The impacts new mullberry varieties on the silk worm productivity and their technological indicators

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Abstract: *In this article the impacts on technological indicators of industrial hybrids "Ipakchi 1 × Ipakchi 2" have thoroughly studied on cocoon productivity for selection numbers of new mulberry. It is known, that worms which was reared by №3-02 and №7-02 leaves of selection numbers, whirled heavier cocoons than the comparison variant. The technological indicators of these cocoons were identified considerably high as well. According to research results №3-02 and №7-02 selection numbers recommended to grow in the regions of Uzbekistan.*
Key Words: *mulberry, silk worm, selection number, hybrid, cocoon weight, floss output, silkiness.*

1. INTRODUCTION:

At present time, a number of countries like, PRC, India, Uzbekistan, Vietnam, and Brazil are leader countries on rearing silk worm. PRC is taking the first possession on rearing silk worm 650000 tons per year. The 330000 boxes of silkworm have been rearing in Uzbekistan since 2018 and as well as providing employment among rural population. The basic nutrient of silkworm is the leaf of mulberry and mainly the species which belongs to *Morus alba* L. has been grown. There are 800000 ha mulberry plantations in PRC and 43200 ha in Uzbekistan and 39 mln. pieces of plants have been planted in single and couple lines.

It is a vital issue to create new species which is copious, high nutritive and propitious on various climatic conditions of mulberry trees that is considered as a basic source of foodstuff for silk worm. For that purpose, identification morpho-physiological characteristics of new creating sorts of mulberry, rising leaf productivity and to explore the liveliness of silk worm on chemical based analysis and implement positive impacts on silk productivity and that is being reared.

The arrangements have been comprehensively performed since Uzbekistan became an independent, on development sericulture in particularly, to establish propitious new varieties of mulberry plants for silk worm. New varieties of mulberry trees have been established and achieved to expand new hybrid and cold durable varieties of trees in the farm for some regions of the republic. Modernization and advanced development of agriculture is essentially paid attention to in the development strategy of the Republic of Uzbekistan, for this trend, investigations that are directed at strengthen nutrition base of silk worm and establish new varieties with high nutrient value features and select among them the best productive varieties that positively impacts on the liveliness and productiveness of silk worm have scientific -practical importance.

The research works on mulberry selection have begun since 1930s. On those periods there existed the only indigenous variety of mulberry "Xasak", afterwards several new varieties and hybrids began to create due to doing researches and exchanging selection materials with foreign scientists.

Uzbek plant breeder Grebinskaya M.I. discovered the nutritive rate of the mulberry leaf, [3] he evaluated ontogenese periods of 4 mulberry hybrids which based on morphologic and structural signs. In this state, there were considered the number of branches, length, link spaces, colour, leaf yield may be taken for per ha. I.I.Chkalo's investigations which were done on this area was worth to note. It has been found that the leaves of good variety mulberry trees and hybrids, consumption by silkworm depends on the nutrient components.

It was identified that the indicators of two hybrid mulberries which studied and foodstuff features of them were higher. When studied their leaves chemical component, nitrogen constituted 1,19% and raw protein was 7,45%. These component differences directly impacted on the aliveness and their cocoon weight.

U.Kuchkarov, D.Kholmatov, M.Akhmedova [5] emphasized that varieties SANIISH- 15 × Pioneer, SANIISH-17 × Pioneer, Payvandi × SANIISH-14 and Yubileyniy × Gulistan 2 discovered in the scientific – research institute absolutely differed from the previously created hybrids on the leaf yield, leaf nutrition quality, durability cold and diseases and other indicators.

U.Kuchkarov, F.G.Gatin, D.I.Kholmatov, M.Akhmedova [6] and F.G.Gatin, K.S.Ogurtsov, U.Kuchkarov [2] emphasized that in the late of 15-20 s, productivity leaves yield of Jarariq 2 and Jarariq 3 varieties which delivered

to the state variety testing commission   was higher 30,6-38,5% than comparison and 1 box of worm bred 28,5-44,4% higher cocoon which reared with them than comparison.

