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RESEARCH ARTICLE

Survey of Weeds on Irrigated Farms in Mubi Area, Semi –Arid Ecology, Nigeria

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Abstract:

A survey was carried out on the weed management practices used by farmers in irrigated farming in Mubi area ($10^{\circ} 15' N$, $13^{\circ} 5' E$) in the semi -arid ecology of Nigeria. twenty farms were selected from four sampled villages (Muchalla, Muvur, Wuro-Gude and Hurida), where irrigated farming is practiced. Questionnaires were administered to farmers; in addition ,oral interview was conducted . Results of theSurvey has shown that classification of weed species in the area based on life cycle has revealed that annual weeds had the highest number of species (73%) followed by perennials (23%) and annuals/perennials (3.8%). With respect to morphology, grasses gave the highest number of species (46.2%) followed by broad leaves (42.3%), and the least sedges (11.5%). The highest weed species density ($153.2/m^2$) was exhibited by *Cyperus tuberosus* followed by *Cyperus esculentus* ($146.2/m^2$). The highest weed infestation at the irrigated farms ($479.2weeds/m^2$) was recorded at Wuro-Gude.

Key Words: weed survey annuals perennials.

Introduction

In irrigated cropping, weed is one of the most troublesome pests. Therefore the need for effective weed control cannot be over-emphasized. More energy is expended on weed control by farmers than on any other single human task. (HoIru,1976, Ayeni, 1991). The area of land cultivated by farmers greatly depends on their ability to control weeds on such land. Akobundu (1989) did a survey on farm labour input and found out that 80% of farm labour input goes to weeding. There are about 50, 000 plant species in the world, less than 50 of this number are universally regarded as weeds (Holt, 1988). Yet they cause serious threats to man on farms, in water ways, on landscapes, avenues and allergies among others. Arable crop production in the tropics is usually associated with excessive annual weed growth which includes perennial and parasitic weeds that are difficult to eliminate. Yield of crop is greatly affected by weeds. Akobundu (1987) reported that weed interference reduces crop yield and yield components. Similar remarks was made by Eneji *et al.*, (1995).Weeds constitute a major production constraints to dry season cropping in Nigeria (Kafaru, 1994). Weed infestation in irrigated crops (tomatoes, pepper, sugarcane and onion) has been reported to cause between 12 and 78% reduction in yield, which varied with the weed species, intensity of weed infestation and the crop cycle (Zamdahi, 1980; Ibrahim, 1984; Fadayomi and Abayomi, 1988).In a study conducted by Eneji *et al.*, (1995), it was observed that soil fertility influenced weed interference with crops. The effect of weed growth may depend on the fertility level of the soil. Yakubu *et al.*, (2006) reported that *fadama* soils (these are valley bottom soils) are highly variable with respect to fertility level and other physical properties such as texture and structure all of which can affect the growth of weed floras.

The weed floras on most irrigated farms consist of both annuals and perennials (Hilton Osgood, 1972; Goswani *et al.*, 1990). In their effort to combat the menace of weeds, farmers adopt various methods which include; hand and mechanical weeding, chemical weed control, mulching, flooding and crop rotation. Effective weed control largely depends on good knowledge of the weed species present in an area, such knowledge can be achieved through weed survey. In this respect, the effort to identify the predominant weed species in Mubi can be invaluable for effective weed control in the area Therefore, this study was conducted with the objectives of identifying the dominant weed species on irrigated farms in Mubi area , which can serve as a guide in knowing the appropriate weed control measures.

Material and Methods

The study was conducted from April to May, 2008, in Mubi North Local Government Area of Adamawa State. The survey area is located about latitude 10.15' N and longitude 13.5' E. comprising four districts namely; Mubi, Ba'a, Muchalla and Mayo-Bani. The area belongs to the highland relief region of Adamawa State with well defined valleys suitable for irrigated farming (Adebayo, 1997). The annual rainfall ranges from about 900mm to 1050mm. (Tukur 1999). In all the four districts (Mubi, Ba'a, Muchalla and Mayo-Bani), dry season farming is practiced using residual moisture. Irrigated farming is practiced in two districts (Mubi and Muchalla). In these two districts, 24 farms were randomly selected. The sampled villages include; Muchalla, Muvur, Wuro-Gude and Hurida.

