COMMUNICATIONS IN PLANT SCIENCES

Influence of post-emergence herbicides on major grass weeds and wheat (*Triticum aestivum* L.) at Gedo and Shambo, Western Oromia

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Received on September 13, 2017
Accepted on December 07, 2017
Published on December 08, 2017

Keywords
Evaluation
Grain yield
Weed reduction
Weed species

A field experiment was conducted to evaluate post-emergence herbicides for weed management and grain yield of wheat at Shambo and Gedo, Sub-station of Bako Agricultural Research center during summer season of 2014/2015. The experiment was laid out in randomized complete block design with three replications. The treatments consisted of four post-emergence herbicides; Pyroxsulam, Fenoxaprop-p-ethyl 6.9%, Clodinafop-propargyl and Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl, and Hand weeding and weedy check were used for comparison. Results of the experiment depicted that Significantly lowest total weed population (11.33 m^{-2}) and (11.00 m^{-2}) and maximum grain yield of (3460.3 and 3254.0 kg ha^{-1}) with (56.9 and 51.7%) increase in grain yield over weedy check was recorded in Plots treated with Pyroxsulam at the rate of 0.5 L ha^{-1} at Shambo and Gedo sites, respectively. Additionally, the lowest total weed dry weight of (5.8 and 5.2 g m^{-2}) with highest herbicide control efficiency (75.9% and 77.3%) was recorded for Pyroxsulam followed by two times hand weeded plot at these respective locations. In contrary, the highest weed population (45.20 m^{-2}) and (45.53 m^{-2}) and lowest grain yield (1492.1 kg ha^{-1}) and (1571.4 kg ha^{-1}) was obtained from weedy check at Shambo and Gedo, respectively. Thus, from the result Pyroxsulam was recommended as effective and feasible post-emergence herbicide to control major grass and other weed species in a wheat field in study areas.

Highlighted Conclusion

Post-emergence herbicides provided better weed efficacy and boosted grain yield. Among tested herbicides, Pyroxsulam provided significant control of weeds causing significant reduction in density of target weed flora and also significantly improved the grain yield in comparison with other herbicides and weedy check.

Wheat (*Triticum aestivum* L.) is the most important cereal cultivated in Ethiopia (Gebre-Mariam 2003). It ranks second in total grain production (2.31 million ton., 14.4%) next to maize (CSA 2008). In area coverage, it is the fourth important cereal crop after *Eragrostis tef*, *Zea mays* and *Sorghum bicolar*. The national average yield of wheat in Ethiopia is about 1.4 t ha^{-1} (CSA 2005). Multifaceted biotic and abiotic factors are responsible for this low yield. Cultivation of un improved low yield varieties, insufficient and erratic rainfall, poor agronomic practices , disease and insect pests are among the most important constraints to wheat production in Ethiopia (Dereje and Yaynu 2000).

Weeds are one of the major factors reducing crop yield and deteriorate quality of crops due to competition, allelopathy, providing habitats for pathogens as well as serving as alternate host for various insects and fungi and increase harvest cost hence reduce farmers' income (Bekelle 2004, Abbas et al. 2009). Weed infestation is a very serious and less attended issue in many developing countries. Weeds compete with crop plants for various resources such as water and nutrients, resulting in low yields (Jarwar et al. 2005). Zand et al. (2007) reported 30% wheat yield loss and sometimes complete failure of crop. Weeds reduce the yield of wheat by 37-50% and weed infestation is the main reason of declining the yield of wheat in Pakistan (Baluch 1993, Nayyar et al. 1994, Waheed et al. 2009). Among grass weeds wild oat (*Avena fatua*), *Phalaris paradoxa* and *Setaria pumila* are major important and have increased tremendously in rain fed areas in the country. Walia et al. (1998) reported that, as the density of wild oat increased, wheat yield decreased exponentially. Wheat yield loss was below 1% up to 3 plants of wild oats m^{-2}, reached 2.2% at 5 plants and was 50-60% at 100 plants of wild oats m^{-2}. Wheat yield loss could also be related mathematically to the dry weight of weeds.