The mutability of mulberry leaves pH was studied by Kh.Khomidov [4]. Falling below 5,7-6,0pH, the activeness of acid results in dying the worms. Because pH the atmosphere of hemolymph is 6,7-6,8 degree in the pupa and worm period. It is known that the placing the branches in upper or down part of a tree can change according to pH atmosphere and vegetation. Meanwhile mulberry leaves which is rich in acid rises economic signs of the worm. All above works and other scientists works showed origination of the leaves of trees, applied selection method and external environment of the growth of mulberry directly impact on productivity technological indicators of silk worm.

In our scientific researches selected 5 new varieties of mulberry trees and tested rearing "Ipakchi 1 × Ipakchi 2" silk worm industrial hybrids that are being reared excessively in Uzbekistan with the leaves of mulberry. The purpose of the work is to identify manifestation technologic indicators and silk productiveness of hybrid silk worm on those new varieties of leaves.

2. MATERIALS AND METHODS:

Experiments on the investigation were held in Sericulture scientific-research institute during 2015-2017 years. New selection numbers of the mulberry trees were grown in the fields of "Mulberry trees experimental Unitarian institution" which is under the institute controlled morpho-physiologic and growth-evolution signs every year.

For experiments №2-02, №3-02, №4-02, №5-02, №7-02 numbers were selected. Tajik's bezcemyannaya variety was selected for comparison variety. According to the main goal and purpose of dissertation work, detected the impact the leaves which selected numbers on hybrid worms aliveness and cocoon productivity.

Every spring, in the season of raising worms, industry hybrid worms Ipakchi1 x Ipakchi2 in 3 repetition and each one has 250 pieces reared with the leaves of №2-02, №3-02, №4-02, №5-02, №7-02 selection numbers and comparison Tajik's bezcemyannaya. Having whirled cocoon   the worms in experiment, after 7 days each version of cocoons collected and separated to healthy, deaf and black hit ("qorapachoq") cocoons.

Experiment versions scaled on the weight of cocoon, weight the shell of cocoon and indicators of silkiness repetition for 30 cocoons. In this process 30 cocoon scaled for its pupa and 30 cocoon, for shell separately scaled and found silkiness by division of weight of cocoon shell. To find technological indicators, 100-150 numbers of pattern selected from each version for experiment then dried and wound by the handicraft wares.

3. RESULTS AND DISCUSSION:

Cocoon productiveness of silk worm is one of the main economic signs. In industrial field the first generation hybrids of silk worm is reared and has been taken of them industrial cocoons. In order to get maximum cocoon yield of 1 box silk worm and to be 100% of cocoon from hybrids and previously reared hybrids need to be require fully follow agro technical principles and to be cared well for quality, good sort cocoon, and   free from various deficiencies. It can be taken copious of cocoon yield if there is much heavier cocoon's weight and loads of head worms that reached to whirl cocoon.   In that case it is very important mulberry trees fruitfulness which is the primary source of silk worm nutrition among the noted productiveness factors. In the case of the chemical component of mulberry leaves is rich in protein, nitrogen, and carbohydrate and various micro-elements as well as worm consume them well, fully consumption , the worm of the first generation   representatives can completely manifest in their possibilities.

As above mentioned ideas and suggestions, we reared Ipakchi 1 x Ipakchi 2 industrial sorts with 5 new selection numbers of mulberry and the leaves of comparison Tadjik bessemyannaya during the 2015-2017 years with the same hydrometric conditions and the same amount but the only various selection numbers of mulberry leaves. Table 1 indicates the results that taken while test rearing which performed during 2015, 2016, 2017 years.

On the first table weight of cocoon, weight of shell and signs of its silkiness proved that its superiority is more than other comparison selection sort of numbers. According to average a three year - data, the leaves of new selection numbers impacted well on the indicators of the weight of cocoon and its shell weight and silkiness of hybrids of Ipakchi1 × Ipakchi 2. The weight of cocoons constituted 1,77 - 1,90 g on versions, №7-02 showed the highest result (1,90 g) and №3-02 was (1,88 g). The weight of cocoon shell was 383-447 mg and indicators of №3-02 and №7-02 were 433 mg and 447 mg.

