

Comparison of Economical Character of the Silkworm, *Bombyx Mori* L., Introduced from Foreign Sericultural Countries to Turkey

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터어키에 導入된 蠶品種의 實用形質의 比較에 關한 研究

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摘 要

本 試驗은 蠶業先進國들로부터 터어키國으로 導入되는 數個 蠶品種들의 生産性을 究明하기 爲해서 몇가지 重要한 家蠶의 實用形質을 比較하였다.

1. 供試蠶品種 모두 飼育期間이 길어서 30~38日 이었다. 그러나 蠶107×蠶108은 가장 짧은 30日 이었다.

2. 日本蠶品種 太平×長安이 箱子當 收繭量이 가장 많았으며 이태리의 Isonzo Piave, 폴란드의 M-198 그리고 터어키의 M×N, S×P, J×C 등이 그 다음으로 收繭量이 많았고 韓國의 蠶107×蠶108이 가장 적었다.

3. 全繭重, 繭層比率 및 生絲量比率은 供試蠶品種 모두 비슷하였으나 蠶 107×蠶108이 가장 낮은 水準이었다.

4. 以上の 成績을 綜合해서 評價할 때 蠶107×蠶108 品種은 좋은 環境下에서는 그 品種의 特性을 發揮해서 좋은 飼育結果를 얻을 수 있으나 터어키와 같이 自然條件下에서 飼育하는 境遇에 는 좋은 成績을 期待하기 어려운 것 같았다.

Introduction

Turkey, where sericulture has a tradition going back 1500 years, has all the facilities to recover its important place in the world silk production. The golden age of sericulture occurred in Turkey at the beginning of the twentieth century and in 1908 the production of fresh cocoons reached 18,000 tons. However, the two world wars adversely affected sericulture and the last decade in the quantity of cocoons produced was around 1,500 tons, far below this country's natural potential.

Turkey has tried to establish the self sufficiency in production of hybrid silkworm eggs and the last decade in the quantity of hybrid silkworm eggs produced was about 60,000 cases, a little below the country's actual demand of 66,000 cases.

Accordingly, Turkey should import different silkworm eggs from other countries.

This experiment was made to compare the productivity of various varieties of silkworm eggs imported from Korea, Japan, Italy and Poland with the productivity of the varieties produced by the Sericulture Research Institute, the Cocoon Co-operatives Association and the Görükle Cooperative. This experiment was also made to determine which country's silkworm varieties were more suitable for Turkey's weather and silkworm rearing conditions.

The author thanks Cahit Topmeşe, Researcher, Sericulture Research Institute, Turkey, for his help in making this paper.

Materials and Methods

Three cases of hybrid silkworm eggs for each

variety were imported from foreign sericultural countries: Korea, Japan, Italy and Poland. Sixteen varieties of silkworm eggs including eight Turkish varieties were distributed to the villages representing plain, coastal and mountain zones of Bursa province on the basis of randomized samples. They were reared by relatively skilled sericultural farmers during May and June, and after harvesting of cocoons rearers sent their cocoons to the Institute. Researcher surveyed and tested economical character of silkworm from 1976 to 1977.

Results

1. Rearing Period

There was not significance among the varieties from the point of rearing period. Generally it lasted 30~38 days of larval stage because heating facilities were not provided for the rearing room and silkworms were reared under natural conditions.

2. Cocoon Yield

In spite of slight differences, there was significance among the varieties in the cocoon yield per case of silkworm eggs. The greatest differences were shown by *Thaiei*×*Choan* and *J*×*C*, *C*×*J*, *C*×*N*, *Jam 107*×*Jam 108*, *M-197* and *Livenzo*. The

cocoon yield of *Thaiei*×*Choan*, *Isonzo*, *Piave*, *M-198* and *M*×*N* was higher than *Jam107*×*Jam108*. Especially Japanese *Thaiei*×*Choan* has been quite popular with sericultural farmers in Turkey and it has actually given more profit to them since last decade.

3. Percentage of Cocoon Shell

No significance appeared between varieties for percentage of cocoon shell. Nevertheless, attention should be given to *Jam107*×*Jam108* which had the lowest percentage of cocoon shell than others tested.

