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CERTIFICATE

This is to certify that Prof./Dr./Mr./Mrs./Ms M. Thilsath Fatima Quraiza, Asst. Prof. in Zoology, Muslim Arts College Thiruvithancode has participated /presented a research paper entitled Effect of Coccinia grandis on the protein content of Larval Infested Bombyx mori in the National Seminar on " Climate change and Biodiversity" organized by the PG & Research Department of Zoology & Department of Microbiology, Muslim Arts College, Thiruvithancode - 629 174, held on 27th September 2023.

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EFFECT ON *COCCINIA GRANDIS* ON THE PROTEIN CONTENT OF BACTERIAL INFECTED *BOMBYX MORI* L.

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ABSTRACT

The success of silkworm crop depends on many factors. Many silkworm diseases are caused due to the infection of various bacteria, virus, fungus etc.. Diseases such as sotto, flacherie and septicemia are caused due to bacterial infection. In the present investigation, sotto disease is caused by *Bacillus thuringiensis;* Septicemia disease is caused by *Pseudomonas sp.,Bacillus proteus and Serratia marcesens;* flacheriedisease is caused by *Sterptococcus pneumonia, Escherichia coli and Klebsiella clacae* .In this study, the leaf extracts along with biologically active principles from three medicinal plant such as Kowaikai (*C.grandis*) was tested for potential in improving the protein content of silk gland and haemolymphin silkworm *B.mori*.Apart from the disease management, the botanical extract had significant effect on silkworm growth and development. It also improve protein content of silk gland and haemolymph of fifth instar *B.mori* larvae.

Key words: *Bombyx mori*, Disease, *C.grndis*, protein

INTRODUCTION:

Sericulture industry has great potential to increase the quality and improve the quality of silk fiber. It is rearing domesticated silkworms and the cultivation of mulberry for raw silk production (Hussain*et al*., 2011). Silkworm domestication resulting in inbreeding depression and variations in climatic conditions and diseases pose great menace to the sericulture industry (Kanwal*et al*., 2018).The most prevalent and serious diseases in the silkworm are grasserie, flacherie, muscardine and pebrine caused by virus, bacteria, fungi and microsporidiarespectively (Jiang and Xia, 2014).However, bacterial infection is well controlled by antibiotics. The use of botanicals having anti-microbial property, non-toxic, biodegradable, and non-pollutant, is an alternative strategy to control diseases of silkworm. The losses occur mainly during the final stages of silkworm rearing, resulting considerably energy and money loss. The effects of the fungal infection on the metabolic adaptations may correlate with its effect on the general health and the rearing performance of the silkworm larvae, as well as on the cocoon economic aspects (Rajitha and Savithri, 2015).Many higher plants produce organic compounds have advantages over synthetic bactericides and fungicides like environmentally friendly, target specificity, to overcome disease resistance and easy availability. Phytochemicals are compounds present in plants and have antioxidants, antiviral, antibacterial, antifungal, anticancer activities, or hormone- like components that help in fighting against many diseases and maintain health (Daniel et al., 2011).

Plant extracts contain variety of components, which have 'static' effect if they inhibit the growth of the micro organisms or 'cidal' effect if they kill them (Nigam, 1982).*Acalyphaindica*, *Tridax procumbens* and *Ocimum sanctum* to first instar *B.mori* larvae of PM x CSR_2 hybrid resulted in positive response with respect to rearing parameters such as larval length, larval weight, cocoon weight, shell weight and shell ratio (Bai *et al*., 2018). Hence, the present study was carried out the effect of plant extracts on the morphometry, biochemical changes and economic traits in different bacterial infected in fifth instar *B.mori* were studied.

MATERIALS AND METHODS:

This investigation was carried out on mulberry silkworm, *B.mori*. Disease Free Layings (DFLs) of *B.mori* ($FC_1 \times FC_2$) were obtained from the State Government Sericulture Center at Thenkasi and incubated at 27°C in ant proof racks at 70-80% humidity. The incubation time was 8 days, during which time, the young caterpillars hatched out. The emerging caterpillars were transferred to clean bamboo basket (25cm diameter and 5 cm deep) with a scaffolding of paraffin paper(Krishnaswamy, 1978). The first day of third instar were selected randomly and grouped into 7 batches for experimental and control. Each group consists of 30 silkworms and 3 replications were carried out. The control was maintained with healthy leaves.

Inoculation of pathogens to silkworms was done on the first day of the third instar immediately after second moult. The dilution 10^{-5} pathogens smeared on the mulberry leaves and fed to the silkworms. The experimental worms were fed with mulberry leaves soaked with smeared pathogens like *Bacillus thuringiensis*, *Pseudomonas* sp., *Bacillus proteus*,*Serratia marcesens*, *Streptococcus pneumonia*, *Escherichia coli* and *K.cloacae* separately. The control larvae were fed with untreated leaves. After 2 days the diseased silkworms were administration of plant extractof*Coccinia grandis* L.(twice on the second day of third instars and the second day of fourth instar). The V instar of control and treated groups were used for protein analysis (Lowry *et al*., 1951)

Effect of *C.grandis* on the protein content of silkworm *B.mori*larvae(V^{th}instar)

Disease	Causative agents	Silk gland (mg/gm)	Haemolymph (mg/ml)
Control	-	13.79±1.02	2.36±0.17
Sotto	*Bacillus thuringiensis*	17.64±1.43(27.9)	4.13 ± 0.29(74.89)
Septicemia	*Pseudomonas sp.*	18.41±1.36(31.5)	4.66 ± 0.68(97.4)
	Bacillusproteus	27.24±2.86(97.51)	3.82 ± 0.32(61.8)
	Serratia marcesens	16.89±1.10(22.47)	2.75 ± 0.19(16.5)
Flacherie	*Streptococcus pneumonia*	17.93±1.35(30.0)	3.93±0.25(66.5)
	Escherichia coli	15.17±1.26(10)	3.82±0.53 (61.86)
	Klebsiellacloacae	14.82±1.35(7.46)*	3.64±0.61(54.2)

Percent deviation over control values in parentheses N = 30

*Not significant

All other deviations significant at $p \leq 0.05$ (t-test)

RESULTS AND DISCUSSION

Sarkar (1993) reported that the growth of silkworm larvae increased significantly upon feeding them with mulberry leaves supplemented with different nutrients. The nutritional status of mulberry leaves can be improved by enriching them with botanicals such as herbal tonic and herbal extracts. Rajeshkarngouda *et al*., noticed that the plant extracts such as, *Tribulus terrestris* L. and *Psoralea corylifora* had the growth promoting effect on silkworm. In this study, protein content silkgland and haemolymph were recorded treated groups. In this study, protein content of silkgland (27.24±2.86mg/g) and haemolymph (4.66±0.38mg/ml) was highly noted in the*B. proteus*and *Pseudomonas sp.* infected *B.mori*treated with *C.grandis*. Murugan *et al.* (1994) observed that extra foliation of aqueous extract of leaves of *Tribulus terrestris* L. and *Phyllanthus niruri* L. increased the total body weight, silk gland weight and silk filament length.

CONCLUSION:

The diseases in sericulture are the major hurdle to gain profit. Although there are many biological solutions to overcome these diseases, they are not so much effective. Overall this study reported that the botanical extract is very effective to control bacterial disease. *C. grandis* extract is also improve the protein content of silk gland and haemolymph. Hence this report is very useful for farmers.

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