

Types of Silk & their properties

Compiled by Dr Nidhi Garg

Silk Cloth



CLASSIFICATION OF NON MULBERRY SERIGENOUS ANIMAL

COMMERCIAL

- Tasar silk
- Muga silk
- Eri silk
- Anaphe silk
- Fagara silk
- Gonometa silk
- Coan silk
- Mussel silk

NON COMMERCIAL

Silk produced by

- Raspy cricket
- Hornets
- Weaver ant
- Bull dog ants
- Honey bee
- bumble bee
- Moon moth
- Cashew caterpillar
- Mango caterpillar
- Silver fish
- May fly
- Thrips
- leaf hopper

Based on family

Lepidopteran

- Tasar silk
- Muga silk
- Eri silk
- Anaphe silk
- Fagara silk
- Gonometa silk
- Coan silk
- Moon moth - saturnidae
- Cashew caterpillar
- Mango caterpillar

Non lepidopterean

- Raspy cricket - Gryllarcrididae
- Hornets - Vespidae
- Weaver ant - Formicidae
- Bull dog ants - Formicidae
- Honey bee - Apidae
- bumble bee - Apidae
- Silver fish – order thysanura
- May fly – order ephimeroptera
- Thrips - thripidae
- leaf hopper - cicaidellidae

Based on the purpose

Metamorphosis

- Tasar silk
- Muga silk
- Eri silk
- Anaphe silk
- Fagara silk
- Gonometa silk
- Coan silk
- Moon moth
- Cashew caterpillar
- Mango caterpillar
- Bulldog ants

Other purposes

NEST:

- Raspy ricket
- Weaver ant
- Hornets
- Silver fish
- May flies
- Thrips
- Leaf hopper
- Spider

TO STRENGTHEN WAX CELLS

- Honeybee & bumblebee

ANCHORAGE

- Sea silk

TYPES OF SILK

1. Mulberry Silk-

- Bulk of the commercial silk produced in the world comes from this variety and often generally refers to mulberry silk.
- Mulberry silk comes from the silkworm, *Bombyx mori* L which solely feeds on the leaves of mulberry plant.
- These silkworms are completely domesticated and reared indoors. Mulberry silk contributes to around 90 percent of the world silk production.




Bombyx mori




2. NON-MULBERRY SILK-


1. Tasar Silk

- **The tasar silkworms belong to the genus *Antheraea* and they are all wild silkworms.**
 - **There are many varieties such as the Chinese tasar silkworm *Antheraea pernyi* Guerin which produces the largest quantity of non-mulberry silk in the world.**
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2. Eri silk

- These belong to either of two species namely *Samia ricini* and *Philosamia ricini*. *P. ricini* (also called as castor silkworm) is a domesticated one reared on castor oil plant leaves to produce a white or brick-red silk popularly known as Eri silk.
 - Since the filament of the cocoons spun by these worms is neither continuous nor uniform in thickness, the cocoons cannot be reeled and, therefore, the moths are allowed to emerge and the pierced cocoons are used for spinning to produce the Eri silk yarn.
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3. Muga silk

- **The muga silkworms (*Antheraea assamensis*) also belong to the same genus as tasar worms, but produce an unusual golden-yellow silk thread which is very attractive and strong.**
 - **These are found only in the state of Assam, India and feed on *Persea bombycina* and *Litsaea monopetala* leaves and those of other species.**
 - **The quantity of muga silk produced is quite small and is mostly used for the making of traditional dresses in the State of Assam (India) itself.**
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2. Muga silk

- 'Silk of Assam'
- Unique monopoly of India. Produced by the sp, *A. assamensis* – endemic to India & occurs in Brahmaputra valley & adjoining hills in Assam.
- Made known to the world by the European traveller Jear Joseph Taveenier in 1662
- In 1950 a great earthquake in upper Assam destroyed Muga industry



TASAR SILK

- About 20 – 58% of total vanya silk is tasar silk in 2010-11
- A number of species belonging to the genus *Antheraea* secrete this type of silk.
- Tasar cocoons are large, thick and pedunculate.
- Made of single unbroken filament, hence reelable
- No record of origin
- Mentioned in Ramayana that Ram's nuptial gift to Sheeta had Tasar silk.



FOUR TYPES OF TASAR

Indian Tropical Tasar:

- *Antheraea mylitta* Dury. Commonly found in India
- Multivoltine, polyphagous worm.
- Principal host plants – asan (*Terminalia tomentosa*) & arjun (*Terminalia arjuna*)
- Secondary host plants are *Shorea robusta* and *Zizyphus* sp.
- Cocoons are grey white, tough & pedunculate.