4. Weight of a Cocoon

Varieties applied did not make any significance for the weight of a cocoon. On the average of the weight of a cocoon, *Isonzo* and *Jam107*×*Jam108* were lighter than other varieties. This result suggested positive relations to the number of cocoons per liter and per kg.

5. Raw Silk Percentage of Cocoon Shell

There was no significance among the varieties in the raw silk percentage of cocoon shell. However, *Jam 107*×*Jam 108* showed lower percentage than even Turkish *M*×*N*, *S*×*P*, *P*×*S*, *C*×*J*, *J*×*C*, especially Italian *Isonzo* Polish *M-197*,

Table 1. Economical character by silkworm varieties (Hybrid)

Item No.	Varieties	Rearing period (days)	Cocoon yield (kg)	Percentage of cocoon shell (%)	No. of cocoons per litre	Weight of single cocoon (g)	Percentage of cocoon drying (%)	No. of cocoons per kg
1	<i>M</i> × <i>N</i> (Turkey)	32.00	28.00	23.05	87.33	1.592	41.16	633.33
2	<i>S</i> × <i>N</i> (")	32.33	25.00	22.88	96.66	1.487	43.23	673.33
3	<i>S</i> × <i>P</i> (")	35.33	27.66	23.09	101.66	1.625	41.16	616.66
4	<i>P</i> × <i>S</i> (")	33.66	27.00	22.67	94.66	1.434	40.44	713.33
5	<i>C</i> × <i>J</i> (Turkey Institute)	35.00	24.66	23.67	90.00	1.631	41.65	614.33
6	<i>J</i> × <i>C</i> (")	37.33	23.66	22.98	102.33	1.408	41.97	725.33
7	<i>C</i> × <i>J</i> (Turkey <i>Gürükle</i>)	38.33	27.66	23.00	106.33	1.595	41.19	645.33
8	<i>J</i> × <i>C</i> (")	31.00	27.33	23.53	93.66	1.616	41.96	618.66
9	<i>M-197</i> (Poland)	31.66	25.33	25.35	100.33	1.482	41.95	690.33
10	<i>M-198</i> (")	37.33	29.33	23.06	91.00	1.335	42.27	753.33
11	<i>Thaiei</i> × <i>Choan</i> (Japan)	31.33	33.33	23.90	86.00	1.629	40.92	629.33
12	<i>Choan</i> × <i>Thaiei</i> (Japan)	33.66	32.00	22.42	99.00	1.720	42.22	614.66
13	<i>Jam 107</i> × <i>Jam 108</i> (Korea)	30.66	25.00	20.81	106.66	1.303	40.79	768.33
14	<i>Isonzo</i> (Italy)	31.00	30.33	21.96	107.00	1.248	41.15	559.33
15	<i>Piave</i> (")	30.33	29.66	22.58	103.66	1.489	41.48	675.33
16	<i>Livenzo</i> (")	36.33	25.66	22.42	120.33	1.443	41.01	700.00

LSD=2.78

Table 2. Economical character by silkworm varieties (Hybrid)

Item No.	Varieties	Fresh cocoons required to obtain 1kg of raw silk (kg)	Dry cocoons required to obtain 1kg of raw silk (kg)	Raw silk percentage of cocoon shell (%)	Raw silk percentage of fresh cocoon (%)	A cocoon have length (m)	Denier	Frisens (%)	Pellete (%)
1	M×N (Turkey)	6.518	2.679	72.409	15.39	1,105	2.29	12.386	15.204
2	S×N (")	7.369	3.188	66.438	13.82	1,032	2.35	12.533	20.028
3	S×P (")	7.406	3.049	73.293	13.51	1,054	2.23	13.260	13.446
4	P×S (")	6.779	2.793	73.695	14.90	1,099	2.37	12.314	13.989
5	C×J(Turkey Institute)	6.281	2.617	78.321	15.97	1,184	2.34	10.447	11.232
6	J×C(")	8.206	3.447	60.284	12.23	1,078	2.18	15.115	24.601
7	C×J(Turkey Görükle)	8.946	2.849	71.338	14.51	1,100	2.37	15.591	18.193
8	J×C(")	6.742	2.830	72.325	14.88	1,054	2.41	13.969	13.969
9	M-197(Poland)	6.948	2.908	64.837	14.47	1,033	2.37	14.297	20.865
10	M-198(")	8.437	3.546	59.739	12.61	1,086	2.47	14.904	25.357
11	Thaiei×Choan(Japan)	6.864	2.816	72.101	15.03	1,072	2.25	11.525	16.374
12	Choan×Thaiei(Japan)	6.357	2.683	75.574	15.86	1,075	2.40	10.615	13.810
13	Jam 107×Jam 108(Korea)	7.873	3.210	63.869	12.72	908	2.19	13.347	22.785
14	Isonzo (Italy)	6.468	2.654	79.449	15.50	1,056	2.40	10.474	10.076
15	Piave (")	6.464	2.682	74.935	15.46	1,124	2.17	10,186	14,411
16	Livenzo(")	6.307	2.587	78.954	15.86	1,064	2.23	9.117	12.528

