

A Survey Of The Weed Flora In Garlic (*Allium Sativum* L.) And Onion (*Allium Cepa* L.) In Dongola Area, Northern State, Sudan

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Abstract: A weed survey was carried out in seven hamlets in Dongola area namely: Eldoum Elawazma, El Selaim basin, Elatroona, Irtidi, Elmasakeen, Kawa and Agja during the winter season of 2015/2016 to determine the most common and prevalent weed species associated with garlic (*Allium sativum* L.) and onion (*Allium cepa* L.). For each crop, a stratified random sampling procedure was adopted, whereby, each hamlet was divided into fields of which 10 were randomly selected. Number of individual weed species was determined in 10 quadrates each 1 m². The field density, field frequency, field uniformity, relative field density, relative field frequency, relative field uniformity and relative abundance of the species were determined. Data revealed the presence of 26 species of annual and perennial weeds belonging to 15 families in garlic and 28 species belonging to 15 families in onion. The highest number of species occurred in Elmasakeen and Irtidi hamlets whilst the lowest was recorded in Kawa hamlet in both crops. In all parameters measured, the dominant weed species prevailed at higher values in garlic than in onion. *Sinapis arvensis*, *Cynodon dactylon*, *Malva palviflora*, *Convolvulus arvensis*, *Chenopodium album* and *Sorghum arundinaceum* displayed the highest relative abundance in both crops. *Trigonella hamosa* also occurred at high relative abundance in onion. Species with moderate relative abundance in garlic included *Cyperus rotundus*, *T. hamosa*, *Eruca sativa*, *Chenopodium murale* and *Sinapis alba*. Whilst *C. murale*, *Datura stramonium*, *Gynandropsis gynandra*, *E. sativa*, *Sonchus oleraceus* and *Amaranthus graecizans* were moderately abundant in onion. The other species occurred in few hamlets and exhibited low to very low relative abundance in both crops.

Key words: Garlic; onion; weeds; weed survey

Introduction

Garlic (*Allium sativum* L.) and Onion (*Allium cepa* L.), Amaryllidaceae, are the most important vegetable cash crops in the Northern State and they are grown in a considerable area for their nutritive and economical values. They are produced by peasant farmers in almost all regions of the country, mostly, throughout the year. Due to favorable climatic conditions and availability of irrigation water the Northern State is one of the most important areas for garlic and onion production for local consumption and export (Mukhtar, 2012; Abd Al wahid, 2008; Nasr Eldin *et al.*, 2003). Recently, due to the implementation of free market agricultural policies, the area under garlic increased because returns from this crop are higher than returns from other traditionally grown horticultural and field crops (El Sadig and Abdalla, 1997 and Nourai 1994). The annually cultivated area of onion was estimated in 1999 as 61 thousand hectares with total production of around one million tonnes of fresh bulbs. In recent years, there is an increasing interest in production of onion bulbs in larger areas for domestic markets and / or export (Mukhtar, 2012; Hag Hamid, 2008 and Asim, 2007). Onion and garlic have open canopies which make their sensitive to weed competition during their growth in the field which takes 4-6 months according to purpose. The onion crop suffers greatly from weed competition particularly in the early stage of growth. Unrestricted weed growth may reduce onion bulb yield by > 70% (Mukhtar, 2012 and Dafalla *et al.*, 2009). Weeds constitute serious constraints to garlic and onion production. They compete with the crops for available moisture, nutrients, sunlight and space and reduce crops growth, quality and yield. Weeds also interfere with land utilization and water resources and adversely affect human welfare (Hamada *et al.*, 2009 and Nasr Eldin and Babiker, 2004). Scarcity of information regarding weed status in hamlets in Dongola area necessitates undertaking weed surveys to generate 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 seven hamlets in Dongola area to determine the most common and prevalent weed species associated with garlic and onion production.

Materials and Methods

A survey was conducted in Dongola area, which is a true desert with extremely high temperatures 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 vapor pressure of only 10.8 mb and a relative humidity of less than 20% (Osman, 2004). The soils of the hamlets are loamy, with average sand, silt and clay contents of 31.5%, 46.5% and 22%, respectively (Osman *et al.*, 2005 and Damirgi and Alagidi, 1982). A weed survey was undertaken in farmers' fields in seven hamlets: Elseir, Elmasakeen, Agja, Elatroona, Kawa, Irtidi and Eldoum Elawazma (each of more than 21 hectare (one hectare = 2.4 feddan), four weeks after sowing winter garlic and onion in season 2015/2016. This period coincided with emergence of weeds in the hamlets. Counts at this time may indicate the size and composition (Mukhtar, 2012). A stratified random sampling procedure, described by Thomas (1985) and Moeini *et al.* (2008) was adopted. For each crop, the surveyed area in each hamlet was divided into fields (2.1 hectares each), of which 10 were randomly selected. The number of individual weed species was determined in 10 quadrates, each 1 m². 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 (Moeini *et al.*, 2008 and Thomas, 1985).

Density (D) = number of individuals of a certain species (K)/m².

