Peace Silk—what does it really mean?

BY KAREN SELK



Top: *Antheraea assama* cocoons. **Middle:** Forearm-reeled muga silk. **Bottom:** 100% muga spun silk.

Bombyx mori, mulberry, tussah, muga, eri, wild, cultivated, spun, reeled, ahimsa, peace, and vegan are all words used to describe silk. Recently these terms seem to have gotten confused with vague and incorrect definitions. I'd like to clear up the confusion. *Bombyx mori* is the Latin name of the silkworm that has been cultivated for over five thousand years and provides a white shiny silk. China is the largest producer of bombyx silk. The caterpillars eat the leaves of mulberry trees exclusively, and the silk is also referred to as mulberry silk. In order for the greatest length of fiber to be reeled from the cocoons, the pupae are stifled inside before they emerge, weakening the silk strands that compose the cocoon. Wild silks are often mistakenly called peace silks—wild silks are also reeled which means that the pupa is stifled. The only true peace silk is from cocoons from which the moths emerge naturally before the cocoon is used for yarn making.

PEACE SILK

Ahimsa is a Sanskrit word meaning without injury or harm. In English, it has come to mean reverence for and nonviolence to every form of life. The term ahimsa silk was patented in May 2006 by Kusuma Rajaiah of Hyderabad, India (www.ahimsasilks.com). It is patented as an "eco-friendly method of manufacturing mulberry silk (or *Bombyx mori*) yarn, which is only spun and not reeled due to the hole in the cocoon." Peace silk is also a term used to describe nonviolent silk—a process that allows the silk moth to emerge from the cocoon to complete its life cycle rather than stifling it within the cocoon to prevent it from weakening the silk threads. If working with peace silk is a true goal for you, it will require some in-depth research on your part to make sure that what you are buying is really what is advertised.

VEGAN SILK

The term vegan silk can be misleading because there are many definitions of vegan—from the practice



Tropical tussah moth.



Left to right: 100% spun tussah silk; 100% peduncle silk; 100% eri silk from red and white cocoons; 100% reeled muga silk; and a Bombyx, muga, and tussah silk scarf.



Bombyx mori caterpillars feeding on mulberry leaves.



A mature muga caterpillar.



Washed tussah peduncles ready for carding.



Male and female tropical tussah moths.



Transferring eri caterpillars to fresh bouquet of food leaves.



Collecting muga caterpillars to transfer to their spinning home.



Feeding eri caterpillars.



Eri moth.





of abstaining from eating any animals or animal by-products (known as dietary veganism) to the rejection of using any animal products for any purpose (ethical veganism). Ethical veganism means abstention from all animal products including meat, fish, dairy, eggs, honey, gelatin, lanolin, wool, fur, silk, leather, and insect-based dyes such as cochineal. Taken strictly, there is no such thing as vegan silk—since silk is produced by an animal.

LIFE CYCLE OF A SILKWORM

To understand the issues fully, it is important to understand the life cycle of a silkworm (which is technically a caterpillar) and what is required to release the silk fiber from the cocoon. All silkworms go through the same phases with only small variations between each type of caterpillar.

- Eggs ranging from the size of poppy seeds to small lentils (depending on the silkworm variety) hatch into baby caterpillars.
- Caterpillars eat nearly nonstop, increasing their body weight by ten thousand times during a lifespan of about thirty days. They extract amino acids from the leaves they consume and transform them into silk.
- Silkworms, with the exception of eri, extrude silk at about one foot per minute while spinning a cocoon. The continuous strand is about the length of twelve football fields and takes three days to complete. Silk is made from two proteins: fibroin and sericin. The caterpillar extrudes the semiliquid fibroin that is coated with the second protein, sericin. That strand solidifies to become a thread of silk when it comes in contact with the air.
- The caterpillar changes from pupa to moth inside the cocoon.
- The fully formed moth emerges from the cocoon by releasing an enzyme-rich juice that loosens the filament, thereby enabling the moth to leave the cocoon through the opening made by pushing the filaments to one side. However, these filaments that have been touched by the juice become weak and are more likely to break during the process of reeling.
- The female moth holds 200 to 500 eggs in her body. These eggs are fertilized when the male and female moth mate. The moth's body contains reproductive organs only, no digestive system. A moth lives just four to seven days after emerging transformed from the cocoon, long enough to mate and lay eggs. It soon dies of malnourishment.
- The cycle starts over again after the eggs go through a rest period.

