

ASSESSMENT OF THE PRODUCTIVITY OF KALE LEAF CABBAGE IN THE OPEN GROUND CONDITIONS OF THE SOUTH-EAST OF KAZAKHSTAN

Abstract

The introduction of vegetable crops has always been relevant, and is no less important for Kazakhstan because the movement of new valuable types of vegetable crops to various ecological and geographical zones allows you to significantly expand the range of vegetables and increase the consumption of vegetable products, make it more complete and diverse. Among all cabbage vegetables, Kale cabbage attracts special attention. Recently, this culture has become widespread due to its unique biochemical composition.

For Kazakhstan, Kale cabbage is a new crop. The introduction of leafy cabbage will contribute to the diversification of vegetable growing in the country, the expansion of the species composition of vegetable crops. Vegetable farms will grow a new vegetable crop, and the local population will receive very valuable vitamin products. In connection with the above, the study and introduction to the culture of Kale leaf cabbage is of great relevance for our country.

A primary collection of Kale leaf cabbage was formed and its study was carried out on a complex of economically valuable characteristics (productivity, quality indicators). In early maturity, the F₁ Dwarf green curlet hybrid stood out. The maximum indicator in all parameters (height, number of leaves, etc.) fell on the hybrid F₁ Nero di Toskana. The hybrid F₁ Kapitan showed maximum productivity – 32,29 t/ha, the next in terms of productivity was F₁ Red Russian – 28,7 t/ha, then F₁ Dwarf green curlet – 28,0 t/ha. A high content of dry substances and vitamin "C" in cabbage leaves was detected in the F₁ Scarlet hybrid, and the F₁ Dwarf green curlet hybrid stood out in terms of the content of total sugars. The hybrid F₁ Dwarf green curlet turned out to be the most combining the maximum number of the best indicators.

Key words: introduction, Kale cabbage, biometrics, productivity, vitamin C, dry matter, total sugar.

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VARIETAL FEATURES OF PROMISING VARIETIES OF REPAIR RASPBERRIES IN THE SOUTH-EAST OF KAZAKHSTAN

Abstract

As a result of a two-year study of the biological characteristics of seven introduced varieties of remontant raspberries, in the conditions of the south-east of Kazakhstan, the main economically useful features of Russian and Polish varieties were established.

The Russian cultivar Bryanskoye Divo 9.8 t/ha was the most productive, exceeding the other studied cultivars by an average of 12%. For productive varieties Polka by 4.2%, this variety is distinguished by the largest berries (average weight - 5.2 g). Research will be continued and, based on their results, promising varieties will be submitted to the SSI.

The experiments were carried out in the farm "Aidarbaev", in the village "Saimasay", Enbekshikazakh district of Almaty region. In the first half, studies were carried out, with positive weather conditions. The second half of the growing season was characterized by significantly hot,

dry-dry weather. The repetition of the experiment is 3-fold for 10 accounting plants, in each repetition.

Phenological records of observation were carried out during the growing season. So, with a naturally simultaneous beginning of the growing season, observed at the end of March, shoots appeared in the remaining phases, which differed in terms of their passage.

In the experiment produced, counting the leaves. Despite the longest shoots of the Karamelka variety, in terms of the number of leaves, it is inferior to the Raspberry Ridge and Nizhegorodets varieties. In the Polana variety, all the main biometric indicators were lower than in the other studied varieties.

Key words: repair raspberries, variety, escape, fruiting, harvesting, berry, yield.

Introduction

Raspberries belong to the Rosacea family (*Rosacea Luss.*). The genus *Rubus L.* The raspberry (*Idaebatus*) subgenus includes more than 120 species. Many of them have red, yellow, white or black berries. In production, various varieties of red raspberries are grown (*Rubusidaebatus L.*). In recent years, much attention has been paid to the creation of varieties of repair types. Raspberries are one of the most valuable berry crops. This is a perishable and productive crop [1, p. 67].

Raspberries are the second most important crop in world production, as well as in the Republic of Kazakhstan. However currently in our Republic the area of planted raspberry plantations has begun to surpass strawberry. In the Almaty region over the past three years, about 300 hectares of plantations have already been laid, and only with repair varieties. These varieties are much easier to grow than traditional ones due to the fact that they bear fruit on annual shoots and do not require protective measures against winter damage and installation of expensive trellis prices for off-season berries the most significant varieties of repair raspberries ripen in late summer and usually bear fruit until autumn frosts. Despite all these advantages, the Kazakhstan state register of varieties approved for use in the Republic does not have more than one repair variety. In Kazakhstan, only one repair variety of raspberries "Indian summer" has been studied until now, but it is already obsolete.

