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Primary seed production of fodder crops

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Abstract. In recent years, for a number of reasons, there has been a decrease in attention to seed production of many forage crops for seed reproduction. Many varieties have lost their yield, resistance to diseases and various unfavorable climatic conditions, for which it is necessary to carry out regular work on the primary seed production of varieties. In our studies, work was carried out on primary seed production on the varieties of fodder beet "Uzbekistan-83", corn "Uzbekistan-2018", oats "Uzbek broadleaf" and triticale varieties "Silver Prague". This article presents the results of primary seed production on forage crops of the above varieties.

1. Introduction

In the course of the implementation of agricultural reforms on the irrigated lands of the republic, many farms were created, including livestock ones. In all regions, points of sale of compound feed for farm animals have been created. This will satisfy the need for enriched feed for livestock in personal, peasant and farm households. However, meeting the needs of livestock for juicy and roughage is of paramount importance.

In recent years, for various reasons, attention to the production of seeds of many forage crops has decreased. Many varieties have lost productivity, disease resistance, resistance to various unfavorable climatic conditions, for which it is necessary to carry out regular work on primary seed production on varieties of forage crops.

These important problems can be solved with the help of primary seed farms. Newly developed varieties will support primary seed production, due to their yield, their biometric characteristics will serve as high resistance to diseases and adverse conditions [1]. Over time, these indicators will decline, and in such cases, increased attention to primary seed production and renewal of varieties will be an urgent task.

In the system of initial work on seed production, the cultivation of elite seeds, being the main link, requires the preservation of the grade, reproduction in accordance with the requirements of the standard, the creation of high-quality seeds in a certain amount, in accordance with the rules of seed production.

In the Decree of the President of the Republic of Uzbekistan dated December 29, 2015 No. PP-2460 "On measures to further reform and develop agriculture in 2016-2020" to strengthen the fodder base of livestock in 2016-2020, an additional 50.3 thousand hectares were allocated for growing forage crops and paid great attention to the seed production of forage crops. In particular, the Research Institute of Livestock and Poultry Farming plans to produce 0.5 tons of beet seeds annually from 2016 to 2020, as



well as 40 tons of elite catch crops. To ensure the fulfillment of the tasks set by this decree, it is necessary to carry out seed-growing work on beets.

In our research, it is planned to carry out work on the primary seed production of such fodder crops as beet varieties "Uzbekistan-83", corn "Uzbekistan-2018", oats "Uzbek broadleaf", triticale "Silver Prague", as well as the preparation of elite seed material.

After sowing the seeds of cereal crops before the formation of new seeds, they go through a certain stage of development during the entire vegetation process. In the process of development, morphological changes occur in plants and new organs appear. Cereals go through developmental stages such as spikelet formation, rooting, flowering, earing and ripening. If at least 10% of plants pass into a certain period, this will be the beginning of the period, and when 75% pass, it will enter this period completely [2].

Oats are richer in fat and calcium than other grains, high in essential amino acids and high in lysine. In this regard, oats play an important role in strengthening the forage base of farm animals [3]. Triticale, which has a high yield of grain and green mass, is used as a valuable feed, silage and feed for farm animals, which gives positive results in the development of animal husbandry. The triticale variety "Silver Prague", being a late-ripening crop, has high productivity elements: ear length 15-17 cm, number of grains per ear 75-85 pieces, weight of 1000 grains 52-58 grams, grain yield 50-55 kg / ha [4].

Bobatova (2018) [5] argues that for the normal development of forage crops, triticale requires an area of 22.7 cm² for each plant to receive adequate nutrition. In the studies of Kenjaev (2018) [6], it was seen that sowing catch crops in pure and mixed form allows you to collect 22-32 tons of bioorganic fertilizers per hectare. In order to determine the degree of soil salinity during the cultivation of grain crops, a number of scientists such as Mirsharipova et al (2018) [7] conducted research to identify fodder crops resistant to saline soils on saline and moderately saline (dry residue - 0.410%, Cl-0.042%, SO₄-0.193%) experimental site of Gulistan State University.

