Regression analysis and orthogonal comparisons for determination of critical period for weeds control in sunflowers (*Helianthus annuus*) fields

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Abstract

Decrease of chemical herbicide application is one of the major objectives of organic farming systems. In order to determine critical period for weeds control in sunflowers fields, an experiment was conducted in field of Islamic Azad University, Tabriz Branch, Iran, during 2007. In this study, a randomized complete block design with three replications was carried out. The treatments were weed-infested and weed-free of 0, 2, 4, 6, 8, 10 and 12 weeks after emergence. Analysis of regression and orthogonal comparisons revealed significant differences between weed-infested and weed-free treatments for leaf area index (LAI), grain number per anthodium and seed oil percentage.

Keywords: Regression analysis, orthogonal comparisons, sunflower, critical period, weed infested.

Introduction

Weeds compete with crops for environmental resources available in limited supply nutrients, water and light. They may significantly reduce yield and impair crop quality, resulting in financial loss to the farmer (3, 4, 6) on a global basis, weeds are considered to be responsible for 10% reduction of crop yield (1,2, 5, 8).

Studies carried about the critical period of weed control (CPWC) showed that the duration of CPWC depends on several factors, including cultivar , climate, weed population density and dominant weeds in the region and weed interference duration (7, 9, 10). Information on weed emergence time is necessary to develop effective models to predict the consequences of sunflowers weed management.

Materials and Methods

In order to determine critical period for weeds control in sunflowers fields, an experiment was conducted in field of Islamic Azad university, Tabriz Branch, Iran, during 2007. In this study, a randomized complete block design with three replications was carried out. The treatments were weed-infested and weed-free of 0, 2, 4, 6, 8, 10 and 12 weeks after emergence. In this experiment, leaf area index, stem height at harvesting, stem diameter, anthodium diameter, dry weight of stem, leaf and anthodium, grain number per anthodium, hollow seed percentage, hull weight to seed brain ratio, thousand seeds weight, seed yield, seed oil percentage and oil yield, were measured.-how these measurement were done? Describe the methods or references

Results and Discussion

Results showed that grain and oil yield losses of full season weed-infested treatment in comparison with full season weed-free plots were 27.5% and 43%, respectively. Analysis of regression and orthogonal comparisons revealed significant differences between weed-infested and weed-free treatments for leaf area index (LAI), grain number per anthodium and seed oil percentage (Table 1& 2). There is no other result of what mentioned in above materials and methods " In this experiment, leaf area index, stem height at harvesting, stem diameter, anthodium diameter, dry weight of stem, leaf and anthodium, grain number per anthodium, hollow seed percentage, hull weight to seed brain ratio, thousand seeds weight, seed yield, seed oil percentage and oil yield, were measured." ???. What is the purpose of this work? Is there anything related to organic control of weed?

Table 1 Results of general linear regression models.

Trait	MS of regression	Residual	R-square
Leaf area index	31.48929**	4.31111	0.769
Grain number per anthodium	37.48158**	5.85340	0.745
Seed oil percentage	0.02385**	0.00223	0.830

** : significant at 1% probability level

Table 2 Results of orthogonal comparisons for weed-infested and weed-free treatments.

Trait	MS of contrast
Leaf area index	48.53444**
Grain number per anthodium	47.95562**
Seed oil percentage	0.00640*

* : significant at 5% probability level

** : significant at 1% probability level

Where is conclusion?

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