Therefore, the planned work is very relevant for Kazakhstan. Selecting and recommending the best varieties for growing by farmers, processing key agro technical methods of cultivation will significantly repeat the interest in this culture and increase the yield and volitional collection of berries. Repair raspberries differ from the usual one-year cycle of development of the aboveground part. Its peculiarity is that it can bear fruit not on two-year-old shoots, but on one-year-old ones. Modern varieties and repair raspberries are widely distributed this valuable crop, obtaining more environmentally friendly products and widespread introduction of mechanization elements in the technology of its cultivation [2, s. 80-83. 3].

Raspberry is a semi-shrub with a two-year development cycle of the aboveground part and a perennial root system. In the first year, 1-3 replacement shoots grow from the buds on the rhizome, and offspring grow on the roots. In the sinus of each leaf of these shoots, buds are laid: one main and 1-2 additional, which remain dormant this season. On the next day, from the buds located on last year's stems, fruit branches grow, on which the crop is formed, and from the buds of the rhizome and horses, new replacement shoots and offspring grow. The second year after fruiting the stems die off [4, 5, 6].

The shoots of remontant varieties are much shorter than those of plants that bear fruit in summer, and their further growth is suspended after apical flowering [7, 8].

Most repair varieties of raspberries growth are 1.0-1.5 m and rarely reaches 1.8-2.0 m. intensive growth of shoots is usually observed in the first half of the growing season [9].

The growth of the shoot and the formation of generative organs is controlled by the length of the day and temperature. In remontant varieties of raspberries, rudimentary flowers are laid, which leads to the termination of vegetative growth of shoots [10, 11].

In addition to environmental conditions, the manifestation of the sign of repair depends on the condition and age characteristics of the plant itself [12].

Thickening of raspberry shoots usually ends with the termination of their growth in length. Due to the small length of shoots, repair raspberries differ in more erect Bush habitus. In addition, with a one-year cycle of cultivation of this crop, the growth and development of shoots occurs in the absence of competition for light, water, and mineral nutrition elements in the two summer stems. This contributes to the formation of larger thickened shoots. The habit of the Bush is more influenced by the place and conditions of growth [13].

The surface of the stems of repair raspberries is usually covered with spikes of different density, shape and color. The shoots of some varieties of raspberries have a high plaque of various degrees of intensity, which performs a phytoncidal role and increases the resistance of plants to low temperatures, drought, and a number of fungal diseases [14].

Research methods

The experiments were conducted in the farm "Aidarbayev" in the village "Saimasay", Enbekshikazakh district of Almaty region. The research was conducted in seasons with positive weather conditions. In 2019, the second half of the growing season was characterized by significantly hot, dry-arid weather. The maximum daily temperature in July rose to 35°C. August-September was characterized by high air temperature, which was warmer than usual at 70°C.

Results and their discussion

A comparative evaluation of seven promising varieties Polana, Nizhegorodets, Orange Miracle, Caramel, Raspberry ridge, Bryansk Divo and Polka was conducted, and the last two varieties have already been transferred to the state variety testing. The scheme of planting 2,5x0,5 (8 000 plant).

The repeatability of the experiment is 3 times 10 accounting plants in each repeat. In the experiments, phenological and biometric observations were carried out, accounting for the crop and its quality, the repeatability of the experience in three multiples of 10 accounting plants in each (B. A. Dospikhov 1985).

Phenological phases of development of repair raspberries: the emergence of shoots, inflorescence emergence, beginning of flowering, mass flowering, beginning of ripening, mass maturation, late maturation; – The number of shoots was calculated by piece on the linear meter, the length of the shoots was measured with a ruler, the diameter of the shoots with a caliper, the area of the leaf surface for all variants of the experiment using a pallet; – The average weight of the fruit was determined for each harvest, for this purpose 100 fruits were taken, to determine the maximum weight of one fruit, 100 of the largest berries were weighed after each harvest.

Description of introduced varieties of repair raspberries: Bryanskoe Divo is a large-fruited repair variety of raspberries, with predominant fruiting on annual shoots in late summer and early autumn. Berries are very large (average weight 5-6 g, maximum-11 g), elongated - conical shape, with uniform bones, red color, paid. The beginning of ripening of berries in the second decade of August, fruiting is long. Potential yield is realized before autumn frosts by 70-90% [15].