Weed control is a major component in the production system of wheat whether it can be manually, mechanically, physically and chemically. Chemical weed control methods are most ideal, practical, effective, up-to-date, time saving and economical means of reducing early weed competition and crop production losses (Ashiq and Noor 2007). Application of herbicides decreased dry weight of weeds significantly as compared to dry weight in non-treated plots and increased yield components and grain yield (Ashrafi et al. 2009). However, the existence of many grass weeds, specially *Avena fatua*, creates an obstacle to increase production and productivity of wheat.

Despite of development of high yielder, insect pest resistance varieties and other agronomic packages for production of wheat, Western Oromia is challenged with sever grass weed infestation. They are more problematic in wheat production than broadleaf species because of the selective nature of available herbicides and the difficulties of distinguishing between species while hand weeding. Even though two times hand weeding and available herbicides at respective manufacturer recommendation rates can be a best management option in wheat production, they control only broad leaves species while grass weeds species compete with crop and causes significant yield losses in western Oromia farming community. In view of this, there is a need to look for effective weed management options against grass weed species.

Therefore, the aim of this study was to evaluate and develop effective post-emergence herbicides against major grass weeds in wheat fields to enhance production and productivity of wheat in Western Oromia.

MATERIAL AND METHODS

The experiment was conducted at sub-station of Bako Agricultural Research center, Shambu and Gedo during main season (June-January) of 2014/2015 cropping year. Gedo site is found in Western Showa zone about 60 km Northwest of Ambo, the capital town of the zone. It is located at 09º012' 84" N, 37º 26' 23.9" E and altitude of 2438 m.a.s.l. The soil is clay loam in texture. Shambu site is found in Horo-Guduru Wollega zone about 4 km Northwest of Shambo, the capital town of the zone. It is located on geographic coordinates of 09o037'23.0'' N, 37º 40' 33.2''E and altitude of 2609 m.a.s.l.

The trial was laid out in Randomized Complete Block design (RCBD) with three replications having a net plot size of 4x5m. The herbicidal treatments used in this experiment were Pyroxsulam, Fenoxaprop-p-ethyl, Clodinafop-propargyll and Pinoxaden + Cloquintocet Mexyl, which are described in (Table 1). Two times hand weeding at 25 and 40 days after sowing and weedy check was involved for comparisons. Improved variety "Danda'a" was used in the experiment. The herbicides were applied at 30 days after sowing or (between 2-4 crop leaves stage) using Knapsack sprayer fitted with flat fan nozzle by mixing 200 liters of water per hectare.

Table 1. Description of herbicides used in experimentation.

Trade Name	Common Name	Rate (L per ha)	Spectrum of Herbicides
Axial	Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl (Safener)	1	Post-emergent herbicide for the control of annual grasses in Wheat & Barley
Current 8 EC	Clodinafop-propargyl	1	Post-emergent herbicide for the control of grass weeds in wheat.
Pallas 45 OD	Pyroxsulam	0.5	Post-emergent herbicide for the control of grass weeds (wild oat, downy brome /Bromus Spp. and annual broad leaf weeds on wheat.
Puma super 75 EW	Fenoxaprop-p-ethyl 6.9%	1.25	Post-emergent herbicide for the control of grass weeds in wheat

Weed infestation was assessed and scored by number and species by throwing quadrate with 50cm x 50cm area three times per plot. Percentage of weed inhibition (PWI) was calculated by the formula of PWI=(NWC-NWT/NWC)*100, where NWC and NWT are number of weeds per square meter in control and any particular treatment, respectively.

Weed control efficacy (WCE)=(WDC-WDT/WDC)*100, where WDC and WDT are weed dry weight (g per square meter) in control and any particular treatment, respectively. Wheat crop data like plant height (cm), number of tillers per plant, number of grain per spike, spike length (cm) and grain yield (kg) were collected.

