

## Research Article

# IMPACT OF POPULARIZATION OF NEW SERICULTURE TECHNOLOGY – THE DISINFECTANT SERIFIT WITH THE FARMERS OF TAMIL NADU

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## ABSTRACT

The success of silkworm cocoon crop in sericulture depends on a package of practices of technologies of which the role of disinfection assumes great importance. Many disinfectants were developed, tested their efficacy and being put to use in the laboratories and farmers fields. Silkworm cocoon crop losses due to various bacterial, viral and fungal diseases vary from 10 – 50 % and in some cases rejection of the batches by the farmers. To make the rearing shed disease free was always a challenge to the farmers and infection were the causes for continued crop losses. Of late “Serifit” a new disinfectant was developed by the Central Sericultural Research and Training Institute, Mysore and the technology was put under Transfer to the farmers - the end users. Since it was a broad spectrum disinfectant, the same was demonstrated widely in the six clusters under the command area of Research Extension Centre, Gobichettipalayam. The new technology was demonstrated to fifty farmers in cluster areas on free trial basis. The guidelines of the technology were followed and the results were recorded. Five farmers of the respective cluster areas were kept as control, without using Serifit for disinfection. The yield improvement was recorded and the trial was repeated thrice. The data showed a significant improvement of an average of 9 kg / 100 dfls. Added to this, the crop losses due to the incidence of the most common silkworm disease - grasserie were reduced to almost nil and continuous use ensured successful disease free silkworm crops. Thus the technology was widely popularized and the material was being procured in bulk quantity and supplied on cost basis to the farmers for the last two years. This has resulted in the increase in cocoon yield from 71 kg to 80 kg / 100 dfls in the cluster areas.

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## INTRODUCTION

In India, Sericulture, the art and science of rearing of silkworm for the cocoon crop is an agro based rural occupation of many farmers for their livelihood, of which mulberry sericulture has already established is strong hold in southern states such as Karnataka, Andhra Pradesh, Tamil Nadu, Telangana and Eastern and North Eastern India. Mulberry silkworm *Bombyx mori* L. is the most domesticated and exploited insect for human welfare. Since 1995 the flow of new technology packages for both the food plant mulberry as well as the precious insect silkworms were being evolved, tested, implemented and popularized in the field, resulting in an increase in the cocoon productivity manifold. Though sericulture is being practiced in India for many years the true potential of improving the economic status of the farmers has seen a silver line in the past 15

years (Geetha *et al.*, 2001; Chowdhury, 2002). The concepts of application of technology package of practices for improvement of soil fertility and mulberry, disease free environment for rearing of silkworms, improved rearing technologies, thermo regulation of micro environment, management of pests and diseases of mulberry and silkworm etc. paved the way for quantum jump in the raw silk production in the country (Kushwah and Singh, 2013). Mulberry sericulture attained sustainability in the field due to focused R & D programs leading to successful delivery of cutting edge technologies.

The success of silkworm crop depends on many factors such as scientifically grown robust young age worms, good quality succulent mulberry leaves, rearing management, climatic conditions etc. Though there is a package of

tested and proven technology for silkworm rearing, many a times farmers face crop losses due to various silkworm diseases caused by bacteria, viruses, fungi etc. Silkworm rearing is the most sensitive activity leading to the production of cocoons for silk. The diseased worms extrude pathogens into the rearing appliances and environment and form the source of infection for spreading the disease. The pathogens remain in active stage for longer periods and keep on contaminating the silkworms in the rearing sheds. Hence efficient disease management practices through utilization of effective room disinfectants are very much essential for minimizing crop losses

(Balavenkatasubbiah *et al.*, 1996; 2006). Recurrence of silkworm diseases leading to crop losses will have a negative impact on the farmers.

Many chemicals viz., Formalin, Bleaching powder, Chlorine dioxide (Sanitech / Serichlor) and Astra were being used in sericulture for disinfection to make the rearing sheds and appliances pathogen free. The disinfectants should be easy to use, cost effective, non-hazardous, less corrosive and most effective for proper sanitation thereby the pathogen load could be removed fully, and thus the crop losses due to diseases could be minimal (Balavenkatasubbiah *et al.*, 2014).

