*International Journal of Environment, Agriculture and Biotechnology*
*Vol-9, Issue-5; Sep-Oct, 2024*
*Peer-Reviewed International Journal*
*Journal Home Page Available: https://ijeab.com/*
*Journal DOI: 10.22161/ijeab*

# Plant based mounting materials use for spinning during seed crop rearing by Adopted Seed Rearers (ASRs)

Amardev Singh

Scientist-C & Incharge, Silkworm Seed Production Centre, Udhampur, J&K UT.
amardevsilk@gmail.com

Received: 24 Aug 2024; Received in revised form: 25 Sep 2024; Accepted: 30 Sep 2024; Available online: 07 Oct 2024


***Abstract***— *Adopted Seed Rearers (ASRs) or P1 seed farmers use locally accessible plants as mounting materials for mounting the matured silkworms under the study they used viz., Dodonaea viscosa, Malotus philipansis,* Bambusa nutans, *Eucalyptus globulus. Based on the data analysis, significant difference was found when the matured silkworms were mounted on plastic collapsible mountages, which resulted in the highest cocoon yield per 100 dfls (85.45 Kg) and also number of cocoons per kg.*

***Keywords***— ***Mountages, plants, plastic collapsible mountage, Adopted seed Rearers.***

## I. INTRODUCTION

Sericulture can immensely support to reduce poverty while increasing income of seed farmers in Udhampur district especially when the seed cocoon prices was enhanced at par with that of southern seed farmers. The Adopted Seed Rearers (ASRs) in Udhampur district having small or marginal land holdings, bivoltine seed rearing provides employment and income opportunities for them. It is supplementary farming for Adopted Seed Rearers at present 213 active Adopted Seed Rearers (ASRs) are involved in P1 seed rearing in three different seed zones *viz.*, Suntha, Thill and Hartaryan and the P1 quality seed cocoons generated from ASRs are procured and utilized by SSPC, Udhampur for the production of double and single hybrid silkworm seed at SSPC, Udhampur. These seed farmers or ASRs seed cocoon productivity is highest in the north-western states. Although the seed farmers in Udhampur produce seed cocoons, their knowledge level on how to use mounting materials is insufficient, and it has been repeatedly observed despite better silkworm rearing seed farmers make mistake at the time of mounting their matured silkworms and lose their seed crop to some extent. Adoption of sericulture technology in the sericulture sector is very low in Udhampur despite being a very productive district where more than 5000 sericulture farmers are practising sericulture farming. Many studies have been conducted to find out reasons for this issue in the past, but still majority of the sericulture farmers in J&K do not adopt sericulture technology it may be due to they considered sericulture as subsidiary occupation . The majority of seed cocoons producers depend on resources and use different types of plant based materials available locally in their areas for making mountages during spinning to mount mature silkworms, yet this has many drawbacks, such uneven shape of seed cocoons, more numbers of defective cocoons, narrow space for ventilation, *etc.*, which effect the quality of seed cocoons. SSPC, Udhampur provides technical guidance to ASRs time to time and in last few years some selected ASRs were motivated to use plastic collapsible mountage for quality seed cocoon generations. In addition to support for spinning worms, the mountages should satisfy the requirements like, providing convenient and uniform space with suitable dimension for spinning good sized cocoons, discouraging formation of double cocoons and malformed cocoons, providing ventilation for drying up of the last excreta of the worm prior to spinning, enabling easy mounting and harvesting **(**Shinde *et al.*, 2012). Narrow space affects ventilation for spinning larvae and results in poor reelability of cocoons. The varied number of defective cocoons depends on the material and structure of the cocooning frame (Tazima, 1972). The number of defective cocoons was very less on self-mounting shindi

