A.P.O. Jones FHI 6571	20-05-42	Udi – near Enugu
		A.P.D Jones FHI 467	12-2-43	Kabba – present Kogi state
		C. Geerling FHI 43435	21-11-70	Yankari game reserve Bauchi state
		P. Wit, Z.O.Gbile, B.O. Daramola FHI: 47383	24-4-72	Baga lake chad
		B.O.Daramola FHI: 78552	21-9-75	Akpabuyo Cross Rivers State.
		J.A. Emwiogbon FHI: 66611	12-7-73	Ngwo-udi near Enugu
		Ologumfemi and Fagbemi FHI: 70723	6-3-73	Sosan village Ondo
		Lady Hoskyns Aberahall FHI: 27578	March 950	Nike-Enugu
R.G. Lowe FHI: 50241	7-2-60	Ekulu River Enugu		

S/No	Taxa	Collector/Accessory or Herbarium number	Date collected	Locality
		G.F.A Onochie and Awua FHI: 35810	21-5-56	Near River Uyaba Enugu
		Edwin Ujor FHI: 23907	16-7-48	Damaturu Yobe State
		Fagbemi FHI: 90065	6-2-79	Mambila Plateau
		Olorenfemi and Oguntayo FHI: 84597	1977	Owo-Ondo
		Okeke, Ekwuno and Macaulay FHI: 72608	06-08-74	Oguta lake Imo State
		James, Adejimi FHI: 78818	27-05-76	Lagun village Iwo
		Boston C. FHI: 53929	October 1962	Kabba present Kogi state.
		J.A. Emwiogbon FHI: 58864	23-11-66	Botanic Garden Enugu
		Ekuno et al FHI: 92167	22-01-80	Eme River Enugu
		B.O. Daramola and A. Binuyo FHI: 61931	01-03-68	Bida - Niger State
		D.P. Stanfield FHI: 40029	14-10-57	Idogun – Owo
		Aguoru 0001	08-12-2006	Near Mechanic village North Bank Makurdi
		Aguoru 0002	09-12-2006	Ancha village near Daudu, Guma Local Govt, Benue State
		Aguoru 0003	08-12-2006	Opposite New Trailer Park. Federal Low Cost housing estate Lafia road, North Bank, Makurdi. Growing together with <i>S. indicum</i> in a farm
		Aguoru 0004	10-09-2006	Beside Ugwuanyi residence. Fed. low cost housing estate North Bank, Makurdi. Cultivated farm land.
		Aguoru 0005	11-09-06	Behind Amaje-Chris filling station North Bank, Makurdi. Cultivated farm land.
		Aguoru 0006	08-12-06	Behind Tiley Gyado Sec. Makurdi. Abandoned farm land.
		Aguoru 0007	08-08-06	Near Gulf course Lafia. Roadside.
		Aguoru 0008	18-12-06	Ankpa Quarters Road cemetery
		Aguoru 0009	29-12-06	Apir Mechanic village Makurdi
		Aguoru 0010	11-10-2007	Roadside along Ayangba road Ankpa Kogi State
		Aguoru 0011	12-10-2007	Kogi state University premises Ayangba, Kogi State.
		Aguoru 0012	12-10-2007	Ugboju near Oturkpo. Roadside.
		Aguoru 0013	10-07-07	Near Upa's compound Udei village Guma LGA Benue State.
		Aguoru 0048	20-07-08	Gbajimba Rd near University of Agriculture. Experi. Farm
		Aguoru 0049	31-08-08	Federal low cost housing estate Lafia road, Makurdi.
2	S. indicum L.	H.D. Onyeachusim and M.G. Latilo FHI: 54065	21-2-1964	Osomba village Oban.
		A.P.D. Jones FHI: 6623	09-06-1942	Awka
		J.O. Ariwoado FHI: 89201	08-07-1978	Utugwangi Obudu
		Batten – Poole FHI: 13242	24-07-1948	Bauchi
		Olorunfemi et al FHI: 93371	02-09-1980	Aiyede Ekiti
		M.O. Ayaji FHI: 26955	29-06-1950	Oni – Gambari

