Net Journal of Agricultural Science
Vol. 8(2), pp. 33-39, May 2020
ISSN: 2315-9766
Full Length Research Paper

Phytosociological attributes of weeds of Sugarcane at Badeggi, Southern Guinea Savannah of Nigeria

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Accepted 27 April, 2020

ABSTRACT

Study was conducted to assess the phytosociological attributes of weed species in sugarcane at the upland sugarcane experimental field of the National Cereals Research Institute, Badeggi, in the Southern Guinea savanna of Nigeria in 2016 and 2017 dry and wet season. A total of 46 weed species were identified during the 2016 and 2017 dry and wet season. The results obtained indicated that *P. scrobiculatum* and *K. squamulata* weed species were the most densely populated in 2016 and 2017 season. Based on the Importance Value Index, the results showed that *Paspalum scrobiculatum*, *Kyllinga squamulata, Brachiaria deflexa, Cyperus esculentus* and *Dactylactenum aegyptium* were the most important weeds in sugarcane fields in both years in the study area. The most notable weeds associated with the sugarcane crop were grasses followed by sedges families. Weed control methods in sugarcane should be made towards the control of grasses and sedges species.

Keywords: Phytosociology, weed species, sugarcane, importance value index (IVI).

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INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) is one of the most important crops in the world. In 2016, a total of 26,774,304 ha were harvested with 1.93% of the world's harvested area, which places it as the 12th most important crop globally. For the same year, sugarcane production was 1,890,661,751 tons, placing it as most important crop in the world in terms of volume and representing 21.1% of the total world crop production. The countries with the largest production volume in 2017 were: Brazil (41% of world production), India (16%), China (6%) and Thailand (6%). The remainder was produced by 100 countries (FAOSTAT, 2019). Sugarcane accounts for 75% of the world's sucrose production (Da Silva and Bressian, 2005). Besides the production of raw sugar, of which sugarcane is mainly produced for, sugarcane also represents an important source of renewable energy which has recently gained attention because of ethanol production (Smeets et al., 2009). In Nigeria, the crop is cultivated on over 500,000 hectares of land, which is capable of producing over 3.0 million metric tons of sugarcane (Wada et al., 2017). It is capable of yielding 3.0 million metric tons of processed sugar. Sugarcane production is mainly located in the North Central part of the country and close to the border with Niger, Kano states accounting for 30% of the national production (Takim et al., 2014).

Weeds pose tough competition to sugarcane crop because of wide spacing, slow germination and initial growth, heavy fertilization and frequent irrigations (Refsell and Hartzler, 2009). Initial slow growth and wider row spacing provide ample opportunity for weeds to occupy the vacant spaces between rows and offer serious crop-weed competition (Mahima and Bijnan, 2016). Apart from the quantitative damages caused by weeds due to competition with water, light and nutrients, weeds also cause a reduction in crop yield (Ahmed et al., 2014; Bassey et al., 2017). Singh and Tomar (2005) reported yield loss to an extent of 28 to 38% in ratoon crop due to weeds, and the most critical period for weed competition was between 30 and 60 days after ratoon initiation. Weed

can reduce sugarcane tonnage in the field, sucrose recovery in the mills and shortened ratoon lives (Chaudhari et al., 2016). The extent of loss in cane yield caused by weeds is from 10% to total crop failure depending upon composition and diversity of weeds (Takim and Amodu, 2013).

Because of the variability in the growth habit of weeds, any single method of weed control cannot effectively provide a season long control in sugarcane. Plants like humans form a society referred to as phyto-society, which is essentially an ecosystem of crops and weeds. Phyto-sociological study gives an appraisal of plants or weeds of importance in an area with fact and figures; provide overall information on the species-wise distribution in and around crops of a given area and; compare and classify weeds in a crop-weed ecosystem (Zimdahl, 2007; Das, 2011). Understanding the sociological structure of weeds in crop fields is a pre-requisite for its effective management (Firehun and Tamado, 2007). Phytosociological study of weeds are necessary for understanding the relationship between crops and their weed flora and may be useful, as a tool for developing a sustainable long-term weed management strategy (Alhassan et al., 2015). This study was under taken to determine the phytosociological characters of weeds in sugarcane field with the view to identify the most important weeds associated with sugarcane and suggest an effective weed management strategy.