Indian Temperate Tasar

- Also called as Oak tasar
- *Antheraea proylei*.
- Hybrid between Chinese *A. pernyi* & Indian *A. roylei*.
- feeds on oak trees of genus Quercus.
- Common in Himalayan borders
- Cocoons are grey white in colour.

Chinese tasar

- *Antheraea perni* Guerin
- Though called as Chinese tasar, also occurs in USSR countries
- Largest of the silk worms of the world
- Feeds on oaks of genus *Quercus* and few other trees
- Cocoons – grey brown in colour
- Its silk are used in making embroidery threads & for weaving fabrics

Japanese tasar

- *A. yamamai* Querin
- Feeds on oak
- Silk is green tinted
- Used for fabrics and embroidery works

Antheraea larvae




4. Anaphe silk

- This silkworm belongs to *Anaphe* of Family Notodontidae.
- *Anaphe moloneyi* Druce, *A. panda* Boisduval, *A. carteri* Washington, *A. venata* Butler, *A. infracta* Washington
- Most important one is *Triplochiton scleroxylon*.
- Univoltine silkworm.
- Eggs are laid in clusters in the under surface of leaves
- Larvae has seven instars and are polyphagous
- Silk is more elastic and stronger than mulberry silk. It is used in velvet and plush making.
- The production of this silk reached the peak during the World War II when it is used in the production of parachutes.

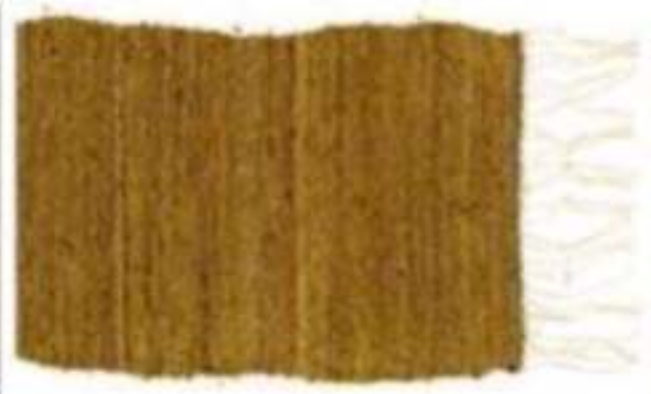


4. Anaphe silk

- They spin cocoons in communes, all enclosed by a thin layer of silk.**
 - The tribal people collect them from the forest and spin the fluff into a raw silk that is soft and fairly lustrous.**
 - The fabric is elastic and stronger than that of mulberry silk. Anaphe silk is used, for example, in velvet and plush.**
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5. Fagara silk


- 13 sps of genus *Attacus* spin this
- Giant moth *Attacus atlas* is commercially important
- Distributed in Indo- Austrlian bio geographical region, China & Sudan.
- Cocoons light brown in colour – 6cm in length with peduncles of varying length (2-10 cm)



5. Fagara silk

- They spin light-brown cocoons nearly 6 cm long with peduncles of varying lengths (2-10 cm).

6. Coan silk

- The larvae of *Pachypasa atus* D., from the Mediterranean bio-geographic region (Southern Italy, Greece, Romania, Turkey, etc.), feed primarily on trees such as pine, ash cypress, juniper and oak.
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6. Coan silk


- *Pachypasa otus* and *P. lineosa*
- From Mediterranean biogeographic region (Italy, Greece, Rumania, Turkey etc.,)
- Feeds primarily on trees like cyperus, juniper, & oak
- White cocoons measuring 8.9 x 7.6cm.
- In ancient times – used to make Crimson dyed apparel worn by the dignitaries of Rome.
- Once extensively cultivated in Europe until the introduction of *Bombyx mori*.
- Yield of silk from each cocoon is very less.



7. Gonometa silk

- Various sps of *Gonometa* – widely distributed throughout the African savanna.
- Moths are called as 'Egger Moth'.
- Polyphagous larvae but found max on *Acacia tortilis* – most widely distributed in Botswana, Africa
- Cocoons are ellipsoidal in shape, weighing 3.5gms.
- Shell is hard, each shell weighs 0.85 to 0.9 gms giving a shell ratio of 18 – 25%
- Sericin content is high (45 – 55%)
- Mulberry silkworm = 25 – 30%
- Tasar silkworm = 18 – 25%
- Cocoon is unreelable and are spun to produce lustrous silk

