



Development of an Early, High-Yield, Promising Variety of Chinese cabbage (*Brassica Rapa* Subsp. *Chinensis* L)

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Annotation: Chinese cabbage is a non-traditional vegetable crop for Uzbekistan, in order to expand the assortment of vegetable crops in the climate of our Republic Chinese cabbage introduced from abroad, inclTaiwan, Chinaand belongs to the Russian states 13 variety samples were studied for morphobiological and valuable economic characters andAs a model variety, the regionalized "Eastern Beauty" variety, regionalized in Uzbekistan, was taken.

As a result of three years of research, 3 early and 3 primary sources were selected according to the sign of yield.

Keywords: Chinese cabbage, new samples, early ripening, productivity, growth period, productivity of one plant.

INTRODUCTION

The role of vegetable crops in ensuring food security in the world is unparalleled; they constitute 70-75 percent of daily human consumption. According to FAO, "in 2022, in addition to cauliflower and broccoli, cabbage family vegetables will be grown on a large scale in China (1009.23 thousand hectares, 33.84 t/ha), the USA (239.17 thousand hectares, 41 .17 t/ha), Russian Federation (72.18 thousand ha, 36.34 t/ha), Ukraine (65.9 thousand hectares, 26.29 t/ha), South Korea (36.16 thousand hectares, 71.17 t/ha)". To ensure food security, it is necessary not only to increase the amount of vegetable products, but also to identify types of crops with unique content and include them in the daily diet. Therefore, the creation of high-yielding varieties of Chinese

cabbage, rich in macro- and microelements, vitamins and less common ones, as well as the organization of seed production, is one of the urgent tasks of modern vegetable growing.

Chinese cabbage has been widely cultivated in East Asian countries since the V-VI centuries. Chinese cabbage contains large amounts of vitamins A and C. On average, 100 grams contain 13 kilocalories, 0.2 grams of fat, 1.5 grams of protein, 105 mg of calcium, 0.8 mg of iron, 19 mg of magnesium and 65 mg of sodium and, due to their richness in other beneficial substances, are widely used in the treatment of insomnia, anemia, headache and nervous diseases in ancient Chinese medicine.

For our republic, Chinese cabbage is a non-traditional vegetable. Chinese cabbage is an annual plant that is eaten fresh, steamed, fried, and boiled.

Purpose of the study. Selection of high-yielding samples suitable for the climatic conditions of the Tashkent region of Chinese cabbage, attraction of promising samples for breeding, introduction into production.

A comprehensive study of Chinese cabbage varieties introduced from abroad in the climatic conditions of the Tashkent region according to valuable economic traits;

attraction of promising samples, divided according to complex characteristics, from varietal samples of Chinese cabbage for breeding and creating new early, high-yielding and commercial varieties;

determining the optimal thickness of seedlings for newly created varieties of Chinese cabbage;

determination and justification of the economic efficiency of growing Chinese cabbage in the climatic conditions of the Tashkent region.

Research method. Research to study the valuable economic indicators of Chinese cabbage samples was carried out on the basis of the methodological manual of the All-Russian Research Institute of Plant Growing (AIG) "Research and restoration of the world collection of cabbage plants" [4] and the method of B.A. Dospehov [5].

Object of study. As an object of study, 13 varieties of Chinese cabbage belonging to Taiwan, China and Russia, as well as the "Eastern Beauty" variety, zoned in our republic, were taken from the gene pool of the Research Institute of Plant Genetic Resources.

Research results. The studies were carried out on experimental fields of the Information and Consulting Center of the Tashkent State Agrarian University (EXTENSION CENTER) on typical gray soils; before sowing the seeds, ammophos was added to the soil at the rate of 200 kg/ha.

During 2015-2021, we studied the agrobiological characteristics of 13 varieties of Chinese cabbage in the climatic conditions of our republic and selected varieties and samples suitable for our local conditions. For the studied varieties and samples of Chinese cabbage, the "Eastern Beauty" variety, zoned in our republic, was used. The seeds were sown in rows of 50 cm, with 20 cm between plants. The experimental area was 6.0 m², and 60 plants were planted on it. Biometric analyses were performed on 10 plants of each variety. The germination of varieties and samples of Chinese cabbage was determined in laboratory conditions at a temperature of +20 °C in special thermostats before sowing seeds in open ground. The germination rate of seeds of all studied varieties and samples of Chinese cabbage was 95-97 percent. The seeds were sown in the first ten days of March.

It was noted that in April the air temperature was 18 °C and the air humidity was 55-0%, which created favorable conditions for the rapid growth of Chinese cabbage. During the growth period, no diseases or harmful insects were recorded in the experimental field.

