

Improvement of Agrotechnologies of Growing Topinambur Varieties in Uzbekistan

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Abstract

In the conditions of Uzbekistan for the first time the growth, development and productivity of new varieties of Jerusalem artichoke varieties were studied. Varieties were planted in early spring and late autumn, and a separate agrotechnology was developed as a feed for livestock, a separate agrotechnology for the food and pharmaceutical industries. , and in the plains, it is advisable to grow it as a single and perennial crop for the livestock sector.

Keywords: *Jerusalem artichoke, variety, planting time, bush thickness. feed, pure ecological product, stalk, stem count, inulin, productivity indicator, agrotechnology, blue mass, cluster system, yield, artichoke stalk powder.*

Introduction

In recent years, a new form of ownership in crop production in agriculture and animal husbandry is being introduced in the cluster system. The main focus in production is to increase profitability, increase income, reduce costs, save water resources, cultivate environmentally friendly products based on new varieties, techniques and technologies while maintaining soil fertility.

60% of productivity in animal husbandry depends on the strength of the feed base, the composition of feed additives, the provision of high-nutrient feeds throughout the year. In multi-sector farms, cotton + grain, grain + fodder grasses, cereals, legumes, legumes, as well as intermediate and secondary crops in relation to the main crop in short-crop rotations, while maintaining soil fertility. requires the organization in accordance with market demand and at the same time provide the population with environmentally friendly products, animal feed Mavlyanova R.F. [3; 25-30-b].

The role of Jerusalem artichoke in the cultivation of food and food security, which is suitable for wide use in the production cluster system, gives high yields in the processing and consumer markets, is invaluable. Camelia (Bonciu) Neagu and Gabriela Bahrim. [4; 57 - b] The crop is important not only for livestock but also for the elderly population who consume it with dietary food in food balance.

According to DT Abdukarimov and others [1; 78 - b], 5 tons of Jerusalem artichoke powder are obtained from 40 tons per hectare. In ensuring food safety, artichoke powder is added to the diet for patients with diabetes in the preparation of bread and bakery products, meals and salads [Safarov.A.K, 7; 32-33-b]. Patients consuming Jerusalem artichoke inulin had a reduction in blood and urine sugar levels of 16-17%, and the consumption of various cool dietary drinks made from artichoke tubers and tumors optimized the metabolism of carbohydrates in the body.

De Mastro G., Manolio G. and Marzi V. [5; 372-b], Kocsis L, Kaul H-P, Praznik W. and Liebhard P [6; 1164-b] Jerusalem artichoke is a perennial high-yielding green mass and end crop, a promising plant that can produce 25-28 tons of nutrients per unit area and retain inulin at the end, fully recyclable.

In world agricultural practice, 85-100 tons of blue mass per hectare, 28-40 tons of tubers and 25-30 tons of quality food units are grown from Jerusalem artichoke plants. 5 tons of Jerusalem artichoke powder or 4680 kg of inulin are obtained from 40 tons of Jerusalem artichokes per hectare. cellulose, paper, ethanol are obtained. Jerusalem artichoke powder is added to the diet for patients with diabetes in the preparation of bread and bakery products, salads, meals to ensure food safety. Patients consuming Jerusalem artichoke inulin have been found to have a 16-17% reduction in blood and urine sugar levels, and a variety of cool diet

drinks made from Jerusalem artichoke tubers and tumors have been shown to optimize carbohydrate metabolism in the body.

Amonova M.E., Akhmedov T, Khasanov X [2; 70-b] In the conditions of Andijan region, the correct determination of the timing and thickness of the bush in the early spring of Jerusalem artichoke varieties will increase productivity and provide livestock with high quality feed.

The aim of the research is to improve the agrotechnology of growing a new cultivar of Jerusalem artichoke in different soil conditions, depending on the purpose of different uses.

