

## THE INFLUENCE OF CROP ROTATION, ROTATION AND FERTILIZATION ON YIELD SUNFLOWER IN CLIMATIC CONDITIONS FROM VALUL LUI TRAIAN

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**Key words:** *sunflower, rotation, crop*

### ABSTRACT

*The work paper includes the results of research regarding the influence of fertilization and rotation on the yield to sunflower. The analyzed results has been obtained in experiments placed at the Research Station and Agricultural Development Valu Traian which contain two crop rotations, a new one is installed at four years sola jumped alfalfa, and other old, twenty-six years, and both with the same four crops in rotation.*

*The sunflower, which is the subject of our experiment, follows the winter wheat in rotation of four years.*

*The sunflower is a plant with less demanding for the previous plant. It shouldn't be cultivated earlier than six years after self or plants with common diseases.*

*The rotation should be considered the most efficient measure to fight with the crop diseases and pests.*

### INTRODUCTION

The Sunflower is one plant with little demanding for previous plant if the soil is well supplied with water and nutrients. It should not be cultivated after plants with common diseases. The rotation should be considered the most efficient measure to fight crop diseases and pests at this crop. To obtain high yields of sunflower she shouldn't return to the same area earlier than six years. The cultivation of sun flower six years earlier will lead to a reduction of production achieved and increased disease attack.

Creation, in the last years of some sunflower hybrids with resistance to disease allows framing the sunflowers in shorter rotations by four to five years. Under irrigation, but it is no longer valid, the production being able to reducing due to illness by 50%.

### MATERIAL AND METHODS

The experiment was performed at the Station of Research and Agricultural Development Valul lui Traian.

The Experiment includes two crop rotations, a new one is installed at four years sola jumped alfalfa, and other old, twenty-six years, and both with the same four crops in rotation. The experimental cycle lasts four years. The experimental variants are:

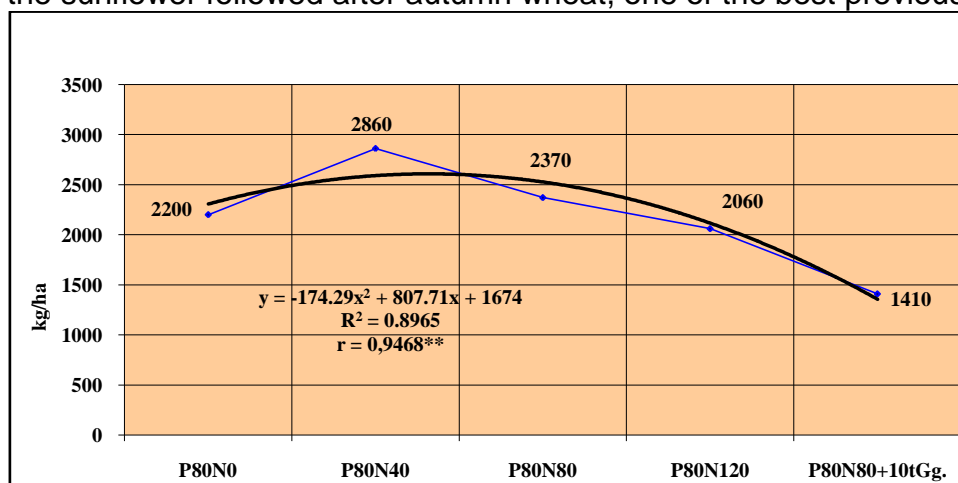
- The monoculture corn and wheat;
- The rotation of 2 years, alternating the corn with soybeans wheat and barley;
- The rotation of three years is made from the most common crops in the corn, soybean, wheat.
- The rotation of four years, with the following crops: corn, beans, wheat, sunflower.
- The sunflower, the subject of our research, follows the winter wheat in rotation for four years.

The applied technology is the conventional one. The culture fertilization was made with the following doses:

- Phosphorus is 80 kg / ha a.i.,
- Nitrogen: N0, N40, N80, N120,
- P80N80 + 10t / ha manure.

## RESULTS AND DISCUSSION

The influence of crop rotation and rotation on sunflower production in our rotation by four years, the sunflower followed after autumn wheat, one of the best previous plant.



The evolution of sunflower yield in four years rotation for, new rotation under the influence of mineral and organic fertilizers, Valul lui Traian

In the new crop rotation, the fourth year of installation after jumping sola planted with alfalfa the production increase to the variant fertilized with phosphorus 80 kg / ha nitrogen and 40 kg / ha, reaching 2860 kg / ha. The nitrogen rate increased to 120 kg / ha, production decreases, reaching 2060 kg / ha.

Additionally, P80N80, the variant fertilized with 10 tons of manure the production decreases further, reaching 1410 kg / ha and 800 kg / ha less than in the variant fertilized with 80 kilograms of phosphorus the active substance.

For sunflower the absence or excess in the growth earlier periods may have negative repercussions on growth, development and fructification of plants.

The evolution of the yield performance can be explained just in terms of fertilization. The nitrogen doses increasingly exerting greater pressure applied on plants, reflected in lower yield.

The dose of manure 10 tones / ha added to phosphorus and nitrogen fertilizers increase the soil macronutrient concentration and therefore greatly decreases production.