The amount of dry residue in the soil was less than 1%, and the amount of chlorine often exceeded the toxicity limit, and in some cases reached 0.042%. According to the results of their experiments, seed germination of the triticale variety "Silver Prague" - (control) was 61.2%, in L-2 - 72.3%, in barley - 71.4%. When fodder beets were added to the diet, the digestion of coarse and concentrated feed improved in animals. Fodder beets are also important for increasing the milk yield of dairy cows [8]. To obtain a yield of 800-1000 c/ha from fodder beets, it should be planted after wheat at a density of 80-120 pieces per hectare [9].

2. Methods

The aim of the work is to carry out work on the primary seed production of forage crops such as Uzbek broadleaf oats, Uzbekistan-2018 corn, Silver Prague triticale, Uzbekistan 83 fodder beet. The experiments were carried out on sierozem soils of the experimental site of the Research Institute of Livestock and Poultry. The experimental site is located in the foothills of the Kibray district of the Tashkent region, 15 km from Tashkent, at an altitude of 400 m above sea level. The soil of the experimental plot is a typical gray soil of heavy texture, irrigated for a long time. According to the results of agrochemical analysis, the amount of humus in the plowed part of the soil is 1.02-1.59%. The amount of useful macroelements in plowed soil at a depth of 0-30 cm is: total nitrogen 0.14-0.29%, mobile phosphoric acid (R₂O₅) - 0.31 mg/kg, exchangeable potassium - 333 mg/kg.

The color of the plowed soil (25-30 cm) is dark gray, the underlying part of the soil (30-40 cm) is relatively dense yellowish-gray, earthworms are found at a depth of 60-65 cm. The climate of the experimental site is characterized by hot summers, dry, cold winters and relatively rainy springs. Spring evening frosts fall on March 25-31, and autumn frosts on October 18-25. Cool days are 190-200 days.

The experiments were carried out on the basis of the methods "Obtaining elite and super-elite seeds from grain and leguminous crops" (1982), "Obtaining elite and super-elite seeds from beets" (1983).

The sown areas of oats and triticale were cleared of weeds and fed with nitrogen fertilizers at the rate of 200 kg per hectare. 50% of the prescribed fertilizer was applied during harvest and 50% during weeding. During the growing season, field observations of the plants were carried out 2 times, they were weeded 2 times, watering was carried out 2-3 times.

In the autumn, on the area sown with fodder beets, phosphorus fertilizers were applied 100 kg per hectare in physical form and plowed to a depth of 28-30 cm. In early spring, the field was leveled, the beds were cut and the typical beetroots were planted. The crops were fed with nitrogen fertilizers at the rate of 300 kg/ha in physical form, irrigated 5 times and field observations were carried out 2 times.

In the fall, the areas for sowing corn were plowed to a depth of 30-35 cm with the introduction of phosphorus fertilizers of 100 kg per hectare in physical form. In the spring, the land was leveled and sown with a row spacing of 70 cm. Watering was carried out 3-4 times. Cultivation of agricultural crops was carried out on the basis of generally accepted agricultural technologies.

3. Results and Discussion

Oat grain and straw are more valuable in animal husbandry than other cereals. Grain, straw or green mass of oats is widely used as nutritious feed for livestock. You can sow oats at different times and get a rich harvest. This will provide the livestock with a complete feed.

Today there are about 70 types of oats, including perennial and annual, cultivated and wild. Of the nearly 70 available species, only 11 are of practical importance. Two types of oats are grown in Uzbekistan: sowing oats (*Avena sativa* L.) and Byzantine oats (*Avena Byzantine* Koch.). In addition, sand oats (*Avena strigosa* Shreb.) And wild oats (*Avena fatua* L.) are found as weeds among cereals, which grow among wheat as wild grasses.

3.1. Morphobiological characteristics of the Uzbek broadleaf oat variety

The Uzbek broadleaf oat variety was created by scientists from the Research Institute of Livestock and Poultry and the Research Institute of Plant Breeding by multiple selection of broad-leaved late-ripening forms from sample K-11302 (Australia) in the collection of the Research Institute of Plant Industry. It belongs to the genus *Avena sativa* Z., species of Pugnaks. The growing season is 102-107 days for spring sowing and 190-195 days for autumn sowing.