Oranzhevoye chudo – large-fruited yellow-fruited variety with berries of high taste qualities. Berries are large, weighing 6.0-7.0 g (maximum-9.0 g), attractive, elongated - obtuse shape, bright orange with a gloss. Resistant to major fungal diseases and pests. The beginning of berry maturation is in the middle of August, and fruit bearing is long. Potential yield is realized before autumn frosts by 70-85%. Medium-sized Bush (1.5-1.8 m) [15].

Caramelka - berry cone-shaped, elongated, large. The caramel berry is not only delicious, but also beautiful - red, has the shape of an elongated cone. The maximum weight of one - 12 g, the average-6 g, the yield of 1 Bush - 5 kg. The flesh is juicy, the bones are firmly connected, the raspberry is well behind the stalk, transportable. The beginning of maturation occurs at the end of July or early August, before frosts (September-October) Caramel manages to give 90% of the second crop [16].

Malinovaya gryada - the berry is large, sweet, and dense. It is distinguished by a friendly maturation of the crop, until September 15 it Matures 100%, but fruiting continues later on late shoots. Bushes of medium height, spreading with a large shoot-producing capacity. Annual shoots are light brown in color, with sparse and small spines. The leaves are large, dark green, medium-sized flowers, large berries weighing from 5 to 8 g, dark red. Berries are very tasty, sweet and flavorful, they contain 7.5% sugar [17].

Nizhegorodets-large-fruited varieties of raspberries leave almost no one indifferent. Nizhegorodets stands out for its size in the line of large-fruited varieties. Bushes differ in average height (1.5-1.8 m), shoots slightly drooping appearance. One plant produces no more than 7-8 shoots. In the second year, the stems turn light brown and turn purple. The average weight of the berries is 5-6 g, but there are also large ones-about 12 g. the shape of the berries is conical [18].

Polka is one of the most popular in Europe. Bred in Poland, Breeder-Jan Danek. Berries weighing 5-6 g, bushes up to 1.8 m high, small thorns, forms up to 10 shoots and a little basal growth. The berries are dark red, the seeds are small, transportable and sweet. The berry begins to Mature in late July - early August, the duration of fruiting until the end of September - October, before the first frosts. Each brush has 7-10 berries. From each Bush, it is possible to collect at least 2 - 4.5 kg of high-quality berries during the season [19].

Polana-considered one of the oldest Polish remontant varieties-it was entered into the register in 1991 and also remains in the leaders of promising raspberry varieties in Ukraine until now. The size of the Bush reaches a height of only 1.5 m, sometimes slightly higher. Shoots, strong and thick, grow straight. Leaves are regular, petioles are long. The fruit is small bones, tightly linked together. Medium-sized berry, weighing from 5 to 7 g [20].

Soil washing is carried out to separate contaminated fractions and pollutants [21].

The experiment showed that all physiological indicators of cold resistance of wild raspberry species were significantly better than those of cultivated varieties [22].

Phenological records and observations were made during the growing season. So at the naturally simultaneous beginning of vegetation, observed at the end of March, when shoots appeared very amicably, the remaining phases differed in terms of their passage.

The timing of the beginning of fruiting of all the studied varieties has been determined. Thus, the earliest onset of maturation was observed in the Bryanskoe Divo variety on July 7 and then Polka from July 9 (figure 1).

In the experiment, the leaves were also counted. Despite the greatest length of shoots of the Karamelka variety in terms of the number of leaves, it was inferior to the Raspberry ridge and Nizhegorodets varieties, while the main biometric indicators of the Polana variety were lower in other studied varieties.

Simultaneously with the growth of the shoot in each node, leaves are formed on it. Their growth lasts 30-32 days. The development of leaves on the shoot is also uneven: in the middle part of the shoot, the leaves are larger than in the lower and upper parts. Also, the area of the leaf surface directly depends on the number of replacement shoots and their height.



Figure 1 - Determining the seasonal movement of growth and development of the studied varieties

Polka and Bryanskoe Divo were distinguished by the earliest beginning of the awakening of generative buds on shoots of the current year in comparison with other varieties.

