

## CONTRIBUTIONS TO THE IMPROVEMENT OF THE SILAGE CORN CULTIVATION TECHNOLOGY

S. Cara

*Payments and Intervention for Agriculture Agency Iași  
e-mail: sergiucara@yahoo.com*

### Abstract

*The improvement of the fodder base structure by using silage corn allows modifying the winter nourishing type, much like the summer one. This research aim is the influence of cultivation technique, fertilization and hybrid on production and its quality. As biological material we used Podu Iloaei 110 and Dekalb 355 hybrids, sowed in pure culture, mixed with soybean on same rows and on alternative rows corn – soybean; fertilization was made with cattle manure and complex fertilizer 22-22-0. The biggest productions were obtained when cultivating silage corn, for both hybrids mixed with soybean (15 kg/ha corn + 40 kg/ha soybean), on the same rows, using fertilization with manure 30 t/ha + complex fertilizer 100 – 200 kg/ha (15,2 – 15,7 t/ha for Podu Iloae 110 and 14,4 – 15,7 t/ha d.s. for Dekalb 355). The studied factors influenced the fodder's raw protein and raw cellulose contents. The highest protein content and the lowest cellulose content was registered when cultivating the mixture on same rows, fertilized with 30 t/ha + complex fertilizer 200 kg/ha for Podu Iloaei 110 hybrid (12,75 % PB and 26,8 % CB) and for Dekalb 355 hybrid in pure culture, same fertilization, we obtained 12,95 % PB and 26,95 % CB. For the Moldavian forest steppe area we recommend cultivating Podu Iloaei 110 hybrid.*

**Key words:** corn, silage, fertilization, hybrids, production

### INTRODUCTION

Silage corn is a main component of the animal nutrition's fodder ratios, especially during winter season. The researches conducted in the Moldavian Plain area aimed the improvement of some technological links for the silage corn cultivation [1, 3].

Silage corn allows modifying the nutrition type during winter, providing the animals with succulent fodder, like in summer periods [2].

This paper represents a contribution into the frame of the national and international preoccupations to assure the required fodder base for the animals.

### MATERIAL AND METHOD

The researches for this scientific paper were conducted in SD Iași's Ezăreni Farm, belonging to USAMV Iași, during 2005-2007. The objectives consisted in establishing the influence of hybrids, cultivation technology and fertilization with organic and mineral compounds on production and its quality.

The experiment was placed according to the subdivided lots method, 2 x 3 x 6 type, on a cambic chernozem soil type, low degraded, of argyle – clay consistency, profound, with a pH of 6.7-6.9, a humus content of 2.93% for the 0-30 cm layer depth and of 2.15% deeper.

#### Experimental factors:

#### **Factor A – corn hybrids:**

- a<sub>1</sub> – simple hybrid Podu-Iloaei 110;
- a<sub>2</sub> – simple hybrid Dekalb 355.

#### **Factor B – cultivation type:**

- b<sub>1</sub> – sowed in pure culture, corn 80 kg/ha, at 35 cm between rows;
- b<sub>2</sub> – sowed in mixture, corn (50 kg/ha) + soybean (45 kg/ha), on the same row;
- b<sub>3</sub> – sowed in alternative rows (4 rows corn + 4 rows soybean)

#### **Factor C – fertilization:**

- c<sub>1</sub> – control;
- c<sub>2</sub> – cattle manure 30 t/ha;
- c<sub>3</sub> – complex fertilizer (22-22-0) 100 kg/ha;
- c<sub>4</sub> – complex fertilizer (22-22-0) 200 kg/ha;
- c<sub>5</sub> – cattle manure 30 t/ha + complex fertilizer (22-22-0) 100 kg/ha;

c<sub>6</sub> – cattle manure 30 t/ha + complex fertilizer (22-22-0) 200 kg/ha.

The production results were expressed in dry substance and the statistic calculus was made through the variance analysis.

**RESULTS AND DISCUSSIONS**

**Production.** Analyzing the obtained production values (tab. 1), in accordance with

the three studied factors, we observed the following:

For Podu-Iloaei 110 corn hybrid, the productions varied with the cultivation type and fertilization. Thus, we registered productions of 10.3-16.2 t/ha d.s., for corn sewed in pure culture, of 9.5-15.7 t/ha d.s. for the mixture corn + soybean sewed on the same row and of 8.1-13.6 t/ha d.s. when the mixture corn + soybean was sewed in alternative rows.