MATERIALS AND METHODS

Experimental site

Field trial was conducted at the upland sugarcane experimental field at the National Cereals Research Institute, Badeggi (lat. 9° 45' N, long. 06° 07' E) in the Southern Guinea savanna of Nigeria in 2016 and 2017 dry and wet season. The total rainfall during the experimental period was 1504.1 mm in 2016 and 1045.4 mm in 2017, respectively. The mean air temperature during the sugarcane plant cropping season was 35 to 38°C in 2016 and 34 to 36°C in 2017 cropping seasons.

Methodology

Weed phytosociological parameters were taken from a 1.0 m × 1.0 m quadrat placed randomly in two sugarcane varieties (NCS 001 and Bida local) made of 96 planted plots at harvest. Weed seedlings in each quadrat were pulled out, washed with tap water, counted and separated by species. The weeds were identified using the handbook of West African Weeds (Akobundu and Agyakwa, 2016). The phytosociological attributes; frequency, density, dominance, and their relative values and Importance Value Index (IVI) were computed using the following principles as presented by Das (2011):

$$\text{Relative frequency (RF)} = \frac{Number\ of\ occurrence\ of\ a\ species}{Sum\ of\ occurence\ of\ all\ species} \times 100$$

$$\text{Relative density (R. Dn.)} = \frac{Total\ number\ of\ individuals\ of\ a\ species\ in\ all\ quadrats}{Total\ number\ of\ individuals\ of\ all\ the\ species\ in\ all\ quadrats} \times 100$$

$$\text{Relative dominance (R. Do.)} = \frac{Abundance\ of\ a\ species}{Sum\ of\ abundance\ of\ all\ species} \times 100$$

$$= \frac{A}{\sum Ai} \times 100$$

Where 'A' is the abundance of a species and '$(\sum Ai)$' is the sum of abundance of all species

Importance Value Index (IVI) = [Relative frequency (RF) + Relative density (R. Dn.) + Relative dominance (R. Do.)]

RESULTS AND DISCUSSION

Weed species identified in the sugarcane experimental field at Badeggi during the 2016 and 2017 dry and wet season and their phytosociological relative frequencies are provided in Table 1. A total of 46 weed species were identified across the experimental fields. Among the weeds 19 (41.3%) are grasses, 21 (45.7%) are broad leaf and 6 (13%) are sedges. The most frequent weed species in NCS 001 variety with relative frequency above 10% were *P. scrobiculatum* and *E. indica* (L.) in 2016, and *C. dactylon* (Linn.) and *H. suaveolens* (Poit.) in 2017. On the other hand, in Bida local, the most frequent weed species were *P. scrobiculatum* and *E. indica* (L.) in 2016. However, in 2017, *C. dactylon* Linn. and *H. suaveolens* Poit were observed. Results of this study shows that the high frequency of these species is an indication of their importance as troublesome weeds of sugarcane. This can be attributed to their rapid growth and abundant shading which produce high amounts of diaspores, which may favour the re-infestation and positively affects neighbouring plants. These could also be because of their ability to adapt to the local conditions and compete efficiently with the sugarcane crops. These findings is in agreement with the work of Moreira and Bragança (2010); Batista et al. (2014) and Ramirez and Plaza (2015), who stated that weed species may exhibit high frequencies only in environments that they are adapted to irrespective of the disturbances in the ecological conditions of the site.

Table 1. Phytosociological analysis of weed relative frequency in two sugarcane varieties.

