U. of K. J. Agric. Sci. 20(2), 26-43, 2012

Weed Survey on Wheat in the Northern State, Sudan

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Abstract: A weed survey was conducted in seven locations in Dongola area during the winter season of 2008/2009 to determine the most prevalent weed species associated with wheat (*Triticum aestivum* L.). A stratified random sampling procedure was adopted and each location was divided into fields, of which 10 were randomly selected. Number of individual weed species was determined in 10 quadrates, each 1 m^2. The field density, field frequency, field uniformity, relative field density, relative field frequency, relative field uniformity and relative abundance of the species were determined. The data revealed the presence of 29 species of annual and perennial weeds belonging to 15 families. The highest number of species occurred in Elmasakeen and Sheikh Shareef, while the lowest was recorded in Selaim basin. *Sinapis arvensis, Cynodon dactylon*, *Malva palviflora, Convolvulus arvensis, Chenopodium album and Sorghum arundinaceum* occurred at high relative abundance. Species with moderate relative abundance were *Cyperus rotundus, Trigonella hamosa, Eruca sativa, Chenopodium murale* and *Sinapis alba*. The other species occurred in few locations and exhibited low to very low relative abundance.

Key words: Wheat; weeds; weed survey

INTRODUCTION

Wheat (*Triticum aestivum* L.) belongs to the family Poaceae, and is the most important cereal crop in the world. It is one of the major food crops in the Sudan and is exclusively produced for local consumption under traditional irrigation systems. It ranks second after sorghum in the Sudanese diet. Traditionally, wheat has been produced on small areas

along the Nile in northern Sudan, using animal-drawn implements and hand tools. At present, wheat consumption has increased, and the Sudan government is attempting to attain self-sufficiency. To achieve this, wheat production has been extended to the central clay plain in several irrigated schemes, e.g. Gezira, New Halfa and Rahad, where the winter season is shorter, warmer and with frequent hot spells than in the traditional wheat producing areas in northern Sudan (Sheikh El Din 2008; Assad *et al*. 2009).

Until lately, weeds were not a serious constraint to crop production in northern 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., *Sinapis arvensis* L. and *Chenopodium album* L., throughout the Northern State (Bedry and Elamin 2011). Recently, weeds became one of the main constraints in crop production in the Northern State and elsewhere in the Sudan. They reduce yield and indirectly interfere with the use of land and water resources and adversely affect human welfare (Ali 2003; Hamada *et al.* 2009; Mukhtar and Elamin 2011).

Weed survey methods have been introduced by many scientists. The method used by Thomas (1985) is more effective in determining the relative abundance of each species in the community (Moeini *et al*. 2008). To the best of my knowledge, only one study (Hamada *et al*. 2009) was conducted on weed status in Dongola area. This necessitates undertaking weed surveys to generate more information on weed species, their density and distribution. 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 different locations in Dongola area to determine the most common and prevalent weed species associated with wheat.

MATERIALS AND METHODS

A survey was conducted in Dongola area, which is a true desert with extremely high temperature and radiation in summer, low temperature in

winter, scarce rainfall and high wind speed (Osman 2004). The mean maximum and minimum temperatures are 36.8°C and 19.5°C, respectively. The climate is hyper arid with a vapour pressure of only 10.8 mb and a relative humidity of less than 20% (Osman 2004). The soil is loamy, with average sand, silt and clay contents of 31.5%, 46.5% and 22%, respectively (Damirgi and Al-agidi 1982; Ibrahim 1987; Osman *et al*. 2005).

A weed survey was undertaken in farmers' fields in seven locations: Elseir, Elmasakeen, Um Elgura, Hamid Narti, Selaim basin, Sheikh Shareef and Maragha (each of more than 50 feddans) (one fed. = 0.42 ha), four weeks after sowing wheat in the winter season 2008/2009. 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 location was divided into fields, of which 10 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 ($RMFD_K$) =

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

Relative field frequency for species K (RFR_K) =

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

Relative field uniformity for species K (RFU_K) =

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

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

RESULTS AND DISCUSSION

The data revealed the presence of 29 species of annual and perennial weeds belonging to 15 families (Table 1). Of these species, 23 were dicotyledonous and 6 were monocotyledonous. The Poaceae, Euphorbiaceae, Solanaceae and Cruciferae made up 17%, 10%, 10% and 10%, respectively, of the total number of species. The remaining weed species belonged to 11 other families (Table 1). Of the 29 recorded species, 11 occurred in one or two locations at very low density (0.23 - 0.30) and were not considered in the analysis and presentation of the results (Table 1).