Administration of Questionnaires

Questionnaires were prepared and administered to every farmer whose farm was selected, however, oral interview was also conducted with respect to those who cannot read and write. The distribution of questionnaires on village basis is presented in Table 1

Table 1 Distribution of questionnaire on village basis

Village	No. Supplied	NO. Received
Muchalla	8	8
Muvur	2	2
Wuro Gude	10	10
Hurida	4	4
Total	24	24

Percentage recovered 100

Weed Sampling .

At each selected farm, weeds were sampled from three quadrants with a dimension of 1m² each. This was used to determine the distribution of weed species and density. The collected weed samples were oven dried at 75⁰ C for 12 hours. Weed dry weight was determined by taking the means of weed oven dry weight from the three quadrants.

Results

General Classification of Weeds

The classification of the weed samples collected from the study area is presented in Table 2

Table 2. Classification of weeds collected from MuM North Local Government Area.

SIN	Weed species	Life cycle	Morphology
1	<i>Acanthospermum hispidum</i>	A	B
2	<i>Ageratum conyzoides</i>	A	B
3	<i>Amaranthus spinosus</i>	A	B
4	<i>Boerhavia diffusa</i>	A	B
5	<i>Cassia mimosoides</i>	NP	B
6	<i>Cyperus tuberosus</i>	P	S
7	<i>Cyperus exculentus</i>	P	S
8	<i>Cyperus rotundus</i>	P	S
9	<i>Cynodon dactylon</i>	P	G
10	<i>Commelina benghalensis</i>	A	G
11	<i>Commelina erecta</i>	A	G
12	<i>Digitaria horizontalis</i>	A	G
13	<i>Echinochloa obitusflora</i>	A	G
14	<i>Echinochloa colona</i>	A	G
15	<i>Euphorbia hirta</i>	A	B
16	<i>Euphorbia heterophylla</i>	A	B
17	<i>Eleusine indica</i>	A	G
18	<i>Ipomoea triloba</i>	A	B
19	<i>Mitracarpus villosus</i>	A	B
20	<i>Oryza longistaminata</i>	A	G

21	<i>Paspalum polystachyum</i>	P	G
22	<i>Portulaca oleracea</i>	A	B
23	<i>Portulaca quardrifida</i>	A	B
24	<i>Roftboellia cochinchinensis</i>	A	G
25	<i>Imperata cylindrical</i>	P	G
26	<i>Setaria pallide-fusca</i>	A	G

B = Broad leaves S = Sedges

G = Grass

A = Annual

P = Perennial

The classification of weed species based on life cycle has shown that annuals had the highest number of species (73%) followed by perennials (23%) and annuals/perennials (3.8%). With respect to morphology, grasses gave the highest number of species (46.2%) followed by broad leaves (42.3%), and the least sedges (11.5%).

Noxious Weeds

Results from the questionnaires indicated that most respondents considered *portulaca oleracea* as the most troublesome weed (Table 3) followed by those who opined that it is *cyperus rutundus* and *Cyprus tuberosus*, then respondents who considered it to be *commelina benghalensis* and lastly those who regarded it to be *cynodon dactylon*.

Table 3 Distribution based on the perceived most troublesome weed

Weed Species	Respondents	Percentage (%)
<i>Portulaca oleracea</i>	12	50
<i>Cyprus rutundus</i> <i>Cyprus turberrosus</i>	6	25
<i>Cammelina banghalensis</i>	4	16.6
<i>Cynonodon dactylon</i>	2	18.3
Total	24	100

Mean Weed Number Quadrant (1m²) Mean weed number per quadrant has shown that WuroGude has the highest number (479.2) followed by Hurida (265.4) Muchalla (194) and lastly Muvur (45.4) (Table 4). With respect to weed species *cyperus exculentus* was found to be most dominant species at Wuro-Gude (29.6%); at Hurida, Muchalla and Muvur it was *cyperus tuberosus* (57.3%), *Echinochloa obtisflora* (23.7%) and *cynodon dactylon* (33.4%) respectively.

