

Performance of multivoltine eggs preserved under double step method:

Conducted bio-assay studies to study the effect of long term preservation of multivoltine pure eggs. This experiment was repeated 3 times in each race and recorded the rearing parameters such as Effective rate of rearing, Single cocoon weight (SCW), Single shell weight (SSW), shell ratio (SR%) and pupation. The rearing performance results are presented in the Table No: 1. Further it is inferred that the preservation schedules have showed promising rearing performance in all the three trials have been compiled and the mean values ranged, 90 to 96% hatching, ERR ranged from 9005 to 9435, Single cocoon weight 0.928 to 1.313 g, Single shell weight 0.121 to 0.227 S.R% 13.15 to 16.93% with 93 to 96% of pupation rate. All parameters are on par with the 20 days preservation of eggs of all multivoltine breeds (Table:1).

Table 1: Bio-assay studies of multivoltine pure breeds (Average of 3 trials)

Race	Treatment / Schedule	Egg/ dfl	Hat. (%)	Lar. wt. (g)	ERR BY	Single Cocoon Wt. (g)	Single Shell Wt. (g)	S.R%	Pupa duration (%)	Larval duration
L14	48h:20+2+2 0	418	92	32.41	9005	1.313	0.221	16.79	95	23
Sarupat	48h:20+2+2 0	338	96	25.03	9341	0.928	0.121	13.12	95	22
APDR15	38h:15+2+2 0	417	93	32.04	9267	1.208	0.227	18.79	93	23
Pure Mysore	48h:20+2+2 0	450	95	23.86	9435	1.144	0.164	14.34	96	27
MH1	48h:20+2+2 0	435	90	29.89	9186	1.115	0.197	16.93	94	25

Further Pure Mysore was test verified at P2 Basic Seed Farm (Kunigal). The results indicated that cocoon yield /100 dfls 44 kg, with an ERR of 9073 by No & by weight 10.138 kg, Single cocoon weight 1.117 g, Single shell weight 0.158 g, Shell Ratio 14.14% and pupation 91%. All the parameters are on par with the 20 days preservation of multivoltine eggs (Table :2).

Table No: 2 Rearing performance of the test verified schedule at - P2 BSF Kunigal

Race	Treatment / Schedule	Egg/ dfl	Hat. (%)	ERR BY	Yield /100 dfls	Single Cocoon Wt. (g)	Single Shell Wt. (g)	S.R%	Pupa duration (%)
Pure Mysore	48h:20+2+2 20	479	92.2	9073	39380	44.0	1.117	0.158	14.14
			4						91

The newly developed technology will be recommended to germplasm stations & Basic seed Farms. By adopting this technology seed producers can postpone hatching up to 40 days for Sarupat, L14, Pure Mysore, MH1 and 35 days for APDR15 (Table:3). Further 10 days for incubation period to avoid the wastage of seed. Even though non-diapause eggs are less tolerant to cold as compared to diapause eggs, the problem of supplying desired quantity of eggs to the farmers at right moment could be solved by following suitable method of double step refrigeration of non-diapause eggs.

Table No: 3 Recommended preservation schedules for multivoltine races.

Recommendation	Multivoltine Races			
	Pure Mysore	L14	Sarupat	MH1
Suitable age (hours)	48	48	48	48
Suitable durations	40	40	40	40
				35

Written By:

Dr.K.M.Vijaya Kumari

Dr. T. Jayappa,

Dr. S. Vidyunnala

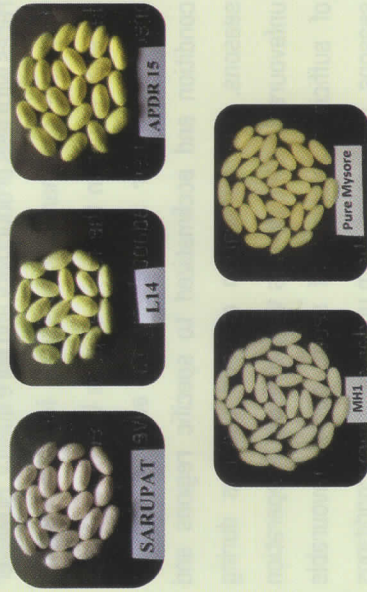
Dr.P.Sudhakara Rao

Vinayak Hosmani (P2 BSF, NSSO, Nagenahalli, Kunigal)

