10th BACSA INTERNATIONAL CONFERENCE

"Regeneration of sericultural industries in 21st century"

"REGESERI" 2023

PROCEEDINGS

Soufli, Greece

April 24th – 27th 2023

Finally, I wish you all pleasant stay in Soufli and Greece, a successful participation in this conference to the end, and a safe trip back to your home countries, bringing with you some work plans and business ideas to be put into practice for further development of sericulture in your respective countries and for further progressive international collaboration.

Believing that the work of the present international meeting will be successful and useful for the regional and world sericulture industry development I open the International conference "Regeneration of sericultural industries in 21st century" "REGESERI" 2023

Thank you very much for your kind attention!

LEAD PAPER!

The role of BACSA in sericulture regeneration in Europe and Central Asia

By

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Considering the constraints facing the silk industry in Eastern Europe, Caucasus and Central Asia as well as the long traditions and high potential of sericulture for income generation, an "International Workshop on Revival and Promotion of Sericultural Industries and Small Enterprise Development in the Black, Caspian Seas and Central Asia Region" was organized by the AGST, Food and Agriculture Organization of the UN (FAO) in collaboration with the Government of Republic of Uzbekistan in April 2005 at Tashkent, Uzbekistan.

At the workshop a common institution was created to facilitate and expedite regional collaboration, in an effort to realize the recommendations to be made. The institution had been named as The Black, Caspian Seas and Central Asia Silk Association (BACSA), it was registered as a legal entity in Bulgaria and unified most of the sericultural countries in Eastern Europe, Caucasus and Central Asia.

When established in 2005 BACSA included 9 countries—Azerbaijan, Bulgaria, Georgia, Greece, Kazakhstan, Tajikistan, Turkey, Ukraine and Uzbekistan. Later on, and gradually, BACSA attracted for membership new countries—Albania, Armenia, Iran, Poland, Romania, Switzerland, Italy, Spain, Germany, Portugal, Slovenia, Russia, UK so that currently the association includes 22 countries and has also ьфдкш 70 individual members and 4 institutional members.

Until the end of 2019 BACSA organized 9 international conferences. Each conference was on a specific subject, connected with the problems of regional sericulture development.

The BACSA activity to prepare project proposals was very intense between 2006 and 2010 when 10 proposals were made, however out of them only 3 were approved for financing then after many failures, these kinds of attempts ceased in terms of projects studied for the whole area and focused mostly on more limited projects or bilateral agreements between members of BACSA.

BACSA makes all the efforts to establish connections among the producers, sellers and buyers of different sericultural products such as mulberry saplings, silkworm eggs, dry cocoons, raw silk,

silk yarn, fabrics, and garments. These activities are performed mainly by responding in real time to all the enquiries from possible sellers and buyers, connecting stakeholders together and giving a chance to exhibit sericultural products by organizing international workshops, conferences, etc. During the last 10 years a new interest was expressed by the European silk industry, especially from Italy and Switzerland for countries alternative to China where silk might be produced and on this basis the silk industry may re-consider establishing part of the cocoon production they need in Europe, Caucasus and/or Central Asia. A sign of this interest was the BACSA conference of 2013, which was held in Italy with the economic support and commitment of the Italian silk industry in collaboration with CREA. A delegation of the executive board was hosted in Como and visited "Ratti", one of the most important silk Italian companies belonging to the Marzotto group. Another sign of interest was the progressive association to BACSA of countries from Western Europe: Italy, Germany, Spain, Portugal, Slovenia, Switzerland, UK which are currently members of BACSA

