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Weed Survey on Faba bean (*Viciafaba* L.) in Khartoum State, Sudan

B.Sc. (Honors) Graduation Research Project in Plant Protection

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الاية

قال تعالى:

يُوسُفُ أَيُّهَا الصِّدِّيقُ أَفْتِنَا فِي سَبْعِ بَقَرَاتٍ سِمَانٍ يَأْكُلُهُنَّ سَبْعٌ عِجَافٌ وَسَبْعِ سُنْبُلَاتٍ خُضْرٍ وَأُخَرَ يَابِسَاتٍ لَعَلِّي أَرْجِعُ إِلَى النَّاسِ لَعَلَّهُمْ يَعْلَمُونَ (46) قَالَ تَزْرَعُونَ سَبْعَ سِنِينَ دَأَبًا فَمَا حَصَدْتُمْ فَذَرُوهُ فِي سُنْبُلِهِ إِلَّا قَلِيلًا مِمَّا تَأْكُلُونَ (47) ثُمَّ يَأْتِي مِنْ بَعْدِ ذَلِكَ سَبْعٌ شِدَادٌ يَأْكُلْنَ مَا قَدَّمْتُمْ لَهُنَّ إِلَّا قَلِيلًا مِمَّا تُحْصِنُونَ (48) ثُمَّ يَأْتِي مِنْ بَعْدِ ذَلِكَ عَامٌ فِيهِ يُغَاثُ النَّاسُ وَفِيهِ يَعْصِرُونَ (49)

صدق الله العظيم

سورة يوسف الآيات 46-49

Dedication

To my father and mother, to my brothers, sisters

To All My Teachers in Plant Protection, Sudan University Of Sciences and Technology, College of Agricultural Studies

To My Class Mate

To all member which help me to produce this work.

Acknowledgement

Firstly, thanks to God for giving me health and kept me well to finish this work.

Grateful thanks are due to my supervisor Mokhtar Abdel Aziz Mohamed for mentoring me and participation throughout the study

My earnest thanks to Moeed Ali for his sincere prompting and valuable help to finish this work.

And thankful are due to staff member of Plant Protection, Department, and College of Agricultural studies.

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ABSTRACT

A weed survey was carried out in sixareas in Khartoumstate namely: ElfakiHashim, ElgazeraIslang, Wawisti, Elgerafa, Tuti and Soba during the winter season of 2015/2016 to determine the most common and prevalent weed species associated with faba bean (*Viciafaba* L.) cultivation. A stratified random sampling procedure was adopted, whereby each area was divided into fields of which 3 were randomly selected. Number of individual weed species was determined in 10 quadrates each 1 m^2. The field density, frequency, uniformity, relative density, relative frequency, relative uniformity and relative abundance of the species were determined. Data revealed the presence of 24 species of annual and perennial weeds belonging to 14 families. The highest number of species occurred in ElgeziraIslang whilst the lowest was recorded in Wawisi. *Cyperusrotundus*and*Cuscutaeuropaea*were weeds that occurred at high relative abundance.Species with moderate relative abundance included *Gynandropsisgynandra* and *Echinochloacolona*, The other species occurred in few areas and exhibited low to verylow relative abundance.

المستخلص

أجرى مسح للحشائش فى الفكى هاشم، الجزيرة اسلانج، جزيرة واوسى، الجرافة، جزيرة توتى، سوبا بولاية الخرطومخلال الموسم الشتوى 2015 /2016 لتحديد أنواع الحشائش الشائعة و السائدة و التى ترافق زراعات الفول المصرى (*V.faba* L.).تم إستخدام نظام العينة الطبقية العشوائية فى أخذ العينات وتم إختيار ثلاثة حقول عشوائياً فى كل منطقة، عدد الحشائش فى المتر المربع لكل نوع تم حسابه عن طريق خشبة مستطيلة. كثافة الحقل، التكرار، التجانس، الكثافةالنسبية، التكرار النسبى، التجانس النسبى والغزارة النسبية للحشائش تم تقديرها.

