Modern American Journal of Biological and Environmental Sciences
ISSN (E): 3067-7920
Volume 01, Issue 07, October, 2025
Website: usajournals.org

PRODUCTIVITY OF MANGOLD VARIETY SAMPLES IN UZBEKISTAN

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Abstract
In the soil and climatic conditions of Uzbekistan, among the mangold variety samples, the highest leaf yield was observed in the Raduga (35.3 t/ha), Brazilskiy (34.4 t/ha), and Krasavitsa (33.7 t/ha) varieties, while the lowest leaf yield was observed in the Rubin (22.3 t/ha), Aliy (22.3 t/ha), Zeleniy (21.1 t/ha), and Lukullus (14.5 t/ha) varieties.

Keywords: Mangold, variety samples, plant height, number of leaves, leaf length, leaf width, leaf surface area, leaf weight per plant, leaf yield.

Introduction

Vegetable plants include at least 1200 species (including wild ones) that can be used as vegetables. They represent 78 families, of which 59 (870 species) are dicotyledons and 19 (330 species) are monocotyledons. Such a diversity of vegetable crops requires a classification necessary for studying the existing differences between different groups and organizing commercial vegetable growing [3].

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In this regard, leafy vegetables have medicinal properties, are beneficial for baby food, and for people prone to obesity. Leafy vegetables are essential in baby food. A.A. Pokrovsky [8], classifying products according to the degree of their benefits for children's nutrition, evaluates leafy vegetables as “beneficial” for children from one and a half to two years old and “very beneficial” for children from three to seventeen years old.

Mangold – leaf beet – a biennial plant belonging to the Chenopodiaceae family, a close relative of table, fodder, and sugar beets. In cultivation, two forms of mangold are used - leaf and petiolate, differing in leaf blade size and petiole width. There are varieties with silver, yellow, red, and green petioles. Mangold is used as a spinach plant with a large mass of leaves and petioles [6]; [7]

In cultivation, two forms of mangold are used - leaf and petiolate, differing in leaf blade size and petiole width. There are varieties with silver, yellow, red, and green petioles. Mangold is used as a spinach plant with a large mass of leaves and petioles. Additionally, this vegetable plant is distinguished by its high calcium, phosphorus, and iron salts. The fiber found in vegetables helps improve the digestion process [3].

A unique property of the mangold is its ability to restore pancreatic cells responsible for insulin production. Also, the nutrients in the composition of mangold protect the liver from destruction in diabetes, this vegetable is suitable for patients with intestinal diseases [4].

Scientific research on the study of morphobiological properties and economically valuable traits of mangold variety samples in the soil and climatic conditions of Uzbekistan has not been conducted. Therefore, the study of foreign selection sources of the mangold plant in the Andijan region is considered relevant.

Research Methodology

The object of the research is the seeds, plants, leaves, and leaf yields of the Mangold varieties “Aliy”, “Arjentata”, “Belovinka”, “Brazilskiy”, “Raduga”, “Jeltochereshkoviy”, “Zeleniy”, “Izumrud”, “Krasavitsa”, “Krasniy”,

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"Kurchaviy", "Lukullus", "Zolotoy Veyer", "Nevesta", "Rubin", "Serebristiy" and "Shpinatniy".

The studies were conducted on 20 plants in each sample with a sowing scheme of 70×15 cm in the sowing dates of February 20, with 4 replications, 2 rows, furrow length of 5.15 m, calculated area of 5.6 m^2.

Field experiments were conducted on the basis of the methodological manuals "Methodology for Conducting Experiments in Vegetable Growing, Melon Growing, and Potato Growing" [1], "Methodology of Field Experiments in Vegetable and Melon Growing" [2], statistical analysis of the research results was carried out in the computer program "Excel 2010" and "Statistica 7.0 for Windows", with a confidence interval of 0.95% using the dispersion method "Methodology of Field Experiments" [5].

Phenological observations, biometric and yield measurements were carried out in the experiments.