7. Mussel silk

- Whereas the non-mulberry silks previously described are of insect origin, mussel silk is obtained from a bivalve, *Pinna squamosa*, found in the shallow waters along the Italina and Dalmatian shores of the Adriatic.
 - The strong brown filament, or byssus, is secreted by the mussel to anchor it to a rock or other surface. The byssus is combed and then spun into a silk popularly known as “fish wool”.
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8. Mussel silk

- Obtained from bivalve *Pinna squamosa* found in shallow water along the Italian & Dalmatian shores
- The strong brown filament – byssus is secreted by the mussel to anchor it to a rock or other surface
- The byssus is combed & then spun into a silk popularly known as fishwool.
- Its production is largely confined to Taranto, Italy




9.Spider silk

- The webs of spider is made of silk
- Spiders use their silk to make webs or other structures/ to make nets to catch other insects / as a cocoon to protect offsprings/ to suspend themselves
- Small spiders use silk for ballooning for dispersal. They exclude several threads into air and let themselves carried away by wind

This extremely fine threads which spider use for ballooning is called as **gossamer**.

8. Spider silk –

- **Another non-insect variety – is soft and fine, but also strong and elastic.**
 - **As the spinning tubes (spinne-rules) are in the fourth and fifth abdominal segments, about a dozen individuals are confined by their abdominal part to a frame from which the accumulated fibre is reeled out four or five times a month.**
 - **Because of the high cost of production, spider silk is not used in the textile industry; however, durability and resistance to extreme temperature and humidity make it indispensable for cross hairs in optical instruments.**
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Female *Nephilla claviceps*



Argiope trifasciata

Wasp spider , St Andrew's cross spider



Cyrtophora moluccensis



Pan Spider

- The commercial production is from some Madagascan sps *Nephila madegascarensis*, *Miranda aurentia*, *Eperia* sp
- The golden orb weaver *Nephila claviceps* can produce different types of silk, as it has 3 pairs of spinneret..
- The building blocks of spider's silk are primarily non essential amino acids, Glycine and Alanine & the alignment of these amino acids in various ways is responsible for the unique properties.

CAPE MADE OF SPIDER SILK



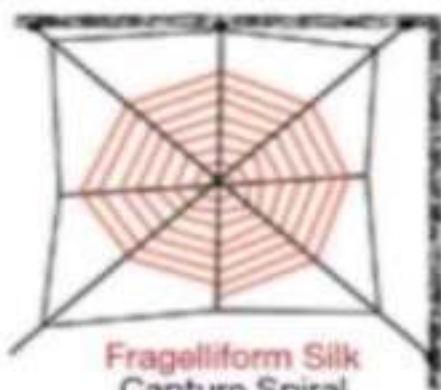
- Because of high cost of production it is not used in textile.
- Due to its durability & resistant to extreme temperature & humidity make it usable for cross hairs in optical instruments
- If the production of spider silk ever becomes industrially viable, it could replace Kevlar and be used to make a diverse range of item such as:

- ✓ Bullet-proof clothing
- ✓ Wear-resistant lightweight clothing
- ✓ Ropes, nets, seat belts, parachutes
- ✓ Rust-free panels on motor vehicles or boats
- ✓ Biodegradable bottles
- ✓ Bandages, surgical thread
- ✓ Artificial tendons or ligaments, supports for weak blood vessels.

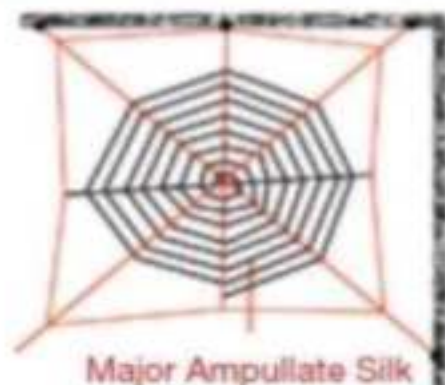


Type of Glands, Silks and Their Functions

Silk	Gland	Spinneret Used	Function
Dragline	Major Ampullate	Anterior/ Median	Orb web frame, radii
Viscid	Flagelliform	Posterior	Prey capture, sticky spiral
Glue-like	Aggregate	Posterior	Prey capture, attachment
Minor	Minor Ampullate	Anterior/ Median	Orb web frame
Cocoon	Cylindrical	Median/ Posterior	Reproduction
Wrapping	Aciniform	Median / Posterior	Wrapping captured prey
Attachment	Piriform	Anterior	Attachment