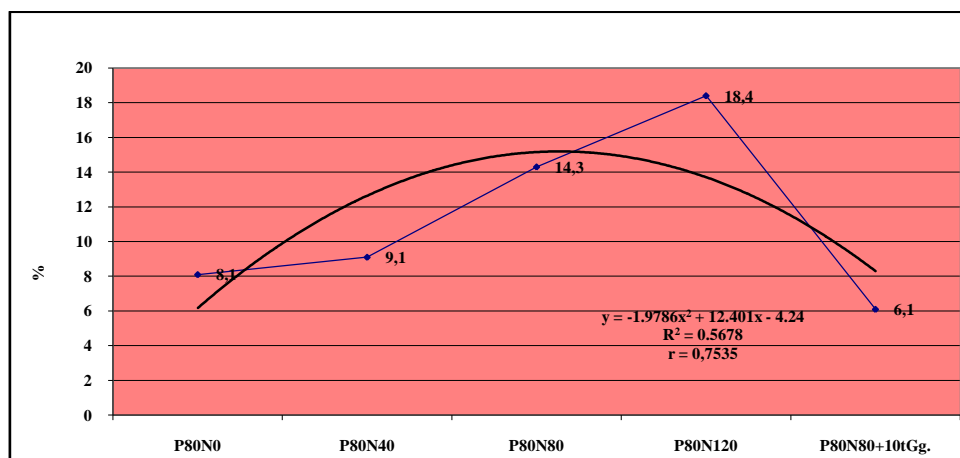
The fertilization variant that ensures the highest yields of 2860 kg / ha, was that the P80N80

Applying a balanced fertilizer system with nitrogen, phosphorus, relative to NP 1: 1 or 1: 1.25, by dosing depending of soil nutrient supply and correlated with hybrid cultivated and planned production requirements, provide as we have seen, a yield of 2860 kg / ha and 2370 kg P80N40 / ha P80N80.

A correct placement of culture will get the possibility of the production potential and limiting attack of pathogens and pests.

The climatic conditions in Valul Traian, diseases sunflower plants had an upward trend in direct relation to the dose of nitrogen fertilizer. Thus, if the fertilized variant only with phosphorus (P80) the percentage of attacked plants was 8.1% in the variant fertilized with P80N120 it is increased to 18.4%.

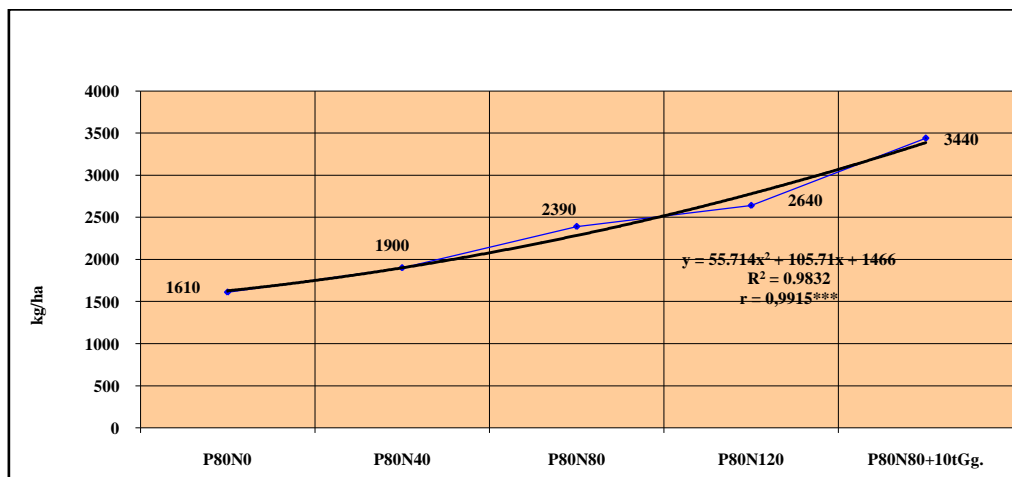
It should be noted that if at the fertilization P80N80 the percentage diseased plants was 14.3%, the administration of these doses of fertilizers besides a quantity of 10 tones per hectare of manure decreased the percentage of diseased plants 6.1%.



The evolution of capitula sunflower diseases in rotation four years, Valul lui Traian

In the same rotation but a crop rotation practiced for more than twenty years, the sunflower yield is higher on average on the five experimental variants with 216 kg / ha compared to the new crop.

The lowest production was obtained in the variant where each year were given 80 pounds of phosphorus, and was 1610 kg / ha. The fund P80 applying increasing doses of nitrogen, N48, N80, N120, production increased progressively obtaining 1900kg / ha (P80N40), 2390 kg / ha (P80N80), respectively, 2640 kg / ha (P80N120). The increased production is statistically significant.



The evolution of sunflower yield in rotation 4 years the old crop rotation system under the influence of mineral and organic fertilizers, Valul lui Traian

The P80N80 fertilizing and organic fertilizing with 10 tons of manure the production increased reaching 3440 kg / ha with 1050 kg less than variant without manure. It is a remarkable increase, which makes this variant to be recommended for production, especially where it has organic fertilizers. This variant stands out by the fact that the disease has been lower than in other variants of fertilization.

## CONCLUSIONS AND RECOMMENDATIONS

1. The sunflower is an unassuming plant for previous plant. It shouldn't be cultivated six years earlier after itself and after plants with common diseases.

2. The rotation should be considered the most effective measure to fight with crop diseases and pests.

3. In order to obtain high productions of sunflower she should return to the same area earlier than six years. Growing six years earlier sunflower will lead a reduction of production achieved and increased disease attack.

The variant fertilization which ensured the achievement of the highest yields of 2860 kg / ha, was the one with P80N80. Applying a system with balanced fertilizer with nitrogen, phosphorus, relative to NP 1: 1 or 1: 1.25, by dosing according to the state of soil nutrient supply and correlated hybrid cultivated and planned production requirements, provide as we have seen, a yield of over 2800 kg / ha.

4. In climatic and soil conditions of the Valu lui Traian the diseases of sunflower plants had an upward evolution in direct relation to the dose of nitrogen fertilizer.

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This variant is distinguished by the fact that the disease has been lower than in other variants of fertilization.

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