The Following Tasks Were Set for the Research

- To determine the growth, development and productivity of varieties when planted as a single and perennial crop in different soil conditions;
- Evaluation of the dynamics of harvesting of single and perennial crops in different soil conditions;
- Evaluation of nutritional quality indicators in the consumption of varieties of whole and green mass crops by different livestock in different soil conditions;
- Determine the amount of inulin in the tubers when growing varieties as annual and perennial crops in different soil climates;
- Evaluation of the laws of formation of blue mass and end crop in the methods of cultivation of varieties in different soil conditions;
- Determine the effectiveness of improving the technology of cultivation of topinambur varieties as a single and perennial crop in different soil and climatic conditions.

Conditions of Research

Field experiments have been conducted on farms in Bakhmal district of Jizzakh region and Aqdarya district of Samarkand region, Navbahor district of Navoi region since 2017.

The object of research is 3 varieties of Jerusalem artichoke (Miracle and Confession), meadow gray soils (Aqdarya district of Samarkand region), meadow soils (Bakhmal district of Jizzakh region), and typical gray soil conditions (Navbahor district of Navoi region) as a single and perennial crop. The planting, planting time and bush thickness are the object of research.

Materials and Methods

Conducting field experiments, sowing, phenological observations, biometric measurements, crop care, yield determination New varieties of agricultural crops of the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, Leningrad (St. Petersburg) Agricultural Institute, All-Russian Scientific Research Institute of Botany, All-Russian Scientific Research of Potato The test is carried out on the basis of methodological recommendations, instructions, methods of the State Variety Testing Commission, such as B.A. Dospekhov's "Methodology of field experiment" (1985). Statistical analysis of the results obtained in field experiments is carried out using WinQSB-2.0 and Microsoft Excel.

Agrotechnologies for the cultivation of varieties in different soil climatic conditions, depending on the purpose of cultivation, have been developed. With this in mind, we present below the analysis of growth, development and productivity indicators and the amount of inulin formation in the regions, growing Topinambur Etiraf variety in the mountains (Jizzakh region), foothills (Samarkand region) and plains (Navoi region).

In the first experiment, there were two options in all three areas: Option 1: Complete-silo direction: Sowing in spring, bush thickness 31.7 thousand bushes / ha (90x35 cm), N-250, P-180, K-150 kg / ha, irrigation The number is 6–8 times, harvesting- separate from the surface in October, the end for separate food and processing.

Option 2: Silage direction: Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N-300, P-200, K-150 kg / ha, number of irrigations 8-10 times, harvesting In September, the topsoil will be silo-hayed along with the end.

The recognized variety was planted in the spring on a scheme of 90x35 cm, in the fall on a scheme of 60x30 cm. The number of returns is 4. The area of Delyanka is 108 m² when planted in spring and 72 m² when planted in autumn.

Field experiments, sowing, phenological observations, biometric measurements, crop care, yield determination were carried out on the basis of methodical recommendations, instructions, methods of the Ministry of Agriculture of the Republic of Uzbekistan, Uzbek Plant Research Institute, State Variety Testing Commission for testing new varieties of agricultural crops.

In the experiment, the duration of the vegetation period was calculated from the time of full germination, with 171 days in the first variant in spring, 175 days in autumn in the second variant, and 163 days in the first variant in spring in the foothills of Samarkand region. Option 2 was 168 days, Jizzakh region was 149 days when planted in spring and 156 days in autumn in mountainous areas. Due to the perennial nature of Jerusalem artichoke, in areas with long marrow days (Navoi region) the vegetation period was more complete, even seed formation, but in Samarkand, especially in the mountainous region of Jizzakh region, full flowering was not observed, and the interfacial period was shorter.

Results and Discussion

When studying the biometric parameters of plants, the plant height was 235.6-242.5 cm in typical gray soils (in the plains), the number of stems was 2.6-2.8, the number of side branches was 32.4-36.7, the number of leaves was 88, 7-95.6 pieces in meadow gray soils (foothills) plant height 220.6-232.8 cm, number of stems 2.4-2.5 pieces, number of side branches 26.5-32.1 pieces, number of leaves 66.5-72.4 pieces, in the mountainous area (Jizzakh region) the plant height is 198.7-209.6 cm, the number of stems is 2.3-2.3 and the number of side branches is 23.1-24.2. the number of leaves was 61.8-64.6 (Table 1). With the increase in sea level in the experimental areas, temperature, humidity and soil type grazing, the plant height, number of stems, number of side branches and leaves in plants also decreased, which of course depends on the biological properties of the plant.

