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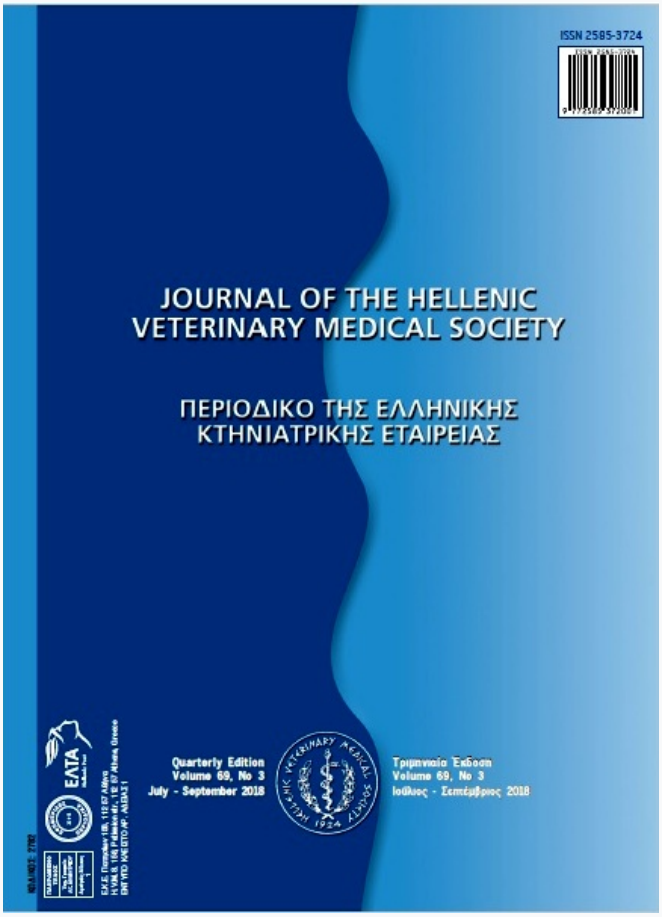

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Review article
Ανασκόπηση

Current Situation in Turkish Sericulture Sector

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ABSTRACT. The purpose of this study is to assess sericulture sector according to actual data which has both cultural and economic value for Turkey and has feature of being a livestock sub-production area mostly considered as a source of additional income. Fresh cocoon, being the output of sericulture, is an important raw material for silk and silky textile industry and also has a traditional and cultural value. The situation assessment was made in terms of production level discussing the fresh cocoon data in Turkey by years. In Turkey, as of 2016, the annual cocoon production is 103 tons, and 2,001 families deal with this occupation. The organization and historical process of sericulture sector was discussed and the supports provided and changes over the years in sericulture sector were examined. The organization in sericulture dates back to old times. In 1940, the first cooperatives were founded in Bursa, Bilecik and Adapazarı in order to maintain and increase the cocoon production after the foundation of the Republic. These cooperatives were merged and Bursa Association of Agricultural Sales Cooperatives for Silk Cocoons (KOZABİRLİK) was founded on 11 May 1940. Although the support given to sericulture has changed over the years, is very important for the sector. By 2016, the purchase price of cocoons was 5 TL / kg while the price of support was 40 TL / kg. Some inferences were made about the market and foreign trade by taking into account the silky textile and silk carpet exportation, being the strength of the sector. Despite the decrease in export amount in recent years, only silk carpet exports have generated nearly 100 million dollars in income in the last 5 years. The key problems, faced in sericulture sector were determined and then to draw attention to these problems. The current situation assessment was made in the conclusion by making general inferences about the sector.

Keywords: Sericulture, Raw Silk, Fresh Cocoon, Silk Carpet, Exportation

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INTRODUCTION

In Turkey, sericulture, which does not require too much investment, is generally carried out in small-scale operations as an additional activity alongside with other livestock activities and therefore it plays an important role in using the labor force of family members. Sericulture offers jobs and is an important income source for many people living in the rural areas mainly in the developing countries (Agatha, 2013).

Almost every region of Turkey is suitable for mulberry tree and sericulture in terms of climate, soil, topographical conditions and social structure. Sericulture is considered as advantageous with regards that the production means in sericulture are extremely simple, the product can be obtained in a short period as 35-40 days and easily turned into cash and in terms of requiring less labor than other livestock activities and also exploiting the elderly or female labor force (Berrin et al. , 2015).

Fresh cocoons create approximately 14-fold added-value until they become several silk weaving products such as silk carpets after the raw silk is obtained through reeling process. The production generates employment to a large extent through floater (silk reeling from cocoon), spinning, dyeing, textile and silk carpet weaving. Additionally, the contribution of the sericulture to the economy is important for Turkey, exporting the raw silk and finished products (Ümran, 2011).

