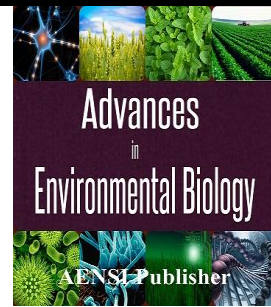




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Effect of Spraying with Late-Vegetative Weedicides Bentazon and Haloxyfop R Methyl on the Soybean (*Glycine max* L.) Yield and Yield Components

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ABSTRACT

This experiment was carried out in split plot design based on completely randomized block design with two main factors at soybean 4-leaf stage and 8-leaf stage and 5 subsidiary factors included, without weedicide and Handy weeding, bentazon weedicide of 2.5 liter, 3liter, 4liter+ once handy weeding, weedicides and haloxyfop r methyl of 1.5liter, 2liter, 3liter and once handy weeding, weedicides bentazon 2.5 + haloxy 1.5, weedicides bentazon 3+haloxy 2, weedicides bentazon 4 +haloxy 3 and once handy weeding, handy weeding treatment and farm common treatments in three replicates for weed control after soybean plantation(*Glycine max*) was carried out in a farm of Chamestan, suburbs of Noor province, in agronomy year of 2014. Results indicated that the effect of spraying time treatment was significant on most of traits except weight of three-seeds with pod, weight of three-seeds without pod, weight of five-seeds without pod, five pod weight of 3-seeds, pod length, number of subsidiary branches, main leaf area, subsidiary leaf area, and dry weight. But different weedicide concentration effect was significant on all traits except pod length. As a result, b4h3 could be one of the best choices to control soybean weed since, firstly it has indicated the best amounts in all traits and secondly, it was not observed any difference between its effect at two-leaf stage and four-leaf stage.

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INTRODUCTION

Soybean (*Glycine max*) is one of oil-plants of Fabaceae family that addition to 20-22 percent eating oil, leaves a meal with 38 percent protein. This plant as the oil source in producing food supply is competing with other plants such as sunflower groundnut, cotton, rape seed and olive. It is expected that due to the fast growth of population, soybean protein supply consumption increases in people feed, specially in poor countries. This plant specie has been native planted probably about two thousand years ago in northern regions of china. Its importance is due to high protein and oil of its seed [11]. Varieties of this plant, was interred Iran for the first one at 1931 and then in 1937 and 1939 interred Iran from eastern Asia and Germany and showed well and high yield in all experiments and now, there are thousands hectares of soybean under planting areas in the country, every year [27]. Soybean under planting area in the world had upward trend from 1991. Among the main soybean producer countries, in 2002, united state with about 41 percent under planting area, globally, is on the first rank, and after that the countries brazil, Argentina, china and India with 18, 11, 10 and 9 percent of global under planting area are placed at the next ranks respectively. Soybean has the third grade of vegetable oil supplying after rape seed and oil palm, so that in 2007, it has allocated about 57.3 percent of total production of world vegetative oil to itself [11]. Weed control cost in soybean farming is the function of planting method and technology promotion of every country. Global average of weed control has been estimated 5 percent of production cost. However, in spite of performing different procedures of control, global soybean damage resulted from weeds was estimated 10 percent. Soybean weed control in Guilan was estimated about 12.5 percent in 1996. Weed damage amount is varied depended on agronomy plant specie, strong seedling at the beginning of

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season, ground covering speed (rate), absorption efficiency of nutritious elements, plant density and plant space [3,13].

MATERIAL AND METHOD

The experiment was carried out in a farm in Chasmeestan, suburbs of Noor province, in agronomy year of 2014. The region was of humid and semi-humid ecologically. In order to investigate soil physical and chemical properties it was taken 4 samples from 0-30 centimeters depth and after breaking clods and preparing, the mixed sample, was undergone laboratory- analyzing. Soil texture was clay-loam and electrical conductance was 3.34 with acidic reaction equal to 7.52. The field has been plowed, then it has been ploughed and weeds and weed roots removed from the soil and plots was prepared in the size of 2.5×3 and after tracing, weedicides were mixed with soil by spraying and firstly 3 days after spray, seeds were planted with 7 centimeters space and row space of 40 centimeters. After 7 days, soybean seeds were planted in the field by linear seeder based on the said condition, after sometimes maintenance operations was started and handy- weeding was carried out before flowering time of crop. Leaf area measuring was performed after maintenance and after that, when the crop matured, it was cut from crown in dimensions of one to one and the following characteristics was investigated: height, 2-seeds number with pod (pod sd2), 3-seeds number with pod (podsd3), total number of pod (pod total), seed number of 2-seed (seed 2), seed number of three-seed (seed 3), total number of seed (seed total), weight of two-seeds with pod (sd2pwight), weight of three-seeds with pod (sd3pwight), pod total weight (podwight), weight of 2-seeds without pod (sd2wight), weight of three-seeds without pod (sd3wight), weight of 5-seeds without pod (sd5wight), weight of 5 pod in a 2-seeds bush (pod2wgh5), weight of 5 pod in a 3-seeds bush (pod3wgh5), main branch pod number (mainbranp), subsidiary branch pod number (subbranp), pod length (podlength), number of subsidiary branch (subbranch), main leaf area (main LA), subsidiary leaf area (sub LA) and weed dry weight (drywight).