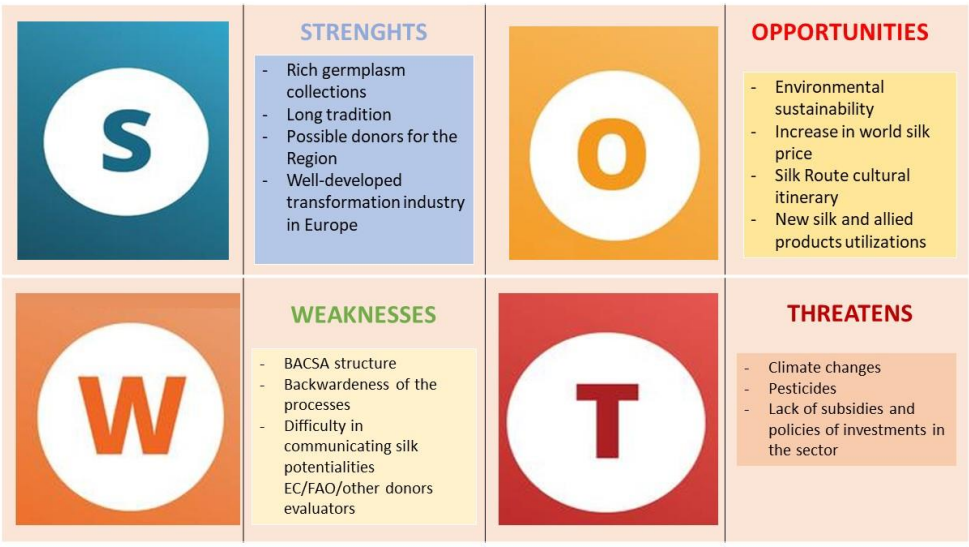

Figure 1. SWOT analysis representing criticalities and qualities of BACSA examined with respect to the possibilities of success in revitalizing the sericultural activity in the area.

Common problems

The global raw silk production was around 91,945 t in 2020, but out of them 53,359 t were produced by China and 33 770 t by India, while all the other countries produced only about 4,816 t of raw silk (see Fig. 2).

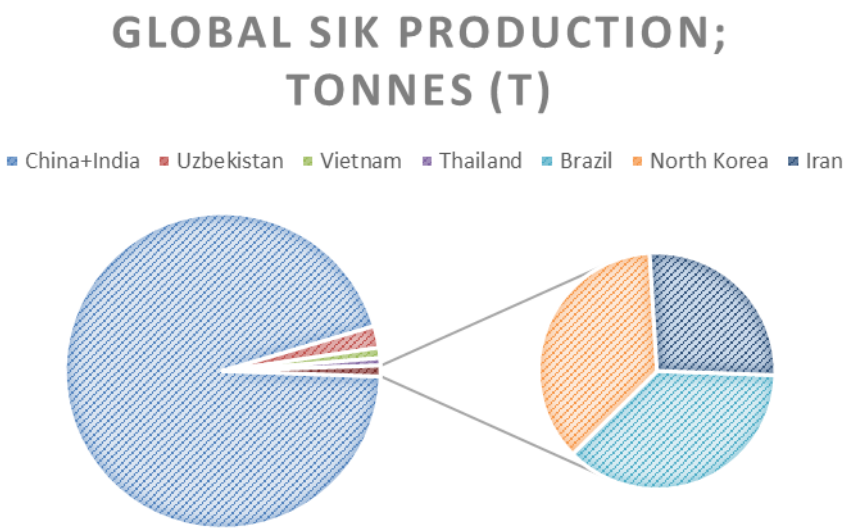

Figure 2: Pie-chart and relative shares of the eight main silk producers (data from https://inserco.org/en/statistics) in 2020; data from China and India collapsed to highlight how they cover more than 90 % of the worldwide production (94.8 %).

That means almost 95% of the total world silk production is from only two countries - China and India. On the other hand, although many countries in the World dealt with sericulture in the past or are still dealing nowadays, the majority of them only make efforts to preserve this activity and only few of them to revive the sericultural industry.
Silk production volumes more than doubled from 1990 to 2019 but it saw a decrease over the last several years. Even in those countries that are the biggest World cocoon and silk producers, there are presently entire regions where the sericultural activities have been partly or even completely stopped and the sericultural expertise may be lost.
Among these, BACSA associated countries, face problems typical of nations with history of long tradition and scarce current production. The first problem for them is how to preserve their mulberry and silkworm germplasms, which usually constitute public genetic resources, mostly located in research Institutes. The preservation activity is quite expensive, governments, in consideration of the present scarce economical revenues from the sericultural agribusiness, tend to restrict funds destinated to conservation.
Any hypothesis to concentrate the germplasm in one center only, preserving accessions for all the region, is quite unrealistic and in addition dangerous for the possible losses of genetic material in case of diseases or unforeseen accidents. The best way to preserve genetic resources is their spreading ex-situ however, this proved to be very difficult because of intellectual properties on the selected strains and varieties and could be done only for the genetic material that does not have any economic significance.
Therefore, encouraging the use of these resources and restarting an economically viable sericulture is certainly the best way to guarantee their preservation. In fact, even a partial sericultural revival will favor bilateral exchanges and commercial exploitation agreements among different countries, which might be regulated internally within the BACSA framework.
To recover the technological gap of sericulture with respect to other agricultural crops or agro-industrial chains, more competitive in terms of economic revenues for farmers or investors, is not easy and requires many funds to develop innovations. This is one of the main reasons why sericulture is a niche production in several developed countries.

