



# **Classification of SILKWORMS**

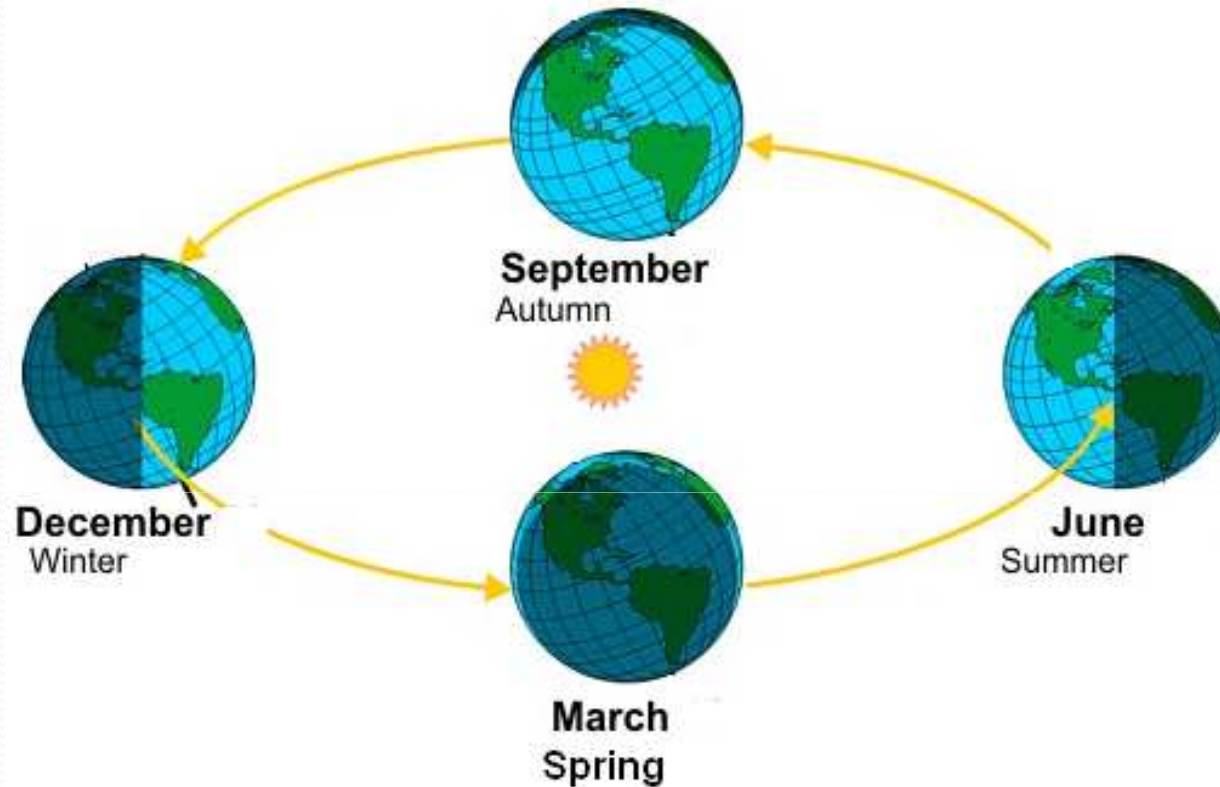
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# CLASSIFICATION OF SILKWORMS BASED ON VOLTINISM

**Voltinism is a term used in biology to indicate the number of broods or generations of an organism in a year. / Number of generations per year under natural environmental conditions.**

- **UNIVOLTINES**
- **BIVOLTINES**
- **MULTIVOLTINES**
- **Semivoltine** - Referring to organisms whose generation time is more than one year

## SEASONS OF TEMPERATE ZONE



**Natural Uni and Bivoltines are available only in this zone**  
**Univoltines completes their life cycle during spring season (Only ONE)**  
**Bivoltines complete their first life cycle during spring and second life cycle during early summer**

