

#8

3 JUL 35 (3)  
1985

ISOLATION AND DEVELOPMENT OF PURE RACES OF SILK WORM

Mian Mohammad Muslim\*

36

Summary

Commercial F1 hybrid eggs (seeds) of silkworms, procured from Japan and Korea, were subjected to self crossing for seven generations during 1977 to 1983 at Sericulture Research Laboratory, Lahore. The pure strains of Japanese, Chinese and European races, separating as a result of their segregation, were picked up on the basis of their respective racial characteristics. The pure lines of Japanese, Chinese and European races, so obtained, were given the following names:

- (a) Japanese race
  - (i) M 101
  - (ii) M 103
  - (iii) M 107
- (b) Chinese race
  - (i) M 104
  - (ii) M 108
- (c) European race
  - (i) ZM 76

Introduction:

The most important step in silkworm rearing is the production of silkworm eggs required for rearing. The silkworm eggs (seeds) can be broadly classified (Krishnaswami, 1973) as reproductive and commercial (industrial) eggs. The reproductive eggs, intended for producing seed cocoons and commercial eggs, are obtained by breeding eggs are generally specific hybrids between two or more pure lines of different races of silkworm and are reared for producing cocoons on commercial scale for reeling purposes.

In Pakistan non-availability of stock eggs of pure lines of silkworm, required for producing commercial hybrid eggs, is one of the major constraints in the development of silk production.

This study was initiated for developing foundation stock of pure lines of Japanese, Chinese and European races of silkworm.

\* Senior Research Officer, Sericulture Research Laboratory, 108 - Ravi Road, Lahore.

## Review of Literature:

Silkworm varieties, by their places of origin, are grouped into: Japanese race, Chinese race, European race and Tropical race. These races have their own characteristics. Most of the silkworm varieties currently reared in Japan, as reported by Masanori Shimizu, 1972, are of Japanese race and Chinese race and from the mating of these two are produced many Japno-Chinese Hybrids, which are reared by farmers. The specific hybrids between two or more pure lines or races of silkworm are reared by the Sericulturists for producing cocoons on a commercial scale for reeling purposes as stated by Krishnaswami, 1973.

## Materials and Methods:

The F1 hybrid silkworm eggs procured from Japan and Korea, were subjected to self crossing for seven generations during 1977 to 1983 at the Sericulture Research Laboratory, Lahore. The Japanese, Chinese and European strains separating as a result of their segregation were picked-up on the basis of the differences in their racial characters as prescribed by Masanori.

Shimizu 1972 (HAND BOOK OF SILKWORM REARING, AGRICULTURAL TECHNIQUE MANUAL I, PP 106) which are given below:-

## DIFFERENCES IN GENERAL CHARACTERS OF JAPANESE, CHINESE AND EUROPEAN RACES.

General Characters	Races		
	Japanese	Chinese	European
(a) Larva			
(i) Normal marking	Quail - Blackish	Plain Whitish	Light marking Redish at ripening
(ii) Body colour.	Cylindrical	Round	Long
(iii) Body shape	Slightly slow	Comparatively fast	Very slow
(iv) Duration			
(b) Cocoon			
(i) Shape	Peanut	Round or oval	Longer Oval
(ii) Colour	White or straw colour	White or yellow	White or flash colour
(c) Voltinism.	Uni-bivoltine	Uni-bivoltine	Univoltine

The pure strains of various races were distinguished from their hybrids on the basis of the differences in their characteristics such as rate of oviposition, hatchability, larval duration and vigour, and cocoon shape and yield.

The pure lines obtained were given the following names.

## PURE LINES OF VARIOUS RACES ISOLATED FROM THE SEGREGATING HYBRIDS

Sl. No.	Pure line	Race
1.	M 101	Japanese
2.	M 103	Japanese
3.	M 107	Japanese
4.	M 104	Chinese
5.	M 108	Chinese
6.	MZ-76	European

The eggs of pure lines obtained were incubated at a temperature of 24 to 25°C. The larvae were brushed on February 20, 1983 and feeding was conducted on the same day at 10 to 11 A.M. The larvae were administered five to six feeds per day. In order to determine the larval life the moulting data of each variety during larval period was recorded.

For the study of characteristics of various varieties, nine hundred larvae of each variety were taken at random out of their respective larval population after giving a feed on passing the third moult and grouped in three batches of three hundred each and reared at Sericulture Research Laboratory, Lahore under same conditions of temperature (ranging from 22°C to 24°C) and relative humidity (ranging from 65% to 75%). The larvae, as soon as matured, were mounted on mounting frames.

The cocoons were harvested after seven days of mounting and the following characteristics were studied separately for each line.

(a) *Cocooning Ratio.* The cocooning ratio was worked out by the following formula.

$$\text{Cocooning Ratio} = \frac{\text{Number of cocoons spun}}{\text{Number of sampled larvae}} \times 100$$

(b) *Grades of Cocoon.* The cocoons were sorted out and graded as.

- 1) Normal cocoon and (2) Low cocoon and their respective percentage was determined.

(c) *Single Cocoon Weight.* 25 male and 25 female cocoons were taken at random from normal cocoons of each group of each variety on the harvest day and their weight determined and averaged.

(d) *Cocoon Shell ratio.* The shell weight of the cocoons described above (c), after removing the pupae from the cocoon, was determined and averaged. Cocoon shell ratio expressed in percentage was calculated by the following formula

$$\text{Cocoon Shell Ratio} = \frac{\text{Cocoon Shell weight}}{\text{Cocoon weight}} \times 100$$

RESULTS. The results obtained are given in Table I.