Mean field density (MFD) = Total of each field density × 100

Total number of fields

Field frequency (FR) = Number of fields in which species (K) occurs × 100

Total number of fields

Field uniformity (FU) =

Number of sampling locations in which species (K) occurs × 100

Total number of samples

Relative mean field density for species K (RMFD_K) =

Mean field density value for species Kx 100

Sum of mean field density values for all species

Relative field frequency for species K (RFR_K) =

Field frequency value for species K x100

Sum of field frequency values for all species

Relative field uniformity for species K (RFU_K) =

Field uniformity value for species Kx 100

Sum of field uniformity values for all species

Relative abundance for species K (RA_K) = RMFD_K + RFR

Results and Discussion

Data from garlic revealed the presence of 26 species of annual and perennial weed plants belonging to 15 families (Table 1). Of these species, 20 were dicotyledonous and 6 were monocotyledonous. The Family Poaceae made up 19% of the total number of species while Solanaceae and Cruciferae made up 12% each. The remaining weed species belong to 12 families. The highest number of species (16) occurred in Elseir, Elatroona and Irtidi followed by Elmasakeen (13), Agja (12), Kawa (11), whilst the lowest was recorded in Eldoum Elawazma (8). Regarding onion, 28 species of annual and perennial weed plants belonging to 15 families were recorded (Table 1). They comprised 21 dicotyledonous and 7 monocotyledonous species. The Poaceae made up 21% of the species while Solanaceae and Cruciferae constituted 11% each. The remaining weed species belong to 12 families. The highest number of species (15) occurred in Elmasakeen and Irtidi whilst the lowest (12) was recorded in Kawa (Table 1 and Table 2). Of the species recorded in the hamlets, 11 species (denoted by * in Table 1) occurred in few hamlets at very low density (less than 2 plants/m²) and were not considered in the analysis and presentation of the results. The results indicated that the weed flora of Dongola area was dominated by broad-leaved weeds. Similar result was found by Mukhtar (2012). This result could be attributed to the use of graminiae weed herbicides such as Topic, Topnour and Traxos by farmers more than broad-leaved weed herbicides such as 2, 4 - D. Also this result could 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 graminiae weeds. *Cynodon dactylon*, *Sinapis arvensis*, *Trigonella hamosa*, *Convolvulus arvensis*, *Malva palviflora*, *Cyperus*

rotundus, *Datura stramonium* and *Tribulus terrestris* prevailed in all hamlets (Table 2). This result could be attributed to the perennial life cycles of *C. dactylon*, *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 five weed species are annuals which propagate sexually by seeds in tropical and subtropical climates and they disseminate their seeds by animals, farm equipment, wind, water, birds and organic manure. In garlic, *S. arvensis*, *C. arvensis*, *M. prvilflora*, and *T. terrestris* prevailed in all hamlets. *C. dactylon* and *S. alba* prevailed in all hamlets except Kawa and Eldoum Elawazma, respectively, whilst *C. album*, *S. arundinaceum*, *E. sativa*, *S. oleraceus* and *C. italica* prevailed in only 5 hamlets. In onion, *C. dactylon*, *S. arvensis*, *T. hamosa*, *C. arvensis*, *C. rotundus*, *C. murale* and *D. stramonium* prevailed in all hamlets. *M. prvilflora* prevailed in all hamlets except Elmasakeen, whilst *S. arundinaceum* and *C. album* prevailed in all hamlets except Elseir and Eldoum Elawazma, respectively (Table 2). In garlic, mean field density (MFD) of *S. arvensis* ranged from 25.6 in Elatroona to 74.8 in Kawa and averaged 59 plants/m². *C. dactylon* was not recorded in Kawa, but displayed a maximum of 127.2 in Eldoum Elawazma and averaged 56.49 plants/m² (Table 2). MFD of *M. prvilflora* ranged from 6.2 in Elmasakeen to 84.4 in Elatroona and averaged 30.57 plants/m². *C. album* was not observed in Elatroona and Eldoum Elawazma but was highest (56) in Elmasakeen and averaged 20.29 plants/m². MFD of *C. arvensis* ranged from 2.6 in Irtidi to 49.8 in Eldoum Elawazma and averaged 20.14 plants/m². *S. arundinaceum* was absent in Elseir and Agja. Its maximum MFD (95) was displayed in Elmasakeen and averaged 18.57 plants/m². *T. hamosa* was absent in Agja, Kawa and Eldoum Elawazma. Its maximum MFD (31) was displayed in Elseir and averaged 7.14 plants/m². *E. sativa* was not recorded in Elmasakeen and Eldoum Elawazma. It revealed a maximum MFD (18.2) in Agja and averaged 4.57 plants/m². *C. murale* was absent in Elmasakeen, Agja and Eldoum Elawazma but its maximum MFD (22.2) was displayed in Elseir and averaged 4.23 plants/m². *S. alba* was not detected in Eldoum Elawazma and revealed a maximum of 14.8 in Elmasakeen and averaged 3.69 plants/m². *C. rotundus* prevailed in all hamlets except Kawa. Its maximum MFD (7.8) was displayed in Elatroona and averaged 3.37 plants/m². The other species occurred at very low MFD, which averaged 0.2 to 1.43 plants/m² (Table 2). MFD of *C. dactylon* in onion ranged from 42.2 in Kawa to 112.8 in Elmasakeen and averaged 85.17 plants/m² (Table 2). Its occurrence in both crops, at high density, is attributed to the counting method were a stolon is considered an individual plant. *S. arundinaceum* was not present in Elseir, however, it amounted to 108 in Elmasakeen and averaged 36.06 plants/m² while *C. album* was absent in Eldoum Elawazma and was highest (86.9) in Kawa and averaged 32.3 plants/m². The lowest MFD of *S. arvensis* was 1.6 in Eldoum Elawazma and the maximum (45.8) in Irtidi and averaged 27.49 plants/m² whilst *T. hamosa* ranged from 6.4 in Irtidi to 72.8 in Kawa and averaged 25.43 plants/m². MFD of *C. arvensis* ranged from 4.2 in Irtidi to 44 in Elatroona and averaged 24.34 plants/m². However, MFD of *M. palviflora* ranged from 0 in Elmasakeen to 53.2 in Eldoum