The results indicated that the weed flora of Dongola area was dominated by broad-leaved weeds. This could be attributed to the use of graminae weed herbicides such as Topic, Topnour and Traxos by farmers more than broad-leaved weed herbicides such as 2, 4 - D. It could also be attributed to the variation of soils, types of arable crops, the farming system, edaphic factors and because the broad-leaved weeds are few preference for feeding by animals than graminae weeds.

The highest number of species (16) occurred in Elseir, Hamid Narti and Sheikh Shareef, followed by Elmasakeen (13), Um Elgura (12), Selaim basin (11), while the lowest was recorded in Maragha (8) (Table 2). *Sinapis arvensis, Convolvulus arvensis, Cyperus rotundus, Malva palviflora* and *Tribulus terrestris* prevailed in all locations. This could be attributed to the perennial life cycles of *C. arvensis* and *C. rotundus* which propagate sexually by seeds and asexually by vegetative organs. These characteristics make their control very difficult; moreover, they can germinate in different types of soils. The other three weed species are annuals which propagate sexually by seeds in tropical and subtropical climates. Seeds of these species are very difficult to separate from wheat grains, and so they have been sown and harvested along with the crop. In addition, these weeds disseminate their seeds by animals, farm equipment, wind, water, birds and organic manure.

Cynodon dactylon and *Sinapis alba* prevailed in all locations except Selaim basin and Maragha, respectively, while *Chenopodium album*, *Sorghum arundinaceum*, *Eruca sativa, Sonchus oleraceus* and *Cassia italica* prevailed in all locations except Maragha and Hamid Narti, Elseir and Um Elgura, Elmasakeen and Maragha, Um Elgura and Maragha, and Elmasakeen and Selaim basin, respectively (Table 2). *Sinapis arvensis* had higher (59) mean field density (MFD) than any of the other species (Table 2). It was followed, in descending order, by *C. dactylon*, *M. palviflora, C. album*, *C. arvensis*, *S. arundinaceum*, *T. hamosa*, *E. sativa*, *C. murale*, *S. alb*a and *C. rotundus* which attained a MFD of 56.49 to 3.37. Other species exhibited a MFD of less than 2% (Table 2).

Field frequency (FR) of individual species indicated that *Sinapis arvensis* was the most frequent species (72.86%) (Table 3). It was followed by *C. dactylon*, *C. arvensis*, *M. palviflora*, *S. arundinaceum*, *C. rotundus*, *C. album*, *T. hamosa*, *E. sativa*, *T. terrestri*s, *C. murale* and *S. alba* which had a FR of 62.86%-14.29%. Other weed species were of very low FR level (mean 4.29% – 8.57%) (Table 3).

The maximum field uniformity (FU) (66.86) was achieved by *S. arvensis* (Table 4). It was followed, in a descending order, by *M. palviflora*, *C. arvensis*, *C. dactylon*, *S. arundinaceum*, *C. album* and *T. hamosa*, which demonstrated a FU of 37.14%-10.57%. Other species attained low FU (0.86%– 9.14%) (Table 4).

S. arvensis had higher (26.96%) relative mean field density (RMFD) than any of the other species (Table 5). It was followed, in a descending order, by *C. dactylon*, *M. palviflora*, *C. arvensis*, *C. album*, *S. arundinaceum*, *T. hamosa* and *E. sativa* which attained a RMFD of 22.92%-2.41%. Other species displayed a RMFD of less than 2% (Table 5).