The collected data were subjected to analysis of variance (ANOVA) using SAS the statistical software (SAS 2008) (version 9.2). The mean separation, in cases where there were significant differences among treatments, was done using LSD (0.05) to facilitate the comparison of all pairs of treatment means.

RESULTS AND DISCUSSION

Weed flora composition. Out of the total weeds present in the experimental fields broadleaved and grass weed species were 71.4% and 28.6%, respectively. A totally of 14 weed species were observed in an experimental fields which were categorized under 10 families (Table 2). Among broad leaf weed species *Guizotia scarba, Polygonum nepalense, Spergula arvensis, Rhaphanus raphanistrum* and *Achyranthes aspera* were dominant. Whereas *Avena fatua* and *Setaria pumila* were dominant grass weed species observed in experimental plot at 80 days after sowing (DAS). This result is in conformity of (Kebede et al. 2017) who suggested *Guizotia scarba, Polygonum nepalense, Spergula arvensis, Rhaphanus raphanistrum*, *Achyranthes aspera*, *Avena fatua* and *Setaria pumila* as dominant weed species in wheat fields.

Table 2. Scientific names, family, life form and categories of weeds in experimental field.

Scientific name	Family	Life form (Category)
Achyranthes aspera	Acanthaceae	Annual (Broad-leaved)
Avena fatua L.	Poaceae	Annual (Grass)
Caylusea abyssinica Meisin	Resedaceae	Annual (Broad-leaved)
Commolina latifolia	Commelinaceae	Annual (Broad-leaved)
Corrigoila capensis	Caryophylaceae	Annual (Broad-leaved)
Digitaria ternata	Poaceae	Annual (Grass)
Galinsoga Parviflora Cav	Asteraceae	Annual (Broadleaved)
Galium sporium	Rubiaceae	Annual (Broad-leaved)
Guizotia scarba (Vis)chiov	Asteraceae	Annual (Broad-leaved)
Phalaris paradoxa L.	Poaceae	Annual (Grass)
Polygonum nepalense L.	Polygnonaceae	Annual (Broad-leaved)
Rhaphanus raphanistrum L.	Brassicaceae	Annual (Broad-leaved)
Setaria pumila	Poaceae	Annual (Grass)
Spergula arvensis L.	Caryophllaceae	Annual (Broad-leaved)

Weed density and percentage weed reduction. Results revealed that all post-emergence herbicides reduced weed density significantly at varied level as compared to weedy check (Table 3). Among the weed management practices the minimum total weed density (11.33 m^{-2}) and (11.00 plants m^{-2}) was recorded in plots treated with Pyroxsulam followed by two times hand weeding (15.33 m^{-2}) and (17.00m^{-2}) at Shambo and Gedo, respectively. Whereas the maximum total weed density (45.20 m^{-2}) and (45.53 m^{-2}) was obtained from weedy check at these respective locations. Both broad and grass weed species were significantly reduced in a plot treated with Pyroxsulam having the minimum weed density of (8.00and 3.00 m^2, 8.66 and 2.66 m^{-2}) as compared to weedy check plot at Gedo and Shambo, respectively. In contrary, the maximum weed density of broad and grass weed species (35.20 and 10.343 m^{-2}, 36.5 and 8.66 m^{-2}) were observed in weedy check plot at Gedo and Shambo, respectively.

Percentage weed reduction of all the treatments was different (Figure 1). Pyroxsulam decreased weed density by 79.8% and 81.8% followed by two times hand weeded (71.1% and 70.9%) at Shambo and Gedo, respectively. These results are in conformity with Hashim et al. (2002) and Khan et al. (2003) who reported that application of the herbicides reduced broad and narrow leaf weeds to a varying degree sometimes approaching to 100% control. Results showed that plots treated with post-emergence herbicides like Fenoxaprop-p-ethyl 6.9%, Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl and Clodinafop-propargyl had significantly lowest number of grass weed species as compared to weedy check. However they were ineffective to control broadleaved weed species. Therefore, supplementation of those chemicals with any other chemicals or hand weeding is necessary as to reduce the infestation of broad leaf weed species in the wheat field. The results shown variation across location for observed parameters that could be mainly due environmental factors.