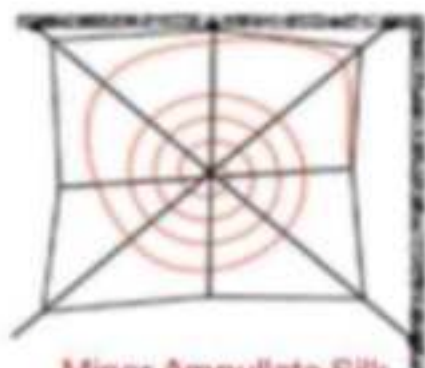
Fragelliform Silk
Capture Spiral



Major Ampullate Silk
Frame and
Radii Lifeline



Aggregate Silk
Glue Substance



Minor Ampullate Silk
Auxiliary Spiral
Web Reinforcement



Cylindriform Silk
Egg Case

Aciniform Silk
Egg Case
Prey Wrapping



Pyriform Silk
Attachment Discs

RASPY CRICKET

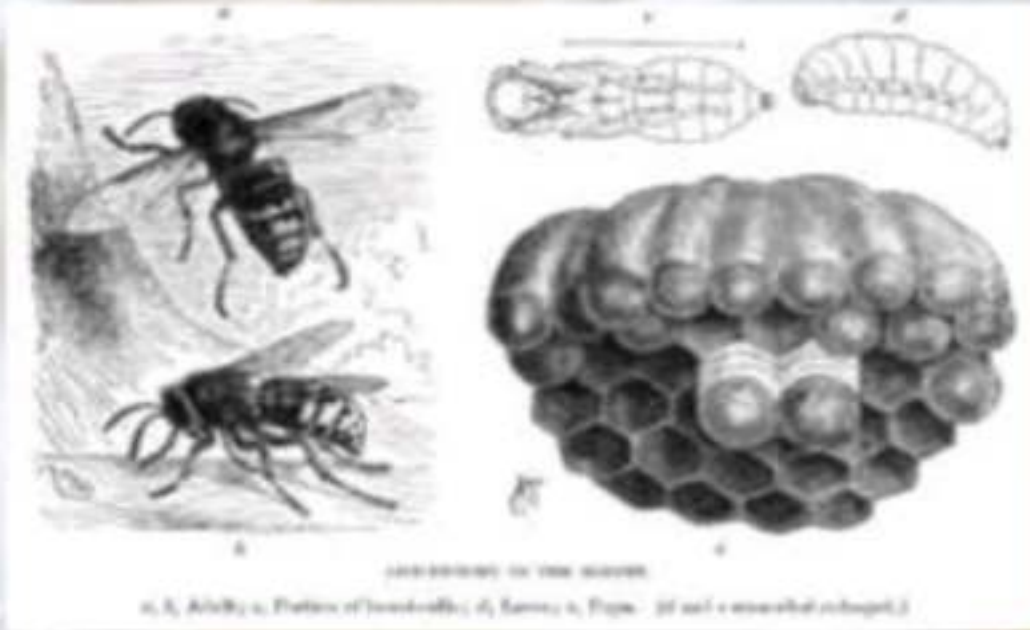
- Also called as leaf rolling cricket/ wolf cricket.
- Belongs to the family Gryllacrididae and suborder Ensifera.
- Non jumping insect, wingless and nocturnal.
- In day time sps of this family rest in shelter made from folded leaves sew with silk
- Some sps use silk to burrow in sand, earth or wood
- Its silk has many convergent features to silkworm silk, being made up of long, repetitive proteins with an extended beta sheet structure.



Hornets

- Eusocial wasps
- *Vespa orientalis*, *V. crabro*(European hornets)
- Nest is founded in spring by a fertilized female (queen)
- She select dark hollow tree trunks and builds a series of cells (upto 50) out of chewed tree bark and lays egg in each cell.
- After 5-8 days egg hatches and in next 2 weeks larva undergoes its 5 stages.
- During this time the queen feed it a protein rich diet.
- Then the larva spins a silver cap over the cell opening and transforms into an adult

- Hornet's nest- means a situation fraught with difficulties or complications
- An English action film was named as 'Hornets nest'
- Phrase- 'to stir up a hornet's nest' means to create a lot of trouble
- e.g.:- Terrorists are stirring up a hornet's nest in the border.



Weaver ants

- *Oecophylla smaragdina*
- First the queen lays a cluster of eggs on a leaf and protects it and feed the larvae until they develop into mature worker.
- The workers construct leaf nest and help to rear new brood laid by the queen
- As the no. of workers increase more nests are constructed and colony productivity and growth increases gradually
- Once the edge of the leaves are drawn together, other workers retrieve the larvae from existing nest using their mandibles.
- These workers hold and manipulate the larvae in such a way that cause them to excrete silk.



