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# Study of effects of different herbicide toxins on the numbers of main stalk, secondary branches, and days till formation of pods of different cultivars of fall chick – peas in the region of Eslam abad- E- gharb

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**Abstract:** In order to study effects of different herbicide toxins on the numbers of main stalk, secondary branches, and days till formation of pods in various fall pea cultivars, a research is done in the form of split plot design based on complete random blokes with 3 repeats. Major factor includes 3 cultivars Arman, Azad, and Hashem ; and minor factor includes any type of toxins and their mixtures including herbicides pyridite , bentazone, imaztapyr, metrybiozin, cyiavazine, fomasaphen, mixture of pyridite and fomasaphen, mixture of bentazone and cyianazine , mixture of imaztapyr and metrybiozin, and manual weeding. In present study, results of variance analysis indicated that cultivar factor had no statistically significant effects on the numbers of main stalk and secondary branches. Results also showed a significant difference (at 1% level) among levels of used berbicide toxins for traits of the numbers of main stalk and secondary branches. In addition, results demonstrated that cultivars had no statistically significant effects on days till formation of pods. Results of variance analysis showed a significant difference (at 1% level) in levels of herbicide toxins and cultivar x toxin interaction for days till formation of pods.

**Key words:** *Herbicides; Cultivars; Numbers of main stalk; Secondary branches; Days till formation of pods*

## 1. Introduction

Presence of weeds is one of problems pea faces, especially under dry farming conditions. Pea is not a competitive plant, being sharply defeated by weeds. Pea sprouts more slowly than weeds do, with its growth being faster at early germination stage, therefore pea is a weak competitor for weeds and its canopy does not cover soil surface completely until a long time after planting. At this stage, fast growth of weeds' shoots and roots, if not controlled, defeats the crop easily. According to studies performed, weed – induced reduction of yields of pea fields are 40%-87%, 42%, and 23% - 52% in India, Russia, and west of Asia, respectively (Rastegaar, 1996) Because of being costly and time consuming , manual weeding is not cost-effective and under such conditions, making use of various farming machinery results in a decrease in soil moisture storage. For each unit of produced dry matter, weeds absorb and evaporate more moisture compared to crops accompanying them. In this direction, it seems that application of herbicides is the easiest and cheapest method. But applying this method at different growth stags brings about environmental pollution and threats consumers' health (Seyedsharifi et al, 2007). For this crop, research shows that application of only one herbicide to control, frequent use of chemicals and / or integration of chemical methods with mechanical ones are needed. As a self-propelled plant, weed grows unwontedly in the fields and gardens, being a uninvited guest for major crop and lowering quantity and quality, hence economic importance of crops sharply and rising production costs while interfering with farming operations. Term weed is used. Against those categories of plants being cultivated by farmers (Rastegaar, 1996). Iterbicides are chemical used to remove weed. Millions liter of herbicides are used on the fields and gardens annually. In general, herbicides are divided into 2 groups: general herbicides and selective herbcides, the former of which hare compounds used to remove all plants and destroy whatever being growing such as Randap Gramaxon and the latter of which are compounds that if be used at recommended concentration, they have no undesirable effects on crops or on main plants such as Aphalon, 2-4-D, Sianazin, etc. Herbicides, whether general or selective, are used in 2 ways: one on the shoot and the other inside the soil (Rastegaar, 1996).Having 18% -23% protein, Legume seeds play an important role in supplying protein substances needed by human beings. In recent years, global pea production has been 7-9 million tons (Allaahdaadi et al., 2007).

Pea has a high level of digestible protein and is phosphorus – and calcium-rich compared to other legume. In places where grains constitute main food, consumption of legume including pea increases value of meals with grains (Goldaani et al., 2007). Because of having various uses and diverse utilization and of the ability to develop in low-input farming regimes under soil non-friendly conditions and in dry environments, this plant has become an

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important part of farming regimes of subsistence agriculture. Also, sue to the role it plays in soil fertility, pea is considered an important factor stabilizing grains production within dry regions and dry lands of developing countries while having a special status in alternate cropping (Goldani and Rezvani Moghaddam, 2005). Legumes are an important group of plants fixing nitrogen, playing a significant role in improvement of efficiency of nitrogen fixation and of seed yields (Ahamd Khan, 2011).

## 2. Materials and methods

Present research was done on a field in the suburb of Eslamabad-e Gharb country located at 47° 26′ eastern longitude and 34° 8′ northern latitude, with a 1346-m altitude from sea level, having moderate cold climate. Its average rainfall is 538 mm annually.

