Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282
Received 15 December 2020; Accepted 05 January 2021.

Exploration of the Belly Characteristics of Living Cocoons Grown in Repeated Seasons

Ermatov Shavkat Kulmatovich*
Researcher, Department of Silk technology, Tashkent Institute of Textile and Light Industry, Tashkent city, Shohjahon street 5, Uzbekistan.
*E-mail: shavkat.ermatov.85@mail.ru

AxmedovJaxongirAdxamovich
Professor, Department of Silk technology, Tashkent Institute of Textile and Light Industry, Tashkent city, Shohjahon street 5, Uzbekistan.
E-mail: jahongir-ahmad@mail.ru

SobirovKuziboyErkinovich
Researcher, Department of Chemical Technology, Urgench State University, Uzbekistan.
E-mail: sabirovkuzibaj@jmail.ru

SharipovJurabekShomilugli
Researcher, Department of Silk technology, Tashkent Institute of Textile and Light Industry, Tashkent city, Shohjahon street 5, Uzbekistan.
E-mail: sharipov.jurabek@mail.ru

UmurzakovaHalimaXabibullayevna
Associate Professor, Department of Silk technology, Tashkent Institute of Textile and Light Industry, Tashkent city, Shohjahonstreet 5, Uzbekistan.
E-mail:umurzaqova_h@mail.ru

ANNOTATION

The article examines the influence of climatic conditions on the technological characteristics of local and Chinese silkworm hybrids (Chofuun Bayye) grown in spring, summer and autumn in the Surkhandarya region. Scientific research was carried out to improve the technological properties of the re-grown cocoon shell and the quality of raw silk, as well as to develop a primary processing technology. The lack of industrial methods of growing cocoons has led to a decrease in attention to the care of mulberry leaves, the nutritional properties of mulberry leaves change during the summer, where it is studied to what extent climatic conditions during feeding affect the yield of raw silk.

In the course of the study, the average porosity of the shell of local cocoons by seasons was 76.32% in spring, 50.55% in summer and 36.08% in autumn. Research has shown that the average seasonal porosity of the shell of Chinese hybrid cocoons is 67.35% in spring, 42.10% in summer and 34% in autumn. The comparison results are presented in the form of a histogram. The shell porosity of local cocoons grown in spring was 8.97% higher

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282

Received 15 December 2020; Accepted 05 January 2021.

than that of cocoons grown in summer; the porosity of the shell of cocoons grown in summer was 8.45%, and the porosity of the shell of the cocoons was 2.08% higher in autumn.

Keywords: *silk, breed, hybrid, linear density, season, cocoon shell, density, vegetation.*

INTRODUCTION

It is known that the quality of the finished product - requires a sequence of properly selected raw materials and technological processes. Today, silk production joint ventures have been set up and equipped with modern equipment. However, it is known that the technical level of aggregates in the cocoon primary processing bases is physically and culturally obsolete, their prolonged exposure to high-temperature hot air during the initial processing of cocoons partially affects the technological properties of the shell. The main processes of cocoon pre-treatment technology are anaesthesia and drying of this live cocoon sponge. At present, this process is carried out in high-temperature hot air at the bases of primary processing of cocoons [1].

Uzbekistan is one of the world's leading cocoon producers. At present, at the initiative of the Uzbekpaksanoat Association, the cocoon growing season is repeated three or four times in the country. However, the quality of cocoons grown in the second, third and fourth seasons does not fully meet the requirements of modern equipment used in silk factories [2]. The machines created in recent years have several features and designs with an increase in the number of different mechanisms and devices [3,4].

The main reasons for this are the low use of industrial methods in cocoon cultivation, especially the lack of attention to the care of mulberry leaves for silkworms, changes in the quality of mulberry leaves during the summer, the impact of climatic conditions on feeding, poor agronomic practices [5].