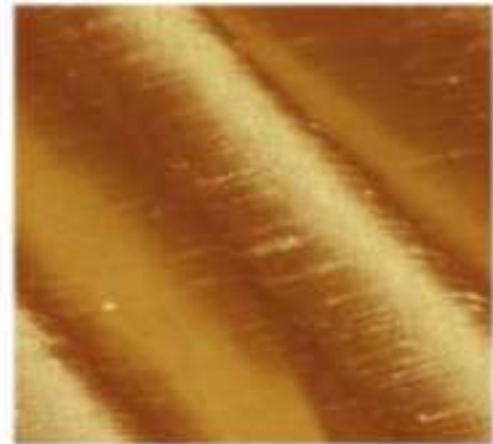
TYPES OF SILK

(**Momme**—describes the weight of the silk; one momme weighs 3.75 grams, higher numbers describe heavier fabrics.)

Wild Silk production is not controlled—silkworms feed on oak & cherry leaves; produce much less uniform fibers.

Tussar Silk most common type of wild silk—coarser, darker & cannot be bleached.

Duppioni Silk—wild silk; result of two silkworms spinning cocoons together, irregular in diameter, thick-and-thin appearance.



Mussel Silk. As the name implies, this silk is produced by mussels - yes, the same ones that can be found on seabeds. It is also sometimes called Sea Silk. This differs from the other silk types we've mentioned so far as it is not produced by silkworms.

Spider Silk. Like Mussel silk, this is the most difficult one to produce as spiders cannot just be bred like silkworms. Spiders cannot produce as much yarn as silkworms either. But though the production of this type of silk may seem difficult, its output is certainly worth the effort. It is regarded as one of the most durable types of silk as it is now being utilised in the production of telescopes, bulletproof vests and wear-resistant clothing!

Murshidabad Silk: Silk produced at the 'Silk Mecca' of East India.

Bangalore Silk: Known for its simplicity and purity of Silk, Bangalore silk is produced in the silk farms of Bangalore.

Angora Silk: Known for tender texture, the Angora silk yarn is made up from the fur of meek 'Angora' rabbit.

Tanchoi Silk: Weaving technique which is a blend of silk from the two countries, India and China.

Garad Silk: Garad originates in West Bengal, and is distinguished by its red border and small paisley motifs. Silk fabric used to weave Garad sarees is produced by the silk yarns woven close together which imparts the fine texture.

Jamawar: Jamawar Silk is an adulterated form of Pashmina silk which contains a blend of cotton and wool. This is usually used in weaving shawls for the winters.

Matka Silk: A rough handloom silk fabric made from the waste Mulberry Silk without removing its gum (sericin) part, largely produced in Karnataka and Kashmir.

Banarasi/Benarasi Silk: A fine variant of silk evolving from the lands of Benaras or Varanasi, known for gold and silver work of brocade and zari on the fabric.

Mulberry Silk: Purest form of silk extracted from Silkworms, usually produced in yellow, white, or greenish yellow color.

Raw Silk: Raw Silk is the most natural form of delicate fibre of silk with no twist and is unprocessed form of silk that can be easily woven into different fabrics.

Kosa Silk: Comes from Chattisgarh, and is known for its soft texture and dull-brownish look, hence available in shades of gold pale, dark honey, cream, etc. Kosa is one kind of Tussar Silk.

Pat/Paat Silk: Produced in Eastern India, Pat silk is known for its distinctive brightness, high quality and durable nature. It comes in brilliant white or off-white shades.

Cot Silk: A well-blended combination of cotton and silk, Cot silk is a cheaper-priced silk.

Kanchipuram: Silk from the village called Kanchipuram in Tamil Nadu, India, this one is known for its durability and shine. The rich quality combined with an amazing finish make them last longer.

Bhagalpuri Silk: Known as the 'Queen of all fabrics', Bhagalpuri Silk originates from West Bengal and is very well known for its unique and striking resilience and superior quality.

Uppada Silk: Also known as Uppada Pattu (Silk in Telugu), Uppada silk comes from Andhra Pradesh. Usually woven in cotton warp, this one is known majorly by the length and breadth count of threads.

Art Silk: Short form for artificial silk, art silk is manufactured by a synthetic fiber like Rayon that very much resembles the silk fiber; however, costs a lot less on the front of manufacture and production.