Figure: 1. Oat variety "Uzbek broadleaf"

The plant grows straight, the stem height is 115-130 cm, the leaves are wide, the stem is compact, one-sided, yellowish-brown, 26-30 cm long. The grain is brown, fleecy, 2 cm elongated. The number of grains is up to 56%. The villus is 1.5 cm long, thin, dark base. 1000 seeds weigh 25-30 grams. Deciduous variety - 52.3%. Resistance to lying down - 3.7 points. Suitable for cleaning with mechanisms. The dry matter contains 5.6-6.0% crude protein and 39.9% fiber. Oat grains of the Uzbek broadleaf variety were planted on 2 hectares (Figure 1). In this nursery, two field observations were carried out and varietal characteristics were studied. The quality indicator of the variety turned out to be at the required level; 1000 individual samples were collected from the selection nursery.

In a seedling nursery, 1000 plants were examined at the height of the plant stem (Table 1). When studying the height of the stems, plants with a height of 1.0 to 1.6 m were identified. The average indicator was 131.3 cm.

Table 1. Indicators of the height of the oat stems of the "Uzbek broadleaf" variety

Oat variety	k=10 cm						n	$\bar{X} \pm S_x$	δ	Cv%
	100-110	111-120	121-130	131-140	141-150	151-160				
"Uzbek broadleaf"	118	162	178	201	194	147	1000	131.3±0.5	15.9	12.1

Triticale is the highest nutritional value crop among the catch crops. Triticale seeds germinate well at a temperature of 6–120 °C, they tolerate winter well, are frost-resistant, and the root system is well developed. The most demanding period for water is from germination to earing. If during this period there is not enough moisture, the ear will remain small and low-yielding. Triticale is self-pollinated like wheat. In its growth and development, like wheat, rye, barley and other cereals, it goes through the phases of germination, rooting, germination, flowering, earing, milk ripening, waxy ripening and full maturation. Seeds germinate at 3–40 °C. The average optimum air temperature for germination is 20–220 °C, germination takes 6–8 days. After germination, the plant takes root after 34–37 days.

In Uzbekistan, triticale takes root mainly in autumn, and 2-6 stems are formed from one plant. When the number of plants is small, rooting is strengthened. Autumn triticale can withstand frosts down to -18–20 °C. After germination, the germination period begins after 140–145 days. The most moisture-demanding period of the plant begins with the germination period. Triticale begins to spike in 154-163 days and flowers in 161-176 days. The milk period in spikelets takes 184–202 days. A specialist examines and gives permission to harvest green mass. After germination of plants, it passes into the wax period for 196–218 days. The transition to the ripening period is specified. It takes 206-225 days to fully mature.

3.2. Morphobiological characteristics of triticale of the "Silver Prague" variety

The stem is erect, 150-170 cm high, the stem is collected, unilinear, yellowish-brown, 35-40 cm long. The grains are brown, scaly, with a pointed shape, 3 cm long. The weight of scaly seeds is up to 65%. The scales are 1.5-2 cm long, yellowish brown in color.

Grain yield: 35-40 c/ha.

Productivity of green mass: 300-350 kg/ha.

A variety with good foliage - 48.2%. Lodging resistance - 3.5 points. Suitable for harvesting machinery. The growing period is 177 days for green mass and 212 days for grain. The area of the Serebristy Prag triticale nursery was 7 hectares (Figure 2).



Figure 2. Nursery of triticale variety "Silver Prague"

In this nursery, two field observations were carried out and varietal characteristics were studied. The quality indicator was at the required level, and 1000 individual selections were collected from the breeding nursery. In the selection nursery, 1000 plants were studied by stem height (Table 2).

Table 2. Indicators of the height of triticale stems of the "Silver Prague" variety

Triticale variety	k=10 cm						n	$X \pm S_x$	δ	Cv%
	120-130	131-140	141-150	151-160	161-170	171-180				
"Silver Prague"	110	168	176	191	203	152	1000	151.6±0.5	15.9	10.5

When studying the height of the stems, plants with a height of 1.2 to 1.8 m were found. Their average indicator was 151.6 cm with a coefficient of variation of 10.5 percent.

