

Influence of soil tillage systems and weed control strategies on soybean production under conditions of the Transylvanian Plain, Romania

Teodor RUSU¹, Paula Ioana MORARU¹, Camelia URDĂ², Felicia MUREȘANU²

¹*University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, 3-5 Manastur Street, 400372, Cluj-Napoca, Romania*

²*Agricultural Research and Development Station Turda, 27 Agriculturii Street, 401100, Turda, Romania*

**Corresponding author, e-mail: trusu@usamvcluj.ro*

Introduction

Soybean is one of the most valuable agricultural plants, being useful for human nutrition, animal nutrition and industry. Soybean, being a leguminous, contributes substantially to the increase in fertility of the soil.

A conservative soil tillage system must target especially the growth of resistance to drought by: maximizing the soil volume used for the crop, increasing the capacity of retaining water in the soil, sustained by optimizing the content of organic matter, accumulating rainfall during the cold season, minimizing losses by evaporation before and during vegetation.



The influence of tillage system on the number and weight of soybean nodules

Results and Discussion

Direct sowing system has had a positive influence on the accumulation of water in the soil. The average of the accumulated water supply, during the experimentation period (2017-2019), shows a value of 531 m³/ha at direct sowing, compared to 327 m³/ha of the conventional system with plow.

This difference is also found in the number of soybean nodes, being 102 nodes/10 soybeans to the conventional system and 143 nodes/10 soybeans, to the direct sowing system.

The registered production represented 2745 kg/ha in the conventional system and 2862 kg/ha in the direct sowing system.

Tillage system	flowering beginning				flowery end			
	n. no./ pl	%	weight, no/pl/g	%	n. no./ pl	%	weight, no/pl/g	%
Conventional sy.	111	100 ^{mt.}	1.37	100 ^{mt.}	165	100 ^{mt.}	3.95	100 ^{mt.}
Minimum tillage	82	82 ⁰⁰⁰	1.03	75 ⁰⁰⁰	135	82 ⁰⁰⁰	2.86	73 ⁰⁰⁰
No-tillage	92	92 ⁰⁰⁰	0.95	69 ⁰⁰⁰	183	111 ^{***}	3.31	84 ⁰⁰
DL (p 5%).	4.67		0.06		5.00		0.41	
DL (p 1%).	7.08		0.09		7.58		0.63	
DL (p 0.1%)	11.37		0.14		12.17		1.01	

Materials and Methods

The aim of the presented paper is to identify an integrated weed control strategy for soybean culture, starting from:

- (1) Soybean culture requirements towards environmental and technological factors (soil tillage system) so that they can compete effectively with weeds;
- (2) Knowing the influence of the conventional tillage system, minimum tillage systems and no-tillage systems on soybean culture;
- (3) Reporting the weed control strategy to new climatic conditions through specific adaptation measures;
- (4) Research of chemical strategies with complementary herbicides as a spectrum of combat and application time.

The experience was placed on a chernozem soil. Experimental factors established were: Factor A-Crop: a1-soybean; a2-wheat; a3-maize; Factor B-Soil tillage system: b1-conventional system: reverse plough + disk 2x + sowed + fertilized (witness); b2-conservative system with minimum tillage: chisel + rotary harrow + sowed + fertilized; b3-conservative system with no-tillage (sowed- fertilized-herbicides).

Conclusions

1. Introducing soybean culture after crops which leaves the field weeds clean, rotation of crops and herbicides, proper performance of soil tillage systems, destruction of emerging weeds in the preparation of the germinating bed, and the choice of the optimal sowing period, contribute in a great measure to the reduction of soybean weed infestation.
2. For the maintenance soybean crops without weeds, two chemical treatments, the first ppi/preemergence for annual monocotyledons and some dicotyledons, and the second postemergent treatment for dicotyledons are generally required.

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