branches than plastic mountages (Shinde *et al.,* 2012) and the absorbent nature of the natural substrate probably reduced the number of defective cocoons like urinated ones. The type of material used to design mounting structure played a significant role in determining cocoon and rawsilk quality (Naphade *et al.*, 2011; Datta *et al.*, 2007; Chikkanna *et al.*, 2009 and Pandey et al., 2007). A mountage is basically a device for providing convenient space for mature silkworms to spin cocoon and therefore mountage or mounting material is the most important component that supports the matured silkworm larvae for spinning of cocoons comfortably (Singh, 1995, Mathur and Qadri 2010., Singh *et al.,* 2012) and the process of transferring the mature larvae is called mounting (Rajan *et al.,* 1996., Shinde *et al.,* 2012). Thus the mountage or mounting material is the most important device that supports the silk worm larvae for spinning of cocoons comfortably (Singh, 1995, Mathur and Qadri 2010., Singh *et al.,* 2012) and the process of transferring the mature larvae is called mounting (Rajan *et al.,* 1996., Shinde *et al.,* 2012). In the past many researchers found that if the silkworm crop is healthy, wrong mounting methods, spinning conditions and bad type of mounting material can result in inferior or poor quality cocoons and silk yarn leading to lower income to farmers (Rajan *et al.,* 1996, Singh and Kambli 1997). It has also been observed when material and structure of the mountage are not proper, the reelibility of the cocoons is reduced and other features like double cocoons, deformed cocoons and soiled cocoons get increased (Mathur and Qadri, 2010). In different sericulture practising countries various types of mountages have been used such as rotary mountage in Japan (Kutsumata, 1975., Rajan *et al.,* 1996) bottle brush mountage in Brazil (Singh *et al.,* 1994).In China many types of mountages *viz.,* Umbrella type, centipede type, checkerboard type are being used at farmers level. All of them are fabricated from rice straw, Wheat/paddy stray and card board material which are economical and easily available (Sugun *et al.,* 2000). Nevertheless, despite the favorable climate for raising bivoltine seed crop, the Adopted Seed Rearers (ASRs) in Udhampur district are losing a significant amount of their seed cocoon crop during spinning due to production of defective or deformed cocoons by employing inappropriate or incorrect mounting materials. Keeping in view, the present study was undertaken to evaluate the comparative performance of locally available plant based materials use by Adopted Seed Rearers with improved mountage *i.e.,* plastic collapsible mountage.

## II. MATERIALS AND METHODS

The present study was undertaken in the year 2022-23 during spring season at seed zones Suntha & Hartaryan of Udhampur district. For seriposition five different types of locally available plant materials *viz.,* Dodonaea viscosa, Malotus philipansis, Bambusa nutans, Eucalyptus globulus used by Adopted Seed Rearers (ASRs) along with ASRs who was motivated to use plastic collapsible mountages for mounting the matured silkworms their comparative performance on some important parameters were observed such as pupation percentage, cocoon yield per 100 Dfls, single cocoon weight (g), single shell weight (g), shell percentage, No. of melted seed cocoons, no. of good seed cocoons and number of seed cocoons per kg were recorded. Bivoltine pure race $SH_6$ & $NB_4D_2$ procured from P2- Basic Seed Stations, Sheeshambara, Dehradun chawki reared by feeding with improved mulberry variety S-1635 and supplied to Adopted Seed Rerarers (ASRs) in seed zone Suntha & Hartaryan.The optimal temperature and relative humidity of the mounting rooms was maintained throughout the period of mounting or seriposition (Jolly, 1987, Mathur and Qadri, 2010). Thus in total 20 seed farmers data were taken to evaluate the seed crop performance, with 04 seed farmers each with separate mounting materials. Harvesting of seed cocoons was done on 7$^{th}$ day from mounting, only after complete pupation by testing the hardening of the pupal skin (Rajan *et al.,* 1996, Rahmathulla *et al.,* 2007). The above said parameters were subjected to statistical analysis to draw logical conclusion for presenting the results (Table 1-2).

*Plants materials utilised as mountages by Adopted Seed Rearers (ASRs) under the study areas.*

| Local Name | Scientific Name | Family | Photos |
|---|---|---|---|
| Santha | *Dodonaea viscosa* | Sapindaceae |  |

| | | | |
|---|---|---|---|
| Kaamla | *Malotus philipansis* | Euphorbiaceae |  |
| Bans | *Bambusa nutans* | Poaceae |  |
| Safeda | *Eucalyptus globulus* | Myrtaceae |  |

