THE STUDY OF THE COMPORTMENT OF SOME FOREIGN ALFALFA VARIETIES DURING THE FIRST VEGETATION YEAR UNDER THE INFLUENCE OF WEST PLAIN CONDITIONS

STUDIUL COMPORTAMENTULUI UNOR SOIURI STRĂINE DE LUCERNĂ ÎN PRIMUL AN DE VEGETAȚIE ÎN CONDIȚIILE CÂMPIEI DE VEST

CAMELIA ŞTEFAN*, A. MOISUC*, VERONICA SĂRĂȚEANU*

**Banat's Univesity of Agricultural Sciences and Veterinary Medicine from Timişoara, Romania*

Abstract: *Alfalfa is a plant with distinct qualities, being appreciated because of some multiple uses as forager plant. The chemical composition of alfalfa and a good digestibility, near to a great production capacity, a good perenity and the fact that it lets great amounts of organic mater rich in nitrogen in soil makes from alfalfa a very important and necessary plant in the ecological or biological crop system.*

Rezumat: *Lucerna este o planta cu calități deosebite, fiind apreciată datorită unor multiple întrebuințări ca plantă furajeră. Compoziția sa chimică şi o bună digestibilitate alături de o capacitate mare de producție, o bună perenitate, şi faptul că lasă cantități mari de substanță organică bogată în azot în sol, face ca lucerna să fie o plantă foarte importantă şi de primă necesitate pentru cultura în sistem biologic sau ecologic.*

Key words**:** *alfalfa, first vegetation year, root length, nodosities number, plant's weight, offshoots number, number of root's branches.*
Cuvinte cheie: *lucernă, primul an de vegetație, lungimea rădăcinii, numărul de nodozități greutatea plantei, numărul de lăstari, numărul ramificațiilor rădăcinii.*

INTRODUCTION

Alfalfa is forage with good quality and yield superior in the cold season because it can be transformed in hay. Alfalfa is a crop proper for organic fertilisation because it removes a great amount of nitrogen from soil and can diminish the high level of nitrites from the root area. Some researches realised in U.S. show that alfalfa yield can be improved applying manure in comparison with other fertilisation sources (LORY, J.A., 2000; HERBERT S.J. *et* DALIPARTHY, J., 2001).

The deep root system of alfalfa allows the extraction of the mobile nutrients (nitrogen, sulphur, boron) from a greater depth in comparison with corn. To benefit by all these aspects of the manure application on alfalfa the producers must to choose well the application time. There are three manure application strategies: before seeding, during the vegetation period, after the last harvest in year and before the preparation of seed bed for a cereal for grains (KELLING K.A. *et* SCHMITT, M.A., 2003).

A suprising aspect is that alfalfa has the ability to eliminate the nitrates from soil (Blumenthal J.M. *et* RUSSELLE, M.P., 1996) even it forms symbiosis with a bacteria (*Rhizobium meliloti*) providing atmospheric nitrogen for plant (PEOPLES, M.B., CRASWELL, E.T., 1992).

Alfalfa can have during the vegetation period the total necessary nitrogen amount from atmosphere, the yield being not dependent by the fertilisers' application. Also, when the nitrogen from soil is in greater amounts then the plant's needs, the nitrates amount from plant will not pass over the toxicity level in comparison with other species (RUSSELLE, M.P. *et al.*, 1996).

The present knowledge of plants' physiology and biochemistry shows that the main

physiological processes that take place in plant's life are determined by growth regulators through a proper amount of them for every moment of the plant's development, these processes influencing the determinant factors of the harvests between some limits specific for species and varieties (LEOPOLD, C.A. *et* KRIEDERMAN P.E., 1975).

The purpose of this work is to analyze the comportment of three foreign alfalfa varieties (Tisa, Rasinka and Novosadanka H-11) in the first vegetation year in the condition of West Plain.

MATERIALS AND METHOD

The experimental plot is set in the area of the Didactic Station of Banat's University of Agricultural Sciences and Veterinary Medicine from Timişoara in 2007.

The seeding is realised in 15 April 2007, the distance between rows is 12.5 cm and the plants density on 1 m^2 is 950-1100 seeds, this corresponding to 20-22 kg/ha.

The experience comprises three Serbian alfalfa varieties: Tisa, Rasinka and Novosadanka H-11 set in three variants with three replicate plots.

The features of the studied alfalfa varieties described by the variety authors are presented as it is following.

Tisa is a synthetic alfalfa variety created at the Agriculture and Horticulture Institute from Novi Sad (Serbia) recognized by the Union Commission in 1996. It is distinct through a great accommodation of the yield in different growing conditions. The average plant's height is 65-70 cm. he genetic potential for yield is to 20 t/ha dry matter. It is resistant to falling dawn and tolerant to drought. This variety is medium resistant to black leaf spot, rust, and other diseases. The average content in crude protein from the dry matter is 19.6 %, and the cellulose 21.6 %. This variety valorises well the irrigated crop system.

