Journal of Phytopathology and Pest Management 4(1): 17-27, 2017
pISSN:2356-8577 eISSN: 2356-6507
Journal homepage: http://ppmj.net/

Efficiency of selected post emergence herbicides against broadleaved weeds in wheat grown in the new reclaimed land and in the Nile valley land, Egypt

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Abstract

Field experiments were performed in 2014/2015 to evaluate the efficacy of certain post emergence herbicides [Rapido 25% EC and Bromoplus 24% EC at 1 L feddan^{-1} (bromoxynil octanoate), Broadystar 8.5% WG (florasulam 1.42% + pyroxsulam 7.08%) and Banvel 4S 48% EC (dicamba) at 250 ml feddan^{-1}] and hand weeding compared with untreated control on various broadleaved weeds in wheat (cv. Sids 12) fields in Assiut Governorate, Egypt. The experiments were carried out in Plant Protection Farm, Assiut city, Assiut, Egypt (a Nile valley land) and in the El-Wady El-Assiuty Farm, Sahel-saliem city, Assiut, Egypt (a newly reclaimed land). The major broadleaved weed in Plant Protection Farm was *Beta vulgaris* L. whereas *Malva parviflora* L. and *Melilotus polymorpha* L. were the lowest ones. In El-Wady El-Assiuty Farm, *M. polymorpha* was the dominant weed species while *Silybum marianum* L. Gaertn recorded as the lowest one. All tested herbicides and hand weeding treatment performed a high efficiency and decreased the fresh weight of individual broadleaved weeds and total weeds in both locations compared to untreated control after 30 days of treatments. In this regard, Rapido and Bromoplus were the most potent ones against broadleaved weeds in both locations and caused the highest grain yield. Broadystar, Banvel 4S and hand weeding treatments also increased the wheat grain yield in both locations compared to untreated control. However, Banvel 4S caused injury symptoms on wheat plants which appeared in the deformations of leaved, stem and spike shape in both locations, as a first report in Egypt but other treatments did not cause any adverse effect on plants. In conclusion, the study confirmed that Rapido, Bromopuls and Broadystar herbicides as well as hand weeding have a great potency against various broadleaved weeds prevailed in wheat fields grown in the new reclaimed land and in the Nile valley land at Assiut Governorate, Upper Egypt, with safety and increase in wheat grain yield compared to untreated control.

Key words: Broadleaved weeds, dicamba, new reclaimed land, wheat, bromoxynil octanoate.

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Introduction

Wheat is the main important cereal crop in Egypt with a potential role in human consumption and livestock feed. However, Egypt is considered to be the largest importer of wheat in the world where the local wheat production is not enough to our needs. Wheat is growing through Egypt in the Nile valley land and the newly reclaimed land. Thus, its main goal to increase and improve wheat production and productivity through various cultural practices such as introduced and improved the wheat cultivars, increased wheat land area in the new reticulum areas and weed management (Hamada et al., 2013; El-kholy et al., 2013). Wheat is infested with various broadleaved weeds such as *Rumex dentatus* L., *Cichorium pumplium* Jacq., *Beta vulgaris* L., *Melilotus* sp, *Sonchus oleraceus* L., *Medicago denticulate* L., *Chenopodium album* L., *Emex spinosa* L. Campd. and *Convolvulus arvensis* L. that played an important role in drastic yield reduction worldwide (Abouziena et al., 2008; Naseer-ud-Din et al., 2011; Chhokar et al., 2007, 2015; El-Kholy et al., 2013). Wheat yield losses related to weeds competition were ranged from 7 to 92% depending on the type of weeds, their abundance and the region (Shah et al., 2005; Chhokar et al., 2012; Bhullar et al., 2012). In Egypt, Shaban et al. (2009) found that where weeds become one of the most pest that threat their production broadleaved weeds reduced wheat grain yield by 19.5 and 27.5%. Chhokar et al. (2007) reported that heavy infestation with *Rumex* sp can result in hindrance to the harvest process. Herbicides with different mode of actions are the main weed control method for profitable wheat production in Egypt and other countries worldwide. Bromoxynil, tribenuron-methyl, 2,4-D, metsulfuron-methyl were registered as post-emergence herbicides for controlling a wide range of broadleaved weeds in wheat and some other cereal crops (Sikkema et al., 2007; El-Kholy et al., 2013; El-Kholy and Abdelmonem 2007; Abouziena et al., 2008). Iodosulfuron plus metsulfuron methyl, isoproturon and metsulfuron methyl are used to control broadleaved weeds and some annual grasses in wheat (Bailey et al., 2003; Tewari et al., 1998; Tagour et al., 2011). Application of these herbicides alone or in combination with other herbicides exhibited a high efficiency for controlling target weeds in wheat and resulted in higher grain yield compared to control (Khan et al., 2003; Naseer-ud-Din et al., 2011). However, certain broadleaved herbicides such as dicamba and 2,4-D resulted in crop injury and yield loss in certain sensitive wheat varieties (Sikkema et al., 2007). Recently, farmers are complained from spread of the weed infestation in wheat fields in the Nile valley land and in the new reclaimed land at Assiut Governorate, which caused a considerable loss in the quantity and quality of wheat yield as well as a decrease in the economic value of farmlands. Thus, the objective of the research is to study the efficacy of selected post emergence herbicides against broadleaved weeds in wheat fields that growing in the Nile valley land and in the new reclaimed land at Assiut Governorate, Egypt.