Research Results

In the soil and climatic conditions of Uzbekistan, in the early spring sowing period of 2021-2023, the shortest growing season in mangold variety samples was observed in the Brazilsky (61 days), Aliy (64 days), and Argentata (66 days) varieties, while the longest growing season was observed in the Belovinka (78 days), Lukullus (78 days), Serebristiy (78 days), and Zeleniy (79 days) varieties. Also, the lowest sum of effective temperatures from sowing seeds to the technical ripening of leaves was observed in the Brazilsky (1180.2°C), Aliy (1260.7°C), and Argentata (1317.1°C) varieties, while the highest sum of effective temperatures was found in the Zeleniy (1703.1°C) variety.

In the early spring sowing season, among the mangold variety samples, the tallest plants were formed in the Raduga (69.3 cm), Brazilskiy (67.3 cm), and Kurchaviy (64.4 cm) varieties. The height of small plants of mangold's Nevesta variety was – 59.4 cm, Belovinka variety – 59.2 cm, Serebristiy variety – 58.4 cm, Zheltochereshkoviy variety – 57.4 cm, Zolotoy Veyer variety – 57.4 cm, Krasniy variety – 55.4 cm, Argentata variety – 54.3 cm, Shpinatniy variety – 54.3 cm,

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Krasavitsa variety – 45.5 cm, Rubin variety – 42.4 cm and Izumrud variety – 41.4 cm. On the contrary, the lowest plant height was found in the Lukullus (39.6 cm), Aliy (39.6 cm), and Zeleniy (37.5 cm) varieties.

When analyzing the number of leaves per bush of mangold variety samples in early spring sowing, the most leafy varieties were Raduga (9.4 pieces) and Krasavitsa (9.1 pieces), and conversely, the sparse leafiness was shown by the spinach variety of mangold (6.1 pieces). Also, compared to the Raduga variety (9.4 pcs.), the number of leaves was 0.6-1.1 pcs. less in the Belovinka (8.8 pcs.), Rubin (8.4 pcs.) and Krasniy (8.3 pcs.) varieties, the number of leaves was 1.6-2.3 pcs. less in the Nevesta (7.8 pcs.), Zeleniy (7.7 pcs.), Kurchaviy (7.6 pcs.), Jeltochereshkoy (7.5 pcs.), Lukullus (7.4 pcs.), Aliy (7.4 pcs.) and Brazilskiy (7.1 pcs.) varieties, as well as the number of leaves was 2.8-3.0 pcs. less in the Argentata (6.6 pcs.), Zolotoy Veyer (6.5 pcs.), Izumrud (6.4 pcs.) and Serebristiy (6.4 pcs.) varieties.

When analyzing the leaf length of mangold variety samples in early spring sowing, the longest leaf length was observed in the Raduga (57.4 cm), Brazilskiy (54.5 cm), and Kurchaviy (54.5 cm) varieties, and compared to the Raduga (57.4 cm) variety, the Belovinka (47.4 cm), Serebristiy (46.5 cm), Nevesta (44.6 cm), Jeltochereshkovyiy (44.6 cm), Zolotoy Veyer (42.6 cm), Krasniy (41.6 cm), and Argentata (41.4 cm) varieties had less leaf length - 10.0-16.0 cm, Spinatniy (39.5 cm) and Krasavitsa (33.7 cm) varieties - 17.9-23.7 cm, Izumrud (29.6 cm), Rubin (28.6 cm), Aliy (25.7 cm), Lukullus (24.8 cm), and Zeleniy (24.7 cm) varieties - 27.8-32.7 cm (Table 1).