The current problem is to conduct scientific research on the technological properties of re-grown cocoon shells and the improvement of the quality of raw silk, as well as the development of primary processing technology [6].

THE MAIN ISSUE

For the experiment, we grew cocoons at the industrial cocoon-feeding enterprise *"Jayraxonamaskani"* in Termez district and at the farm *"Koraxon-Pakhtakor"* in the district. In order to comprehensively address the theoretical and practical issues of re-worm feeding, we conducted our research in the following areas.

In the summer-autumn season at high temperatures and low relative humidity, first of all, the characteristics of mulberry leaves, the care of worms, their development and the reasons for the decline in yield were analyzed[7].

Experiments were carried out 10 times with the selection of Chinese hybrids and local Navruz-1 breeds of silkworms reared in the summer and autumn seasons.

Local hybrids selected from spring cocoons were compared with Navruz-1 (1.08 mg) and Chinese hybrids (610 mg) and Chinese hybrids (790 mg, 680 mg, 670 mg) from summer-autumn crops.

The viability of the seasonally fed worms and the yield from 1 box of seeds of hybrids with a high average weight of cocoons and silk bark grew were also high. For example, the

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282
Received 15 December 2020; Accepted 05 January 2021.

yield of the local Navruz-1 breed (62.2 kg) and the Chinese hybrid of small cocoons did not exceed (48.4 kg). (Table 1).

Table 1.Average cocoon yields at the expense of 1 box worm in the spring

Selection	Efficiency from a box of worms	
	Average, kg	Comparative (norm), kg
Navruz-1	62,2	55
Chinese	48,4	55
Average cocoon yield per 1 box worm in summer		
Navruz-1	36	55
Chinese	21	55
In the autumn, the cocoon yield is average at the expense of 1 box of worms		
Navruz-1	18	55
Chinese	15	55

The thickness of the cocoon shell. It is known that the shell thickness of cocoons varies in different parts [8, 9].

When silkworms were cared for in the spring, the average thickness of the cocoon shell was 0.80 mm in local breeds and 0.76 mm in Chinese hybrids. The average thickness of the cocoon shell grown in summer and autumn was 0.68 mm in local breeds and 0.54 mm in Chinese hybrids.

The hardness of the cocoon shell. The temperature in the oasis rises in April-May. Increasing temperature primarily affects the growth process of mulberry, under the influence of temperature the leaves harden and the leaf-eating of silkworms decreases [6]. This process affects the hardening of the cocoon shell. In order to study the hardness of the cocoons grown in the repeat seasons, a sample of 10 kg of cocoons grown in each season was taken and the hardness of the cocoons was determined under laboratory conditions (Table 2).

Table 2. The hardness of cocoons grown in spring and autumn

SilkwormSelection	Deformation of the cocoon shell, mm	
	Feedintheapartment	Feedindustrially
Navruz-1 (spring)	0,75±0,05	0,89±0,07
Navruz-1 (summer)	0,65±0,05	0,78±0,07
Navruz-1 (autumn)	0,65±0,05	0,76±0,07
Chinese (spring)	0,70±0,05	0,84±0,07
Chinese (summer)	0,66±0,05	0,88±0,07
Chinese (autumn)	0,62±0,05	0,92±0,07

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282
Received 15 December 2020; Accepted 05 January 2021.

The hardness of cocoons grown in the spring season is higher than that of cocoons grown in the fall season.

The density of the cocoon shell. The density of the cocoon shell is an indicator of the weight of the cocoon shell corresponding to a certain volume, which is calculated using the following formula: [10].

$$\delta = m_k \ / \ ft \quad (1)$$

here, *δ is the density of the shell, mg / mm3;*
f is the surface of the disk, mm2;
t is the thickness of the shell, mm.

RESULTS ANALYSIS

The results of determining the coefficient of density and density inequality of cocoons grown in repetitive seasons are given in Table 3.