LSD=0.188

M-198 had also low percentage when compared with Turkish and Japanese varieties and they had almost the same percentage as Korean Jam 107×Jam 108.

6. Raw silk Percentage of Fresh Cocoon

No significance was seen among the varieties in the raw silk percentage of fresh cocoon. Generally, the raw silk percentage of all the varieties applied was markedly low when they were compared with a normal raw silk percentage of fresh cocoon of 21.43 percent tested in Korea.

7. Cocoon Bave Length

No significance was also seen among the varieties. M×N, P×S, C×J and Piave had a relatively long cocoon bave length, while Jam 107×Jam 108 had a short thread. Generally, a cocoon's thread was shorter than a normal thread tested in foreign countries.

8. Denier

There was no significance among the varieties. Generally the denier of all varieties was thinner than a normal denier of 2.98 of Jam 107×Jam 108 tested in Korea.

Discussion

These results show that Korean variety of Jam 107×Jam 108 has a very weak point under natural rearing conditions with such economical character as cocoon yield, weight of a cocoon, raw silk of cocoon shell and raw silk percentage of fresh cocoon, but Japanese Thaiei×Choan bred by KADAKURA in 1946 has been known as a valuable variety in Turkey even under natural conditions.

Generally the percentage of cocoon shell showed comparatively high ratio in spite of poor conditions of silkworm rearing in Turkey. This might be caused by poor facilities of a cocoon drying system. The raw silk percentage of all varieties tested was markedly low when they were compared with some varieties tested in Korea: 18.75% of Jam 103×Jam 104, 21.43% of Jam 107×Jam 108, 20.55% of Keongchu×Yeonil, 21.15% of Hansaeng 1×Hansaeng 2, 19.54% of Jam 111×Jam 112 and 20.72% of Jam 113×Jam 114. Such a low raw silk percentage might be also caused by unreason-

nable cocoon drying process that at present cocoon drying is done by steaming of cocoon for killing the pupa and then is done under sun light drying of cocoon. This unreasonable cocoon drying process is clearly beared out by the high percentage of cocoon shell shown in Table 1 and by such by-products as frisans and pellete shown in Table 2.

In the length of a cocoon bave, Jam 107×Jam 108 tested in Turkey was 908m but its length tested in Korea was 1,623m. This might be resulted from the primitive rearing of silkworm and low technique of silk reeling.

Summary

These experiments were made in order to compare the productivity of various varieties of F₁ silkworm eggs imported from foreign sericultural countries with the productivity of some F₁ silkworm eggs varieties produced by Turkey. The results are summarized as follows:

1. In the durations of whole instar, it lasted 30 ~38 days under natural rearing conditions but Jam 107×Jam 108 about 30 days.

2. Cocoon yield per case of silkworm eggs was shown significantly among the varieties. Thaei×Choan was the highest yield of cocoon, followed by Isonzo, Piave, M-198, M×N, S×P, J×C and Jam 107×Jam 108 in that order.

3. In the percentage of cocoon shell, M-197 was the highest and other varieties were almost on the same level of cocoon shell, but Jam 107×Jam 108 was the lowest percentage.

4. In the weight of a cocoon, Choan×Thaei was the heaviest, followed by S×P, C×J, M×N, M-197, Piave, Livenzo and Jam 107×Jam 108 in that order.

5. In the raw silk percentage of fresh cocoon, Choan×Thaei, 3 Italian varieties and Turkish M×N,C×J belonged to the first group of better raw silk percentage, followed Polish M-197 and Jam 107×Jam 108 in that order.

References

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