بيانات المسح أظهرت وجود 24 نوع من الحشائش الحولية والمعمرة وتنتمى !لى 14 عائلة. أكبرعدد لأنواع الحشائش قد سجل فى الجزيرة اسلانج بينما أدناه كان فى واوسى. حشائش السعدة والحامول ظهرت بغزارة نسبية عالية. حشائش الدفرةوالتمليكة رصدت بغزارة نسبية معتدلة. الأنواع الأخرى المتبقية ظهرت فى مناطققليلة بغزارة نسبية قليلة إلى قليلة جداً .

CHAPTER ONE

INTRODUCTION

Faba bean (*Viciafaba* L.) a Fabaceae, has a number of English names, such as broadbean, field bean, faba bean and horse bean. It is commonly known in the Sudan as Egyption bean (Mukhtar, 1998). It is one of the fourth most important food legume crops in the world and it is used in different forms. Dry seeds are consumed for long as a source of protein in the human diet and animal feed, and the pods are harvested green for consumption as vegetable. In addition, faba bean contributes to soil fertility through biological nitrogen fixation. The main production zones of faba bean in the country are the Northern State (> 70%) and the Nile State (20%) (Gamal, 2008 and Bedry and Abbas, 2011).

Until lately, weeds were not a serious constraint to faba bean production in Sudan. However, use of uncertified seeds, animal grazing and flooding of the River Nile led to spread of some serious annual weeds, such as *Sorghum arundinaceum* (Dew.) Stapf.,*Sinapisarvensis*L., *amdChenopodium album* L., (Bedry and Abbas, 2011). Recently, weeds constitute the main obstacle in agricultural production. Weeds reduce yield through direct competition for light, moisture and nutrients and indirectly interfere with the utilization of land and water resources and adversely affect human welfare (Rao, 1983; Lavabre, 1991; Radosevich*et al.* 1997; Aldrich and Kremer, 1997 and Abdalla, 2009). The little work of past surveys and information regarding weed status in Khartoum State necessitates undertaking weed surveys to generate information on weed species, then density and distribution of weeds. The generated data help in understanding the size and extent of the problems that may arise due to weeds and in developing management practices. A weed survey was, therefore, conducted in six areas in Khartoum State

to determine the most common and prevalent weed species associated with faba bean crop.

CHAPTER TWO

LITERATURE REVIEW

2.1 Faba bean (*V. faba* L.):-

2.1.1 Taxonomy:-

Faba bean (***V.faba*** L.) belongs to the family Fabaceae, sub- family Papilionoidae, Order Fabales(Abbas*et*al., 2003 and Mohammad, 2010).

2.1.2 Common names:-

The common names of *V. faba* are broad bean, field bean, horse bean and faba bean (Amal, 2009).

2.1.3 Economic importance:-

Faba bean is an important leguminous crop in the Sudan. Millions of people particularly depend on faba bean as an important food for dietary protein and main table food for both breakfast and supper.

Cultivated faba bean is used as a vegetable either green or dried, fresh or canned. It is a common breakfast food crops legume which contains the highest amount of protein generally twice the level found in cereal grains. Faba bean has been considered as meat extender or substitute and as a skim–milk substitute. It is sometimes grown for green manure, but generally for livestock feed.

2.2 Weeds: definition, classification and economic importance:-

A weed is a plant growing out of place, that is, a plant growing where it is not wanted, a plant interfering with the intended use of land, and a plant with negative value. It interferes with crop production, directly, through competition, parasitism and allelopathy or indirectly through hindering cultural and harvest practices (Lavabre, 1991; Ibrahim, 2005 and Suhair, 2012).

Weeds present a serious problems to crop production in the Sudan. In the Gezira scheme about 34% of the tenants share is cost of weed control. Weeds through competition with crops for water, nutrients, space and light or by allelopathy, lead to serious yield losses. Weeds also act an alternative hosts for many diseases and animal pests (Osama, 1999; Ihsan, 2002 and Nayla, 2003).

Some common methods used to classify weeds are based on i) botanical (taxonomic) characteristics, ii) life history, iii) habitat, iv) physiology, v) Day length plants, vi) degree of undesirability and vii) evolutionary strategy.