*Demonstrations on use of plastic collapsible mountage at P1 seed zone*

*Use of plastic collapsible mountages by ASRs*

*Seed Cocoon spun on Santha leaves*

*Seed cocoons spun on Kamla leaves*

*Seed cocoons spun on Eucalyptus leaves*

## III. RESULTS AND DISCUSSION

From the data (Table-1) it could be seen that there was significant difference in yield per 100 Dfls (85.45 Kg) when the seed farmers use plastic collapsible mountage when compared to other locally accessible plant materials used for spinning. The pupation percentage was also recorded highest in plastic collapsible mountage & Bamboo shootlets (90%). The improvement noticed in the plastic collapsible mountage is may be to the design and material used for fabrication of mountage and it is well suited to the behaviour of spinning larvae. Reddy *et al.*, (2004) also advocated that plastic mountages are more durable, easily washable and can be thoroughly washed, dried and preserve safely. It occupies less space and is suitable for self-mounting and maintaining cocoon quality. Geetha Devi *et al.,* (2004) opined that an ideal mountage having many merits over conventional chandrike is the plastic collapsible mountage. According to Tazima (1972) increase or decrease in the defective and good cocoons varies depending upon the materials and structure of cocooning frame used for spinning. Wu Pangh-Chuan and Chen Da-Chuang (1988) suggested that a good mountage should be convenient for spinning cocoons with abundant space. Others parameters did not show any significant different except shell percentage which was recorded highest in Bamboo shootlets (19.69 %) Table-1. The silkworm *Bombyx mori L.* is the main source of quality silk. It requires specific atmosphere conditions and care in handling, during its various development stages. The quality and quantity of silk produced are highly related with the care taken during rearing and kind of mountages provided to them during spinning (Ullal and Narsimhanna, 1987) besides other factors. Among the many factors that contribute to produce the quality cocoons at the end of spinning, the mounting material provided to the matured larvae play a significant role (Yokohama, 1954; Tanaka, 1964; Alam *et al.,* 1977; Barah and Samson, 1990; Singh and Kamble 1997, Haroon and Khan, 2004). Statistical difference was observed among the different mounting materials tested as number of seed cocoons per kg was recorded highest in plastic collapsible mountage (665 No's) followed by Santha leaves (575 No's), Bamboo shootlets (569 No's), Kamla leaves (565 No's) and Eucalyptus dried leaves (560 No's) respectively. Number of melted cocoons were recorded highest in Kamla leaves (69 No's) and least were recorded in Bamboo shootlets (59

No's)). Numbers of good cocoons were recorded highest in plastic collapsible mountages (606 No's) (Table-2)

*Table-1. Performance of seed crop rearing using different plants based materials/mountage during spinning by Adopted Seed Rearers (ASRs).*

| Mountage/ Mounting materials used | Pupation (%) | Cocoon Yield/100 Dfls | Single Cocoon Weigh (g) | Single Shell Weight (g) | Shell % |
|---|---|---|---|---|---|
| Santha leaves | 89.40 | 81.74 | 1.73 | 0.340 | 19.70 |
| Kamla leaves | 88.20 | 66.98 | 1.77 | 0.343 | 19.39 |
| Bamboo shootlets | 90.00 | 71.37 | 1.78 | 0.346 | 19.69* |
| Plastic collapsible mountages | 90.00 | 85.45* | 1.77 | 0.338 | 19.23 |
| Eucalyptus dried leaves | 88.80 | 68.03 | 1.78 | 0.343 | 19.21 |
| **Mean** | **89.28** | **74.72** | **1.77** | **0.342** | **19.44** |
| **CD@5%** | **0.427-NS** | **0.019*** | **0.140-NS** | **0.747-NS** | **0.013*** |

*****The result is significant at $p < .05$., NS-Non-Significant.

*Table-2. Performance of seed crop rearing using different plants based materials/mountage during spinning on melted, good and numbers of cocoons per Kg.*

| Mountage/Mounting materials used | No. of melted cocoons | No. of good cocoons | No. of cocoons per Kg |
|---|---|---|---|
| Santha leaves | 59 | 516 | 575 |
| Kamla leaves | 69 | 496 | 565 |
| Bamboo shootlets | 57 | 512 | 569 |
| Plastic collapsible mountages | 59 | 606 | 665* |
| Eucalyptus dried leaves | 62 | 498 | 560 |
| **Mean** | **61** | **506** | **587** |
| **CD@5%** | **0.1516-NS** | **0.2204-NS** | **0.001*** |

*The result is significant at $p < .05$., NS-Non-Significant.

## IV. CONCLUSION

Locally available plant based materials is traditionally used by Adopted Seed Rearers (ASRs) in Udhampur district as mountage, which gives space for the formation of cocoons of different shape and size. But in seed crop the quality seed cocoons is indispensible for quality hybrid silkworm seed production and present findings has shown that plastic collapsible mountages performing better when compared to other locally available plant based mounting materials used by seed farmers under the study. However, seed farmers may not always have easy access to plastic collapsible mountages because of their expensive price; they prefer to mount the matured silkworms using locally accessible plant materials, but surely it has some negative impact on seed cocoon quality. The findings of the study recommended that the seed farmers need to be aware about usage of plastic collapsible mountage during the seed crop rearing to produce quality seed cocoons.

## REFERENCES

[1] Alam, M.O., Sharma, A.K., Zargar, M.A., Sultan, S., Pandita, S.l., and Ashan, M.M. 1977. Studies on the performance of cocoon characters by use of different types of mountages in Kashmir. *National Conference of Mulberry Sericulture Research.* December, 10-11 .Mysore, India.p.143.