Following results were obtained by performing soil analysis operations on random soil samples taken from a 0-125-cm depth of test field soil at agrology lab of soil & water Research Division of Kermanshah Agriculture Research Center. Soil of target region with 11.4% sand, 58% silt, and 35.5% clay has a silty – clay – loam texture. This project was implemented in the form of split plot design based on complete random blocks with 3 repeats; Major factor includes 3 cultivars Arman, Azad, and Hashem; and minor factor includes any type of toxins and their mixtures including herbicides pyridite, bentazone, imaztapyr, metrybiozin, cyianazine, fomasaphen, mixture of pyridite and fomasaphen, mixture of bentazone and cyianazine , mixture of imaztapyr and metrybiozin , and manual weeding. Following operations of bedding and planting, in order to measure and examine studied traits, samples are taken from a 5.0 × 5.0 $m^2$ frame at different times during crop management stage. Variance analysis was performed on data obtained using statistica l C-MSTAT software and means of studied truits were compared by using LDS test at levels of 5% and 1%. Operations of preparation and cultivation were done according to local custom. Operations of cultivation were done with pneumatic machine on intervals and rows 50cm wide and 80 kg seeds ha, which were disinfected by dungicide toxin ManKozab. In order to control Aggrotis and ltetiotis, toxin Swine (3kg/ha) was used in spring. Dimensions of each test plot were set at 10×5 m. During management stage, samples were taken at specified times to measure some traits studied by using 5% × 5% frame and biological yield as well as harvest index were measured.

## 3. Results and discussion

### 3.1. The numbers of main stalk and secondary branches

In this study, variance analysis testlts showed that cultivars had no statistically significant effects on the numbers of main stalk and secondary branches. So, it can be said that cultivars tested for production of stalks and secondary branches under climatic conditions in Eslam abade Gharb show identical responses, therefore if these cultivars are not different in terms of the numbers of pods per plant and grains per plant, additional branches will have no effects on the yield. The highest number of stalks per plant (2.8) belonged to cv. Arman. Number of branches produced can be indicative of a cultivar's genetic potential for yields. In the absence of weed competition (to control by mechanical and chemical factors) and density observance, plants can help to improve yield in unit area by producing more stalks.

Also, there is a significant difference (at level of 1% ) amony levels of utilized herbicide toxins in terms of the numbers of main stalk and secondary branches, indicating that stalks and secondary branches vary under environmental factors and field conditions ( utilization of herbicide toxins).

Such variation is typically caused by the most number of stalks (3.8) with usage of herbicide pyridite and the least number of stalks (2.1) with utilization of combined herbicides.

Imaztapyr + Metry biosione, controlling weed by using chemical herbicide toxins avoids wasting nutrients and losing moisture. In parallel to increased density of weed in the field and decreased moisture and nutrients in the soil, some disturbance occurs to photosynthetic processes. As a result, soil moisture stress reduces production of photosynthetic matters to be transferred to growing parts of plants and, ultimately, in ability of plants to have access to genetic potential for vegetative traits such as the numbers of stalks and secondary branches results in their imperfect growth, hence economic yield decreases.

Maximum number of stalks (3.8) was obtained by controlling weed with herbicide pyridite.

This difference is usually caused by maximum (4.3) and minimum (2) the numbers of main stalk observed with cv. Arman for herbicide pyridite and cv. Hashem for mixed herbicides Imaztapyr + Metrybiosine treatments ,respectively .

As well as cv. Azad treatment with manual weeding. Comparison of interaction means by Duncken's method indicated that maximum number of stalks was obtained with cv. Arman at 4.3 and 3.7 under action of herbicides pyridite and bentazone, respectively.

### 3.2. Days till formation of pods

In present study, cultivars had no statistically significant effects on days till podding, however, the highest (67.1. d) and lowest (65.4 d) numbers of days till pudding were seen with cvs. Arman and Hashem, respectedly.

Variance analysis results indicated that difference among levels of used herbicide toxins was significant

at level of 1% for trait of days till formation of pods, indicating environmental changes (controlling weed)

Caused by herbicide toxins, therefore, it can be stated that days till chickpeas podding vary under action of herbicide treatments.

Crops seem to complete their phonological stages sooner due to competing with weed moisture and nutrients shortages and this is why they complete their germinative phases earlier in order to avoid moisture stress on the fields with no weed control. By looking at the table of means comparison, it is observed, for reasons mentioned, that control treatment (no weed control) completed its days till the end of podding earlier than other treatments did, Maximum (69.1 d /ha) and minimum (62.1 d /ha) numbers of days till formation of pods were observed with treatment of weed control by mixed imaztapyr and Metry biosine, and with control treatment without weed control, respectively.