Table 1. Plant growth and development indicators

τ/p	Options	Flourishing time					
		Plant height, cm	number of stems, pcs	number of leaves, pcs	side person, pcs	barg sathi, thousand cm ²	
Navoi region, plain area, typical glacial soils							
1	Tuganaxilos direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	235,6	2,8	95,6	36,7	192,5
2	The direction of the end of the silo	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	242,5	2,6	88,7	32,4	186,1
Samarkand region, foothills, meadow gray soils							
3	Tuganaxilos direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	220,6	2,5	66,5	31,2	154,6

4	The direction of the end of the silo	Sowing in autumn, bush thickness 55.5 thousand bushes (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	232,8	2,4	72,4	26,5	151,3
Jizzakh region, mountainous area, meadow soils							
5	Tuganaxilos direction	Sowing in spring, bush thickness 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is for separate food and processing	198,7	2,3	61,8	24,2	135,7
6	The direction of the end of the silo	Sowing in autumn, bush thickness 55.5 thousand bushes (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	209,6	2,3	64,6	23,1	133,8

In the experiment, the productivity of plants differed sharply from one region to another. In the plain region (Navoi region) in one bush the surface area is 1704.5-2413.2 grams, the total yield is 635.9-1345.7 grams, in the foothills - 1482.8-2211.3 grams, and the total yield is 511.7-1214, 5 grams, in the mountainous area the surface area was 1266.6-1851.7 and the final yield was 477.4-927.4 grams. When determining the content of inulin in the soil, 13.6-13.8% was recorded in the mountainous area, 12.5-12.7% in the foothills and 9.5-10.3% in the plains (Table 2).

Table 2. Cook mass nutrition in the experiment, the dynamics of inulin accumulation at the end

Table 2. Cuckoo mass nutrition in the experiment, the dynamics of inulin accumulation at the end								
τ/ p	Options		feed unit			inulin content,%		
			25.aug	25.sen	25.oct	25.aug	25.sen	25.oct
Navoi region, plain area, typical glacial soils								
1	The end-silo direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	0,18	0,21	0,24	7,1	8,9	9,5
2	Silos-end direction	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	0,16	0,19	0,22	8,2	9,4	10,3
Samarkand region, foothills, meadow gray soils								
3	The end-silo direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	0,16	0,2	0,23	8,3	9,9	12,5
4	Silos-end direction	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	0,15	0,18	0,22	8,7	10,6	12,7

Jizzakh region, mountainous area, meadow soils								
5	The end-silo direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	0,16	0,18	0,22	10,1	11,2	13,6
6	Silos-end direction	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haysta	0,15	0,17	0,22	10,5	12	13,8

In the three soil climatic conditions studied in the experiment, there was a sharp difference in plant growth, development, productivity and inulin content when grown in two sets of agro-measures in the 1st variant in the end-silo direction and in the 2nd variant in the silo-end direction. cultivation was found to be expedient.

Table 3. Blue mass and tuber yield in Jerusalem artichoke reproductions, t / ha

Table 3. Blue mass and tuber yield in Jerusalem artichoke reproductions, t / ha									
T/ p	Options		in reproductions						
			I		II		III		
			blue mass	tuganak	blue mass	tuganak	blue mass	tuganak	
Navoi region, plain area, typical glacial soils									
1	The end-silo direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	76,5	42,6	68,3	35,2	64	33,2	
2	Silos-end direction	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystac	94,6	35,2	84,6	29,1	75	27,4	
Samarkand region, foothills, meadow gray soils									
3	The end-silo direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	70,1	38,5	65,2	34,3	61,7	28,6	
4	Silos-end direction	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	82,3	28,4	71,7	26,9	63,8	25,4	
Jizzakh region, mountainous area, meadow soils									