By botanical characteristics (taxonomic) weeds are classified into kingdom, divisions (phyla), classes, orders, families, genera and species. They also are classified as dicotyledons (broadleaves) and monocotyledons (grasses). According to life history plants classified into annuals, biennials and perennials. On basis of habitat plants are classified as terrestrial (that is, they are found on land) and aquatic. On physiological basis plants are classified according to photosynthetic pathway into C_3 plants and C_4 plants. According to day length plants are classified into short-day, long-day and day-neutral. According to undesirability they can be classified into noxious and poisonous plants. By evolutionary strategy they can be classified into stress-tolerators, competitors and ruderals (Radosevich*et al.,* 1997 and Aldrich and Kremer, 1997). Weeds have been part of the agricultural science, since man first started cultivated crops, more than 10,000,000 years ago and they are still a major problem today. Weeds encompass all types of undesirable plants trees, broad-leaved plants, grasses, sedges, ruches, aquatic plants and parasitic flowering plant (Abdel Marouf, 2004). Weeds cause greater losses than either insects or plant diseases. They are the major barrier to food production and economic development in many regions of the world particularly in underdeveloped countries, lacking machinery and chemicals (Tomador, 2002).

Furthermore, aquatic weeds reduce the efficiency of irrigation canals by hindering water flow and encouraging siltation. Moreover, weeds interfere with crop production in various ways.

i) Weeds decrease yields by competing with the crop directly for the resources of the environment and inputs in terms of water, nutrients, light, space and / or carbon dioxide.

ii) Reduce yields by releasing toxic substances or exudates which inhibit crop growth. This is called the allelopathic effect.

iii) Act as an alternative hosts for insect pests and diseases that attack crop plants and cause indirect losses.

iv) Delay maturity and slowdown the process of harvesting.0

v) Depress crop quality by contamination of the harvested product.

vi) Increase tendency for some crops to lodge or to go over, flat.

vii) Reduce the value of land specially perennials such as bermuda grass and field bindweed and parasitic ones such as broomrape and dodder.

viii) Reduce farm loans.

ix) Decrease human efficiency.

x) Increase costs of other pests control.

xi) Reduce the quality of livestock products.

xii) Increase the cost of labour and equipment.

xiii) Consume water and generally disrupt efficient farm operation.

xiv) They cause damage to machinery or clogging of harvest equipment.

xv) Waste excessive proportion of farmers time.

xvi) Increase loss of water from rivers or irrigation canals by evapotranspiration.

xvii) Some weeds are reported to be poisonous to man and animals (Ahmed, 2003; Alia, 2003; Abdel Marouf, 2004; Khalid, 2005; Mukhtar, 2006; Ali, 2007; Mohamed, 2009 and Suhair, 2012).

Increase in weed population has a direct impact on reduction in crop yield. The duration of weed competition and the time of weed removing have a great influence on crop growth and yield (Rao, 1983).

In some crops, weed infestation during the first 3 to 8 weeks is very critical (Rao, 1983). Weeds are a major factor influencing crop production in agricultural system in the United States at least 12 million dollars are lost annually due to weed competition with crops

Weeds are not always harmful. Some weeds induce suicidal germination of some parasitic weeds such as *Strigahermonthica*. Weeds can also help in recycling soil nutrients. In addition, weeds are used as human food and animal feed. Moreover, some weeds are important in traditional medicine such as Italian senna and thorn apple (Hamada, 2000). Perennial weeds are a major problem in crop production allover the world (Jodies and deboraha, 1991).

2. 3 Weed survey in various crops in Sudan:-

A Weed survey was conducted by Mukhtar ,(2012)in wheat in Dongla Area Northern State ;Hamada et al.,(2009)in Maize in Dongla Area Northern State;Mukhtar,(2013)in Okra in Dongola Area ,Northern State ., Mukhtar,(2024)in garlic in Dongla Area Northern State; and Mukhtar,(2012)in onion in Dongola Area ,NothernState,Sudan.

2.4 **Weed survey in faba bean (*Viciafaba* L.) in Sudan:**

A weed Survey was conducted byMukhter ,(2012)in faba bean in Dongola Locality Northern State. Sudan.

CHAPTER THREE

MATERIALS AND METHODS

3-1- The experimental Site:-

A survey was conducted in Khartoum State,Poi the Winter Seson 2015/2016 at Khartoum State Latitude 15° 40-N and Lonngitude32° 23E). (Babiker et al. 2015).

