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Research article

## INVESTIGATING EFFECTS OF RICE HERBICIDES ON CONTROLLING RATOON WEED

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**ABSTRACT:** Field trials were conducted to evaluate various herbicides for weed control in rice farm (ratton rice crop) in Sari, Iran during the summer season of 2012. Six herbicide treatments were evaluated and compared with hoe weeding control and a weedy check in a randomized complete block design with four replications. All the weed control treatments and hoe weeding significantly reduced weed growth and resulted in higher rice grain yields than the respective weedy check. Among the various herbicide treatments tested application of Sunriceplus (Anilofus + Auto oxi sulforon), Stuff (Sinosulforon), londux (Bensulforon-methyl)+Machete –EN (Botakolor), Londux (Bensulforon-methyl) and hoe-weeded control consistently combined effective weed control with good crop growth and high kernel yields with 2175,2092/5,1940,1897/5 and 18 kg/ha comparable to the weedy check (1065kg/ha). Herbicides effect on weeds of *Echinochloa crus-galli* (L.) P. Beauv., *Cyperus difformis* L., *Cyperus rotundus* L., *Cyperus globosus* Aublet, and *Scirpus mucronatus* L. also were studied. Londux had the highest effect on all of the weeds except *Cyperus globosus* Aublet. Hoe weeding effect was nearly same as Sunriceplus. All of the herbicides were effective on weeds in compare of weedy check.

**Key words:** Weed control, herbicide treatments, rice, Iran.

## INTRODUCTION

Rice (*Oryza sativa* L.) is one of the world's most important food crops [11]. Rice is considered the most important staple food in the world as it supplies the major food requirement for more than one half of the world's population. This crop has become an important staple food whose demand is always on the increase in Iran largely due to increasing population. As a staple food, rice has also provided more calories per hectare than other cereal crops [4]. In spite of its diversified uses and high acceptability both as food and cash crop, the production of rice is constrained by a number of factors. These include problems of insect pests, diseases and weeds. Of all the constraints limiting the production of this crop, weeds, appear to have the most deleterious effect causing between 75 and 100% reduction in potential paddy rice yield [1, 6, 7]. Weeds are the most serious biotic constraint to higher yields [5, 13, 8]. They are a major problem in all rice-production countries, including Macedonia, mainly because rice is grown mostly as a continuous crop. In rice crops worldwide, losses due to competitive effects of weeds are estimated at 10% to 15% of potential production [3,12, 15]. On average in Europe, the potential reduction in rice yields due to uncontrolled weeds has been estimated at 55–60% [10]. Madrid et al [9] reported that losses in rice yields due to weeds ranged from 41% to 100%. Ratoon rice crop is the second harvesting from rice [14]. Weed control was caused that rice yield increased [2].

## MATERIALS AND METHODS

Field trials were conducted to evaluate various herbicides for weed control in rice farm (ratton rice crop) in Sari, Iran (53°10' E longitude and 36° 40'N latitude, 16 m above sea level) during the summer season of 2012. The trial was laid out in randomized complete block with four replications. In each plot 6 planting row, with plant distance of 20 cm in row and row distance of 25cm, were applied .Six herbicide treatments including Sunriceplus (Anilofus + Auto oxi sulforon) 3lit/ha , Stuff (Sinosulforon) 100g/ha, londux (Bensulforon-methyl)75g/ha + Machete–EN (Botakolor) 3lit/ha , Londux (Bensulforon-methyl) 75g/ha , Machete –EN (Botakolor) 3lit/ha + Stuff (Sinosulforon) 100g/ha and Machete –EN (Botakolor) 3lit/ha were evaluated and compared with hoe weeding control and a weedy check.

Plant height(cm) , panicle length(cm) , plant drying weight(g/m<sup>2</sup>), empty grain in panicle , filled grain in panicle ,1000 grain weight (g) and grain yield (kg/ha) were measured in ten plants at per treatment . Herbicides effect on weeds of *Echinochloa crus-galli* (L.) P. Beauv., *Cyperus difformis* L., *Cyperus rotundus* L., *Cyperus globosus* Aublet, and *Scirpus mucronatus* L. were studied.