5	The end-silo direction	Sowing in the spring, the thickness of the bush 31.7 thousand bushes / ha (90x35 cm), N250, P180, K150 kg / ha, watering 6-8 times, harvesting - in October, the surface is separate, the end is separate for food and processing	58,7	29,4	56,5	28,2	54,1	24,9
6	Silos-end direction	Sowing in autumn, bush thickness 55.5 thousand bushes / ha (60x30 cm), N300, P200, K150 kg / ha, irrigation 8-10 times, harvesting - in September, the topsoil is siled with haystack	70,3	26,5	63,8	26,1	55,7	23,8

In the experiment, the yield of artichoke tubers in the mountainous area was 58.7-70.3 tons of green mass per hectare, 26.5-29.4 tons of tubers were obtained in the first reproduction, while in the third reproduction these figures decreased to 54.1-55.7 and 23, respectively. , 8-24.9 t / ha. The same decrease in productivity was observed in other regions with the increase in reproduction, but the figures were higher in the plateau region. It is characterized by the length of warm days, the passage of full growth cycles of the variety, the biological properties of temperature, humidity, solar energy, high utilization rate of FAR.

In mountainous and foothill areas, the thickness of the bush is 31.7 thousand bushes, nitrogen-250, phosphorus-180, potassium-150 kg / ha, the number of irrigations is 6-8, due to the high content of inulin in the spring for food in different regions of Jerusalem artichoke plant. Once in October, it will be possible to meet the needs of the population in dietary products.

From the first experiment it can be concluded that in order to create a succulent fodder base of the network in the system of forage rotation in a cluster system specializing in animal husbandry, Jerusalem artichoke was planted in late autumn in the regions with a bush thickness of 55.5 thousand bushes / ha, nitrogen-300, phosphorus-200, potassium-150. kg / ha, the number of irrigations is 8-10 times, silage suppression by harvesting in September together with the completion of the above-ground part increases the level of feed efficiency and strengthens the feed base of the livestock sector.

In the second experiment, the Miracle and Etiraf varieties of Jerusalem artichoke were studied for growth, development, fertility and green mass yield, and yield of powder and inulin when grown for tukanak in one-year tukanak and perennial silage-tukanak conditions in hot gray soils of Samarkand region.

In the experiment, the growth and development indicators of Jerusalem artichoke varieties are given in Table 4, the growth and development indicators are 31.7 thousand / ha when grown for one year, the spring planting and late planting for fodder silage and haylage. 55.5 thousand / ha) create conditions for alternative growth and development.

Plants are tall (253.8 cm), sessile (3.1-3.2), the number of side branches (34.6-35.8), the number of baskets (38.9-40.1), flowering Miracle variety with high intensity (8-9 points), plant height 231.8 cm, number of stems 2.4-2.5, number of side branches 29.3-30.2, number of baskets 28.6-29 , 4 relatively small indicators were recorded in the Recognition variety, but the phenotypic homogeneity of the stems was 7-8 points, the average weight of the stalks was 95-105 grams, the location of the nest in the nest and the swelling of the pores in the stalks, and the inulin content in the stalks was 12.5%. which is high . The number of ends and the cost of uneven ends were higher in the Miracle variety.



1.picture. The appearance of the khan's daughter insects on the Jerusalem artichoke plant in the experiment.

It is interesting to note that during the period of rapid growth in the experimentally studied varieties, the growth point and upper base of plants, stems and side horns, leaf blades, they encounter insects with the help of the khan's daughter (Fig. 1). It is also a feature for attracting insects in varieties and a direct field biolaboratory.