A weed survey was undertaken in farmers' fields in six areas: ElfakiHashim, Wawisti, ElgaziraIslang, Elgerafa, Tuti and Soba (each of more than 50 feddan) (one fed. = 0.42 ha), four weeks after sowing faba bean in the winter season 2015/2016. This period coincided with maximum growth of weeds and ease of their identification. Counts at this time may indicate the size and extent of weed populations. The survey was undertaken using commonly accepted botanical survey methods to locate and identify weeds. The survey methods involved searching, identifying and counting different weed species.

A stratified random sampling procedure, described by Thomas (1985), Mohamed and Mohamed (1992) and Moeini*et al*.(2008), was adopted. The surveyed area in each area was divided into fields, of which 3 were randomly selected. The number of individual weed species was determined in 10 quadrates, each 1 m^2. The data were processed to indicate density, the mean field density, field frequency, field uniformity, relative mean field density, relative field frequency, relative field uniformity and relative abundance of the species (Thomas 1985; Mohamed and Mohamed 1992 and Moeini*et al*.2008).

Density (D) = number of individuals of a certain species (K)/m^2.

$$\text{Mean field density (MFD)} = \frac{\text{Total of each field density} \times 100}{\text{Total number of fields}}$$

$$\text{Field frequency (FR)} = \frac{\text{Number of fields in which species (K) occurs} \times 100}{\text{Total number of fields}}$$

Field uniformity (FU) =

$$\frac{\text{Number of sampling locations in which species (K) occurs} \times 100}{\text{Total number of samples}}$$

Relative mean field density for species K ($RMFD_K$) =

$$\frac{\text{Mean field density value for species K}}{\text{Sum of mean field density values for all species}} \times 100$$

Relative field frequency for species K (RFR_K) =

$$\frac{\text{Field frequency value for species K}}{\text{Sum of field frequency values for all species}} \times 100$$

Relative field uniformity for species K (RFU_K) =

$$\frac{\text{Field uniformity value for species K}}{\text{Sum of field uniformity values for all species}} \times 100$$

Relative abundance for species K (RA_K) = $RMFD_K + RFR_K + RFU_K$

CHAPTER FOUR

RESULTS AND DISCUSSION

The data revealed the presence of 24 species of annual and perennial plants belonging to 7 families (Table 1).Of these species, 16 were dicotyledonous, 8 were monocotyledonous and of these 24 species 2 were parasitic weeds, *Cuscutacompestris*and*Orobanchcrenata* were holo parasites. The Poaceae and Malvaceae, formed 28.57, 21.43, respectively, of the total number of species. The remaining weed species belonged to 12 families. Of the 24 species recorded in the areas, 8 species (denoted by * in Table 1) occurred in few areas at very low density and are not considered in the analysis and presentation of the results. These results confirmed that, the weed flora of Khartoum state was dominated by broad-leaved weeds. This result could be attributed to the use of graminae weed herbicides such as Topic by farmers more than broad-leaved weed herbicides such as 2, 4 - D. Also this result could be attributed to the variation of crops, types of soils, the farming system and the variation of climatic conditions.

The highest number of species(13) occurred in ElfkiHashim whilst the lowest (9) was recorded in Wawistiisland (Table 2). *C. rotundus*, *C. europaea* and *B. eruciformis* prevailed in all areas. This finding could be attributed to the perennial nature of *C. rotundus*. This propagate sexually by seeds and asexually by vegetative organs, these characteristics make their control very difficult. The other two weed species are annuals which propagate sexually by seeds. These weeds produce millions of small and light seeds which disseminate by several means such as animals, farm equipment, wind and water. *C. rotundus* occurred at high density. Mean field density (MFD) of *C. rotundus* ranged from 1.00 in ElgaziraIslang to 120.33 in Elgerafawith mean 82.99 plants/m^2 (Table 2). Its occurrence at high

density is attributed to its propagation sexually and asexually and the counting method used where a stolon is considered an individual plant.*B. eruciformis, C. rotundus, C. europaea*, *I. cylindrical* and*G.gynandra*occurred at medium MFD which rangedfrom5.88 to 16.88. The other species occurred at very low MFD, which averaged 0.55 to 3.61 plants/m^2 (Table 2).