Table 3. Weed density (m^{-2}) as influenced by different weed management practices at 80 DAS.

Treatments	Shambo			Gedo		
	Broad leaf	Grass leaf	Total	Broad leaf	Grass leaf	Total
Pinoxaden	37.0±5.43a	6.66±2.36a	43.66±6.33a	30.48±5.53ba	4.66±2.06bc	35.15±6.36ba
Weedy check	36.5±6.03a	8.66±3.30a	45.20±7.26a	35.20±5.86a	10.33±3.20a	45.53±7.10a
Fenoxaprop	20.5±4.46b	4.66±2.13a	25.20±5.43b	25.20±5.03ba	5.33±2.26bc	30.53±5.96bc
Clodinafop	20.1±4.46b	5.00±2.20a	25.10±5.40b	19.53±4.40bc	4.33±2.06c	23.86±5.26bcd
Pyroxsulam	8.66±2.90b	2.66±1.93a	11.33±3.90b	8.00±2.80d	3.00±1.70c	11.00±3.70d
Hand weeded	8.0±2.80b	7.33±2.46a	15.33±4.13b	9.00±3.00dc	8.00±2.80ba	17.00±4.50cd
F-test	**	NS	**	**	**	**
LSD	12.73	6.56	17.68	11.5	3.6	13.7
Cv (%)	12.3	21.1	13.7	14.4	17.3	11.9

Means followed by the same letter within the column are not significantly different at p<0.05 using LSD.
*Note: **, * = significance difference at (p<0.01) and (P≤0.05) respectively, ns = no significance difference, LSD =list significance difference, CV (%) = coefficient of variation.* Pinoxaden =Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl, Fenoxaprop = Fenoxaprop-p-ethyl 6.9%, Clodinafop = Clodinafop-propargyl

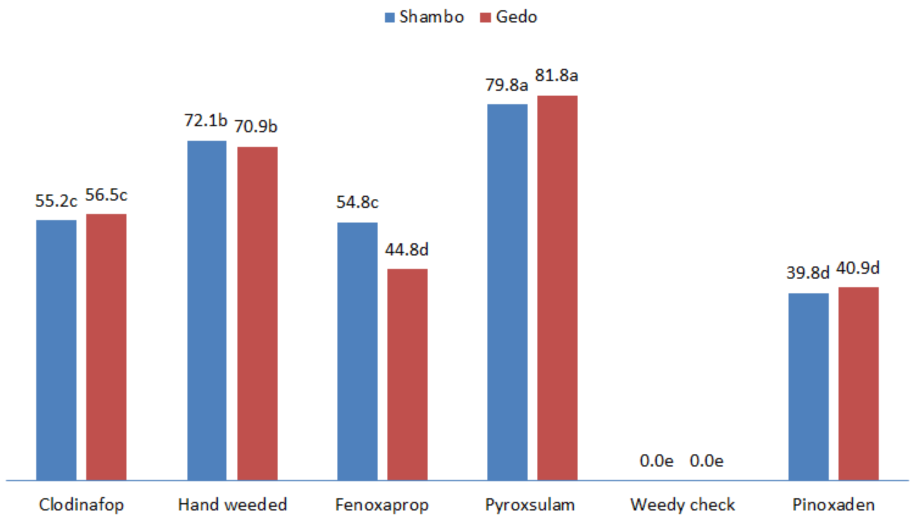

Figure 1. Percentages weed reduction of different weed management practices.