Weed species	LC	MG	Relative frequency			
			NCS 001		Bida local	
			2016	2017	2016	2017
Paspalum scrobiculatum (Linn.)	P	G	12.37	4.0	13.89	3.53
Setaria pumila (Poir)	A	G	1.03	-	2.39	-
Cynadon dactylon (Linn.)	P	S	2.06	10.89	1.15	10.59
Phyllanthus niruri (Schum.&Thonn)	A	S	-	4.0	-	5.88
Commelina diffusa (Burm.)	P	S	-	-	5.85	-
Kyllinga squamulata (Thorn.ex Vahl)	A	S	8.25	-	6.89	-
Eragrostis tremula (Hochst.ex.Steud)	A	G	-	-	2.39	-
Sacciolepis Africana (Hubb & Snowden)	P	G	3.09	-	2.39	-
Panicum laxum Sw.	A	G	2.06	-	1.15	-
Brachiaria deflexa (Schumach) C.E	A	G	5.16	2.97	4.59	3.53
Euphorbia hirta (Linn.)	A	B	-	-	3.55	-
Digitaria horizontalis (Willd.)	A	G	4.02	-	8.06	-
Tridax procumbens (Linn.)	A	B	2.06	-	1.15	1.18
Eleusine indica (L) Gaertn.	A	G	11.34	-	10.35	-
Ludwigia hyssopifolia (G.Don)	A	B	3.09	-	-	-
Brachiaria jubata (Fig&De Not.)	A	G	5.16	-	6.89	-
Cyperus esculentus (Linn.)	P	S	4.02	8.91	4.59	8.24
Seteria barbata (Lasr.)Kunth	A	G	3.09	-	1.15	-
Imperata cylindrical (Linn.)	P	G	2.06	0.99	3.55	2.35
Commelina benghalensis (L.)	P	B	5.16	9.90	-	8.24
Trianthema portulacastrum (Linn.)	A	B	1.03	-	1.15	-
Tephrosia bracteolate (Guill&Perr.)	A	B	2.06	-	1.15	-
Dactylactenum aegyptium (Linn.)	A	G	5.16	9.90	3.55	9.41
Setaria longiseta (P.Beauv.)	A	G	-	-	2.39	-
Corchorus olitorius (L.)	A	B	1.03	6.93	1.15	8.24
Rottboellia cochinchinensis (Lour.)	A	G	1.03	2.0	-	1.17
Cleome hirta (L.)	A	B	2.06	-	1.15	-
Chloris pilosa (Schumach)	A	G	1.03	-	-	-
Setaria verticilillata (Lam.) Kunth	A	G	2.06	-	1.15	-
Cyperus rotundus (Linn.)	P	S	1.03	-	1.15	-
Cleome viscose(L.)	A	B	2.06	-	2.39	-
Digitaria milangina (Wild.)	A	G	4.02	-	1.15	-
Desmodium tortuosum (Sw.)DC.	A	B	-	-	1.15	-
Sesamum alatum (Thonning)	A	B	-	-	-	1.18
Gomphrena celosiodes (Mart.)	A	B	-	0.99	-	-
Ipomoea asarifolia (Desr.)Roem	P	B	-	-	1.15	-
Hyptis suaveolens (Poit)	A	B	2.06	12.87	1.15	15.19
Andropogon gayanus(Schum.&Thonn)	P	G	1.03	-	1.15	-
Digitaria nuda (Schumach.)	A	G	-	5.0	-	5.88
Boerhavia diffusa (L.)	A	B	-	2.0	-	2.35
Physalis angulata (Linn.)	A	B	-	2.97	-	-
Schwenckia Americana (L.)	P	B	-	2.0	-	3.53
Sebastiana chamaelea (L.) Muell.Arg.	P	B	-	8.91	-	7.06
Tephrosia linearis (Wild.) Pers.	A	B	-	2.97	-	1.18
Calopogonium mucunoides (Desv.)	P	B	-	-	-	1.18
Leucas martinicensis (Jacq.) Ait.f.	A	B	-	2.0	-	-

LC - Life cycle, MG - Morphological group, P - Parennial, A - Annual, G - Grass, S - Sedges, B – Broadleaves.

Weed species identified with their phytosociological densities are shown in Table 2. It was observed that three species, namely *P. scrobiculatum* (Linn.) and *K. squamulata* (Thorn.ex. Vahl) in both varieties and

Table 2. Phytosociological analysis of weed relative density in two sugarcane varieties.