RESULTS AND DISCUSSION

Based on analyzing of variation table, treatment time effect on height was non significant, weedicide effect on height, became significant at 1 percent level (95.44), also reciprocal effect of weedicide and treatment time on plant height was significant at 1 percent (92.24). According to the mean comparison table, bentaz4 weedicide had the most effect on plant height (56.7 centimeters), and bentaz2.5 weedicide had the minimum effect on plant height (45.1 centimeters) (Table 2). based on Duncan test, said treatment had the maximum effect on plant height (63.5) and Ben2.5_8b had minimum effect on plant height (37.4 centimeters) (Table 3). studies of board *et al* showed that plant density has no significant effect on height of this plant. Parvez *et al* [21], reported that the height of soybean bush decreased partially with increasing density. Lueschen *et al* [16], concluded that, soybean plant height and maturity didn't affected by density. According to analyzing of variance table time treatment effect on the number of 2-seeds with pod (1497924) and weedicide effect on the number of 2-seeds with pod (59927.9) were significant at 1 percent level, also reciprocal effect of weedicide and treatment time on number of 2-seeds with pod (75485.5) became significant at 1 percent. According to mean comparison table at spraying time, the plant had the most number of 2-seeds with pod (1207.4) in 8-leaf stage and minimum number of 2-seeds with pod (845.1) in 4-leaf stage. Also, b4h3 weedicide caused its maximum effect on the number of 2-seeds with pod (1156.8), and bentaz2.5 caused its minimum effect on number of 2-seeds with pod (78.4) (Table 2). based on Duncan's test, treatment of Hal1.5_8b had the maximum effect on number of 2-seeds with pod (1384.33) and the control treatment had minimum effect on number of 2-seeds with pod (647.33) (Table 3). Esehie [10], expressed in his researches, that increasing density had no significant effect on number of node per plant but the number of pod per plant, seeds per pod and seed weight of each plant were decreased.

According to the analyzing of variance table, treatment of time effect on number of 3-seeds with pod (13458.3), and weedicide effect on number of 3-seeds with pod (6052) became significant at 5 and 1 percent levels respectively. Also, reciprocal effect of weedicide and time treatment on number of 3-seeds with pod at 1 percent level (4092) became significant. According to the mean comparison table at spraying time, the plant had maximum number of 3-seeds with pod (217.5) at 4-leaf stage and minimum number of 3-seeds with pod (183.3) at 4-leaf stage. Also halx3 weedicide had the least effect on number of 3-seeds with pod (16.07) (Table 1). Based on Duncan's test, B2.5h1.5_8b caused its maximum effect on number of 3-seeds with pod (285), and weeding treatment had minimum effect on number of 3-seeds with pod (133.50) (Table 3). Rezaei zad [22] investigated 240 genotypes of soybean and concluded that there is a significant and positive correlation between biologic-yield and traits of seed yield per bush and the number of seeds per bush.

According to the analyzing of variance table, treatment time effect on total number of pod (1685003.6) and weedicide effect on total number of pod (96012.6) became significant at 1 percent level. Also, reciprocal effect of weedicide and time treatment on total number of pod became significant at 1 percent level (102077.7). According to the mean comparison table at spraying time, the plant had maximum number of total pods at 8-leaf stage (1424.2) and had its minimum number of total pods at 4-leaf stage (1040.8) (Table 1). Also, b4h3 weedicide had maximum effect on total number of pod (1420.83), and bentaz2.5 had minimum effect on total

number of pod(968) (Table 2). According to the Duncan's test, Hal1.5-8b treatment caused the most effect on total number of pod(1635.33) and B3h2-4b treatment, caused the minimum effect on total number of plant pod(830). Chettri *et al* [5] investigated 318 elite genotypes of soybean in three years and showed that seed yield has significant positive correlation with number of day from germination to maturity and number of seeds per pod. Duarte and adams [8], through investigating the bean showed that the number of pod per bush, number of seeds per pod and seed weight had considerable direct effect on yield that among these, the number of pod per bush had the most direct effect.