Materials and methods

Field experiments were carried out in winter season of 2014/2015 in Assiut University Farms which located in two different places in Assiut Governorate, Egypt. The first and second experiments were conducted in El-Wady El-Assiuty Farm, a new reclaimed land, Sahel-saleim city, and in the Plant Protection Department Farm, Assiut city, a Nile Valley land. The soil in the experiment sites is sandy with 8.5 pH in El-Wady El-Assiuty Farm and clay with 7.5 pH in Plant Protection Farm. Wheat cv. Sids 12 was sown on 2 and 13 December 2014 in the Plant Protection Farm and El-Wady El-Assiuty Farm with a seed rate of 60 Kg feddan^{-1} (Feddan = 0.42 hectare). The experiments were laid out in a randomized complete block design with four replications in both locations and the experimental plot size was 10.5 m^2. The broadleaved weed control treatments were comprised of the field rates of commercial formulations of four post emergence broadleaved herbicides: Banvel 4S 48% EC (dicamba) at 250 ml feddan^{-1}, Rapido 25% EC and Bromoplus 24% EC at 1 L feddan^{-1} (bromoxynil octanoate) and Broadystar 8.5% WG (florasulam 1.42% + pyroxsulam 7.08%) at 90 g feddan^{-1} as well as hand weeding and untreated control. The herbicides were applied 30 and 35 days after sown date in El-Wady El-Assiuty Farm and Plant Protection Farm, respectively using Knapsac sprayer with a single flat fan nozzle with water volume of 200 L feddan^{-1}. Traxos 4.5% EC (clodinafop-propargyl + pinoxaden) at 500 ml feddan^{-1} was sprayed to control grass weeds seven days after broadleaved herbicide application. All the normal agricultural practice packages recommended for wheat were applied.

Thirty days after treatments, all broadleaved weeds in a one square meter area in each plot in both locations were identified, clipped near the ground surface, separated by species and their fresh weight (g m^{-2}) were recorded. The percentage of reduction in fresh weight of broadleaved weeds caused by weed control treatments were estimated by the formula of El-Kholy et al., (2013). In the untreated control plots, the density and the fresh weight of broadleaved weeds and their rates were also estimated by different formulas as also described by El-Kholy et al. (2013). Wheat crop was harvested and grain yield (kg feddan^{-1}) was calculated in each location.

Statistical analysis: Data of weed fresh weight were subjected to square root transformation ($\sqrt{x + 0.5}$) to normalize the distribution prior to their analysis. Then transformed data were subjected to analysis of variances ANOVA and means were compared by Fisher's protected L.S.D. test at $P \leq 0.05$.