Weed species	LC	MG	Relative density			
			NCS 001		Bida local	
			2016	2017	2016	2017
Paspalum scrobiculatum Linn.	P	G	22.27	2.89	20.83	1.13
Setaria pumila (Poir)	A	G	0.80	-	5.25	-
Cynadon dactylon (Linn.)	P	S	0.37	15.96	0.49	21.09
Phyllanthus niruri (Schum.&Thonn)	A	S	-	7.23	-	2.89
Commelina diffusa (Burm.)	P	S	-	-	1.35	-
Kyllinga squamulata (Thorn.ex Vahl)	A	S	19.99	-	19.73	-
Eragrostis tremula (Hochst.ex.Steud)	A	G	-	-	1.35	-
Sacciolepis Africana (Hubb & Snowden)	P	G	1.79	-	1.59	-
Panicum laxum Sw.	A	G	1.67	-	0.67	-
Brachiaria deflexa (Schumach) C.E	A	G	11.73	3.57	5.76	4.67
Euphorbia hirta (Linn.)	A	B	-	-	0.43	-
Digitaria horizontalis (Willd.)	A	G	1.48	-	8.89	-
Tridax procumbens (Linn.)	A	B	0.31	-	0.18	0.16
Eleusine indica(L) Gaertn.	A	G	9.49	-	9.29	-
Ludwigia hyssopifolia (G.Don)	A	B	0.25	-	-	-
Brachiaria jubata (Fig&De Not.)	A	G	7.04	-	4.29	-
Cyperus esculentus (Linn.)	P	S	1.67	5.60	3.37	9.18
Seteria barbata (Lasr.)Kunth	A	G	5.38	-	2.61	-
Imperata cylindrical (Linn.)	P	G	1.36	0.51	1.35	2.09
Commelina benghalensis (L.)	P	B	1.60	3.74	-	7.09
Trianthema portulacastrum (Linn.)	A	B	0.12	-	0.55	-
Tephrosia bracteolate (Guill&Perr.)	A	B	0.25	-	0.06	-
Dactylactenum aegyptium (Linn.)	A	G	3.27	13.24	6.62	3.54
Setaria longiseta (P.Beauv.)	A	G	-	-	2.51	-
Corchorus olitorius (L.)	A	B	0.12	4.41	0.12	3.06
Rottboellia cochinchinensis (Lour.)	A	G	0.56	0.51	-	0.16
Cleome hirta (L.)	A	B	0.43	-	0.18	-
Chloris pilosa (Schumach)	A	G	0.80	-	-	-
Setaria verticilillata (Lam.) Kunth	A	G	0.56	-	0.25	-
Cyperus rotundus (Linn.)	P	S	0.12	-	0.18	-
Cleome viscose(L.)	A	B	0.56	-	0.31	-
Digitaria milangina (Wild.)	A	G	5.13	-	0.55	-
Desmodium tortuosum (Sw.)DC.	A	B	-	-	0.18	-
Sesamum alatum (Thonning)	A	B	-	-	-	0.33
Gomphrena celosiodes (Mart.)	A	B	-	0.51	-	-
Ipomoea asarifolia (Desr.)Roem	P	B	-	-	0.12	-
Hyptis suaveolens (Poit)	A	B	0.19	25.81	0.12	15.62
Andropogon gayanus (Schum.&Thonn)	P	G	0.68	-	0.40	-
Digitaria nuda (Schumach.)	A	G	-	8.32	-	8.05
Boerhavia diffusa (L.)	A	B	-	2.38	-	16.43
Physalis angulata (Linn.)	A	B	-	0.51	-	-
Schwenckia Americana (L.)	P	B	-	0.51	-	1.61
Sebastiana chamaelea (L.) Muell.Arg.	P	B	-	2.55	-	2.42
Tephrosia linearis (Wild.) Pers.	A	B	-	1.63	-	0.16
Calopogonium mucunoides (Desv.)	P	B	-	-	-	0.33
Leucas martinicensis (Jacq.) Ait.f.	A	B	-	0.34	-	-

LC - Life cycle, MG - Morphological group, P - Parennial, A - Annual, G - Grass, S - Sedges, B – Broadleaves.

