

## WEED SURVEY IN AUTUMN PLANTING OF SUGAR CANE AT ESNA DISTRICT- QENA GOVERNORATE

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### ABSTRACT

A weed survey of 100 fields for planting or ratoon sugar cane was conducted monthly from October 1999 to September 2001, at Esna district, Qena Governorate. Fifty two species were observed in planting sugar cane (37 broad leaf and 15 grassy) belonging to 44 genera and 18 families. Fifty species (35 broadleaf and 15 grassy) belonging to 42 genera and 18 families were recorded in ratoon sugar cane.

*Gramineae* and *Cyperaceae* families were representing narrow leaved weeds (Monocotyledons plants). *Amaranthaceae*, *Chenopodiaceae*, *Compositae*, *Convolvulaceae*, *Cruciferae*, *Euphorbiaceae*, *Leguminosae*, *Malvaceae*, *Plantaginaceae*, *Polygonaceae*, *Portulacaceae*, *Primulaceae*, *Solanaceae*, *Tiliaceae*, *Umbelliferae* and *Urticaceae* were representing broad leaved weeds (Dicotyledons plants).

Dominant broadleaved weed species according to frequency % as well as relative abundance values in planting sugar cane were : Slender (*Amaranthus viridis* L.), Nettleleaf (*Chenopodium murale* L.), Field bindweed (*Convolvulus arvensis* L.) and Common Purslane (*Portulaca oleracea* L.) while in ratoon sugar cane were *Chenopodium murale* L. and *Portulaca oleracea* L. Dominant broadleaved weed species of density (occurrence fields) in planting

sugar cane were: Pigweed (*Amaranthus cruentus* L.), Greater ammi (*Ammi majus* L.), *Chenopodium murale* L., *Convolvulus arvensis* L., Sun spurge (*Euphorbia helioscopia* L.) and *Portulaca oleracea* L. while in ratoon sugar cane were *Amaranthus cruentus* L., *Chenopodium murale* L., *Convolvulus arvensis* L.

Dominant narrow leaved weed species by the obtained frequency % as well as relative abundance values in planting and ratoon sugar cane were : Purple nutsedge (*Cyperus rotundus* L.) Dominant narrow leaved weed species of density (occurrence fields) in planting sugar cane were Signal grass (*Brachiaria eruciformis* (Sibth & Sm) Griseb.) and *Cyperus rotundus* L. while no dominant narrow leaved weed species of density in ratoon sugar cane.

**Key words:** density and relative abundance, frequency, planting and ratoon sugar cane, weed flora.

## 1. INTRODUCTION

In Egypt, sugar cane *Saccharum officinarum* L. is considered the main source of sugar production. It is cultivated in about 290000 fed. in upper Egypt. Weeds compete with crops for solar radiation, soil, water, nutrients and space. Sugar cane yield reductions caused by weed infestation and the total loss in the yield ranged between (25-93%) as reported by Mani *et al.*, 1968, El-Nawawy and Abu Zaid 1969, Obein and Baltazar 1979, Ibrahim 1984, Nour and Allam 1988, Abd El- Latif *et al.*, 1994 and Attalla *et al.*, 1995.

Cultivated soil contains a large number of weed seeds which under favourable conditions germinate and interfere with growing crops. Identification of weed seedling species would provide information about weed population distribution in the fields. Variability in weed density and species composition could be an important source in the extant community.

Surveys are useful for determining the geographical distribution of weeds over large areas, and variation in weed density within smaller areas. Weed distribution and density information may

provide a useful data base for weed research and planning efficient control programmes of weeds in sugar cane.

In Egypt, weed survey was performed in different crops such as wheat (El-Khanagry 1993 and Hassanein *et al.* 1998), Faba bean (Hassanein *et al.* 1995) and sugar beet (El-Gharabawy *et al.* 1988).

The main objective of the present work was to provide a base information about the existing weed flora, weed distribution and density in sugar cane fields at Qena Governorate.

## 2. MATERIALS AND METHODS

Weed survey of sugar cane fields was conducted monthly (1<sup>st</sup> week of October 1999 till September 2001) at Esna, Qena Governorate to study weed flora in planting and ratoon sugar cane. The sowing dates were (September-October) and (January-February), respectively. The district was divided into 10 villages (Locations) and each village (Location) contained 10 fields. Fields were surveyed by the methodology of (Thomas 1985). Five quadrates (1-m<sup>2</sup>) were randomly placed at the end of (W) pattern in each field. The starting sample point was collected by walking 100 paces from one corner along the edge of the field (beside road or main watering canal), turning at right angle and then walking 100 paces into the field (within branch watering canal). The 1<sup>st</sup> quadrate of sampling began at this point then walking between the rows (rows spaced 1-m apart) for doing the other samples and followed by (W) pattern as shown in Fig. (1). The distance between each quadrate was 30 paces apart. Each village (Location) contained 50 quadrates. The existing weed species in each quadrate were listed and calculated. Then, identification and classification of species were performed according to Muschler 1912, Tackholm and Drar 1950, Tackholm 1974, Boules and El-Hadidi 1984, Zaki 1991 and Hassanein *et al.* 2000.

The data were summarized using the following quantitative measures as outlined by Thomas 1985 and Shaltout and El-Fahar 1991.



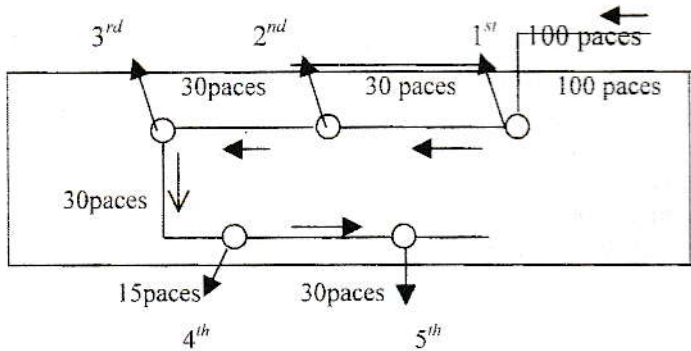


Fig. (1) A diagram of taking field samples during the survey in sugar cane fields(5 sample sites give W pattern).

Frequency (F%) was the number of fields in which a species occurred in at least one quadrate, over total number of fields.

$$\text{Frequency \%} = \frac{\text{Number of fields infested by each weed species} \times 100}{\text{Total number of fields (100 fields)}}$$

Density(occurrence fields) was the number of plants/m<sup>2</sup> for each weed, over only those fields in which the weed species occurred(DOF).

$$\text{Density(DOF)} = \frac{\text{Sum of number of plants for each species/m}^2}{\text{(occurrence fields) Total number of infested fields}}$$

Density(all fields) was the number of plants/m<sup>2</sup> for each weed, over all fields(DF).

$$\text{Density(DF)} = \frac{\text{Sum of number of plants for each weed species/m}^2}{\text{(all fields) Total number of fields(100 fields)}}$$

Field uniformity(all fields) was the number of sampling locations(5 quadrates/field) in which the weed species occurred, over the total number of samples. This measure was used to estimate the area infested with a species (UF) in particular area.

$$\text{UF} = \frac{\text{Sum of number of each species in quadrates/field} \times 100}{5 \times \text{total number of fields(100 fields)}}$$

$$\text{Relative Frequency \% (RF)} = \frac{\text{Frequency value of each weed species} \times 100}{\text{Frequency values for all species}}$$

$$\text{Relative density \% (RD)} = \frac{\text{Field density value of each species} \times 100}{\text{Field density values for all species}}$$

$$\text{Field uniformity \% (RUF)} = \frac{\text{Field uniformity value of each species} \times 100}{\text{Field uniformity values for all species}}$$

Relative abundance for each species(RA)=RF+RD+RUF

Relative abundance (RA) was used to compare between species. McCully *et al.*, (1991) mentioned that the most common and prevalent weeds determined by more than 15/300(5%) RA.

Another scales were used with previous parameters such as used by Abd El-Raouf *et al.*, 1993.

1- Dominant	> 30	F % and DOF/m <sup>2</sup>
	>4	R F % and R DOF %
2- Common	15-30	F % and DOF/m <sup>2</sup>
	2-4	R F % and R DOF %
3-Rare	<15	F % and DOF/m <sup>2</sup>
	<2	R F % and R DOF %

### 3. RESULTS AND DISCUSSION

Weed species which appeared with planting or ratoon sugar cane crop at Esna district, Qena Governorate are summarized in Tables (1&2).

**Planting sugar cane:** Fifty two species (37 broadleaf and 15 grassy) belonging to 44 genera (29 broadleaf and 15 grassy) and 18 families (16 broadleaf and 2 grassy) were recorded and classified during both seasons as follows: annual broadleaf weeds (33 species), annual grassy weeds (11 species), perennial broadleaf (4 species) and perennial grassy weeds (4 species). Annual summer weeds were 17 species (13 broadleaf and 4 grassy) whereas, annual winter weeds were 27 species (20 broadleaf and 7 grassy).