Results

The main broadleaved weeds in unweeded control plots after 30 days of treatments were *Beta vulgaris* L., *Rumex dentatus* L., *Ammi majus* L., *Melilotus polymorpha* L. and *Malva parviflora* L. at Plant Protection Farm (Table 1) and *Capsella bursa-pastoris* L. Medicus, *Silybum marianum* L. Gaertn, *M. parviflora* L. and *M. polymorpha* L. at El-Wady El-Assiuty Farm (Table 2). The highest density and fresh weight as well as corresponding rates was recorded with *B. vulgaris* specie of 15.00 weed m^{-2}

(53.57%) and 685.17 g m^{-2} (82.32%), respectively at Plant Protection Farm. The lowest density and fresh weight was found with *M. parviflora* and *M. polymorpha*. However, at El-Wady El-Assiuty Farm, *M. polymorpha* was the dominant weed species, which showed the highest density of 75.25 weed m^{-2} (86.25%) and a fresh weight of 63.04 g m^{-2} (45.12%) while *S. marianum* L. Gaertn with density of 2.00 weed m^{-2} (2.29%) and a fresh weight of 5.29 g m^{-2} (0.64%) exhibited the lowest ones (Table 2).

Table 1: The density (no. m^{-2}) and fresh weight (g m^{-2}) of broadleaved weeds prevailed in the wheat fields in Plant Protection Department Farm, Assiut University at 30 days.

Traits / Weed species	Weed density		Weed fresh weight	
	no. m^{-2}	%	g m^{-2}	%
B. vulgaris L.	15.00	53.57	685.17	82.32
R. dentatus L.	5.25	18.75	104.33	12.53
A. majus L.	4.25	15.18	14.69	1.76
M. polymorpha L.	2.25	8.04	5.29	0.64
M. parviflora L.	1.25	4.46	22.86	2.75
Total weeds	28.00	100.00	832.34	100.00

Table 2: The density (no. m^{-2}) and fresh weight (g m^{-2}) of broadleaved weeds prevailed in the wheat fields in El-Wady El-Assiuty Farm, Assiut University at 30 days.

Traits / Weed species	Weed density		Weed fresh weight	
	no. m^{-2}	%	g m^{-2}	%
M. polymorpha L.	75.25	86.25	63.04	45.12
C. bursa-pastoris L.	4.75	5.44	34.02	24.35
S. marianum L.	2.00	2.29	17.77	12.72
M. parviflora L.	5.25	6.02	24.88	17.81
M. polymorpha L.	87.25	100.00	139.71	100
Total weeds	75.25	86.25	63.04	45.12

Efficacy of weed control treatments: All weed control treatments were exhibited a significant reduction in the fresh weight of the total broadleaved weeds compared with untreated control after 30 days of treatments at Plant Protection Farm (Table 3). Rapido 25% EC, Bromoplus 24% EC and Broadystar 8.5% WG were more efficient and provided the highest significant reduction in fresh weight of total weeds, followed by Banvel 4S 48% EC compared to untreated control. The fresh weight reduction percent of total weed were 99.74, 99.50, 99.28 and 97.72% for Rapido, Bromoplus, Broadystar and Banvel 4S, respectively compared to untreated control. Hand weeding reduced the fresh weight of total weeds by 97.72%. At El-Wady El-Assiuty Farm, all treatments reduced significantly the fresh weight of the total broadleaved weeds compared to untreated control after 30 days of treatments (Table 4). All herbicides were more significantly effective than hand weeding treatment.

There was no significant difference between the percentages of fresh weight reduction in total broadleaved weeds which were 98.76, 98.40, 96.68 and 90.57% for Rapido, Bromoplus, Broadystar and Banvel 4S, respectively. However, hand weeding exhibited a satisfactory effect and also reduced the fresh weight of total weeds by 51.81%. In general, these results represented in Table 3 and 4 showed that all herbicides and hand weeding treatments were significantly effective against the total broadleaved weeds and reduced the fresh weight after 30 days of treatments compared with untreated control at both locations.