C. rotundus, C. europaea, B. eruciformis,C. Dactylon, Echinocloacolona, S. oleraceous, G.gynandra and *S. sudanensis*occurred at high field frequency (FR) which ranged from 72 to 100. *H. ficulneas, D. stramonium, I. cylindrical, A. graecizans and T. portulacastrum* occurred at medium field frequency (FR) which ranged from 33.33 to 55.Other weed species were observed at a very low (FR) level (mean 16.60 to 22) as shown in (Table 3). These weeds have various characteristics which permit them to propagate quickly annually by different methods of propagation and disseminate to new areas and I predict that, in the future they will disseminate in all parts of the country.

Field uniformity (FU) of *C. rotundus* ranged from 53.30 in ElfakiHashim to 100 in Elgerafa, Tuti and Soba with mean 88.70% which was the maximum. It was followed, in a descending, order, by *C. europaea*, *B. eruciformis*and *E. colona*which demonstrated a FU of 69.90%-45.36%. Other species occurred at low (FU) (6.66 – 29.89) (Table 4).

C. rotundus had the highest relative mean field density (RMFD) (45.89) than any of the other weed species. It was followed, in descending order, by*E. colona,.B. eruciformis,C. europaea*, *C. dactylon,A. graecizansand S. oleraceus*which attained a (RMFD) of 13.75, 13.36, 8.19, 5.75, 3.90 and2.76, respectively. Other species revealed a (RMFD) less than 2 (Table 5).

Relative field frequency (RFR) of individual species showed that *C. rotundus*was the most frequent species (10.37). It was followed by, *C. europaea, B.* eruciformis,

E. colona, *C. dactylon*, *T. portulacastrum*and*G. gynandra*which demonstrated a (RFR) of (10.37%-6.71%). Other species revealed (RFR) less than 6 (Table 6).

The maximum relative field uniformity (RFU) (17.89) was achieved by *C. rotundus*. It was followed, in descending order, by *C. europaea*, *A. graecizans*, *B. eruciformis*,*E. colona* and *G. gynandra*which ranged from 13.78 to 6.00. Other species displayed a RFU less than 5 (Table 7).

The important feature of this survey is the method of ranking species on their relative abundance (RA). The survey system provided quantitative comparison of the common species. *C. rotundus*and*C. europaea*were weeds that ranked high in the survey. *C. rotundus*is a perennial that is difficult to control by hand weeding or herbicides and accordingly displayed high MFD, FR and FU. If the use of herbicides become common in this area the yield of the different crops will be high in its quantity and quality and the soil seed-bank of weeds will be few. On the other hand, *C. europaea*is a parasitic and annual weed that is easily disseminated in the areas and its to control is difficult by hand weeding or herbicides and accordingly displayed high. Species with moderate relative abundance included*E. colona* and *B. eruciformis*, The other species exhibited low relative abundance (Table 8).