Relative field frequency (RFR) of individual species showed that *S arvensis* was the most frequent species (17.51%) (Table 6). It was followed by *C. dactylon, C. arvensis*, *M. palviflora*, *S. arundinaceum*, *C. rotundus*, and *C. album* which demonstrated a RFR of 12.23%-5.60%. Other species exhibited a RMFD of less than 5% (Table 6).

The maximum relative field uniformity (RFU) (25.87%) was achieved by *S. arvensis* (Table 7). It was followed, in a descending order, by *M. palviflora*, *C. arvensis*, *C. dactylon*, *S. arundinaceum*, *C. album*, *T. hamosa*, *C. rotundus* and *E. sativa*, which displayed a RFU of 13.50%-3.35%. Other species displayed a RFU of less than 3% (Table 7).

S. arvensis had higher (70.35%) relative abundance (RA) than any of the other species (Table 8). It was followed, in a descending order, by *C. dactylon*, *M. palviflora*, *C. arvensis*, *C. album*, *S. arundinaceum*, *C. rotundus*, *T. hamosa*, *E. rauwolfii*, *C. murale* and *S. alba* which attained a RA of 45.74%-7.02%. Other species exhibited low to very low RA (Table 8).

The important feature of this survey is the method of ranking species on their mean relative abundance. The survey system provided quantitative comparison of the common species. *S. arvensis, C. dactylon*, *M. palviflora, C. arvensis, C. album* and *S. arundinaceum* ranked high in the survey. *C. dactylon* and *C. arvensis* are perennials which combine the

advantages of both systems of reproduction: fast and extensive spread through sexually produced seeds plus firm establishment on the site through vegetative organs which store considerable food reserves for spread and regeneration. These characteristics make their control by hand or herbicides difficult, and accordingly displayed high MFD, FR and FU. On the other hand, *S. arvensis, M. palviflora, C. album* and *S. arundinaceum* are annuals which propagate sexually by seeds in tropical and subtropical climates. Seeds of these species are difficult to separate from wheat grains, and so they have been sown and harvested along with the crop. Also, these weeds disseminate their seeds by wild and domesticated animals, farm equipment, wind, water, birds and stable manure before decomposition which is a very common source of weed dissemination. The species with moderate mean relative abundance were *C. rotundus, T. hamosa, E. sativa, C. murale* and *S. alba*. The other species exhibited low to very low mean relative abundance (Table 8).

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

Scientific name	English name	Arabic name	Family
Cynodon dactylon L.	Bermuda grass	Nageel	Poaceae
Sorghum arundinaceum. (Dew.) Stapf.	Wild sorghum	Adar	Poaceae
Chenopodium album L.	Common goosefoot	Dorora	Chenopodiaceae
Sinapis arvensis L.	Wild mustard	Fugaila	Cruciferae
Trigonella hamosa L.	Sweet trefoil	Handagoog	Fabaceae
Convolvulus arvensis L.	Field bindweed	Olleig	Convolvulaceae
Malva palviflora L.	Cheeze-weed	Khoubaiza	Malvaceae
Cyperus rotundus L.	Purple Nutsedge	Seida	Cyperaceae
Chenopodium murale L.	Nettle-leaved goosefoot	Dorora hamraa	Chenopodiaceae

Table 1. Cont.

Scientific name	English name	Arabic name	Family
Gynandropsis gynandra (L.) *Briq.*	Caffir cabbage	Tamaleka	Capparidaceae
Datura stramonium L.	thorn apple	Datura	Solanaceae
Eruca sativa Mill.	Rocket	Girgeer	Cruciferae
Sonchus oleraceus L.	Sow thistle	Moleita	Asteraceae
Amaranthus graecizans L.	White pigweed	Lissan tair Saghir	Amaranthaceae
Echium rauwolfii Del.	Bugloss	Kohali	Boraginaceae
Sinapis alba L.	White mustard	Kabar	Cruciferae
Tribulus terrestris L.	Caltrops	Dereisa	Zygophyllaceae
Cassia italica (Mill.) Lam. Ex Steud.	Italian senna	Sen Elkalib	Caesalpiniaceae
Imperata cylindrica (L.) Raeuschel*	Cogon grass	Halfa Zail Elgit	Poaceae
Dicanthium annulatum (Forsk.) Stapf*	Blueweed	Lukh	Poaceae
Solanum dubium Fresen*	Poison berry	Gubbein	Solanaceae
Abutilon pannosum (Forst. f.) Schlecht*	Ragged mallow	Hambouk	Malvaceae
Tephrosia apollinea (Del.) DC*	Wild sweet pea	Amayouga	Fabaceae
Chrozophora plicata (Vahl.) * A. Juss	Croton	Taroob	Euphorbiaceae
Echinochloa colona (L.) Link*	Barnyard grass	Defra	Poaceae
Ricinus communis L.*	Caster bean plant	Khirwaa	Euphorbiaceae
Euphorbia indica Lam.*	Milk weed	Um Labena	Euphorbiaceae
Aerva javanica (Burm. f.)*	Kapok bush	Ras elshaib	Amaranthaceae
Solanum nigrum L.*	Black nightshade	Einab al dib	Solanaceae