Elawazma and averaged 24.23 plants/m². MFD of *C. rotundus* ranged from 3.4 in Eldoum Elawazma to 51.4 in Agja and averaged 20.95 plants/m². MFD of *C. murale* ranged from 0.1 in Eldoum Elawazma to 25.4 in Kawa and averaged 12.06 plants/m². Other species occurred at very low field density (2-2.97 plants/m²) (Table 2). In garlic, *S. arvensis* was absent in Elmasakeen. Its maximum field frequency (FR) (100) was displayed in Kawa and Irtidi and averaged 72.86%. FR of *C. dactylon* ranged from 0 in Kawa to 90 in Elatroona and Eldoum Elawazma and averaged 62.86%, while *C. arvensis* prevailed at high FR (20%–90%) and averaged 52.86%. FR of *M. palviflora* ranged from 30% to 100% and averaged 51.43%. *S. arundinaceum* did not prevail in Elseir and Agja. However, its FR amounted to 90% in Elmasakeen and averaged 32.86%. *C. rotundus* was absent in Kawa but exhibited a FR of 70% in Irtidi and averaged 30% over the hamlets. *C. album* was not recorded in Elatroona and Eldoum Elawazma. It revealed a maximum FR (60%) in Elmasakeen and Kawa and averaged 25.71%. *T. hamosa* was not detected in Agja, Kawa and Eldoum Elawazma and scored 70% in Elseir and averaged 22.86%. Mean FR of *E. sativa* was 20%. It was absent in Elmasakeen and Eldoum Elawazma and amounted to 70% in Agja. FR of *T. terrestris* ranged from 10% to 30% and averaged 18.57% while *C. murale* ranged from 0% to 60% and averaged 17.14%. Mean FR of *S. alba* was 14.29%. It was not recorded in Eldoum Elawazma. However, its maximum FR (30%) was recorded in Elmasakeen and Kawa. Other weed species were observed at very low FR (mean 4.29%-8.57%) (Table 3). Field frequency (FR) of *C. dactylon* in onion ranged from 60% in Agja to 100% in Elseir, Irtidi and Eldoum Elawazma and averaged 87.14%, while *M. palviflora* exhibited a FR of 0% in Elmasakeen and 100% in Eldoum Elawazma and averaged 55.71%. *T. hamosa* displayed a FR of 10% in Elmasakeen and 90% in Elseir and Elatroona and averaged 55.71%. FR of *S. arvensis* ranged from 10% in Eldoum Elawazma to 80% in Kawa and Irtidi and averaged 54.29%. Mean FR of *C. arvensis* was 52.86%. It ranged between 20% in Irtidi to 80% in Eldoum Elawazma. Average FR of *C. rotundus* amounted to 50% and ranged from 20% in Elmasakeen to 80% in Kawa. FR of *C. album* ranged from 0% in Eldoum Elawazma to 100% in Kawa and averaged 42.86%. *S. arundinaceum* was absent in Elseir but exhibited a FR of 100% in Elmasakeen and averaged 37.14%. On the other hand, average FR of *D. stramonium* ranged from 10% in Elmasakeen and Irtidi to 60% in Kawa and averaged 27.14%. *C. murale* was not recorded in Eldoum Elawazma. It revealed a maximum FR (50%) in each of Elseir, Elatroona and Irtidi and averaged 27.14%. *G. gynandra* was not recorded in Elatroona and Kawa. Its FR was highest (50%) in Agja and averaged 20%. Other weed species were observed at very low FR (mean 2.86%-12.86%) in (Table 3). In garlic, field uniformity (FU) of *S. arvensis* ranged from 56% in Eldoum Elawazma to 90% in Kawa and averaged 66.86%. Mean FU of *M. palviflora* was 37.14%. Its highest occurrence (90%) was in Elatroona and the lowest (10%) in Elmasakeen (Table 4). FU of *C. arvensis* ranged from 6% in Kawa to 66% in Eldoum Elawazma and averaged 30.86%. Its maximum uniformity (66%) was exhibited in Eldoum Elawazma. FU of *C. dactylon* ranged from nil in Kawa to 58% in Eldoum Elawazma and averaged 28%. *S. arundinaceum* revealed a

mean FU of 20.29%, was absent in Elseir and Agja but prevailed at 70% FU in Elmasakeen. *C. album* displayed a mean FU of 18.57% and ranged between 0% in Elatroona and Eldoum Elawazma to 50% in Kawa. FU of *T. hamosa* was highest (40%) in Elseir and was absent in Agja, Kawa and Eldoum Elawazma. Other species occurred at low FU (0.86%–9.14%) (Table 4). Field uniformity (FU) of *C. dactylon* in onion ranged from 30% in Agja to 64% in Elseir and averaged 50.57%. Mean FU of *M. palviflora* was 45.43%. The highest FU (96%) occurred in Eldoum Elawazma and was absent in Elmasakeen (Table 4). *S. arvensis* averaged FU 40.86% with the maximum (58%) in Kawa. FU of *C. arvensis* ranged from 12% in Irtidi and Elmasakeen to 72% in Eldoum Elawazma and averaged 38.86%. *T. hamosa* revealed a mean FU of 34.29% and ranged from 4% in Elmasakeen to 64% in Elseir where *C. rotundus* displayed a mean FU of 32% and ranged between 8% in Elmasakeen and Eldoum Elawazma to 56% in Kawa. *S. arundinaceum* exhibited the highest FU (90%) in Elmasakeen but was absent in Elseir. Mean FU of *C. album* was 25.71%, highest (58%) in Elmasakeen and was not recorded in Eldoum Elawazma. *C. murale* showed a mean FU of 18.29% and ranged between 0% in Eldoum Elawazma to 36% in Elatroona. Other species occurred at low FU (2.29%-9.43%) (Table 4). In garlic, *S. arvensis* exhibited a relative mean field density (RMFD) of 26.96%. It was followed, in descending order, by *C. dactylon* (22.92%), *M. palviflora* (13.38%), *C. arvensis* (10.29%), *C. album* (9.40%), *S. arundinaceum* (7.01%), *T. hamosa* (2.96%) and *E. sativa* (2.41%) (Table 5). On the other hand *C. dactylon* in onion displayed the highest (27.61%) RMFD. It was followed, in descending order, by *S. arundinaceum*, *C. album*, *M. palviflora*, *S. arvensis*, *T. hamosa*, *C. arvensis*, *C. rotundus* and *C. murale*, which attained a RMFD of 10.50%, 9.05%, 8.44%, 8.36%, 7.95%, 7.83%, 6.70% and 3.67%, respectively. Other species revealed a RMFD less than 2% in both crops (Table 5). Relative field frequency (RFR) of individual species in garlic showed that *S. arvensis* was the most frequent species (17.51%). It was followed by, *C. dactylon* (12.23%), *C. arvensis* (10.93%), *M. palviflora* (9.97%), *S. arundinaceum* (6.90%), *C. rotundus* (5.90%) and *C. album* (5.60%) (Table 6). In onion, RFR of *C. dactylon* averaged (14%) followed by, *S. arvensis*, *M. palviflora*, *T. hamosa*, *C. arvensis*, *C. rotundus*, *C. album* and *S. arundinaceum* (8.79%-6.54%). Other species revealed relative field frequency less than 5% in both crops (Table 6). In garlic, maximum relative field uniformity (RFU) of 25.87% was achieved by *S. arvensis*. It was followed, in descending order, by *M. palviflora*, *C. arvensis*, *C. dactylon*, *S. arundinaceum*, *C. album*, *T. hamosa*, *C. rotundus* and *E. sativa*, which attained a RFU of 13.50%, 12.06%, 10.59%, 7.77%, 7.33%, 3.59%, 3.50%, and 3.35%, respectively (Table 7). In onion, the maximum RFU (12.97%) was displayed by *C. dactylon* followed, in descending order, by *S. arvensis*, *M. palviflora*, *C. arvensis*, *S. arundinaceum*, *T. hamosa*, *C. rotundus*, *C. album*, *C. murale*, *G. gynandra* and *D. stramonium*, which ranged from 10.88% to 2.27%. In both crops, other species displayed a RFU less than 2% and 3% in garlic and onion, respectively (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 in garlic and onion (Table 8). In all parameters

