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EFFICACY OF ANTIBIOTICS AGAINST GRASSERIE IN SILKWORM

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ABSTRACT

Antibiotics, *viz.*, tetracycline and gentamycin treated mulberry leaves were fed to silkworm *Bombyx mori*L. at varied concentrations. Both the antibiotics at 50 ppm level significantly reduced the grasserie and increased the larval and cocoon parameters in silkworm.

KEY WORDS : *Bombyx mori*, antibiotics, mulberry, grasserie

The growth promoting effect of antibiotics together with other food supplements was extensively studied in silk worm, *B.mori* L. by different workers. Enriching mulberry leaves with small quantities of antibiotics increased the larval growth, weight, fecundity and silk content. (Murthy and Sreenivasayya, 1953). However, information on the possible role of antibiotics in reducing grasserie in silkworm is meagre. In this paper, effects of antibiotics suplementation to mulberry leaves as a feed to silkworm and their influence on grasserie disease and rearing performances are discussed.

MATERIALS AND METHODS

The different concentration of antibiotics, tetracycline and gentamycin *viz.*, 12.5, 25, 50, 75 and 100 ppm were prepared in distilled water containing 0.1 per cent Teepol. Five sets of larvae of PM x NB_4 D_2 were maintained. In the first set of larvae, the mulberry leaves treated with different concentration were fed once during third instar. In the second set, the larvae were fed with treated leaves once during third and fourth instar while in the third set, the larvae were fed sequentially with once during third fourth and fifth instar. The fourth set of larvae fed with untreated leaves served as control. In all the sets including control, the third instar larvae were exposed to nuclear polyhedrosis virus (NPV) by oral feeding with polyhedra @ 100 POB larva by using a microsringe applicator (0.2 ul). An obsolute control fed with untreated leaves and without virus inoculation was also maintained for comparison. For each treatment, 40 larvae were

Table 1. Effect of tetracycline on grasserie in *B.mori*

Treatment (ppm)	%NPV mortality when tetracycline was fed during instar*						Mean
	III		III,IV		III,IV, V		
	Computed % NPV mortality	% reduction	Computed % NPV mortality	% reduction	Computed % NPV mortality	% reduction	% NPV mortality
0	47.28 (43.43)	-	47.28 (43.43)	-	47.28 (43.43)	-	47.28 (43.43)
12.5	30.61 (33.42)	23.04	32.0 (34.42)	20.74	32.6 (34.78)	19.91	31.73 (34.20)
25.0	24.36 (29.42)	32.25	20.2 (26.69)	38.54	13.3 (21.39)	50.74	19.28 (25.83)
50.0	12.7 (20.89)	51.89	6.2 (14.36)	66.93	7.5 (15.83)	63.55	8.80 (17.02)
75.0	18.8 (25.68)	40.87	13.2 (21.29)	50.97	14.7 (22.53)	48.12	15.56 (23.16)
100.0	17.1 (24.41)	43.79	14.0 (21.94)	49.48	12.0 (20.27)	53.32	14.36 (22.86)
Mean	25.8 (30.54)		25.5 (30.25)		23.6 (29.04)		24.96 (29.98)
Stages					CD (P=0.05)		
Treatment					NS		
Interaction					(5.23)		
					NS		

*Abbott's correction for mortality due to tetracycline Figures in parentheses are arcsin $\sqrt{\text{percentages}}$

Table 2. Effect of tetracycline on mean larval weight, cocoon weight, shell weight and silk filament length in *B.mori*

Treatment (ppm)	Larval weight (g)		Cocoon weight (g)		Shell weight (g)		Silk filament length (m)	
	Tetracycline	Tetracycline + NPV	Tetracycline	Tetracycline + NPV*	Tetracycline	Tetracycline + NPV*	Tetracycline	Tetracycline + NPV*
0	3.19^{d}	2.72^{d}	1.36^{c}	1.14^{d}	0.260^{d}	0.209^{c}	666^{d}	547^{d}
12.5	3.33^{c}	2.95^{c}	1.37^{c}	1.17^{d}	0.279^{c}	0.217^{d}	690^{cd}	559^{cd}
25.0	3.34^{c}	3.14^{b}	1.53^{b}	1.30^{c}	0.290^{b}	0.227^{c}		583^{c}
50.0	3.67^{a}	3.41^{a}	1.74^{a}	1.48^{ab}	0.356^{a}	0.307^{a}	810^{ab}	725^{a}
75.0	3.59^{b}	3.34^{a}	1.74^{a}	1.52^{a}	0.358^{a}	0.291^{b}	817^{a}	692^{b}
100.0	3.68^{a}	3.39^{a}	1.69^{a}	1.47^{a}	0.356^{a}	0.297^{b}	786^{b}	702^{ab}
Mean	3.45	3.14	1.57	1.34	0.316	0.258	745	635

*BmNPV 100 POB/larva; Means followed by similar letters are not different statistically (P = 0.05) by L.S.D.

maintained and the experiment was replicated four times and mortality due to grasserie was recorded daily. After applying Abbott's correction (Abbott, 1925) the actual mortality due to grasserie was computed by taking into consideration the mortality due to antibiotics in larvae not inoculated with NPV. Besides mortality due to grasserie in treatments, data on larval and cocoon parameters were recorded and analysed statistically using factorial completely randomised design.