Table 1. Scientific name, English name, Arabic name and family of weed species

Scientific name	English name	Arabic name	Family
Cyperusrotundusl L.	Purple nutsedge	Seida	Cyperaceae
.Cuscutaeuropae L.	Dodder	Hamool	Cuscutacee
Cynodondactylon L.	Bermuda grass	Nageel	Poaceae
Brachianiaeruciformis		Um kwiat	Poaceae
Echinochloacolona(L.) Link.	Barnyard grass	Defra	Poaceae
CynandropsisgynandraL.Briq	Caffir Cabbage	Tamaleka	Capparidaceae
*Sonchusoleraceus*L.	Sow thistle	Moleita	Asteraceae
HibischusficulneTus L.			Malvaceae
. Sorghum arundinaceum. (Dew.) Stapf	*Wild Sorghum*	Adar	Poaceae
*Daturastramonium*L.	Thorn apple	Datura	Solanaceae
*Tribulusterrestris*L	Caltrops	Dereisa	Zygophyllaceae
*Amaranthusgraecizans*L.	White pigweed	Lisantairsaghir	Amaranthaceae
*Portulacaoleracea*L.	Purslane	Rigla	Portulacaceae
*Amaranthusviridis*L.	Pigweed	Lisantairkabir	Amaranthaceae
Imperatacylindrica (L.) Raeuschel	Cogon grass	Halfazailelgit	Poaceae
Hibiscus ficulneusL.		Afrita	Malvaceae
Sorgamsudanisiss L.			
Abutilon pannosum L.	Ragged mallow	Hambouk	Malvaceae
*Euphorbia indica*Lam.*	Milk weed	Um labena	Euphorbiaceae
*Celosia argentea*L.*	Cock's comb	Danab el kalib	Amaranthaceae
*Orobanchecrenata*Forssk.*	Broomrape	Halouk	Orobanchaceae
*Eruca sativa M Ill.**	Rocket	Girgeer	Cruciferae
Xanthium brasilicumVell*		Ramyuk	Asteraceae
*Solanumdubium*Fresen.*	Poison berry	Gubbein	Solanaceae
Tephrosiaapollinea(Del) DC*	Wild sweet pea	Amayouga	Fabaceae

Table (2): Mean field density of common weed species

Name of species	Els	Elm	Um	Ham	Sel	She	Mean
C.rotundus .	*966.*	100	35.66	120.33	71.66	60.0	82.66
B.eruciformsL.49.3		5.33	18.0	6.00	6.00	3.66	16.88
C.dactylonL..0.00		23.66	4.00	1.00	6.33	0.33	14.77
ropaeaL	*16.66*	19.0	8.00	5.66	6.33	2.66	9.60
I.cylindrcaL.	*4.00*	1.0	1.00	0.33	1.00	0.00	6.49
C.gynandraL16.66		19.0	0.00	0.00	1.00	6.33	5.88
C.italigaL.	*13.0*	0.0	0.00	2.66	4.00	200	3.61
S.oleraceusL.0.00		0.0	0.00	9.66	0.33	0.66	3.55
E.colona	*13.66*	73.33	4.33	0.66	3.00	2.60	2.54
T.portulacastrum L.6.66		2.0	0.33	0.00	0.33	1.00	2.53
S.arundna	*3.66*	2.0	2.00	0.00	0.33	0.00	1.72
S.arundinaceumL.4.00		1.0	1.00	0.33	0.33	0.00	1.11
S.sudanisissL.	2.00	0.66	1.00	1.00	0.0	0.60	0.94
D.innoxias	1.00	1.33	0.33	0.00	0.66	0.66	0.77
A.pannosumL.	2.00	0.33	0.33	0.33	1.33	0.00	0.77
T.terrestrs	0.00	0.33	0.00	0.33	2.66	0.00	0.55

Ka y: ELf :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti, EL: Elgerafa, TU: Tuti and ,Soba

Table (3): Field frequency of common weed species

Name of species	Els	Elm	Um	Ham	Sel	She	Mean
C.rotundusL.	100	100	100	100	100	100	100
C.europaea	100	100	100	100	100	100	100
B.erucforms	100	100	100	66.6	100	100	90
C.dactylonL.	66.6	100	100	33.3	100	66.6	77
E.colonaL.	66.6	66.6	66.6	100	66.6	100	77
G.gynandra	100	33.3	33.3	66.6	33.3	33.3	77
S.sudunisis	0.0	66.6	66.6	100	33.3	33.3	72
H.ficulneus	33.3	66.6	33.3	0.0	33.3	0.0	55
D. stramonium	3.33	66.6	33.3	33.3	33.3	0.0	55
D.innoxiaL.	100	0.0	0.0	33.3	0.0	66.6	33
I.cylindricaL.	66.6	33.3	66.6	100	100	0.0	33
A.graecizansL.	66.6	66.6	100	33.3	100	0.0	33
T.protulacastrumL.	33.3	33.3	0.0	0.0	33.3	33.3	22
T.terrestrisL.	0.0	33.3	33.3	33.3	0.0	66.6	22
S.arundinaceumL.	0.0	0.0	0.0	0.0	66.6	0.0	16
A.pannosumL.	0.0	66.6	0.0	33.3	0.0	0.0	16