**Table 1. Comparative performance of cocoon crops after Serifit disinfection**

Cluster No.	Farmer	No. of dfls	Avg. yld kg		Yield / 100 dfls		Improvement in Coc. Yld	
			Before	After	Before	After	Kg	%
1	(1)	150	99	111	66.0	74.00	12	12.12
	(2)	200	123	144	61.5	72.00	21	17.07
	(3)	125	99	101	79.2	80.80	2	2.02
	(4)	200	151	169	75.5	84.50	18	11.92
	(5)	200	161	166	80.5	83.00	5	3.11
Tota l/ Avg.		<b>875</b>	<b>633</b>	<b>691</b>	<b>72.5</b>	<b>78.9</b>	<b>11.6</b>	<b>9.2</b>
2	(1)	200	164	182	82.0	91.0	18	10.98
	(2)	250	199	211	79.6	84.4	12	6.03
	(3)	175	129	149	73.7	85.1	20	15.50
	(4)	300	239	245	79.7	81.7	6	2.51
	(5)	350	279	302	79.5	86.3	23	8.24
Tota l/ Avg.		<b>1275</b>	<b>1010</b>	<b>1089</b>	<b>78.7</b>	<b>85.7</b>	<b>15.8</b>	<b>8.7</b>
3	(1)	250	191	215	76.40	86.00	24	12.57
	(2)	300	221	238	73.67	79.33	17	7.69
	(3)	225	175	189	77.78	84.00	14	8.00
	(4)	300	234	249	78.00	83.00	15	6.41
	(5)	350	290	299	82.86	85.43	9	3.10
Tota l/ Avg.		<b>1425</b>	<b>1111</b>	<b>1190</b>	<b>77.7</b>	<b>83.6</b>	<b>15.8</b>	<b>7.6</b>
4	(1)	100	68	78	68.00	78.00	10	14.71
	(2)	75	53	62	70.67	82.67	9	16.98
	(3)	150	101	116	67.33	77.33	15	14.85
	(4)	275	200	221	72.73	80.36	21	10.50
	(5)	250	184	199	73.60	79.60	15	8.15
Tota l/ Avg.		<b>850</b>	<b>606</b>	<b>676</b>	<b>70.5</b>	<b>79.6</b>	<b>14.0</b>	<b>13.0</b>
5	(1)	150	104	112	69.33	74.67	8	7.69
	(2)	200	135	142	67.50	71.00	7	5.19
	(3)	175	128	140	73.14	80.00	12	9.38
	(4)	250	175	182	70.00	72.80	7	4.00
	(5)	300	200	210	66.67	70.00	10	5.00
Tota l/ Avg.		<b>1075</b>	<b>742</b>	<b>786</b>	<b>69.3</b>	<b>73.7</b>	<b>8.8</b>	<b>6.3</b>
Grand total / Avg		<b>5500</b>	<b>4102</b>	<b>4432</b>	<b>74.6</b>	<b>80.58</b>	<b>13.2</b>	<b>9.0</b>

## MATERIALS AND METHODS

A new disinfectant for silkworm rearing - Serifit – a chlorine based inorganic compound, developed jointly by CSRTI, Mysore and Sree Rayalaseema Hi-Strength Hypo Ltd., Kurnool, A.P. was put for popularization in the field. The technology was demonstrated in five farmers rearing sheds where the crop failure was reported. The demonstrations were conducted to a group of farmers and the new technology was explained in detail, attended by nearly 100 farmers. The surroundings were cleared and residues were removed to avoid contamination from earlier infected batches. Measurement of rearing sheds was taken for effective disinfection. The area of rearing sheds were of 1000 sq.ft. each. 200 liters of solution is required for disinfecting 1000 sq.ft. area. Prepared 0.2 % Serifit disinfectant solution by adding a packet of 200 g of Serifit in 100 liters of water, stirred well with a stick, ( 2 packets of Serifit for 200 liters of disinfectant ). Kept the solution closed for 30 minutes for activation. Sprayed the disinfectant in the rearing shed @ 1.5 litre / sq.m or 140 ml / sq.ft. floor area. Sheds with more than the standard height of 10 ft. were given 0.5 litre / sq.m or 14 ml / sq.ft. per additional meter or foot each.

For uniform and effective spray, the power sprayer was used. The disinfection with Serifit was conducted twice, one immediately after the cocoon harvest and consequent cleaning of the shed and the second spray 3 days before the arrival of next crop young age worms.

Initially 200 packets of 200 g each were supplied free of cost to 50 farmers @ 4 packets / farmer under popularization of technology in Gobi South Cluster. Data on cocoon yield before and after the Serifit usage were collected from 25 farmers. The previous crop performance of the respective farmers was taken as the control. The rearing batches were inspected three times in 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> stages. The observations on rearing hygiene and cocoon yield were recorded. The trial was repeated twice and the average data of cocoon yield of three trials was taken for analysis and drawing of conclusion.

## RESULTS AND DISCUSSION

The silkworm cocoon crop performance of the batches of 25 farmers from five clusters where Serifit was used for disinfection are presented in Table – 1. A total of 5500 dfls of rearing was covered with 25 farmers in five clusters. The data on cocoon yield was recorded and their respective earlier batches in which other disinfectants such as Bleaching powder, Sanitech or Astra used were taken as control.