Table 3: Effect of herbicides and hand weeding treatments on average fresh weight (g m-2) of broadleaved weeds in wheat fields at Plant Protection Department Farm after 30 days of treatments.

Weed species	*B. vulgaris* L.		*R. dentatus* L.		*A. majus* L.		*M. polymorpha* L.		*M. parviflora* L.		Total broadleaved weeds	
Traits / Treatment	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)
Rapido 25% EC	1.33c	99.81	0.60b	99.42	0.01b	99.91	0.00c	100.00	0.23b	98.99	2.17d	99.74
Bromoplus 24% EC	0.76c	99.89	1.97b	98.11	0.02b	99.85	0.00c	100.00	1.45b	93.67	4.20d	99.50
Broadystar 8.5% WG	4.67c	99.32	0.40b	99.62	0.15b	99.01	0.37bc	93.01	0.41b	98.21	5.99cd	99.28
Banvel 4S 48% EC	32.28b	95.29	0.00b	100.00	2.83b	80.74	0.00c	100.00	5.71ab	75.01	40.82b	95.10
Hand weeding	7.59c	98.89	1.99b	98.09	5.35ab	63.56	3.31ab	37.52	0.72b	96.87	18.95bc	97.72
Untreated control	685.17a	0.00	104.33a	0.00	14.69a	0.02	5.29a	0.01	22.86a	0.00	832.34a	0.00
LSD (P≤0.05)	2.50		3.27		1.52		0.867		2.40		2.09	

Means followed by the same letter (same column) are not significantly different.

Effect on individual broadleaved weed: Effect of all weed control treatments on fresh weight of each broadleaved weed species grown in wheat field in both locations after 30 days of treatments presented in Table 3 and 4. At Plant Protection Farm, the fresh weight reduction percent of broadleaved weeds ranged from 95.29 to 99.89 % for *B. vulgaris*; 98.11 to 100% for *R. dentatus*; 80.74 to 99.85% for *A. majus*; 93.01 to 100% for *M. polymorpha* and 75.01 to 98.99% for *M. parviflora* compared to untreated control (Table 3). Hand weeding treatment reduced also the fresh weight of these broadleaved weeds by 98.89, 98.09, 63.56, 37.52 and 96.87%, respectively as comparing with control. At El-Wady El-Assiuty Farm, Rapido, Bromoplus, Broadystar and Banvel 4S reduced the fresh weight by 99.85 to 99.97% for *M. polymorpha*; 69.41 to 100% for *C. bursa-pastoris*; 88.86 to 100% for *M. parviflora* and 93.91 to 100% for *S. marianum* compared to untreated control (Table 4). For hand weeding treatment, the reduction in fresh weight of these broad leaved weeds were 14.24; 86.83, 81.46 and 77.90%, respectively.

Wheat visual injury: No visual injury symptoms on wheat plants in both locations observed after Rapido, Bromoplus, Broadystar as well as hand weeding treatments. Thus, these herbicides are safe to use in this wheat cv. Sids 12 in the Nile valley land and new reclaimed land in Assiut governorate, Egypt. In contrast, application of Banvel 4S, dicamba, resulted in visual injury symptoms included gross malformations effects in the stems and leaves especially the flag leaf, spikes and spikelet form (Fig. 1). Banvel 4S also resulted in bending stem, kinked awns and rachis, clubshaped heads, fused glumes and florets due to tightly rolled flag leaf. As our information, this is the first reported data on the effect of dicamba (Banvel 4S) on wheat cultivar Sids12 in Egypt.

Table 4: Effect of herbicides and hand weeding treatments on average fresh weight (g m^{-2}) and percent of reduction (%) of broadleaved weeds in wheat fields at El-Wady El-Assiuty Farm, Assiut University after 30 days of treatments.