S.O. Magaji FHI: 27261	25-01-1968	Okene – Oguda Rd.
Odewo and Binuyo FHI: 96216	11-08-1981	Mokwa
Eimunjeze et al FHI: 66504	20-05-1973	Keffi
J.O. Chapman FHI: 46246	28-06-1972	Mambilla Plateau
Daramola B.O. and M. Okoro FHI: 99037	02-11-1982	Abuja
B.O. Daramola FHI: 84513	23-08-1977	Gembu – Janro – Umaru Camp.
B.O. Daramola FHI: 105098	30-07-1993	Bauchi
Odewo et al FHI: 88121	25-10-1978	Badagry
Eimunjeze and Oguntayo FHI: 70206	16-05-1974	Iguoriakhi Benin Edo
Magbogbeola et al FHI: 94926	23-07-1981	Majidu – Ikorodu
H.D. Onyeachusim FHI: 53737	15-08-1962	Ebute – Ikorodu
Oyayomi and Osanynlusi FHI: 82990	13-06-1977	Ohunbe Forest Reserve Ogun
Ekwuno et al FHI: 90947	18-09-1979	Isienu, Nsukka
Ekwuno et al FHI: 88882	20-08-1978	Awi Forest Reserve Calabar
Oguntayo and Adejinmi FHI: 83286	13-06-1977	Ohunbe Forest Reserve Ogun
T.K. Odewo FHI: 87947	28-08-1977	Gembu, Mambilla Plateau
T.K. Odewo FHI: 87861	28-08-1977	Njawai, Gembu Mambilla, Plateau.
Zac O. Gbile FHI: 80930	17-06-1977	Ejigbo – Oyo
Magbagbeola et al FHI: 94659	23-04-1981	Orile-Ibara Abeokuta
Magbagheola and others FHI: 94927	22-06-1981	Badagry – Lagos
Magbagheola and others FHI: 94745	26-06-1980	Ijebu, Ajebandele Forest Reserve
Jones FHI: 7178	30-12-1943	Oyo Ibadan
J.C. Okafor and Omiyale FHI: 62248	08-07-1966	Abakaliki
C.F.A. Onochie FHI: 40229	23-06-1958	Gulu Village Badeggi – Lapai Road
M.C. Ejiofor FHI: 19849	21-06-1960	U.I. Premises Ibadan
Odewo and Adedeji FHI: 96917	14-12-1981	Gombe – Yola Road
Daramola and Ihe FHI: 86372	15-05-1978	Ipe- Ikun Road; Ikare
Ariwoado FHI: 89201	08-07-1978	Utugwang, Obudu
Aguoru 0015	26-12-06	Railway Bypass opposite NYSC State Secretariat Makurdi
Aguoru 0016	26-12-06	Near General Hospital NASME N/Bank, Makurdi
Aguoru 0017	29-12-6	Beside ECWA Secondary school North Bank, Makurdi
Aguoru 0018	29-12-06	Opposite O.O. Obu North Bank, Makurdi
Aguoru 0019	29-12-06	Ancha Village near Daudu Benue State
Aguoru 0020	03-02-07	Former Agan Toll Gate Makurdi
Aguoru 0021	03-02-07	Beside ‘C’ Division Police Makurdi
Aguoru 0022	07-07-07	Besides BENKOS Hotel Uniagric Road, Makurdi
Aguoru 0023	07-07-07	Beside Ter Guma’s cpd Makurdi
Aguoru 0024	07-07-07	In front of celestial Church besides Tonimas filling station, Makurdi
Aguoru 0025	12-10-07	Minna, near FUT. Niger State
Aguoru 0026	12-10-07	Near Golf course, Lafia
Aguoru 0027	01-11-07	Oturkpa near Branch Ogbadibo LGA, Benue State
Aguoru 0028	06-06-08	Ayagba Rd Ankpa
Aguoru 0029	10-07-08	Near College of Agric. Yandev, Gboko