Fodder beet roots contain complex biologically active catalysts rich in easily digestible nutrients, which is an easily digestible tasty feed for farm animals. Fodder beets help animals digest coarse hay well. 1 kg of fodder beet roots contains 0.11-0.12 nutritional units, 9 g of digestible protein, 0.40 g of calcium, 0.30 g of phosphorus. 1 kg of tops contains 0.10-0.11 feed units, 21 g of digestible protein. Root crops are especially important when used during the winter months when there is no green forage in the livestock diet.

When feeding animals with root crops of fodder beets, it leads to an increase in their productivity, breed species, as well as resistance to many diseases. Studies have shown that the use of fodder beet roots in the diet of dairy cows not only increases the amount of milk, but also improves the quality of milk, improves the digestion of roughage.

3.3. Characteristics of fodder beet varieties "Uzbekistan 83"

The beet variety "Uzbekiston-83" was created by the scientists of our institute by colchinzation of seedlings followed by mixing with tetraploid forms.

In 1986 it was zoned across the republic for planting on irrigated lands. The variety is of the semi-sweet type. The sheet is bent. The color of the root crop is light green, white inside, conical in shape. Tubers penetrate into the ground in half or 2/3 part. The variety is late ripening. The growth period from germination to full maturation is 144-167 days. Total sugar content up to 9%, protein up to 2%, during the years of research it was not affected by diseases and pests.

Since the beginning of research work, extensive work has been carried out on the beet variety "Uzbekistan-83" to restore this variety on the basis of biometric indicators, valuable economic characteristics due to the correct organization of primary seed production. Much attention was paid to the correct selection of typical root crops for planting in a seedling nursery to obtain elite seeds.

When selecting typical root crops, only healthy conical root crops, light green in color, without additional rhizomes, weighing approximately 0.5 kg to 1.5 kg were selected, and nurseries were created (Figure 3). Field observations were carried out twice during the growing season in a seed nursery. As a result of the initial sowing, the beet variety "Uzbekistan-83" was renewed, and in 2014, 0.43 tons of elite seeds were produced. The fodder beet variety "Uzbekistan-83" was studied for the weight of 1000 seeds (Table 3).

Table 3. Indicators of the mass of 1000 pieces of fodder beet seeds of the "Uzbekistan 83"

Type of culture and variety	Weight of 1000 seeds, g			Weight of 1000 seeds, g	Average weight, g
	Sample-1	Sample-2	Sample-3		
Fodder beet varieties "Uzbekistan-83"	27	28	27	82	27,3

As can be seen from the data in the table, the average weight of 1000 seeds was 27.3 grams.



Figure 3. Root crop of fodder beet varieties "Uzbekistan-83"

We analyzed the biometric indicators of the selected fodder beet root crops (Table 4).

Table 4 Biometric indicators of fodder beet varieties "Uzbekistan-83"

Variety name	Roots		Sugar content, %
	Length, cm	Width, cm	
Uzbekistan-83	20-30	10-15	6-9

Selected typical root vegetables were 20 cm to 30 cm long and 10 cm to 15 cm wide. Sugar content was found to vary on average from 6 to 9 percent.