Rasinka is a synthetic alfalfa variety created at the Agriculture and Horticulture Institute from Novi Sad (Serbia) and recognized Union Commission in 1997. This variety is resistant to falling dawn and to the main alfalfa diseases. It grows well after cutting, resists well to low temperatures and is resistant to drought. This variety is distinct through good adaptability and stable production in different agro-ecological conditions. This variety has greater yields of crude protein in comparison with the standard varieties. It can be used in economic condition 4-6 years.

Novosadanka H-11 is a hybrid alfalfa variety between *Medicago sativa L.* and *Medicago falcate L.*, this has been recognized in 1988. This synthetic variety is composed from 15 hybrid alfalfa clones. The plants are semi-erect, with many offshoots per plant. This variety is resistant to falling down, to frost, to drought and to the main alfalfa's diseases. This variety can be cut 4-5 times during a year in rainfed system. The genetic production potential of this alfalfa variety is 20 t/ha dry matter content. It is proper to be cultivated in low lands.

Some chemical features of the soil from the experimental plot are represented in Table 1, and show the pH, humus (%), total nitrogen (%), phosphorus (ppm), recalculated phosphorus (ppm), and potassium (ppm) at 0-20 cm depth, and 20-40 cm depth.

Table 1

Some chemical features of the soil from the experimental plot at 0-20 cm depth, and 20-40 cm depth

Soil depth	pH	Humus (%)	N total (%)	P (ppm)	Recalc. P (ppm)	K (ppm)
0-20 cm	8.02	3.34	0.31	34.2	16.79	110
20-40 cm	7.96	2.41	0.20	20.0	10.32	103

There are collected biometrical data from 20 plants from every variety and replica as are: root's length, nodosities number, plant's weight, offshoots number, number of root's

branches. The data are analysed using the calculus of linear regression and the correlation coefficient Bravais-Pearson.

RESULTS AND DISCUSSION

Alfalfa is a crop suitable for western Romania conditions, and is one of the most important forage crops in West Plain. Here are analyzed some biometric data collected in the first vegetation year from three Serbian alfalfa varieties. The analyzed features are: the root's length, the nodosities number, the plant's weight, the offshoots number, and the number of root's branches.

In table 1 are presented the correlation coefficients among the measured features for those analyzed alfalfa varieties.

Table 1

The correlation coefficients among some features of studied alfalfa varieties

Tisa				
Features	nodosities number	plant's weight	offshoots number	number of root's branches
root's length	-0.15	-0.11	0.47	0.47
nodosities number	-	-0.04	0.14	-0.06
plant's weight	-	-	0.29	0.47
offshoots number	-	-	-	0.79**
Rasinka				
Features	nodosities number	plant's weight	offshoots number	number of root's branches
root's length	0.67*	0.40	0.71*	0.39
nodosities number	-	0.19	0.70*	0.70*
plant's weight	-	-	0.52*	0.15
offshoots number	-	-	-	0.61*
Novosadanka H-11				
Features	nodosities number	plant's weight	offshoots number	number of root's branches
root's length	0.41	-0.07	0.33	0.42
nodosities number	-	-0.36	0.70*	0.66*
plant's weight	-	-	-0.09	0.09
offshoots number	-	-	-	0.77**

In the case of Tisa alfalfa variety the only correlation obtained among analysed features is found between offshoots number and number of root's number, the correlation coefficient being $r = 0.79$.

Rasinka alfalfa variety shows many correlations between the analysed features studied in the first vegetation year. The root's length and nodosities number presents a interrelation, and the correlation coefficient obtained between these two features is $r = 0.67$. The root's length has a positive interrelation with the offshoots number ($r = 0.71$). Nodosities number has a positive influence on the offshoots number and number of root's branches ($r = 0.70$). Between the plant's weight and the offshoots number is also a positive interrelation, the calculated correlation coefficient being $r = 0.52$. Another correlation found among the features of Rasinka alfalfa variety is between the number of offshoots and the number of root's branches ($r = 0.61$).

Novosadanka H-11 alfalfa variety is the third species analysed from the point of view of the interrelations analysed among the analysed features registered in the first year of vegetation. Between the nodosities number and the offshoots number the correlation coefficient

obtained is positive (r = 0.70). The nodosities number has also positive influence on the number of root's branches (r = 0.66). Another positive correlation obtained in the case of Novosadanka H-11 alfalfa variety is between the offshoots number and the number of root's branches (r = 0.77).

CONCLUSIONS

Synthesizing the results obtained in the study of these three Serbian alfalfa varieties (Tisa, Rasinka and Novosadanka H-11) we can conclude the following:

- Tisa alfalfa variety shows a positive correlation between root's length and nodosities number;

- Rasinka alfalfa variety presents the greatest number of positive interrelations among features in comparison with the other two alfalfa varieties studied in this research; these are among the next pair of features: root's length and nodosities number, root's length and offshoots number, nodosities number and offshoots number, nodosities number and number of root's branches, plant's weight and offshoots number, number of offshoots and number of root's branches;

- Novosadanka H-11 alfalfa variety shows some positive interrelation among the next pair of features: nodosities number and offshoots number, nodosities number and number of root's branches, offshoots number and number of root's branches.

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