**Ratoon sugar cane:** Fifty species (35 broadleaf and 15 grassy) belonging to 42 genera (27 broadleaf and 15 grassy) and 18 families (16 broadleaf and 2 grassy) were recorded during 1999 season and classified as follows :annual broadleaf weeds(32 species),annual grassy weeds (11 species), perennial broadleaf(3 species) and perennial grassy weeds (4 species).Annual summer weeds were 16 species (12 broadleaf and 4 grassy).Annual winter weeds were 27 species (20 broadleaf and 7 grassy).

While, in 2000 season 45 species were recorded (31 broadleaf and 14 grassy) belonging to 37 genera (23 broadleaf and 14 grassy) and 15 families (13 broadleaf and 2 grassy) and classified as follows: annual broadleaf weeds (28 species),annual grassy weeds (11 species), perennial broadleaf (3 species) and perennial grassy weeds (3 species).Annual summer weeds were 16 species (12 broadleaf and 4 grassy).Annual winter weeds were 23 species (16 broadleaf and 7 grassy).

*Gramineae, Compositae and Chenopodiaceae* contained 14,6 and 5 species, respectively. Meanwhile, *Amaranthaceae, Euphorbiaceae, Leguminosae, Malvaceae and Solanaceae* contained 3 species for each. Whereas *Convolvulaceae and Cruciferae* contained 2 species for each. On the other hand, only one species for other families in the planting sugar cane (Table 2). The weeds *Salicornia fruticosa* L. and Fleabane (*Conyza aegyptiaca*(L.)Ait.) disappeared from ratoon sugar cane in 1999. Meanwhile, Scarlet pimpernel (*Anagallis arvensis* L.), Black mustard (*Brassica nigra* (L.)Koch.), *Conyza aegyptiaca*(L.)Ait., Common reed (*Phragmites australis* Kunth.), Broadleaf plantain (*Plantago major* L.), *Salicornia fruticosa* L. and Wild mustard (*Sinapis arvensis* L.) were disappeared from ratoon sugar cane in 2000.

Table (3) shows the average number of fields and number of weed species of planting and ratoon sugar cane during 1999 and 2000 seasons. The data used for quantitative measures. Sugar cane crop stay in the fields 12 months and grow with the crop annual (summer-winter) and perennial weeds, therefore the samples were taken monthly to avoid disappearing some weeds during the survey if the samples were taken 2-3 times or during weed maturation.



Table (1) : Family, Scientific and Vernacular name, English name, Type and Life Cycle of weeds in sugar cane.

No	Family	Scientific name	Vernacular name	English name	Cycle	Type
1	Amaranthaceae	<i>Amaranthus viridis</i> L. <i>Amaranthus cruentus</i> L. <i>Amaranthus ascendens</i> Lois.	Orf ed deek Orf ed deek Orf ed deek	Slender Pig weed Livid amaranth	A-W A-W A-W	B B B
2	Chenopodiaceae	<i>Beta vulgaris</i> L. <i>Chenopodium album</i> L. <i>Chenopodium murale</i> L. <i>Chenopodium ambrosioides</i> L. <i>Salicornia fruticosa</i> L.	Saiq Rokab El-Gamal Lisaa El-Teir Nitna Khoriza	Wild beet Lamb's quarters Nettle leaf Mexican tea Khoriza	A-W A-W A-W A-W P	B B B B B
3	Compositae	<i>Ageratum conyzoides</i> L. <i>Cichorium pamilum</i> Jacq. <i>Conyza aegyptiaca</i> (L.) Ait. <i>Sonchus oleraceus</i> L. <i>Xanthium brasiliicum</i> Vellozo <i>Xanthium pungens</i> Wallr.	Borgomman Shikoria Nashash Eddibbaan Go odeid Shobbeit Shobbeit	Tropic ageratum Chicory Flexbane Annual sow thistle Cocklebur Cocklebur	A-W A-W A-S A-W A-S A-S	B B B B B B
4	Convolvulaceae	<i>Convolvulus arvensis</i> L. <i>Ipomoea stolonifera</i> (Cyr) Gmel	Olleiq Sitt El-Hosen	Field bind weed Morning glory	P P	B B
5	Cruciferae	<i>Brassica nigra</i> (L.) Koch. <i>Sinapis arvensis</i> L.	El-Kabber Khardal	Black mustard Wild mustard	A-W A-W	B B
6	Cyperaceae	<i>Cyperus rotundus</i> L.	El-Seed	Purple nutsedge	P	G
7	Euphorbiaceae	<i>Euphorbia geniculata</i> Ortega. <i>Euphorbia helioscopia</i> L. <i>Euphorbia peplus</i> L.	Sharba Libbein Weideina	Mexican fire plant Sun spurge Petty spurge	A-S A-S A-S	B B B
8	Gramineae	<i>Avena fatua</i> L. <i>Brachiaria eruciformis</i> (Sibth&Sm) Grish. <i>Cynodon dactylon</i> (L.) Pers. <i>Digitaria sanguinalis</i> L. <i>Dinebra retroflexa</i> (Vahl) Panz. <i>Echinochloa cololum</i> (L.) Link. <i>Lolium</i> sp. <i>Imperata cylindrica</i> (L.) Beav. <i>Phalaris</i> sp. <i>Phragmites australis</i> Kunth. <i>Poa annua</i> L. <i>Polygonum monspeliensis</i> (L.) Desf. <i>Setaria viridis</i> (L.) Beauv <i>Sorghum</i> sp.	Zommeyr Rokeyb  Nigeel Dafira Denaab Abu-Rokba Samma Halfa Sha cer El-Faar Hagna Sabal Deil El-Qott Deil El-Faar Garawa	Wild oat Signal grass  Bermuda grass Large crabgrass Dinebra Barnyard grass Rye grass Cogon grass Canary grass Common reed Annual bluegrass Rabbit foot grass Green foxtail Johnson grass	A-W A-S  P A-S A-S A-S A-W P P A-W A-W A-W A-W	G G  G G G G G G G G G G G G
9	Leguminosae	<i>Alhagi maurorum</i> Medic. <i>Medicago polymorpha</i> L. <i>Melilotus indica</i> (L.) All.	Aqool Naphal Handaqooq	Thorn Burclover Yellow sweetclover	P A-W A-W	B B B
10	Malvaceae	<i>Hibiscus trionum</i> L. <i>Malva parviflora</i> L. <i>Sida alba</i> L.	Teel Sheitaani Khobbeiza Melokhiet Iblees	Mallow Little mallow Sida	A-S A-W A-S	B B B
11	Plantaginaceae	<i>Plantago major</i> L.	Lisaa Hamad	Broadleaf plantain	A-W	B
12	Polygonaceae	<i>Rumex dentatus</i> L.	Hommeid	Dock	A-W	B
13	Portulacaceae	<i>Portulaca oleracea</i> L.	Rigla	Common purslane	A-S	B
14	Primulaceae	<i>Anagallis arvensis</i> L.	Ain El-Kott	Scarlet pimpernel	A-W	B
15	Solanaceae	<i>Datura innoxia</i> Mill. <i>Datura stramonium</i> L. <i>Solanum nigrum</i> L.	Datoora Datoora Enab El-Deeb	Downy thornapple Jimson weed Black night shade	A-S A-S A-S	3 B B
16	Tiliaceae	<i>Corchorus olitorius</i> L.	Melokhiya	Nalta jute	A-S	B
17	Umbelliferae	<i>Ammi majus</i> L.	Khilla	Bull wort	A-W	B
18	Urticaceae	<i>Urtica urens</i> L.	Horraqa	Burning nettle	A-W	B

B = Broad Leaf  
G = GrassA = Annual  
P = PerennialS = Summer  
W = Winter

Table (2) : Species, genera, family and life cycle (annual and perennial weeds) of broadleaf and grassy weeds during 1999 and 2000.

Type of weeds in sugar cane		Species	Genera	Family	Life cycle		Total	Perennial
					Annual weeds			
					Summer	Winter		
Planting 1999	Broad	37	29	16	13	20	33	4
	Grassy	15	15	2	4	7	11	4
	Total	52	44	18	17	27	44	8
Planting 2000	Broad	37	29	16	13	20	33	4
	Grassy	15	15	2	4	7	11	4
	Total	52	44	18	17	27	44	8
Ratoon 1999	Broad	35	27	16	12	20	32	3
	Grassy	15	15	2	4	7	11	4
	Total	50	42	18	16	27	43	7
Ratoon 2000	Broad	31	23	13	12	16	28	3
	Grassy	14	14	2	4	7	11	3
	Total	45	37	15	16	23	39	6

### 3.1. Planting sugar cane.

#### 3.1.1. Frequency and relative frequency %

Frequency, relative frequency % and their averages during 1999-2000 for weed species in planting sugar cane are shown in Tables (4&5).

Dominant weed species according to average frequency and relative frequency % were: *Amaranthus viridis* L., *Chenopodium murale* L., *Convolvulus arvensis* L., *Cyperus rotundus* L. and *Portulaca oleracea* L.

