https://www.sworldjournal.com/index.php/swj/article/view/swj08-02-079
DOI: 10.30888/2663-5712.2021-08-02-079

УДК 631.559:636.085.52:631.8

FORMATION OF SILOS YIELD UNDER THE INFLUENCE OF VARIETIES AND FERTILIZERS

Voitsekhivskyi V. / Войцехівський В.
PhD./ к. с.-г. н., доц.
Denisyuk V. / Денисюк В.
Student/ студент
National university of life and environmental sciences of Ukraine, Kiev
Poltoretskyi S. / Полторецький С.
d. a. s., professor/ д. с.-г. н., профессор
Uman national university of horticulture, Uman, Ukraine
Muliarchuk O. / Мулярчук О.
PhD./ к. с.-г. н., доц.
State agrarian and engineering university in Podilia, Ukraine
Tagantsova M. / Таганцова М.
Researcher/ с.н.с.
Balitska L. / Баліцька Л.
Researcher/ н. с.
Ilchenko Ya. / Ільченко Я.
Researcher/ м. н. с.
Ukrainian institute for plant varieties examination, Kiev

Annotation. *Creating a reliable fodder base is one of the most important and acute problems in the development of animal husbandry. Animals in specialized farms especially need versatile and complete feeding. Feed, being a raw material for the production of meat and milk, in the structure of its cost is more than 50-60%. The main reason for the low rates of livestock development is the weak feed base, which is characterized by insufficient feed production, low quality and high cost. The cost of producing corn for silage of different hybrids varies significantly depending on the variety, fertilizer and cultivation technology. to increase the efficiency of growing corn for silage, it is advisable to replace the long-used Tesla hybrid with KVS 3381. The level of productivity of the recommended hybrid is higher by 15%. Application of fertilizers in the dose of $N_{120}P_{90}K_{90}$ will increase the yield by 22,5%, and on a high agro background by 68,8%.*

Key words: *corn, silage, fertilizers, yields.*

Introduction. Economic growth and welfare of the state largely depend on the efficiency of the agro-industrial complex, in which an important place belongs to feed production. Today, corn is one of the most productive fodder crops and, accordingly, is of paramount economic importance. It is widely used in the diet of cattle and is processed to obtain grain, green mass and silage [4,6,10,12].

In terms of intensification of agricultural production, the most important task is to develop an optimal model of plant nutrition, which would ensure the maximum possible realization of their sortogenetic features in order to obtain a high yield of optimal quality. One of the most influential and fast-acting factors that have a positive effect on the size of the crop and its quality is fertilizers [1, 2, 4, 10].

The total yield is a derivative of a complex set of biological features of the plant and environmental conditions. The size of the crop is the basis for evaluating a particular system of fertilizer, variety, implemented in certain soil and climatic conditions. The formation of the crop mass is a complex process consisting of the

growth of plant tissues due to substances entering the plant and substances synthesized by the plant. The primary forms of this process are the absorption of CO_2, water, minerals and solar energy and the accumulation of assimilants. Further processes are multiple cell division and differentiation, which is ultimately realized in plant growth. The formed assimilants, in addition to their direct consumption for structural and energy processes, are deposited in reserve forms, which constitute the bulk of the crop. Thus, the growth of green mass occurs under the influence of physiological and biochemical processes, the direction of which is determined by both sortogenetic features of the culture and the action of environmental factors, the most effective of which is the presence of nutrients in the soil. Mineral feeding conditions significantly affect the formation of the size and structure of the crop [3,7,8,9].

Research methodology and materials. The research was carried out at the NULES of Ukraine at the Professor B.V. Lesik Department of Storage, Processing and Standardization of Plant Product and on production crops of FE "Zorya". Intensive hybrids of Tesla and KVS 3381 (FAO 360) were used. Growing and accounting of the harvest was carried out according to the generally accepted technology [5, 11].

Research results and discussion. The results of research have shown that the systematic application of fertilizers is a powerful tool for influencing the dynamics of growth of green mass of corn.