measured, the dominant weed species prevailed at higher values in garlic than in onion. This could be attributed to early sowing of garlic during the relatively hotter period of the winter season (November-December) which is conducive to germination and emergence of weeds compared to onion (December-January). *S. arvensis*, *C. dactylon*, *M. palviflora*, *C. arvensis*, *C. album* and *S. arundinaceum* were weeds that ranked high in the survey. *C. dactylon* and *C. arvensis* are perennials that are difficult to control by hand weeding or herbicides and accordingly displayed high mean field density, field frequency and field uniformity. 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 and they disseminate their seeds by insects, animals, farm

equipment, wind, water, birds and organic manure. Species with moderate relative abundance included *C. rotundus*, *T. hamosa*, *E. sativa*, *C. murale*, *D. stramonium*, *G. gynandra* and *S. alba*. The other species exhibited low to very low relative abundance (Table 8). These findings could be attributed to the use of broad-leaved weed herbicides such as 2, 4 - D by farmers which reduce their numbers / m². Also these results could be attributed to the variation of soils, types of arable crops, the farming system, edaphic factors and types of weeds. The weed flora in garlic is similar to that in onion. This result could be attributed to their membership to Family Amariyllidaceae and similarity in climatic and environmental needs. Weeds in these vegetable crops reduce their quality and yield and can be controlled by integrated management.

Table 1. Scientific, English, local arabic names and family of weed species in garlic (G) and onion (O)

Scientific name	English name	Local name	Family	G	O
<i>Cynodon dactylon</i> (L.) pers.	Bermuda grass	Nageel	Poaceae	+	+
<i>Sorghum arundinaceum</i> . (Dew.) Stapl.	wild sorghum	Adar	Poaceae	+	+
<i>Chenopodium album</i> L.	Common goosefoot	Dorora	Chenopodiaceae	+	+
<i>Sinapis arvensis</i> L.	Wild mustard	Fugaila	Cruciferae	+	+
<i>Trigonella hamosa</i> L.	Sweet trefoil	Handagoog	Fabaceae	+	+
<i>Convolvulus arvensis</i> L.	Field bindweed	Olleig	Convolvulaceae	+	+
<i>Malva . palviflora</i> L.	Cheeze-weed	Khoubaiza	Malvaceae	+	+
<i>Cyperus rotundus</i> L.	Purple Nutsedge	Seida	Cyperaceae	+	+
<i>Chenopodium murale</i> L.	Nettle-leaved goosefoot	Dorora hamraa	Chenopodiaceae	+	+
<i>Gynandropsis gynandra</i> (L.) Briq.	Caffir cabbage	Tamaleka	Capparidaceae	+	+
<i>Datura stramonium</i> L.	thorn apple	Datura	Solanaceae	+	+
<i>Eruca sativa</i> Mill.	Rocket	Girgeer	Cruciferae	+	+
<i>Sonchus oleraceus</i> L.	sow thistle	Moleita	Asteraceae	+	+
<i>Amaranthus graecizans</i> L.	White pigweed	Lissan tair saghir	Amaranthaceae	+	+
<i>Echium rauwolfii</i> Del.	Bugloss	Kohali	Boraginaceae	+	+
<i>Sinapis alba</i> L.	White mustard	Kabar	Cruciferae	+	+
<i>Tribulus terrestris</i> L.	Caltrops	Dereisa	Zygophyllaceae	+	+
<i>Cassia italica</i> (Mill) spreng.	Italian senna	Sen Elkalib	Caesalpinaceae	+	-
<i>Dicanthium annulatum</i> (Forsk.) stapf	Blueweed	Lukh	Poaceae	+	+
<i>Imperata cylindrica</i> (L.) Raeuschel*	Cogon grass	Halfa Zail Elgit	Poaceae	+	+
<i>Solanum dubium</i> Fresen*	Poison berry	Gubbein	Solanaceae	+	+
<i>Abutilon panosum</i> (Forst. F.) Schlecht.*	Ragged mallow	Hambouk	Malvaceae	+	-
<i>Tephrosia apollinea</i> (Del) DC*	Wild sweet pea	Amayouga	Fabaceae	+	+
<i>Echinochloa colona</i> (L.) Link*	Barnyard grass	Defra	Poaceae	+	+
<i>Amaranthus viridis</i> L.*	Pigweed	Lissan tair kabhir	Amaranthaceae	-	+
<i>Euphorbia aegyptiaca</i> Boiss.*	Egyptian milk weed	um Labena musria	Euphorbiaceae	-	+
<i>Solanum nigrum</i> L.*	Black nightshade	Einab al dib	Solanaceae	+	+
<i>Portulaca oleracea</i> L.*	Purslane	Rigla	Portulacaceae	-	+
<i>Euphorbia indica</i> Lam.*	Milk weed	Um Labena	Euphorbiaceae	+	+
<i>Avena fatua</i> L.*	Oat	Shawfan	Poaceae	-	+

+ Present, - Absent

* Occurred in few hamlets at very low density (less than 2 plants/m²).