Common weeds as shown by average frequency and relative frequency % were : Wild beet(*Beta vulgaris* L.), Common lambsquarters (*Chenopodium album* L.), Mexican tea (*Chenopodium ambrosioides* L.), Morningglory (*Ipomoea stolonifera* (Cyr)GmeL.), *Euphorbia helioscopia* L. Bermuda grass(*Cynodon dactylon* (L.)Pers.), Large crabgrass(*Digitaria sanguinalis* L.), Canary grass(*Phalaris sp.*), Dock(*Rumex dentatus* L.), Jimson grass(*Datura*



*stramonium* L.) and Burning nettle(*Urtica urens* L.) ,while Rabbitfoot grass(*Polypogon monspeliensis*(L)Desf.) was recorded by frequency % only.

While, the other listed weeds in Tables (4&5) were rare for average frequency and relative frequency %.

### 3.1.2. Density and relative density %

Density (occurrence fields) and relative density occurrence % and their average during 1999-2000 for weed species in planting sugar cane are shown in Tables(4&5).

Dominant weed species according to average density occurrence and relative density occurrence % were: *Amaranthus cruentus* L., *Ammi majus* L., *Brachiaria eruciformis* (Sibth&Sm) Griseb., *Chenopodium murale* L., *Convolvulus arvensis* L., *Cyperus rotundus* L., *Euphorbia helioscopia* L. and *Portulaca oleracea* L.

Common weeds by average density occurrence and relative density occurrence % were: *Amaranthus viridis* L., *Beta vulgaris* L., Annual sowthistle(*Sonchus oleraceus* L.), Wild oat(*Avena fatua* L.), *Cynodon dactylon* (L.)Pers., Cogongrass(*Imperata cylindrica* (L.)Beav.), *Phalaris* sp., Burclover(*Medicago polymorpha* L.), Mallow(*Hibiscus trionum* L.), Little mallow(*Malva parviflora* L.), *Rumex dentatus* L., and *Urtica urens* L., while Scarlet pimpernel(*Anagallis arvensis* L.) , Annual yellow sweet clover(*Melilotus indica* (L.)AIL.) and Cocklebur (*Xanthium pungens* Wallr) were recorded by density occurrence only.

While, the other listed weeds in Tables (4&5) were rare for the density occurrence and relative density occurrence % .

Results in Table (6) show that the weeds with the highest relative abundance (RA) had the highest relative density(RD), relative frequency (RF) and relative uniformity (RU) values. *Amaranthus viridis* L., *Chenopodium murale* L., *Convolvulus arvensis* L., *Cyperus rotundus* L. and *Portulaca oleracea* L. had the highest relative abundance and this means that these weeds were most common and prevalent by associated with planting sugar cane.

Table (3): Average total number of fields and total number of weed species of planting and ratoon sugar cane during 1999 and 2000 seasons.

No.	Scientific name	Planting sugar cane				Ratoon sugar cane			
		No of fields		plants/m <sup>2</sup>		No of fields		Plants/m <sup>2</sup>	
		1999	2000	1999	2000	1999	2000	1999	2000
1	<i>Amaranthus viridis</i> L.	33	38	825	1216	27	29	46	638
	<i>Amaranthus cruentus</i> L.	9	10	360	420	7	10	224	300
	<i>Amaranthus ascendens</i> Lois.	13	15	104	150	10	12	60	96
2	<i>Beta vulgaris</i> L.	21	24	483	648	17	21	306	441
	<i>Chenopodium album</i> L.	17	15	221	180	14	19	154	323
	<i>Chenopodium murale</i> L.	45	46	2160	2116	36	36	1368	1368
	<i>Chenopodium ambrosioides</i> L.	16	16	80	80	13	16	65	112
	<i>Salicornia fruticosa</i> L.	4	4	12	12	0	0	0	0
3	<i>Ageratum conyzoides</i> L.	13	13	169	130	11	18	110	216
	<i>Cichorium pamilum</i> Jacq.	7	7	49	42	7	5	42	25
	<i>Conyza aegyptiaca</i> (L.) Ait	2	3	12	15	0	0	0	0
	<i>Sonchus oleraceus</i> L.	10	5	230	105	7	7	147	147
	<i>Xanthium brasiliicum</i> Vellozo	13	15	78	120	13	13	65	91
	<i>Xanthium pungens</i> Wallr.	11	11	165	165	8	10	88	130
4	<i>Convolvulus arvensis</i> L.	32	30	1280	1200	26	30	806	1080
	<i>Ipomoea stolonifera</i> (Cyr) Gmel	26	21	208	252	22	26	176	312
5	<i>Brassica nigra</i> (L.) Koch.	9	11	63	110	7	0	49	0
	<i>Sinapis arvensis</i> L.	10	8	80	48	6	0	48	0
6	<i>Cyperus rotundus</i> L.	46	50	1932	2350	40	42	1200	1260
7	<i>Euphorbia geniculata</i> Ortega.	13	13	91	117	9	10	45	80
	<i>Euphorbia helioscopia</i> L.	20	24	800	816	15	15	60	120
	<i>Euphorbia peplus</i> L.	13	13	78	104	10	10	50	50
8	<i>Avena fatua</i> L.	14	11	378	275	13	18	325	576
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Griseb.	10	14	370	574	9	11	270	330
	<i>Cynodon dactylon</i> (L.) Pers.	25	30	700	960	19	22	456	638
	<i>Digitaria sanguinalis</i> L.	14	17	112	204	12	12	84	108
	<i>Dinebra retroflexa</i> (Vahl) Panz.	12	15	120	210	12	12	120	120
	<i>Echinochloa colonum</i> (L.) Link.	10	8	70	56	10	10	70	70
	<i>Lolium</i> sp.	9	12	63	120	9	9	63	63
	<i>Imperata cylindrica</i> (L.) Beauv.	5	8	95	176	12	12	48	72
	<i>Phalaris</i> sp.	25	29	400	580	19	17	285	255
	<i>Phragmites australis</i> Kunth.	5	7	35	63	3	0	12	0
	<i>Poa annua</i> L.	10	8	50	56	8	10	32	60
	<i>Polypogon monspeliensis</i> (L.) Desf.	14	16	126	176	12	10	96	80
	<i>Setaria viridis</i> (L.) Beauv	8	12	24	72	9	9	27	36
	<i>Sorghum</i> sp.	11	8	66	64	8	8	40	40
9	<i>Alhagi maurorum</i> Medic.	5	7	20	49	4	6	20	42
	<i>Medicago polymorpha</i> L.	11	12	286	312	10	11	200	231
	<i>Melilotus indica</i> (L.) Ail.	6	6	108	102	6	6	72	72
10	<i>Hibiscus trionum</i> L.	12	15	276	390	10	12	180	180
	<i>Malva parviflora</i> L.	8	10	176	250	8	10	160	200
	<i>Sida alba</i> L.	10	10	100	100	10	10	100	100
11	<i>Plantago major</i> L.	5	6	30	36	5	0	25	0
12	<i>Rumex dentatus</i> L.	18	18	468	468	16	13	336	273
13	<i>Portulaca oleracea</i> L.	34	39	1258	1599	30	35	840	1050
14	<i>Anagallis arvensis</i> L.	8	10	112	160	6	0	60	0
15	<i>Datura innoxia</i> Mill.	14	14	140	140	10	10	90	90
	<i>Datura stramonium</i> L.	17	17	204	204	12	12	120	120
	<i>Solanum nigrum</i> L.	8	10	72	120	8	10	64	120
16	<i>Corchorus olitorius</i> L.	12	12	108	108	8	8	80	80
17	<i>Ammi majus</i> L.	8	8	320	320	7	9	210	261



Table (4): Frequency (%), density occurrence (plants/m<sup>2</sup>) and their averages for dominant, Common and rare weed species during 1999 and 2000 seasons in planting sugar cane.