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Table 1. Height, number of leaves, and sizes of mangold variety samples in early spring crops (2021-2023 years)

Name of variety samples	Plant height (with petiole), cm	Number of leaves per bush, pcs.	Leaf length (unbranched), cm	Leaf width, cm
Aliy	39,6±0,49	7,4±0,09	25,7±0,32	18,2±0,23
Arjentata	54,3±0,58	6,6±0,07	41,4±0,45	15,7±0,21
Belovinka	59,2±0,88	8,8±0,13	47,4±0,70	17,1±0,19
Brazilskiy	67,3±0,84	7,1±0,09	54,5±0,68	19,9±0,18
Raduga	69,3±1,03	9,4±0,14	57,4±0,85	16,1±0,24
Jeltochereshkoviy	57,4±0,83	7,5±0,11	44,6±0,65	14,7±0,17
Zeleniy	37,5±0,50	7,7±0,10	24,7±0,33	18,0±0,24
Izumrud	41,4±0,52	6,4±0,08	29,6±0,37	17,6±0,16
Krasavitsa	45,5±0,49	9,1±0,10	33,7±0,36	21,0±0,21
Krasniy	55,4±0,82	8,3±0,12	41,6±0,62	15,3±0,23
Kurchaviy	64,4±0,94	7,6±0,11	54,5±0,79	14,8±0,19
Lukullus	39,6±0,59	7,4±0,11	24,8±0,37	12,3±0,20
Zolotoy Veyer	57,4±0,83	6,5±0,10	42,6±0,62	13,7±0,22
Nevesta	59,4±0,58	7,8±0,08	44,6±0,44	18,2±0,19
Rubin	42,4±0,70	8,4±0,14	28,6±0,47	16,4±0,21
Serebristiy	58,4±0,84	6,4±0,09	46,5±0,67	17,6±0,36
Shpinatniy	54,3±0,64	6,1±0,07	39,5±0,47	16,0±0,26
NSR_{05}	1,2	0,17	1,0	0,3
$Sx_{\%}$	2,3	2,2	2,4	2,0

According to the data in Table 1, when analyzing the leaf width in mangold variety samples in early spring sowing, it was found that the widest leaf width was formed in the Krasavitsa variety (21.0 cm). The varieties Brazilskiy – 1.1 cm, Nevesta and Aliy varieties – 2.8 cm, Zeleniy, Izumrud, Serebristiy and Belovinka varieties – 3.0-3.9 cm, Rubin and Raduga varieties – 4.6-4.9 cm, Shpinatniy, Arjentata and Krasniy varieties – 5.0-5.7 cm, Kurchaviy and Jeltochereshkoviy varieties – 6.2-6.3 cm, as well as Zolotoy Veyer and Lukullus varieties – 7.3-8.7 cm less leaf width compared to the Krasavitsa variety (21.0 cm).

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When analyzing the leaf area of one leaf in mangold variety samples during early spring sowing, the largest leaf area was observed in the Brazilskiy (542.5 cm^2) variety, compared to which the Raduga variety – 78.6 cm^2, Serebristiy, Nevesta, Belovinka and Kurchaviy varieties (respectively) – 131.7; 136.2; 138.0 and 140.4 cm^2, Krasavitsa, Zheltochereshkovy, Argentata, Krasny and Spinatny – 188.8; 215.5; 217.2; 223.1 and 226.9 cm^2, Zolotoy Veyer, Izumrud, Aliy, Rubin and Zeleniy (respectively) – 251.2; 282.4; 307.6; 308.0 and 320.9 cm^2 of small leaf area. On the contrary, the smallest leaf area was formed in the Lukullus variety (152.1 cm^2) (Fig. 1)