### i) Average yield / 100 dfls :

In cluster – 1, a total of 875 dfls of chawki worms were reared by five farmers as per their regular quantum of rearing capacity. The cocoon yield / 100 dfls varied from 61.5 kg to 80.5 kg with an average of 72.5 kg / 100 dfls before using Serifit. After using Serifit the cocoon yield

increased and ranged from 72 kg to 84.5 kg, with an average of 78.9 kg / 100 dfls. An average increase of 11.6 kg and an improvement of 9.2 %. (Table – 1).

In cluster – 2, a total of 1275 dfls were reared by five farmers and the cocoon yield / 100 dfls varied from 73.7 kg to 82 kg with an average of 78.7 kg / 100 dfls before using Serifit, where as the cocoon yield increased within the range of 81.7 kg to 91 kg, with an average of 85.7 kg / 100 dfls. An average increase of 15.8 kg cocoon and an improvement of 8.7 % over the control.

In cluster – 3, a total of 1425 dfls rearing was taken up by five farmers. After using Serifit the cocoon yield increased within the range of 79.3 kg to 86 kg, with an average of 83.6 kg / 100 dfls. The cocoon yield / 100 dfls varied from 73.7 kg to 82.86 kg with an average of 77.7 kg / 100 dfls before using Serifit. An average increase of 15.8 kg and an improvement of 7.6 % over previous batch.

In cluster – 4, a total of 850 dfls were reared by five farmers and the cocoon yield / 100 dfls varied between 67.3 kg to 73.6 kg with an average of 70.5 kg / 100 dfls before using Serifit, whereas after Serifit disinfection the cocoon yield increased to the range of 77.33 to 82.67 kg, with an average of 85.7 kg / 100 dfls. An average increase of 14 kg yield / 100 dfls and an improvement of 13 % .

In cluster – 5, a total of 1075 dfls of chawki worms were reared by five farmers. Before Serifit disinfection the cocoon yield / 100 dfls varied from 66.67 kg to 73.14 kg with an average of 69.3 kg / 100 dfls. After using Serifit the cocoon yield increased and ranged from 70 kg to 80 kg, with an average of 73.7 kg / 100 dfls. An average increase of 8.8 kg and an improvement of 6.3 % over control.

All the 25 farmers, who tested the disinfectant, recorded an average of 13.2 kg increase in cocoon yield. The improvement percentage in cocoon yield was 9 kg / 100 dfls. Further, no incidence of the most common silkworm diseases such as grasserie and flacherie was recorded during the trial and hence no batch failure. Since very effective, the technology was adopted well with speed and thus popularized with the rest of the farmers. It was found less corrosive, easy to handle and more effective towards control of pathogen load in the rearing sheds.

The Disinfection, one of the most important steps to ensure healthy and successful silkworm rearing, aims at total destruction of disease causing pathogens. The spores of pathogens like fungi are very light and easily carried by wind and can spread from one rearing house to another. There are no curative methods for any silkworm diseases, therefore, prevention of the disease is the best cure. Prevention of the disease is ensured by proper disinfection and maintenance of hygiene.

In sericulture to make the rearing shed pathogen free for silkworm rearing, many disinfectants are reported to be effective against different pathogens. However, due to constraints associated with the products, only a few are being used effectively.

Earlier Formalin was effectively used in separate and airtight rearing rooms with high humidity. Present rearing sheds are almost open with more ventilation for free circulation of air and hence it could not be used for disinfection. Further it has got an unbearable pungent smell, burning of eyes, and health hazards of carcinogenicity. Next in the series come bleaching powder, though suitable for all types of rearing sheds, is unstable and highly corrosive. All sericulture farmers use it for the first spray in the series of disinfections to remove the pathogens and stains. To overcome the constraints Chlorine dioxide (Sanitech/ Serichlor) and Astra were developed (Balavenkatasubbaiah, *et al.*, 2006 ; 2016) but the cost was the constraint. Hence to overcome all the above constraints, a new disinfectant- the Serifit – a chlorine based product manufactured by Rayalaseema Hi Strength Hypo Ltd. Kurnool, Andhra Pradesh jointly developed and tested for its suitability and adoptability by CSRTI, Mysore was put under popularization with the sericulture farmers of cluster areas (Balavenkatasubbaiah, *et al.*, 2013; 2014).

The technology was introduced to the farmers through various extension communication programs and a total of 5250 packets of the technology material was procured from the company, demonstrated and distributed to all the farmers. The technology is working well in the field and hence adoption level is quite high. The farmers who realized the benefit of this disinfectant will never go out of this and in turn they popularize the technology. The technology of proper disinfection with Serifit is an answer to set right the crop failures due to common silkworm diseases.

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