



Nippon Silk Center

(Nippon Kinu No Sato)

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About Us

The Prefectural **Nippon Silk Center** (**Nippon Kinu No Sato** in Japanese) was founded in April of 1998. Although Gunma Prefecture is foremost in number of sericultural farmers and production of raw silk in Japan, these numbers are decreasing year by year. Therefore the Gunma Prefectural Government expects all people to feel a close relationship to silk and wishes to promote the sale of silk products through the activities of the Nippon Silk Center.

From 2006, according to the Designated Trustee Institution, the Nippon Silk Center has been managed by the Foundation for Sericultural Industry Promotion in Gunma Prefecture. Nippon Silk Center provides information about the history of silk in Japan and the world, the history of sericulture and filature industry in Gunma, the technology of sericulture and filature, the biology of silkworms and mulberry trees, and the future of silk utilization.



History of Silk

Silk is produced by silkworms, the caterpillar of the moth *Bombyx mori*. The silkworm was domesticated from the wild silkworm, *Bombyx mandarina* in China around 4,500 B.C. The modern silkworm is entirely dependent on humans for reproduction and food and is no longer found in the wild.

Silkworms arrived in Europe through the Silk Road (Seiden Strasse in Germany) and Japan via

Korea more than 2,000 years ago.

Modernization of Japan and Silk

After the Meiji Restoration (restoration of Imperial power in 1868), the new administration aimed to develop the foundation for Japan as a modern nation by designing a policy to increase the nation's wealth and military power through the promotion of new industries. In order to achieve this purpose, they founded national factories including filature at Tomioka and spun yarn at Shinmachi. Raw silk has played a vital role as a main export of Japan since the Meiji era.

The main part of the buildings and structures of the National Tomioka Filature Factory are in good condition and the Cultural Affairs Agency has applied to inscribe the property into the UNESCO World Heritage Tentative List.



Production of Cocoons (Sericulture)

Cocoons are produced by sericultural farmers. The farmers grow mulberry trees, collect leaves and provide them to silkworms. Nearly all sericultural farmers belong to farmer's co-operative, and the rearing of silkworms in the earlier stages, usually the 1st and 2nd instars, is carried out on a conjoint basis feeding an artificial diet. When the silkworms begin their 3rd instar, they are delivered to



individual farmers for final rearing.

The fully grown silkworms stop feeding and become translucent. They are then picked up from feeding trays and transferred to spinning racks made from cardboard called "Mabushi". In the "Mabushi", they spin their cocoons for the two or three days in succession. These cocoons are collected about one week later. The collected cocoons are sent to filature factories. Within ten days adult eclosion occurs and the moth tries to get out of the cocoon by making a small hole in the cocoon. Once the moth pierces the cocoon, it can no longer be used for raw silk. Therefore, the filatures, upon taking delivery of cocoons, dry and kill the pupae in the cocoons with an automatic dryer.



Production of Raw Silk (Filature)

The cocoon is made of a single continuous thread of raw silk from 900 to 1500 meters long. When the silkworm caterpillar spins the cocoon, it secretes a gummy protein called "sericin" along with filamentous protein called "fibroin". Sericin protein glues the fibroin threads to each other to form a cocoon. Sericin is water soluble; therefore the dried cocoons are boiled before reeling. An endless chain system of wire cages carries cocoons through steam and hot baths of various temperatures. Through this operation, the cocoon walls both inside and outside are softened and sericin is partly dissolved. The softened cocoons are then placed in a basin of hot water for reeling. The process of reeling consists of finding the outside end of a cocoon filament, unraveling it and winding it onto a drum.

The reeling apparatus used in the Edo era was a wooden hand-reeling instrument called "Jyosyu-Zaguri" ("Josyu" means Gunma Prefecture, "Za" means gear and "guri" means reeling). The next stage of the development of reeling methods involved a foot-operated hand-reeling apparatus. These two types were operated by manpower. The next development was the reeling machine, followed by the multi-reeling machine, both operated by a motor. Current machines are completely automatically driven.

Raw silk is reeled onto a frame, and made up into a skein. Thirty skeins are formed into a bundle called a book, and thirty books form a bale, a unit used for raw silk transaction.



The Science of Mulberries, Silkworms and Silk

Mulberry leaves contain DNJ (deoxynojirimicine), one of the pseudo-sugar alkaloids and other biologically functional compounds. In addition, fruits of the mulberry tree contain many anthocyanins. Therefore, mulberry is known as herbal medicine.

Silk fibroin is composed of amino acids, among which glycine (44.1%), alanine (29.5%), serine (12.0%) and tyrosine (5.3%) are prominent in amount. These amino acids provide some good benefits to the human body. Therefore, recently fibroin powder has gained popularity as food.

Work-study Program

The Nippon Silk Center has some workshops where people can experience dyeing, weaving on a loom and cocoon-crafting. Visitors are able to get coaching from instructors at our center.