B. deflexa (Schumach CE) in NCS 001 in 2016 were most densely populated. However in 2017, *C. dactylon* (Linn.) and *H. suaveolens* (Poit.) in both varieties, and *D. aegyptium* Linn in NCS 001 and *B. diffusa* L. in Bida

Table 3. Phytosociological analysis of weed relative dominance in two sugarcane varieties.

Weed species	LC	MG	Relative dominance			
			NCS 001		Bida local	
			2016	2017	2016	2017
Paspalum scrobiculatum Linn.	P	G	9.17	4.63	6.64	1.69
Setaria pumila (Poir)	A	G	4.25	-	9.85	-
Cynadon dactylon (Linn.)	P	S	0.96	9.30	1.88	10.66
Phyllanthus niruri (Schum.&Thonn)	A	S	-	11.53	-	2.61
Commelina diffusa (Burm.)	P	S	-	-	1.03	-
Kyllinga squamulata (Thorn.ex Vahl)	A	S	12.28	-	12.59	-
Eragrostis tremula (Hochst.ex.Steud)	A	G	-	-	2.58	-
Sacciolepis Africana (Hubb & Snowden)	P	G	3.08	-	3.05	-
Panicum laxum Sw.	A	G	4.31	-	2.58	-
Brachiaria deflexa (Schumach) C.E	A	G	11.09	7.62	5.51	7.11
Euphorbia hirta (Linn.)	A	B	-	-	0.55	-
Digitaria horizontalis (Willd.)	A	G	1.91	-	4.86	-
Tridax procumbens (Linn.)	A	B	0.79	-	0.70	0.73
Eleusine indica (L) Gaertn.	A	G	4.46	-	3.91	-
Ludwigia hyssopifolia (G.Don)	A	B	0.42	-	-	-
Brachiaria jubata (Fig&De Not.)	A	G	6.25	-	2.74	-
Cyperus esculentus (Linn.)	P	S	2.15	3.99	3.23	5.91
Seteria barbata (Lasr.) Kunth	A	G	7.55	-	9.62	-
Imperata cylindrical (Linn.)	P	G	3.51	3.37	1.72	4.72
Commelina benghalensis (L.)	P	B	1.66	2.39	-	4.66
Trianthema portulacastrum (Linn.)	A	B	0.64	-	2.11	-
Tephrosia bracteolate (Guill&Perr.)	A	B	0.64	-	0.24	-
Dactylactenum aegyptium (Linn.)	A	G	3.38	8.44	8.44	1.99
Setaria longiseta (P.Beauv.)	A	G	-	-	4.81	-
Corchorus olitorius (L.)	A	B	0.64	4.04	0.47	1.97
Rottboellia cochinchinensis (Lour.)	A	G	2.87	1.63	-	0.73
Cleome hirta (L.)	A	B	1.12	-	0.70	-
Chloris pilosa (Schumach)	A	G	4.25	-	-	-
Setaria verticilillata (Lam.) Kunth	A	G	1.44	-	0.94	-
Cyperus rotundus (Linn.)	P	S	0.64	-	0.70	-
Cleome viscose (L.)	A	B	1.44	-	0.59	-
Digitaria milangina (Wild.)	A	G	5.34	-	2.21	-
Desmodium tortuosum (Sw.) DC.	A	B	-	-	0.70	-
Sesamum alatum (Thonning)	A	B	-	-	-	1.45
Gomphrena celosiodes (Mart.)	A	B	-	3.27	-	-
Ipomoea asarifolia (Desr.) Roem	P	B	-	-	0.47	-
Hyptis suaveolens (Poit)	A	B	0.49	12.73	0.47	5.18
Andropogon gayanus (Schum.&Thonn)	P	G	3.51	-	4.42	-
Digitaria nuda (Schumach.)	A	G	-	10.67	-	7.36
Boerhavia diffusa (L.)	A	B	-	7.62	-	36.99
Physalis angulata (Linn.)	A	B	-	1.09	-	-
Schwenckia Americana (L.)	P	B	-	1.63	-	2.52
Sebastiana chamaelea (L.) Muell.Arg.	P	B	-	1.82	-	1.81
Tephrosia linearis (Wild.) Pers.	A	B	-	3.27	-	0.73
Calopogonium mucunoides (Desv.)	P	B	-	-	-	1.45
Leucas martinicensis (Jacq.) Ait.f.	A	B	-	1.09	-	-