Considering all these features, sericulture makes a great contribution directly or indirectly to the national economy as cocoon and silk sector in terms of production and employment.

CURRENT SITUATION AND PRODUCTION LEVEL OF SERICULTURE

The fresh cocoons, being the output of sericulture, is the raw material for the silk and silky textile industry and also has a traditional and cultural value. The number of villages and families, engaging in sericulture, the number of silkworm egg boxes used and fresh cocoon production values in Turkey are shown in Table 1 (TÜİK, 2017a).

When analyzing Table 1, it can be observed that the decrease in the number of villages and families, engaging in sericulture between 1991 and 2001 directly affected the production and therefore the silky textile industry of which the raw material is

Table 1. Sericulture production values in Turkey (1991-2016)

Years	Number of Villages Engaged in Sericulture	Number of Families Engaged in Sericulture	Number of Silkworm Egg Boxes Used	Fresh Cocoon (tons)
1991	1,635	29,689	50,623	1,353
1996	398	5,756	7,529	215
2001	213	1,555	2,445	47
2006	233	2,527	5,699	127
2007	212	2,274	5,273	125
2008	195	2,193	5,564	125
2009	203	2,295	5,683	136
2010	194	2,134	5,477	126
2011	295	2,623	5,808	151
2012	342	2,572	5,576	134
2013	327	2,343	5,261	121
2014	340	1,760	3,739	80
2015	474	1,956	4,674	115
2016	576	2,001	5,303	103

silk was affected negatively. The main reasons for the production decrease include; unconsciously increased use of pesticides, increase in terrorist incidents in the Southeastern Anatolia region and damping implemented on cocoon prices since 1989 by China, which has a great share in fresh cocoon, silk and silky textile trade (Esra, 2008).

When considering the geographical and social situation in Turkey, the sericulture for which all the provinces are suitable for the production activities, is carried out in 42 provinces as of 2016. The production has been realized in 35 of 42 provinces but the fresh cocoon could not be obtained in 7 of them. Fresh cocoon production by provinces for the year of 2016 in Turkey is given in Table 2 (TÜİK, 2017b).

When analyzing Table 2, it can be observed that Diyarbakır province alone constitutes 43.9% of total fresh cocoon production. The provinces of Antalya, Ankara, Bilecik, Sakarya, Muğla and Eskişehir follow Diyarbakır. While total production of these 7 provinces constitutes 86.2% of the total production, it is seen that Bursa province, which was the center of sericulture at the beginning of 1990s, has not displayed its previous activity as of 2016. The reason of this is the abandonment of production over years because of the increased industrialization and pollution in Bursa and its vicinity.

As a result of abandonment of production in sericulture in Turkey by years, the share in the World production has also gradually decreased. While 66% of 589,170 tons of fresh cocoon in the World was conducting by the People's Republic of China as of 2014, Turkey is on the 15th rank in the world with 80 tons of production and 0.014% share (FAOSTAT, 2017).

ORGANIZATION AND SUPPORT POLICIES IN SERICULTURE

Turkey has a history that goes back 1,500 years in sericulture (Keun, 1979; Gülşen and Ahmet, 2003). Sericulture was not only a commercial activity, but also affected many parts of the production area. In 1888, the first school of sericulture named Bursa Harir Darüt Talimi, which teaches the silkworm rearing from the scientific point of view (Esra, 2008). This school started education with 12 students and 5,000 students graduated from Bursa and Bilecik since the foundation of Turkish Republic (Nuran, 1996). The presence of 161 silk yarn factories operating in Gemlik, Geyve, Adapazarı, Izmit, Mudanya and Bandırma, especially in Bursa and Bilecik in early 20th century, is an indication that sericulture is an important economic activity (Ertuğrul Murat, 1996).

The organization in sericulture dates back to old times. In 1940, the first cooperatives were founded in Bursa, Bilecik and Adapazarı in order to maintain and increase the cocoon production after the foundation of Turkish Republic. These cooperatives were merged and Bursa Association of Agricultural Sales Cooperatives for Silk Cocoons (KOZABİRLİK) was founded on 11 May 1940 (Berrin, 2011).