Table 2. Mean field density (MFD) of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	53.4	56.8	18.6	67.8	0.0	71.6	127.2	56.49
	O	101.2	112.8	52.4	86.0	42.2	101.8	99.8	85.17
<i>S. arundinaceum</i>	G	0.0	95	0.0	0.4	15.8	17.4	1.4	18.57
	O	0.0	108.0	42.2	9.0	0.6	92.2	0.4	36.06
<i>C. album</i>	G	0.8	56	16.2	0.0	50.4	18.6	0.0	20.29
	O	16.6	77.4	7.8	7.6	86.9	29.8	0.0	32.30
<i>S. arvensis</i>	G	52.2	61.2	62.6	25.6	74.8	68.2	68.4	59.0
	O	15.8	36.4	32.2	21.0	39.6	45.8	1.6	27.49
<i>T. hamosa</i>	G	31.0	0.8	0.0	15.8	0.0	2.4	0.0	7.14
	O	29.8	7.8	9.2	30.2	72.8	6.4	21.8	25.43
<i>C. arvensis</i>	G	18.8	9.4	33.2	24.4	2.8	2.6	49.8	20.14
	O	14.8	7.0	16.4	44.0	42.8	4.2	41.2	24.34
<i>M. palviflora</i>	G	60.2	6.2	16.8	84.4	14.2	19.4	12.8	30.57
	O	38.0	0.0	14.0	43.4	13.2	7.8	53.2	24.23
<i>C. rotundus</i>	G	1.2	4.2	1.4	7.8	0.0	4.2	4.8	3.37
	O	7.0	4.4	51.4	20.0	36.5	24.0	3.4	20.95
<i>C. murale</i>	G	22.2	0.0	0.0	0.2	4.6	2.6	0.0	4.23
	O	11.0	10.8	7.6	18.6	25.4	11.0	0.1	12.06
<i>G. gynandra</i>	G	0.2	1.0	0.4	0.0	0.0	0.0	0.0	0.23
	O	0.6	5.4	5.2	0.0	0.0	1.0	8.6	2.97
<i>D. stramonium</i>	G	0.0	0.0	1.0	0.4	0.2	0.0	0.0	0.23
	O	1.0	0.2	2.6	4.2	8.8	1.8	1.8	2.91
<i>E. sativa</i>	G	0.4	0.0	18.2	8.0	3.0	2.4	0.0	4.57
	O	0.6	0.0	11.0	4.0	1.2	0.0	2.8	2.80
<i>S. oleraceus</i>	G	0.2	1.0	0.0	0.4	0.2	0.2	0.0	0.29
	O	1.2	0.8	0.0	6.2	0.0	1.8	9.0	2.71
<i>A. graecizans</i>	G	0.2	0.8	0.0	0.2	0.0	0.2	0.0	0.20
	O	0.0	0.6	6.0	0.0	0.0	4.4	7.6	2.66
<i>D. annulatum</i>	G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
	O	0.0	5.8	0.0	0.0	0.0	0.0	11.4	2.46
<i>E. rauwolfii</i>	G	0.2	0.0	0.0	0.4	0.0	9.4	0.0	1.43
	O	2.8	0.0	0.0	0.0	6.2	5.4	0.0	2.06
<i>S. alba</i>	G	0.2	14.8	0.6	1.4	6.8	2.0	0.0	3.69
	O	0.0	4.0	0.0	9.0	0.0	1.0	0.0	2.00
<i>T. terrestris</i>	G	1.0	0.2	1.8	0.2	0.4	0.4	0.4	0.63
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
<i>C. italica</i>	G	0.2	0.0	0.2	0.2	0.0	0.2	0.8	0.23
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

Table 3. Field frequency (FR) of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	80	80	20	90	0	80	90	62.86
	O	100	90	60	80	80	100	100	87.14
<i>S. arundinaceum</i>	G	0	90	0	10	50	60	20	32.86
	O	0	100	30	20	10	90	10	37.14
<i>C. album</i>	G	10	60	20	0	60	30	0	25.71
	O	30	70	30	30	100	40	0	42.86
<i>S. arvensis</i>	G	90	0	80	60	100	100	80	72.86
	O	50	60	60	40	80	80	10	54.29
<i>T. hamosa</i>	G	70	10	0	40	0	40	0	22.86
	O	90	10	40	90	70	20	70	25.71
<i>C. arvensis</i>	G	70	30	80	60	20	20	90	52.86
	O	50	40	50	70	60	20	80	52.86
<i>M. palviflora</i>	G	100	30	30	100	30	40	30	51.43
	O	90	0	40	80	50	30	100	55.71
<i>C. rotundus</i>	G	30	20	20	20	0	70	50	30.00
	O	60	20	50	70	80	40	30	50.00
<i>C. murale</i>	G	60	0	0	10	30	20	0	17.14
	O	50	10		50	20	50	0	27.14
<i>G. gynandra</i>	G	10	10	10	0	0	0	0	4.29
	O	10	40	50	0	0	10	30	20.00
<i>D. stramonium</i>	G	0	0	10	20	10	0	0	5.71
	O	20	10	20	50	60	10	20	27.14
<i>E. sativa</i>	G	10	0	70	30	20	10	0	20.00
	O	10	0	40	30	10	0	10	12.86