LC - Life cycle, MG - Morphological group, P - Parennial, A - Annual, G - Grass, S - Sedges, B – Broadleaves.

local were also densely populated. Our finding shows that species of the Poaceae family were not highly populated in sugarcane field in each year of the study. It could be that some of the high amounts of diaspores produced

Table 4. Phytosociological analysis of weed IVI in two sugarcane varieties.

Weed species	LC	MG	IVI			
			NCS 001		Bida local	
			2016	2017	2016	2017
Paspalum scrobiculatum Linn.	P	G	42.81	11.47	41.26	6.35
Setaria pumila (Poir)	A	G	5.98	-	17.29	-
Cynadon dactylon (Linn.)	P	S	3.02	36.15	3.52	42.24
Phyllanthus niruri (Schum.&Thonn)	A	S	-	22.52	-	11.39
Commelina diffusa (Burm.)	P	S	-	-	8.13	-
Kyllinga squamulata (Thorn.ex Vahl)	A	S	39.51	-	39.22	-
Eragrostis tremula (Hochst.ex.Steud)	A	G	-	-	6.23	-
Sacciolepis Africana (Hubb & Snowden)	P	G	7.96	-	6.94	-
Panicum laxum Sw.	A	G	8.03	-	4.40	-
Brachiaria deflexa (Schumach) C.E	A	G	26.98	14.16	15.87	15.21
Euphorbia hirta (Linn.)	A	B	-	-	4.42	-
Digitaria horizontalis (Willd.)	A	G	7.52	-	21.79	-
Tridax procumbens (Linn.)	A	B	3.17	-	2.04	2.06
Eleusine indica (L) Gaertn.	A	G	25.29	-	23.45	-
Ludwigia hyssopifolia (G.Don)	A	B	3.76	-	-	-
Brachiaria jubata (Fig&De Not.)	A	G	17.45	-	13.92	-
Cyperus esculentus (Linn.)	P	S	7.94	18.51	11.19	23.32
Seteria barbata (Lasr.)Kunth	A	G	15.02	-	13.28	-
Imperata cylindrical (Linn.)	P	G	6.93	4.77	6.52	9.16
Commelina benghalensis (L.)	P	B	8.42	16.03	-	19.88
Trianthema portulacastrum (Linn.)	A	B	1.79	-	3.81	-
Tephrosia bracteolate (Guill&Perr.)	A	B	2.95	-	1.45	-
Dactylactenum aegyptium (Linn.)	A	G	11.80	31.58	18.51	14.95
Setaria longiseta (P.Beauv.)	A	G	-	-	9.26	-
Corchorus olitorius (L.)	A	B	1.79	15.39	1.74	13.26
Rottboellia cochinchinensis (Lour.)	A	G	4.46	4.12	-	2.06
Cleome hirta (L.)	A	B	3.61	-	2.04	-
Chloris pilosa (Schumach)	A	G	5.98	-	-	-
Setaria verticilillata (Lam.) Kunth	A	G	4.05	-	2.33	-
Cyperus rotundus (Linn.)	P	S	1.79	-	2.04	-
Cleome viscose (L.)	A	B	4.05	-	3.19	-
Digitaria milangina (Wild.)	A	G	13.59	-	3.81	-
Desmodium tortuosum (Sw.)DC.	A	B	-	-	2.04	-
Sesamum alatum (Thonning)	A	B	-	-	-	2.95
Gomphrena celosiodes (Mart.)	A	B	-	4.77	-	-
Ipomoea asarifolia (Desr.)Roem	P	B	-	-	1.74	-
Hyptis suaveolens (Poit)	A	B	2.73	51.41	1.74	35.99
Andropogon gayanus (Schum.&Thonn)	P	G	5.22	-	6.47	-
Digitaria nuda (Schumach.)	A	G	-	23.94	-	21.19
Boerhavia diffusa (L.)	A	B	-	11.98	-	55.78
Physalis angulata (Linn.)	A	B	-	4.57	-	-
Schwenckia Americana (L.)	P	B	-	4.12	-	7.56
Sebastiana chamaelea (L.) Muell.Arg.	P	B	-	13.27	-	11.29
Tephrosia linearis (Wild.) Pers.	A	B	-	7.77	-	2.06
Calopogonium mucunoides (Desv.)	P	B	-	-	-	2.95
Leucas martinicensis (Jacq.) Ait.f.	A	B	-	3.41	-	-