[2] Barah, A. and Samson, M.V. 1990. Effect of various mountages on the cocooning of the muga silkworm, *Antherae assama* Westwood. *Sericolgia.*30 (3):313-321.

[3] Chikkanna G. S., Singh, A.S and Qadri S. M. H 2009. Qualitative improvement in terms of economic gained by

using two different types of Mountages for Silkworm cocoon. Green Farming. 2 (14): 1014-1016.

[4] Datta (Biswas) T., Saha A. K., Das S. K. and Sarkar S 2007. A comparative study of Spinning of silkworm in two types of Mountages. Indian Sericulture. 11(2): 39-43.

[5] Geetha Devi, R.G., Himantharaj, M.T., Vindhya, G.S. and Mathur, V.B. 2004. Can plastic collapsible mountage replace the bamboo mountage? *Indian Silk*, 29(6):26-28.

[6] Haroon Rashid and Khan, M.A. 2004. Comparative evaluation of different locally available mounting materials for spinning of silkworm cocoons under temperate conditions of Kashmir. *Bull.Sericult.Res.* Bangladesh.11:83-85.

[7] Jolly M. S 1987. Appropriate sericulture technique. Ed: M.S. Jolly. International Centre for Tropical Research and Training in Sericulture Mysore India. pp.75

[8] Kutsumata F 1975. Silk worm mounting. In: Text book of tropical sericulture (111adn). Japanese overseas co-operation volunters, Tokyo Japan, pp.503-519.

[9] Mathur V B and Qadri S M H. 2010. Manual on mountages, mounting and harvesting technology for quality cocoon production. A publication of CSR&TI Mysore. Central Silk Board. Ministry of Textiles. Govt. of India. Nandikeswara printing press new Sayyaji Roa road, Mysore. pp23.

[10] Naphade S T, Hiware C J and Avhad S. B. 2010. Development of improved mountage using mango plant twigs during lack of sufficient number or absence of mountages on field for silkworm cocoons. Recent Research in Science and Technology, 2 (7): 5-8.

[11] Panday R k, Khan M A, Bindroo, B B, Dhar A and Chauhan S S. 2007. Plant shoot mountages of north-western India. Researchgate, 46, 4-5.

[12] Rajan R K, Tamio Inokuchi and Datta R K. 1996. Manual on mounting and harvesting technology. JICA bivoltine sericulture technology development Project, CSR & TI Mysore. Printed at Jawalamukhi Job press 4411.R.K Road, Basava angdi Bangalore, pp.22.

[13] Reddy, V.G., Venkatachalapathy, M., Manjula, A. and Kamble, C.K. 2004. Impact of mountages and larval density on cocoon quality and egg production. *Indian silk*, 10:14-16.

[14] Shinde K S, Avhad S B, Jamdar S V and Hiware C J. 2012. Comparative studies on the performance of mountages on cocoon quality of *Bombyx mori* L. Trends in life Science.1 (4): 8-11.

[15] Singh G B and Kamble C K 1997. A review of silkworm spinning. Bull.Sericult.Res 8: 71-75.

[16] Singh G B, Chandrakanth K S, Vijayakumari K M and Qadri S M H 2012. Impact of mountages in seasons on cocoon yield and reeling parametres of bivoltine silkworm. *Bombyx mori*. Green farming, 3 (1):69-73.

[17] Singh G B, Rajan R K, Inokuchi T, Himantha Raj M T, Menal A and Datta R K 1994. Studies on use of plastic bottle brush mountage for silkworm mounting and its effect on cocoon characters and reebility. Indian Journal of Sericulture. 33 (1): 95-97.

[18] Singh G B. 1995.Silkworm mountages. Indian Silk 4 (1):13-16.

[19] Sugun R, Chandra Kalla M V and Katti S R. 2000. Types of mountages practiced in Chinese sericulture. Bull.In.Acad.Seri. 4 (1): 82-84.

[20] Tanaka, Y. 1964. *Sericology.* Translated and published by Central Silk Board, Bombay, India.

[21] Tazima Y. 1972. Hand book of silkworm rearing. Translated by Central Silk Board in 1997.Western India. Indian Silk. 46(8):4-5.

[22] Ullal, S.R. and Narasimhanna, M.N. 1978. *Hand book of practical Sericulture*, Central Silk Board, India, pp.67-134.

[23] Wu Pangh-Chuan and Chen Da-Chuang 1988. *Mounting and cocoon harvesting.* In: silkworm rearing.73/2, FAO Publication, Rome.

[24] Yokohama, T. 1954. *Synthesized science of Sericulture*. Translated by CSB, Bombay, India, (1962).