SERICULTURE

Raising silkworms is a basic and simple agricultural occupation called sericulture. Sericulture is a sustainable and renewable resource done on a small scale by knowledgeable, caring farmers and plays an important role in the lives of millions of rural people. Harmful pesticides and herbicides cannot be used because the highly sensitive silkworms will not develop properly and will die when exposed to toxic chemicals. It is a labor-intensive, risky business like any agriculture, dependent on climatic conditions, soil nutrients, predators, disease, and the attention given to the silkworms by their caretakers. In many rural regions, reeling and spinning cocoons, dyeing the yarn, and weaving cloth are part of the connection with sericulture. Along with better marketing, improved tree stock, and examination of mother moths for disease, the improvements to income generation, working conditions, and community development I've seen over the past twenty-seven years working in this industry have been astounding and heartwarming. I have been touched many times while learning about sericulture firsthand in the forests and on the farms of India







1) *Antheraea mylitta* coccons; Tasar Ghicha, a yarn that is handpulled from the cocoon with very little twist **(Top)**; and spun tussah silk yarn **(Bottom)**. **2)** *Bombyx mori* cocoons, spun **(Top)** and reeled **(Bottom)** bombyx silk yarns. **3)** *Samia ricini* cocoons (red and white), Eri handspun silk yarn, and a tortoise-shell takli spindle used for spinning eri silk.

and China by the caring, skill, humility, and generosity of the farmers, spinners, reelers, and weavers of silk.

Whether it is done in a factory, as a cottage industry, or by an individual, the same basic technique is used for reeling bombyx, tussah, and muga silk. (Eri cocoons can only be spun, as the cocoon is formed from entangled filaments.) Reeled or filament silk is the highest-quality yarn and is very shiny. There is no way to reel silk and allow the moths to emerge naturally from the cocoon. To get the maximum length filament, the cocoon is kept intact by stifling the pupa inside very quickly with dry heat. But it does not go to waste as the pupa is a valuable by-product that is a source of protein for people and their animals. Cocoons are soaked in warm water to soften and release the gummy sericin that holds the cocoon together. The silken strand from a single cocoon is too fine to use alone, so individual filaments from six to twenty cocoons are reeled at the same time, traveling through a very small orifice and then winding onto a swift. As the softened sericin dries, it hardens and binds the strands together to become one thread the size of a human hair.

SPUN SILK

Spun silk yarn is made from the weak filament of the transparent silken envelope remaining from the reeling process; the damaged, discolored, or imperfectly shaped cocoons; and cocoons with openings that were the result of moths hatching for mating. This cocoon waste must first have the sericin removed (degummed) with soap and water. Next, the fiber is cut into uniform lengths and carded to remove short, tangled bits. Combing lays all the fibers parallel in a sliver that is spun into a lustrous (but not as shiny as reeled silk) yarn.

TUSSAH SILK

Tussah or tasar silk is the common name referring to silk from the *Antheraea mylitta* caterpillar raised in tropical India. In years past, the tribal men lived away from their homes and hunted in the forests for the tan to gray cocoons found in the tall trees these caterpillars feed on. Today the caterpillars remain semiwild, as they prefer to eat their food leaves outside in the trees. The Central Silk Board (CSB) in India, a government agency of scientists and humanitarians, has been working for over thirty years to help improve the productivity of wild silks and therefore the lives of the indigenous tribal farmers. With the help of the CSB, farmers are planting forests of dwarf food trees for the caterpillars. The farmers can tend them on the plantations, allowing most of the men to go home to their families in the evening. Armed with slingshots as well as bows and arrows, some men stand watch for twenty-four hours to protect the caterpillars from the many predators such as crows, snakes, and rodents.

