

DEVELOPMENT OF DIFFERENT EGG PRESERVATION SCHEDULES FOR “BARPAT”, AN UNIVOLTINE RACE OF THE MULBERRY SILKWORM, *BOMBYX MORI* L.

Ravindra Singh*, G. Vemananda Reddy*, K. L. Rajanna*,
K. M. Vijayakumari*, B. S. Angadi* and V. Sivaprasad*

* Silkworm Seed Technology Laboratory, NSSO, Central Silk Board, Kodathi, Bangalore - 560 035, Karnataka, INDIA.

[Singh, R., Reddy, G. V., Rajanna, K. L., Vijayakumari, K. M., Angadi, B. S. & Sivaprasad, V. 2014. Development of different egg preservation schedules for “Barpat”, an univoltine race of the Mulberry Silkworm, *Bombyx mori* L.. Munis Entomology & Zoology, 9 (1): 521-524]

ABSTRACT: A study was conducted at Silkworm Seed Technology Laboratory, Kodathi, Bangalore, to evaluate a tropical univoltine race “Barpat” by preserving the eggs for 4, 6, 8 and 10 months preservation schedules following 10, 20, 40 and 60 days aestivation period respectively. The results indicated that fecundity ranged from 406 to 566, hatching ranged from 77 to 85%, effective rate of rearing (ERR) ranged from 8855 to 9800, pupation from 92.18 to 93.19%, cocoon weight from 1.243 to 1.374 g, cocoon shell weight from 0.203 to 0.224 g and cocoon shell percentage ranged from 15.13 to 17.37 %. Further studies are in progress to utilize the univoltine race as male parent with indigenous multivoltine races namely, Pure Mysore, Sarupat and Nistari to know the feasibility of utilization of univoltine race in order to get sustainable cocoon crops in the field.

KEY WORDS: Barpat, *Bombyx mori*, Egg preservation, Evaluation, Multivoltine, Univoltine.

“Barpat” or Borpolu is the only tropical univoltine silkworm race in the world available in northeastern part of India. Unlike other univoltine races, “Barpat” does not possess high quantitative characters but it has some important features like resistant to various silkworm diseases, tolerant to high temperature, no double cocoons, silk is free from lousiness ensuring best quality silk yielding among indigenous races and survival even in severe weather conditions (Chowdhury, 2004; 2005). “Barpat” is almost restricted to spring season and is being reared in a limited scale by some farmers particularly in Majuli River Island in Jorhat district of Assam. It was thought that Barpat has been extinct but it has been retrieved. Farmers generally face the problem regarding the hatching of “Barpat”. Chowdhury (1989) has observed higher response towards artificial parthenogenesis as compared to bivoltine breeds. Recently, salient features of “Barpat” have been studied (Singh et al., 2012). This study has been undertaken to know the performance of the univoltine race following 4, 6, 8 and 10 months egg preservation schedules in order to facilitate the farmers for increased quality silk production in the northeastern regions of India.

MATERIALS AND MEHODS

A tropical univoltine race “Barpat” was collected from Jammu and Kashmir during June, 20012 and first rearing was conducted during July, 2012. Eggs generated were preserved for 4, 6, 8 and 10 months preservation schedules following 10, 20, 40 and 60 days aestivation period. Different preservation schedules have been depicted in Fig. 1 - 4. Eggs were released and rearings were conducted as per the schedule. Three replications were maintained with 300

larvae in each replication. Data were recorded for seven economic characters *viz.*, fecundity, hatching percentage, effective rate of rearing, pupation rate, cocoon weight, cocoon shell weight and cocoon shell percentage.

RESULTS AND DISCUSSION

Performance of “Barpat” during 4, 6, 8 and 10 months preservation schedules has been given in Table 1. Maximum fecundity of 566 was observed following 6 months preservation schedule. Hatching percentage ranged from 77.28 to 85.01%. Effective rate of rearing (ERR) ranged from 8855 to 9022 whereas pupation varied from 92.18 to 93.19 %. Cocoon weight ranged from 1.243 to 1.374 g, cocoon shell weight ranged from 0.203 to 0.224 g and cocoon shell percentage ranged from 15.13 to 17.37 %.

Presently, the main challenge before Indian sericulture is to increase the quality silk in the domestic markets. Exploitation of the tropical univoltine race “Barpat” possessing quality silk coupled with hardiness character will not only improve the quality of silk but also will be useful to increase temperature tolerance and disease resistance in silkworm crops. Study on egg preservation schedule of the univoltine “Barpat” would be an added advantage in order to obtain silkworm eggs as and when required to get sustainable silkworm crops. Studies on long-term preservation schedules have been carried out in bivoltine (Reddy et al., 2004; Rajanna et al., 2008) and non - diapause eggs (Kumareshan et al., 2004; Singh et al., 2010; Rajanna et al., 2009; 2011) of the mulberry silkworm. Further studies are needed utilize “Barpat” with other indigenous multivoltine silkworm races such as Pure Mysore, Sarupat and Nistari to obtain higher cocoon yield.

