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THE INFLUENCE OF CULTIVATION TECHNOLOGY ELEMENTS ON PRODUCTIVITY
OF MAIZE HYBRIDS OF DOMESTIC AND FOREIGN SELECTION IN THE CONDITIONS
OF NORTH KAZAKHSTAN

Abstract

According to forage qualities maize has almost no equal among other fodder crops. It gives an excellent cornmeal, exceptional value silage and green maize. The identified high-yielding, promising and early-maturing maize hybrids will help increase the range of cultivated forage crops, and thus have a significant impact in strengthening the fodder base of livestock in the region.

Keywords: maize, herbage, germination ability, hybrids, crop yield.

Introduction

Maize is an important feed crop. The forage area is one of the most important in the maize industry. Grain, products of its refining and processing, herbage in fresh, dry state and in the form of silage is used as forage [1].

Forage production is a fundamental branch of agriculture at the present time and in the future, which level of development determines the state of livestock and has a significant impact on the effectiveness of this industry. Over the last 10 years the proportion of animal weight in the structure of commodity products (in comparable prices) amounted to 74-77%, and it is well known that fodder amount to 50-60% or more in the structure of the cost livestock production [2, 3].

Currently, according to the priorities of the national development strategy of the agribusiness industry is necessary to select such varieties and hybrids of maize, which would provide in the conditions of North Kazakhstan is not only high yields of vegetative mass, used for green feeding, but also for the preparation of high-quality silage.

In this regard range of varieties of tested maize hybrids of different maturity groups and the development of agricultural practices accelerate their maturation, increase the productivity and improve production quality. Due to the active importation of breeding stock to North Kazakhstan from abroad and as a result the implementation of intensive cattle-breeding complexes having Western European cattle housing technologies, there is a major problem of creating an appropriate forage base. This fact once again caused interest in the maize cultivation [4].

For this purpose in 2015-2016 the field studies to establish the optimal seeding rates in the cultivation of early maturing maize hybrids and the research of the effect of biomass formation, the maize yield and forage quality, the foreign and domestic selection were carried out on the experimental field of the agrobiological station of NKSU named after M. Kozybayev in the conditions of forest-steppe zone of North Kazakhstan.

Materials and methods of the research

The experiment was carried out three times. The plot area was 75 m². All surveys and observations were carried out according to the method of forage crops field studies of All-union Scientific Research Institute of Forages dedicated to V.R. Williams and methodological recommendations for maize field studies of Corn Research Institute, 1980 [5]. The economical

efficiency was calculated by the method of N.N. Baranov (1974) [6]. The mathematical processing of the data was carried out by the methods of B.A.Dospehov.

The object of the research was the maize hybrids of domestic and foreign selection like Moldova 257 (early maturing) taken as a standard, Turgay 5/87, Turan 150 SV, Omka 130, Kneja 310 (short-season), Budan 237 MV, Knezha 435 (middle-early), Kneja 511 Kazakhstan 435 MV (middle-late). The maize hybrids sowing was conducted on May 25th by the drill-machine SON-2.8, and with aisles it was 70 cm, according to N₆₀P₆₀K₄₀. The seeding rate was 60, 70, 80 thousand per hectare. The seeding depth was 5-6 cm. The soil experimental area was ordinary chernozem, medium-humic, moderately, medium and heavy loamy black soil. The humus content was 5.8 - 5.9% (according to Tyurin).

The results of the research

It is important to establish in each zone is the optimum time of sowing, which depend on the temperature conditions, seed moisture soil layer, morphological and biological properties of hybrids, as well as the weather conditions prevailing in some years in order to obtain high yields of maize and silage [8]. The temperature of air and soil prevailing in this period is important in determining the number of days from seeding to sprouting.

After the germination on the seventh - twelfth days the proportion of germinating plants ranged from 98 to 94 percent of the sown seeds. When extending the sowing- germination period up to 13 - 16 days, the number of germinating plants was 89 to 93 percent, and over 16 days of their risen 83 to 90 percent of the total amount of seeds sown.

The weather conditions and especially the temperature of air and soil prevailing during the growing season had a significant impact on the growth and development of maize hybrids. Maize is a heat-loving plant. The optimum temperature for its growth is 25-28^oS, and the accumulated positive temperatures for the early maturing hybrids should be 2000-22000 S.

In 2015, the accumulated positive temperatures during the growing season when sown from 7 to 12 May before harvest beginning on August 25 was 1798.0 ^o C. During the period from germination to harvest at the beginning of the second term of sowing total heat was reduced to 1645.5 ^o C and in the third term it was reduced to 1499.2 ^o C.