No.	Scientific name	Frequency %			Density occurrence fields		
		1999	2000	Average	1999	2000	Average
1	<i>Amaranthus viridis</i> L.	33	38	35.5 D	25	32	28.5 C
	<i>Amaranthus cruentus</i> L.	9	10	9.5 R	40	42	41 D
	<i>Amaranthus ascendens</i> Lois.	13	15	14 R	8	10	9 R
2	<i>Beta vulgaris</i> L.	21	24	22.5 C	23	27	25 C
	<i>Chenopodium album</i> L.	17	15	16 C	13	12	12.5 R
	<i>Chenopodium murale</i> L.	45	46	45.5 D	48	46	47 D
	<i>Chenopodium ambrosioides</i> L.	16	16	16 C	5	5	5 R
	<i>Salicornia fruticosa</i> L.	4	4	4 R	3	3	3 R
3	<i>Ageratum conyzoides</i> L.	13	13	13 R	13	10	11.5 R
	<i>Cichorium pamilum</i> Jacq.	7	7	7 R	7	6	6.5 R
	<i>Coryza aegyptiaca</i> (L.)Ait.	2	3	2.5 R	6	5	5.5 R
	<i>Sonchus oleraceus</i> L.	10	5	7.5 R	23	21	22 C
	<i>Xanthium brasiliicum</i> Vellozo	13	15	14 R	6	8	7 R
	<i>Xanthium pungens</i> Wallr.	11	11	11 R	15	15	15 C
4	<i>Convolvulus arvensis</i> L.	32	30	31 D	40	40	40 D
	<i>Ipomoea stolonifera</i> (Cyr)Gmel	26	21	23.5 C	8	12	10 R
5	<i>Brassica nigra</i> (L.) Koch.	9	11	10 R	7	10	8.5 R
	<i>Sinapis arvensis</i> L.	10	8	9 R	8	6	7 R
6	<i>Cyperus rotundus</i> L.	46	50	48 D	42	47	44.5 D
7	<i>Euphorbia geniculata</i> Ortega.	13	13	13 R	7	9	8 R
	<i>Euphorbia helioscopia</i> L.	20	24	22 C	40	34	37 D
	<i>Euphorbia peplus</i> L.	13	13	13 R	6	8	7 R
8	<i>Avena fatua</i> L.	14	11	12.5 R	27	25	26 C
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Grisb.	10	14	12 R	37	41	39 D
	<i>Cynodon dactylon</i> (L.) Pers.	25	30	27.5 C	28	32	30 C
	<i>Digitaria sanguinalis</i> L.	14	17	15.5 C	8	12	10 R
	<i>Dinebra retroflexa</i> (Vahl)Panz.	12	15	13.5 R	10	14	12 R
	<i>Eichinochloa colonum</i> (L.)Link.	10	8	9 R	7	7	7 R
	<i>Lolium sp.</i>	9	12	10.5 R	7	10	8.5 R
	<i>Imperata cylindrica</i> (L.)Beav.	5	8	6.5 R	19	22	20.5 C
	<i>Phalaris sp.</i>	25	29	27 C	16	20	18 C
	<i>Phragmites australis</i> Kunth.	5	7	6 R	7	9	8 R
	<i>Poa annua</i> L.	10	8	9 R	5	7	6 R
	<i>Polypogon monspeliensis</i> (L.)Desf.	14	16	15 C	9	11	10 R
	<i>Setaria viridis</i> (L.)Beaurv	8	12	10 R	3	6	4.5 R
<i>Sorghum sp</i>	11	8	9.5 R	6	8	7 R	
9	<i>Alhagi maurorum</i> Medic.	5	7	6 R	4	7	5.5 R
	<i>Medicago polymorpha</i> L.	11	12	11.5 R	26	26	26 C
	<i>Melilotus indica</i> (L.)All.	6	6	6 R	18	17	17.5 C
10	<i>Hibiscus trionum</i> L.	12	15	13.5 R	23	26	24.5 C
	<i>Malva parviflora</i> L.	8	10	9 R	22	25	23.5 C
	<i>Sida alba</i> L.	10	10	10 R	10	10	10 R
11	<i>Plantago major</i> L.	5	6	5.5 R	6	6	6 R
12	<i>Rumex dentatus</i> L.	18	18	18 C	26	26	26 C
13	<i>Portulaca oleracea</i> L.	34	39	36.5 D	37	41	39 D
14	<i>Anagallis arvensis</i> L.	8	10	9 R	14	16	15 C
15	<i>Datura innoxia</i> Mill.	14	14	14 R	10	10	10 R
	<i>Datura stramonium</i> L.	17	17	17 C	12	12	12 R
	<i>Solanum nigrum</i> L.	8	10	9 R	9	12	10.5 R
16	<i>Corchorus olitorius</i> L.	12	12	12 R	9	9	9 R
17	<i>Ammi majus</i> L.	8	8	8 R	40	40	40 D
18	<i>Urtica urens</i> L.	17	17	17 C	28	30	29 C

D = Dominant

C = Common

R = Rare



Table (5): Relative frequency (%), density occurrence (%) and their averages for dominant, common and rare weed species during 1999 and 2000 seasons in planting sugar cane.

No.	Scientific name	Relative Frequency %			R DOF %		
		1999	2000	Average	1999	2000	Average
1	<i>Amaranthus viridis</i> L.	4.4	4.8	4.6 D	2.9	3.4	3.1 C
	<i>Amaranthus cruentus</i> L.	1.2	1.3	1.2 R	4.6	4.4	4.5 D
	<i>Amaranthus ascendens</i> Lois.	1.7	1.9	1.8 R	0.9	1.1	1.0 R
2	<i>Beta vulgaris</i> L.	2.8	3.0	2.9 C	2.6	2.9	2.7 C
	<i>Chenopodium album</i> L.	2.3	1.9	2.1 C	1.5	1.3	1.4 R
	<i>Chenopodium murale</i> L.	6.0	5.8	5.9 D	5.5	4.9	5.2 D
	<i>Chenopodium ambrosioides</i> L.	2.1	2.0	2.1 C	0.6	0.5	0.5 R
	<i>Salicornia fruticosa</i> L.	0.5	0.5	0.5 R	0.3	0.3	0.3 R
3	<i>Ageratum conyzoides</i> L.	1.7	1.6	1.7 R	1.5	1.1	1.3 R
	<i>Cichorium pamilum</i> Jacq.	0.9	0.9	0.9 R	0.8 0.7	0.6	0.7 R
	<i>Conyza aegyptiaca</i> (L.) Ait.	0.3	0.4	0.3 R	2.6	0.5	0.6 R
	<i>Sonchus oleraceus</i> L.	1.3	0.6	1.0 R	0.7	2.2	2.4 C
	<i>Xanthium brasiliicum</i> Vellozo	1.7	1.9	1.8 R	1.7	0.8	0.8 R
	<i>Xanthium pungens</i> Waltr.	1.5	1.4	1.4 R		1.6	1.6 R
4	<i>Convolvulus arvensis</i> L.	4.3	3.8	4.1 D	4.6	4.2	4.4 D
	<i>Ipomoea stolonifera</i> (Cyr) Gmel	3.5	2.6	3.0 C	0.9	1.3	1.1 R
5	<i>Brassica nigra</i> (L.) Koch.	1.2	1.4	1.3 R	0.8	1.1	0.9 R
	<i>Sinapis arvensis</i> L.	1.3	1.0	1.2 R	0.9	0.6	0.8 R
6	<i>Cyperus rotundus</i> L.	6.1	6.3	6.2 D	4.8	5.0	4.9 D
7	<i>Euphorbia geniculata</i> Ortega.	1.7	1.6	1.7 R	0.8	1.0	0.9 R
	<i>Euphorbia helioscopia</i> L.	2.7	3.0	2.8 C	4.6	3.6	4.1 D
	<i>Euphorbia peplus</i> L.	1.7	1.6	1.7 R	0.7	0.8	0.8 R
8	<i>Avena fatua</i> L.	1.9	1.4	1.6 R	3.1	2.6	2.9 C
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Grisb.	1.3	1.8	1.6 R	4.2	4.3	4.3 D
	<i>Cynodon dactylon</i> (L.) Pers.	3.3	3.8	3.6 C	3.2	3.4	3.3 C
	<i>Digitaria sanguinalis</i> L.	1.9	2.1	2.0 C	0.9	1.3	1.1 R
	<i>Dinebra retroflexa</i> (Vahl) Panz.	1.6	1.9	1.7 R	1.1	1.5	1.3 R
	<i>Echinochloa colonum</i> (L.) Link.	1.3	1.0	1.2 R	0.8	0.7	0.8 R
	<i>Lolium</i> sp.	1.2	1.5	1.4 R	0.8	1.1	0.9 R
	<i>Imperata cylindrica</i> (L.) Beauv.	0.7	1.0	0.8 R	2.2	2.3	2.3 C
	<i>Phalaris</i> sp.	3.3	3.6	3.5 C	1.8	2.1	2.0 C
	<i>Phragmites australis</i> Kunth.	0.7	0.9	0.8 R	0.8	1.0	0.9 R
	<i>Poa annua</i> L.	1.3	1.0	1.2 R	0.6	0.7	0.7 R
	<i>Polypogon monspeliensis</i> (L.) Desf.	1.9	2.0	1.9 R	1.0	1.2	1.1 R
	<i>Setaria viridis</i> (L.) Beauv	1.0	1.5	1.3 R	0.3	0.6	0.5 R
	<i>Sorghum</i> sp.	1.5	1.0	1.2 R	0.7	0.8	0.8 R
9	<i>Alhagi maurorum</i> Medic.	0.7	0.9	0.8 R	0.5	0.7	0.6 R
	<i>Medicago polymorpha</i> L.	1.5	1.5	1.5 R	3.0	2.8	2.9 C
	<i>Melilotus indica</i> (L.) All.	0.8	0.8	0.8 R	2.1	1.8	1.9 R
10	<i>Hibiscus trionum</i> L.	1.6	1.9	1.7 R	2.6	2.8	2.7 C
	<i>Malva parviflora</i> L.	1.0	1.3	1.2 R	2.5	2.6	2.6 C
	<i>Sida alba</i> L.	1.3	1.3	1.3 R	1.1	1.1	1.1 R
11	<i>Plantago major</i> L.	0.7	0.8	0.7 R	0.7	0.6	0.7 R
12	<i>Rumex dentatus</i> L.	2.5	2.3	2.3 C	3.0	2.8	2.9 C
13	<i>Portulaca oleracea</i> L.	4.5	4.9	4.7 D	4.2	4.3	4.3 D
14	<i>Anagallis arvensis</i> L.	1.0	1.3	1.2 R	1.6	1.7	1.6 R
15	<i>Datura innoxia</i> Mil.	1.9	1.8	1.8 R	1.1	1.1	1.1 R
	<i>Datura stramonium</i> L.	2.3	2.1	2.2 C	1.4	1.3	1.3 R
	<i>Solanum nigrum</i> L.	1.0	1.3	1.2 R	1.0	1.3	1.2 R
16	<i>Corchorus olitorius</i> L.	1.6	1.5	1.6 R	1.0	1.0	1.0 R
17	<i>Ammi majus</i> L.	1.0	1.0	1.0 R	4.6	4.2	4.4 D
18	<i>Urtica urens</i> L.	2.3	2.1	2.2 C	3.2	3.2	3.2 C

