ASSESSMENT OF POTATO HYBRIDS IN COMPETITION TEST

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The article presents the results of testing of promising hybrids in nurseries of competitive testing in the conditions of Central Yakutia for 2017–2018. Ten hybrids that were selected in previous breeding nurseries were tested. All studied hybrids belong to the group of early maturing (55–70 days): 216 (Country × 128-6), 239-1, 239-2, and 239-3 (Ladozhsky x Rosalind), 233, 233-2 (Slavyanka × Rosalind), 237, 237-1 (Northern × Dubrava), 232 (Aurora × Bonus), 234 (Scarlet Sail × Victoria).

Evaluation of hybrids showed that the studied hybrids, according to economically valuable traits, correspond to the model of the variety: early maturing have good biochemical indicators, and in appearance of the tubers correspond to the requirements of consumers (small surface eyes, a mid-depth stolon trace).

A description of the morphological characteristics of potato hybrids on tubers carried out. The number and weight of hybrids commercial tubers met the requirements for table varieties. The investigated samples of hybrids had a marketability of 92–97 %, which makes them economically valuable.

The samples differed in the content of dry matter (18.4–22.1 %) and starch (9.5–13.4 %). The content of nitrates in tubers did not exceed the permissible concentration.

In terms of resistance to the most common diseases in local conditions, it has been established that the samples under study have field resistance to viral diseases, macrosporosis, rhizoctoniosis, and common scab.

According to the results of the research, hybrids of potatoes 232 (Aurora × Bonus), 233 (Slavyanka × Rosalind) were selected for further study.

Keywords: potato, variety, hybrids, nursery, selection, quality, starch, harvest.

In Yakutia, potato is one of the most important food crops; its planting takes about 8.5 thousand hectares. The main limiting factors in the cultivation of potatoes in local conditions are the short growing season, heat (up to 37 ° C) and lack of rainfall, especially during the budding and stolonoobrazovanie (July). In this regard, the most important condition for the profitability of potato is the presence of varieties of the adaptive type.

For cultivation in local conditions, varieties must have early ripeness, resistance to drought, daily temperature drops and the most harmful diseases in local conditions, good keeping quality during storage. It is also necessary to apply agro technical techniques that minimize the growing season and promote the maturation of the crop in a short period [2, 6–9].

The aim of the work is the selection of promising hybrids for the subsequent creation of potato varieties.

Conditions, materials and research methods

Place of work. Studies of conducted in 2017–2018 on the experimental field of the plot "Balanthey" Yakut Research Institute of Agriculture. M.G. Safronov.

The upper soil horizons had a slightly alkaline reaction (approximately pH 7.8); 2.4–3.0% of humus in the arable layer. Ammonia nitrogen (trace amounts) and nitrate nitrogen the found in the soil in the range of 1.0–4.0 mg / 100 g of soil, which indicates low availability of readily available nitrogen. The content of gross phosphorus is 0.12–0.16%, while the comparatively high availability of its readily available forms is 17.4–23.8 mg / 100 g of soil. The availability of potassium (gross - 1.8–2.1%, exchange - 26.2–33.2 mg / 100 g of soil) is quite high.

During the vegetation period, three irrigations were carried out in the experiment - 250–300 m3 / ha. Planting care consisted in the cultivation of shoots and deep hilling.

Weather conditions. The spring of 2017 was unusually cold and long: snow melted from the fields at the beginning of the third decade of April, warming occurred only on May 27–28. In May, with the exception of 8 days with little drizzling, there was almost no rain, in the nights were cool. The ice drift near the town of Pokrovsk took place on usual terms - on May 17 th. Under such weather conditions, plant growth was slowed. In July and August, rainy weather and cold nights were an observed, and September was unusually warm and dry.