## RESULTS AND DISCUSSION

All the weeds control treatments and hoe weeding significantly reduced weed growth and resulted in higher rice grain yields than the respective weedy check. Among the various herbicide treatments tested application of Sunriceplus (Anilofus + Auto oxi sulforon), Stuff (Sinosulforon), londux (Bensulforon-methyl)+Machete –EN (Botakolor) , Londux (Bensulforon-methyl) and hoe-weeded control consistently combined effective weed control with good crop growth and high kernel yields with 2175,2092/5,1940,1897/5 and 18 kg/ha comparable to the weedy check with 1065kg/ha(Table 1). Herbicides effect on weeds of *Echinochloa crus-galli* (L.) P. Beauv., *Cyperus difformis* L., *Cyperus rotundus* L., *Cyperus globosus* Aublet., and *Scirpus mucronatus* L. were showed that Sunriceplus had more effect on *Cyperus difformis* L.,and *Scirpus mucronatus* L. Machete –EN + Stuff had highest effect on *Cyperus difformis* L. londux + Machete had highest effect on *Cyperus difformis* L., and *Scirpus mucronatus* L. Machete –EN had least effect on weeds. Stuff had more effect on *Cyperus difformis* L., *Cyperus rotundus* L. and *Scirpus mucronatus* L. Londux had the highest affect on all of the weeds except *Cyperus globosus* Aublet. Hoe weeding effect was nearly same as Sunriceplus. All of the herbicides were effect on weeds in compare of weedy check (Table 2).

**Table 1. Means comparison effects of herbicides on Plant height(cm) , panicle length(cm) , plant drying weight(g/m<sup>2</sup>) , empty grain in panicle , filled grain in panicle ,1000 grain weight (g) and grain yield (kg/ha)**

grain yield (Kg/ha)	1000 grain weight (g)	filled grain in panicle (Panicle <sup>-1</sup> )	empty grain in panicle (Panicle <sup>-1</sup> )	plant drying weight (g/m <sup>2</sup> )	panicle length (cm)	Plant height (cm)	Herbicides
a 2175	ab 21/95	ab 384/25	a 59/75	a 1191/5	a 19/15	ab 69/4	Sunriceplus
abc 1595	ab 21/5	bc 285/25	a 39/5	a 950	a 18/43	ab 64/51	Machete –EN + Stuff
a 1940	a 22/9	a 363	a 32/75	a 1123/5	a 19/10	a 74/62	Londux + Machete–EN
bc 1127/5	ab 21/12	bc 287	a 43/75	a 929/8	a 17/28	ab 66/25	Machete–EN
a 2092/5	ab 22/2	abc 324/25	a 62/75	a 1029	a 18/73	ab 68/78	Stuff
a 1897/5	a 22/52	abc 301/25	a 51/75	a 910/5	a 17/92	ab 68/71	Londux
ab 1800	ab 21/62	ab 352/75	a 30/25	a 849	a 17/85	ab 62/62	Hoe weeding
c 1065	b 20/72	c 261/25	a 38/25	a 1004/3	a 18/04	b 59/87	weedy check

Different letters in each colum shows significant difference at %5 probability (DMRT).

**Table2. Means comparison effects of herbicides on weeds**

Scirpus mucronatus L.(plant/m <sup>2</sup> )	Cyperus globosus Aublet (plant/m <sup>2</sup> )	Cyperus rotundus L. (plant/m <sup>2</sup> )	Cyperus difformis L (plant/m <sup>2</sup> )	Echinochloa crus-galli L. P. Beauv.( plant/m <sup>2</sup> )	Herbicides
cd 0/83	a 0/70	a 2/42	b 2/90	ab 3/35	Sunriceplus
abc 1/45	a 1/04	ab 1/93	b 6/65	ab 3/47	Machete –EN + Stuff
d 0/70	a 0/99	ab 1/30	b 6/80	ab 3/55	Londux + Machete–EN
ab 1/53	a 1/37	ab 1/43	a 14/56	ab 2/58	Machete–EN
bcd 0/99	a 0/99	b 1/06	b 3/42	a 3/80	Stuff
d 0/70	a 1/04	b 0/70	b 4/81	b 1/74	Londux
bcd 1/44	a 0/83	ab 1/41	b 5/03	ab 3/39	Hoe weeding
a 2/05	a 1/26	ab 1/30	a 15/56	ab 2/56	weedy check

Different letters in each colum shows significant difference at %5 probability (DMRT).

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