<i>S. oleraceus</i>	G	10	20	0	10	10	10	0	8.57
	O	30	10	0	30	0	10	10	12.86
<i>A. graecizans</i>	G	10	10	0	10	0	10	0	5.71
	O	0	10	20	0	0	20	30	11.43
<i>D. annulatum</i>	G	0	0	0	0	0	0	0	0.00
	O	0	10	0	0	0	0	10	2.86
<i>E. rauwolfii</i>	G	10	0	0	10	0	10	0	4.29
	O	10	0	0	0	30	20	0	8.57
<i>S. alba</i>	G	10	30	10	10	30	10	0	14.29
	O	0	10	0	20	0	10	0	5.71
<i>T. terrestris</i>	G	30	10	30	10	10	20	20	18.57
	O	0	0	0	0	0	0	0	0.00
<i>C. italica</i>	G	10	0	10	10	0	10	20	8.57
	O	0	0	0	0	0	0	0	0.00

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

Table 4. Field uniformity (FU) of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	28	30	8	40	0	32	58	28.00
	O	64	56	30	60	50	40	54	50.57
<i>S. arundinaceum</i>	G	0	70	0	2	30	32	8	20.29
	O	0	90	30	12	2	78	2	30.57
<i>C. album</i>	G	2	42	14	0	50	22	0	18.57
	O	24	58	14	18	38	28	0	25.71
<i>S. arvensis</i>	G	66	66	72	38	90	80	56	66.86
	O	34	50	48	36	58	56	4	40.86
<i>T. hamosa</i>	G	40	2	0	22	0	10	0	10.57
	O	64	4	26	56	42	12	36	34.29
<i>C. arvensis</i>	G	34	14	50	38	6	8	66	30.86
	O	42	12	32	68	34	12	72	38.86
<i>M. palviflora</i>	G	78	10	20	90	20	24	18	37.14
	O	80	0	32	76	16	18	96	45.43
<i>C. rotundus</i>	G	6	4	4	12	0	18	20	9.14
	O	34	8	44	44	56	30	8	32.00
<i>C. murale</i>	G	28	0	0	2	14	8	0	7.43
	O	28	10	10	36	16	28	0	18.29
<i>G. gynandra</i>	G	2	2	2	0	0	0	0	0.86
	O	2	16	18	0	0	4	18	8.29
<i>D. stramonium</i>	G	0	0	4	4	2	0	0	1.43
	O	6	2	8	24	18	2	6	9.43
<i>E. sativa</i>	G	2	0	32	12	6	6	0	8.29
	O	4	0	26	12	2	0	6	7.14
<i>S. oleraceus</i>	G	2	4	0	4	2	2	0	2.00
	O	10	4	0	20	0	6	10	7.14
<i>A. graecizans</i>	G	2	2	0	2	0	2	0	1.14
	O	0	4	8	0	0	8	16	5.14
<i>D. annulatum</i>	G	0	0	0	0	0	0	0	0
	O	0	6	0	0	0	0	10	2.29
<i>E. rauwolfii</i>	G	2	0	0	2	0	10	0	2.00
	O	6	0	0	0	10	8	0	3.43
<i>S. alba</i>	G	2	18	2	2	14	6	0	6.29
	O	0	10	0	20	0	4	0	4.86
<i>T. terrestris</i>	G	8	2	8	2	4	4	4	4.57
	O	0	0	0	0	0	0	0	0
<i>C. italica</i>	G	2	0	2	2	0	2	4	1.71
	O	0	0	0	0	0	0	0	0

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

Table 5. Relative mean field density (RMFD) of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	21.89	18.74	10.79	28.48	0.0	32.22	48.34	22.92
	O	41.49	29.33	19.39	26.66	10.97	29.52	53.93	27.61
<i>S. arundinaceum</i>	G	0.0	31.35	0.0	0.17	9.16	7.83	0.53	7.01
	O	0.0	28.08	15.61	2.79	0.16	26.74	0.14	10.50
<i>C. album</i>	G	0.33	18.48	9.40	0.0	29.23	8.37	0.0	9.40
	O	6.81	20.12	2.89	2.36	22.56	8.64	0.0	9.05
<i>S. arvensis</i>	G	21.4	20.20	36.31	10.75	43.38	30.69	25.99	26.96

	O	6.48	9.46	11.91	6.51	10.30	13.28	0.58	8.36
<i>T. hamosa</i>	G	12.71	0.26	0.0	6.64	0.0	1.08	0.0	2.96
	O	12.22	2.03	3.40	9.36	18.93	1.86	7.85	7.95
<i>C. arvensis</i>	G	7.71	3.10	29.26	10.25	1.62	1.17	18.92	10.29
	O	6.07	1.82	6.07	13.64	11.13	1.22	14.83	7.83
<i>M. palviflora</i>	G	24.68	2.05	9.74	35.45	8.24	8.73	4.80	13.38
	O	15.58	0.0	5.18	13.45	3.43	2.26	19.15	8.44
<i>C. rotundus</i>	G	0.49	1.39	0.81	3.28	0.0	1.89	1.82	1.38
	O	2.87	1.14	19.02	6.20	9.48	6.96	1.22	6.70
<i>C. murale</i>	G	9.10	0.0	0.0	0.08	2.67	1.17	0.0	1.86
	O	4.51	2.81	2.81	5.77	6.60	3.19	0.0	3.67
<i>G. gynandra</i>	G	0.08	0.33	0.23	0.0	0.0	0.0	0.0	0.09
	O	0.25	1.40	1.92	0.0	0.0	0.29	3.19	0.99
<i>D. stramonium</i>	G	0.0	0.0	0.58	0.17	0.12	0.0	0.0	0.12
	O	0.41	0.05	0.96	1.30	2.29	0.52	0.65	0.88
<i>E. sativa</i>	G	0.16	0.0	10.56	3.36	1.74	1.08	0.0	2.41
	O	0.25	0.0	4.07	1.24	0.31	0.0	1.01	0.98
<i>S. oleraceus</i>	G	0.08	0.33	0.0	0.17	0.12	0.09	0.0	0.11
	O	0.49	0.21	0.0	1.92	0.0	0.52	3.24	0.91
<i>A. graecizans</i>	G	0.08	0.26	0.0	0.08	0.0	0.09	0.0	0.07
	O	0.0	0.16	2.22	0.0	0.0	1.28	2.74	0.91
<i>D. annulatum</i>	G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	O	0.0	1.51	0.0	0.0	0.0	0.0	4.10	0.80
<i>E. rauwolfii</i>	G	0.08	0.0	0.0	0.17	0.0	4.23	0.0	0.64
	O	1.15	0.0	0.0	0.0	1.61	1.57	0.0	0.62
<i>S. alba</i>	G	0.08	4.88	0.35	0.59	3.94	0.90	0.0	1.53
	O	0.0	1.04	0.0	2.79	0.0	0.29	0.0	0.59
<i>T. terrestris</i>	G	0.41	0.07	1.04	0.08	0.23	1.08	0.15	0.44
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>C. italica</i>	G	0.08	0.0	0.12	0.08	0.0	0.09	0.30	0.10
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