*Occurred in one or two locations at very low density (0.23 - 0.30)

Table 2. Mean field density (MFD) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensis	52.20	61.20	62.60	25.60	74.80	68.20	68.40	59.00
Cynodon dactylon	53.40	56.80	18.60	67.80	0.00	71.60	127.20	56.49
Malva palviflora	60.20	6.20	16.80	84.40	14.20	19.40	12.80	30.57
Chenopodium album	0.80	56.00	16.20	0.00	50.40	18.60	0.00	20.29
Convolvulus arvensis	18.80	9.40	33.20	24.40	2.80	2.60	49.80	20.14
Sorghum arundinaceum	0.00	95.00	0.00	0.40	15.80	17.40	1.40	18.57
Trigonella hamosa	31.00	0.80	0.00	15.80	0.0	2.40	0.00	7.14
Eruca sativa	0.40	0.00	18.20	8.00	3.00	2.40	0.00	4.57
Chenopodium murale	22.20	0.0	0.0	0.20	4.60	2.60	0.00	4.23
Sinapis alba	0.20	14.80	0.60	1.40	6.80	2.00	0.00	3.69
Cyperus rotundus	1.20	4.20	1.40	7.80	0.00	4.20	4.80	3.37
Echium rauwolfii	0.20	0.00	0.00	0.40	0.00	9.40	0.00	1.43
Tribulus terrestris	1.00	0.20	1.80	0.20	0.40	0.40	0.40	0.63
Sonchus oleraceus	0.20	1.00	0.00	0.40	0.20	0.20	0.00	0.29
Cassia italica	0.20	0.00	0.20	0.20	0.00	0.20	0.80	0.23
Datura stramonium	0.00	0.00	1.00	0.40	0.20	0.00	0.00	0.23
Gynandropsis gynandra	0.20	1.00	0.40	0.00	0.00	0.00	0.00	0.23
Amaranthus graecizans	0.20	0.80	0.00	0.20	0.00	0.20	0.00	0.20

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

Table 3. Percentage of field frequency (FR) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensis	90.0	0.0	80.0	60.0	100.0	100.0	80.0	72.86
Cynodon dactylon	80.0	80.0	20.0	90.0	0.0	80.0	90.0	62.86
Convolvulus arven sis	70.0	30.0	80.0	60.0	20.0	20.0	90.0	52.86
Malva palviflora	100.0	30.0	30.0	100.0	30.0	40.0	30.0	51.43
Sorghum arundinaceum	0.0	90.0	0.0	10.0	50.0	60.0	20.0	32.86
Cyperus rotundus	30.0	20.0	20.0	20.0	0.0	70.0	50.0	30.00
Chenopodium album	10.0	60.0	20.0	0.0	60.0	30.0	0.0	25.71
Trigonella hamosa	70.0	10.0	0.0	40.0	0.0	40.0	0.0	22.86
Eruca sativa	10.0	0.0	70.0	30.0	20.0	10.0	0.0	20.00
Tribulus terrestris	30.0	10.0	30.0	10.0	10.0	20.0	20.0	18.57
Chenopodium murale	60.0	0.0	0.0	10.0	30.0	20.0	0.0	17.14
Sinapis alba	10.0	30.0	10.0	10.0	30.0	10.0	0.0	14.29
Cassia italica	10.0	0.0	10.0	10.0	0.0	10.0	20.0	8.57
Sonchus oleraceus	10.0	20.0	0.0	10.0	10.0	10.0	0.0	8.57
Amaranthus graecizans	10.0	10.0	0.0	10.0	0.0	10.0	0.0	5.71
Datura stramonium	0.0	0.0	10.0	20.0	10.0	0.0	0.0	5.71
Echium rauwolfii	10.0	0.0	0.0	10.0	0.0	10.0	0.0	4.29
Gynandropsis gynandra	10.0	10.0	10.0	0.0	0.0	0.0	0.0	4.29