D = Dominant

C = Common

R = Rare

Table (6): Density (D), field uniformity (FU), relative density (RD), relative field uniformity (RFU) relative frequency (RF) and relative abundance (RA) species vain planting sugar cane. (Average 1999-2000)

No.	Scientific name	D	FU	RD	RFU	RF	RA
1	<i>Amaranthus viridis</i> L.	10.21	21.4	5.94	5.93	4.6	16.47
	<i>Amaranthus cruentus</i> L.	3.90	2.8	2.27	0.78	1.2	4.25
	<i>Amaranthus ascendens</i> Lois.	1.27	5.8	0.74	1.61	1.8	4.15
2	<i>Beta vulgaris</i> L.	5.66	9.4	3.29	2.61	2.9	8.80
	<i>Chenopodium album</i> L.	2.01	5.8	1.17	1.61	2.1	4.88
	<i>Chenopodium murale</i> L.	21.38	28.6	12.43	7.93	5.9	26.26
	<i>Chenopodium ambrosioides</i> L.	0.80	7.8	0.47	2.16	2.1	4.73
	<i>Salicornia fruticosa</i> L.	0.12	0.6	0.07	0.17	0.5	0.74
3	<i>Ageratum conyzoides</i> L.	1.50	4.6	0.87	1.27	1.7	3.84
	<i>Cichorium pamilum</i> Jacq.	0.46	3.0	0.27	0.83	0.9	2.00
	<i>Conyza aegyptiaca</i> (L.)Ait.	0.14	0.4	0.08	0.11	0.3	0.49
	<i>Sonchus oleraceus</i> L.	1.68	1.4	0.98	0.39	1.0	2.37
	<i>Xanthium brasilicum</i> Vellozo	0.99	6.0	0.58	1.66	1.8	4.04
	<i>Xanthium pungens</i> Wallr.	1.65	2.6	0.96	0.72	1.4	3.08
4	<i>Convolvulus arvensis</i> L.	12.40	19.6	7.21	5.43	4.1	16.74
	<i>Ipomoea stolonifera</i> (Cyr)Gmel	2.30	12.8	1.34	3.55	3.0	7.89
5	<i>Brassica nigra</i> (L.) Koch.	0.87	3.0	0.51	0.83	1.3	2.64
	<i>Sinapis arvensis</i> L.	0.64	1.0	0.37	0.28	1.2	1.85
6	<i>Cyperus rotundus</i> L.	21.41	31.4	12.45	8.70	6.2	27.35
7	<i>Euphorbia geniculata</i> Ortega.	1.04	7.4	0.60	2.05	1.7	4.35
	<i>Euphorbia helioscopia</i> L.	4.48	12.8	2.60	3.55	2.8	8.95
	<i>Euphorbia peplus</i> L.	0.91	5.4	0.53	1.50	1.7	3.73
8	<i>Avena fatua</i> L.	3.27	3.8	1.90	1.05	1.6	4.55
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Griseb.	4.72	4.4	2.74	1.22	1.6	5.59
	<i>Cynodon dactylon</i> (L.) Pers.	8.30	14.8	4.83	4.10	3.6	12.53
	<i>Digitaria sanguinalis</i> L.	1.58	7.4	0.92	2.05	2.0	4.97
	<i>Dinebra retroflexa</i> (Vahl)Panz.	1.65	5.6	0.96	1.55	1.7	4.21
	<i>Eichinochloa colonum</i> (L.)Link.	0.63	1.6	0.37	0.44	1.2	2.01
	<i>Lolium sp.</i>	0.92	3.2	0.53	0.89	1.4	3.08
	<i>Imperata cylindrica</i> (L.)Beav.	1.36	2.0	0.79	0.55	0.8	5.69
	<i>Phalaris sp.</i>	4.90	14.8	2.85	4.10	3.5	10.45
	<i>Phragmites australis</i> Kunth.	0.49	2.2	0.29	0.61	0.8	1.70
	<i>Poa annua</i> L.	0.53	2.4	0.31	0.66	1.2	2.12
	<i>Polypogon monospermiensis</i> (L.)Des.	1.51	7.4	0.88	2.05	1.9	4.83
	<i>Setaria viridis</i> (L.)Beauv	0.48	4.2	0.28	1.16	1.3	2.74
<i>Sorghum sp.</i>	0.65	4.4	0.38	1.22	1.2	2.80	
9	<i>Alhagi maurorum</i> Medic.	0.35	2.0	0.20	0.55	0.8	1.55
	<i>Medicago polymorpha</i> L.	2.99	6.2	1.74	1.72	1.5	4.96
	<i>Melilotus indica</i> (L.)All.	1.05	1.4	0.61	0.39	0.8	1.80
10	<i>Hibiscus trionum</i> L.	3.33	7.2	1.94	1.99	1.7	5.63
	<i>Malva parviflora</i> L.	2.13	4.6	1.24	1.27	1.2	3.71
	<i>Sida alba</i> L.	0.95	4.6	0.55	1.27	1.3	3.12
11	<i>Plantago major</i> L.	0.33	1.8	0.19	0.50	0.7	1.39
12	<i>Rumex dentatus</i> L.	4.68	6.2	2.72	1.72	2.3	6.74
13	<i>Portulaca oleracea</i> L.	14.29	22.8	8.31	6.32	4.7	19.33
14	<i>Anagallis arvensis</i> L.	1.36	2.4	0.79	0.66	1.2	2.65
15	<i>Datura innoxia</i> Mill.	1.40	5.6	0.81	1.55	1.8	4.16
	<i>Datura stramonium</i> L.	2.04	6.0	1.19	1.66	2.2	5.05
	<i>Solanum nigrum</i> L.	0.96	4.8	0.56	1.33	1.2	3.09
16	<i>Corchorus olitorius</i> L.	1.08	5.6	0.63	1.55	1.6	3.78
17	<i>Amni majus</i> L.	3.20	2.6	1.86	0.72	1.0	3.58
18	<i>Urtica urens</i> L.	4.93	5.2	2.87	1.44	2.2	6.51



### 3.1.3. Species / village

Results in Table (7) show that the number of species / village during 1999 and 2000 and their averages in planting sugar cane were different and its values ranged (22- 26),(26-44) and (26-44) species,respectively. The results also indicate that the number of species / village obtained from frequency % and density means as averages of (1999-2000) had the same trend in species differences. Dominant, common and rare species as indicated by frequency % means ranged (4-10),(6-18)and(9-20) species, respectively. Whereas, dominant, common and rare species by density means ranged (5-9), (8-11)and(10-28) species,respectively. These differences may be due to variations in natural distribution of weeds between fields and villages.

Table (7): Dominant,common and rare weed species according to frequency (%) and density/ village (average of 1999/2000)and their numbers during 1999 and 2000 in planting sugar cane.

Village	No of species / village			Density			Frequency%		
	1999	2000	Average	D	C	R	D	C	R
1	22	26	26	7	9	10	7	6	13
2	29	31	31	5	11	15	7	13	11
3	32	32	33	7	9	17	9	15	9
4	31	31	32	6	8	18	4	14	14
5	29	34	34	9	8	17	9	11	14
6	28	33	34	5	9	20	7	9	18
7	36	41	41	6	10	25	8	18	15
8	32	39	39	5	10	24	9	13	17
9	35	44	44	7	10	27	7	18	19
10	33	43	43	6	9	28	10	13	20

### 3.2. Ratoon sugar cane.

#### 3.2.1. Frequency and relative frequency %.

Frequency and relative frequency % values as averages 1999-2000 for weed species in ratoon sugar cane are shown in Tables (8&9).

Dominant weed species according to frequency and relative frequency % values were *Chenopodium murale* L.,*Cyperus rotundus* L. and *Portulaca oleracea* L. whereas, dominant weed species by relative frequency % only were *Amaranthus viridis* L. and *Convolvulus arvensis* L.



Common weeds as indicated by average frequency and relative frequency values % were *Avena fatua* L., *Beta vulgaris* L., *Chenopodium album* L., *Cynodon dactylon* (L.)Pers., *Euphorbia helioscopia* L., *Ipomoea stolonifera* (Cyr) GmeL., and *Phalaris sp.* Meanwhile, common weeds by average frequency % only were *Amaranthus viridis* L. and *Convolvulus arvensis* L. and relative frequency % only were *Tropic ageratum* (*Ageratum conyzoides* L.), *Chenopodium ambrosioides* L., *Rumex dentatus* L., *Urtica urens* L., and Cocklebur (*Xanthium brasiliicum* Vellozo.).