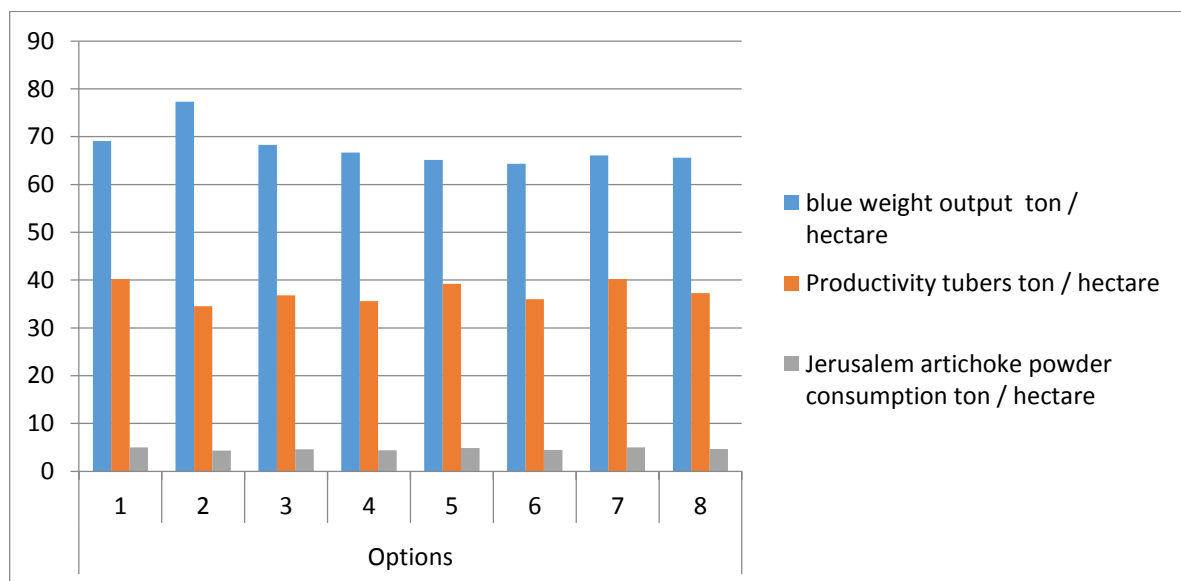
Figure 2. Appearance of the experimental field during flowering.

Table 4: Biometric indicators of plants and flowering intensity

№	Options	planting time	during flowering								
			Plant height, cm	number of stems, pcs	number of stems per hectare, thousand pieces	side person, pcs	number of baskets	number of baskets per hectare, thousand pieces	The duration of flowering in a basket, days	Duration of flowering plant, days	Flowering intensity, ball
As an annual crop											
A kind of miracle											
1	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	5-7 march	235,6	3,2	101,4	34,6	38,9	1233,1	7	51	9
2	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		248,9	3	166,5	30,1	35,7	1981,3	6	44	8
3	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	10-12 november	242,3	3,2	101,4	35,8	40,1	1271,2	7	52	9
4	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		253,8	3,1	172	33,4	36,4	2020,2	6	44	8
Type of recognition											
5	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	5-7 march	209,4	2,5	79,2	29,3	28,6	906,6	6	37	8
6	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		231,8	2,3	127,6	25,4	25,9	1437,4	5	36	7
7	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	10-12 november	213,4	2,4	76	30,2	29,4	931,9	6	35	8
8	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		227,8	2,3	72,9	27,1	26,7	1481,8	5	37	7
As a perennial crop											
A kind of miracle											
9	The first year harvest is in October, the first year the bush thickness is 31.7 thousand / ha	10-12 november	245,8	3,1	98,3	35,2	36,5	1157	6	53	8
10	In the second year, the summer stem harvest, the second stem harvest in November, the bush thickness is 55.5 thousand / ha		161,2	3,2	177,6	12,4	0	0	0	0	0
11	In the third year, sow weeds in the field and mow the mass 4-5 times		120,5	2	102,5	5,6	0	0	0	0	0
Type of recognition											
12	The first year harvest is in October, the first year the bush thickness is 31.7 thousand / ha	10-12 november	221,9	2,3	72,9	26,4	28,3	897,1	5	39	7
13	Carrying out summer stem harvest in the second year, carrying out the second stem harvest in November, bush thickness 55.5 thousand / ha		152,5	2,1	116,5	13,4	0	0	0	0	0
14	In the third year, sow weeds in the field and mow the mass 4-5 times		125,6	1,8	105,3	4,8	0	0	0	0	0