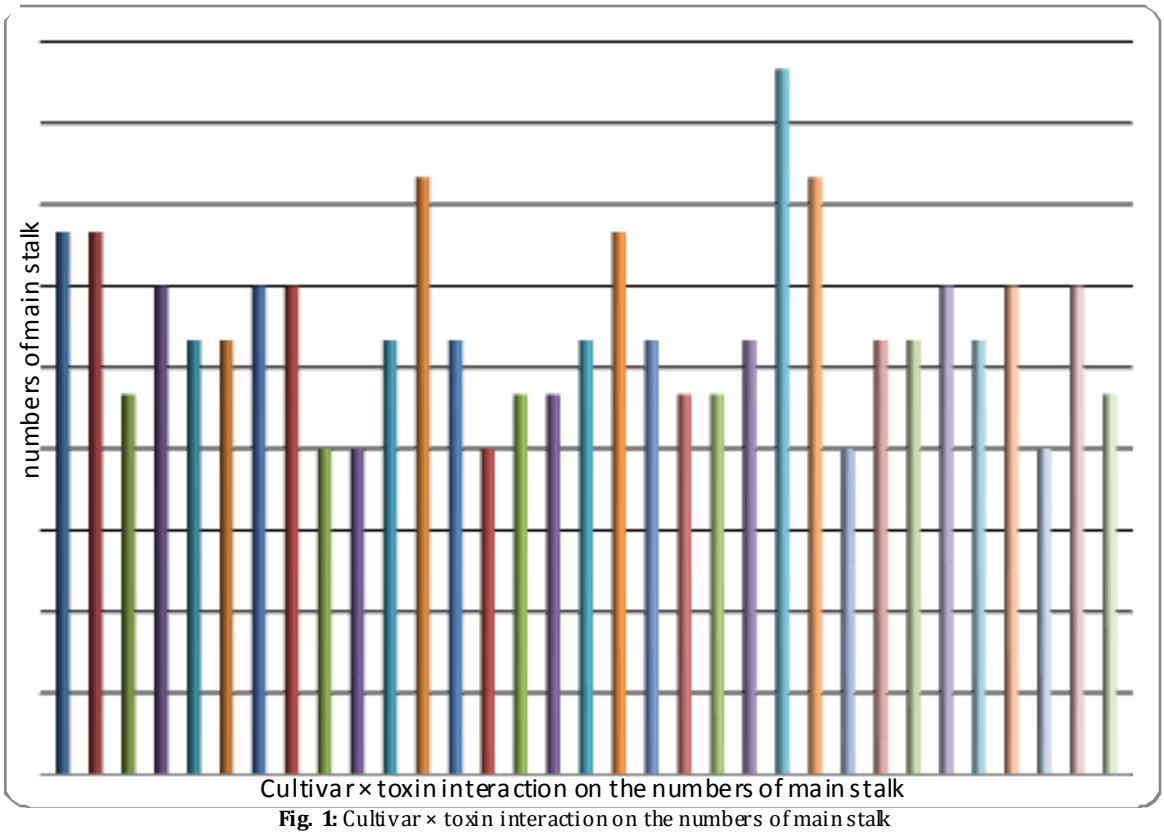


**Fig. 1:** Cultivar × toxin interaction on the numbers of main stalk

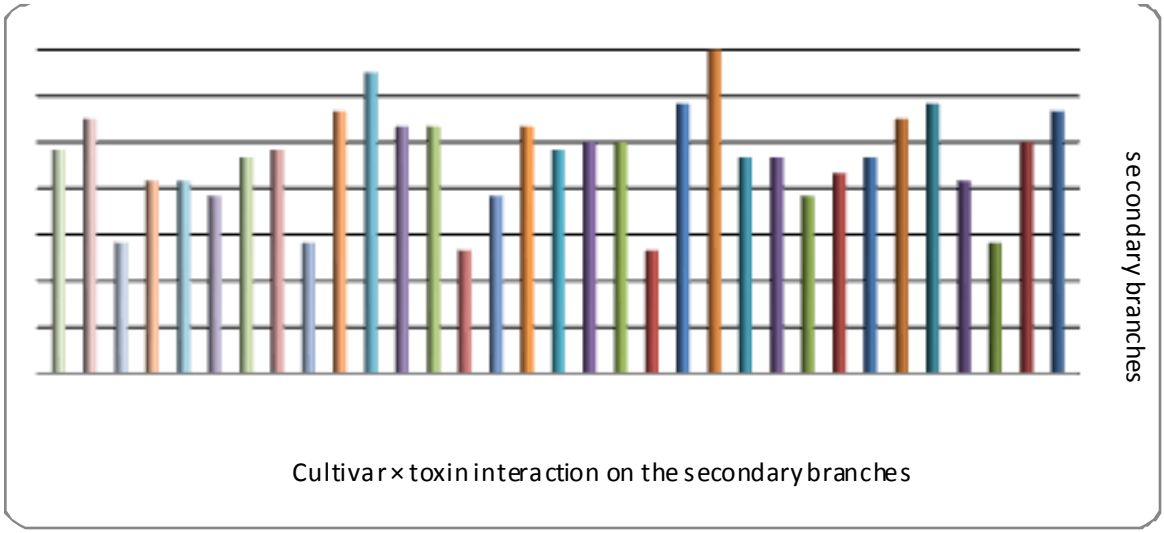


**Fig. 2:** Cultivar × toxin interaction on the secondary branches

Results of variance analysis showed that cultivar x toxin interaction on days till formation of pods was significant at level of 1% so, it can be said that utilization of different herbicide toxins to control

weed leaves different responses to days till formation of pods in different cultivars, that is, each of herbicide toxin treatments (controlling weed) has different effects on the rate of weed control. Comparison of interaction means by duncken's method indicated that the highest (72 d) and lowest (60d) numbers of days till formation of pods belonged to cv. Azad in herbicide Imaztapyr treatment and no weed control treatment, respectedly. Intensive competition between crops and weed as well as absence of water and minerals in the soil are some reasons why vegetative growth stages such as days till flowering and days till formation of pods are shortened. Therefore, in vegetative stage, development of foliage and leaf area decrease which, finally, result in reduction of photosynthetizing area of plants. With decreased production of photosynthetic matters, duration of germinative period is shortened resulting in reduced number of days till formation of pods. In chick peas farming biological and economic yields