If we consider the silkiness of cocoons, indicator signs of four selection numbers were 22,1-23,4%, this indicator was 20,3% on comparison sort of Tajik's bezcemynnaya. And it was low to 1,8-3,1 abs. % compare with testing variants. It is significantly noted that increasing the only 1% of silkiness of cocoons can bring millions of economical profit for the whole country. Thus, worms are required to rear with new varieties of mulberry leaves.

Table 1

Average cocoon productivity during the 2015-2017 years of Ipakchi 1 × Ipakchi 2 hybrids which reared with various varieties of mulberry leaves

Selection numbers of mulberry	Cocoon numbers, piece	Cocoon weight $\overline{X} \pm S\,\overline{x}$, g	Weight of cocoon shell $\overline{X} \pm S\,\overline{x}$, mg	Cocoon silkiness $\overline{X} \pm S\,\overline{x}$, %
№2-02	90	1,80**±0,01	400*±4,3	22,1*±0,35
№3-02 Jarariq 9	90	1,88**±0,10	433*±2,6	23,2*±0,02
№4-02	90	1,77**±0,014	383*±1,4	22,6*±0,18
№5-02	90	1,77**±0,06	397*±1,7	22,2*±0,32
№7-02 Jarariq 10	90	1,90**±0,08	447*±8,7	23,4*±0,15
Comparison (Tadjik bezsemyanaya)	90	1,68±0,020	337±7,3	20,3±0,06

* - Pd=0,999
** - Pd=0,899

The cocoon productiveness that are taken from one box of worm is the priority economic signs in silk worm breeding. Because 1, 2, 3 boxes of worms are distributed to sections which are engaging to take care of silk worm. One box of worm is 19 gram and it has approximately 43000-48000 pieces of worms. If these worms whirl 90% of cocoon, there will be 38700-43200 pieces of cocoons. If it is achieved to gain about 2,0 gram weight for per cocoon, 77,4-86,4 kg cocoon can be received for one box of worm. On this process the amount of mulberry leaves and its chemical component, nutritious virtues play an important role. In most cases cocoon productivity depends on the mulberry leaves.

Technological indicators of cocoon mark how much effective of silk worm hybrids and their competitiveness. It was proved in the science outputting the floss, total length of fiber, winding length, metrical number mainly depends on genotype of genus and hybrids. However, the external environment plays a vital role for manifestation in any genotype. Exactly, the amount of nutrition and its quality are the primary external environment factors for silk worm. Our research outcomes on this area reveal impact rate on important signs of the new varieties mulberry leaves. So, we received cocoon samples of Ipakchi1 × Ipakchi 2 industrial hybrids which was reared new selection numbers of mulberry leaves in order to identify technological indicators after analyzed the productiveness making the pupa lifeless under the heat and dried in the shade.

Technological indicators of cocoon samples like, dry cocoon weight outputting floss and silk products, total length of fiber, length of uninterrupted winding and metric numbers (thinness) identified with winding at the certificated laboratory of natural fibers scientific –research institute of Uzbekistan in autumn.

Initially dry weight of cocoon comes out live cocoon weight and it may reduce to 2,6-2,8 times. Floss outputting and the rest other indicators comes out dry cocoon. On the table 2 described technological indicators of Ipakchi 1 × Ipakchi 2 industrial hybrid.

As shown numbers on table 2, mulberry varieties impact existed directly on the main technological signs of mulberry varieties Ipakchi 1 × Ipakchi 2 industrial indicators, that identified result analysis during 2015-2017.

It is significantly noted that the 2015- 2017 years results sharply differ from each other. The early spring cold damaged mulberry leaves, even the buds of the trees and but the worms were cared with the leaves taken from the small mulberry branches that appeared late. If we draw our attention carefully on numbers of table 2, we can see dry cocoon weight constituted 0,625-0,667 g in 2015. Floss outputting on the №3-02 and №7-02 selection numbers indicators were 40,1-41,3% and comparison variant made up 38,75%.