Table 3.The bark of cocoons grown in repetitive seasons inequality in density

Silkwormfeeding (byseasons)	The average density of cocoon shell, mg / mm3		
	the average density of the shell, mg / mm3	standarddeviation, mg / mm3	squareinequality %
Navruz-1 (spring)	0,350±0,005	0,026	7,32
Navruz -1 (summer)	0,327±0,005	0,034	8,05
Navruz -1 (autumn)	0,325±0,005	0,049	14,93
Chinese (spring)	0,305±0,005	0,023	7,55
Chinese (summer)	0,303±0,005	0,025	7,50
Chinese (autumn)	0,301±0,005	0,027	8,97

The porosity of the cocoon shell. The nature of placing the rings on the layers of the shell in packages, packages in layers, the adhesion of cocoon yarn in individual parts of the shell gives the shell a porous structure and is calculated using the following formula: [10].

$$P = \left(1 - \frac{M}{1,37 \cdot t}\right) \cdot 100 \quad (2)$$

here, *P-porosity,%,*
M-shell strength, mg / mm2
The density of 1.37-silk, mg / mm3.
t - is the thickness of the shell, mm

The average seasonal shell porosity of local cocoons in the shell parts was 76.32% in spring, 50.55% in summer and 36.08% in autumn. Studies have shown that the average

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282
Received 15 December 2020; Accepted 05 January 2021.

seasonal shell porosity of Chinese hybrid cocoons is 67.35% in spring, 42.10% in summer and 34% in autumn. The results of the comparison are expressed in the form of a histogram (Figure 1).

The porosity of the shells of local cocoons grown in the spring was 8.97% higher than the porosity of the cocoons grown in the summer, the porosity of the shell of cocoons grown in the summer was 8.45%, and the porosity of the shell of cocoons grown in the fall was 2.08% higher.

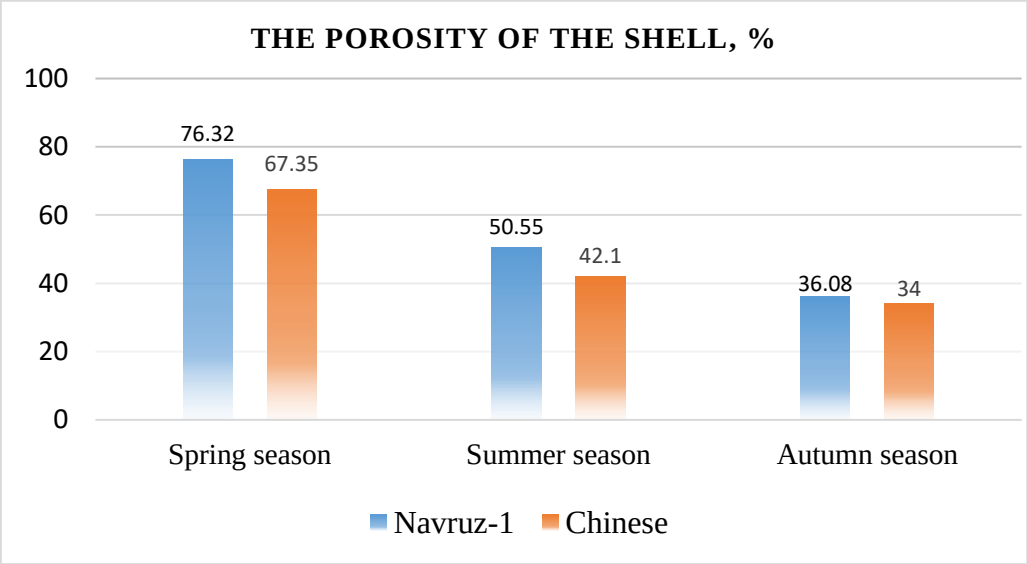


Figure 1. The difference in the porosity of local and Chinese hybrid cocoons by season.