are extremely reduced under impacts of the time of weed control. In early growth stages, soil moisture is drained due to dense weed, as a result of which plants grow less because of competing with weed, so leaves and leaf area develop in sufficiently. With a decrease in photosynthesis, carbo hydrates production and plant metabolism is reduced and plant power to flower mitiation and flower induction drops as well. Thus, in order to obtain high yields, control of weed must begin before it grows quickly. It seems that availability of sufficient moisture to early growth stages causes foliage to be produced properly, increasing crops' potential for production of flowers and pods, At the time of floral initiation and development, lack of moisture and nutrients (no weed control) leads to a decrease in the number of flowers and pods, in the grain – setting and, finally, in grain yields.

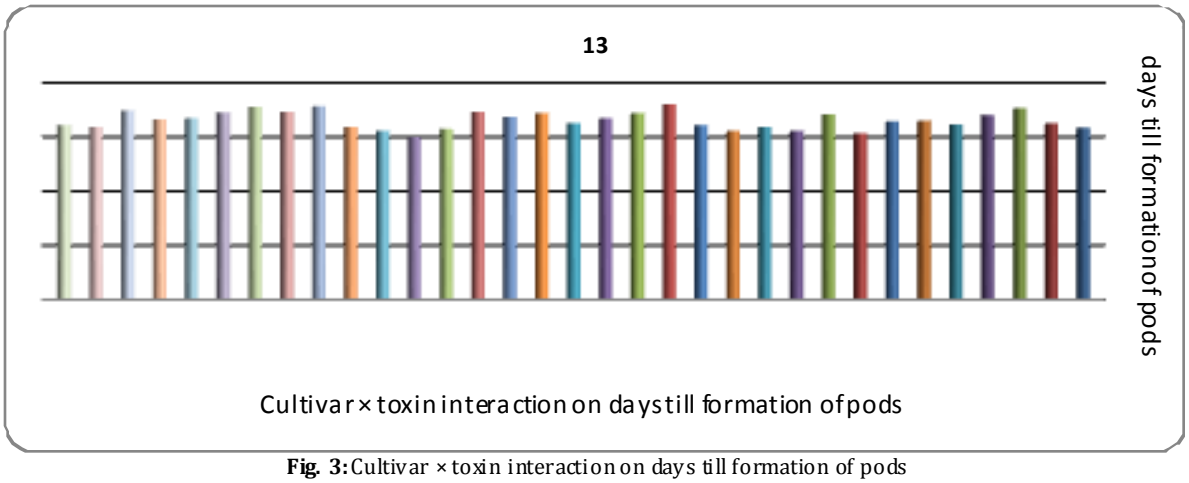


**Fig. 3:** Cultivar × toxin interaction on days till formation of pods

## 4. Conclusion

In this study, variance analysis testIts showed that cultivars had no statistically significant effects on the numbers of main stalk and secondary branches. In present study, cultivars had no statistically significant effects on days till podding, however, the highest (67.1. d) and lowest (65.4 d) numbers of days til podding were seen with cvs. Arman and Hashem, respectedly.

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