General length of fiber was on №3-02 and №7-02 selection numbers between 1046-1066 m that showed low result in comparison version from 906m to 140-160m. The winding percent of cocoons and metric number was №3-02 and №7-02 respectively to, and selection numbers equaled to 89,0%; 3278,7 m/g and 92,4%; 3221,0 m/g. These indicators exactly made up 87,8%; 3030 m/g in comparison Tajik bezsemyannaya variety.

Now let's analyze technological indicators average based on a three-year data. We can say on average based results the winding of cocoon and general length of fiber and outputting floss of dry cocoons were high №3-02 and №7-02 in selection numbers. Thus, floss outputting was 41,8-42,04%, winding cocoons percent was 89,0-89,9% and the length of fiber was in space1050,0-1066,0 m. While comparison Tajik bezsemyannaya variety was relatively to 38,3%; 83,0%; 969,0 m indicators were recorded.

Table 2

Technological indicators of hybrid cocoons Ipakchi 1 and Ipakchi 2 silk worms which reared by new selection numbers of mulberry leaves (2015-2017 y.)

| New selection numbers of mulberry | Years | Weight of per dry cocoon, g | For percent | | Number of silk taken of cocoon, m/g | Uninterrupted length of cocoon while winding, m | Winding, for percent | Taken total length of silk, m |
			Floss	silkiness				
№2-02	$\overline{X} \pm S\,\overline{x}$	0,668±0,0386	40,89±1,020	47,3±1,292	3282,3±84,3343	862,7±68,635	86,48±2,902	981,7±50,250
	Relative to the control, %	97,4	106,8	102,4	107,1	110,1	104,2	101,3
№3-02 Jarariq 9	$\overline{X} \pm S\,\overline{x}$	0,698±0,0321	42,04±0,0807	46,9±1,123	3278,7±118,482	854,0±14,657	89,0±1,055	1050,0±35,394
	Relative to the control, %	101,7	109,8	101,5	106,9	109,0	107,2	108,6
№4-02	$\overline{X} \pm S\,\overline{x}$	0,707±0,0249	40,34±1,502	47,4±1,635	3311,7±86,9290	833,3±52,376	85,3±4,080	983,0±78,943
	Relative to the control, %	103,1	105,3	102,6	109,1	106,4	102,8	101,4
№5-02	$\overline{X} \pm S\,\overline{x}$	0,673±0,0364	41,03±0,921	47,24±1,056	3278,0±70,247	826,0±46,659	87,5±1,655	1035,0±35,840
	Relative to the control, %	98,1	107,1	102,2	106,9	105,5	105,4	106,8
№7-02 Jarariq 10	$\overline{X} \pm S\,\overline{x}$	0,684±0,0338	41,8±1,103	46,6±1,043	3221,0±130,466	894,7±29,362	89,9±3,497	1066,0±67,171
	Relative to the control, %	99,7	109,1	100,8	105,1	114,2	108,3	103,1
Comparison (Tajik bezsemyannaya)	$\overline{X} \pm S\,\overline{x}$	0,686±0,0361	38,30±1,177	46,21±1,036	3065,7±17,856	783,3±23,701	83,0±3,415	969,0±36,708
	Relative to the control, %	100,0	100,0	100,0	100,0	100,0	100,0	100,0

It was determined that for all new selection numbers leaves exist positive impact on fiber's uninterrupted winding length. (826,0-894,7 m).

The testing results showed for high technological signs which identified and recommended mulberry candidate selection numbers leaves how much nutrious and to be rich in beneficial nutrients.

4. CONCLUSION:

It may be concluded that experiments on new selection numbers results which №3-02 and №7-02 numbers have more superiority than other numbers and comparison variety of Tadjik's bezsemyannaya.

These numbers of selection of mulberry tree led to demonstrate full indications of technologicaly and cocoon productivity of "Ipakchi 1 × Ipakchi2" hybrids. So mulberry tree is important as a feed to demonstrate the genetic potential of silkworm hybrids. According to research results №3-02 and №7-02 selection numbers recommended to grow in the regions of Uzbekistan.

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