According to the analyzing of variance table, time treatment on the number of 2-seeds (5012139.3) and weedicide effect on the number of 2-seeds (270849.5) became significant at 1 percent level, also reciprocal effect of weedicide and treatment time on number of 2-seeds became significant at 1 percent level (243252.7). According to the mean comparison table in spraying time, the plant had the most number of 2-seeds(2297.9)at 8-leaf stage, and the least number of 2-seeds(1040.8) in 4-leaf stage (Table 1). Also, b4h3 weedicide, had the maximum effect on the number of 2-seeds (2311.83) and bentaz2.5 weedicide had its minimum effect on number of 2- seeds (1513.2).based on Duncan's test, Hal1.5-8b treatment had maximum effect on number of 2-seeds(2602) and the control treatment had minimum effect on number of 2- seeds (1268.3) (Table 3). Mishra *et al* [17], in the study of path analyzing in soybean reported that 100 seed weight, seed number per bush, and pod number per bush caused considerable direct effect on yield.

Based on analyzing of variance table, time treatment effect on number of three -seeds was significant at 5 percent level(163552.2) and weedicide effect on number of three-seeds became significant at 1 percent level(48455.4), Also reciprocal effect of weedicide and treatment time on number of three-seeds became significant at 1 percent level(34416.6). According to the mean comparison table at spraying time, the plant had maximum number of 3-seeds(637.9) in 8- leaf stage and minimum number of 3-seeds (519.1) in 4-leaf stage. Also B4h3 had the most effect on the number of 3-seeds (762.5) and halx3 weedicide had minimum effect on number of 3 -seeds(477) (Table 1). Based on Dancan's test,b2.5h1.5-8b had maximum effect on number of 3-seeds(834.67) and side treatment had the least effect on number of 3-seeds(389). Singh *et al* [26], investigated three genotypes of soybean and concluded that seed yield per bush has positive significant correlation with seed number per pod, weight of 100 seed, and biologic yield. Based on analyzing of variance table, time treatment effect on total number of seed was significant at 1 percent level(7148650) and weedicide effect on total number of seed became significant at 1 percent level(507638).Also reciprocal effect of weedicide and treatment time on total number of seeds was significant at 1 percent level(443617).Based On mean comparison table at spraying time, the plant had the most total number of seed in 8-leaf stage(2935.9) and had the minimum total number of seeds in 4-leaf stage(2152.3). Also b4h3 weedicide had maximum effect on total number of seeds (3074.3) and bentaz2.5 weedicide had minimum effect on total number of seeds (2047.6) (Table 1). Based on Dancan's test, b2.5h1.5_8b treatment had the most effect on total number of seeds(3354.3) and control treatment had minimum effect on total number of seed(1679). Based on analyzing of variance table, treatment time effect on the number of 2-seeds with pod weight was significant at 5 percent level(163040.1)and weedicide effect on the number of 2-seeds weight with pod was significant at 1 percent level,(24964), and reciprocal effect of weedicide and treatment time on the weight of 2-seeds with pod was significant at 1 percent level(13708.7). According to the mean comparison table in spraying time, the plant had the maximum weight of 2-seeds with pod in 8-leaf stage(542.5) and the minimum weight of 2-seeds with pod (424.9grams) in 4-leaf stage. Also,b4h3 weedicide had the most effect on the weight of two-seeds with pod(590.82) and bentaz2.5 weedicide had the least effect on the weight of 2-seeds with pod(390.14 grams) (Table 1). Based on Dancan's test, b2.5h1.5_8b had the maximum effect on the weight of 2-seeds with pod(663.49grams). Dursun [9], in study of bean genotypes reported positive and very significant correlations between pod number per bush,fresh pod weight and seed number per pod, with yield and expressed that fresh pod weight has maximum effect on yield. Based on analyzing of variance table, time treatment effect on weight of three-seeds with pod was non-significant and weedicide effect on weight of three-seeds with pod became significant at 1 percent level (3213.2), also reciprocal effect of weedicide and treatment time on weight of 3-seeds with pod became significant at 1 percent level(1689.3). According to the mean comparison table, b4h3 weedicide had the maximum effect on weight of three-seeds with pod(182 grams) and halx2 weedicide had the minimum effect on the weight of three-seeds with pod(113.7 grams) (Table 2). Based on Duncan's test, B4h3_4b treatment caused maximum effect on the weight of three-seeds with pod(202.139 grams) and side treatment had the least effect on weight of three-seeds with pod(85.555 grams).based on analyzing of variance table, time treatment effect on total weight of pod was significant at 5 percent level(201554.07)and weedicide effect on total weight of pod was significant at 1 percent level(41624.42).