	Aguoru 0030	15-08-08	Along Keffi Road Akwanga
	Aguoru 0050	31-08-08	Federal Low Cost Housing along Lafia road, Makurdi
	Aguoru 0051	31-08-08	Ene Aisha's compound near Day Spring Hotel, Old Lafia Rd., Makurdi
3	S. radiatum Schum. & Thonn.	01-01-1980	Wumiri forest Reserve Borno
	Ekwuno and Fagbemi FHI: 94077		
	M.C. Ejiofor FHI: 29334	08-04-1951	Victoria – Cameroon
	Ekwuno and Fagbemi FHI: 93967	29-09-1990	Kauwa Forest Reserve, Borno
	P. and J. Wit FHI: 64909	31-01-1972	Jos road, Kaduna
	J.O. Ariwaodo FHI: 49295	10-12-1976	Ugep, Obubara Cross Rivers
	P. wit et al FHI: 46192	19-11-1971	Sapoba FR Benin
	J. Olorunfemi FHI: 30534	20-04-1951	Kumba Cameroon
	Ariwaodo and Adesina FHI: 97294	12-09-1981	Warri – Niger Delta
	J.C. Okafor and M.G. Latilo FHI: 57799	23-01-1966	Itu, Uyo
	J.A. D Jackson FHI: 59673	28-01-1963	Kaduna
	Odewo and Binuyo FHI: 96220	07-08-1981	Mokwa
	Fagbemi FHI: 89962	23-08-1977	Gembu
	Okeke, Ekwuno and Macaulay FHI: 71295	03-08-1974	Sapoba Benin
	Ekwuno and others FHI: 96300	09-02-1981	Oguta
	Ariwaodo and Adesina FHI: 97296	18-09-1981	Warri
	R.O. Meikle FHI: 50659	17-03-1950	Jebba Kwara State
	B.O. Daramola FHI: 38048	26-06-1950	Ankpa Kogi State
	J.C. Okafor FHI: 35870	23-10-1956	Ukpor – Nnewi Anambara State
	J.B. Gillett FHI: 14403	15-08-1962	Ebute – Ikorodu Lagos
	G.F.A Onochie FHI: 15549	28-04-1953	Ijebu
	J.D. Kennedy FHI: 10746	10-10-1931	Locality not indiated
	D.P. Stanfield FHI: 39990	12-10-1957	Owo
	A.P.D. Jones FHI: 730	04-03-1942	Sapoba Benin
	J.D. Kennedy FHI: 10747	May 1928	Sapoba, Benin
	Magbagbeola and others FHI: 94686	23-05-1981	Ijebu – Igbo
	Latilo and others FHI: 71788	16-10-1974	Calabar Township
	Aguoru 0031	04-10-05	Beside General Hospital North Bank, Makurdi
	Aguoru 0032	10-10-05	Upaa's House Behind V.I.O North Bank Makurdi.
	Aguoru 0033	21-12-05	Beside former Day Spring Hotel, old Lafia Rd Makurdi.
	Aguoru 0034	29-12-05	Beside Obosi's compound behind VIO testing ground N/Bank Makurdi.
	Aguoru 0035	02-02-06	Beside Seed Faith Church Near N/Bank Mechanic Village Makurdi
	Aguoru 0036	07-07-06	Beside former midway inn Hotel New Bridge Road, Makurdi.
	Aguoru 0037	07-07-06	Ancha village near Daudu Guma LGA Benue State.
	Aguoru 0038	07-07-06	Beside Senator Waku's office, Makurdi.

S/No	Taxa	Collector/Accessory number	or Herbarium	Date collected	Locality
		Aguoru 0039		08-07-06	Beside NYSC State Secretariat
		Aguoru 0040		10-08-06	Eke village, along Enugu-Mkd Rd. Near Oturkpo
		Aguoru 0041		10-09-06	Ayargu, along Lafia Mkd Road Nassarawa
		Aguoru 0042		10-09-06	Near TOMINAS Filling station Lafia Nassarawa
		Aguoru 0043		10-09-06	College of Education compound Akwanga
		Aguoru 0044		26-06-07	Permanent site University of Abuja Niger
		Aguoru 0045		09-06-08	Abuja – Kaduna Road Suleja Niger State
		Aguoru 0046		10-07-08	Near Catholic Church Ichuwa Benue State
		Aguoru 0047		19-06-08	Samaru campus ABU Zaria.
		Aguoru 0052		31-08-08	Near Naka Road cemetery Makurdi
		Aguoru 0053		31-08-08	Near Industrial Layout Naka Road Benue State
		Aguoru 0054		01-09-08	Near Federal Low Cost Housing Naka Road Benue State
4	S. alatum Thonn.	P.Wit and B.O. Daramola FHI: 80345		09-07-1973	Yola Adamawa State
		M.G. Latilo FHI: 62627		28-07-1969	Ilorin Kwara State
		D.P. Stanfield FHI: 56577		13-02-1965	
		Soladonye Ekwuno and Ihe FHI: 83968		29-10-1977	Maiduguri Borno State
		B.O. Daramola FHI: 61367		29-05-1968	Kano Kano State
		J.K. Jackson FHI: 15830		20-06-1966	Kano Kano State
		Onyeachusim Odewo and Olorunfemi FHI: 101452		17-09-84	Not indicated