Weed dry weight and weed control efficiency. Results figured out that both weed dry weight and weed control efficiency were significantly affected by weed management practices (Table 4). Significance difference was observed between Pyroxsulam and the rest of herbicide treatments for parameters like dry weight of broad leaved and total weed species at both study areas. However, no significant difference was observed among post-emergence application of Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl, Clodinafop-propargyll and Fenoxaprop-p-ethyl 6.9%for broad leaved and total weed dry weight (g m^{-2}) at study locations. No significance difference was noticed among herbicides regarding to grass weeds dry weight (g m^{-2}) at study areas which was attributed to selective nature of these herbicides only for grass weed species except Pyroxsulam which is broad spectrum herbicide. However, there was numerical difference where the lowest grass weed dry weight of (5.8 g m^{-2}) and (5.2 g m^{-2}) scored from plots treated with Pyroxsulam at across locations. This result is in analogy with the work of Getachew et al. (2012) who reported that Pyroxsulam reduced the dry weight of serious grassy weeds on bread wheat. Significantly higher total weed dry weight at 80 DAS (24.4 g m^{-2}) and (19.9 g m^{-2}) was recorded from weedy check plot at Shambo and Gedo, respectively. This was due to higher total weed density observed in this plot. Whereas the lowest total weed dry weight (5.8 g m^{-2}) and (5.2 g m^{-2}) was obtained from plot treated with Pyroxsulam at Shambo and Gedo, respectively. This low total weed dry weight was mainly due to significantly higher reduction of total weed density and significantly superior weed percentage reduction. These results are also in accordance with findings of Anwar-ul-Haq et al. (1981) who reported that dry weights of weed species were significantly reduced under chemical treatments.

Among herbicide treatments, maximum weed control efficacy (75%) and (77.3 %) was observed in plot treated with Pyroxsulam at Shambo and Gedo sites, respectively. Such higher weed control efficiency could be due to broad spectrum nature and effectivity of this chemical against all weed species observed in experimental fields.

This result agrees with the finding of Singh et al. (2013) who recorded that the highest weed control efficiency and the lowest common grassy weed species in irrigated wheat cultivation. The minimum weed control efficiency (34.3%) and (32.3%) was noticed in plots treated with Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl at Shambo and Gedo, respectively. This is due to the maximum weed population density and weed dry weight observed in plot treated with Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl which in turn caused minimum weed control efficiency.

Table 4. Effect of Weed management practices on weed dry weight (g m^{-2}) and weed control efficacy (WCE %) in wheat fields at Shambo and Gedo, Western Oromia.

	Shambo				Gedo			
Treatments	BLDW(g m^{-2})	GLDW(g m^{-2})	TWDW(g m^{-2})	WCE (%)	BLDW(g m^{-2})	GLDW(g m^{-2})	TWDW(g m^{-2})	WCE(%)
Pinoxaden	12.9b	2.8b	15.7b	34.3c	13.3b	2.0c	15.4b	32.3d
Clodinafop	9.4b	2.3b	11.7b	51.4bc	8.9b	2.1c	11.0bc	51.7bc
Fenoxaprop	9.0b	2.2b	11.3bc	53.3bac	11.5b	2.4bc	13.9b	38.6cd
Pyroxsulam	3.9c	1.9b	5.8d	75.9a	3.6c	1.6c	5.2d	77.3a
Hand weeded	3.5c	2.9b	6.4dc	73.9ab	4.2c	3.8ba	7.9cd	65.0ab
Weedy check	19.2a	5.2a	24.4a	-----	19.9a	5.0a	24.0a	-----
F-test	**	*	**	*	**	**	**	**
Cv (%)	23.5	24.7	22.9	21.5	25.5	26.9	22.8	16.5
LSD 0.05	4.1	1.8	5.2	23.4	4.7	1.4	5.3	16.5

Means followed by the same letter with in column are not significantly different at 5.% level of significance.

Note: *. ** = Significance difference and high significance difference, respectively. CV(%) = Coefficient of variation, LSD = List significance difference, Pinoxaden = Pinoxaden 45 g L^{-1} + Cloquintocet Mexyl, Fenoxaprop = Fenoxaprop-p-ethyl 6.9%, Clodinafop = Clodinafop-propargyl, BLWD = Broad leaf weed dry weight, GLWD = Grass leaf weed dry weight, TWDW = Total weed dry weight, WCE(%) = Weed control efficacy

Wheat yield related parameters. Analysis of variance revealed that there was significance difference among treatments regarding to yield attributing parameters like plant height, number of tillers, spike length and thousand kernel weight (Table 5).