Also reciprocal effect of weedicide and treatment time on total weight of pod was significant at 1 percent level(22724.63).According to the mean comparison table in spraying time, the plant had maximum weight of pod(690.1grams) in 8-leaf stage and had minimum weight of pod (559.8 grams) in 4-leaf stage. Also,b4h3 weedicide had the most effect on total weight of pod(772.8)and bentaz2.5 weedicide caused the least effect on total weight of pod(514.7gram) (Table 2). Based on Dancan's test, the b2.5h1.5_8b caused maximum effect on

total weight of pod(843.42 grams) and side treatment has minimum effect on total weight of pod(384.27 grams) (Table 3). Kazemi *et al* [15], by investigating the yield of two soybean variety, concluded that, in consider with planting date levels, except number of seeds per pod, there were significant difference between other traits such as pod number per bush, seed number per bush, thousand seeds weight and final yield.

Based on analyzing of variance table, the time treatment effect on the weight of 2-seeds without pod was significant at 5 percent level(80541.2) and weedicide effect on the weight of 2-seeds without pod was significant at 1 percent level(1685.3),also reciprocal effect of weedicide and treatment time on the weight of 2-seeds without pod was significant at 1 percent level(9064.5).According to mean comparison table, b4h3 weedicide caused the most effect on weight of 2-seeds without pod(466.2grams)and bentaz2.5 weedicide caused the minimum effect on weight of 2-seeds without pod(308.1grams).Based on Dancan's test b2.5h1.5_8b caused the most effect on weight of 2-seeds without pod(531.29grams)and side treatment had the least effect on weight of 2-seeds without pod (225.01grams) (Table 3). Based on analyzing of variance table,time treatment effect on weight of 3-seeds without pod was non significant and the effect of weedicide on weight of 3- seeds without pod became significant at 1 percent level(2638.4), also reciprocal effect of weedicide and treatment time on weight of 3-seeds without pod became significant at 1 percent level(1358.5). According to the mean comparison table, b4h3 weedicide caused the most effect on weight of 3-seeds without pod(158.82grams)and halx2 had the least effect on weight of 3-seeds without pod(92.43gram).Based on Dancan's test, B4h3_8b treatment had maximum effect on weight of 2-seeds without pod(179 grams)and side treatment had minimum effect on weight of 3-seeds without pod(68 grams) (Table 2). Based on analyzing of variance table, time treatment effect on weight of 5-seeds without pod was non-significant and weedicide effect on weight of 5-seeds without pod was significant at 1 percent level(0.351),also, reciprocal effect of weedicide and time treatment on weight of 5-seeds without pod became significant at 1 percent level(0.419).According to the mean comparison table, b2.5h1.5 weedicide caused maximum effect on weight of 5-seeds without pod(3.895 grams) and bentaz3 weedicide had minimum effect on weight of 5-seeds without pod(3.152).Based on Dancan's test, b2.5h1.5_4b had maximum effect on weight of 5-seeds without pod(4.2 grams)and control treatment had the least effect on weight of 5-seeds without pod (2.7grams) (Table 3). Ikeda (1992),observed that, when planting pattern is square, the maximum pod ,maximum seed weight and consequently highest yield is achieved and if planting pattern go out of square form, the yield decreases.