LITERATURE CITED

- Chowdhury, S. N.** 1989. Parthenogenesis, gynogenesis and androgenesis in silkworm, *Bombyx mori*. Indian Journal of Sericulture, 28 (2): 284-292.
- Chowdhury, S. N.** 2004. Origin, evolution and distribution of silkworm species. Journal of Assam Science Society, 45: 43-51.
- Chowdhury, S. N.** 2005. In, Biology of Silkworms and Host plants. 343 pp.
- Kumareshan, P., Thangavelu, K. & Sinha, R. K.** 2004. Studies on long-term preservation of eggs of Indian tropical multivoltine silkworm (*Bombyx mori* L.) genetic resources. Int. J. Indust. Entomol., 9 (1): 79-87.
- Rajanna, K. L., Jayarama Raju, P., Prabhakar, C. J. & Kamble, C. K.** 2008. Long-term preservation of acid treated bivoltine eggs in silkworm *Bombyx mori* L. Int. J. Indust. Entomol., 17 (2): 165-168.
- Rajanna, K. L., Jayarama Raju, P., Prabhakar, C. J. & Kamble, C. K.** 2009. Studies on long-term preservation of non-diapause eggs in silkworm *Bombyx mori* L. Indian J. Seric., 48 (2): 156-161.
- Rajanna, K. L., Reddy, G. V., Harlapur, V. K. & Basavaraja, H. K.** 2011. Development of new cold storage preservation technology for cross breed (PM × CSR2) eggs of silkworm, *Bombyx mori* L.. Sericologia, 51 (1): 77-85.
- Reddy, G. V., Veeraiah, T. M. & Samson, M. V.** 2004. Silkworm seed preservation schedules for bivoltines- New dimensions. Indian J. Seric., 43 (1): 25-34.
- Singh, R., Nirupama, R. & Gangopadhyay, D.** 2010. Effect of refrigeration of non-diapause eggs of the mulberry silkworm, *Bombyx mori* L.. Sericologia, 50 (1): 129-132.

Singh, R., Reddy, G. V., Rajanna, K. L. & Sivaprasad, V. 2012. Salient features of a tropical univoltine race "Barpat". Mun. Ent. Zool., 7 (2): 1278-1279.

Table 1. Performance of univoltine race "Barpat" during different hibernation schedules.

| Preservation schedule | Fecundity (No.) | Hatching % | Effective Rate of Rearing (ERR) | Pupation (%) | Cocoon weight (g) | Cocoon shell weight (g) | Cocoon shell % |
|-----------------------|-----------------|-----------------|---------------------------------|-----------------|-------------------|-------------------------|-----------------|
| 4 months | 406 ± 10 | 80.93 ± 3.58 | 9122 ± 84 | 92.96 ± 0.32 | 1.243 ± 0.001 | 0.216 ± 0.002 | 17.37 ± 0.16 |
| 6 months | 566 ± 21 | 77.28 ± 3.46 | 9800 ± 262 | 92.18 ± 0.93 | 1.340 ± 0.05 | 0.203 ± 0.01 | 15.13 ± 0.42 |
| 8 months | 458 ± 43 | 82.72 ± 2.19 | 8855 ± 277 | 93.01 ± 0.55 | 1.374 ± 0.09 | 0.224 ± 0.01 | 16.29 ± 0.09 |
| 10 months | 528 ± 24 | 85.01 ± 1.97 | 9022 ± 422 | 93.19 ± 0.97 | 1.347 ± 0.05 | 0.204 ± 0.008 | 15.17 ± 0.07 |

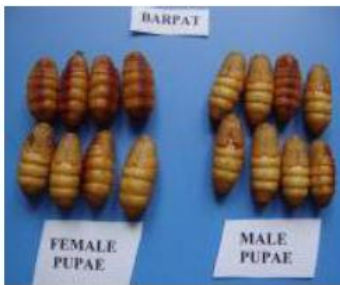
Data mean ± SD of three replications.



1



2



3



4

Plate I. Photographs of univoltine race "Barpat": 1. Eggs, 2. Larvae, 3. Pupae and 4. Cocoons.

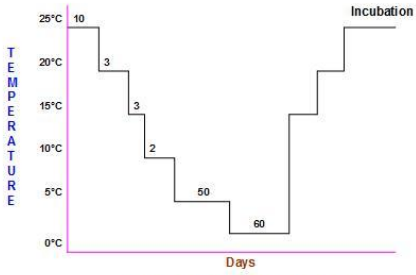


Fig.1. 4 months preservation schedule

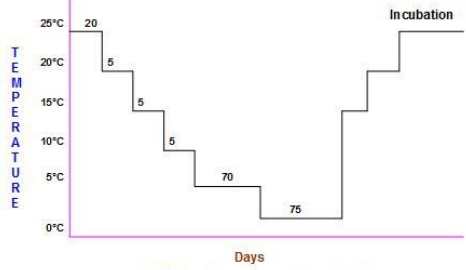


Fig.2. 6 months preservation schedule

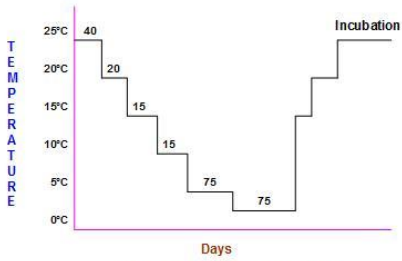


Fig.3. 8 months preservation schedule

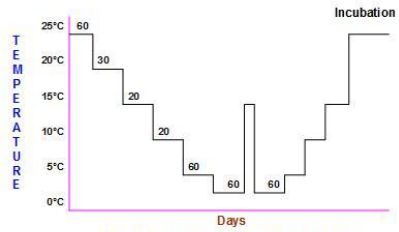


Fig.4. 10 months preservation schedule