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

Table 4. Percentage of field uniformity (FU) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensis	66.0	66.0	72.0	38.0	90.0	80.0	56.0	66.86
Malva palviflora	78.0	10.0	20.0	90.0	20.0	24.0	18.0	37.14
Convolvulus arvensis	34.0	14.0	50.0	38.0	6.0	8.0	66.0	30.86
Cynodon dactylo	28.0	30.0	8.0	40.0	0.0	32.0	58.0	28.00
Sorghum arundinaceum	0.0	70.0	0.0	2.0	30.0	32.0	8.0	20.29
Chenopodium album	2.0	42.0	14.0	0.0	50.0	22.0	0.0	18.57
Trigonella hamosa	40.0	2.0	0.0	22.0	0.0	10.0	0.0	10.57
Cyperus rotundus	6.0	4.0	4.0	12.0	0.0	18.0	20.0	9.14
Eruca sativa	20.0	0.0	32.0	12.0	6.0	6.0	0.0	8.29
Chenopodium murale	28.0	0.0	0.0	2.0	14.0	8.0	0.0	7.43
Sinapis alba	2.0	18.0	2.0	2.0	14.0	6.0	0.0	6.29
Tribulus terrestris	8.0	2.0	8.0	2.0	4.0	4.0	4.0	4.57
Sonchus oleraceus	2.0	4.0	0.0	4.0	2.0	2.0	0.0	2.00
Echium rauwolfii	2.0	0.0	0.0	2.0	0.0	10.0	0.0	2.00
Cassia italica	2.0	0.0	2.0	2.0	0.0	2.0	4.0	1.71
Datura stramonium	0.0	0.0	4.0	4.0	2.0	0.0	0.0	1.43
Amaranthus graecizans	2.0	2.0	0.0	2.0	0.0	2.0	0.0	1.14
Gynandropsis gynandra	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.86

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

Table 5. Percentage of relative mean field density (RMFD) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensi	21.40	20.20	36.31	10.75	43.38	30.69	25.99	26.96
Cynodon dactylon	21.89	18.74	10.79	28.48	0.00	32.22	48.34	22.92
Malva palviflora	24.68	2.05	9.74	35.45	8.24	8.73	4.80	13.38
Convolvulus arvensis	7.71	3.10	9.26	10.25	1.62	1.17	18.92	10.29
Chenopodium album	0.33	18.48	9.40	0.00	29.23	8.37	0.00	9.40
Sorghum arundinaceum	0.00	31.35	0.00	0.17	9.16	7.83	0.53	7.01
Trigonella hamosa	12.71	0.26	0.00	6.64	0.00	1.08	0.00	2.96
Eruca sativa	0.16	0.00	10.56	3.36	1.74	1.08	0.00	2.41
Chenopodium murale	9.10	0.00	0.00	0.08	2.67	1.17	0.00	1.86
Sinapis alba	0.08	4.88	0.35	0.59	3.94	0.90	0.0	1.53
Cyperus rotundus	0.49	1.39	0.81	3.28	0.00	1.89	1.82	1.38
Echium rauwolfii	0.08	0.00	0.00	0.17	0.00	4.23	0.00	0.64
Tribulus terrestris	0.41	0.07	1.04	0.08	0.23	1.08	0.15	0.44
Datura stramonium	0.00	0.00	0.58	0.17	0.12	0.00	0.00	0.12
Sonchus oleraceus	0.08	0.33	0.00	0.17	0.12	0.09	0.00	0.11
Cassia italica	0.08	0.00	0.12	0.08	0.00	0.09	0.30	0.10
Gynandropsis gynandra	0.08	0.33	0.23	0.00	0.00	0.00	0.00	0.09
Amaranthus graecizans	0.08	0.26	0.00	0.08	0.00	0.09	0.00	0.07