Table 6. Relative field frequency (RFR) of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	12.8	16.0	4.6	17.1	0.0	14.4	20.7	12.23
	O	15.0	18.0	9.6	10.4	12.0	17.0	16.0	14.0
<i>S. arundinaceum</i>	G	0.0	18.0	0.0	1.9	13.0	10.8	4.6	6.90
	O	0.0	20.0	4.8	2.6	1.5	15.3	1.6	6.54
<i>C. album</i>	G	1.6	12.0	4.6	0.0	15.6	5.4	0.0	5.60
	O	4.5	14.0	4.8	3.9	15.0	6.8	0.0	7.00
<i>S. arvensis</i>	G	14.4	16.0	18.4	11.4	26.0	18.0	18.4	17.51
	O	7.5	12.0	9.6	5.2	12.0	13.6	1.6	8.79
<i>T. hamosa</i>	G	11.2	2.0	0.0	7.6	0.0	7.2	0.0	4.00
	O	13.5	2.0	6.4	11.7	10.5	3.4	11.2	8.39
<i>C. arvensis</i>	G	11.2	6.0	18.4	11.4	5.2	3.6	20.7	10.93
	O	7.5	8.0	8.0	9.1	9.0	3.4	12.8	8.26
<i>M. palviflora</i>	G	16.0	6.0	6.9	19.0	7.8	7.2	6.9	9.97
	O	13.5	0.0	6.4	10.4	7.5	5.1	16.0	8.41
<i>C. rotundus</i>	G	4.8	4.0	4.6	3.8	0.0	12.6	11.5	5.90
	O	9.0	4.0	8.0	9.1	12.0	6.8	4.8	7.67
<i>C. murale</i>	G	9.6	0.0	0.0	1.9	7.8	3.6	0.0	3.27
	O	7.5	2.0	1.6	6.5	3.0	8.5	0.0	4.16
<i>G. gynandra</i>	G	1.6	2.0	2.3	0.0	0.0	0.0	0.0	0.84
	O	1.5	8.0	8.0	0.0	0.0	1.7	4.8	3.43
<i>D. stramonium</i>	G	0.0	0.0	2.3	3.8	2.6	0.0	0.0	1.24
	O	3.0	2.0	3.2	6.5	9.0	1.7	3.2	4.09
<i>E. sativa</i>	G	1.6	0.0	16.1	5.7	5.2	1.8	0.0	4.34
	O	1.5	0.0	6.4	2.6	1.5	0.0	1.6	1.94
<i>S. oleraceus</i>	G	1.6	4.0	0.0	1.9	2.6	1.8	0.0	1.70
	O	4.5	2.0	0.0	3.9	0.0	1.7	1.6	1.96
<i>A. graecizans</i>	G	1.6	2.0	0.0	1.9	0.0	1.8	0.0	1.04
	O	0.0	2.0	3.2	0.0	0.0	3.4	4.8	1.91
<i>D. annulatum</i>	G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	O	0.0	2.0	0.0	0.0	0.0	0.0	1.6	0.51
<i>E. rauwolfii</i>	G	1.6	0.0	0.0	1.9	0.0	1.8	0.0	0.76
	O	1.5	0.0	0.0	0.0	4.5	3.4	0.0	1.34
<i>S. alba</i>	G	1.6	6.0	2.3	1.9	7.8	1.8	0.0	3.06
	O	0.0	2.0	0.0	2.6	0.0	1.7	0.0	0.90
<i>T. terrestris</i>	G	4.8	2.0	6.9	1.9	2.6	3.6	4.6	3.77

	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>C. italica</i>	G	1.6	0.0	2.3	1.9	0.0	1.8	4.6	1.74
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