Key: KeyELf :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti,

EL: Elgerafa, TU: Tuti and ,Soba

Table (4): Field uniformity of common weed species

Name of species	Els	Elm	Um	Ham	Sel	She	Mean
C. rotundusl	53.3	86	93	100	100	100	88.77
C.europaea	93.3	80	73	60	73	40	69.99
B.eruciformis	80	40	93.3	33	60	26	55.43
E.colona	40	86	46.6	13	33	33	45.36
A.graecizans	33.3	13.3	0.0	53.3	6.66	0.0	38.85
C.gynandr	46.6	0.0	0.0	80	33.3	46.3	34.37
C.dactylonL.	33.3	40	26	20	40	20	29.89
T.portulacstrumL.	26	20	40	6.66	60	6.66	26.55
H.ficulneus	6.66	26	33.3	0.0	0.0	13.3	23.02
S.arundinaceumL.	13.3	13.3	0.0	0.0	13.3	13.3	17.75
S.oleraceusL.	40.0	6.66	13.3	0.0	0.0	0.0	14.38
S.sudanisiss	6.66	13.3	20	0.0	0.0	13.3	12.21
I.cylindrica	13.3	0.0	0.0	0.0	6.66	6.66	9.98
D.innoxiaL.	33.3	0.0	6.66	0.0	6.66	6.66	8.88
T.terrestrisL.	6.66	13.3	13.3	13.3	0.0	6.66	8.87
A.pannosumL.	6.66	13.3	6.66	0.0	0.0	0.0	7.55

KeyELf :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti, EL: Elgerafa, TU: Tuti and ,Soba

Table (5): Relative mean field density of common weed species

Name of species	Els	Elm	Um	Ham	Sel	She	Mean
C. rotundus	7.87	0.73	47.55	79.34	67.63	73.22	45.89
E.colona	10.02	55.01	5.33	0.95	5.97	3.42	13.75
B.eruciformis	36.19	4.10	24	3.94	5.97	4.46	13.36
C.europaea	15.58	0.0	5.18	13.45	3.43	2.26	8.44
C.dactylon	6.48	9.46	11.91	6.51	10.30	13.28	8.36
A.graecizans	10.22	0.0	0.0	1.75	3.77	2.84	3.09
S. oleraceus	10.51	0.0	0.0	2.19	0.21	3.66	2.76
G.gynandra	0.0	0.0	0.0	6.35	1.97	0.08	1.52
S.arundinaceum	2.93	0.75	0.21	0.62	0.33	3.24	1.51
T.portulacastrum	2.86	1.50	2.66	0.0	0.31	1.22	1.42
H. ficulneus	4.88	1.50	0.44	0.0	0.21	1.22	1.37
S. sudaniss	0.49	0.21	0.0	1.92	0.0	0.52	0.91
T.terrestis	0.0	0.24	0.0	1.75	2.51	0.0	0.75
D.innoxia	0.73	1	0.44	1.43	1.62	0.08	0.67
A.pannosum	1.46	0.24	0.0	0.21	0.0	0.40	0.48
E. rauwolfii	0.0	0.24	0.43	0.24	0.0	1.40	0.42
I.cylindrica	0.97	0.0	0.0	0.0	0.0	0.40	0.27

Key :EL :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti, EL: Elgerafa, TU: Tuti and ,Soba

Table (6): Relative field frequency of common weed species

Name of species	Elf	ELg	Wa	El	Tu	So	Mean
C. rotundus	12.51	10.7	10.4	10.0	8.57	10.0	10.34
C. europaea	12.51	10.7	10.4	10.0	8.57	10.0	10.37
B. eruciformis	12.51	10.7	10.4	6.66	8.57	10.0	9.81
E.colona	8.33	10.7	10.4	3.33	8.57	3.34	7.45
C.dactylon	4.16	10.7	10.4	6.66	8.57	3.34	7.29
T.portulacastrum	8.33	0.00	6.8	10.0	8.57	3.33	6.76
G.gynandra	8.33	3.57	6.8	10	6.66	3.00	6.71
D. innoxia	4.16	7.14	3.44	3.33	8.57	3.34	5.41
S.sudanisiss	0.0	7.14	6.8	10	2.85	3.33	5.02
S.oleraceus	12.51	3.57	3.34	6.66	2.85	3.34	4.85
S.arundinaceum	8.33	3.57	3.44	0.0	2.85	3.34	3.58
S. groecizans	12.51	0.0	0.0	3.33	0.0	3.00	3.14
H. ficulneus	4.16	3.57	3.44	0.0	2.85	3	2.88
A. pannosum	0.0	3.57	6.8	3.33	0.0	3.00	2.78
T.terrestris	0.0	3.57	3.44	0.0	3.33	0.0	2.22
I. cylindrical	0.0	0.0	0.0	0.0	8.57	3.00	1.42

