

Evaluation of the effect of integrated weed management on quantitative and qualitative characteristics of corn, weed density and biomass under Dehloran climatic condition

B. Zarrin Kaviani¹ , E. Zeidali^{2*}, R. Moradi³, K. Zarrin Kaviani⁴

1. MSc Student, Department of Agronomy, Faculty of Agriculture, Ilam University, Ilam, Iran .
2. Assistant Professor, Department of Agronomy, Faculty of Agriculture, Ilam University, Ilam, Iran. (Corresponding author)
3. Assistant Professor, Department of Plant Productions, Agricultural Faculty of Bardsir, Shahid Bahonar University of Kerman, Kerman, Iran
4. Assistant Professor, Department of Animal Science, Faculty of Agriculture, Ilam University, Ilam, Iran

Received: April 2018 Accepted: February 2019 - DOI: 10.22092/aj.2019.121327.1272

Extended Abstract

Zarrin Kaviani, B., Zeidali, E., Moradi, R., Zarrin Kaviani, K., Evaluation of the effect of integrated weed management on quantitative and qualitative characteristics of corn, weed density and biomass under Dehloran climatic condition
Applied Research in Field Crops Vol 31, No. 4, 2019 19-21: 129-150(in Persian)

Introduction:

Crop damage caused by weeds is more than crop failure due to pests and diseases. As a consequence, half or more of farmers` efforts is directed towards weed control (Rashed-Mohassel *et al.*, 2001). Weeds inflict damage to crops through competition for light, water and nutrients, as well as via exerting allelopathic effects, leading to crop loss and decreased yield quality and quantity, which, in turn, results in losses among farmers (Zand *et al.*, 2002). Weed control is of significant importance in corn production, particularly, during the early stages of corn growth when weeds can naturally outcompete young corn stands. Increasing crop density can be used as an effective factor to enhance availability of resources for crops in competition with weeds. With increased corn density, growth and seed production ability of weeds are diminished in the production system (Bayat *et al.*, 2009). Application of chemical herbicides is a major way to curb weeds in crop production systems. However, excessive use of herbicides can pollute environment and contaminate underground water and put the health of humans and animals in jeopardy. Hence, integrated management of weeds is considered to be an important approach in terms of reducing consumption of chemical herbicides. The present study was conducted to evaluate the role of integrated weed management practices in the

Email address of the corresponding author: e.zeidali@ilam.ac.ir

control of weeds in the corn field as well as its effects on corn yield performance.

Materials and Methods:

Integrated weed management in corn (Cordona variety) was studied in an experiment conducted in 2016-2017 growing season in Dehloran region, Ilam province, Iran. The experiment was performed in split-split plots based on a randomized complete block design with three replications. The main plot was tillage systems with two levels (tillage (cultivator) and no-tillage), corn density at three levels (65, 75 and 85 thousand plants per hectare) assigned to sub plots, and two herbicide applications (herbicide and no- herbicide) in sub-sub plots. Frequency and density of weeds, dry weight grain yield, biological yield, harvest index, 100 seed weight, grain number per ear, protein percent, fiber and ash were measured. The data from the experiment were analyzed using SAS ver. 9.4 and all the figures were drawn by Excel. Means were compared by LDS test at 5 % probability level and interaction effects between traits were sliced.

Results and Discussion:

Small-flowered nutsedge (5.2 plants m⁻²), ground cherry (4.4 plants m⁻²), and redroot pigweed (6.8 plants m⁻²) were found to be dominant weed species in the field. Increasing the corn density from 65 to 85 thousand plants m⁻² led to a reduction of 102% and 129% in weed density and biomass, respectively. The results showed that weed density and biomass were decreased by inter-row tillage system. The highest grain yield (5720 kg ha⁻¹) was associated with the highest maize density + herbicide + tillage treatments. Inter-row tillage increased biological yield of maize by 17% as compared to non-tillage. The highest protein content of grain (9.78%) was obtained at 75000 plants m⁻² density using herbicide. Fiber and ash percentage were higher at higher densities with the application of tillage and herbicide. The greatest harvest index (52.88 %) was achieved with no tillage treatment, 65000 plants m⁻² density and herbicide application. The lowest harvest index was related to tillage treatment, 85000 plants m⁻² density and no herbicide application. The highest corn grain fiber content was recorded from tillage treatment and herbicide use when sowing density was 85000 plants m⁻², which did not show any significant difference with sowing densities of 65000 and 75000 plants m⁻².

Conclusion:

Our results showed that increase in planting density of corn reduced the number and dry weight of weeds. This could be a suitable strategy as an alternative to the excessive use of chemical herbicides, which causes a lot of environmental issues. Also, it was observed that tillage practices resulted in reduced density and dry weight of weeds. Therefore, inter-row tillage could be used to keep the weed population at the lowest level throughout the growing season.

Keywords: Ash, Herbicide, inter-row tillage, plant density, protein

References

- Bayat, M.L, Nasiri Mahalati, M., Rezvani Moghadam, P., and Rashed-Mohassel, M.H. 2009. Effect of crop density and reduced doses of 2,4-D + MCPA on control of redroot pigweed (*Amaranthus retroflexus* L.) in corn (*Zea mays* L.). *Journal of Iranian Agronomy Research*. 7(10): 11-22. (In Persian with English Summery).
- Rashed Mohassel, M.H., Najafi, H., and Akbarzadeh, M. 2001. Biology and weed control. Mashhad Ferdowsi University Press.350pp. (In Persian).
- Zand, E., Baghestani, M.A., Bitarafan, M., Shimi, P., and Faghieh, A. 2002. Analysis of herbicide management in Iran. Inc., Department of Weed Research, Plant Protection Research Institute, Tehran. (In Persian with English Summery)