CLASSIFICATION OF SILKWORMS

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BREED: A stock of animals or plants within a species having a distinctive appearance and typically having been developed by deliberate selection.

RACES: A population within a species that is distinct in some way, esp. a subspecies.

Indigenous originating in and characteristic of a particular region or country; native.

Eg., Pure Mysore, Nistari.

Exotic plant or animal species introduced into an area where they do not occur naturally, non-native species.

Eg., E16, Daizo *etc*.,

CLASSIFICATION BASED ON GEOGRAPHIC DISTRIBUTION

1. JAPANESE RACE (ABORIGINAL IN JAPAN)

Fecundity is higher ranging from 600-700. The larvae is very active & leaf cocoon ratio is less. Larval body size is small for long larval duration & is around 26 days and the larvae are marked. The shape of the cocoon is strangulated giving the appearance of pea nut shape. Almost all races produce white cocoons. Further, Per cent age of double cocoons are more & quality of silk is better. Larvae are susceptible to grasserie and flacherrie. There are Uni and Bivoltines races in this group.

2. CHINESE RACE (ABORIGINAL IN CHINA):

In Chinese races the fecundity rate is higher ranging from 600- 650 eggs. The progress of the larval growth is quick & as a result of which the leaf cocoon ratio is less. Most of the Chinese races are plain without any markings. The shape of the cocoon is round/elliptical/few of them are spindle shaped. The Cocoon colour is white, golden yellow, flesh or red. The Silk filament is fine & reelability is good. The Chinese races are resistant to high temperature & humidity. Uni, Bi, Multivoltines falls under this group and ever trimoulters are noticed.

3. **EUROPEAN RACES (ABORIGINAL IN EUROPE AND CENTRAL ASIA):**

   The fecundity rate is medium ranging from 550- 600 & size of the eggs is large. The larval stage is long, the moulting period reduced by 1-2 h. The larvae are plain without any markings. The cocoons are big, long elliptical. Cocoons are either white/flesh coloured. The % of double cocoons is less. The filament length is long with good reelability. Europian races are weak against high temperature & humidity. All are Univoltines.

4. **SOUTH EAST ASIAN RACES (TROPICAL):**

   The fecundity rate is lower ranging from 400-500. Eggs are small. The larval length is short with few exceptions where the tropical races of India exhibit longer larval duration. The larval markings are not common in these races. Leaf cocoon ratio is high. The size of the larvae is small. The shape of the cocoon is spindle, flossy with less filament length. The common cocoon colour is green/pink/yellow/white. Denier of the silk filament is fine. These races are resistant to varied environmental conditions especially high temperature & humidity. Multivoltines/polyvoltine races are very common.

CLASSIFICATION OF SILKWORMS BASED ON VOLTINISM

Voltinism is a term used in biology to indicate the number of broods or generations of an organism in a year. or Number of generations per year under natural environmental conditions. Based on voltinism *Bombyx mori* is divided in to 3 types, namely

1. UNIVOLTINES, 2. BIVOLTINES and 3. MULTIVOLTINES.

1. **UNIVOLTINE RACES:**

   They produce ONE generation per year. The larval weight is comparatively higher and cocoons are heavy. Denier of the silk filament is above 2.3. They are not suitable for summer & winter rearings, since the larvae are weak against unfavourable conditions especially to higher temperature. They lay only diapausing eggs. All European races are univoltines *eg.*, E16

2. **BIVOLTINE RACES:**

   They produce TWO generations per year. The length of the larval stage is short. The leaf consumption to cocoon production (cocoon ration) is less, and the quality of the cocoons inferior to that of Univoltine races. Further, cocoon weight, shell weight, silk % & filament length lesser

than uni/mono voltines. Most of the temperate races are bivoltines and lays both non hibernating and non hibernating eggs *eg.*, NB_4D_2, $NB_1$8, KA, NB_7 *etc.*,

3. MULTIVOLTINE RACES:

They produce more than 5-6 generations per year. The length of the larval duration is short. In most of the polyvoltine races the leaf cocoon ratio is high, cocoons are compact grained and cocoon layer is soft. The length of the filament is short (approximately 400 mts). However, the cocoon filament is fine and clean with little lousiness; but with more lustrous. The larvae are robust and can tolerate fluctuating environmental conditions and hence best suited for tropical climates. They lay only non diapausing eggs. *Eg.,* Pure Mysore, C.nichi, Hosa Mysore.

CLASSIFICATION BASED ON MOULTINISM

Moulting - Moulting or molting, also known as shedding, or ecdysis, is the manner in which an animal routinely casts off an outer layer or covering at specific points in its life cycle. Silkworms can be classified in to tri moulters, tetra moulters, penta moulters and hexa moulters (very rare)

1. TRIMOULTERS:

This group includes silkworms which moult three times during larval period. The larval growth is limited, the larval duration short ranging from 15-18 days. Pupae & moths are small, cocoon weight is less, cocoon filament is fine & denier of the silk filament ranges from 1.6 to 1.7.

2. TETRAMOULTERS:

This group moults four times during their larval stage. The length of the larval stage is medium ranging from 23-28 days. The larval growth and cocoon weight is medium. Denier is 2-2.5. Tetra moulters are cosmopolitan in their distribution.

3. PENTAMOULTERS:

This moults five times during their larval stage. The length of the larval stage is long, larval weight is high and cocoons are heavy, filament length is more. Denier of the silk filament denier is very high.

Characteristics of temperate and tropical voltine groups of silkworm:

Temperate Breeds	Tropical Breeds
1. Temperate breeds are all either Uni/ Bivoltines. They lay both hibernating and non hibernating eggs.	1. Tropical breeds are all Multivoltines. They lay only non hibernating aggs.
2. Temperate silkworm breeds are Susceptible to Fluctuating environmental conditions as well as poor quality leaves.	2. Tropical silkworm breeds are resistant to fluctuating/varied environmental conditions and poor quality leaves
3. Temperate breeds are Good Yielders in general i.e., more cocoon weight, shell weight, filament length, denier etc., *Eg.* E16, Daizo etc.,	3. Tropical breeds are Poor Yielders in general i.e., more cocoon weight, shell weight, filament length, denier etc., when compared to temperate breeds *Eg.,* Pure Mysore, Nistari, *etc*.,

Popular silkworm breeds of Karnataka

Popular Silkworm Breeds of Karnataka & their Economic Traits

Traits > / Breed↓	Fecundity	Hatching %	LD	Cocoon shape & color	Cocoon wt.	Shell Wt.	Shell%	Denier
PM	473	96.13	689.22	Greenish yellow / oval	0.942	0.130	13.79	1.7
C.nichi	454	96.64	505.11	Dumb bell / white	1.077	0.121	11.32	1.6
NB_4D_2	558	95.34	609.55	Dumb bell / white	1.817	0.398	21.89	2.2
KA	540	94.9	600.00	Oval / white	1.62	0.3	18.63	2.1
CSR_2	550	97	600	Round / oval	1.8	0.36	20	2.1

In Karnataka, a multi X bi (Pure Mysore X CSR_2, earlier it was Pure Mysore X NB_4D_2) hybrid is very popular and used for the production of commercial silk in the areas where irrigation faculity is available for mulberry garden. But, in the traditional belt, with rainfed mulberry gardens, still a multi X multi (Pure Mysore X C. nichi) hybrid is used for the production of commercial silk. Further, Nandi, a Bi X Bi between KA X NB_4D_2 is also reared by some of the rearers to produce commercial silk.