Weed species	*M. polymorpha* L.		*C. bursa-pastoris* L.		*M. parviflora* L.		*S. marianum* L.		Total broadleaved weeds	
Traits / Treatments	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)	Fresh weight (g m^{-2})	Reduction (%)
Rapido 25% EC	0.10b	99.85	3.17b	90.68	0.00a	100.00	1.38ab	94.45	4.65c	96.68
Bromoplus 24% EC	0.11b	99.83	0.00b	100.00	0.83a	95.34	0.80ab	96.80	1.73c	98.76
Broadystar 8.5% WG	0.02b	99.97	0.00b	100.00	0.70a	96.09	1.52ab	93.91	2.23c	98.40
Banvel 4S 48% EC	0.79b	98.75	10.41ab	69.41	1.98a	88.86	0.00ab	100.00	13.17c	90.57
Hand weeding	54.06a	14.24	4.48b	86.83	3.30a	81.46	5.50b	77.90	67.33b	51.81
Untreated control	63.04a	0.00	34.02a	0.00	17.77a	0.00	24.88a	0.00	139.71a	0.00
LSD (P≤0.05)	1.86		2.71		2.29		2.64		2.40	

Means followed by the same letter (same column) are not significantly different.

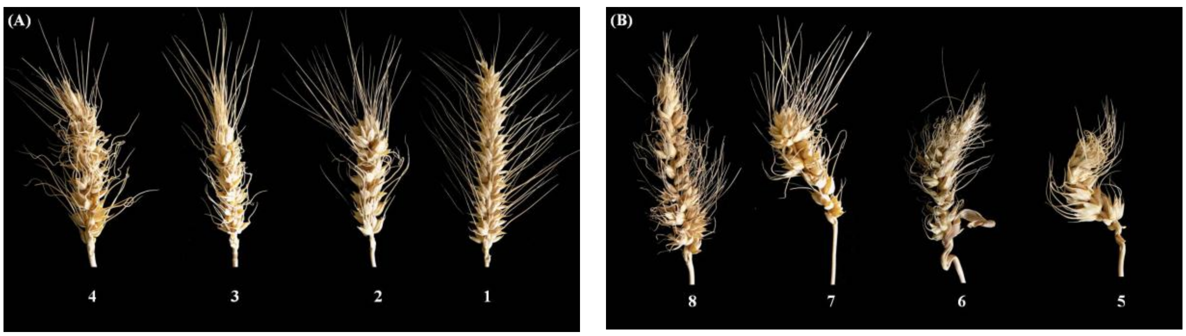

Figure 1: Adverse effect of Banvel 4S (dicamba) herbicide on spike shape of wheat cv. Sids 12 in Plant Protection Department Farm and El-Wady El-Assiuty Farm, Assiut University. 1= Control , 2 to 8 = Banvel 4S.

Effect on wheat yield: Compared with the weed control treatments, untreated control produced the lowest grain wheat yields 3032.00 kg fed^{-1} in Plant Protection Farm and 1592.00 kg fed^{-1} in El-Wady El-Assiuty Farm (Table 5 and Fig. 2) and the wheat grain reduction may be attributed to the aggressive compete of various broadleaved weeds with the crop plants in both locations on the essential growth factors like water, space, light and nutrition; as also suggested by Zand et al. (2007); shehzad et al. (2012); El-Kholy et al. (2013).

Application of all tested herbicides and hand weeding treatments resulted in a significant increase in the grain wheat yield compared to those recorded in untreated control in both locations (Table 5 and Fig. 2). At Plant Protection Farm, Rapido and Bromoplus followed by hand weeding and Broadystar showed the highest wheat grain yield 4595.20, 4528.00, 4417.60 and 4299.20 Kg fed^{-1}, respectively without any statistical significance among them. Banvel 4S provided the lowest grain yield 3877.60 kg fed^{-1} compared with those presented for other treatments except control. The percent of wheat yield grain increment were 51.56, 49.34, 45.70, 41.79 and 27.89% respectively for Rapido, Bromoplus, hand weeding, Broadystar and Banvel 4S compared to untreated control. At El-Wady El-Assiuty Farm, Rapido, Bromoplus, hand weeding, Banvel 4S and Broadystar increased the grain wheat yield to 2330.00, 2556.00, 1884.00, 1882.00 and 1870.00 kg fed^{-1}, respectively with no statistical significance among them. They increased grain yield rates by 46.36, 60.55, 18.34, 18.22 and 17.46%, respectively compared to control.