The effect of fertilizers on the growth of green mass is noticeable at the beginning of the growing season - in the second decade of June, the weight of the plants of the variant with fertilizer is 2,18-2,32 times greater than the weight of control plants. During this period, the increase in biomass in the control is 0,59-0,61 t / ha per day, and in the variant background + $N_{120}P_{90}K_{90}$ – 0,83-0,91 t / ha per day. Intensive growth of green mass is also observed in the 2nd decade of July: in the control variant – 0,83-0,55 t/ha per day and 0,81-0,92 t/ha per day on fertilizer background + N120P90K90. At the end of the growing season, the effect of fertilizers becomes less noticeable than in the initial stages of plant growth: in the second decade of August, the weight of fertilized plants is 1,60-1,66 times greater than the weight of control plants. In the variant background + $N_{120}P_{90}K_{90}$ the increase is 17,76 t/ha, while in the variant where only mineral fertilizers were applied – 6,0 t/ha (table). The reason that mineral fertilizers do not cause a known increase in biomass is probably the special physical and chemical conditions of the soil, as well as the biological characteristics of corn.

Fertilizers also change the structure of the crop. The yield under control is 25.68 t / ha, of which the mass of leaves is 4,68 t/ha (18,2%). Stems – 13,74 t/ha (53,5%), and cobs – 7,2 t/ha (28,0%). Yield on the background + $N_{120}P_{90}K_{90}$ variant is higher than on the control by 17,76 t / ha, of which 4,44 - leaves, 2,70 - stems and 10,74 - cobs, with their mass fraction is respectively -21,0%, 37,8% and 41,2%, which indicates an increase in the proportion of leaves and stems in plants grown on fertilizer. In the background, the green mass yield exceeds the control crop by 4,62 t/ha, mainly due to the increase in the mass of stems – 1,86 t/ha and cobs – 1,92 t/ha.

Analyzing the obtained data, it can be stated that the systematic application of fertilizers significantly increases the growth of green mass of corn: the yield of corn on the background + $N_{120}P_{90}K_{90}$ exceeds the yield on control by 17,76 t/ha and is 43,44 t / ha. Fertilizers also affect the structure of the crop: the mass fraction of cobs in the phase of milk-wax ripeness is 28,1% in the control, and in the background + $N_{120}P_{90}K_{90}$ – 41,2%, leaves 18,3 and 21,0% and stems - 53,5%.

The structure of the corn harvest for silage, t / ha

Experiment options	Harvest for 2018-2019 years							
	total yield, t / ha	including			Yield increase			
					to control	including		
		leaf	stems	cobs		leaf	stems	cobs
Control (Tesla)	25,68	4,68	13,74	7,2	–	–	–	–
background + $N_{120}P_{90}K_{90}$	43,44	9,12	16,44	17,94	17,76	4,44	2,7	10,74
$N_{120}P_{90}K_{90}$	31,68	6,18	16,26	9,24	6,0	1,5	2,52	2,04
KWS 3381	29,52	5,88	13,2	8,52	3,84	1,2	0,26	1,32
Average options	32,1	6,28	15,05	10,4	–	–	–	–
SSD_{05}	5,95	2,37	3,05	4,52	–	–	–	–

Analyzing the data in the table regarding the use of the hybrid KWS 3381, we can say about the feasibility of further use of this hybrid. At present, it is seen that the excess in terms of yield as a whole is 3,84 t/ha, which is almost 15%, and in terms of leaf formation – 4,7, stems – 2,8 and cobs – 5,1%, respectively.

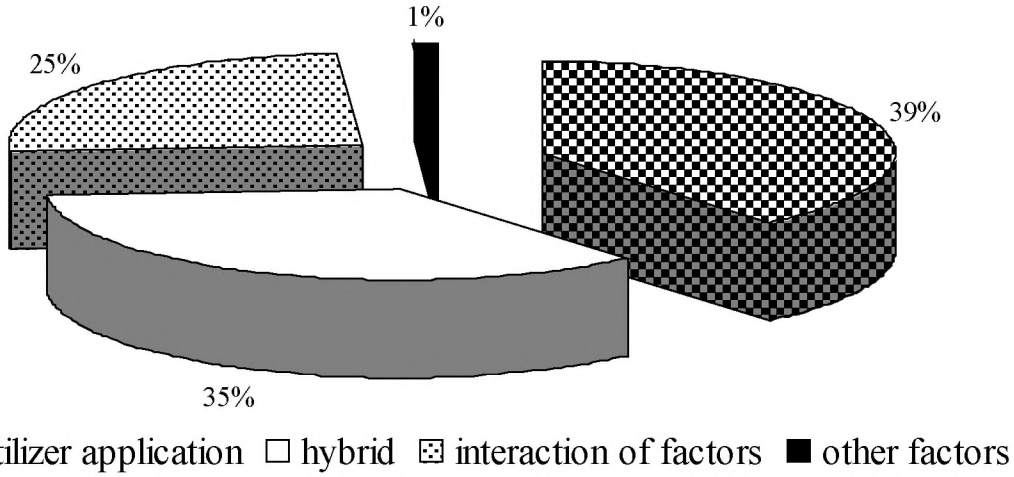

Figure. Influence of varietal characteristics and fertilizers on the formation of corn harvest on silage