Table 1.  
The influence of hybrid, cultivation type and fertilization on average production of silage corn, 2005-2007

Hybrid	Cultivation type	Fertilization	Production t/ha	% comp. to control	Diff. t/ha	Signif.
Podu-Iloaei 110	Pure culture	Control	10.3	100	-	
		30 t/ha c.m.	11.1	108	0.8	
		Complex 100 kg/ha	11.2	109	0.9	
		Complex 200 kg/ha	12.5	121	2.2	***
		30 t/ha c.m.+100 kg	14.9	145	4.6	***
		30 t/ha g.g+200 kg	16.2	157	5.9	***
	Mixture	Nefertilizat	9.5	-	-	-
		30 t/ha c.m.	10.4	109	0,9	-
		Complex 100 kg/ha	11.2	118	1,7	***
		Complex 200 kg/ha	14.1	148	5,1	***
		30 t/ha c.m.+100 kg	15.7	165	6,2	***
		30 t/ha g.g+200 kg	15.2	160	5,7	***
	Alternative	Control	8.1	-	-	-
		30 t/ha c.m.	9.1	112	1,0	-
		Complex 100 kg/ha	9.6	119	1,5	***
		Complex 200 kg/ha	10.9	135	2,8	***
		30 t/ha c.m.+100 kg	12.6	156	4,5	***
		30 t/ha g.g+200 kg	13.6	168	5,5	***
Dekalb 355	Pure culture	Control	9.0	-	-	
		30 t/ha c.m.	10.0	111	1,0	
		Complex 100 kg/ha	10.8	120	1,8	***
		Complex 200 kg/ha	13.2	147	4,2	***
		30 t/ha c.m.+100 kg	14.3	159	5,3	***
		30 t/ha g.g+200 kg	15.1	168	6,1	***
	Mixture	Control	9.3	-	-	
		30 t/ha c.m.	10.3	111	1,0	
		Complex 100 kg/ha	11.3	122	2,0	***
		Complex 200 kg/ha	13.2	142	3,9	***
		30 t/ha c.m.+100 kg	14.4	155	5,1	***
		30 t/ha g.g+200 kg	15.7	169	6,4	***
	Alternative	Control	8.5	-	-	
		30 t/ha c.m.	8.4	99	-0,1	
		Complex 100 kg/ha	9.7	114	1,2	**
		Complex 200 kg/ha	10.6	125	2,1	***
		30 t/ha c.m.+100 kg	11.6	136	3,1	***
		30 t/ha c.m.+200 kg	12.9	152	4,4	***
			DL 5 % = 1.4 t/ha	DL 1 % = 1.8 t/ha	DL 0.1 % = 2.1 t/ha	

The fertilization only with cattle manure 30 t/ha conducted to small production raises, compared to the control (0.8 t/ha, 0.9 t/ha, respectively 1.0 t/ha), for the three cultivation types. The fertilization with complex compounds (100-200 kg/ha) lead to bigger productions compared to the control (0.9-2.2 t/ha, 1.7-4.6 t/ha, respectively 1.5-2.8 t/ha). The combined fertilization (manure 30 t/ha + complex fertilizer 100-200 kg/ha) determined the biggest production differences compared to the control, for all three cultivation types (4.6-5.9 t/ha, 5.7-6.2 t/ha, respectively 4.5-5.5 t/ha).

For Dekalb 355 corn hybrid, the production registered the same changes. Thus, we obtained 9.0-15.1 t/ha d.s. for the corn sowed in pure culture, 9.3-15.7 t/ha d.s. for the mixture corn + soybean sowed on the

same row and 8.5-12.9 t/ha d.s. for the mixture corn + soybean sowed in alternative rows. The biggest productions resulted for the fertilization with complex compounds (100-200 t/ha), of 10.8-13.2 t/ha d.s., 11.3-13.2 t/ha respectively 9.7-10.6 t/ha d.s.) and for the combined fertilization manure + complex fertilizers (14.3-15.1 t/ha, 14.4-15.7 t/ha and 11.6-12.9 t/ha d.s.), for the three cultivation type.

