Research of Preparation of Defect Cocoons for Unreeling and Technology for Producing Silk-Raw With High Linear Density

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Abstract: ***The article examines the yield of defective cocoons according to the feeding season of the silk moth and hybrids, determines the increase in the yield of defective cocoons in the second and third season by 2 and 6% compared to the first season. It is proved that in order to obtain raw silk of grade 4A; cocoons must be unwound separately by grades. Determining the indicators of defective cocoons after processing, the possibilities of unwinding with a speed of 110-130 m / min were revealed.***

Studying the time of filling cocoons in a rose while regulating leukemic density, the compaction time was determined for raw silk with a high linear density and it was recommended to use the obtained raw silk for the production of silk carpets.

Keywords: cocoon, rodent, defective cocoon, raw silk, high density silk, cocoon rate, hybrids.

I. INTRODUCTION

Although the use of artificial fiber in the world light industry has increased dramatically, it has not been able to reduce the demand for natural fiber textiles. On the contrary, there is a growing need for the purchase of clothing and household appliances that are useful in all respects and environmentally friendly, with healing properties. As a result, the development of industries delivering natural fibers, in particular the silk industry, is accelerating. In this direction, there is a significant increase in productivity. And also, special attention is paid to the use of the existing potential of the republic, which is the leading producer of cocoons in the world [1].

Currently, large-scale work is underway to bring the silk industry to a new level. Measures are being taken to increase the efficiency of the industry, the production of more silk fibers using innovative methods that consume as few resources as possible. The linear density and quality indicators of raw silk are important factors in the production of high-quality products [2].

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II. METHODOLOGY

In the process of feeding silkworms together with varietal cocoons, non-varietal cocoons are also formed, like twin, ugly, satin, spotted, thin-walled and holey due to improper environmental conditions and agricultural technicians during feeding [3]. Currently, taking into account the need for natural silk products, cocoons are grown in three and four seasons. In studies, the effect of seasons on the yield of cocoons was studied (Table 1).

Table 1.
The yield of defective cocoons grown in different seasons

№	Defective cocoons	1 season, %	2 season, %	3 season, %
1	Spotted	2	3	3,6
2	Ugly	1	1,5	2,6
3	Satin	2	2,1	2,8
4	Fifth	0,6	0,5	2
5	Twin	1	1,5	2
6	Leaky	0,4	0,4	0,6
7	Black spotted	1	1,5	2,4
	Total	8	10,5	16

The results showed that the yield of defective cocoons from season to season increases and an increase of 2 and 6% was observed compared to the first season.

Studies on the yield of defective cocoons in different hybrids were carried out (Table 2). As hybrids, zoned hybrids of cocoons were studied, such as Musaffo tola-2, Navruz-2, Navruz-3, Istiqbol, Mayin tola-1, K-108, China -106.

Table 2.
The yield of varietal and defective cocoons of different hybrids by season

Hybrids	1 season		2 season		3 season	
	Different	Defective	Different	Defective	Different	Defective
Musaffo tola-2	93,8	6,2	91,9	8,1	86,7	13,3
Navruz-2	90,7	9,3	87,9	12,1	82,7	17,3
Navruz-3	91,5	8,5	88,9	11,1	83,3	16,7
Istiqbol	93,9	6,1	91,8	8,2	86,9	13,1
Mayin tola-1	93,6	6,4	91,7	8,3	86,5	13,5
K-108	92,9	7,1	90,8	9,2	85,7	17,3
China -106	91,7	8,3	89,8	10,2	83,9	16,1

The results showed that during the first season there was the greatest yield of varietal cocoons. Cocoons of the hybrids Istiqbol, Musafo-tola-2, Mayin tola-1, K-108 showed the highest yield by yield of varietal cocoons. Growing from season to season in the hybrids of Navruz-2, Navruz-3, China -106, the yield of defective cocoons increased.

III. RESULTS AND DISCUSSION

In the process of unwinding from calibrated cocoons, industrial lots are formed. For effective use of raw materials during unwinding, cocoon, spotted, cotton-like, with scars, with smooth surfaces, irregularly shaped, suitable for unwinding, are mixed [4,5].

In our studies, we studied the effect of mixing cocoon varieties on specific consumption and reeling (Table 3).