Table 5. Effect of different weed management practices on yield related parameters.

Treatments	Shambo				Gedo			
	PLHG	No.TLR	SPLG	TKW	PLHG	No.TLR	SPLG	TKW
Clodinafop	103.60a	3.70ba	6.80a	37.80a	89.85ba	3.00a	5.23a	40.33a
Hand weeded	104.60a	4.30a	7.20a	39.50a	94.90a	3.57a	5.27a	41.00a
Fenoxaprop	103.30ba	4.20a	6.30a	41.90a	85.47ba	2.20b	5.04a	37.00bc
Pyroxsulam	104.00a	4.10a	6.70a	42.20a	93.10a	3.57a	5.31a	41.10a
Pinoxaden	103.30ba	4.20a	6.30a	40.00a	87.93ba	2.20b	4.75a	38.00ba
Weedy check	99.60b	3.10b	5.90a	36.70a	82.60b	1.80b	4.13b	34.33c
F-test	*	*	NS	NS	*	**	**	**
LSD	3.8	0.67	1.47	6.15	10.01	0.67	0.56	3.03
Cv(%)	2	9.3	12.3	8.5	6.18	13.64	6.32	4.32

Means followed by the same letter within the column are not significantly different at $p \leq 0.05$ using LSD.

Note: **, * = Significance difference at ($P<0.01$) and ($P \leq 0.05$) respectively, ns = non significance difference, LSD = list significance difference, CV(%) = coefficient of variation, PLHG = Plant heght, No. TLR = Number of tiller, SPLG = Spike length, TKW= thousand kernel weight.

Plant height. There was statistically significant difference at ($P<0.05$) between post-emergence herbicides and weedy check (Table 5). But there was no significant difference among post-emergence herbicides. The highest plant height was recorded from hand weeded plot (104.6 cm and 94.9 cm) followed by Pyroxsulam at the rate of 0.5 L ha^{-1} (104.0 cm and 93.1 cm) at Shambo and Gedo, respectively. Whereas, the lowest plant height (99.6 and 82.6 cm) was obtained from weedy check plot at Shambo and Gedo, respectively. This indicated plants growing with effective weed control could attain higher height.

Number of tillers. Number of tillers was significantly affected by treatments (Table 5). The maximum number of tillers (4.3 and 3.57 $hill^{-1}$) was observed in hand weeding plot, while the minimum number of tillers (3.1 and 1.8 $hill^{-1}$) was recorded in weedy check at Shambo and Gedo, respectively. As the weed densities reduced and weed crop competition become low, and then there was an increment in number of tillers. The higher number of tillers recorded in two times hand weeded plot might be due to more effectiveness of these treatments on weeds that resulted in lower weed density thus reduced weed crop competition that contributed to more number of tillers. These results are in agreement with the work of Ijaz et al. (2008) who observed that herbicidal weed control increased the nutrients availability to the crop which ultimately increased the spike bearing tillers.

Spike length. Effect of weed management practices on spike length was significant (Table 5). Significant difference was noticed in any other treatments as compared to weedy check. But there was no statistically significant difference among post-emergence herbicides. However there was numerical difference. The highest spike length (5.31) was recorded in plot treated with Pyroxsulam followed by two times hand weeding (5.27 cm) at Gedo station. Whereas the lowest grain spike was recorded in weedy check. The analysis of variance revealed there was no significant difference among weed management practices at Shambo. However, there was numerical difference. The highest spike length (7.20 cm) was obtained from two times hand weeding. Whereas the lowest (5.9 cm) was obtained from weedy check plot.