# UNIVOLTINES

- **ONE generation/year**
- **Larval weight is comparatively higher, cocoons are heavy**
- **Denier is above 2.3**
- **Not suitable for summer & winter rearing**
- **They lay only Diapausing eggs**
- **All European races are univoltines *eg., E16***

# BIVOLTINES

- **They produce TWO generations/year**
- **The larval duration is short to that of Univoltines**
- **The leaf cocoon ratio is less**
- **The quality of the cocoons inferior to that of Univoltine races**
- **Cocoon weight, shell weight, silk % & filament length lesser than univoltines**
- **Most of the temperate races are bivoltines and lays both hibernating and non hibernating eggs eg., NB<sub>4</sub>D<sub>2</sub>, NB<sub>18</sub>, KA, NB<sub>7</sub> etc.,**

# MULTIVOLTINES

- **They produce more than 5-6 generations/year.**
- **The larval duration is short.**
- **The leaf cocoon ratio is high.**
- **Cocoons are compact grained and soft.**
- **The filament length is short.**
- **The filament is fine and clean with little lousiness; but with more lustrous.**
- **The larvae are robust and can tolerate fluctuating environmental conditions.**
- **They lay only non diapausing eggs. *Eg., Pure Mysore, C. nichii, 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.

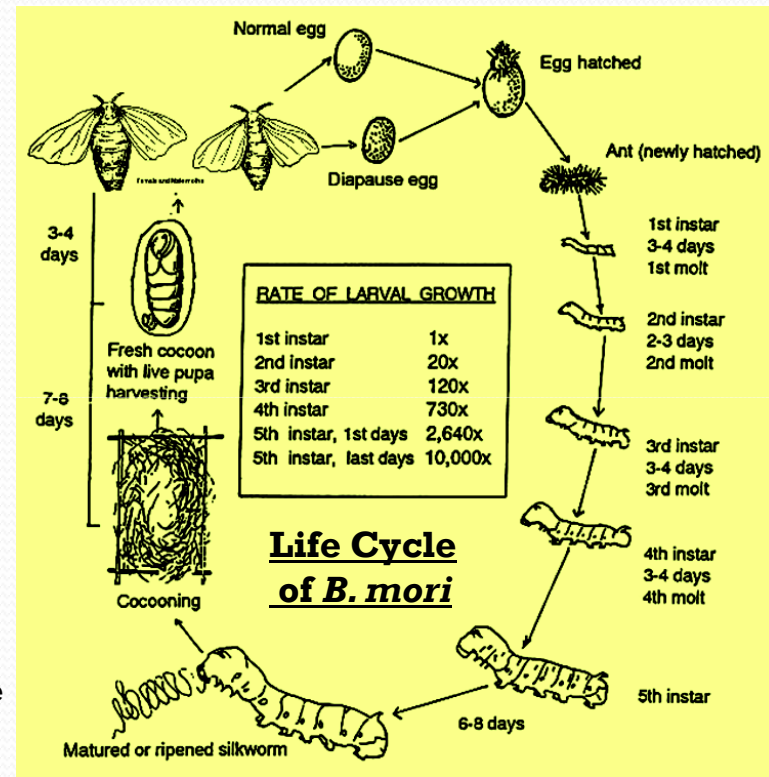


**Silkworm Larva crawling out of its outer old layer of skin**

# CLASSIFICATION BASED ON MOULTINISM continued

Based on number of moults silkworms can be classified as

- **Tri moulters**
- **Tetra moulters**
- **Penta moulters**
- **Hexa moulters** - Very rare





# TRIMOULTERS

- **This group includes silkworms which moults 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 is 1.7.**

# 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.

# PENTAMOULTERS

- **Which moults five times during their larval stage.**
- **The length of the larval stage is long, larval weight is high and cocoons are heavy.**
- **Denier is very high.**