Analysis of variance of the influence of variety and fertilizer on the formation of the corn crop on silage showed that its value is most affected by fertilizer, varietal characteristics and the interaction of factors at almost the same level (Figure).

Conclusions. Thus, to increase the efficiency of growing corn for silage, it is advisable to replace the long-used Tesla hybrid with KVS 3381. The level of productivity of the recommended hybrid is higher by 15%. Application of fertilizers in the dose of N120P90K90 increases the yield by 22,5%, and on a high agricultural background by 68,8%.

References:

1. Altukhov A.I., Silaeva L.P., Veklenko V.I., Soloshenko R.V., etc. Economic efficiency of increasing the sustainability of crop production. K.: KSAA, 2016. 95 p.
2. Babich AO World land, food and fodder resources. K.: Agrarian. science, 1996. 570.
3. Degtyarevich I.I., Bychek I.I. Organization of corn cultivation for silos on intensive technology. Territory of science. 2017. № 2. 78-84.
4. Fryer O.V. Trends in crop production and sustainable development of agriculture in Ukraine - opportunities for harmonization. Economics of AIC. 2018. № 10. 117-125. DOI: https://doi.org/10.32317/2221-1055.201810117.
5. Frans J., Tornly J.H.M. Mathematical models in agriculture. M.: Agropromizdat, 1987. 400.
6. Moiseenko A.N. Economic performance management at introduction of intensive technologies in agriculture. Journal of Economy and Business. 2018. – Vol.1. – P. 121-124.
7. Petrinenko V.F. Substantiation of technology of growing fodder crops and energy saving in field fodder production. Bulletin of Agricultural Science. 2003. № 10. 6-10.
8. Podpryatov G.I., Senkov A.M., Voitsekchivsii V.I. Technology of production, storage and evaluation of feed quality. K.: NAU, 2003. 216.
9. Podpryatov G.I., Voitsekhivskii V.I., Kilian M. and set. Technologies of storage, processing and standardization of agricultural products. K.: CIT. 2017. 658.
10. Shugurov I.V. Technical equipment as a basis for the introduction of modern technologies in crop production. NSU Bulletin. Series: Socio-economic sciences. 2009. T. 9, Vol. 4. 151-155.
11. Skaletskaya L.F., Podpryatov G.I., Zavadska O.V. Methods of scientific research on the preservation and processing of crop products: textbook. manual. K .: ЦП Компринт, 2014. 416 p.
12. Tereshchenko S.A., Mudrova L.D. Dependence of silo quality on elements of corn cultivation technology (ZEA MAYS L.). Науч. ж. «Известия КГТУ», № 52. 2019. 133-142.

Анотація. *Створення надійної кормової бази - одна з найбільш важливих і гострих проблем розвитку тваринництва. Тварини в спеціалізованих господарствах особливо потребують різнобічної і повноцінної годівлі. Корми, будучи сировиною для виробництва м'яса і молока, в структурі його собівартості складають більше 50-60%. Основною причиною низьких показників розвитку скотарства є слабка кормова база, яка*

характеризується недостатнім виробництвом кормів, низькою їх якістю і високою собівартістю. Витрати на виробництво кукурудзи на силос різних гібридів значно відрізняється залежно від сорту, удобрення та технології вирощування. для підвищення ефективності вирощування кукурудзи на силос доцільно замінити давно використовуваний гібрид Тесла на КВС 3381. Рівень продуктивності рекомендованого гібриду вищий на 15%. Вносення добрив у дозі $N_{120}P_{90}K_{90}$ підвищити урожайність на 22,5%, а на високому агрофоні на 68,8%.

Ключові слова: *кукурудза, силос, удобрення, урожайність.*

© Voitsekhivskii V., Denisyuk V. Poltoretskyi S.,
Muliarchuk O., Tagantsova M., Balitska L., Ilchenko Ya.