The economic and social advantages of re-feeding worms in Uzbekistan are many:

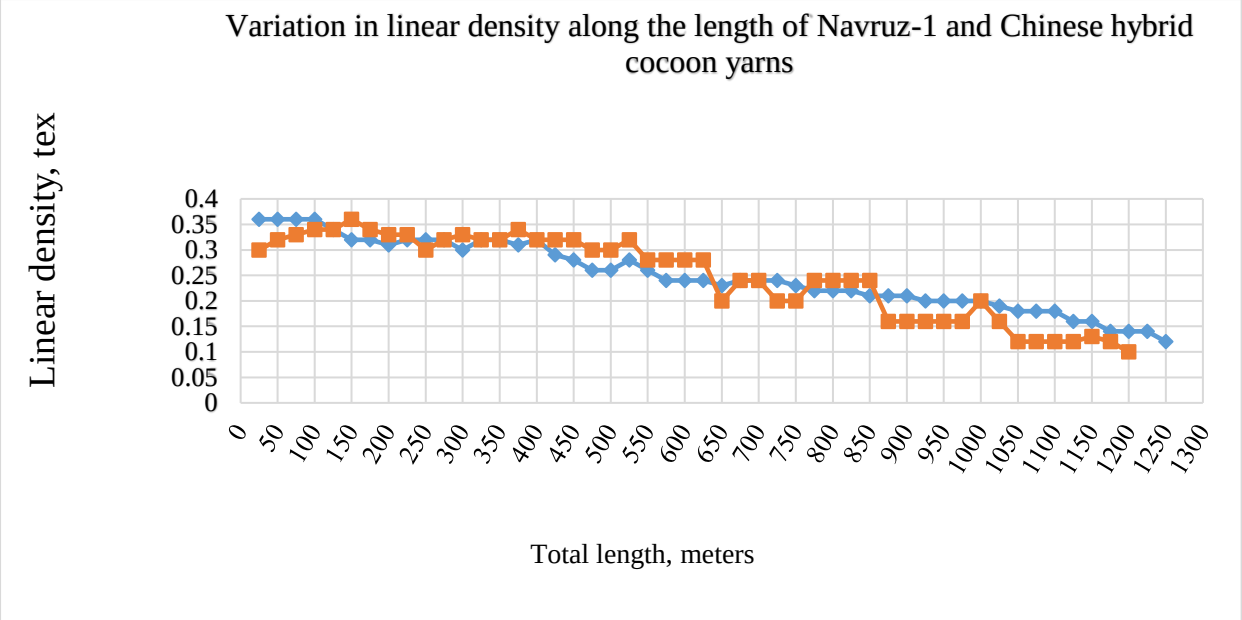
- During the mulberry vegetation after worm feeding in the spring, additional cocoons can be grown using mulberry leaves grown on mulberry groves and individual rows of mulberries.
- There will be an opportunity to provide employment and additional income to the rural population.
- It is possible to expand export opportunities and increase foreign exchange earnings in the silk industry.

Of course, in order to solve these huge tasks, research is needed in several areas, [7].

In order to determine the quality of cocoon yarn re-grown in the spring and autumn seasons of 2020 in the southern Surkhandarya region of the country, the results were analyzed on a single cocoon spinning machine and the results were analyzed [3]. The following graph compares the linear densities of cocoon yarns grown in different seasons, (Figure 2.3).