Table 5: Effect of herbicides and hand weeding treatments on average fresh weight (g m^{-2}) and percent of reduction (%) of broadleaved weeds in wheat fields at El-Wady El-Assiuty Farm, Assiut University after 30 days of treatments.

Experiment location	Plant Protection Department Farm		El-Wady El-Assiuty Farm	
Traits / Treatments	Avg. grain yield (kg fed^{-1})	Increase (%)	Avg. grain yield (kg fed^{-1})	Increase (%)
Rapido 25% EC	4595.20 ± 156.86 a	51.56	2330.00±307.72 ab	46.36
Bromoplus 24% EC	4528.00±283.64 a	49.34	2556.00±402.69 a	60.55
Broadystar 8.5% WG	4299.20±62.15 ab	41.79	1870.00±279.63 ab	17.46
Banvel 4S 48% EC	3877.60±252.78 b	27.89	1882.00±122.17 ab	18.22
Hand weeding	4417.60±164.31 ab	45.70	1884.00±173.08 ab	18.34
Untreated control	3032.00±138.18 c	0.00	1592.00±30.11b	0.00
LSD (P≤0.05)	592.34		796.78	

Means followed by the same letter (same column) are not significantly different.

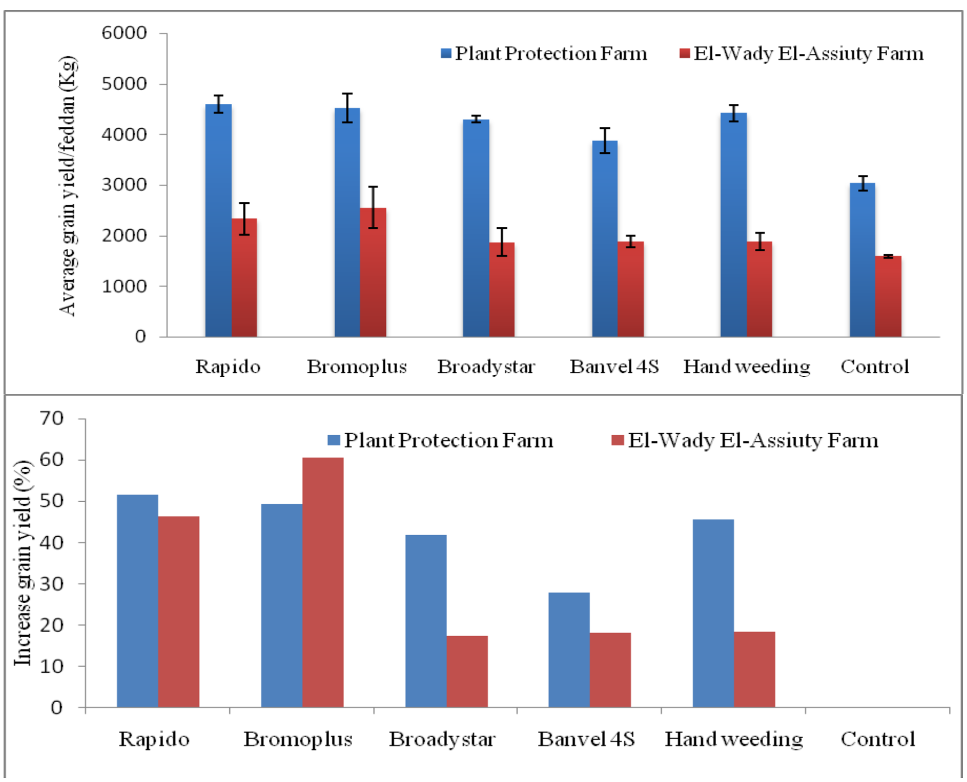

Fig. 2: Average wheat grain yield (kg feddan-1) and percentage of yield increase as affected by herbicides and hand weeding treatments in Plant Protection Department Farm and El-Wady El-Assiuty Farm, Assiut University.