Kozabirlik which has sought to improve nationwide after its first foundation years opened coop-

Table 2. Fresh cocoon production in tons by provinces in Turkey (2016)

Provinces	Number of Villages	Number of Families	Number of Silkworm Egg Boxes Used	Fresh Cocoon (tons)	Share %
Diyarbakır	54	640	1,682	45.1	43.9
Antalya	41	329	599	16.2	15.7
Ankara	32	113	386	8.2	8
Bilecik	26	83	250	6.9	6.7
Sakarya	23	77	249	4.7	4.6
Muğla	47	133	283	4.3	4.2
Eskişehir	23	48	125	3.3	3.2
Total (42 Provinces)	**576**	**2,001**	**5,302**	**103**	**100**

eratives in Edirne in 1944, Mihalgazi in 1951 and Alanya in 1984. Today, Kozabirlik continues its activities both in cooperative regions through its cooperatives in Bursa, Bilecik, Adapazarı, Mihalgazi and Alanya regions and in other regions where the production activities are carried out and which has production potential (Diyarbakır, Hatay, Muğla/Köyceğiz, İzmir/Ödemiş, Batman/Sason) and has 3,344 registered partners (Kozabirlik, 2017).

Kozabirlik not only makes cocoon purchase but also provides a significant contribution to the silkworm production through its silkworm egg production facility, established in 1963. On the other hand, the Association established a modern reeling factory in order to process the silk cocoon produced through the project supported by the Ministry of Agriculture in 2008 and so it has provided the employment area and also reduced foreign dependency in raw material processing (Kozabirlik, 2017).

The supports in sericulture have had many different periods over the years and also excluded from the support scope from time to time. Notwithstanding, both the incentives and supports have increased for the development of production sector at the present time.

Despite the increase in production costs in Turkey, since the prices of dry cocoons are low in foreign markets, fresh cocoon producers have started to be supported as of 1999. The supports have continued as subsidies in 1999 and 2000, as subsidy and direct support in 2001 and as direct support after 2002. Beside this, the eggs and plants are distributed as free of charge (TZOB, 2011).

Since the supports in sericulture were covered by the Support and Price Stabilization Fund, it was required to be covered by the budget of the Ministry

Table 3. Purchase price and supports by years for fresh cocoons *

	Purchase Prices of the Association (TL/kg)			Supports (TL/kg)			Total Purchase Prices (TL/kg)			In Total Purchase Price	
Years	Current Price	** Real Price	Index (%)	Current Price	** Real Price	Index (%)	Current Price	** Real Price	Index (%)	Association Purchase Share (%)	Supports Share (%)
1999	0.50	4.56	100.00	1.40	12.78	100.00	1.90	17.35	100.00	26.32	73.68
2000	0.65	4.47	97.97	1.73	11.87	92.85	2.38	16.34	94.20	27.37	72.63
2001	1.00	3.65	79.91	3.50	12.77	99.89	4.50	16.41	94.63	22.22	77.78
2002	2.00	5.58	122.19	5.50	15.34	120.01	7.50	20.92	120.58	26.67	73.33
2003	3.00	7.35	160.92	7.00	17.14	134.10	10.00	24.48	141.16	30.00	70.00
2004	2.30	4.95	108.41	7.70	16.57	129.62	10.00	21.51	124.04	23.00	77.00
2005	2.50	5.15	112.72	8.50	17.49	136.87	11.00	22.64	130.52	22.73	77.27
2006	2.50	4.61	101.02	9.50	17.52	137.10	12.00	22.13	127.61	20.83	79.17
2007	3.50	6.09	133.50	9.50	16.54	129.41	13.00	22.63	130.49	26.92	73.08
2008	6.00	9.66	211.69	10.00	16.10	126.01	16.00	25.77	148.55	37.50	62.50
2009	4.00	6.08	133.23	12.00	18.24	142.74	16.00	24.32	140.24	25.00	75.00
2010	3.00	4.19	91.78	15.00	20.95	163.89	18.00	25.14	144.91	16.67	83.33
2011	3.50	4.31	94.48	20.00	24.64	192.82	23.50	28.96	166.94	14.89	85.11
2012	4.00	4.81	105.40	20.00	24.05	188.21	24.00	28.86	166.42	16.67	83.33
2013	4.50	5.06	110.84	20.00	22.49	175.94	24.50	27.55	158.81	18.37	81.63
2014	5.00	5.37	117.68	30.00	38.16	298.57	35.00	43.53	250.96	12.34	87.66
2015	5.00	5.18	113.54	30.00	33.56	262.59	35.00	38.74	223.36	13.38	86.62
2016	5.00	5.00	109.54	40.00	40.00	312.98	45.00	45.00	259.44	11.11	88.89

* Fresh cocoon purchase and support prices of the Association were obtained from the 45th Bursa Directorate of Agricultural Sales Cooperatives for Silk Cocoons; ** As of 2016.

of Agriculture in order that this situation be based on a solid foundation. The supports were included in the scope of the Decree on Livestock Supports of the Ministry of Agriculture as of 2006 through the studies conducted for this reason and the first application of these supports was started in 2006 through the fund allocated from the budge of the Ministry of Agriculture (TZOB, 2011).