LC - Life cycle, MG - Morphological group, P - Parennial, A - Annual, G - Grass, S - Sedges, B – Broadleaves.

could not favour the re-infestation due to extreme weather condition and depliction of seed reserves. This finding is not in consonance with Ndarubu et al. (2006) and Takim et al. (2014) who reputed that species of Poaceae family are the most densely populated weeds associated with sugarcane in Nigeria, followed by

broadleaved weeds and the sedges being the least.

Highest dominance was observed in *K. squamulata* (Thorn.ex. Vahl) in both varieties and *B. deflexa* (Schumach CE) in NCS 001 in 2016 (Table 3). The phytosociological study shows that nine species were most dominant in 2016 in both varieties namely, *P. scrobiculatum, B. deflexa, E. indica, B. jubata, S. barbata, D. aegyptium, D. milangina, K. squamulata and C. esculentus*. Similarly, in 2017, highest dominance was observed in *P. niruri* (Schum and Thonn), *H. suaveolens* (Poit.) and *D. nuda* in NCS 001 variety while *C. dactylon* (Linn.) and *B. deflexa* (Schumach) in Bida local var. The dominance of these species indicates their power of regeneration, tolerance ability and survivability in sugarcane fields. In Nigeria, Ndarubu et al. (2006) earlier reported the scourge of poaceae family on the Nigerian sugar company Bacita fields.

Furthermore, *P. scrobiculatum, K. squamulata* and *E. indica* were weed species with highest Important Value Index (IVI) in both varieties (Table 4). In 2017, the weed species with highest IVI in both genotypes were *P. niruri, B. deflexa, C. esculentus, C. benghalensis, D. aegyptium, C. olitorius, H. suaveolens, D. nuda, B. diffusa, S. chamaelea* with *P. scrobiculatum* and *C. dactylon* in NCS 001 genotype only and *C. diffusa* in Bida local only. The high important value of these species indicate that their dominance and ecological success was due to their high phenotypic plasticity, more competitive characteristics such as large production of seeds, alternating forms of propagation and a high capacity of spread. These results also corroborate with the work of Blanco (2014), Rafael et al. (2015) and Welday et al. (2018), who found that *C. esculentus* and *P. scrobiculatum* showed the highest importance value of weeds in sugarcane fields.

CONCLUSION

This study was able to establish that the most important weeds that were associated with sugarcane crop in the study area were mostly grasses, a few broadleaved and sedges. The most important weed species of sugarcane in both seasons were *P. scrobiculatum*, *B. deflexa*, *E. indica*, *B. jubata, S. barbata*, *D. aegyptium*, *D. milangina*, *K. squamulata* and *C. esculentus*. The weed species with high IVI in sugarcane suggest their adaptation and ability to produce high number of seeds in the soil seed bank. Effective weed management should strategize on the control of growth and reproduction of the grass and sedge weed species family.

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Citation: Bassey MS, 2020. Phytosociological attributes of weeds of Sugarcane at Badeggi, Southern Guinea Savannah of Nigeria. Net J Agric Sci, 8(2): 33-39.