This technological gap in sericulture became more evident in the last decades when the effect of climatic changes and environmental pollution began to seriously affect agriculture. For example, dramatic climatic changes began to negatively affect silkworm rearing with serious fluctuations in the average temperatures even in the seasons traditionally favorable to sericulture.
Climatic abnormalities such as heavy droughts, late frosts, excessive rains compromise mulberry leaf harvests. High temperatures and humidity favor spreading of insect pests, which are also more invasive due to the increased globalization of the transport of goods around the world, which works as involuntary carrier. Fighting against these new insect pests with insecticides, on turn, affects sericulture. To solve these problems a lot of technology and research related to the environmental management of sericulture would be necessary.
With regard to structural funding for research, training, dissemination, demonstration and other activities related to the sericulture revival, as mentioned above, some BACSA associated countries are members of EU, therefore, they should have access to EU funding for research institution and SMEs (Small and Medium Enterprises). Probably, the correct manner to attract financing is to enclose sericulture as a small part of wide projects focusing on other activities and where sericulture represents a study-case more than the central research or investment attractor.
On the other hand, non-EU BACSA countries can have access to FAO funds or to those of other NGOs. However, the lack of experts at world level in the specific branch of sericulture often results in a minor attention to this theme. It is not a case that two Korean experts gave a great personal contribution (Dr Hoo Zoo Lea, FAO Senior officer and Dr Jong Sung Lim, FAO consultant) to the BACSA creation, because of their knowledge and in-depth expertise in this sector. Unfortunately, FAO now is missing these professional officers specialized in sericulture.
With regard to subsidies of governments to silk production, what occurred was that both in the EU and in the other BACSA countries, where they were applied, they did not prevent sericulture from the decline and, in some cases, they triggered frauds from farmer associations or other organizations. Therefore, it is clear enough that this instrument to guide the market might be useful only if coupled with a general policy of industrial and technological development of this sector.

Prospects for the future

China, India, Brazil have probably already reached their maximum level of silk production and are not going to increase further their quote in the world market. On the other hand, silk consumption, so far, has been a very small quote of total world fiber production (less than 1%), but very stable in the years, although with a diminishing trend in the last several years.
This stability of silk for the textile market is due to the general buyers' identification of silk with a luxury fiber, which is a part of human civilization. In many countries it is intrinsically connected with local culture, and it has a long-standing tradition. Silk is considered as "Queen of textiles" because it has some unique and important characteristics, such as its ability to keep the body warm when it is cool, and cool when it is warm, or being a healthy fiber because it breathes easily and naturally keeps away moisture from the skin or being actually soothing to the skin diseases and itches.
Therefore, according to the recent trend for a rising demand of natural fibers from the final consumers, who look for comfortable wearing and sustainability of clothes, an increase of the silk price is expected. This phenomenon might give opportunities to BACSA countries to be competitive with China, even considering that the top world quality silk fabrics and garment producing industries are concentrated in Europe (Italy, France, Switzerland, England).
Regarding the fresh cocoon purchasing prices in the main producing countries, they were as follows in 2021:
China: US$ 5.54/kg
India: US$ 5.09/kg

Uzbekistan: US$ 2.31/kg
Vietnam: US$ 4.2/kg
Thailand: US$ 4.7/kg
Brazil: US$/4.05/kg

Many BACSA countries might develop even more than currently their artisanal and handicrafts production, especially by linking it to the tradition of their territories, countryside landscapes, culture. This idea gave birth to a project promoted by the Venice Municipality and the Council of Europe through the creation of a cultural itinerary “The European Silk Route”; it aims to be a local cultural network and infrastructure linking cities, regions, sites, museums and universities in order to enhance knowledge of a shared European cultural heritage, both tangible and intangible, and to promote new relationships within Europe and between Europe and the East through sharing of best practices and cultural tourism activities.

The Project "Advocating the Role of silk Art and Cultural heritage at National and European scale" ARACNE is one of the three projects funded by the European Commission that emerged victorious over a fierce competition with 55 projects in the framework of the call "Research and innovation on cultural heritage and Cultural and Creative Industries" (HORIZON-CL2-2022-HERITAGE-01-02). The coordinator of this project is CREA Agriculture and Environment, Italy.