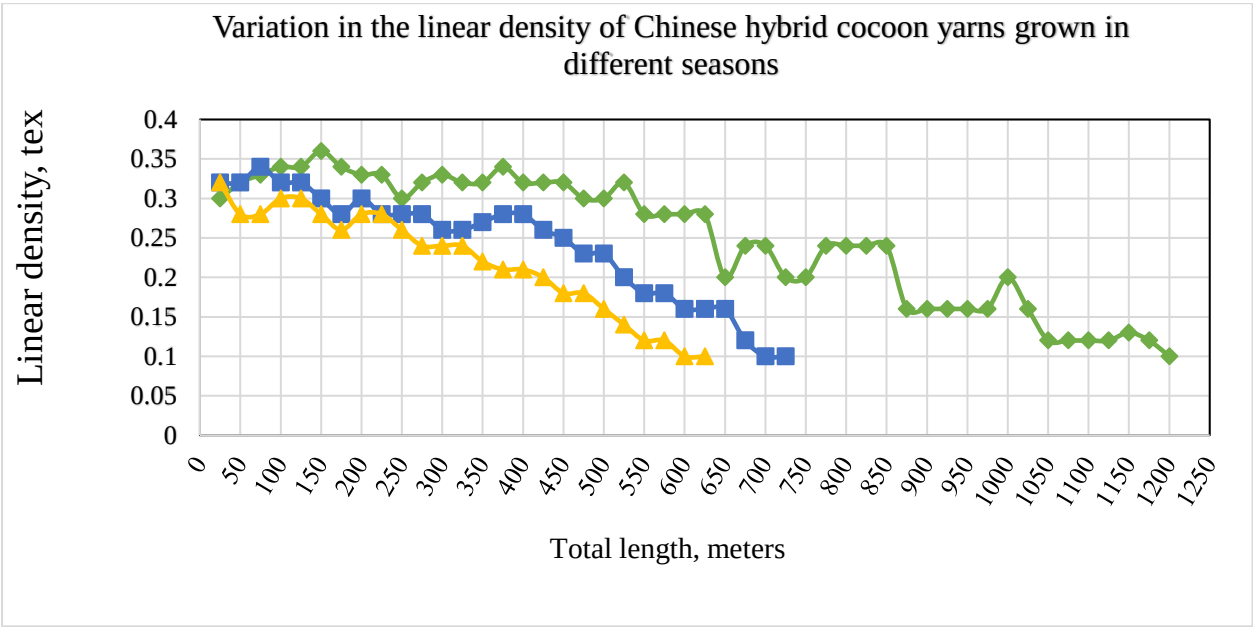
Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282

Received 15 December 2020; Accepted 05 January 2021.



blue line - Navruz-1,red line - Chinese

Figure 2. Variation in the linear density of Navruz-1 and Chinese hybrid cocoon yarns grown in the spring season



green line-spring season, blue line - summer season, yellow line-autumn season

Figure 3. Variation in linear density of Chinese hybrid cocoon yarns grown in repeated seasons

The linear density of cocoon yarn is not a constant size but depends on the size, hardness, silkiness of the cocoon, temperature and humidity during cocoon wrapping, a layer of cocoon shell, breed and hybrid of the silkworm. [7].

The unevenness of the cocoon yarn plays an important role in the quality of the raw silk. The amount of fibre in a cocoon, its quality depends in many ways on the quality of the

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282

Received 15 December 2020; Accepted 05 January 2021.

cocoon and its spinning technology. Bark shedding can be 85-90%, but in practice, the performance of local and foreign hybrids is around 70% [7].

Characterizing the change in linear density of cocoon yarns, the linear density variation along the length of each cocoon yarn every 25 m was plotted, showing that the linear density of all hybrid cocoon yarns first increased and then decreased.

In addition, the silkiness of the cocoons fed during the season was also determined. Silkiness is determined by the following formula [10].

$$I = \frac{m_i + m_{p.l.} + m_{p.p.}}{m_p} \cdot 100\ \%; \qquad (3)$$

Here; m_i*-cocoon fibre,*

$m_{p.l.}$*-cocoonlosi,*

$m_{p.p.}$*-cocoon,*

m_p*is the weight of the cocoon.*

The average silkiness of cocoons grown in the spring.

1-variation

$$I = \frac{0,357 + 0,014 + 0,006}{0,790} \cdot 100\% = \frac{0,377}{0,790} \cdot 100\% = 47,7\%$$

2- variation

$$I = \frac{0,252 + 0,012 + 0,005}{0,680} \cdot 100\% = \frac{0,269}{0,680} \cdot 100\% = 39,5\%$$

The average silkiness of cocoons grown in the fall.