CHARACTERISTICS OF SILK FIBER

1. **Composition:** Silk is composed of 80% of fibroin, which is protein in nature and 20% of sericin.
2. **Strength:** Silk has good tensile strength, which allows it to withstand great pulling pressure.
3. **Elasticity:** It is an elastic fiber and may be stretched from $\frac{1}{7}$ to $\frac{1}{5}$ of its original length.
4. **Resilience:** Silk fabric retains their shape and have moderate resistance to wrinkling.
5. **Drapability:** Silk has a liability and suppleness that, aided by its elasticity and resilience, gives it excellent drape ability.
6. **Heat Conductivity:** Silk is a protein fiber and is a non-conductor of heat. It make suitable for winter wear.



PROPERTIES OF SILK: AESTHETICS

Silk can be dyed and printed in brilliant colors, available in many fabric types for interior & apparel uses.

Luster is soft with an occasional sparkle due to smooth but slightly irregular surface & triangular cross section.

Fabric has smooth appearance & luxurious hand, not as slippery as many synthetic fibers.

Wild silks have duller luster & more pronounced texture in filament form, has poor covering power—historically often treated with metallic salts weighting to produce better drape, covering power, & dye absorption



PROPERTIES OF SILK: DURABILITY

Silk has moderate abrasion resistance, seldom receives harsh abrasion due to luxury of use.

It is one of strongest natural fibers dry, may lose up to 20% of its strength when wet.

Not as elastic as wool because of lack of cross linkages, when silk is stretched even a small amount it does not return to its original length.



PROPERTIES OF SILK: COMFORT AND APPEARANCE

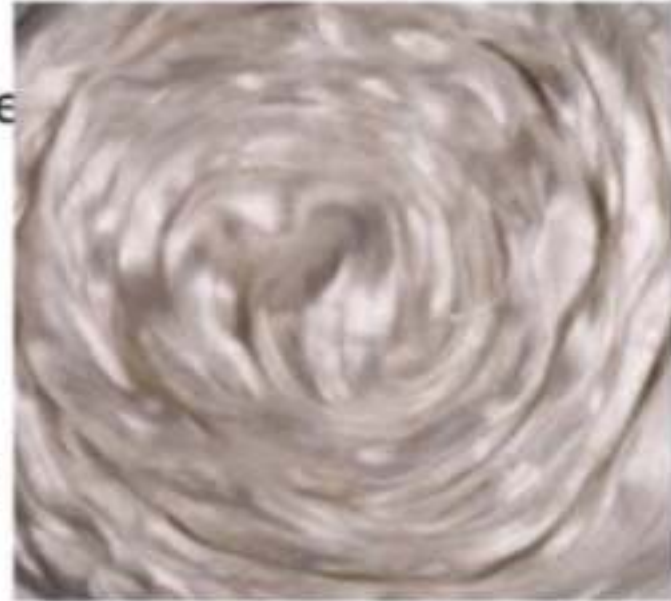
Silk has good absorbency, sheer silks are comfortable in summer.

Poor conductor of heat (like wool), heavier silks comfortably warm in winter.

May develop static cling due to smoothness of yarns and fabric weight.

Silk is smooth and soft and not irritating to skin.

Silk has moderate resistance to wrinkling & fibers do not shrink.



7. **Absorbency:** Silk fabric has good absorbency. Silk can absorb 11% of its weight in moisture, but range varies from 10% to as much as 30%.
8. **Cleanliness and Wash ability:** Silk does not attract dirt because of its smooth surface. Dirt can be easily removed by washing or dry cleaning.
9. **Reaction to Bleaches:** Silk is deteriorated with chlorine bleaches like sodium hypochlorite. Mild bleach of hydrogen peroxide or sodium per borate may be used for silk.
10. **Shrinkage:** Silk fabrics are subjected only to normal shrinkage which can be restored by ironing.
11. **Effect of Heat:** Silk is sensitive to heat and begins to decompose at 165°C .
12. **Effect of Light:** Silk fabric weakens on exposure to sunlight.



CHARACTERISTICS OF SILK FIBER

- 13. **Resistance to Mildew:** Silk will not mildew unless left for sometime in damp state.
- 13. **Resistance to Insect:** Silk may be attacked by the larvae or clothe moths or carpet beetles.
- 13. **Reaction to Alkalis:** Silk can be damaged if the concentration and temperature is high. A mild soap or detergent in lukewarm water is advisable.
- 13. **Reaction to Acid:** Concentrated mineral acids will dissolve silk faster than wool. Organic acids do not harm.
- 13. **Affinity for Dyes:** Silk has good absorbency and thus has good affinity for dyes.
- 13. **Resistance to Perspiration:** Perspiration weakens and yellows silk fabric.



Silk may water spot easily, before laundering, test in obscure place.