Table 3.
The effect of mixing varietal cocoons on specific consumption and reeling

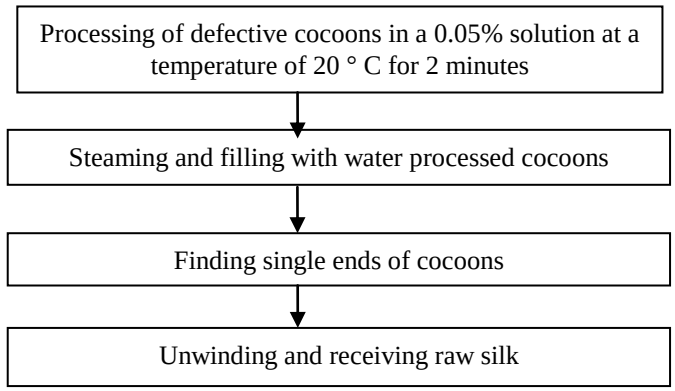
Cocoon variety	Specific consumption, kg	Shell unwinding, %
I- grade	2,83	73,1
I+II grade	2,91	72,6
I+II+ a mixture of defective cocoons suitable for unwinding	3,15	61

The results showed that a separate unwinding of each grade has a positive effect on the specific consumption and unwinding of the shell. The mixing of grades I and II, and their unwinding, leads to an acceleration of production batches, and raw silk of grade 4A is also produced.

Based on this, it is advisable to unwind defective cocoons according to a separate technological regime. When unwinding defective cocoons according to the established process chart at an unwinding speed of 70-80 m / min, the temperature of the pelvis is 50-55 ^{0}C, the length of the grafting is 4-5 sm, we get 20-25% of silk. In this case, the linear density of raw silk is not controlled.

The studies planned to obtain raw silk with a high linear density. For the unwinding of cocoons, the KMS-10-VU cocoon winding machine installed at the laboratory of the "Silk Technology" department was selected and silk was produced according to the following sequence.

Sequence of technological processes



Processing defective cocoons before unwinding leads to an increase in the speed of unwinding and an increase in the yield of raw silk by 5-10%. The unwinding speed is an important factor when unwinding cocoons. In our studies, we determined the dependence of the breakage of silk on the speed of unwinding. The results are shown in (Table 4).

Table 4
The dependence of the breakage of silk on the unwinding speed

Cocoon unwinding speed, m / min	Raw silk breakage, basin / hour					
	Average deviation		Standard deviation		The coefficient of variation	
	untreated	processed	untreated	processed	untreated	processed
70	3,4	3,2±0,21	0,82	0,79	24	21
90	3,8	3,6±0,25	1,30	1,42	30	30
110	4,3	3,7±0,32	1,40	1,32	22	21
130	4,7	3,9±0,29	1,10	1,05	24	22
150	5,1	4,9±0,20	1,03	1,08	22	26

The results showed that the unwinding speed of untreated cocoons was selected at 70-90 m / min. After processing, the cocoons were unwound at a speed of 110-130 m / min. and the number of breakage of raw silk showed as with unwound low speed. The compensation period for the rose is the time it takes to connect a new cocoon to the rose. The rose should consist of a complex of new and old cocoons. During this period, we reduce the unevenness in linear density [6].

The study examined the problems of filling the trap with cocoons with the ends during unwinding on mechanical equipment to obtain raw silk with high linear density from defective cocoons and studied the compensation time associated with the continuous unwinding length, the nominal linear density of raw silk, the linear density of the cocoon thread and the unwinding speed.

The compensation period for roses t_k with cocoons is determined by the following formula.

$$t_c = \frac{l_{c.u.n} \cdot T_{n.l}}{\upsilon * T_{s.r}}$$

here, $l_{c.u.n}$ – continuously unwinding length, m
$T_{n.l}$ – linear density of raw silk, tex
υ- unwinding speed, m / min
$T_{s.r}$ – nominal linear density, tex

Table 5.
Filling roses with cocoons while adjusting linear raw silk density

Time compensation min	Continuous. razmat.length, m	The linear density of cocoon filament, Tex	Raw Silk Linear Density, Tex	Unwinding speed, m / min.
0,15	670	0,31	15	90
0,14	670	0,31	15	96
0,13	670	0,31	15	102
0,11	670	0,31	15	120
0,10	670	0,31	22	90
0,09	670	0,31	22	96
0,09	670	0,31	22	102
0,07	670	0,31	22	120
0,10	730	0,31	25	90
0,09	730	0,31	25	96
0,08	730	0,31	25	102
0,07	730	0,31	25	120
0,08	730	0,31	30	90
0,07	730	0,31	30	96
0,07	730	0,31	30	102
0,06	730	0,31	30	120

The results showed that the compensation period is affected by indicators such as continuously unwinding length, linear density of cocoon thread, nominal linear density and unwinding speed, and to obtain raw silk with high linear density, attention should be paid to the above indicators.

High linear density and higher speeds result in shorter compensation times.

IV. CONCLUSION

The yield of defective cocoons grown in different seasons was studied and the yield of cocoons was determined, which amounted to 8% in the first season, 10.5% in the second season and 16% in the third season. The yield of defective cocoons was studied for different hybrids by season, and from them in hybrids Navruz-2, Navruz-3, and China -106, the yield of defective cocoons was greater. To increase the unwinding capacity of defective cocoons, it is recommended that the cocoons be treated separately before being unwound.

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