Thousand kernel weight. Analysis of variance regarding to 1000 kernel weight showed that there was significant among weed management options at Gedo (Table 5). The maximum thousand grain weights (41.1 g) was recorded in plots treated with Pyroxsulam at the rate of 0.5 L ha^{-1} followed by hand weeded (41.0 g). While, the minimum thousand grain weight (34.33 g) was obtained from weedy check. This low 1000 grain weight may be attributed to resource competition of wheat by weed in un-treated plot. These outcomes are supported by findings of Ahmad et al. (1991) and Mason and Spaner (2006). There was no significance difference among weed management treatments at Shambo station. However, numerical difference was observed. Maximum thousand weights (42.2 g) were obtained from plots sprayed with Pyroxsulam. at the rate of 0.5 ha^{-1}. Whereas the minimum thousand grain weight (36.7 g) was observed from weedy check at Shambo.

Wheat grain yield. Grain yield was significantly affected by weed management practices at both Shambo and Gedo stations (Table 6) below. Result of the experiment revealed that the herbicide treatments had a convincing effect on the grain yield of wheat crop. In line with this, the highest grain yield (3460.3 kg $ha^{-1}$and 3254.0 kg ha^{-1}) was recorded in Plots treated with Pyroxsulam at the rate of 0.5 L ha^{-1} that was 1968.2 kg ha^{-1} i.e.56.9% and 1682.6 kg ha^{-1} i.e. 51.7% increased over weedy check plots, followed by two times hand weeded plot (3309.5 kg ha^{-1} and 2857.1 kg ha^{-1}) at Shambo and Gedo, respectively. Increased grain yield of treated crop may be attributed to availability of more nutrients, light, moisture and space resulting in crop growth. These findings are in agreement with the work of Arif et al., (2004) who reported that the application of herbicides in fact does affect grain yield of wheat. The results are also in conformity with the findings of Awan et al. (1990), Hassan et al. (2003) and Tunio et al. (2004) who reiterated the efficacy of herbicide applications having been influential in raising the grain yield of wheat. The lowest grain yield (1492.1 kg ha^{-1} and 1571.4 kg ha^{-1}) was recorded in weedy check at both respective locations. Such a yield reduction could be due to maximum infestation of weeds in un-treated plot. These result is in analogy with findings of Chaudhary et al. (2008) and Dalley et al. (2006) who reported that high weeds intensity and more competition time with crop plants causes more reduction in crop yield.

Table 6. Effect of weed management practices on yield and yield advantage (%) of wheat at Shambo and Gedo.

Treatments	Shambo			Gedo		
	Yield ha^{-1}	Yield Increase(kg)	Yield Advantage (%)	Yield ha^{-1}	Yield Increase(kg)	Yield Advantage (%)
Clodinafop	2571.4bc	1079.3	42.0	2230.2bc	658.8	29.5
Hand weeded	3309.5a	1817.4	54.9	2857.1ba	1285.7	45.0
Fenoxaprop	2984.1ba	1492	50.0	2301.6bc	730.2	31.7
Pyroxsulam	3460.3a	1968.2	56.9	3254.0a	1682.6	51.7
Pinoxaden	2095.2dc	603.1	28.8	1904.8c	333.4	17.5
Weedy check	1492.1d	------	-----	1571.4c	-----	-----
F-test	**			**		
LSD	732.18			759.08		
Cv (%)	15.2			17.73		

Means followed by the same letter within the column are not significantly different at p≤0.05 using LSD.

Note: **, * = significance difference at (p<0.01) and (P≤ 0.05) respectively, ns = non-significant difference, LSD = list significance difference, CV(%) = coefficient of variation.

CONCLUSION

Generally, wheat yield were influenced by applied treatments. Pyroxsulam was effective to control major broad and grass weed species observed in wheat fields. Hence was recommended as effective herbicide in study areas and similar ecology of the country.

Acknowledgements

The authors would like to acknowledge the financial support provided by Oromia Agricultural Research Institute and research facilities by Bako Agricultural Research Center.

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