The EU gives direct income support to sericulture, at € 133 per box, provided that there is no economic benefit for the Union, provided that a minimum of 20 kg of product is obtained. In Iran, the state encourages the production of silk by purchasing fresh cocoon at $ 3.5 and selling it to consumers at a lower price. In Turkey, the supports for sericulture are as the free egg distribution and the direct support payment to the producers in sales of fresh cocoons (Gülşen and Ahmet, 2003; GTB, 2017).

The purchase price and supports by years for fresh cocoon is given in Table 3 and Fig 1.

When analyzing Table 1 and Figure 1, it can be observed that the fresh cocoon purchase prices of the association, supports and total purchase price in Turkey have shown a steady increase by years. This situation corresponds to the production figures coinciding with the same years and it is seen the supports have mobilized the silkworm production. It is obvious that the government support has increased within total purchase price over the years and has a very important share. This reveals how important the government support is in sericulture.

State support in sericulture is increasing day by day. In this grant scheme, which includes rearing rooms construction, equipment and equipment purchasing, mulberry cultivation, which will be implemented between 2017 and 2019, the grant rate is set at 100 % (Resmi Gazete, 2017). Increasing support in recent years will revitalize the sector.

MARKETING AND FOREIGN TRADE IN SERICULTURE

In the world, silk is an important textile raw material and is used in luxury consumer goods. Silk has a miniscule percentage of the global textile fibre market-less than 0.2 % (Rajat and Mahesh, 2005; ITC, 2017). This figure, however, is misleading, since the actual trading value of silk and silk products is much more impressive. This is a multibillion dollar trade, with a unit price for raw silk roughly twenty times that of raw cotton (ISC, 2017).

Turkey is a country with a great silk market potential. Almost all of the raw silk obtained from fresh cocoons in Turkey is used in the silk carpet production. However, the raw silk production in Turkey is far from meeting the needs for silk carpet industry.

Annual raw silk production is 22-25 tons and the raw silk that the sector needs is provided through imports. Besides this, the silk yarn importation other than raw silk has increased in recent years. The countries such as China, India, and Uzbekistan come to the forefront in importation.

The major silk consumers of the world are; USA, Italy, Japan, India, France, China (ISC, 2017). In

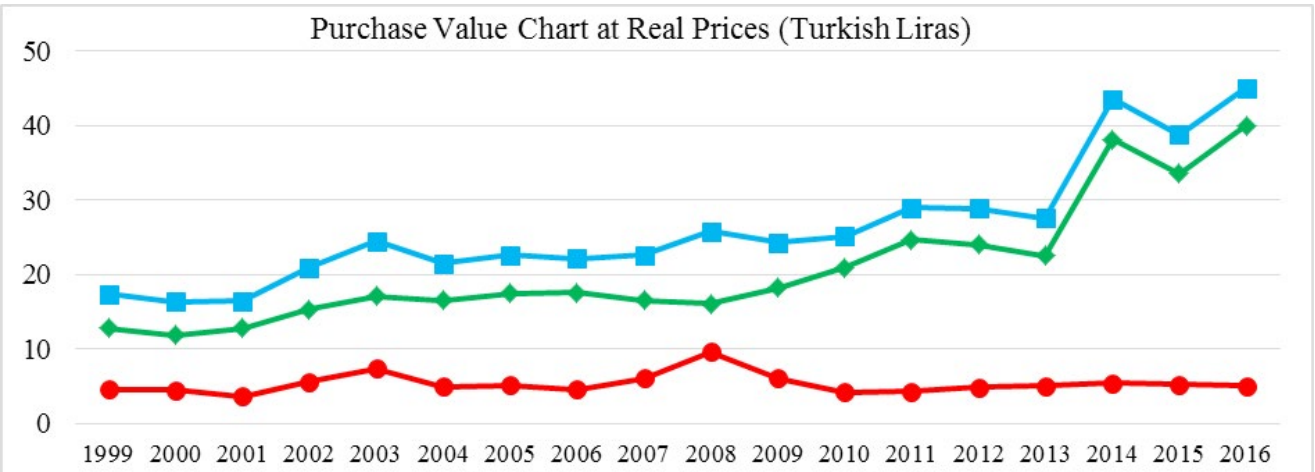

Figure 1. Association purchase prices, supports and total purchase prices (Turkish Liras per Kg)