Tropical tussah caterpillars spin a unique cocoon. They extrude a hard silk that is wound around a branch on the food tree and then formed into a stem (peduncle) on which they begin to spin the brown cocoon that hangs from a branch. The peduncles are cut off the cocoons and put aside for making a coarse peduncle yarn (see Contents page), and then the cocoons are further sorted for either stifling and reeling, or mating. The CSB considers the

peduncle yarn a peace silk. Other types of *Antheraea* tussah caterpillars are raised in temperate areas of India and other countries.

MUGA SILK

Muga silk is the common name for the silk from the *Antheraea assama* caterpillar raised in Assam and other northeastern states of India. The golden cocoons produced by this silkworm are rare and treasured, coming only from this region of the world where the food trees are indigenous to the Brahmaputra River valley. Once, the cocoons were collected in the wild, but as with the tussah silkworm, muga caterpillars are now semidomestic, raised on plantations with the help of the CSB. The farmers camp on the plantation to protect their crops around the clock from predators.

ERI SILK

Eri silk is the common name for silk from the *Samia ricini* caterpillar raised mainly in the northeastern states of India as well as sparsely in a few other Indian states. Eri is also known as poor man's silk because it is not of the same quality as the other silks and therefore is not as costly. The caterpillar spins a while and then stops, continuing this way until it is finished, resulting in a cocoon that has entangled filaments. These cocoons cannot be reeled, only spun. The village women make each cocoon into a cake or small hankie and spin it on a takli spindle. Because eri cannot be reeled, people have called eri silk peace silk, because they have been led to believe that all the pupae become moths. However, in the poor regions where eri is produced, the live pupa is removed from the cocoon to sell for food. It is a delicacy among the people, rich in fat and protein. The farmers make more money from the sale of the pupa than from the silk cocoon. For village women, eri culture is like keeping chickens. The women carry out the associated tasks in their homes during their spare time, first to supply their own needs and then for extra income for the family. The leaves of the castor plant, the caterpillar's favorite food, are tied into bouquets and hung upside down over a dowel for the silkworms to feed on.

I have been fortunate these past thirty-five years to be totally immersed with the luxury, practicality, inspiration, and life sustainability that is silk. It is more than an exotic fiber produced by a clever caterpillar—it is a connection between the people and the land. This passion has taken me abroad for many years as I strive to understand the story and pass on my findings. ⌘



Woman spinning eri fiber on a takli spindle.



Tussah farmer with slingshot protecting caterpillars from crows in Orissa, India.

Karen Selk lives on Salt Spring Island, British Columbia, Canada. The fresh air from sleeping outside and growing organic food, along with her family, friends, and the people from Asian cultures, enrich her creative spirit and color her work.

Mythbusting

- If you are an ethical (as opposed to a dietary) vegan, there is no such thing as vegan silk.
- Ahimsa silk is a patented term referring to an eco-friendly method of manufacturing spun mulberry silk.
- Eri silk could be peace silk, but most likely it is not, as almost always the pupa is removed for feeding people or other animals.
- Don't assume that because tussah, muga, and eri silk are wild silks they are peace silks—muga and tussah are also reeled and eri pupae are used for food—so check your sources.
- The only true peace silk is made from cocoons in which the pupa has matured into a moth. Most often this is for breeding purposes, and the quantity of this type of silk is very small.
- The caterpillars produced from the eggs resulting from all the matings from unstifled cocoons (200 to 500 eggs per moth) would not have enough food and they would die from starvation and neglect.
- Sericulture is a sustainable, renewable, environmentally friendly resource that gives millions of rural people a healthy, family-oriented lifestyle.