In 2016, the accumulated positive temperatures during all stages of sowing was higher than in 2015, but even in the first term of sowing (in the 2nd decade of May), the accumulated positive temperatures did not exceed 1900 ^o C. The accumulated positive temperatures were significantly lower during other dates of sowing. The plant height primarily depended on weather conditions. The more favorable weather conditions and moisture content of the crops were, the higher were the maize hybrids. Thus, the highest of all the plants of maize hybrids during the harvest season were in wet 2016 year. Sowing dates had some effect on the plant height. The highest plants of maize hybrids were sown during the second and the third decades of May in all the years of research. The plant height on average for the years of the research is shown in Figure 1.

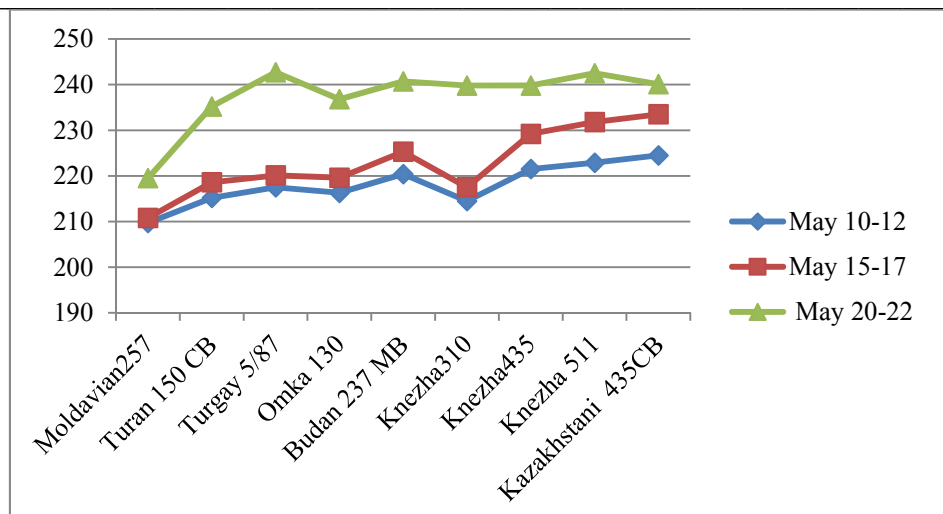


Figure 1 - Plant height of different maturity maize hybrids depending on the time of sowing (average height for the years 2015-2016).

Meteorological conditions and especially the provision of crops with water had a great influence on the formation of the harvest of maize hybrids.

Table 1- Yield of maize hybrids of different ripeness groups depending on the crop crowdedness (on average for the years 2015-2016).

Hybrid	Density of planting, thous. pcs. / ha								
	May 10-12			May 15-17			May 20-22		
	herbage, c/ha	dry matter, %	dry matter, c/ha	herbage, c/ha	dry matter, %	dry matter, c/ha	herbage, c/ha	dry matter, %	dry matter, c/ha
Moldavian 257 (standard)	292	22,9	66,9	322,5	23,3	75,1	299	23,8	71,1
Turan 150 SV	347,5	24,3	84,5	429	25,7	110	412	25	102,5
Turgay 5/87	340,2	24	81,6	420	25,7	108	406	24,8	100
Omka 130	320,5	22,6	72,4	389,5	24	93,6	372	22,7	84,4
Budan 237 MV	343	23,3	80	415,5	23,4	97,2	405	23,1	93,5
Knezhha 310	337	22,5	75,9	416	25,1	104,5	394	23,8	93,7
Knezhha 435	340,5	21,4	73	412,5	23,3	96	404	22,7	91,7
Knezhha 511	343	20,3	69,7	425	20,1	85,6	419	20,5	85,8
Kazakhstani 435 SV	350	20,6	72,2	439,5	19,4	85,4	428	20,3	87
Least significant difference (LSD) 0.5 for herbage of hybrids – 10,1 t / ha									

According to the survey, the best period of sowing the investigated maize hybrids was on May 15-17. At that time of sowing the maize plants had a high yield of both herbage and dry matter content, a maximum height of 230-235 cm, they were well-leafy and most yielding in comparison with other periods.

The early-maturing hybrids such as Omka 130 -320.5 (72.4 percent), Kneja 310-337 (75.9 percent), the middle-early hybrids like Knezhha 435 -340.5 (73 percent) had a low yield of herbage, the crop yield of the middle-late hybrids such as Kneja 511 -343 (69.7%), Kazakhstani 435 -350 (72.2) was significantly higher than that of the other hybrids, but the dry matter content

was lower in the first period of sowing on May 7-12. At a later date of sowing on May 20-22 the content of fodder units in the herbage of maize hybrids and their crop yield of 1 hectare reduced significantly. The early-maturing hybrids to the beginning of harvesting for silage formed cobs of milky-wax ripeness. The middle-early hybrids such as Budan 237 MW with the length of the vegetational season of 89-95 days had time to form a vegetative mass suitable for silage with the dry matter content of 25% or more. The middle-late hybrids, including the middle-early hybrid Knezha 435 did not reach the required moisture silage mass.