KeyEL :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti, EL: Elgerafa, TU: Tuti and ,Soba

Table (7): Relative field uniformity of common weed species

Name of species	Elf	Elg	Wa	El	Tu	So	Mean
C.rotundus	*7.93*	18.51	18.45	23.45	23.44	23.22	17.89
C.europaea	13.88	17.22	15.78	14.69	11.58	9.28	13.78
A. graecizans	1.97	2.57	0.0	1.96	1.56	0.0	12.83
B.eruciformis	11.90	6.19	18.45	7.80	9.84	6.38	10.03
E.colona	5.95	18.51	9.21	3.11	8.38	7.73	8.81
G.gynandra	9.91	0.0	0.0	12.81	5.26	10.7	6.00
C.dactylon	0.73	8.61	5.14	4.96	6.32	4.46	4.99
H.ficulneus	9.91	4.21	6.85	0.0	0.0	3.88	4.90
T. portulacastrum	9.91	0.0	7.91	0.0	9.48	1.54	4.70
S.sudansiss	0.73	0.0	3.95	0.0	5.26	0.0	3.76
T. terrestris	0.0	1.03	1.03	0.0	2.10	1.54	3.16
S.oleraceus	5.95	1.03	2.93	3.11	1.52	1.54	2.68
A.pannosum	0.0	0.0	0.0	0.0	2.26	7.73	2.41
S.arundnaceum	0.0	1.03	0.0	1.96	1.26	7.73	1.80
Sa	0.73	0.0	1.31	0.0	1.52	1.54	1.36
I.cylindrica	0.0	0.0	1.03	1.96	1.52	1.54	0.85
D. annulatum	2.97	0.0	0.0	0.0	1.03	0.0	0.49

KeyELf :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti, EL: Elgerafa, TU: Tuti and ,Soba

Table (8): Relative abundance of common weed species

Name of species	Els	Elm	Um	Ham	Sel	She	Mean
C. rotundus	28.33	26.95	76.34	112	92.02	106.4	74.0
C. europaea	38.34	41.84	76.34	24.41	92.02	106.4	70.16
G. gynandra	15.26	84.16	22.88	11.47	22.92	14.55	28.53
E.colona	24.5	21.01	52.88	15.56	24.02	20.84	26.46
B. eruciformis	60.6	21.01	20.81	12.3	20.86	8.38	23.99
T. portulacastrum	15.05	9.00	9.46	11.50	18.32	6.1	11.46
S.oleraceus	29.41	7.14	6.8	11.96	12.94	5.2	10.87
S.sudanisiss	11.37	10.2	9.13	10.78	8.42	5.8	9.25
A. graecizans	23.40	2.57	0.0	13.61	5.29	5.84	8.46
H. ficulneus	18.95	9.44	6.37	0.0	3.58	8.1	7.78
S. arundinaceum	13.23	11.26	4.77	6.78	1.78	8.3	7.66
D. innoxia	5.62	8.14	4.21	3.76	10.71	5.68	6.23
T. terrestris	9.91	6.36	3.44	5.8	4.61	5.54	5.78
A. pannosum	11.37	5.21	7.57	3.44	0.62	0.40	4.78
I. cylindrical	4.6	4.9	3.88	0.0	13.83	0.0	4.53
D. annulatum	0.0	5.31	0.0	0.0	0.0	0.0	1.94

KeyELf :ElfakiHashim, , ELG:ElgaziraIslang, WA: Wawisti, EL: Elgerafa, TU: Tuti and ,Soba

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