The vegetation period of 2018 was characterized by an early warm spring, a hot summer period with an uneven distribution of precipitation and a warm long autumn with a small amount of precipitation. May was warmer than usual, with heavy rains (173% of precipitation from perennial norms), the last frosts (-5.4 ° C) were recorded in the second decade of the month. June - hot, dry, with extremely uneven precipitation; the average decade temperature is 15.2 ° C (mean multiyear value is 11.9 ° C). The rains began from the second decade of June, which favorably affected the growth and development of plants. In the first decade of July, there was hot, dry weather, the maximum air temperature reached 34.6 ° C. In the second decade, sharp fluctuations in day and night temperatures were a noted; daytime temperatures reached 28.9 ° C, and night temperatures - 2.8 ° C. In August, during the period of crop formation and ripening of seeds of agricultural crops, there was warm rainy weather with total rainfall exceeding the average long-term by 59%.

Agrotechnics on the experimental plot - generally accepted in the republic. Records and observations carried out according to [3–5]. The obtained data were are subjected to mathematical processing using the method of field experience B.A. Dospekhova [1], programs SNEDECOR, Microsoft Excel.

Research results and discussion

The studied hybrids were obtained by the method of intervarietal hybridization. The parental forms were potato varieties Dachny, Ladozhsky, Rosalind, Slavyanka, Severny, Dubrava, Aurora, Bonus, Scarlet Sail, Victoria. All varieties belong to the groups of early and middle early ripening. They have potential yields up to 40–50 t / ha, marketability up to 90–96%, high biochemical and taste indices. Varieties Slavyanka, Ladozhsky resistant to potato nematode. Many of them are distinguished by high keeping quality during winter storage (Ladozhsky, Rosalind, Victoria, Slavyanka).

In 2010, a single-tub nursery (975 pcs.) Of potato hybrids was laid in 6 combinations. Parental forms were the above varieties. From the studied hybrids, 10 numbers in 6 combinations passed through the complete selection plan: 219 (Dachny x 128-6), 239-1, 239-2, 239-3 (Ladozhsky × Rosalind), 233, 233-2 (Slavyanka x Rosalind), 237, 237-1 (Northern x Dubrava), 232 (Aurora x Bonus), 234 (Scarlet Sail x Victoria).

The results of studies in competitive tests showed that the unfavorable conditions of 2017 had a negative effect on the development of potato plants, their stologen formation and, as a result, their productivity.

In 2017, in a competitive test, 16 hybrids were evaluated, of which 12 were selected. The weight of the tops was from 325 to 650 g. The number of formed tubers was 5.7–11.7 pieces / bush; in standard varieties Varmas and Yakutyanka - 6.7–7.0 pcs / bush. The weight of tubers of the studied hybrids of competitive testing was 303–960 g / bush, the highest result was shown: 232 (Aurora x Bonus) - 960 g / bush, 233 (Slavyanka × Rosalind) - 950 g / bush, 239 (Ladozhsky × Rosalind) - 950 g / bush. The weight gain of tubers compared to the standards was 440.0–450.0 g / bush.

The yield of the studied hybrids was 12.2–16.3 t / ha, which exceeded the yield of standard varieties by 0.2–5.3 t / ha (Varmas variety) and 0.9 - 5.0 t / ha (Yakutyanka variety) . The reliable yield increase by both standards was 1.5–5.0 t / ha in 5 combinations: Dachny x 128-6, Ladozhsky × Rosalind, Slavyanka x Rosalind, Aurora x Bonus, Scarlet Sail x Victoria (Table 1).

In 2018, the largest mass of tubers was observed in hybrids 239-2 (Ladozhsky × Rosalind) - 920 g / bush, 232 (Aurora × Bonus) - 1005 g / bush, 233 (Slavyanka × Rosalind) - 920 g / bush, weight gain tubers compared with the standards amounted to 200-420 g / bush. Promising hybrids formed a powerful green mass, which indicates their relative resistance to drought. The number of stems per plant varies between 3–7, and their height is 45–75 cm. The

number of tubers in selected hybrids varies between 12.5–13.5 pcs / bush, which exceeds the results of both standards.