Table 1-Biometric indicators of introduced varieties of repair raspberries in the conditions of the South-East of Kazakhstan

Variety	The number of shoots pcs/linear m	Height of shoots at maturation, cm	Diameter of shoots, mm	The number of leaves pcs/linear m	Wed. Area of 1 leaf blade, cm ²
Bryanskoe Divo	15,3	120,0	7,7	129,6	79,8
Polka	16,8	118,3	6,0	133,9	89,2
Karamelka	12,2	115,0	5,5	100,3	72,6
Polana	14,3	99,7	4,8	125,4	52,7
Nizhegorodets	10,1	101,4	5,2	119,2	68,8
Malinovaya gryada	11,0	109,7	4,7	112,5	65,5
Oranzhevoye chudo	11,8	107,4	6,2	109,6	63,6

It was found that the largest average area of 1 leaf blade was observed in varieties Polka and Bryanskoe Divo (89.2-79.8 cm²), which is on average 21.2% more than in other varieties. According to the main economic and useful features, the Bryanskoe Divo and Polka varieties also have a significant advantage (table 1).

Table 2-Productivity of introduced varieties of repair raspberries

Variety	Number of berries, pcs/linear m	Average weight berries (g)	Productivity t/ha
Bryanskoe Divo	473,0	5,2	9,8
Polka	520,0	4,3	8,9
Karamelka	455,0	4,0	7,2
Polana	435,0	3,7	6,4
Nizhegorodets	450,0	3,3	5,9
Malinovaya gryada	458,0	3,5	6,4
Oranzhevoye chudo	421	4,2	7,0

In General, the productivity growth of the selected varieties averaged 12% and the yield of the Bryanskoe Divo variety reached 9.8 t / ha. The least productive variety was Nizhegorodets with a yield of 5.9 t / ha (figure 2).

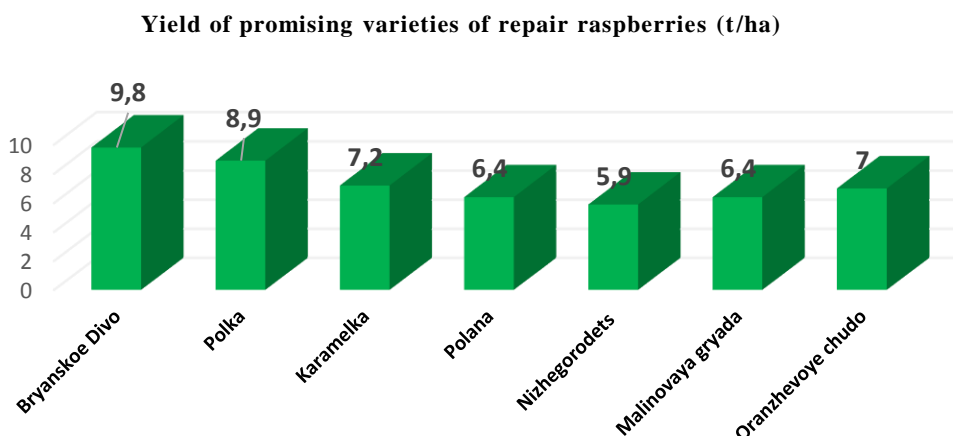


Figure 2 - Productivity of the studied varieties of repair raspberries

It was also found that the Bryanskoe Divo variety exceeds the Polka variety by 8% and the Polana and Raspberry ridge varieties by an average of 14% in terms of large fruit (table 2).

Discussion of results.

The process of plant introduction begins with the study of the phenological phases of cultivar development. It was found that at the beginning of the raspberry growing season, the Bryanskoe Divo variety is 3-4 days ahead of all other varieties, and the Polka variety is characterized by the earliest flowering, marked on June 17. In the period of mass flowering varieties entered from 2 to 3 decades of June.

Bryanskoe Divo (25.03.19), Polka and Polana (27.03.19) were distinguished by the earliest beginning of the awakening of generative buds on shoots of the current year in comparison with other varieties.

In terms of the number of shoots developed on the linear m row, the Bryanskoe Divo variety surpassed other varieties of repair raspberries by an average of 1.2 times, which indicates that it is sufficient to obtain a high yield of shoot-forming ability. The average length of a single shoot in the first class reached a length of 120 cm, and Polka at 118 cm and Caramelka 115 cm. However, the difference in maximum length among the studied varieties was also observed and correlated with the yield of the variety. So between the Bryanskoe Divo variety and the polka and Karamelka varieties that have the second and third indicators of productivity, the difference in yield was only 4.1 %, and compared to the four other varieties studied, 8.1 %. In Generalka it is necessary to recognize the undeniable advantage of the Bryanskoe Divo variety in comparison with other studied varieties

Conclusion

In 2020 research will continue and according to their results promising varieties will be transferred to the state variety tests.