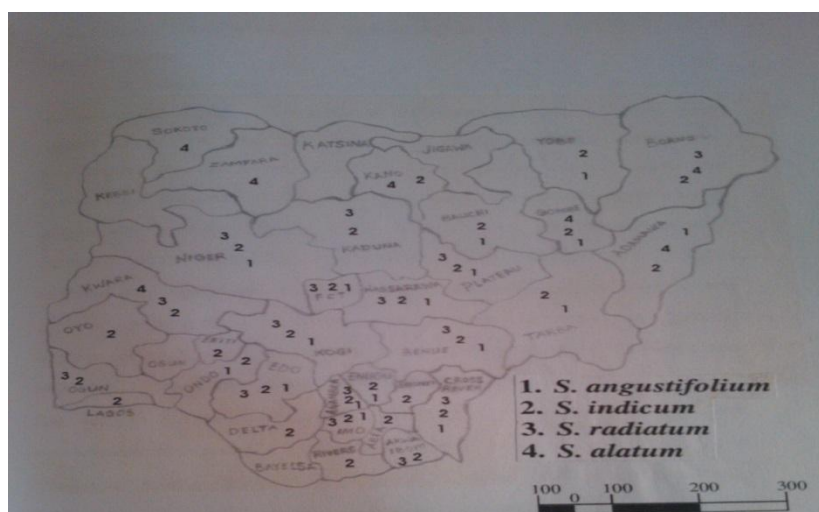


Fig. 1. Distribution pattern of the four species of sesamum studied.

References

- Aguoru, C.U., 2009. Biosystematic studies on the genus *Sesamum* L in Nigeria. PhD thesis. Department of Plant Science and Biotechnology. Univ. Port Harcourt. Nigeria.
- Akobundu, I.O., Agyakwa, C.W., 1998. A handbook of West African weeds 2nd Ed. IITA Ibadan 564pp.
- Bedigian, D. (1984). *Sesamum indicum* L crop origin, chemistry and ethnobotany, PhD University of Illinois Urban champaign.
- Bedigian, D., 2003. Sesame in Africa: Origin and Dispersals pp 17-36 in food, fuel and field progress in African Archaeobotany (K. Neuman, A. Butler and S. Kahlheber eds) African Prehistorica. Heinrich Barth Institute, Coconge.
- Brar, G.S., Ahuja, K.L., 1979. Sesame; Its culture, genetics, breeding and biochemistry. Pp 245-303 in Annu. Rev. of Plant Sci. (C.P. Malik ed) Kalyani Publishers, New Delhi, India.
- Busari, L.D., Olowe, V.I.O., Idowu, A.A., 2005. Sesame in major oil legumes and oil seeds of Nigeria; principles of production and utilization x1 211 (ED- idem, N.U.A and Showemimo, F.A).
- Edeoga, H.O., Ugbo, H.N., Osawe, P., 1998. Palynomorphology of species of *Commelina* L. and *Senna* Tourn. Ex. Mill from Nigeria. New Botan., 5, 1-10.
- Food and Agriculture Organization., 2004. <http://apps.fao.org/faostat/collections? Version=ext & hasbulk=0 & subset=agricultu/retrieve> March 2006.
- Hutchinson, J., Dalziel, J.M., 1958. Flora of west tropical Africa vol. 1 and 2. 2nd ed. Crown Agents London, s.w.1. 567-569 pp.
- IPGRIS and NBPGR., 2004. Descriptors for Sesame (*Sesamum* spp) International Plant Genetic Resource Institute, Rome Italy and National Bureau of Plant Genetic Resource, New Delhi.
- Johnson, L.A., Suleiman, J.M., Lucas E.W., 1979. Sesame protein; a review and prospectus. J. Amer. Oil. Chem. Soc., 56, 463-468.
- Kamal-Eldin, A., 1993. Seeds oils of *Sesamum indicum* L and some wild relatives. A compositional study in the fatty acids acyl, lipids, sterols, tocopherols and lignins. PhD thesis. Swedish Univ. Agr. Sci., Uppsala.
- Kidir, M.D., 1978. Oil seeds (*Sesame*) crop genetic resources in Africa. Proceedings of workshop jointly organized by association for the advancement of agricultural science in Africa and IITA Ibadan. Pp 92-102.
- Nayarr, N.M., 1995. Sesame; *Sesamum indicum* L. (Pedaliaceae) Pp 404-407 in evolution of crop plants 2nd ed. (J. Smart and N.W. Simmonds, eds.) Wiley New York.
- World Bank., 2011. www.worldbank.org/en/country/ng retrieved 02/02/2013 @5.45pm.
- World Bank., 2012. www.worldbank.org/en/country/ng retrieved 02/02/2013 @ about 5.58pm.