Below we will focus on the main valuable economic characteristics and features of varieties and hybrids of Chinese cabbage (when grown in the climatic conditions of our republic).

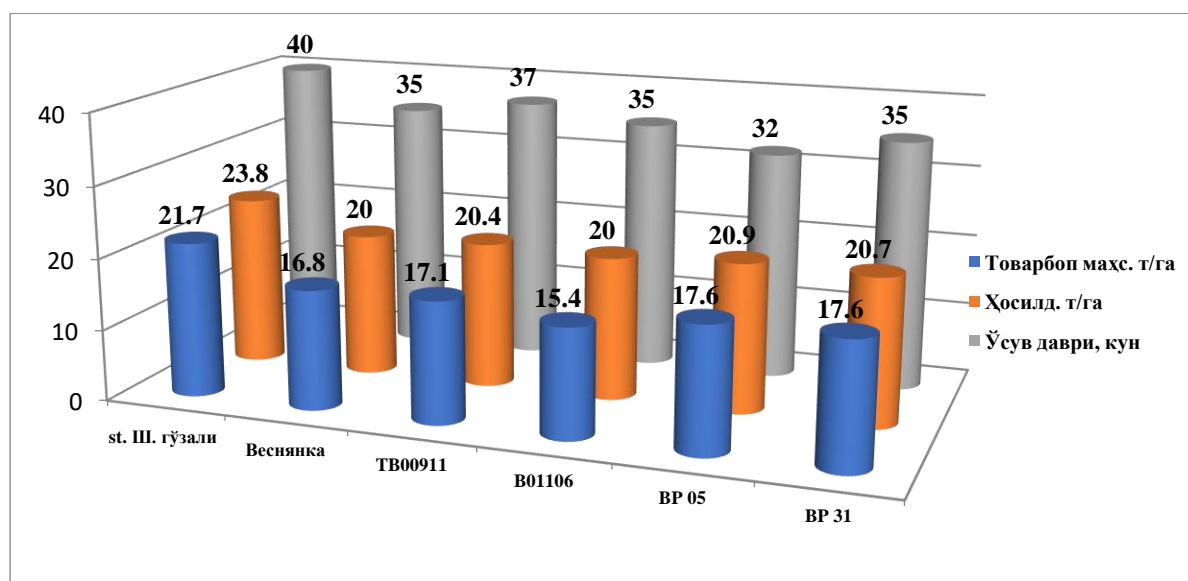
The research involved 13 varieties and samples of Chinese cabbage. Over the course of three years, 10 samples of each variety were studied for morphobiological and economic characteristics of plants, including: the number of leaves in the plant, leaf blades, leaf blade length, shape, color, yield 10%, 75%, average weight of one plant (g), yield, share of commercial products (%) and biometric analyses were carried out (Table 1).

Table 1 Valuable economic characteristics of varieties and hybrids of Chinese cabbage (2014-2016).

Catalogue No.	Sample name	Source	Growing period, days	Plant height, cm.	Average weight of one plant, g.	Total yield, t/ha
k-117	Eastern Beauty	Uzbekistan	40	28	238	23,8
k-133	Vesnyanka	Russia	35	24	200	20,0
k-131	Goluba	Russia	45	27	247	24,7
k-130	Vitavir	Russia	45	20	237	23,7
k-132	Corolla	Russia	52	30	248	24,8
k-134	Kholodok F ₁	Russia	55	28	266	26,6
k-135	Beauty of the East	Russia	49	25	240	24,0
k-41	LB01105	Taiwan	38	30	266	26,6
k-109	TB00911	Taiwan	37	29	204	20,4
k-110	TB 00912	Taiwan	39	26	210	21,0
k-111	TB 00916	Taiwan	39	28	225	22,5
k-42	LB01106	Taiwan	35	26	200	20,0
k-120	BP 05	China	32	25	209	20,9
k-121	BP 31	China	35	29	207	20,7

The content of plants in the collection nursery was determined visually and a harvest was organized.

Valuable economic characteristics of samples selected for early ripening (2014-2016). When studying the samples of Chinese cabbage for early maturing characteristics, the following 5 samples were selected that attracted our attention: k-120 BP 05, k-121 "BP 31" (China, 32-35 days); k-42 LB 01106, k-109 TB 00911 (Taiwan, 35-37 days) and k-133 "Vesnyanka" (Russia, 35 days). The growth period of these samples was 32-37 days, and it was noted that the sample was 5-7 days earlier than the "Eastern Beauty" variety (diagram 1).