Table 7. Relative field uniformity (RFU) of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	8.98	11.10	3.44	14.4	0.0	11.48	24.36	10.59
	O	15.36	16.80	8.10	10.8	14.5	11.2	14.04	12.97
<i>S. arundinaceum</i>	G	0.0	25.90	0.0	0.72	12.6	11.48	3.36	7.77
	O	0.0	27.0	8.10	2.16	0.58	21.48	0.52	8.60
<i>C. album</i>	G	0.64	15.54	6.02	0.0	21.0	8.14	0.0	7.33
	O	5.76	17.40	3.78	3.24	11.02	7.84	0.0	7.01
<i>S. arvensis</i>	G	21.12	24.42	30.96	13.68	37.70	29.6	23.52	25.87
	O	8.16	15.0	12.96	6.48	16.82	15.68	1.04	10.88
<i>T. hamosa</i>	G	12.8	0.74	0.0	7.92	0.0	3.7	0.0	3.59
	O	15.36	1.20	7.02	10.08	12.18	3.36	9.36	8.37
<i>C. arvensis</i>	G	10.88	5.18	21.5	13.68	2.52	2.96	27.72	12.06
	O	10.08	3.60	8.64	12.24	9.86	3.36	18.72	9.50
<i>M. palviflora</i>	G	24.96	3.70	8.60	32.40	8.4	8.88	7.56	13.50
	O	19.20	0.0	8.64	13.68	4.64	5.04	24.96	10.88
<i>C. rotundus</i>	G	1.92	1.48	1.72	4.32	0.0	6.66	8.4	3.50
	O	8.16	2.40	11.88	7.92	16.24	8.4	2.08	8.15
<i>C. murale</i>	G	8.96	0.0	0.0	0.72	5.88	2.96	0.0	2.65
	O	6.72	3.0	2.7	6.48	4.64	7.84	0.0	4.48
<i>G. gynandra</i>	G	0.64	0.74	0.86	0.0	0.0	0.0	0.0	0.23
	O	0.48	4.80	4.86	0.0	0.0	1.12	4.68	2.28
<i>D. stramonium</i>	G	0.0	0.0	1.72	1.44	0.84	0.0	0.0	0.57
	O	1.44	0.60	2.16	4.32	5.22	0.56	1.56	2.27
<i>E. sativa</i>	G	0.64	0.0	13.76	4.32	2.52	2.22	0.0	3.35
	O	0.96	0.0	7.02	2.16	0.58	0.0	1.56	1.75
<i>S. oleraceus</i>	G	0.64	1.48	0.0	1.44	0.84	0.74	0.0	0.73
	O	2.40	1.20	0.0	3.6	0.0	1.68	2.6	1.64
<i>A. graecizans</i>	G	0.64	0.74	0.0	0.72	0.0	0.74	0.0	0.57
	O	0.0	1.20	2.16	0.0	0.0	2.24	4.16	1.39
<i>D. annulatum</i>	G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	O	0.0	1.80	0.0	0.0	0.0	0.0	2.6	0.63
<i>E. rauwolfii</i>	G	0.64	0.0	0.0	0.72	0.0	0.73	0.0	0.72
	O	1.44	0.0	0.0	0.0	2.9	2.24	0.0	0.94
<i>S. alba</i>	G	0.64	6.66	0.86	0.72	5.88	2.22	0.0	2.43
	O	0.0	3.0	0.0	3.6	0.0	1.12	0.0	1.10
<i>T. terrestris</i>	G	2.56	0.74	3.44	0.72	1.68	1.48	1.68	1.76
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>C. italica</i>	G	0.64	0.0	0.86	0.72	0.0	0.74	1.68	0.66
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

Table 8. Relative abundance of common weed species in garlic (G) and onion (O)

Name of species		Els	Elm	Ag	Elat	Ka	Irt	Eld	Mean
<i>C. dactylon</i>	G	43.65	45.84	18.83	59.98	0.0	58.46	93.4	45.74
	O	71.85	64.13	37.09	47.86	37.47	57.72	65.97	54.58
<i>S. arundinaceum</i>	G	0.0	75.25	0.0	2.79	34.76	30.47	8.49	21.68
	O	0.0	75.08	28.51	7.55	2.24	63.88	2.26	25.65
<i>C. album</i>	G	2.57	46.02	20.02	0.0	65.83	21.91	0.0	22.34
	O	17.07	51.52	11.47	9.5	48.58	23.28	0.0	23.06
<i>S. arvensis</i>	G	56.92	60.62	85.67	35.83	107.2	78.29	67.91	70.35
	O	22.14	36.46	34.47	8.19	39.12	42.56	3.22	26.59
<i>T. hamosa</i>	G	36.71	3.0	0.0	22.16	0.0	11.98	0.0	10.55
	O	41.08	5.23	16.82	31.14	41.61	8.62	28.41	24.70
<i>C. arvensis</i>	G	29.79	14.28	59.16	35.33	9.34	7.73	67.34	31.85
	O	23.65	13.42	22.71	34.98	29.99	7.98	46.35	25.58
<i>M. palviflora</i>	G	65.64	11.75	25.24	86.85	24.44	24.81	19.32	36.86
	O	48.28	0.0	20.22	37.53	15.57	12.4	60.11	27.73
<i>C. rotundus</i>	G	7.21	6.87	7.13	11.4	0.0	21.15	21.72	10.78
	O	20.03	7.54	38.9	23.22	37.72	22.16	8.1	22.52
<i>C. murale</i>	G	27.66	0.0	0.0	2.7	16.35	7.73	0.0	7.78
	O	18.73	7.81	7.11	18.75	14.24	19.53	0.0	12.31

<i>G. gynandra</i>	G	2.32	3.07	3.39	0.0	0.0	0.0	0.0	1.25
	O	2.23	14.2	14.78	0.0	0.0	3.11	12.58	6.70
<i>D. stramonium</i>	G	0.0	0.0	4.6	5.41	3.56	0.0	0.0	1.94
	O	4.85	2.65	6.32	12.12	16.51	2.78	5.41	7.23
<i>E. sativa</i>	G	2.4	0.0	40.42	13.38	9.46	5.1	0.0	10.11
	O	2.71	0.0	17.49	6.0	2.39	0.0	4.17	4.68
<i>S. oleraceus</i>	G	2.32	5.81	0.0	3.51	3.56	2.63	0.0	2.55
	O	7.39	3.41	0.0	9.42	0.0	3.9	7.44	4.51
<i>A. graecizans</i>	G	2.32	3.0	0.0	2.7	0.0	2.63	0.0	1.52
	O	0.0	3.36	7.58	0.0	0.0	6.92	11.7	4.22
<i>D. annulatum</i>	G	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	O	0.0	5.31	0.0	0.0	0.0	0.0	8.3	1.94
<i>E. rauwolfii</i>	G	2.32	0.0	0.0	2.79	0.0	9.73	0.0	2.12
	O	4.09	0.0	0.0	0.0	9.01	7.21	0.0	2.90
<i>S. alba</i>	G	2.32	17.54	3.51	3.21	17.62	4.92	0.0	7.02
	O	0.0	6.04	0.0	8.99	0.0	3.11	0.0	2.59
<i>T. terrestris</i>	G	7.77	2.81	11.38	2.7	4.51	6.16	6.43	5.97
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>C. italica</i>	G	2.32	0.0	3.28	2.7	0.0	2.63	6.58	2.50
	O	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Key: Els: Elseir, Elm: Elmasakeen, Ag: Agja, Elat: Elatroona, Ka: Kawa, Irt: Irtidi and Eld: Eldoum Elawazma

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