3- variation

$$I = \frac{0,195 + 0,018 + 0,006}{0,670} \cdot 100\% = \frac{0,219}{0,670} \cdot 100\% = 32,7\%$$

In order to improve the quality of cocoon raw materials, it is necessary to introduce new breeds and hybrids, as well as to improve silkworm feeding methods, especially on the basis of improving feed quality [12].

CONCLUSION

1. The high temperature of spring and autumn can significantly affect the technological properties of mulberry silkworm;
2. Extremely hot air temperature may cause the size of the cocoons to shrink, even if they do not affect the shape of the cocoons;
3. A decrease in the yield of raw silk from cocoons grown in summer and autumn was observed, and a thinning of the fibre was detected;
4. An increase in the number of defective cocoons was observed in cocoons grown in summer and autumn.
5. For the re-feeding of worms in the southern regions of the country can be recommended Navruz-1, which is a large silkworm cocoon with high productivity.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 1, 2021, Pages. 4275 - 4282

Received 15 December 2020; Accepted 05 January 2021.

REFERENCES

1. Islambekova N.M., Khaydarov S.S., Azamatov U.N., Akhmedov J.A., Yusupkhodjayeva G.A., Muxiddinov N. Investigation of unwinding speed based on the process of separating the thread from the surface of the cocoons. International journal of advanced research in science engineering and technology. 2019 May;6(5):9136-41.
2. Ahmadjanovich KS, Lolashbayevich MS, Tursunbayevich YA. Study OfFiber Movement Outside The Crater Of Pnevmomechanical Spinning Machine. Solid State Technology. 2020 Oct 16;63(6):3460-6.
3. Korabayev SA, Mardonovich MB, Lolashbayevich MS, Xaydarovich MU. Determination of the Law of Motion of the Yarn in the Spin Intensifier. Engineering. 2019 May 8;11(5):300-6.
4. AdkhamovichAZ, Khalimakhan A, Uktamovna AD, Davranovna BK. Ways and technologies for making natural silk. European science review. 2016(9-10):179-181
5. Alimova KA, Umurzakova KK, Akhmedov JA, Aripdjanova DU, Sharipov JS. New Range Of Raw Silk Twisted Threads. The American Journal of Engineering and Technology. 2020 Nov 30;2(11):166-73..
6. Esirgapovich SJ. The modern state of technology and technology for primary processing of cocoons silkworm. Innovative Techniques in Agriculture. 2018;3:577-80.
7. Patent UzbR. UZ IAP 05415. 31.05.2017.Alimova X., Akhmedov J.A., Daminov A.D., Bastamkulova X.D., Gulamov A.E. Method of obtaining threads. Official newsletter 30.06. 2017, № 6.
8. Patent UzbR. UZ IAP 05447. 31.07.2017 Alimova X., Akhmedov J.A., Bastamkulova X.D., Daminov A.D., Gulamov A.E. Method of obtaining silk threads. Official newsletter 31.08. 2017, № 8.
9. Rubinov E. B. Technology shelka. [Silk Technology]. M.: Legkaya and pishchevaya promышlennost, 1981.390 p.
10. Alimova X.A., Bastamkulova X.D., Akhmedov J.A. Svyaz krutki s lineynoy plotnostyu shelkovoy niti. Problemy tekstilya.Tashkent.2016, 3: 32-35.
11. Murtozaevna IN, Sunnatovich KS. Investigation of the quality indicators of raw silk with a high linear density. Middle European ScientificBulletin. 2020 Oct 8;5:74-6.
12. Kalita T, Dutta K. Characterisation of cocoon of different population of Antheraea assamensis (Lepidoptera: Saturniidae). OrientalInsects. 2020 Oct 1;54(4):574-90.