Discussion

Weeds are considered one of the most serious biotic factors limiting wheat production. Various common broadleaved weed species were recorded in unweeded control after 30 days of treatments including *B. vulgaris* L., *R. dentatus* L., *A. majus* L., *M. polymorpha* L. and *M. parviflora* L. at Plant Protection Farm (Table 1) and *C. bursa-pastoris* L. Medicus, *S. marianum* L. Gaertn, *M. parviflora* L. and *M. polymorpha* L. at El-Wady El-Assiuty Farm (Table 2). Several studies reported that a wide variety of broadleaved weeds were infested the wheat production regions in the world. *B. vulgaris* L., *Melilotus* sp and *R. dentatus* L., are of major and competitive broadleaved weed species infest wheat fields that can cause a great yield loss and retardation crop harvest practice (Chhokar et al., 2007; Bhullar et al., 2013; El-Kholy et al., 2013; Tagour et al., 2011). In addition, the maximum density or the biomass of dominant broadleaved weeds was found in weedy check. In this concern, Shaban et al. (2009) reported that broadleaved weeds reduced wheat yield by 27.5%. Among various weed control methods, herbicides are the main and the most effective one all over the world. In this study, all tested broadleaved herbicides (Rapido 25% EC, Bromoplus 24% EC, Broadystar and Banvel 4S 48% EC) and hand weeding treatment were exhibited high efficacy against target broadleaved weeds and caused a significant reduction in the fresh weight of individual and total broadleaved weeds compared with untreated control after 30 days of treatments in Plant Protection Farm and El-Wady El-Assiuty Farm (Table 3 and 4). Rapido 25% EC and Bromoplus 24% EC were provided a higher herbicidal effect and showed the highest reduction in fresh weight of individual and total broadleaved weeds in both locations compared with untreated control. Here, both of Rapido and Bromoplus have same active ingredient bromoxynil octanoate and they were the most efficient herbicides against broadleaved weeds in the Nile valley land and in the new reclaim land. Application of bromoxynil alone or in combinations with MCPA showed excellent efficiency for controlling several broadleaved weeds such as *Melilotus* sp, *C. bursa-pastoris*, *B. vulgaris*, *R. dentatus* and exerted maximum weed biomass reduction as well as high wheat grain yield increment (Zand et al., 2007; Madafiglio et al., 2006; Naseer ud-Din et al., 201; Abbas et al., 2009). Bromoxynil kills susceptible broadleaved weeds through the inhibition of photosynthesis, respiration and causes disruption in cell division control and the growth (Lemerle et al., 1986). A premix florasulam + pyroxsulam (Broadystar) and dicamba (Banvel 4S) was also effective against broadleaved weeds in both locations but less than recorded with both bromoxynil formulations Rapido and Bromoplus. The difference among the herbicides efficiency may attribute to the differences of herbicides target sites in weeds. A premix florasulam + pyroxsulam inhibit the activity of the enzyme ALS, acetolactate synthase that resulted in block the biosynthesis of free branched chain amino acids such as valine, leucine and isoleucine (Tan et al., 2006) while, dicamab modified the nucleic acid metabolism (Lemerle et al., 1986). Hand weeding was efficient on all broadleaved weeds except *M. polymorpha* L. in both locations (especially in El-Wady El-Assiuty Farm) due to its dominance species there. Similar results were found by Bhullar et al., (2013) who reported that hand weeding was usually not effective and due to higher density of *M. polymorpha* and *Chenopodium album* compared to herbicides. Efficiency of the tested herbicides and hand weeding on individual broadleaved weeds in both locations are presented in Table 3 and 4 and the results indicated that all tested herbicides caused varied efficiency against individual broadleaved weeds in both locations and this variable herbicidal actions may be attributed to the variable susceptibility of these weed species to target herbicides and their formulations. This suggestion is in agreement with those of El-Kholy et al. (2013); Abbas et al. (2009); Zand et al. (2007) and Chhokar et