Conclusion

The early-maturing maize hybrids formed the yield of green mass significantly lower than the middle-late ones. But thanks to the fact that during the harvest the early-maturing hybrids had gold ripe corn cobs and their herbage contained more than 31% dry matter, during all the periods of sowing the difference between the early-maturing hybrids and the middle-late ones in collecting of dry matter per hectare significantly reduced.

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СОЛТҮСТІК ҚАЗАҚСТАН ЖАҒДАЙЫНДА ЖҮГЕРІ ГИБРИДТЕРДІҢ ОТАНДЫҚ ЖӘНЕ ШЕТ ЕЛДІК СЕЛЕКЦИЯНЫҢ ӨНІМДІЛІГІНЕ ТЕХНОЛОГИЯЛЫҚ ӨНДЕУ ЭЛЕМЕНТТЕРІНІҢ ӨСЕРІ

Аңдатпа

Өртүрлі будандардың түсімділігі себу мерзіміне байланысты, айтарлықтай аралықта құбылып тұрады, жүгерінің зерттелетін будандарын себудің ең қолайлы мерзімі 15-17 мамыр аралығы болып табылады. Өсімдіктерді себу мерзімінің бұндай ретінде, жүгерілердің жасыл массасы, құрғақ заттардың мөлшері тәрізді жоғары өнімділікке ие, оның ең жоғары биіктігі (230-235 см.) құрайды және басқа мерзімдермен салыстырғанда, жапырақтандырылған және неғұрлым өнімдірек болып келеді.

Кілт сөздер: жүгері, өнімділігі, жасыл массасы будандар.

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ВЛИЯНИЕ ЭЛЕМЕНТОВ ТЕХНОЛОГИИ ВОЗДЕЛЫВАНИЯ НА ПРОДУКТИВНОСТЬ ГИБРИДОВ КУКУРУЗЫ ОТЕЧЕСТВЕННОЙ И ЗАРУБЕЖНОЙ СЕЛЕКЦИИ В УСЛОВИЯХ СЕВЕРНОГО КАЗАХСТАНА

Аннотация

Урожайность различных гибридов варьирует в значительных пределах в зависимости от сроков сева, лучшим сроком сева изучаемых гибридов кукурузы является 15-17 мая. При этом сроке сева растения кукурузы имели высокую урожайность, как по зеленой массе, так и по содержанию сухого вещества, максимальную высоту (230-235 см), хорошо облиственны и наиболее продуктивны, по сравнению с другими сроками

Ключевые слова: кукуруза, урожайность зеленой массы, гибриды.

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СОСТОЯНИЕ ЛЕСНОГО ФОНДА ЖОНГАР-АЛАТАУСКОГО ГНПП

Аннотация

В статье приведены данные состояния лесного фонда Жонгар-Алатауского ГНПП. Производительность основных древесных лесообразующих пород низкая. Насаждения III и IV классов бонитета составляют 65 %. Основная лесообразующая порода ель Шренка представлена в основном IV бонитетом и занимает 65% от площади еловых насаждений.

Ключевые слова: экология, лесной фонд, лесхоз, производительность древостоев, бонитет, класс возраста, покрытые лесом угодья.

Введение

Жонгар-Алатауский государственный национальный природный парк создан с целью сохранения естественных горных ландшафтов, имеющих особую экологическую, историческую и эстетическую ценность. В силу благоприятного сочетания разнообразных по функциональному назначению представленных здесь ландшафтов они могут быть использованы в научных, просветительских, воспитательных, культурных и рекреационных целях. Государственный национальный природный парк является специальным учреждением, сочетающим охрану окружающей среды с возможностью проведения научных исследований и различными видами рекреации и просветительской деятельности [1].

Территория Жонгар-Алатауского ГНПП планируется с включением участков Саркандского, Лепсинского, Уйгентасского государственных учреждений (ГУ), находящихся в подчинении Департамента природных ресурсов и регулирования природопользования Алматинского областного Акимата. Первое лесоустройство территории Саркандского лесхоза с входившими в него нынешними лесхозами - Лепсинским, Уйгентасским, Алакольским впервые было осуществлено в 1927 году по IV разряду согласно инструкции 1926 года [2].