Based on analyzing of variance table, time treatment effect on weight of 5 pods per 2-seed-bush was significant at 1 percent level(0.154) and weedicide effect on weight of 5 pod per 2-seed-bush was significant at 1 percent level(0.313),also reciprocal effect of weedicide and treatment time on weight of 5 pod per 2- seed bush became significant at 1 percent level(0.469).According to the mean comparison table in spraying time ,the plant had the maximum weight of 5 pods per 2 seed-bush in 4-leaf stage (3.11grams) and had the minimum weight of 5 pods per 2-seed-bush in 8-leaf stage(3 grams) (Table 1). Also, b2.5h1.5 weedicide had the maximum effect on weight of 5 pods per 2-seed-bush(3.506grams)and bentaz4 weedicide had the minimum effect on weight of 5 pod per 2- seed-bush (2.778 grams).Based on Dancan's test, b2.5h1.5_4b treatment caused the maximum effect on weight of 5 pods per 2-seed-bush(3.87 grams) and side treatment had the minimum effect on weight of 5 pods per 2-seed-bush (2.48 gr). Based on analyzing of variance table, time treatment effect on weight of 5 pods per 3-seed-bush was non significant, also reciprocal effect of weedicide and time treatment on weight of 5 pods per 3-seeds bush was significant at 1 percent level(0.434).According to the mean comparison table, b2.5h1.5 had the maximum effect on weight of 5 pod per 3-seed-bush(4.512gr)and bentaz2.5 weedicide had the minimum effect on weight of 5 pods per 3-seed-bush(3.505 grams) (Table 2). Based on Dancan's test, b2.5h1.5_4b treatment had the most effect on weight of 5 pods per 3-seed-bush (4.74 grams) and Ben2.5_4b treatment caused the least effect on weight of 5 pods per 3-seed- bush (3.25 grams). Based on analyzing of variance table,time treatment effect on main branch pod number was significant at 1 percent level(3412.6)and weedicide effect on main branch pod number was significant at 1 percent level(87.6).Also, reciprocal effect of weedicide and time treatment on main branch pod number became significant at 1 percent level(94.4). According to mean comparison table in spraying time ,the plant had the maximum number of pod in 8-leaf stage (53.3) and the minimum main branch pod number in 4-leaf stage(36.7) (Table 1). Also, b2.5h1.5 weedicide caused maximum effect on main branch pod number(52.49 gr) and halx2 weedicide caused minimum effect on main branch pod number (39.55 gr) (Table 2). Based on Dancan's test b2.5h1.5_8b treatment caused maximum effect on main branch pod number(60.6)and control treatment caused minimum effect on main branch pod number(24.3) (Table 4). Danaei[7],by investigating 40 genotypes of soybean, concluded that variation range in single-bush seed yield, 100 seeds weight, subsidiary branch number, pod number per main branch were less than other traits. Based on analyzing of variance table, time treatment effect on subsidiary branch pod number was significant at 5 percent(397.8) and weedicide effect on subsidiary branch pod number became significant at 1 percent level(104.2).Also, reciprocal effect of weedicide and treatment time on subsidiary branch pod number became significant at 1 percent level(338.3).According to the mean comparison table in spraying time, the plant had maximum number of main branch number in 8- leaf stage(33.5) and had the minimum number of main branch number in 4- leaf stage(28.2).Also bentaz2.5 had the maximum effect on

number of subsidiary branch pod (33.9), and b3h2 had the minimum effect on number of subsidiary branch pod(20.38) (Table 2). Based on Duncan's test, Benz4-8b treatment had maximum effect on pod number of subsidiary branch (49.6) and B3h2_8b had the minimum effect on the pod number of subsidiary branch(13.8) (Table 4). Based on analyzing of variance table, time treatment effect on pod length and weedicide effect on pod length became non significant, also, reciprocal effect of weedicide and time treatment on pod length became significant at 5 percent level(0.171).Hashemi jazi [12]reported decreasing of pod in subsidiary branch by delay in planting. Ombakho *et al*(1971), in study of cowpea yield, concluded that, seed number per pod has positive significant correlation with pod length and 100 seeds weight. Mishra *et al*[18], on study of mung bean yield, concluded that pod number per bush, pod length, plant height and 50% number of flowering day, had considerable role in harvest index amount and plant height , pod length and number of subsidiary branch had the main and important role in biologic yield. Based on analyzing of variance table, treatment time effect on number of subsidiary branch was non-significant and weedicide effect on number of subsidiary branch was significant at 1 percent level(7.39). Also, reciprocal effect of weedicide and treatment time on subsidiary branch number of plant became significant at 1 percent level(7.6).According to the mean comparison table , bentaz4 weedicide had maximum effect on subsidiary branch number of plant(6.1) and halx3 had the minimum effect on subsidiary branch number of plant(2.33).Based on Duncan's test, Benz4_4b had the most effect on number of subsidiary branch(9.23)and side treatment had the least effect on number of subsidiary branch(1.49) (Table 4). Bhandarkar [2], studied 16 genotypes of soybean, and reported high genetic coefficient of variation for plant height, yield and number of subsidiary branches. Zeinali and Sohani(1999), in an experiment on 14 varieties of soybean reported that, number of subsidiary branches with 36.9 percent has the maximum genetic coefficient of variation between different characteristic and phenotype coefficient of variation of this trait is 42.5. Based on analyzing of variance, treatment time effect on main leaf area was non significant and weedicide effect on main leaf area became significant at 1 percent level(424.1),also reciprocal effect of weedicide and treatment time on main leaf area became non significant. According to the mean comparison table b2.5h1.5 weedicide had maximum effect on plant main leaf area (139.88) and halx1.5 weedicide had minimum effect on plant main leaf area(116.54) (Table 2). Based on Duncan's test B1.5_8b treatment had the most effect on the main leaf area(148.3)and weeding treatment had the least effect on the main leaf area(95.3) (Table 4). Sadeghi *et al*(2002),reported that leaf area index is one key factors in weed management via increasing crop competition ability. Based on analyzing of variance table, time treatment effect on subsidiary leaf area was non-significant and weedicide effect on subsidiary leaf area was significant at 1 percent(52.4), also, reciprocal effect of weedicide and treatment time on subsidiary leaf area of plant became significant at 1 percent level(60.5).According to the mean comparison table, bentaz3 weedicide had the maximum effect on plant subsidiary leaf area(53) and halx3 had the minimum effect on plant subsidiary leaf area(43.2) (Table 2).Based on Duncan's test, Benz3_4b treatment had the maximum effect on subsidiary leaf area(55.6)and weeding treatment had the least effect on plant subsidiary leaf area(33.4) (Table 2). Saber ali *et al* [23] showed that with increasing leaf area in maize, common(*Chenopodium album*)weed suppression potential is increased by this plant. Research of Dianat *et al* [7], is verifying the results of Baghestani *et al* [2] and these research too. Based on analyzing of variance table, time treatment effect on weed dry weight was non-significant and weedicide effect on weed dry weight became significant at 1 percent level (14419), also reciprocal effect of weedicide and treatment time on weed dry weight became significant at 1 percent level(3139.1).According to the mean comparison table, halx1.5 weedicide caused the most effect on weed dry weight (397.5)and b4h3 weedicide had the minimum effect on weed dry weight(249.17gr) (Table 2). According to Duncan's test, control treatment caused the maximum effect on weed dry weight (674)and side treatment caused the minimum effect on weed dry weight(22.5 gr).Baghestani *et al* [1], showed that , different varieties of wheat has different competition ability against both wild-oat(*Avena ludoviciana*) either Field melilot weeds. Mousavi[19] reported that with10 centimeters increasing in water depth of paddy, Pigweed(*Echinochloa crusgalli*) seed germination is decreased about 90 percent and accordingly, weed density and dry weight is decreased too. Generally, with investigating reciprocal effect table for different traits, it could be observed that b4h3 treatment was one of the best choices to control soybean weeds, because firstly, it shows the best amount in almost all of the traits and secondly, there is not observed difference between its effect on 4-leaf stage and 8-leaf stage. Against that, there is hal1.5 treatment that its effect is very well at 8-leaf stage and its effect on 4-leaf stage isn't good.