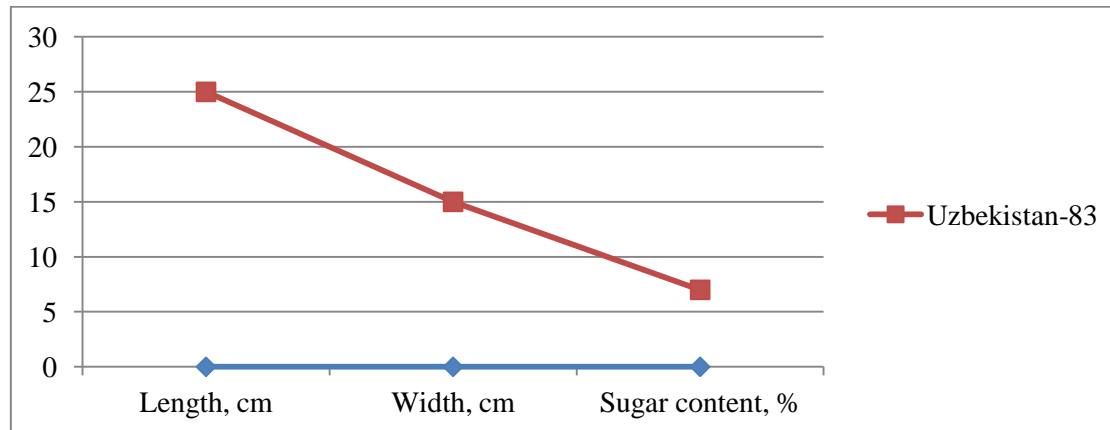


Figure 4. Biometric indicators of fodder beet varieties "Uzbekistan-83"

As can be seen from the diagram, the average values of typical root crops of the "Uzbekistan-83" variety were as follows. That is, the average length of the root crop was 25 cm, the average width was 15 cm, and the average sugar content was 7%.

The corn variety "Uzbekistan-2018" is a new variety created by the scientists of the institute.

Botanical classification: Plant color light green, 2 stems each. Plant height reaches 250-300 cm. Resistant to sticking and rod breakage, suitable for bevelling with a mechanism. The head stalk is green, thick, dense, 14-15 links, has 16-18 leaves. Leaves are light green, slightly curved. The leaves are large, linear, up to 90-100 cm long, with a dark green plate and colorless green filaments. It is recognized as a promising variety for sowing cereals on irrigated lands in the main periods and is included in the State Register. Vegetation period: 110-115 days for grain, 85-90 days for silage. The yield of green mass is 450-500 c/ha. Grain yield 90-100 kg/ha. Forage unit of green mass -0.20. fodder unit of grain -1.12.

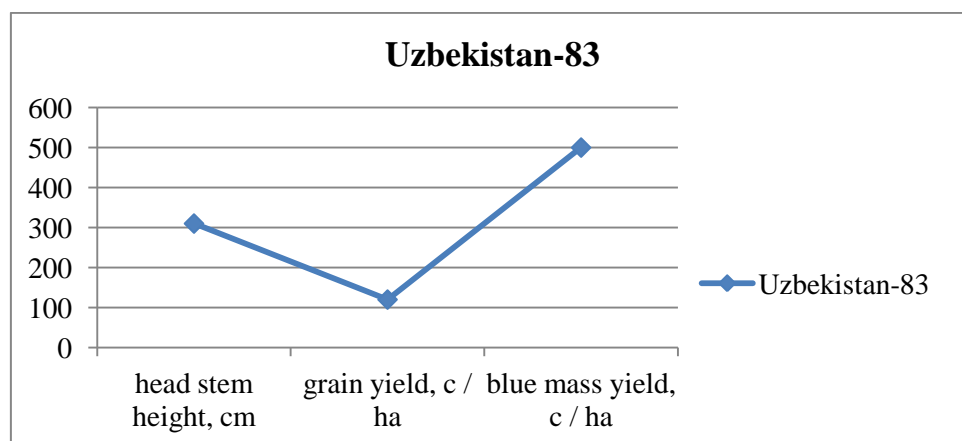


Figure 5. Indicators of economically valuable traits of corn varieties

As can be seen from the diagram, as a result of the research, the average height of the stalk of the corn variety "Uzbekistan-2018" was 310 cm, the average grain yield was 120 c/ha, the average yield of green mass was 500 c/ha.

4. Conclusions

Thus, according to the research results, the stem height of the Uzbek broadleaf oat variety was 131.3 cm, the triticale stem height - 151.5 cm, the width of the fodder beet root crops of the Uzbekistan-83 variety was 15 cm and 25 cm long, sugar content in root crops - 7%, the height of the stalk of corn varieties "Uzbekistan-2018" - 310 cm, grain yield 120 c/ha, green mass yield 500 c/ha. 6 tons of elite seeds were obtained from oats, 22 tons from triticale, 20 tons from corn, 1 ton of super-elite seeds was obtained from fodder beets.

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