RESULTS AND DISCUSSION

Data from the experiments in which the frequency of antibiotic treatments was evaluated showed that there were no significant differences between feeding during third instar or during third, fourth or during third, fourth and fifth instars (Tables 1, 2). A dose of 50 ppm recorded the lowest grasserie mortality of both of the antibiotics individually. It is evident from the studies that treatment once during third instar was sufficient to contain the grasserie disease of silkworm. Treating mulberry leaves with different doses of antibiotics did not affect the larval and cocoon parameters. On the other hand, all the doses recorded higher larval, cocoon and shell weights as well as silk filament length (Tables 3, 4). Ueda *et al.* (1955) also reported that grasseriomycin antibiotic had a positive role in prolonging the incubation period of grasserie. Baig *et al.* (1990) reported that gentamycin at 0.1 per cent reduced the grasserie incidence (2.33 %) and resulted in maximum.

Table 3. Effect of gentamycin on grasserie in *B.mori*

Treatment (ppm)	% NPV mortality when gentamycin was fed during instar*						Mean
	III		III,IV		III,IV, V		
	Computed % NPV mortality	% reduction	Computed % NPV mortality	% reduction	Computed % NPV mortality	% reduction	% NPV mortality
0	44.5 (41.48)		44.5 (41.48)		44.5 (41.84)		44.5 (41.84)
12.5	31.8 (34.33)	17.80	32.3 (34.62)	17.25	26.4 (30.89)	26.17	30.1 (33.28)
25.0	17.8 (24.93)	40.41	12.8 (20.90)	50.04	12.8 (20.90)	50.04	14.4 (22.24)
50.0	8.0 (16.45)	60.68	8.1 (16.51)	60.50	5.0 (12.87)	69.23	7.0 (15.27)
75.0	12.3 (20.52)	50.90	12.0 (20.29)	51 50	10.4 (18.81)	55.05	11.6 (19.88)
100.0	12.4 (20.58)	50.81	10.5 (18.05)	54.78	11.6 (19.90)	52.43	11.5 (19.86)
Mean	19 9 (26.44)		18.6 (25.51)		16.8 (24.20)		15.8 (25.38)
						CD (P=0.05)	
Stages						NS	
Treatment						(4.60)	
Interaction						NS	

*Abbott's correction for mortality due to gentamycin;
Figures in parentheses are arcsin $\sqrt{}$ percentages

Table 4. Effect of gentamycin on mean larval weight, cocoon weight, shell weight and silk filament length in *B.mori*

Treatment (ppm)	Larval weight (g)		Cocoon weight (g)		Shell weight (g)		Silk filament length (m)	
	Gentamycin	Gentamycin + NPV*	Gentamycin	Gentamycin + NPV*	Gentamycin	Gentamycin + NPV*	Gentamycin	Gentamycin + NPV*
0	3.18^{c}	2.94^{c}	1.62^{d}	1.30^{c}	0.280^{c}	0.246^{c}	679^{c}	514^{d}
12.5	3.20^{c}	3.01^{c}	1.66^{c}	1.36^{b}	0.309^{d}	0.269^{d}	733^{d}	559^{c}
25.0	3.29^{c}	3.12^{b}	1.70^{b}	1.37^{b}	0.320^{c}	0.275^{c}	741^{cd}	591^{c}
50.0	3.48^{a}	3.20^{a}	1.77^{a}	1.57^{a}	0.341^{a}	0.318^{a}	829^{a}	743^{a}
75.0	3.50^{a}	3.21^{a}	1.75^{a}	1.56^{a}	0.328^{bc}	0.317^{ab}	816^{ab}	650^{b}
100.0	3.50^{a}	3.22^{a}	1.75^{a}	1.58^{a}	0.330^{b}	0.313^{b}	779^{bc}	652^{b}
Mean	3.37	3.13	1.71	1.46	0.319	0.289	763	619

*BmNPV 100 POB/Larva Means followed by similar letters are bot different statistically (P=0.05) by L.S.D.

effective rate of rearing (ERR) of 92.26 per cent compared to the other antibiotics.

From this study it was found that mulberry leaf supplemented with 50 ppm of either tetracycline or gentamycin, once during third instar of silkworm was found effective in reducing the grasserie mortality besides enhancing the larval and cocoon parameters.

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PARTIAL SUBSTITUTION OF NITROGEN THROUGH COMBINED APPLICATION OF BIOFERTILIZERS IN RICE

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ABSTRACT

The individual and combined effect of *Azolla* and *Azospirillum* on rice was investigated both in the presence and absence of inorganic nitrogen for two seasons. At O kg N/ha level, application of *Azolla* or *Azospirillum* alone augmented the grain yield by 21 and 19 per cent respectively. However, combined application of *Azospirillum* and *Azolla* with 50 and 75 kg N levels increased the grain yield. At 100 kg N/ha, the response was relatively low.

KEY WORDS : Biofertilizers, *Azolla, Azospirillum*, rice

Biological nitrogen fixation plays a key role in nitrogen management. It has been reported that application of 75 kg N/ha along with *Azospirillum* increased the rice yield significantly (Subba Rao *et al.*, 1979) So far attempts were made to study the effect of biofertilizers like *Azolla*, *Azospirillum* and BGA either individually or in combination with graded levels of N. The information on the effect of combined application of *Azolla* and *Azospirillum* with different levels of N is limited. Hence, it was field tested in *Kuruvai* and *Samba* seasons and the results are reported here.