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

Table 6. Percentage of relative field frequency (RFR) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensis	14.40	16.00	18.40	11.40	26.00	18.00	18.40	17.51
Cynodon dactylon	12.80	16.00	4.60	17.10	0.00	14.40	20.70	12.23
Convolvulus arvensis	11.20	6.00	18.40	11.40	5.20	3.60	20.70	10.93
Malva palviflora	16.00	6.00	6.90	19.00	7.80	7.20	6.90	9.97
Sorghum arundinaceum	0.00	8.00	0.00	1.90	13.00	10.80	4.60	6.90
Cyperus rotundus	4.80	4.00	4.60	3.80	0.00	12.60	11.50	5.90
Chenopodium album	1.60	12.00	4.60	0.00	15.60	5.40	0.00	5.60
Eruca sativa	1.60	0.00	16.10	5.70	5.20	1.80	0.00	4.34
Trigonella hamosa	11.20	2.00	0.00	7.60	0.00	7.20	0.00	4.00
Tribulus terrestris	4.80	2.00	6.90	1.90	2.60	3.60	4.60	3.77
Chenopodium murale	9.60	0.00	0.00	1.90	7.80	3.60	0.00	3.27
Sinapis alba	1.60	6.00	2.30	1.90	7.80	1.80	0.00	3.06
Cassia italica	1.60	0.00	2.30	1.90	0.00	1.80	4.60	1.74
Sonchus oleraceus	1.60	4.00	0.00	1.90	2.60	1.80	0.00	1.70
Datura stramonium	0.00	0.00	2.30	3.80	2.60	0.00	0.00	1.24
Amaranthus graecizans	1.60	2.00	.00	1.90	0.00	1.80	0.00	1.04
Gynandropsis gynandra	1.60	2.00	2.30	0.00	0.00	0.00	0.00	0.84
Echium rauwolfii	1.60	0.00	0.00	1.90	0.00	1.80	0.00	0.76

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

Table 7. Percentage of relative field uniformity (RFU) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensis	21.12	24.42	30.96	13.68	37.70	29.60	23.52	25.87
Malva palviflora	24.96	3.70	8.60	32.40	8.40	8.88	7.56	13.50
Convolvulus arvensis	10.88	5.18	21.50	13.68	2.52	2.96	27.72	12.06
Cynodon dactylon	8.98	11.10	3.44	14.40	0.00	11.48	24.36	10.59
Sorghum arundinaceum	0.00	25.90	0.00	0.72	12.60	11.48	3.36	7.77
Chenopodium album	0.64	15.54	6.02	0.00	1.00	8.14	0.00	7.33
Trigonella hamosa	12.80	0.74	0.00	7.92	0.00	3.70	0.00	3.59
Cyperus rotundus	1.92	1.48	1.72	4.32	0.00	6.66	8.40	3.50
Eruca sativa	0.64	0.00	13.76	4.32	2.52	2.22	0.00	3.35
Chenopodium murale	8.96	0.00	0.00	0.72	5.88	2.96	0.00	2.65
Sinapis alba	0.64	6.66	0.86	0.72	5.88	2.22	0.00	2.43
Tribulus terrestris	2.56	0.74	3.44	0.72	1.68	1.48	1.68	1.76
Sonchus oleraceus	0.64	1.48	0.00	1.44	0.84	0.74	0.00	0.73
Echium rauwolfii	0.64	0.00	0.00	0.72	0.00	0.73	0.00	0.72
Cassia italica	0.64	0.00	0.86	0.72	0.00	0.74	1.68	0.66
Datura stramonium	0.00	0.00	1.72	1.44	0.84	0.00	0.00	0.57
Amaranthus graecizans	0.64	0.74	0.00	0.72	0.00	0.74	0.00	0.41
Gynandropsis gynandra	0.64	0.74	0.86	0.00	0.00	0.00	0.00	0.23