TABLE I

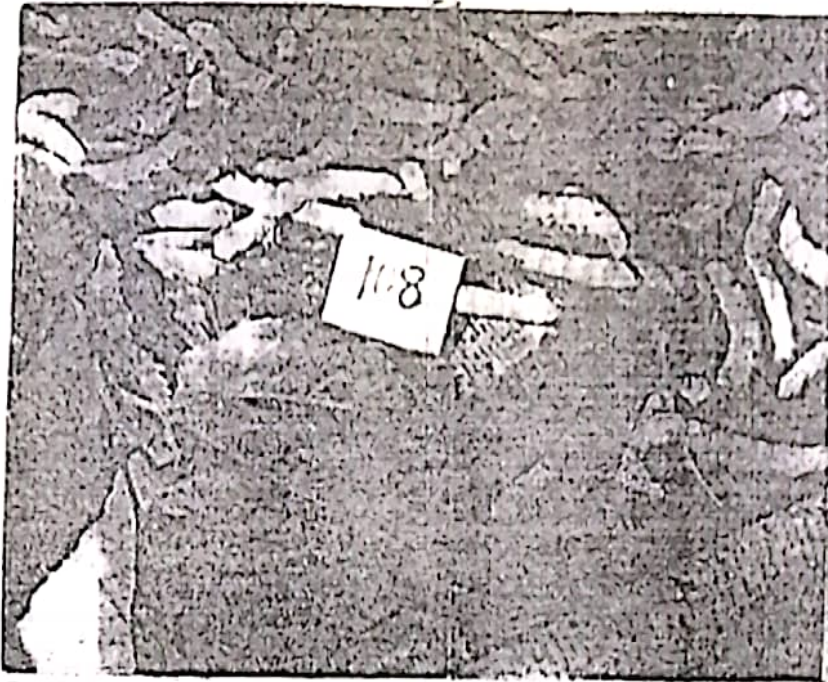
## CHARACTERISTICS OF THE PURE SILKWORM RACES DEVELOPED

Race	Name of variety developed.	Larval duration whole life (days)	Fifth instar (days)	Larval marking	Cocooning ratio(%)	Normal cocoon (%)	Cocoon shape	Single cocoon weight (Grams)	Cocoon shell (%)
a) Japanese	M 101	28	8	Quail	96.7	92.2	Peanut	1.459	20.7
	M 103	28	8	-do-	91.0	92.1	Peanut	1.387	20.9
	M 107	29	8	-do-	97.3	89.4	Peanut	1.509	20.7
b) Chinese	M 104	27	7	Plain	97.0	84.8	Oval	1.263	20.0
	M 108	27	7	-do-	95.3	91.5	Oval	1.438	20.7
c) European	ZM 76	29	8	Zebra crossing	96.3	88.7	Oblong	1.725	20.0

**ACKNOWLEDGEMENTS** The author appreciates the assistance of Mr. M. Akram, Assistant Sericulture Development Officer and Mr. Badar Munir, Research Officer during the course of this work. Special thanks are extended to Mian Mohammad Shameem, Conservator of Forests, Development and Working Plan Circle, Lahore for his kind guidance during the course of this work.

**REFERENCES**

1. S. Krishnaswami, M. N. Narasimhanna, S. K. Suryanarayn and S. Kumaraj 1973 Manual on Sericulture. Volume 2-Silkworm Rearing FAO. AGS ASB/15 Rome, Italy.
2. Masanori Shimizu 1972, Hand Book of Silkworm Rearing, Agriculture Technique Manual 1, Tokyo, Japan.



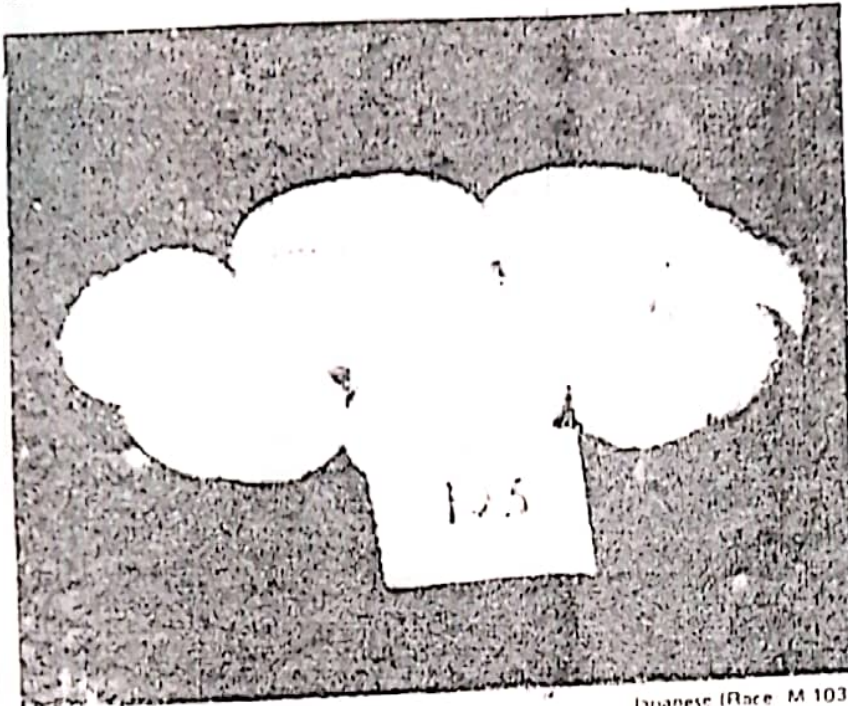
RACE M 108

Chinese (Race: M 10R)



RACE ZM 76

European (Race: ZM 76)



RACE M 101

Japanese (Race M 103)



RACE M 107

Japanese (Race M 107)