Table 4. Turkish raw silk and silk yarn export and import values (2010-2016)

	Raw Silk				Silk Yarn			
	Export		Import		Export		Import	
Years	Kg	$	Kg	$	Kg	$	Kg	$
2010	0	0	92,442	2,205,181	21,937	388,179	89,457	4,121,647
2011	0	0	113,991	3,358,816	21,334	196,898	54,101	2,305,366
2012	0	0	47,957	1,574,124	22,446	341,166	47,067	2,015,059
2013	0	0	58,300	2,424,858	16,094	445,650	66,821	3,883,426
2014	0	0	57,947	2,291,283	22,295	446,674	69,319	4,053,657
2015	0	0	36,499	1,523,632	22,615	520,411	59,000	3,410,839
2016	0	0	26,496	1,013,688	29,229	283,506	36,263	2,063,777

Table 5. Turkish silk carpet export and import values (2010-2016)

	Silk Carpet					
	Export			Import		
Years	Kg	m^2	$	Kg	m^2	$
2010	127,786	43,369	3,880,0371	89,903	29,583	17,311,372
2011	165,169	34,156	4,463,0032	81,951	25,664	15,494,130
2012	110,305	22,204	3,342,1183	88,751	30,175	19,471,431
2013	99,077	24,353	2,869,3375	95,331	30,474	19,408,021
2014	94,788	20,432	1,957,8653	59,210	19,706	13,018,848
2015	62,046	11,932	1,012,0427	28,166	9,298	3,458,337
2016	30,248	5,990	578,1679	22,967	7,367	1,864,200

addition, China, which is the main producer of cocoon and silk in the world, promotes imports to Turkey as a result of the cheap price policy resulting from subsidies, cheap labor force and dumping sales (Matei et al. , 2006).

The raw silk, silk yarn and silk carpet export and import are conducted intensively in sericulture in Turkey. Among these, the silk carpet export is placed on the top. Turkish raw silk and silk yarn export and import values are given in Table 4 (TÜİK, 2017c, 2017d).

When analyzing Table 4, it is seen that Turkey does not export raw silk and provides its domestic market's needs for raw silk and silk yarn by import. Any customs duty is not applied to the raw silk and silk yarn waste and this can be shown as its factor. In addition to this, while the silk yarn exports are rapidly declining, imports continue at an equal rate.

The production of silk carpet, being the silk weaving product, is the product offering the highest added-value in this sector in Turkey. Hand weaving further increases the economic value of silk carpet. Turkish silk carpet export and import values are given in Table 5 (TÜİK, 2017e).

When analyzing Table 5, it is observed that there has been a gradual decrease in the export of silk carpets in recent years. Notwithstanding, the decrease in import makes the balance on the side of export. The political problems, faced in the countries which are among the silk carpet markets of Turkey, internal disturbances and economic crises influence the decrease in export over the years.

PROBLEMS EXPERIENCED IN SERICULTURE

Although sericulture sector is an additional field

of activity, it has some problems in itself. These problems includes: the losses due to the poisoning occurred as a result of contamination of mulberry leaves used in silkworm breeding, the losses occurred as a result of breeding at home by not creating special breeding places because it can be done once a year and for a short time.

Other problems of sericulture sector are incomes of alternative livestock and agricultural activities are more than sericulture income and exemption of customs on raw silk imports reduce the competitive power of the domestic market.

CONCLUSION

Although sericulture, which has national, historical, cultural and economic values for Turkey, had some periods with ups and downs, it maintains the distinction of being a traditional product. Besides, it is important to create an extra income source for the enterprises since it is a livestock sub-production area mostly conducted as a secondary occupation.

Despite all the problems experienced and declines in production, the silkworm production, re-mobilizing through the government supports is an important production branch that can be evaluated in rural area. Since both the cost and labor requirements are low, it has advantages in terms of profitability.

Considering the domestic market, the raw material needs are not met by import (by removing customs exemption) but on the contrary can be met through the increased production and quality by supporting the producers. This also indicates that sericulture is an up-and-coming production branch.

Consequently, Turkey can have an important role in revitalization of interest in sericulture by years and fulfillment of silk and silk goods needs of the European Union countries together with the increased production. It is necessary to protect sericulture that is our national value, to increase fresh cocoon production and quality by making silkworm egg production at a more technical level. As a result of this, the producers will generate more income and the number of producers will be increased and accordingly silk production, then silk carpet production and export will be increased. Eventually all these developments will make significant contributions to the national economy.

CONFLICT OF INTEREST STATEMENT

I have no conflict of interest to declare.

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