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

Table 8. Percentage of relative abundance (RA) of common weed species

Species	Els	Elm	Um	Ham	Sel	She	Mar	Mean
Sinapis arvensis	56.92	60.62	85.67	35.83	107.18	78.29	67.91	70.35
Cynodon dactylon	43.65	45.84	18.83	59.98	0.00	58.46	93.40	45.74
Malva palviflora	65.64	11.75	25.24	86.85	24.44	24.81	19.32	36.86
Convolvulus arvensis	29.79	14.28	59.16	35.33	9.34	7.73	67.34	31.85
Chenopodium album	2.57	46.02	20.02	0.00	65.83	21.91	0.00	22.34
Sorghum arundinaceum	0.00	75.25	0.00	2.79	34.76	30.47	8.49	21.68
Cyperus rotundus	7.21	6.87	7.13	11.40	0.00	21.15	21.72	10.78
Trigonella hamosa	36.71	3.00	0.00	22.16	0.00	11.98	0.00	10.55
Echium rauwolfii	2.40	0.00	0.42	13.38	9.46	5.10	0.00	10.11
Chenopodium murale	27.66	0.00	0.00	2.70	16.35	7.73	0.00	7.78
Sinapis alba	2.32	17.54	3.51	3.21	17.62	4.92	0.00	7.02
Tribulus terrestris	7.77	2.81	11.38	2.70	4.51	6.16	6.43	5.97
Sonchus oleraceus	2.32	5.81	0.00	3.51	3.56	2.63	0.00	2.55
Cassia italica	2.32	0.00	3.28	2.70	0.00	2.63	6.58	2.50
Echium rauwolfii	2.32	0.00	0.00	2.79	0.00	9.73	0.00	2.12
Datura stramonium	0.00	0.00	4.60	5.41	3.56	0.00	0.00	1.94
Amaranthus graecizans	2.32	3.00	0.00	2.70	0.00	2.63	0.00	1.52
Gynandropsis gynandra	2.32	3.07	3.39	0.00	0.00	0.00	0.00	1.25

Els: Elseir, Elm: Elmasakeen, Um: Um Elgura, Ham: Hamid Narti, Sel: Selaim basin; She: Sheikh Shareef and Mar: Maragha

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مجلة جامعة الخرطوم للعلوم الزراعية : المجلد العشرين – العدد الاول ، 2012م

مسح الحشائش فى القمح بمنطقة دنقلا ، الولاية الشمالية – السودان

مختار عبد العزيز محمد

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المستخلص: أجرى مسح للحشائش فى سبعة مواقع بمنطقة دنقلا خلال الموسم الشتوى 2008 /2009 لتحديد أنواع الحشائش الشائعة والسائدة التى ترافق زراعات القمح. أستخدم نظام العينة الطبقية العشوائية فى أخذ العينات وقسم كل موقع إلى حقول واختيرت عشرة منها عشوائياً. حدد عدد الحشائش لكل نوع فى عشر مربعات خشبية مساحة كل منها متراً مربعاً وقدرت الكثافة والتكرار والتجا نس والكثافة النسبية والتكرار النسبى والتجانس النسبى والغزارة النسبية للنوع. أظهرت النتائج وجود 29 نوعاً من الحشائش الحولية والمعمرة تنتمى !لى 15 فصيلة. سجل أكبر عدد لأنواع الحشائش فى المساكين وشيخ شريف بينما أدناه كان فى حوض السليم. حشائش الفجيلة والنجيل و الخبيزة والعليق والدرورة والعدار ظهرت بغزارة نسبية عالية، ورصدت حشائش السعدة والحندقوق والجرجير والدرورة الحمراء والكبر بغزارة نسبية معتدلة. ظهرت الأنواع الأخرى من الحشائش فى مواقع قليلة بغزارة نسبية قليلة إلى قليلة جداً.