While, the other listed weeds in Tables (8&9) were rare for average frequency and relative frequency %.

### 3.2.2. Density and Relative density %

Density occurrence and relative density occurrence % average of 1999-2000 for weed species in ratoon sugar cane are shown in Tables (8&9).

Dominant weed species by average density occurrence and relative density occurrence % values were *Amaranthus cruentus* L., *Chenopodium murale* L., *Convolvulus arvensis* L. However, dominant weed species by relative density occurrence % only were *Ammi majus* L., *Avena fatua* L., *Brachiaria eruciformis* (Sibth&Sm) Griseb., *Cyperus rotundus* L. and *Portulaca oleracea* L.

Common weeds as shown by average density occurrence and relative density occurrence % values were: *Amaranthus viridis* L., *Beta vulgaris* L., *Cynodon dactylon* (L.)Pers., *Hibiscus trionum* L., *Malva parviflora* L., *Medicago polymorpha* L., *Phalaris sp.*, *Sonchus oleraceus* L., *Rumex dentatus* L., and *Urtica urens* L. Common weed species by density occurrence only were: *Ammi majus* L., *Avena fatua* L., *Brachiaria eruciformis* (Sibth&Sm) Griseb., *Cyperus rotundus* L. and *Portulaca oleracea* L. According to relative density occurrence % only *Chenopodium album* L. was recorded as a common species.

While, the other listed weeds in Tables (8&9) were rare for density occurrence and relative density occurrence %.

Results in Table (10) show that weeds with the highest relative abundance (RA) had the highest relative density (RD),

Table (8): Frequency (%), density occurrence (plants/m<sup>2</sup>) and their averages for dominant, common and rare weed species during 1999 and 2000 seasons in ratoon sugar cane.

No.	Scientific name	Frequency %			Density occurrence fields		
		1999	2000	Average	1999	2000	Average
1	<i>Amaranthus viridis</i> L.	27	29	28 C	19	22	20.5 C
	<i>Amaranthus cruentus</i> L.	7	10	8.5 R	32	30	31 D
	<i>Amaranthus ascendens</i> Lois.	10	12	11 R	6	8	7 R
2	<i>Beta vulgaris</i> L.	17	21	19 C	18	21	19.5 C
	<i>Chenopodium album</i> L.	14	19	16.5 C	11	17	14 R
	<i>Chenopodium murale</i> L.	36	36	36 D	38	38	38 D
	<i>Chenopodium ambrosioides</i> L.	13	16	14.5 R	5	7	6 R
3	<i>Ageratum conyzoides</i> L.	11	18	14.5 R	10	12	11 R
	<i>Cichorium pamilum</i> Jacq.	7	5	6 R	6	5	5.5 R
	<i>Sonchus oleraceus</i> L.	7	7	7 R	21	21	21 C
	<i>Xanthium brasiliicum</i> Vellozo	13	13	13 R	5	7	6 R
	<i>Xanthium pungens</i> Wallr.	8	10	9 R	11	13	12 R
4	<i>Convolvulus arvensis</i> L.	26	30	28 C	31	36	33.5 D
	<i>Ipomoea stolonifera</i> (Cyr)Gmel	22	26	24 C	8	12	10 R
5	<i>Brassica nigra</i> (L.) Koch.	7	0	3.5 R	7	0	3.5 R
	<i>Sinapis arvensis</i> L.	6	0	3 R	8	0	4 R
6	<i>Cyperus rotundus</i> L.	40	42	41 D	30	30	30 C
7	<i>Euphorbia geniculata</i> Ortega.	9	10	9.5 R	5	8	6.5 R
	<i>Euphorbia helioscopia</i> L.	15	15	15 C	4	8	6 R
	<i>Euphorbia peplus</i> L.	10	10	10 R	5	9	7 R
8	<i>Avena fatua</i> L.	13	18	15.5 C	25	32	28.5 C
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Griseb.	9	11	10 R	30	30	30 C
	<i>Cynodon dactylon</i> (L.) Pers.	19	22	20.5 C	24	29	26.5 C
	<i>Digitaria sanguinalis</i> L.	12	12	12 R	7	9	8 R
	<i>Dinebra retroflexa</i> (Vahl)Panz.	12	12	12 R	10	10	10 R
	<i>Echinochloa colonum</i> (L.)Link.	10	10	10 R	7	7	7 R
	<i>Lolium</i> sp.	9	9	9 R	7	7	7 R
	<i>Imperata cylindrica</i> (L.)Beav.	12	12	12 R	4	6	5 R
	<i>Phalaris</i> sp.	19	17	18 C	15	15	15 C
	<i>Phragmites australis</i> Kunth.	3	0	1.5 R	4	0	2 R
	<i>Poa annua</i> L.	8	10	9 R	4	6	5 R
	<i>Polypogon monspeliensis</i> (L.)Desf.	12	10	11 R	8	8	8 R
	<i>Setaria viridis</i> (L.)Beauv	9	9	9 R	3	4	3.5 R
	<i>Sorghum</i> sp.	8	8	8 R	5	5	5 R
9	<i>Alhagi maurorum</i> Medic.	4	6	5 R	5	7	6 R
	<i>Medicago polymorpha</i> L.	10	11	10.5 R	20	21	20.5 C
	<i>Melilotus indica</i> (L.)All.	6	6	6 R	12	12	12 R
10	<i>Hibiscus trionum</i> L.	10	12	11 R	18	15	16.5 C
	<i>Malva parviflora</i> L.	8	10	9 R	20	20	20 C
	<i>Sida alba</i> L.	10	10	10 R	10	10	10 R
11	<i>Plantago major</i> L.	5	0	2.5 R	5	0	2.5 R
12	<i>Rumex dentatus</i> L.	16	13	14.5 R	21	21	21 C
13	<i>Portulaca oleracea</i> L.	30	35	32.5 D	28	30	29 C
14	<i>Anagallis arvensis</i> L.	6	0	3 R	10	0	5 R
15	<i>Datura innoxia</i> Mill.	10	10	10 R	9	9	9 R
	<i>Datura stramonium</i> L.	12	12	12 R	10	10	10 R
	<i>Solanum nigrum</i> L.	8	10	9 R	8	12	10 R
16	<i>Corchorus olitorius</i> L.	8	8	8 R	10	10	10 R
17	<i>Ammi majus</i> L.	7	9	8 R	30	29	29.5 C
18	<i>Urtica urens</i> L.	14	14	14 R	21	20	20.5 C

D = Dominant

C = Common

R = Rare



Table (9): Relative frequency (%), density occurrence(%) and their averages for dominant, common and rare weed species during 1999 and 2000 seasons in ratoon sugar cane.