Table 1: Mean comparison table of studied traits in two different treatment of spraying time (05/0 = α).

trait	Growth stage at spraying time	
	8-leaf	4-leaf
Podsd2	1207.4a	845.1b
Podsd3	217.5a	183.3b
podtotal	1424.2a	1040.8b
Seed2	2297.9a	1641.2
Seed3	637.9a	519.1b
seedtotal	2935.9a	2152.3b

Sd2pwight	542.5a	424.9b
podwight	690.1a	559.8b
Sd5wight	433.2a	347.9b
Pod2wgh5	3b	3.11a
mainbrap	53.3a	36.7b
subbrap	33.5a	28.2b

Table 2: Mean comparison table of different weedicide treatment from the viewpoint of measured traits.

Wediside treatment	B2.5h1.5	B3h2	B4h3	Bentaz2.5	Bentaz3	Bentaz4	Halx1.5	Halx2	Halx3
Height	52.9ab	55.7a	54.7a	45.1b	47.5ab	56.7a	54ab	54.6a	50.1ab
Podsd2	1090.6ab	921.5c	1156.8a	788.4d	1082.3ab	1019.5bc	1086.5ab	1031.3abc	971.5bc
Podsd3	227.3b	170.1d	264a	179.6cd	208.5bc	202bc	201.6bc	170.3d	160.7d
Podtotal	1318ab	1091.67e	1420.83a	968e	1290.83abc	1275.17abc	1285.17abc	1201.67bc	1132.25cd
Seed2	2081.33ab	1747.17bc	2311.83a	1513.2c	2070.17ab	1983.67b	2057.67ab	1910.5b	1895.25b
Seed3	651.17b	501.5cd	762.5a	534.4cd	610.33bc	549.17bcd	584.5bcd	485.17d	477d
Seedtotal	2732.5b	2248.7cd	3074.3a	2047.6d	2680.5b	2532.8bc	2642.2b	2361bcd	2372bcd
Sd2pwight	560.84ab	402.75de	590.82a	390.14e	515.08bc	466.84cde	478.25cd	448.09cde	471.66cde
Sd3pwight	157.7b	115.7d	182a	124.5cd	159.9b	133.4cd	142.7bc	113.7d	120.2d
Podwight	710.2ab	518.5d	772.8a	514.7d	668.5bc	625.1bcd	612bcd	570.7cd	591.9cd
Sd2wight	447a	319.9c	466.2a	308.1c	413ab	412.8ab	405.2ab	357.3bc	351.2bc
Sd3wight	122.94b	94.05c	158.82a	99.05bc	123.61b	98.71bc	112.45bc	92.43c	104.87bc
Sd5wight	3.895a	3.382ab	3.81ab	3.326ab	3.152b	3.571ab	3.599ab	3.306ab	3.3ab
Pod2wgh5	3.506a	3.089bc	3.314ab	3.024bc	2.978bc	2.778c	2.994bc	2.84bc	2.91bc
Pod3wgh5	4.512a	4.089abc	4.361ab	3.505d	3.64cd	4.3ab	3.819bcd	4.032abcd	4.206ab
Mainbrap	52.49a	46.16ab	42.05ab	41.46b	42.6ab	44.77ab	47.6ab	39.55b	47.83ab
Subbrap	32.6a	20.38b	31.32ab	34.39a	30.66ab	33.44a	33.49a	29.21ab	33.33a
Subbranch	3.55b	2.49b	3.33b	2.86b	3.72b	6.1a	2.82b	2.94b	2.33b
MainIA	139.88a	133.22ab	134.67ab	117.6b	128.54ab	122.02ab	116.54b	121.19ab	117.16b
SubIA	52.6ab	47.4ab	49.8ab	44.2ab	53a	51.4ab	50.4ab	49.3ab	43.2b
Drywight	281.67cd	274.17cd	249.17d	308cd	301.67cd	264.17d	397.5a	335.83bc	372.5ab