Mean weeds number per quadrant (1m²) is presented in Table 4.

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Table 4 Mean Weed Number per Quadrant (1m²)

S/N	Weed species	Muchalla	Muvur	W/Gude	Hurida
1	<i>Acanthospemutrl Hispidum</i>	0	0	18.0	0
2	<i>Ageratum conyzoides</i>	10.0	14.0	0	0
3	<i>Amaranthus spinosus</i>	0	0	4.0	0
4	<i>Boerhavia diffusa</i>	0	0	15.8	0
5	<i>Cassia mimosoides</i>	9.0	0	0	0
6	<i>Cyperus tuberosus</i>	3.4	0	1024	153.2
7	<i>Cyprus excuientus</i>	39.2	0	142.6	0
8	<i>Cyperus rutundus</i>	10.6	0	34.0	7.2
9	<i>Cynodon dactylon</i>	0.6	15.2	0.6	46.0
10	<i>Commelina benghalensis</i>	24.6	0	4.6	0
11	<i>Commelina erecta</i>	2.6	0	0	1.2

12	<i>Digitaria horizontalis</i>	3.2	0	0	0
13	<i>Echinoch(oa obitusflora</i>	46.0	8.6	0	31.2
14	<i>Echinochloa colona</i>	0	0.6	-0	0
15	<i>Euphorbia hirta</i>	0	0.6	-o	0
16	<i>Euphorbia heterophylla</i>	0.6	2.6	78.4	4.0
17	<i>Eleusine Indica</i>	0	0	19.2	0
18	<i>Ipomoea triloba</i>	0	0.6	0	0
19	<i>Mitracarpus villosus</i>	0.6	0	0	0
20	<i>Oryza longistaminata</i>	2.6	0	0	0
21	<i>Paspalum Polystachyum</i>	2.6	0	0	0
22	<i>Portulaca Oleracia</i>	16.0	3.2	50.0	20.6
23	<i>Portulaca quardrifida</i>	0	0	9.0	0
24	<i>Rottboellia Cochinchinensis</i>	22.6	0	0	1.4
25	<i>Imperata cylindrical</i>	0	0	0	0.6
26	<i>Setaria pallid-fusca</i>	0	0	0.6	0
Total		1940	45.4	479.2	265.4

Discussion

Weed Classification

The weed species under irrigated cropping in Mubi area were observed to be mostly annuals, constituting about 73% of the total weed species. Morphological classification has shown that majority of the weed species are grasses constituting 46.2% of the number of weed species. This could be ascribed to regular over flooding in the area, as over flooding increases the rate of weed in weed seed bank (Yakubu *et. al.*, 2006).

Weed Density

Mean Weed per /m² quadrant showed that *cyperus tuberosus* ranked highest. Wuro-Gude exhibited the highest weed infestation. (492 weeds/m²). It is possible that, the *tuberosus* underground structure of *cyperus* species enables the weed to survive better than other weed species when hand weeded, since manual weeding only removes the above ground vegetation, hence the ability of the weed species to colonize an area easily. This therefore, requires the combined use of hand weeding and use of systemic herbicides such as glyphosate to effectively combat the problem of weeds in this area. That is why in the study, the combined use of herbicide and hand weeding gave better suppression of weed infestation.

Therefore, while *portulaca oleraca* has been noted to be most difficult weed to control in the surveyed areas, *cyperus exculentus* and *cyperus tuberisus* are not only rated as the second troublesome weed species but also the most dominant weed species across the various locations. It is therefore pertinent that the combined use of herbicide and hand weeding has been found to be the most effective weed control method. This is to be expected since systemic herbicide effectively controls the tuber of the *cyperus* species and *portulaca oleracae* which resist desiccation when hoe weeded.

Conclusion

The study has shown that the dominant weed flora in the survey area is annuals while morphological classification has shown that most of the weeds are broadleaves, Mean weed number has shown Wuro-Gude as recording the highest (479.2) while *cyperus* species was accorded the most populated weed species *portulea oleracea* was ranked as the worst noxious broadleaves weed but, *cynodon dactylon* among grass.

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