Table 5: Productivity, nutrition and inulin output in plants

№	Options	Planting times	Blue mass yield t / ha	final yield, t / ha	сушка буряка, т/га	инулин мкг/г
As an annual crop						
sort of a miracle						
1	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	5-7 march	69,1	40,2	27,6	502
2	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		77,3	34,5	28,8	431
3	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	10-12 november	68,3	36,8	27,4	460
4	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		66,7	35,6	27,2	445
kind of recognition						
5	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	5-7 march	65,1	39,2	27,3	490
6	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		64,3	36	26,2	450
7	For the end, the harvest is in the third decade of October, the thickness of the bush is 31.7 thousand / ha	10-12 november	66,1	40,2	27,9	502
8	Cook mass and end harvesting together, third decade of October, for haylage, bush thickness 55.5 thousand / ha		65,6	37,3	26,9	466
As a perennial crop						
A kind of miracle						
9	The first year harvest is in October, the first year the bush thickness is 31.7 thousand / ha	10-12 november	77,5	33,5	28,7	418
10	In the second year in the summer (third decade of June) stem harvest, the second stalk harvest in November, bush thickness 55.5 thousand / ha		97,4	7,8	25,7	
11	In the third year, sow weeds in the field and mow the mass 4-5 times		194,9	0		
Type of recognition						
12	The first year harvest is in October, the first year the bush thickness is 31.7 thousand / ha	10-12 november	72,5	36,7	28,3	458
13	In the second year in the summer (third decade of June) stem harvest, the second stalk harvest in November, bush thickness 55.5 thousand / ha		105,3	10,5	28,4	
14	In the third year, sow weeds in the field and mow the mass 4-5 times		192,4	0		



3.picture. In the experiment, in 1-4 variants (Miracle), 5-8 variants (Confession) when planted as an annual crop, blue mass and yield per hectare, as well as inulin output.

In experiments, when planted as a perennial crop, the second year of use in the field was cared for, leaving 4–5 seedlings per pound. The plants were harvested in the summer, in the third decade of June, the stem was harvested and the silage was given to the cattle. Re-growth of plants from rootstocks to stem buds was observed. The cultivator was cultivated with a deep softener and 150 kg of nitrogen, 100 kg of phosphorus and 75 kg of potassium fertilizers per hectare were applied by cultivating twice between rows. In late autumn, in late October, depending on the arrival of the weather, the blue mass and small stalks were harvested together. The yield of green mass was 97.4-105.3 t / ha at the expense of two harvests, and 7.8-10.5 t / ha at the end.

In the third year of use, 192.4-194.9 tons of high-quality fodder per hectare was grown at the expense of multi-crop water weeds and several (4 times) harvests. As a result, the formation of small Jerusalem artichoke tubers is not allowed, and next year it will be possible to plant the main grain or cotton varieties.

Thus, the new Etiraf variety of Jerusalem artichoke, as an annual crop for the production of Jerusalem artichoke powder in the food and pharmaceutical industries, was planted on 31.7 thousand bushes per hectare in meadow-gray soils, ensuring full maturation of the tubers in the third decade of October. cluster shop as a local raw material for the pharmaceutical industry for daily harvesting, production of paper with dried po and leaves, or use as coarse hay, separate collection of waste and production of waste powder is provided to increase profitability through the delivery of a bee cluster.

In a cluster system established on the banks of the Zarafshan valley, which specializes in animal husbandry, Jerusalem artichoke varieties are harvested as perennial crops for three years, the first year with a complete green mass, silage, haymaking, the second year with a stalk harvest in late summer and late autumn. The preparation of seneage and the planting of multi-crop forage grasses in the field in the third year will create an opportunity to prepare high-quality fodder due to several harvests.

Conclusions

For the first time in the history of the Zarafshan Valley of Uzbekistan, the growth, development and productivity of Jerusalem artichoke varieties were studied. Varieties were planted in early spring and late autumn, and a separate agrotechnology was developed as a feed for livestock, a separate agrotechnology for the food and pharmaceutical industries, taking into account the high content of inulin in food in mountainous and foothill areas of the republic. - for the food and pharmaceutical industries, and in the plains for the livestock sector, it is advisable to grow in a three-year system as a single and perennial crop.

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