Table 3: Mean comparison table of different treatment and control treatment for measured traits(based on multi sided Duncan's).

treatment	Height	Podsd2	Podsd3	Podtotal	Seed2	Seed3	Seedtotal	Sd2pwight	Sd3pwight	Podwight	Sd2wight
B2.5h1.5_4b	53.1abc	869.00ef	169.67c-g	1038.67ef	1643.0de	467.67cd	2110.7a	458.19c-f	118.811d-g	577.00c-h	362.84d-g
B2.5h1.5_8b	52.8abc	1312.33ab	285.00a	1597.33ab	2519.7ab	834.67a	3354.3d	663.49a	196.598a	843.42a	531.29a
B3h2_4b	48.6a-d	678.33fg	151.67d-g	830.00f	1349.3e	438.33cd	1787.7b	315.04g	111.150d-g	426.19hi	263.64hi
B3h2_8b	62.9ab	1164.67bc	188.67c-g	1353.33bcd	2145.0abc	564.67bcd	2709.7b	490.46b-e	120.345d-g	610.81c-g	376.32d-g
B4h3_4b	50.5a-d	1191.00bc	281.33a	1472.33abc	2302.7abc	798.00a	3100.7ab	611.46a	202.139a	813.60ab	478.99abc
B4h3_8b	59.0abc	1122.67cd	246.67ab	1369.33bcd	2321.0abc	727.00ab	3048.0ab	570.18abc	162.010bc	732.19abc	453.49a-d
Ben2.5_4b	50.3a-d	767.33fg	192.33c-f	959.67ef	1518.3de	573.00bcd	2091.3cd	398.28efg	132.898c-f	531.17d-i	316.28f-i
Ben2.5_8b	37.4d	820.00fg	160.50c-g	980.50ef	1505.5de	476.50cd	1982.0d	377.94efg	112.052d-g	489.99f-i	296.04ghi
Benz3_4b	50.3a-d	974.33de	204.67bc	1179.00de	1931.3cd	610.00bc	2541.3bc	507.09b-e	149.656bcd	657.08b-f	406.85b-f
Benz3_8b	44.7cd	1190.33bc	212.33bc	1402.67a-d	2209.0abc	610.67bc	2819.7ab	523.08bcd	170.289b	680.01a-e	419.30b-e
Benz4_4b	54.2abc	776.67fg	197.00b-e	1081.00ef	1540.7de	490.33cd	2031.0d	379.82efg	130.670c-f	560.16c-i	382.00c-g
Benz4_8b	59.2abc	1262.33abc	207.00bc	1469.33abc	2426.7ab	608.00bc	3034.7ab	553.85abc	136.313b-f	690.13a-e	443.76a-d
Check	47.6bcd	647.33g	196.00b-e	843.33f	1268.3e	574.33bcd	1679.0d	286.34g	145.437b-e	431.77hi	235.60hi
Hall1.5_4b	53.5abc	788.67fg	146.33efg	935.00f	1513.3de	430.00cd	1943.3d	407.02d-f	121.060d-g	510.08e-i	325.89e-h
Hall1.5_8b	54.5abc	1384.33a	257.00a	1635.33a	2602.0a	739.00ab	3341.0a	594.48abc	164.447bc	713.93a-d	484.69ab
Halk2_4b	57.4abc	752.67fg	156.00c-g	908.67f	1431.7e	422.22cd	1784.3d	346.47fg	99.630fg	446.10ghi	267.36hi
Halk2_8b	51.8a-d	1310.00ab	184.67c-g	1494.67abc	2389.3abc	548.33bcd	2937.7ab	549.71abc	127.892c-f	695.32a-d	447.41a-d
Halk3-4b	48.5a-d	790.50fg	134.50g	925.00f	1490.5de	404.50d	1895.0d	389.56efg	106.631efg	496.19f-i	317.67f-i
Halk3_8b	51.8a-d	1152.50bc	187.00c-g	1339.50cd	2300.0abc	549.50bcd	2849.5ad	553.76abc	133.873c-f	687.63a-e	384.84c-g
Kenari	63.5a	725.50fg	138.00fg	863.50f	1308.0e	389.00d	1697.0d	298.72g	85.555g	384.27i	225.01i
Vejin	51.2a-d	1096.00cd	133.50g	1365.00bcd	2063.5bc	397.00d	2690.0b	543.13abc	122.888d-g	666.02a-f	453.81a-d