C.R. Hegde (SCPC, NSSO, Kunigal) and

Dr.R.K.Mishra, Director, NSSO, Bengaluru

Egg preservation technology for Multivoltine breeds (Sarupat, L14, APDR15, MH1 and Pure Mysore) through double step refrigeration method



Silkworm Seed Technology Laboratory
National Silkworm Seed Organisation,
Central Silk Board,
Carmelram Post, Kodathi, Bangalore-560 035
Email:sstlhan.csb@nic.in

SILKWORM SEED TECHNOLOGY LABORATORY

Egg preservation technology for Multivoltine pure breeds (Sarupat, L14, MH1 and Pure Mysore) through double step refrigeration method.

Indian multivoltine mulberry silkworms are hardy races with less productivity and fibre quality. However they are commercially exploited for the past 5 decades either in the form of pure breeds or cross breeds of their adaptability to adverse climatic condition and acclimatized to specific regions and seasons. The generation of seed cocoons during unfavourable conditions is very difficult. Preparation of sufficient quantity of seeds during favourable seasons, processing them under optimum conditions and preservation in the cold storage by manipulation of environmental conditions followed by releasing of layings at the time of demand is an area which needs greater emphasis.

Hatching of silkworm eggs can be delayed by employing refrigeration. Eggs of polyvoltine breeds of silkworm cannot be refrigerated for longer duration, as they cannot tolerate the cold conditions. However, it is established fact that the polyvoltine eggs can be preserved at 5°C for 20 days without affecting the rearing characters. Hence studies were conducted and a technology for long term preservation of multivoltine pure breed layings was developed. The present practice of preservation of pure breed layings up to 20 days can be extended up to 30-40 days by adopting the new technology.

Procedure:

1. Collect the pure breed layings.
2. Surface sterilize the layings with 2% formalin.
3. Check the embryonic stage and confirm the stage of the embryo.
4. Stage - 15 is attained at 36 hrs of embryonic age under optimal conditions.
5. Stage - 18 is attained at 48 hrs of embryonic age under optimal conditions.

1st Step (5°C):

6. Sarupat, L14, MH1, and Pure Mysore 48 h embryonic stage-18 at room temperature (25°C), shift eggs to 15°C for 2 h and then preserve the layings at 5°C for 20 days.
7. APDR15 eggs has attained stage-15 at 36 h at room temperature (25°C), shift to 15°C for 2 h and then preserve the layings at 5°C for 15 days.

Intermediate Stage (15°C): While shifting the layings to 2nd step all eggs of different Races should preserve at 15°C for 2 days to develop the embryo.

2nd Step (2.5°C):

8. Then shift the layings to double step refrigeration at 2.5°C.
9. In 2nd step, Sarupat, L14, MH1 & Pure Mysore should be preserve for 20 days at 2.5°C.
10. While releasing also release the layings through 15°C for 2h.
11. The Pure multivoltine layings of these breeds can be preserved for APDR15 for 35 days, Sarupat, L14, MH1 and Pure Mysore for 40 days.
12. During this period of preservation, the layings can be released on any day depending on the requirement.

Morphological characters of stage -15 embryo:

Embryo sinks deep into yolk and yolk granules enter between serosa and embryo. Mesoderm mass at the mid-line of embryo extends gradually to lateral sides along inner side of the ectoderm. The embryo covers nearly $\frac{3}{4}$ th circumference of the egg and thus called the longest embryonic stage.

Morphological characters of stage -18 embryo:

Embryo increases in width. The stomodaeum is clear and proctodaeum begins to form at the caudal end. Appendages appear in gnathal region of the head. Appendages in the thoracic and abdominal region appear in the form of mesoderm becomes clear gradually.

Calculation of the age of the Embryo:

- A. 36 h Embryonic stage: When the pairing time is 7am - 10 am, 10 AM of the 3rd day of oviposition is 36 h embryonic stage.
- B. 48 h Embryonic stage: When the pairing time is 7am - 10 am, 4 PM of the 3rd day of oviposition is 48 h embryonic stage.

The above schedule is practiced when optimum conditions of temperature ($25 \pm 1^\circ\text{C}$) and humidity ($75 \pm 5\%$).