Can be damaged by strong soaps or detergents & high temperatures.

Chlorine bleaches should be avoided—hydrogen peroxide & sodium perborate are safe if direction carefully followed.

Silk is weakened and yellowed by exposure to sunlight and perspiration.

May be attacked by insects, especially carpet beetles.



CARE

Dry cleaning is preferred. But can be laundered at home using mild detergent. It should be ironed at medium to low temperature by placing a semi wet muslin fabric. It should be dried in shade.

TABLE 5 : RECOMMENDED CARE INSTRUCTIONS WITH SYMBOLS FOR SILK ITEMS				
				
Do not wash	Do not bleach	Do not iron	Dry-cleaning with Perchloro- ethylene	Do not tumble dry

REACTION WITH CHEMICALS

Effects of acids: Concentrated mineral acids will dissolve silk faster than wool. Organic acids do not harm silk.

Effects of alkalis: Silk is not as sensitive as wool to alkalis, but it can be damaged if the concentration and the temperature is high. A mild soap or detergent in lukewarm water is thus advisable

Affinity for dyes: Silk has good absorbency and thus has good affinity for dyes. Dyed silk is colourfast under most conditions, but its resistance to light is unsatisfactory.

Resistance to perspiration: Perspiration and sunlight weakens and yellows silk fabrics. The silk itself deteriorates and the colour is affected causing staining. Garments worn next to the skin should be washed or otherwise cleaned after each wearing.

Effect of Heat: Silk is sensitive to heat and begins to decompose at 330° F (165° C). The silk fabrics thus have to be ironed when damp.

Effect of Light: Silk fabric weakens on exposure to sun light. Raw silks are more resistant to light than degummed silk.

Resistance to Mildew: Silks will not mildew unless left for sometime in a damp state or under the extreme conditions of tropical dampness.

Resistance to Insects: Silk may be attacked by the larvae or clothe moths or carpet beetles.

IDENTIFICATION OF NATURAL PROTEIN FIBRES

Natural protein fibers can be identified with microscope fairly easily:

- correct ID of specialty wools important due to fraudulent blends.
- silk surface not as regular as that of most manufactured fibers.

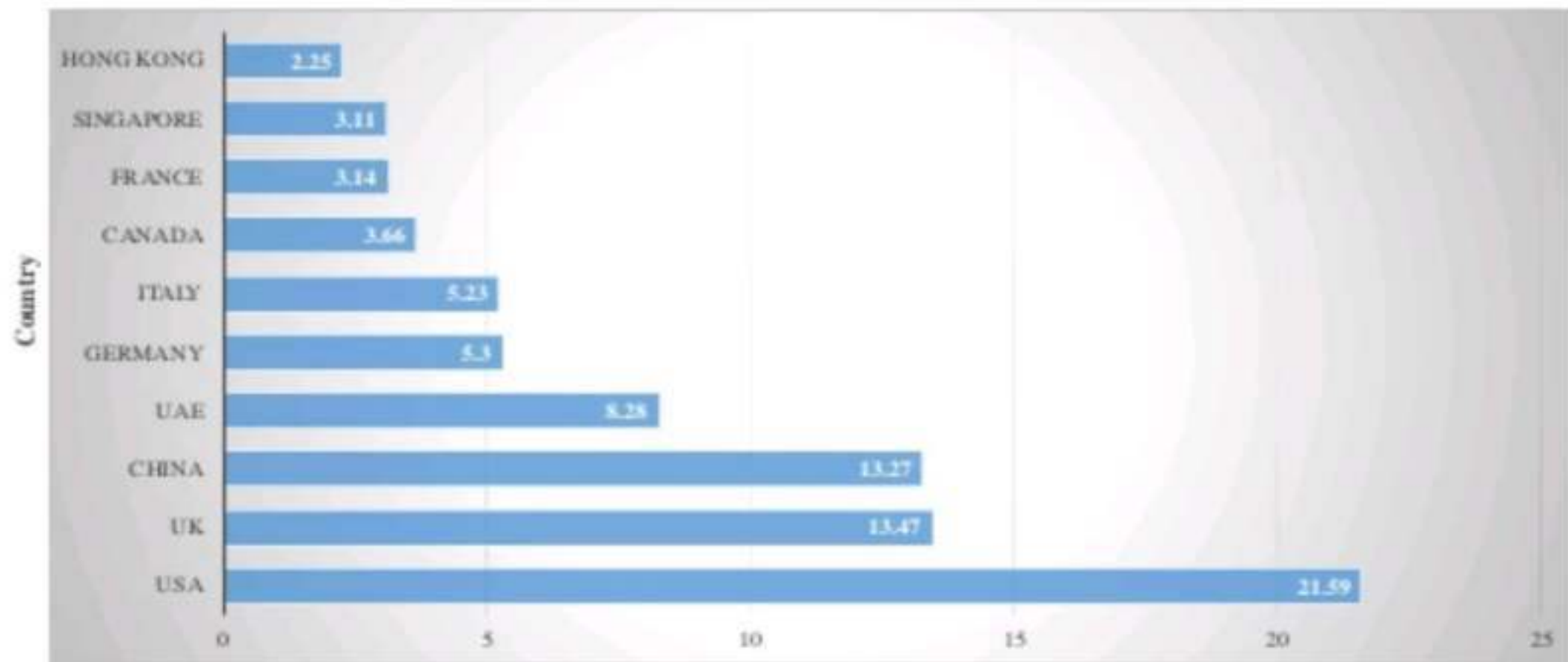
Soluble in sodium hypochlorite.