The yield of all hybrids was quite high - 22.0–42.8 t / ha, the best indicators were recorded in hybrids 232 (Aurora × Bonus) - 42.8 t / ha and 233 (Slavyanka × Rosalind) - 34.3 t / ha . In combinations of 233-2 (Slavyanka × Rosalind), 239-3 (Ladozhsky × Rosalind), 232 (Aurora × Bonus), the yield was 28.6–42.8 t / ha, which is significantly higher than the standard variety Yakutyanka, by 2.9–17.1 t / ha (Table 1). Marketability of tubers was at the level of 92–97%.

Table 1

The yield of potato hybrids (t / ha) in the nursery of competitive testing

Number	Origin	2017			2018		
		productivity	St +/-		productivity	St +/-	
			Varmas	Yakutyanka		Varmas	Yakutyanka
216	Dachny x 128-6	14,6	+3,6	+3,3	30,0	-3,5	-4,3
239-1	Ladozhsky × Rosalind	16,3	+5,3	+5,0	28,6	-4,9	+2,9
233	Slavyanka × Rosalind	12,6	+1,6	+1,3	34,3	+0,8	+8,6
239-3	Ladozhsky × Rosalind	15,7	+4,7	+4,4	29,8	-3,7	+4,1
237	Northern x Dubrava	10,8	-0,2	-0,5	22,4	-11,1	-3,3
232	Aurora x Bonus	12,8	+1,8	+1,5	42,8	+9,3	+17,1
233-2	Slavyanka × Rosalind	12,2	+1,2	+0,9	28,6	-4,9	+2,9
234	Scarlet Sail x Victoria	12,7	+1,7	+1,4	30,7	-2,8	-5,0
239-2	Ladozhsky × Rosalind	13,2	+2,2	+1,9	26,3	-7,2	+0,6
237-1	Northern x Dubrava	10,6	-0,4	-0,7	22,0	-11,5	-3,7
control varieties –	Varmas	11,0			33,5		

St.	Yakutyanka	11,3	25,7
$NSR_{0,5}$		1,2	3,2

The results of the biochemical analysis of tubers (Table 2) showed that the dry matter content of the studied hybrids differs slightly. In hybrids 232 and 233, are the distinguished by their yield, the dry matter content varies from 20.6 to 20.7%.

Table 2

The results of the biochemical analysis of tubers of potato hybrids (average for 2017–2018).

Number	Origin	dry matter, %	starch, %	Vitamin C, мг/%
216	Dachny x 128-6	21,2	12,4	17,3
239-1	Ladozhsky × Rosalind	21,1	12,1	18,6
233	Slavyanka × Rosalind	20,6	12,8	21,7
239-3	Ladozhsky × Rosalind	19,0	11,5	19,8
237	Northern x Dubrava	19,3	11,8	22,6
232	Aurora x Bonus	20,7	12,8	21,2
233-2	Slavyanka × Rosalind	19,7	11,5	19,7
234	Scarlet Sail x Victoria	18,6	12,4	16,6
239-2	Ladozhsky × Rosalind	18,9	11,5	18,3
237-1	Northern x Dubrava	18,8	11,5	16,5
control varieties – St.	Varmas	19,2	13,6	22,6
	Yakutyanka	20,1	14,2	23,4

Evaluation of disease incidence carried out in the period of maximum plant development. It is established that all studied hybrids are 100% free from viral and bacterial diseases. Plant diagnostics by ELISA also showed the absence of latent virus infection.

Of the fungal diseases, rizaktoniosis is not in the white pedicle phase. Macrosporia and alternaria were not observed in both years of research. Bacteriosis is not marked both during the growing season of plants and during storage of tubers.

Conclusion

Result of competitive testing 2017–2018 in the conditions of Yakutia, hybrids 232 (Aurora x Bonus), 233 (Slavyanka x Rosalind) are promising. They transferred for preliminary testing for resistance to the causative agent of cancer and nematode. In the future, these hybrids will be transferred to production nurseries.

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