**Raw protein and raw cellulose.** The highest content in raw protein was obtained for the Podu-Iloaei 110 hybrid, cultivated in mixture with soybean on the same row (9.75-12.75%); bigger values resulted for the fertilization with complex compounds (11.5-12.15%) and for the combined fertilization (12,30-12,75%) (fig. 1).

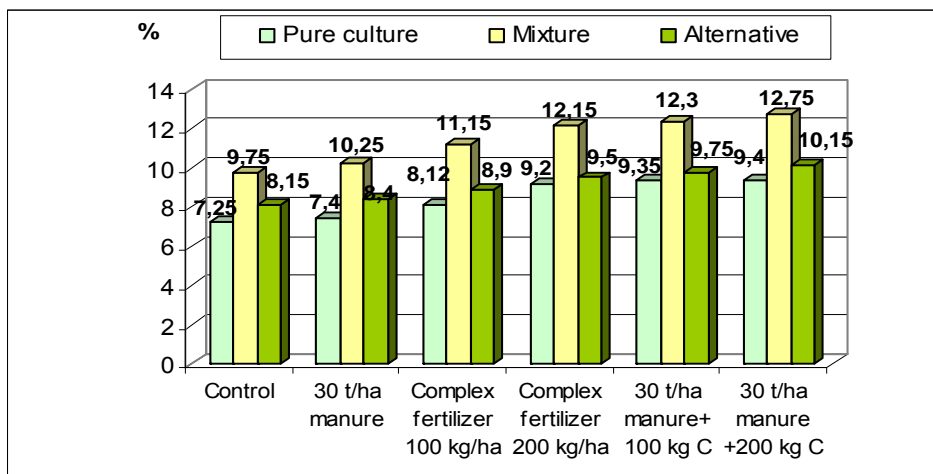


Fig. 1. Evolution of crude protein content in hybrid Podu Iloaei 110, under the influence of fertilization and cultivation method

The lowest raw cellulose content was registered for the fertilization with manure + complex fertilizers, for all three cultivation types (27.15-28.35), respectively 26.80-27.75%) (fig. 2).

For Dekalb 355 hybrid, the highest content in raw protein was obtained for the

mixture corn + soybean, sowed on the same row, in the same fertilization conditions as for Podu-Iloaei 110 hybrid (12.25-12.95%) (fig. 3), and the lowest content in raw cellulose was obtained for the pure culture sowing technique, in the same fertilization conditions (26.95-27.35%) (fig. 4).

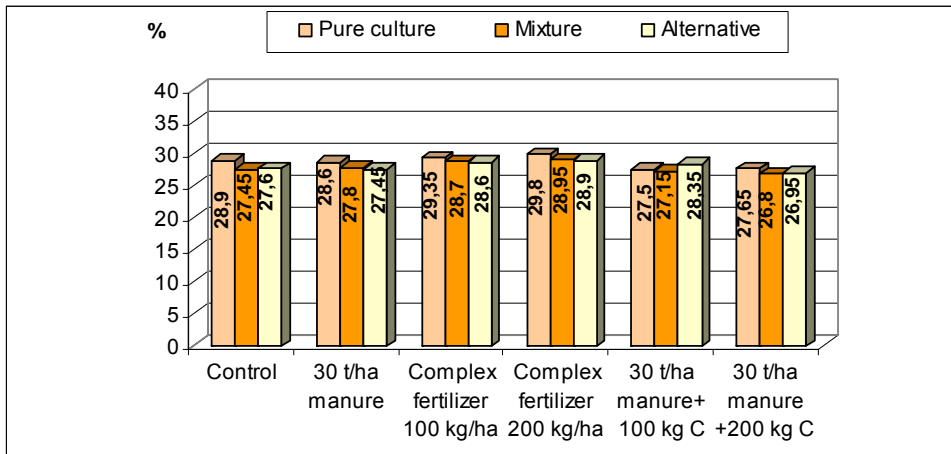


Fig. 2. Evolution of crude fiber content in hybrid Podu Iloaiei 110, under the influence of fertilization and cultivation method