The project started on 1st March 2023 and has the ambition to contribute to the creation of a broad and connected innovation ecosystem related to silk in Europe, including the industrial sector, and intended as a tool for expressing cultural and landscape heritage, thus, connecting culture, tradition, and new industrial production within an ideal network of exchanges and visions. ARACNE has a duration of 36 months and involves 11 partners and 3 associated partners from 7 EU member and non-EU member countries.

In addition to this exciting opportunity, the forecasts for the future represent that the demand of non-textile silk as constitutive proteins will increase at a steady rate, due to the new utilizations of silk as a versatile polymer for different aims (cosmetics, pharmaceuticals, biomedicals). Recently a bio-technological sericulture has been developing. For the first time in the world, in 2017, the legitimated rearing of genetically modified silkworms in conventional sericulture farms started in Japan. Functional silk is a promising material for medical applications.

Using the methods of genetic engineering, absolutely new silks that have unprecedented functions were developed. These are transgenic spider silk, hyperfine silk of small diameter, artificial blood vessels, fluorescent silk. Some of the BACSA countries are ready to face this biotechnological challenge. Silk regenerative medical materials like silk sponge, silk hernia mesh, wound dressing, silk surgical tape, hydrogel, films and 3D scaffolds for wound healing and tissue regeneration and reconstruction gels, powders, enzyme immobilization matrices were also created. Transgenic sericin is used for several medical reagents, like blood test drugs, biomatrix for tissue engineering and cosmetics.

Therefore, new kind of applications are likely to offer new opportunities; the interesting consideration is that, in this case, it is not necessary to produce silk in a huge quantity and it is not necessary to possess big reeling plants or transformation industries. This event might allow BACSA countries to increase their production slowly and steadily.

The region possesses some of the richest silkworm and mulberry germplasm collections. Several of the commercial silkworm hybrids, produced in the BACSA area manifest comparatively high productivity, namely single cocoon weight 2.2 – 2.5 g, shell ratio 23-24 %, shell weight 0.500 – 0.600 g, filament length 1300 – 1500 m under laboratory conditions. This might help in making the member countries attractive for this production. The level of sericultural science and technology in the region countries is comparatively high at a world level. This expertise might be particularly useful because new technological properties might be required for such a kind of silk production for innovative aims.

The EC green deal might also play a great role in promoting the development of sericulture in the BACSA countries: as recalled before, sericulture might be an organic agricultural practice; the mulberry is environmentally useful to protect soil from erosion, to adsorb carbon dioxide, to prevent desertification in marginal areas; if it is exploited in a non-intensive way it requires limited fertilization and irrigation and no pesticides at all; moriculture can also be practiced in polluted or salty soils to accelerate their recovery to production.
The silkworm is an environmental sentinel especially informative on the abuse of pesticides on agricultural crops cultivated nearby the rearing places. Furthermore, sericulture and moriculture can be exploited for circular economies where by-products of some processes can become raw materials for others. Mulberry fruit can be consumed fresh, dry or employed for production of juice, wine, jam and food additives. Pharmaceuticals can be extracted from mulberry branches, roots, leaves (for example, 1-deoxynojirimycin (DNJ) with antidiabetic aims).

Conclusions

BACSA, being established only 18 years ago, is a rather young international organization, for example in comparison to another one in the same sector, the International Sericultural Commission (1960). BACSA is basically managed on a voluntary basis thanks to the work and support of individual members, mostly belonging to scientific institutions.
According to its aims, it has been strengthening links and sharing knowledge among sericultural member countries, by giving a wide support to many actions dedicated to the revival of sericulture in Europe, Caucasus and Central Asia. Although this revival has not been possible yet on a large scale there are many hints about possible future developments, so that the support action of this Association continues to be fundamental and would deserve more attention by the sector stakeholders.

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The ARACNE project: Advocating the Role of silk Art and Cultural heritage at National and European level

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(Abstract)

The name ARACNE refers to a tale of Greek mythology in which the main character – ARACNE – was transformed into a spider after challenging the goddess Athena to a weaving contest. In our case, however, the acronym stands for "Advocating the Role of silk Art and Cultural heritage at National and European level" and it describes the main targets of this project funded by the EU. The international partnership engaged in this project is committed to the preservation and valorisation of cultural values and traditional skills linked to the silk world and the legacy it has