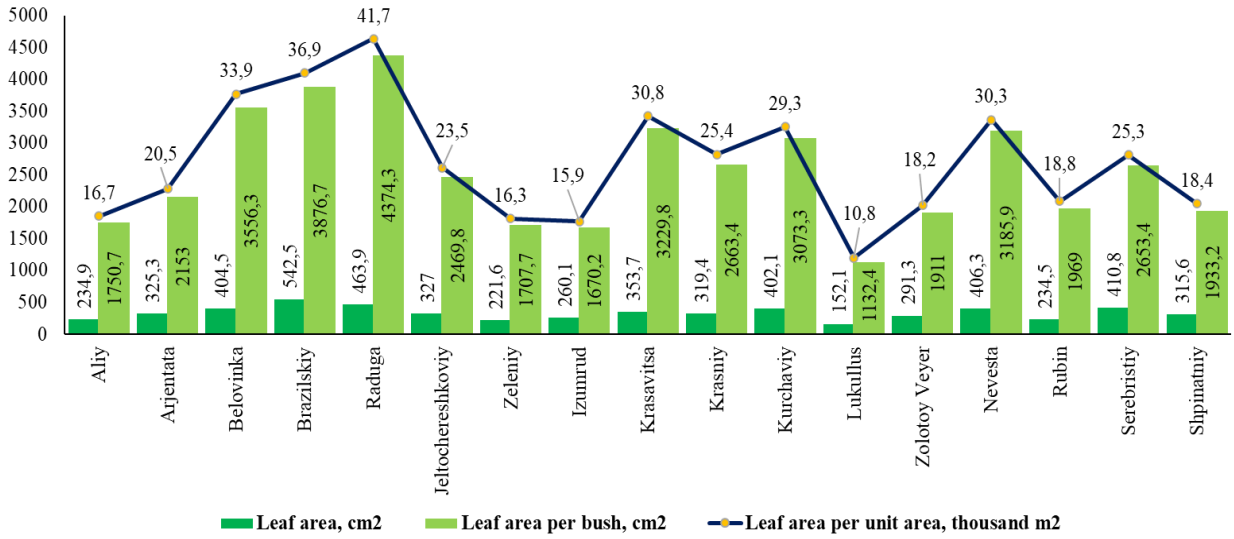

Figure 1. Leaf area of mangold variety samples in early spring sowing (2021-2023 years)

According to the data in Figure 1, when analyzing the leaf area of mangold variety samples on a single plant in early spring sowing, the widest leaf area was found in the Raduga variety – 4374.3 cm^2, in the Brazilsky variety – 497.6 cm^2, in the Belovinka variety – 818.0 cm^2, in the Krasavitsa variety – 1144.5 cm^2, in the Nevesta variety – 1188.4 cm^2, in the Kurchavy variety – 1301.0 cm^2, in the Krasniy variety – 1710.9 cm^2, in the Serebristiy variety – 1720.9 cm^2, in the Zheltochereshkoviy variety – 1904.5 cm^2, in the Argentata variety – 2221.3 cm^2,

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in the Rubin variety – 2405.3 cm^2, in the Spinatny variety – 2441.1 cm^2, and the Lukullus variety – 3241.9 cm^2.

Thus, when analyzing the leaf area per unit area of mangold variety samples in early spring sowing, the highest leaf area was found in the Raduga (41.7 thousand m^2), Brazilskiy (36.9 thousand m^2), and Belovinka (33.9 thousand m^2) varieties. However, compared to the Raduga variety (41.7 thousand m^2), in terms of area, the Krasavitsa variety – 10.9 thousand m^2, the Nevesta variety – 11.4 thousand m^2, the Kurchaviy variety – 12.4 thousand m^2, the Krasniy variety – 16.3 thousand m^2, the Serebristiy variety – 16.4 thousand m^2, the Zheltochereshkoviy variety – 18.2 thousand m^2, the Arjentata variety – 21.2 thousand m^2, the Rubin variety – 22.9 thousand m^2, the Spinatniy variety – 23.3 thousand m^2, the Zolotoy Veyer variety – 23.5 thousand m^2, the Aliy variety – 25.0 thousand m^2, the Zeleniy variety – 25.4 thousand m^2, the Izumrud variety – 25.8 thousand m^2, and the Lukullus variety – 30.9 thousand m^2 of small leaf area.