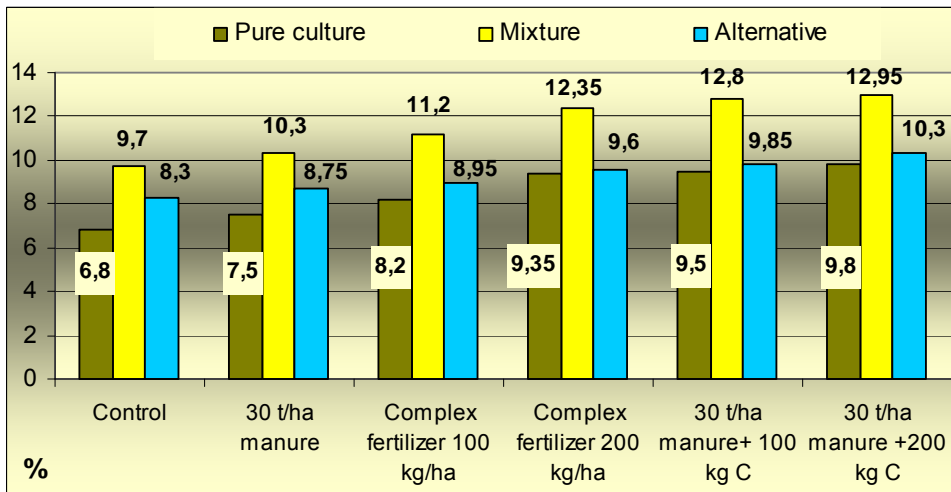


Fig. 3. Evolution of crude protein content in hybrid Dekalb 355, under the influence of fertilization and cultivation method

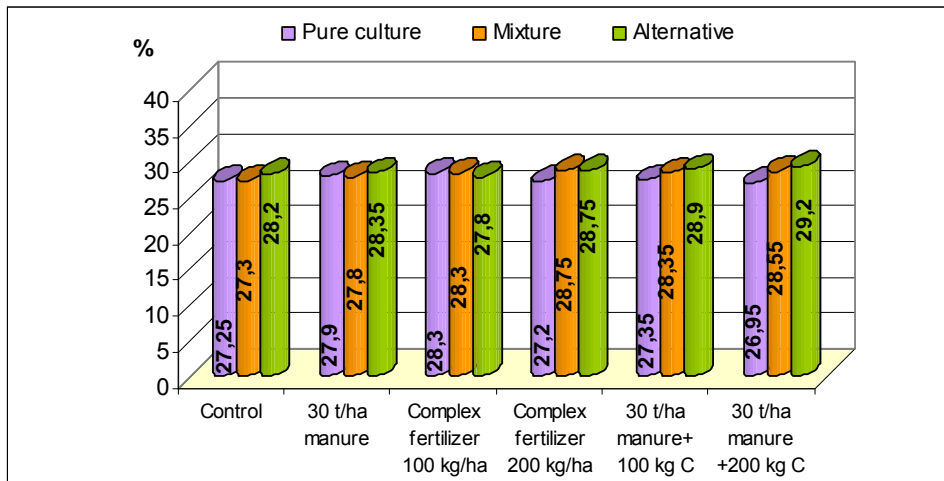


Fig. 4. Evolution of crude fiber content in hybrid Dekalb 355, under the influence of fertilization and cultivation method

## CONCLUSIONS

- Corn represents an important fodder plant cultivated for silage, the obtained product assuring and balancing the fodder ratios.
- High production values were obtained for Podu-Iloaei 110 hybrid, sowed in mixture on the same row (corn 15 kg/ha + soybean 40 kg/ha), for the application of complex fertilizers 200 kg/ha (14.1 t/ha d.s.) and combined fertilization with manure + complex fertilizers (15.2-15.7 t/ha d.s.).
- We recommend for the target area, for the corn breed for silage, the cultivation of Podu-

Iloaei 110 hybrid, sowed in mixture corn + soybean on the same row.

## REFERENCES

- [1] Iacob T., Vintu V., Samuil C., 2000 – *The technology of producing and preserving fodder*. "Ion Ionescu de la Brad" Press Iași.
- [2] Lașcu L., 1977 – *The influence of fertilizers on production and chemical composition of the corn breed for silage at S.C.Z. Popăuți – Botoșani*. Agricultural researches in Moldavia, vol. 1.
- [3] Struik P.C., Deinum B., 1982 – Effect of light intensity after flowering on the productivity and quality of silage maize. *Neth. J. Agric.*, 30.