Table 4: Mean comparison table of different treatment and control treatment for measured traits. Based on multi side Duncan's test.

Treatments	Sd3wight	Sd5wight	Pod2wgh5	Pod3wgh5	Mainbrap	Subbrap	Subbranch	MainIA	SubIA	Drywight
B2.5h1.5_4b	95.6def	4.2a	3.87a	4.74a	44.3b-f	27.4b-e	3.22bc	131.3abc	51.9ab	288.3cde
B2.5h1.5_8b	150.2b	3.4abc	3.14bcd	4.27a-d	60.6a	37.7abc	3.88bc	148.3a	53.3ab	275.00cde
B3h2_4b	87.4def	3.8abc	3.42bc	4.60ab	39.3c-h	26.8b-e	2.77bc	133.0abc	41.7abc	290.0cde
B3h2_8b	100.6c-f	2.8bc	2.74cd	3.57bcd	52.9abc	13.8e	2.22bc	133.4abc	53.0ab	258.3de
B4h3-4b	179.0a	4.0ab	3.77ab	4.70a	37.4c-h	34.3a-d	3.66bc	146.2a	48.2ab	256.6de
B4h3_8b	138.6bc	3.5abc	2.85cd	4.01a-d	46.6a-d	28.3b-e	3.00bc	123.1abc	51.4ab	241.6de
Ben2.5_4b	105.4c-f	3.0bc	2.88cd	3.25d	37.3c-h	39.3abc	3.33bc	116.2abc	41.3abc	325.0cde
Ben2.5_8b	89.3def	3.6abc	3.23bcd	3.88a-d	47.6a-d	26.9b-e	2.16bc	119.6abc	48.5ab	282.5cde
Benz3_4b	122.1b-e	3.2abc	2.81cd	3.56bcd	40.0c-g	31.0b-e	5.00b	119.6abc	55.6a	310.0cde
Benz3_8b	125.0bcd	3.0bc	3.14bcd	3.71a-d	45.2b-e	30.3b-e	2.44bc	137.4ab	50.3ab	293.3cde
Benz4_4b	91.7def	3.5abc	2.67cd	4.48abc	29.2fgh	17.2de	9.33a	129.3abc	49.2ab	258.3de
Benz4_8b	105.7c-f	3.5abc	2.88cd	4.11a-d	60.3a	49.6a	2.88bc	114.6abc	53.7ab	270.0cde
Check	102.6c-f	2.7c	2.72cd	3.90a-d	24.3h	25.7b-e	2.88bc	97.5bc	39.3bc	674.0a
Hall1.5_4b	87.1def	3.4abc	2.95cd	3.72a-d	35.2d-h	32.4a-e	2.99bc	11.0abc	50.8ab	351.6bcd

Hal1_5_8b	137.8bc	3.7abc	3.02cd	3.91a-d	60.0a	34.5a-d	2.66bc	121.9abc	50.0ab	443.3b
Halx2_4b	82.0ef	3.1bc	2.50d	3.82a-d	30.7e-h	21.6cde	2.66bc	120.6abc	53.8ab	365.0bcd
Halx2_8b	102.7c-f	3.4abc	3.17bcd	4.24a-d	48.3a-d	36.7a-d	3.22bc	121.7abc	44.8abc	306.6cde
Halx3_4b	85.6def	3.4abc	3.05cd	4.44abc	37.3c-h	21.8cde	1.83bc	115.8abc	40.1abc	355.0bcd
Halx3_8b	124.0b-e	3.1abc	2.76cd	3.96a-d	58.3ab	44.8ab	2.83bc	118.4abc	46.4abc	390.0bc
Kenari	68.0f	3.2abc	2.48d	3.46cd	25.6gh	23.3cde	1.49c	101.4bc	47.2ab	222.5e
Vejin	102.3c	3.5abc	3.05cd	4.19a-d	24.1b-f	25.4b-e	2.16bc	95.3c	33.4c	455.0b

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