al. (2015) who reported that, in general, a herbicide can be more efficient against some of the weeds and less or not effective against others. Beside their efficiency against target weeds, application of all tested broadleaved herbicides (except Banvel 4S) and hand weeding did not exhibit any adverse effect on wheat plants (Fig. 1) and all these treatments increased the grain yield of wheat compared to untreated control treatment in both locations (Table 5 and Fig. 2). The wheat grain yield rates were ranged from 4595.20 to 3877.60 kg feddan^{-1} for Plant Protection Farm and 2330.00 to 1870.00 kg feddan^{-1} for El-Wady El-Assiuty Farm with increment rates of 27.89% to 51.56 and of 17.46 to 46.3 %, respectively compared to control. The highest grain yields were also recorded on wheat plots treated with Rapido and Bromoplus. Similar result was reported by El-Kholy et al. (2013); Abbas et al. (2009) and Sikkema et al. (2007) who reported that treatment of herbicides such as bromoxynil did not cause any visible injury on plants of different wheat cultivars. Concern with Banvel 4S adverse effects on wheat plants in this study, Schroeder & Banks (1989) and Friesen et al. (1964) indicated that visible injury occurred on wheat and barley plants with application of certain herbicides like dicamba, dicamba plus MCPA plus mecoprop and dicamba plus 2,4-D. Also, many hard and soft red winter wheat varieties exhibited sensitivity to dicamba (Rinella et al., 2001; Schroeder &Banks 1989). Sikkema et al. (2007) found that application of dicamba plus MCPA plus mecoprop caused and yield decrease and more visible injury in the soft white and red winter wheat varieties but the hard red winter wheat variety was tolerant and was not affected by this herbicide. Friesen et al. (1964) found that dicamba induced abnormal growth and distorted morphological shape due to the interference of this herbicide with mitosis on wheat and barley plants. The differences in quantity of wheat grain yield (kg feddan^{-1}) were recorded in each location; it may be ascribed to biotic and a biotic factors such as soil types and their characteristics, weed biotypes and density as well as the weather factors in the new reclaimed land in El-Wady El-Assiuty Farm and in the Nile valley land in Plant Protection Farm. The reduction in wheat grain yield in hand weeding treatment in El-Wady El-Assiuty Farm may be due to the poor efficiency on control of *M. polymorpha*. The low wheat grain yield quantity recorded after Banvel 4S treatment it could be contributed to the injury effects of this herbicide on wheat plants particular on leaves and spike shapes (Fig. 1). Tottman (1977) observed underdeveloped wheat seeds with dicamba plus MCPA plus mecoprop treatment. Although, the injury and low grain yield of wheat cv. Sids 12 observed after dicamba treatment in both locations under Assiut condition but the grain yield still more than recorded on untreated control plots. In conclusion, the present study confirmed a high effectiveness of Rapido, Bromopuls and Broadystar herbicides against various broadleaved weeds found in wheat fields in the new reclaimed land and in the Nile valley land at Assiut Governorate in Upper Egypt with a safety and an increase in wheat grain yield. Banvel 4S is also succeeded in controlling the broadleaved weeds in wheat in both locations but it showed injury symptoms in the stems, leaves (particularly the flag leaf), spikes and spikelet form of wheat cv. Sids 12 plants. Therefore, more studies were needed to test the susceptibility of the wheat cultivar, Sids 12, and other wheat cultivars in Egypt to this herbicide. Thus, Rapido, Bromopuls and Broadystar has a potency and safety dimensions for controlling the broadleaved weeds in wheat fields with increasing grain yield in the new reclaimed land and in the Nile valley land at Assiut governorate, Upper Egypt.

Acknowledgements

The author would like to thank the Agricultural Pesticide Committee (APC), Ministry of Agricultural of Egypt for providing the herbicides used in these experiments and for providing a partial funding support.

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