In burn test- fibers smell like burning hair.





Top Ten Importers of Indian Silk (2016-17)



Source - <https://www.ibef.org/exports/indian-silk-industry.aspx>

Silk Imported (Million)

SUMMARY - SILK

- Silk is a **protein fiber**, which is obtained from cocoons of the silkworms.
- The fabric made of twisted fibers exhibits **good strength and are very elastic in nature**.
- These fibers are suitable for winter apparels as these are **bad conductors of heat** and also provides comfort in warmer weathers
- Silk is called as **hygienic material** as it does not attract dirt.
- Silk **absorb the dyes** very well because of their amorphous nature.




Central Silk Board

- Central Silk Board is a statutory body, under the administrative control of the Ministry of Textiles, Govt. of India.
- **Established in 1948**, by an Act of Parliament, the CSB has been entrusted with the overall responsibility of developing silk industry
- covering the full gamut of sericulture activities in the country from development of food plants to silk cocoons for production of silk yarn including formation of policies governing Import & Export of silk
- CSB is basically an R&D Organization
- One of the important activities of the CSB is undertaking, assisting and encouraging scientific, technological and economic research in the Silk Sector

Source - <http://www.csb.gov.in/>

CENTRAL SECTOR SCHEMES

- Research & Development, and Research Extension,**
 - Maintenance of four tier silkworm seed production network,**
 - Providing leadership role in commercial silkworm seed production,**
 - Standardizing and instilling quality parameters in the various production processes,**
 - Promotion of Indian Silk in domestic and international markets and advising the Union Government on all matters concerning sericulture and silk industry.**
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Schemes By CSB

A. National Silkworm Seed Organization, Bangalore (1975)

- It was established by CSB to supplement the state governments in supplying high quality **Bivoltine** and **Multibivoltie** silkworm seeds to the farmers
- It has mandate to maintain, multiply and supply authorized silkworm stock, production and supply of quality industrial silkworm seeds and transfer of technologies in the field to improve the productivity and quality of silk

Source - <http://www.csb.gov.in/assets/Uploads/rti-files/RTI-NSSO.pdf>



Cont.....

B. Silk Mark Organization of India (SMOI), June 2004

- Silk Mark is a **certification mark** in India for silk textiles. The mark certifies that the piece of textile which bears the mark is made of pure natural silk. The certification is managed by the 'Silk Mark Organization of India', a society set up by the state-controlled Central Silk Board of India.
- The mark included a silk mark logo woven on a hang-on tag on which a unique numbered hologram would be affixed
- The certification scheme assures the consumer a facility for free testing of the marked product in Silk Mark Chapters (accredited labs) in case of doubt

Source - https://en.wikipedia.org/wiki/Silk_Mark



Cont.....

C. Indian Silk Export Promotion Council (ISPEC), Mumbai (1983)

- The Council as on date has a membership of 853 regular exporters of Silk goods whereas more than 1800 exporters have registered with the Council
- ISEPC works closely with the Government of India on policy formulation concerning silk sector and provides specialized services to the entrepreneurs enlarging global business opportunities for the silk industry in India

Source - <http://www.theindiansilke xportpromotioncouncil.com/>



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D. Catalytic Development Programme for Silk

- Catalytic Development Programme (CDP) is the flagship scheme of CSB
- sustaining all round development of sericulture and silk industry in the country
- It has been an important tool for effective transfer and adoption of improved technology packages developed by the research institutes of CSB

Source - <http://www.csb.gov.in/schemes/centrally-sponsored/cdp-xii-plan/>