However, it was found that the yield of these samples and the percentage of commercial products are lower than those of the model variety "Eastern Beauty". The average yield of the variety "Eastern Beauty" was 23.8 t/ha, of which commercial products were 21.7 t/ha. This means 91% of the gross productivity. It was noted that almost all early-ripening samples had lower yield results (2.9-3.8 t/ha) and the share of marketable fruits compared to the standard (5.8-7.4%).

In these samples, the relative yellowing of the first leaves, the resistance of leaf blades to mechanical impact, the appearance of black lines due to leaf curling, and the openwork stripes of leaves caused a decrease in the marketability of the products. However, promising primary sources for selection are Vesnyanka of Russia, BP 05 and BP 31 of China, LB 01106 of Taiwan. In the future, by individual selection on these samples, it will be possible to create ultra-early (28-30 days) varieties.

Results of the study of the yield of collection samples of Chinese cabbage. Eight out of 13 varieties of Chinese cabbage were studied in comparison with the model variety and varieties (k-133 Vesnyanka, K-135 Krasa Vostoka (Russia), k-109 TB 00911, k-110 TB 00912, k-111 TB 00916, k-42 LB 01106 (Taiwan), k-120 BP 05 and k-121 BP 31 (China)) showed low yield of 1.3-3.8 t/ha, while the sample k-130 Vitavir (Russia) with a result of 23.7 t/ha practically corresponded to the model "Eastern Beauty" (23.8 t/ha).



Over three years of research, 4 productive samples of Chinese cabbage were isolated. These samples include the varieties k-131 Goluba (24.7 t/ha), 134 Kholodok F₁ (26.6 t/ha), k-132 Corolla (24.8 t/ha) of Russian samples and including samples from Taiwan k-41 LB 01105 (26.6 t/ha), it was established that the yield is 0.9-2.8 t/ha higher than the model variety (Table 2).

Table 2 Valuable economic characteristics of samples by production characteristics (2014-2016)

Catalogue No.	Sample name	Source	Productivity, t/ha.	Commodity product	
				t/ha	%
k-117	Eastern Beauty	Uzbekistan	23,8	21,7	91,0
k-131	Goluba	Russia	24,7	21,7	88,3
k-132	Corolla	Russia	24,8	20,2	83,2
k-134	Kholodok F ₁	Russia	26,6	25,3	95,3
k-41	LB 01105	Taiwan	26,6	25,3	95,2

Among the samples selected for this productivity trait, the vegetation period of k-41 LB 01105 was 38 days, and it was established that the sample ripened two days earlier than the varieties k-131, Goluba 45 days, k-132, Corolla 52 days, and for the variety k-134, Kholodok F₁ technical ripening took 55 days. It was noted that Goluba ripened 5 days later, Corolla 12 days later, and Kholodok F₁ 15 days later compared to the model variety "Eastern Beauty". K-41 (Taiwan), k-131 Goluba (Russia) and the hybrid k-134 Kholodok F₁, selected for their yield characteristics, are valuable source material for selection when creating high-yielding varieties.

Our research has proven once again that high productivity does not always guarantee high efficiency. Of the 4 varieties and samples selected for productivity, only k-41 LB 01105 and Kholodok F₁ have a higher percentage of commercial products by 4.2-4.3% compared to the model variety; for Goluba this figure is 88.3%, and for Corolla - 83.2%. The results of the analysis of varieties, samples and hybrids of Chinese cabbage that participated in the research, in terms of the share of commercial products in the gross harvest, are presented in Diagram 3. It was noted that the contribution of commercial products to the gross product was 2.7-10.8% less than the standard variety for all varieties and samples, except for k-41 LB 01105 and Kholodok F₁.

Conclusion:

1. During 2014-2021, 13 samples of Chinese cabbage varieties were studied in the climatic conditions of our republic for morphobiological features and characteristics, and early-ripening, high-yielding varieties suitable for our local climate were selected.
2. The studied samples included the following varieties and hybrids: k-120 BP 05, k-121 "BP 31" (China, 32-35 days); k-42 LB 01106, k-109 TB 00911 (Taiwan 35-37 days) and k-133 "Vesnyanka" (Russia 35 days), k-41 LB 01105. These selected samples ripened 2-8 days earlier than the model variety "Eastern Beauty".
3. The highest yield was observed in varietal samples k-41 LB 01105 (Taiwan), k-131 Goluba (Russia), k-132 Corolla (Russia) and hybrid k-134 Kholodok F₁ and it was found that the yield was 0.9-2.8 t/ha is higher than that of the sample.

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