No.	Scientific name	Relative Frequency %			R DOF %		
		1999	2000	Average	1999	2000	Average
1	<i>Amaranthus viridis</i> L.	4.3	4.4	4.4 D	2.8	3.2	3.0 C
	<i>Amaranthus cruentus</i> L.	1.1	1.5	1.3 R	4.8	4.3	4.5 D
	<i>Amaranthus ascendens</i> Lois.	1.6	1.8	1.7 R	0.9	1.1	1.0 R
2	<i>Beta vulgaris</i> L.	2.7	3.2	3.0 C	2.7	3.0	2.9 C
	<i>Chenopodium album</i> L.	2.2	2.9	2.6 C	1.6	2.4	2.0 C
	<i>Chenopodium murale</i> L.	5.8	5.5	5.6 D	5.7	5.4	5.6 D
	<i>Chenopodium ambrosioides</i> L.	2.1	2.4	2.3 C	0.7	1.0	0.9 R
3	<i>Ageratum conyzoides</i> L.	1.8	2.7	2.3 C	1.5	1.7	1.6 R
	<i>Cichorium pamilum</i> Jacq.	1.1	0.8	0.9 R	0.9	0.7	0.8 R
	<i>Sonchus oleraceus</i> L.	1.1	1.1	1.1 R	3.1	3.1	3.1 C
	<i>Xanthium brasiliacum</i> Vellozo	2.1	2.0	2.0 C	0.7	1.0	0.9 R
	<i>Xanthium pungens</i> Wallr.	1.3	1.5	1.4 R	1.6	1.9	1.8 R
4	<i>Convolvulus arvensis</i> L.	4.2	4.6	4.4 D	4.6	5.2	4.9 D
	<i>Ipomoea stolonifera</i> (Cyr)Gmel	3.5	4.0	3.8 C	1.2	1.7	1.5 R
5	<i>Brassica nigra</i> (L.) Koch.	1.1	0.0	0.5 R	1.0	0.0	0.5 R
	<i>Sinapis arvensis</i> L.	1.0	0.0	0.5 R	1.2	0.0	0.6 R
6	<i>Cyperus rotundus</i> L.	6.4	6.4	6.4 D	4.5	4.3	4.4 D
7	<i>Euphorbia geniculata</i> Ortega.	1.4	1.5	1.5 R	0.7	1.1	1.0 R
	<i>Euphorbia helioscopia</i> L.	2.4	2.3	2.3 C	0.6	1.1	0.9 R
	<i>Euphorbia peplus</i> L.	1.6	1.5	1.6 R	0.7	1.3	1.0 R
8	<i>Avena fatua</i> L.	2.1	2.7	2.4 C	3.7	4.6	4.2 D
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Grisb.	1.4	1.7	1.6 R	4.5	4.3	4.4 D
	<i>Cynodon dactylon</i> (L.) Pers.	3.0	3.4	3.2 C	3.6	4.2	3.9 C
	<i>Digitaria sanguinalis</i> L.	1.9	1.8	1.9 R	1.0	1.3	1.2 R
	<i>Dinebra retroflexa</i> (Vahl)Panz.	1.9	1.8	1.9 R	1.5	1.4	1.5 R
	<i>Echinochloa colonum</i> (L.)Link.	1.6	1.5	1.6 R	1.0	1.0	1.0 R
	<i>Lolium</i> sp.	1.4	1.4	1.4 R	1	1.0	1.0 R
	<i>Imperata cylindrica</i> (L.)Beav.	1.9	1.8	1.9 R	0.6	0.9	0.7 R
	<i>Phalaris</i> sp.	3.0	2.6	2.8 C	2.2	2.1	2.2 C
	<i>Phragmites australis</i> Kunth.	0.5	0.0	0.2 R	0.6	0.0	0.3 R
	<i>Poa annua</i> L.	1.3	1.5	1.4 R	0.6	0.9	0.7 R
	<i>Polypogon monspeliensis</i> (L)Desf.	1.9	1.5	1.7 R	1.2	1.1	1.2 R
	<i>Setaria viridis</i> (L.)Beauv	1.4	1.4	1.4 R	0.4	0.6	0.5 R
	<i>Sorghum</i> sp.	1.3	1.2	1.3 R	0.7	0.7	0.7 R
9	<i>Alhagi maurorum</i> Medic.	0.6	0.9	0.8 R	0.7	1.0	0.9 R
	<i>Medicago polymorpha</i> L.	1.6	1.7	1.6 R	3.0	3.0	3.0 C
	<i>Melilotus indica</i> (L.)AIL.	1.0	0.9	0.9 R	1.8	1.7	1.8 R
10	<i>Hibiscus trionum</i> L.	1.6	1.8	1.7 R	2.7	2.1	2.4 C
	<i>Malva parviflora</i> L.	1.3	1.5	1.4 R	3.0	2.9	2.9 C
	<i>Sida alba</i> L.	1.6	1.5	1.6 R	1.5	1.4	1.5 R
11	<i>Plantago major</i> L.	0.8	0.0	0.4 R	0.7	0.0	0.4 R
12	<i>Rumex dentatus</i> L.	2.6	2.0	2.3 C	3.1	3.0	3.1 C
13	<i>Portulaca oleracea</i> L.	4.8	5.3	5.1 D	4.2	4.3	4.2 D
14	<i>Anagallis arvensis</i> L.	1.0	0.0	0.5 R	1.5	0.0	0.7 R
15	<i>Datura innoxia</i> Mill.	1.6	1.5	1.6 R	1.3	1.3	1.3 R
	<i>Datura stramonium</i> L.	1.9	1.8	1.9 R	1.5	1.4	1.5 R
	<i>Solanum nigrum</i> L.	1.3	1.5	1.4 R	1.2	1.7	1.5 R
16	<i>Corchorus olitorius</i> L.	1.3	1.2	1.3 R	1.5	1.4	1.5 R
17	<i>Ammi majus</i> L.	1.1	1.4	1.3 R	4.5	4.2	4.3 D
18	<i>Urtica urens</i> L.	2.2	2.1	2.2 C	3.1	2.9	3.0 C

D = Dominant

C = Common

R = Rare



Table(10): Density (D), field uniformity (FU), relative density (RD), relative field uniformity (RFU), relative frequency (RF) and relative abundance (RA) species values in ratoon sugar cane. (Average 1999-2000).

No	Scientific name	D	FU	RD	RFU	RF	RA
1	<i>Amaranthus viridis</i> L.	5.76	15.2	5.07	5.88	4.4	15.35
	<i>Amaranthus cruentus</i> L.	2.62	2.0	2.30	0.77	1.3	4.37
	<i>Amaranthus ascendeus</i> Lois.	0.78	3.4	0.69	1.32	1.7	3.71
2	<i>Beta vulgaris</i> L.	3.74	8.0	3.29	3.10	3.0	9.39
	<i>Chenopodium album</i> L.	2.39	9.0	2.10	3.48	2.6	8.18
	<i>Chenopodium murale</i> L.	13.68	19.4	12.03	7.50	5.6	25.13
	<i>Chenopodium ambrosioides</i> L.	0.89	6.0	0.78	2.32	2.3	5.40
3	<i>Ageratum conyzoides</i> L.	1.63	8.2	1.43	3.17	2.3	6.90
	<i>Cichorium pamilum</i> Jacq.	0.34	2.6	0.30	1.01	0.9	2.21
	<i>Conyza aegyptiaca</i> (L.) Ait.	0.00	1.4	1.20	0.54	1.1	2.84
	<i>Sonchus oleraceus</i> L.	1.47	3.8	0.69	1.47	2.0	4.16
	<i>Xanthium brasiliicum</i> Vellozo	0.78	3.2	0.96	1.24	1.4	3.60
4	<i>Convolvulus arvensis</i> L.	9.43	16.4	8.29	6.35	4.4	19.04
	<i>Ipomoea stolonifera</i> (Cyr) Gmel	2.44	13.2	2.15	5.11	3.8	11.06
5	<i>Brassica nigra</i> (L.) Koch.	0.25	0.4	0.22	0.15	0.5	0.87
	<i>Sinapis arvensis</i> L.	0.24	0.4	0.21	0.15	0.5	0.86
6	<i>Cyperus rotundus</i> L.	12.30	25.2	10.82	9.75	6.4	26.97
7	<i>Euphorbia geniculata</i> Ortega.	0.63	1.8	0.55	0.70	1.5	2.75
	<i>Euphorbia helioscopia</i> L.	0.90	7.2	0.79	2.79	2.3	5.88
	<i>Euphorbia peplus</i> L.	0.70	1.8	0.62	0.70	1.6	2.92
8	<i>Avena fatua</i> L.	4.51	5.6	3.97	2.17	2.4	8.54
	<i>Brachiaria eruciformis</i> (Sibth&Sm) Grish.	3.00	2.6	2.64	1.01	1.6	5.25
	<i>Cynodon dactylon</i> (L.) Pers.	5.47	11.0	4.81	4.26	3.2	12.27
	<i>Digitaria sanguinalis</i> L.	0.96	2.8	0.84	1.08	1.9	3.82
	<i>Dinebra retroflexa</i> (Vahl) Panz.	1.20	3.6	1.06	1.39	1.9	4.35
	<i>Echinochloa colonum</i> (L.) Link.	0.70	2.2	0.62	0.85	1.6	3.07
	<i>Lolium</i> sp.	0.63	1.6	0.55	0.62	1.4	2.57
	<i>Imperata cylindrica</i> (L.) Beauv.	0.60	2.8	0.53	1.08	1.9	3.51
	<i>Phalaris</i> sp.	2.70	6.4	2.38	2.48	2.8	7.66
	<i>Phragmites australis</i> Kunth.	0.06	0.8	0.05	0.31	0.2	0.56
	<i>Poa annua</i> L.	0.46	2.4	0.40	0.93	1.4	2.73
	<i>Polyponon monospeliensis</i> (L.) Desf.	0.88	2.4	0.77	0.93	1.7	3.40
	<i>Setaria viridis</i> (L.) Beauv	0.32	1.8	0.28	0.70	1.4	2.38
	<i>Sorghum</i> sp.	0.40	1.8	0.35	0.70	1.3	2.35
9	<i>Alhagi maurorum</i> Medic.	0.31	1.4	0.27	0.54	0.8	1.61
	<i>Medicago polymorpha</i> L.	2.16	3.4	1.90	1.32	1.6	4.82
	<i>Melilotus indica</i> (L.) All.	0.72	1.0	0.63	0.39	0.9	1.92
10	<i>Hibiscus trionum</i> L.	1.80	4.6	1.58	1.78	1.7	5.06
	<i>Malva parviflora</i> L.	1.80	3.2	1.58	1.24	1.4	4.22
	<i>Sida alba</i> L.	1.00	3.0	0.88	1.16	1.6	3.64
11	<i>Plantago major</i> L.	0.13	0.2	0.11	0.08	0.4	0.59
12	<i>Rumex dentatus</i> L.	3.05	5.0	2.68	1.93	2.3	6.91
13	<i>Portulaca oleracea</i> L.	9.45	20.2	8.32	7.82	5.1	21.24
14	<i>Anagallis arvensis</i> L.	0.30	0.4	0.26	0.15	0.5	0.91
15	<i>Datura innoxia</i> Mill.	0.90	2.2	0.79	0.85	1.6	3.24
	<i>Datura stramonium</i> L.	1.20	3.6	1.06	1.39	1.9	4.35
	<i>Solanum nigrum</i> L.	0.92	3.6	0.81	1.39	1.4	3.60
16	<i>Corchorus olitorius</i> L.	0.80	2.0	0.70	0.77	1.3	2.77
17	<i>Ammi majus</i> L.	2.36	3.4	2.08	1.32	1.3	4.70
18	<i>Urtica urens</i> L.	2.87	4.8	2.52	1.86	2.2	6.58

relative frequency (RF) and relative uniformity (RU). *Amaranthus viridis* L., *Chenopodium murale* L., *Convolvulus arvensis* L., *Cyperus rotundus* L. and *Portulaca oleracea* L. had the highest relative abundance which means that these weeds were most common and prevalent by associated with ratoon sugar cane.