In the early spring sowing season, the largest leaf mass of mangold variety samples per bush was observed in the Raduga variety – 370.5 g, compared to which the Brazilsky variety – 9.0 g, the Krasavitsa variety – 16.9 g, the Zheltochereshkoviy variety – 43.8 g, the Krasny variety – 51.3 g, the Spinatny variety – 54.8 g, the Zolotoy Veyer variety – 79.5 g, the Serebristiy variety – 97.4 g, the Nevesta variety – 99.7 g, the Belovinka variety – 100.8 g, the Kurchaviy variety – 102.5 g, the Izumrud variety – 110.6 g, the Argentata variety – 110.7 g, the Rubin variety – 136.3 g, the Aliy variety – 13,0 g, Zeleniy variety – 148.7 g and the Lukullus variety – 218.3 g small leaf weight (Table 2).

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Table 2. Leaf mass and leaf yield per bush in mangold variety samples during early spring sowing

Name of variety samples	Leaf weight per bush, g	Leaf productivity, t/ha			
		2021-year	2022-year	2023-year	average
Aliy	234,1±2,9	21,8±0,32	23,6±0,22	21,4±0,31	22,3±0,28
Arjentata	259,8±2,8	24,1±0,35	25,6±0,23	24,6±0,45	24,7±0,27
Belovinka	269,7±4,0	25,5±0,38	25,0±0,23	26,6±0,54	25,7±0,38
Brazilskiy	361,5±4,5	33,7±0,50	36,2±0,33	33,4±0,49	34,4±0,43
Raduga	370,5±5,5	34,2±0,50	34,6±0,32	37,1±0,76	35,3±0,52
Jeltochereshkoviy	326,7±4,7	30,5±0,45	33,0±0,30	29,9±0,61	31,1±0,45
Zeleniy	221,8±3,0	20,6±0,30	21,8±0,20	21,0±0,38	21,1±0,28
Izumrud	259,9±3,3	24,6±0,36	24,1±0,22	25,6±0,38	24,8±0,31
Krasavitsa	353,6±3,8	33,0±0,49	35,4±0,32	32,7±0,60	33,7±0,36
Krasniy	319,2±4,7	29,5±0,43	29,8±0,27	31,9±0,65	30,4±0,45
Kurchaviy	268,0±3,9	25,0±0,37	26,8±0,39	24,7±0,36	25,5±0,37
Lukullus	152,2±2,3	14,1±0,21	14,2±0,13	15,2±0,31	14,5±0,22
Zolotoy Veyer	291,0±4,2	27,2±0,40	29,4±0,27	26,6±0,54	27,7±0,40
Nevesta	270,8±2,7	25,3±0,37	27,1±0,25	25,0±0,46	25,8±0,25
Rubin	234,2±3,9	22,2±0,33	21,7±0,32	23,1±0,47	22,3±0,37
Serebristiy	273,1±3,9	25,5±0,38	27,6±0,56	25,0±0,51	26,0±0,38
Shpinatniy	315,7±3,7	29,3±0,43	31,1±0,46	29,9±0,44	30,1±0,36
NSR_{05}	6,4	0,7	0,7	0,8	0,6
$Sx_{\%}$	2,3	2,8	2,4	3,1	2,3

According to the data in Table 2, the highest leaf yield of mangold variety samples in the early spring sowing period for 2021-2023 was observed in the Raduga (35.3 t/ha) and Brazilskiy (34.4 t/ha) varieties. However, less leaf yield per unit area compared to the Raduga variety (35.3 t/ha) was observed in the varieties Krasavitsa (33.7 t/ha), Zheltochereshkoy (31.1 t/ha), Krasniy (30.4 t/ha), Shpinatniy (30.1 t/ha), Zolotoy Veyer (27.7 t/ha), Serebristiy (26.0 t/ha), Nevesta (25.8 t/ha), Belovinka (25.7 t/ha), Kurchaviy (25.5 t/ha), Izumrud (24.8 t/ha), Argentata (24.7 t/ha), Rubin (22.3 t/ha), Aliy (22.3 t/ha), Zeleniy (21.1 t/ha), and Lukullus (14.5 t/ha).