It was found that the Bryanskoe Divo variety exceeds the Polka variety by 8% and the Polana and Raspberry ridge varieties by an average of 14%. In Generalka, the productivity growth of the selected varieties averaged 12% for the Bryanskoe Divo variety. The largest average area of 1 leaf blade was observed in the varieties Polka and Bryanskoe Divo, which is on average 21.2% more than in other varieties.

In the next 2020, the comprehensive study of these varieties will be continued and promising conditions for the South-East of Kazakhstan will be established.

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ҚАЗАҚСТАННЫҢ ОҢТҮСТІК-ШЫҒЫСЫНДА КЕЛЕШЕГІ МОЛ РЕМОНТАНТТЫ ТАҢҚУРАЙ СОРТТАРЫНЫҢ ЕРЕКШЕЛІКТЕРІ

Аңдатпа

Қазақстанның оңтүстік-шығыс жағдайында интрадукциялық жеті ремонтантты таңқурай сорттарының биологиялық ерекшеліктері екі жылдық жүргізілген зерттеу нәтижесінде, Ресей және Польшалық сорттарының негізгі пайдалы-шаруашылық белгілері анықталды.

Ең жоғарғы өнімділікті көрсеткен Ресей сорты Брянское Диво 9,8 т/га, ортақ көрсеткіш бойынша басқа сорттардан 12%-ға жоғары, ал Polka сорты екінші болып өнімділікті 4,2%-ды көрсетті. Бұл сорт ең ірі жидектері (орташа салмағы-5,2 г) құрады. Зерттеу жұмыстары 2020 жылы жалғасын табады және нәтижесінде перспективті сорттар мемлекеттік сорт сынау орталығына тапсырылады.

Алматы облысы, Еңбекшіқазақ ауданы, Саймасай ауылында «Айдарбаев» шаруа қожалығында тәжірибе жүргізілді. 2019 жылдың вегетациялық кезеңнің екінші жартысында ыстық және құрғақ, су тапшылағы ауа райымен сипатталды. Тәжірибе әр қайсысында, үш қайталымнан он есептік өсімдіктен жүргізіледі.

Тәжірибе барысында фенологиялық және биометриялық бақылау жүргізілді, өнімнің түсімдік есебі және оның сапасы, тәжірибенің әр қайсысында 10 есептік өсімдіктен үш есе қайталанды.

Фенологиялық есеп және бақылау жұмыстары вегетациялық кезеңде жүргізілді. Осылайша, наурыз айының соңында вегетациялық кезінің басталуы бір мезгілде байқалған, фазалар бірлескен түрде пайда болып, олардың қалған фазалары бойынша өту мерзімдері ерекшеленді.

Кілт сөздер: ремонтанты таңқурай, сорт, өркен, жеміс беру, жинау, жидек, өнімділік.

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ОСОБЕННОСТИ ПЕРСПЕКТИВНЫХ СОРТОВ РЕМОНТАНТНОЙ МАЛИНЫ НА ЮГО-ВОСТОКЕ КАЗАХСТАНА.

Аннотация

В результате двухлетнего изучения биологических особенностей, семи интродуцированных сортов ремонтантной малины, в условиях юго-Востока Казахстана, установлены основные хозяйственно-полезные признаки Российских и Польских сортов.

Наибольшей продуктивностью отличался Российский сорт Брянское Диво 9,8 т/га, превысивший другие изучаемые сорта, в среднем на 12%. По продуктивным сортам Polka на 4,2 %, этот сорт отличается, наиболее крупными ягодами (средняя масса- 5,2 г). Исследования будут продолжены и по их результатам, перспективные сорта будут переданы в ГСИ.

Опыты проводились, в КХ «Айдарбаев», в селе «Саймасай», Енбекшиказахского района Алматинской области. В первой половине были проведены исследования, с положительными погодными условиями. Вторая половина вегетации характеризовалась значительно жаркой, сухо-засушливой погодой. Повторность опыта 3-х кратная по 10 учетным растениям, в каждой повторности.

Фенологические учеты наблюдения, проводились в период вегетации. Так, при естественно одновременном начале вегетации, наблюдавшимся в конце марта, появились побеги остальные фазы, различались по срокам их прохождения.

В опыте произведён, подсчет листьев. Несмотря, на наибольшую длину побегов сорта Карамелька, по количеству листьев, он уступает сорту Малиновая гряда и Нижегородец. У сорта Polana по всем основным биометрическим показателям были ниже, чем у других изучаемых сортов.

Ключевые слова: ремонтантная малина, сорт, побег, плодоношение, уборка, ягода, урожайность.