### 3.2.3. Species / village

Results in Table(11) show that the number of species / village during 1999,2000 and their averages in ratoon sugar cane were different and its values ranged (21- 28),(22-29)and(24-31) species, respectively. The results also indicated that the number of species / village obtained from frequency % and density means (as average of 1999-2000) had the same trend in species differences. Dominant, common and rare species as recorded by frequency % means ranged (3-7),(10-19)and(6-15) species, respectively. However, dominant, common and rare species by density means ranged : (0-6),(4-13)and(14-22) species, respectively. These differences may be due to variation in natural distribution of weeds between fields and villages.

Table (11): Dominant,common and rare weed species according to frequency (%) and density/ village (average of 1999/2000)and their number during 1999 and 2000 in ratoon sugar cane.

Village	No of species / village			Frequency%			Density		
	1999	2000	Average	D	C	R	D	C	R
1	22	22	24	6	10	8	5	4	15
2	23	22	24	5	13	6	6	4	14
3	21	26	27	3	14	10	3	8	16
4	24	27	27	4	16	7	1	12	14
5	23	29	31	6	12	13	5	4	22
6	22	27	30	6	14	10	2	8	20
7	22	27	29	4	17	8	3	7	19
8	26	29	30	7	13	10	4	7	19
9	28	28	30	5	19	6	3	13	14
10	22	28	31	5	11	15	0.	9	22

It can be concluded that the number of species in planting and ratoon sugar cane were 52 and 50 species, respectively. Frequency % and weed density of planting sugar cane during 1999 was higher than 2000 by 6.68 and 7.88 %, respectively. Meanwhile, the previous character of ratoon sugar cane was less than in the same period by

4.97 and 4.18 %, respectively. Frequency % and weed density (average of 1999-2000) for planting sugar cane were higher than ratoon sugar cane by 20.88 and 33.11%, respectively. Winter annual weed species were higher than summer annual weed species in planting and ratoon sugar cane in both seasons. Winter annual weed species that germinate in the autumn and winter and mature in spring and early summer are associated with kharify sugar cane. Weed survey could provide baseline information for future comparisons and weed control programs in sugar cane fields during that period.

#### 4. REFERENCES

- Abd El-Latif F.A., Hassanein E.E. and Al-Marsafy H.T. (1994). Effect of some new herbicides on weed control, yield, yield components and juice quality of sugar cane. *J. Agr. Sci., Mansoura Univ.*, 19(2):453-62
- Abd El-Raouf M.S., Shaban S.A., Abusteit E.O. and El-Khanagry S.S., (1993). Field survey of weed flora in wheat (*Triticum aestivum* L.) at Giza and Qalubia Governorates. *Egypt. J. Appl. Sci.*, 8(11):47-63.
- Attalla S.I., Ibrahim H.M., Kholosy A.S. and El-Meshad L.A. (1995). A study on selectivity and efficiency of herbicides on weed and sugar cane. *Egypt. J. Appl. Sci.*, 10 (7):223-232.
- Boulos L. and El-Hadidi M.N. (1984). *The Weed Flora of Egypt*. The American University in Cairo Press.
- El-Gharabawy A.A., Elian M.A.S. and Beshier S.Y. (1988). Weed flora distribution in the projected sugar beet area at West Nubariya. *Agr. Res. Review*, 66 (3):527-536.
- El-Khanagry S.S. (1993). Comparative study of weed communities associated with some field crops. M.Sc. Thesis, Fac. Agric. Cairo Univ.
- El-Nawawy A.S. and Abu Zaid M. (1969). Fundamental planning of weed control as a field practice. (in Arabic) Dar Al-Maaref Publication, Cairo, Egypt.
- Hassanein E.E., El-Wakil H.R., El-Rayes F.M., El-Khanagry S.S. and Mohamed A.A. (1995). Weed survey in winter crops in Qena Governorate. pages 215-227 in Nile Valley Regional



- Program for wild oat control in cereals and some other winter crops, Egypt, Proceedings of the 3<sup>rd</sup> Annual Meeting, 10-14 September, Cairo, Egypt.
- Hassanein E.E., El-Wakil H.R., Yehia Z.R., El-Khanagry S.S. and Mohamed A.A. (1998). Weed survey in winter crops in Alexandria Governorate. p 157-170 in Nile Valley Regional Program for wild oat control in cereals and some other winter crops, Egypt, Proceeding of the 6<sup>th</sup> Annual Meeting, 6-11 September, Cairo, Egypt.
- Hassanein E.E., Ibrahim H.M., Kholosy A.S. and Al-Marsafy H.T. (2000). Manual of weed identification and control in wheat. Weed control research section in collaboration with the European Union and ICARDA. pp 160.
- Ibrahim A.A.S. (1984). Weed competition and control in sugar cane. *Weed Res.*, 24: 227-230.
- Mani V.S., Gautam E.C. and Chakraborty T.K. (1968). Losses in crop yields due to weed growth. *Pans*, 2(4): 142-158.
- McCully K.V., Sampson M.G. and Watson A.K. 1991. Weed survey of Nova Scotia lowbush Blueberry (*Vaccinium, angustifolium*) fields. *Weed Sci*, 39, 180-185.
- Muschler R. (1912). A manual flora of Egypt. Berlin, Friedlaender and son 2 vols, 1312 pp.
- Nour A.H. and Allam A.I. (1988). Chemical control in sugar cane fields. *Agr. Res. Review*, 66(3): 497-503.
- Obien S.R. and Baltazar A.M. (1979). Weed control in sugar cane in the Philippines. *Weed Sci. Soc. of Philippines*, 45: 55-60. (weed Abst. 32)
- Shaltout K.H. and El-Fahar R.A. (1991). Diversity and Phenology of weed communities in the Nile Delta Region. *J. of Veget. Sci.*, 2, 385-390.
- Tackholm V. (1974). Student's Flora of Egypt. 2<sup>nd</sup> ed., Cairo Univ., 888pp.
- Tackholm V. and Drar M. (1950). Flora of Egypt Vol. II, Fouad-I Univ. Press. Cairo, Egypt. 547 pp.

- Thomas A.G. (1985). Weed survey system used in Saskatchewan for Cereal and oilseed crops. Weed Sc.,33,34-43.
- Zaki M.A. (1991). Identification of important weeds of Egypt. APCP, Principal Bank for Development and Agriculture Credit, Ministry of Agriculture Egypt. (in Arabic) 226pp.

## حصر وتصنيف الحشائش المنتشرة في قصب السكر الغرس والخلفة بمركز اسنا محافظة قنا

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### ملخص

اجريت هذه الدراسة لحصر وتصنيف الحشائش المصاحبة لمحصول قصب السكر الغرس والخلفة بمركز اسنا محافظة قنا خلال موسمي ٢٠٠٠/١٩٩٩ و ٢٠٠١/٢٠٠٠. وقد اتضح من حصر حقول قصب السكر الغرس انه ينتشر ٥٢ نوع من الحشائش التي تتبع ١٨ عائلة نباتية مختلفة بينما ينتشر في حقول قصب السكر الخلفة ٥٠ نوع من الحشائش التي تتبع ١٨ عائلة نباتية مختلفة.

كانت أهم العائلات التي تتبعها الحشائش عريضة الأوراق (ذات الفلقتين) هي العائلة المركبة -الصلبية-البقولية-العلقية-الباذنجانية-السوسنية-الخبازية-الرمرامية-الخمبية. وكل من العائلة النجيلية والسعدية تتبع الحشائش ضيقة الأوراق (ذات الفلقة الواحدة).

كانت أهم الحشائش عريضة الأوراق في قصب السكر الغرس هي الخلة -الزربيح- العليق - الرحلة - عرف الديك-النبينة.

أما أهم الحشائش عريضة الأوراق في قصب السكر الخلفة فكانت هي عرف الديك- الرحلة.

كانت أهم الحشائش ضيقة الأوراق في قصب السكر الغرس هي السعد بورشاريا.

أما أهم الحشائش ضيقة الأوراق في قصب السكر الخلفة فكانت هي السعد.

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( يوليو ٢٠٠٢ ): ٣٨٩-٤١٠.