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Summary:

1. It was established that in the early spring crop, the tallest plants were formed in the Raduga (69.3 cm), Brazilskiy (67.3 cm), and Kurchaviy (64.4 cm) mangold varieties, and conversely, the lowest plant height was formed in the Lukullus (39.6 cm), Aliy (39.6 cm), and Zeleniy (37.5 cm) varieties.
2. In the early spring crop, the most abundant leafiness was observed in the Mangold varieties Raduga (9.4 pcs.) and Krasavitsa (9.1 pcs.), and conversely, the sparse leafiness was observed in the Spinatny variety (6.1 pcs.).
3. In the early spring crop, the longest leaves were formed in the Raduga (57.4 cm), Brazilskiy (54.5 cm), and Kurchaviy (54.5 cm) varieties, and, conversely, the smallest leaves in the Lukullus (24.8 cm) and Zeleniy (24.7 cm) varieties, as well as the widest leaf width in the Krasavitsa variety (21.0 cm), and the narrowest leaf width in the Zolotoy Veyer (13.7 cm) and Lukullus (12.3 cm) varieties.
4. In the early spring crop, the largest leaf surface area was found in the Brazilsky (542.5 cm^2) and the smallest leaf surface area in the Lukullus (152.1 cm^2) varieties, the widest leaf surface area per bush was found in the Raduga (4374.3 cm^2), Brazilsky (3876.7 cm^2) and Belovinka (3556.3 cm^2) varieties, on the contrary, the smallest leaf surface per bush was found in the Izumrud (1670.2 cm^2) and Lukullus (1132.4 cm^2) varieties, as well as the largest leaf surface per unit area was found in the Raduga (41.7 thousand m^2), Brazilsky (36.9 thousand m^2) and Belovinka (33.9 thousand m^2) varieties, on the contrary, from the mangold variety samples, the smallest leaf surface per unit area was found in the Aliy (16.7 thousand m^2), Zeleniy (16.3 thousand m^2), Izumrud (15.9 thousand m^2) and Lukullus (10.8 thousand m^2) varieties.
5. In the early spring crop, the heaviest leaf mass was observed in the Raduga (370.5 g), Brazilskiy (361.5 g), and Krasavitsa (353.6 g) varieties, while the lightest leaf mass was observed in the Rubin (234.2 g), Aliy (234.1 g), Zeleniy (221.8 g), and Lukullus (152.2 g) varieties.
6. In the early spring crop, the highest leaf yield was observed in the Raduga (35.3 t/ha), Brazilskiy (34.4 t/ha), and Krasavitsa (33.7 t/ha) varieties, while the lowest

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leaf yield was observed in the Rubin (22.3 t/ha), Aliy (22.3 t/ha), Zeleniy (21.1 t/ha), and Lukullus (14.5 t/ha) varieties.

References:

1. Azimov B.J., Azimov B.B. Methodology for Conducting Experiments in Vegetable Growing, Melon Growing, and Potato Growing. - Tashkent, 2022. – P. 121-152.
2. Belik V.F. Methods of experimental work in vegetable and melon growing. – Moscow: Agropromizdat, 1992. – 224 p.
3. Berson G.Z. Vegetables for every taste. – Yekaterinburg: Wednesday. – Ural. kN. ed. 1993. – 240 p.
4. Borisov V.A., Litvinov S.S., Romanova A.V. Quality and lezhkost vegetables. – Moscow, 2003. – 625 p.
5. Dospekhov B.A. Methodology of field experience (with the basics of statistical processing of research results). - 5th ed., additional and pererab. - M.: Agropromizdat, 1985. – 351 p.
6. Grinberg E.G., Gubko V. N., Vitchenko E. F., Meleshkina T. N. Vegetable crops in Siberia. - Novosibirsk: Sib. Univ. Publishing house, 2004. – 400 p.
7. Litvinov S.S. vegetable growing in Russia and its scientific support (State, priorities, prospects). – Moscow: RASKHN-VNIIO, 2003. – 35 p.
8. Paponov A.N. Vegetables are a source of health. - Edition 2-e pererab. I DOP. – Perm: Publishing house pgsha, 2009. – 159 p.