## CLASSIFICATION BASED ON **GEOGRAPHIC DISTRIBUTION**

- **Japanese race (Aboriginal [indigenous] in Japan)**
- **Chinese race (Aboriginal in China)**
- **European races (Aboriginal in Europe and Central Asia)**
- **South east Asian races**

## **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 (26d).
- **The larvae are marked.**
- The cocoon shape is **pea nut / dumbbell.**
- Almost all races produce white cocoons.
- **Double cocoon** % is more & quality of silk is better.
- Larvae are susceptible to **grasserie** and **flacherrie.**
- **Uni and Bivoltines** races falls under this group

# Chinese race (Aboriginal in China)

- **Fecundity** is higher.
- The larval growth is quick & **leaf cocoon ratio** is less.
- The larvae are plain.
- The shape of the cocoon is round/elliptical/few of them are spindle shaped.
- Cocoon colour is white. Silk filament is fine & **reelability** is good.
- Resistant to high temperature & humidity.
- **Uni, Bi, Multivoltines** falls under this group.
- Silkworms were reared in different localities in 2600 B.C.

# European races (Aboriginal in Europe and Central Asia)

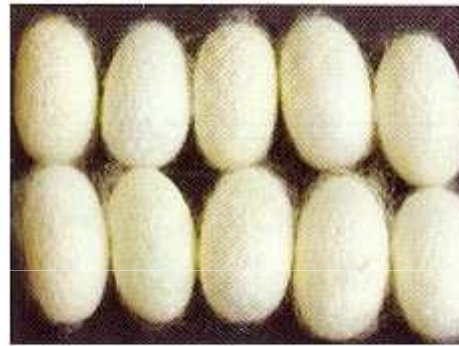
- **Fecundity** is low, around 600 & size is large.
- The larval stage is long, moulting period reduced by 1-2 h.
- The larvae are plain.
- The cocoons are big & elongated. White/flesh coloured.
- The filament length is long with good **reelability**.
- The % of **double cocoons** less.
- Weak against high temperature & humidity.
- **All are Univoltines.**

# South east Asian races (Tropical)

- **Fecundity is lower @ 400-500. Eggs are small.**
- **The larval length is short with few exceptions.**
- **The larval markings are not common.**
- **Leaf cocoon ratio is high.**
- **The shape of the cocoon is spindle, flossy, less filament.**
- **Cocoon colour is green/pink/yellow/white. Denier is fine.**
- **Resistant to high temperature & humidity.**
- **Multivoltines are very common.**



# Popular Silkworm Breeds of Karnataka



PM X CSR2



## Popular Silkworm Breeds of Karnataka & their Economic Traits

Traits > Breed ↓	Fecundity No.	Hatching %	LD Hours	Cocoon shape & color	Cocoon wt. Gm	Shell Wt. Gm	Shell %	Denier
<b>PM</b>	<b>473</b>	<b>96.13</b>	<b>689.22</b>	<b>Greenish yellow / oval</b>	<b>0.942</b>	<b>0.13 0</b>	<b>13.79</b>	<b>1.7</b>
<b>C.nichi</b>	<b>454</b>	<b>96.64</b>	<b>505.11</b>	<b>Dumb bell / white</b>	<b>1.077</b>	<b>0.12 1</b>	<b>11.32</b>	<b>1.6</b>
<b>NB<sub>4</sub>D<sub>2</sub></b>	<b>558</b>	<b>95.34</b>	<b>609.55</b>	<b>Dumb bell / white</b>	<b>1.817</b>	<b>0.39 8</b>	<b>21.89</b>	<b>2.2</b>
<b>KA</b>	<b>540</b>	<b>94.9</b>	<b>600.00</b>	<b>Oval / white</b>	<b>1.62</b>	<b>0.3</b>	<b>18.63</b>	<b>2.1</b>
<b>CSR<sub>2</sub></b>	<b>550</b>	<b>97</b>	<b>600</b>	<b>Round oval/ White</b>	<b>1.8</b>	<b>0.36</b>	<b>20</b>	<b>2.1</b>



**Acknowledgements  
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