

## Studies on Optimum Temperature for Storage of *Sticholotis madagassa* Weise Adults

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### ABSTRACT

Studies were carried out on consequences of different temperature on fecundity and longevity of *Sticholotis madagassa* Weise. Progeny production declined with increasing storage period. High mortality of predators was observed when stored at 5°C and 10°C. However, 15°C was ideal for storage in comparison to 26+1°C.

Key Words : *Sticholotis madagassa*, temperature, survival, progeny production

Coccinellid predators play an important role in biological suppression of diaspine scale insects. However, under natural conditions, their population build up is late in the crop season. Hence, there is enormous scope for augmentation early in season to achieve effective biological suppression.

The Optimum storage temperature for subsequent progeny production, has been worked out for *Coccinella septempunctata* L. (Hodek, 1958 ; Kawauchi, 1979). No such information is available on *Sticholotis madagassa* Weise. Of the several predators introduced in India, only *S. madagassa* has established and is most commonly encountered with *Melanaspis glomerata* Green. (Sankaran and Mahadev, 1973; Tewari and Tripathi, 1979; Pawar *et al.*, 1984). Non availability of the predator in the early season of the crop is a major limiting factor in mass production and release in initial stages of pest build up. Hence, in the present study, an attempt has been made to find out the ideal temperature for storage of adults of *S. madagassa* and its influence on fecundity.

### MATERIALS AND METHODS

*S. madagassa* was multiplied on *M. glomerata* colony in the laboratory prior to

initiation of the experiment. Freshly emerged adults were collected and kept in plastic containers (15 X 10cm) with accordion type paper strips and honey + agar medium as adult food. Adults were stored at 5°, 10° and 15°C. Adults kept at room temperature (26 + 1.5°C) were used for comparison. Observations on percent mortality were recorded at 7, 15, 30, 45, 75 and 90 days.

After the storage period, 10 pairs of adults from each of the temperature were separately released in insect rearing cages (30 cm<sup>3</sup> size) containing sugarcane setts infested with *M. glomerata*. Observations on fecundity, survival after storage and developmental period of progeny were recorded. Adults stored at 26 + 1°C were provided with honey + agar as adult food but not with *M. glomerata* as was done with adults in storage. Pooled data were analysed in factorial RBD. Each treatment, temperature and day wise was replicated three times and 10 pairs of adults were used in each replication. Data on percent mortality were transformed into arcsin values before analysis of variance. Mean fecundity was derived by dividing the number of progeny produced by the number of adult predators released in each treatment. Data of 5°C was not included for analysis since there was no survival after 7 days.

## RESULTS AND DISCUSSION

Mortality of *S. madagassa* adults differed significantly between 5°, 10° and 15°C (Table 1). It was clear that 5°C and 10° C were lethal for storage of adult predators. At 15°C, there was significantly less mortality upto 60 days (12.8%) than at 26°C. Hence, it is clear that the predator can be stored at 15°C for a period upto 60 days with artificial diet. Deng *et al.* (1987) reported mortality of 17.1 - 37.1% and 0 - 54.3% for *Synonycha gradis* Thunberg and *Coelphora biplagiata* Mulsant at 18 - 20°C after 5 months of storage during winter months. In the present study also, low mortality of 12.8% was obtained at 15°C after 2 months of storage.

Fecundity of adult predator was greatly affected at 5 and 10°C. At 15°C, fecundity was 73.2, 72.7, 66.5 and 61.0 at 7, 15, 30 and 45 days storage, respectively. But at room temperature, fecundity upto 15 days only was comparable with that of the predators stored at 15°C (Table 2). Survival of adult predators

after removal from storage declined drastically at 5 and 10°C within 7 days of storage. However, at 15°C statistically non significant decrease was obtained upto 45 days but at 26°C, sharp decline was observed after 15 days. At 26°C, decline may be attributed to temperature as well as deprivation of scale insects for longer duration. Developmental period of grubs was enhanced with increase in storage period at 15°C and deprivation of scale insect at 26°C. Developmental period was 28.0, 29.3, 32.0, 36.3 and 36.0 days at 7, 15, 30, 45, 60 and 75 days storage respectively at 15°C. These results are in accordance with Butler (1982), who reported similar observations for *Coccinella septempunctata* L.

It may be concluded that *S. madagassa* can be stored at 15°C for 45 days without affecting the fecundity and survival after removal from storage. This technique would be useful in the laboratory rearing as well as planning field release by storing large numbers of predators during periods of non availability of the host insects.

Table 1. Percent mortality of *S. madagassa* adults at different temperatures

Storage (in days)	% mortality at °C*				Temperature Factor Mean
	5°	10°	15°	26°	
7	81.2	53.1	0.29	0.29	33.7
15	90.0	84.2	0.29	26.1	50.0
30	90.0	90.0	6.0	58.5	61.1
45	90.0	90.0	9.3	71.9	65.3
60	90.0	90.0	12.8	90.0	70.7
75	90.0	90.0	43.0	90.0	78.2
90	90.0	90.0	81.2	90.0	87.8
Storage Factor Mean	88.7	83.9	21.8	60.9	

S.Em.	Temperature	Storage	Temp. X days
	0.50	0.66	1.33
C.D. (P=0.05)	1.42	1.88	3.76

\*Transformed values

Table 2. Fecundity, survival and development time of *S.madagassa* after storage

Storage (in days)	Fecundity (eggs/female)			Survival after storage (days)			Developmental time (days)		
	10°C	15°C	26°C	10°C	15°C	26°C	10°C	15°C	26°C
7	10.5	73.2	73.7	14.7	79.5	65.0	31.7	28.0	26.7
15	0.0	72.7	69.2	8.5	70.0	66.2	0.0	29.3	29.0
30	0.0	66.5	29.5	0.25	71.7	29.5	0.0	32.0	31.0
45	0.0	61.0	5.7	0.0	64.2	10.0	0.0	34.0	33.0
60	0.0	36.0	1.7	0.0	49.2	2.0	0.0	36.3	0.0
75	0.0	17.0	0.0	0.0	24.0	0.0	0.0	36.0	0.0
90	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0
Factors	S.Em	C.D. (P=0.05)		S.Em	C.D. (P=0.05)		S.Em.	C.D. (P=0.05)	
Temperature	2.24	6.31		2.48	6.99		0.17	0.49	
Days	2.96	8.35		3.28	9.25		0.26	0.75	
Temp. X days	5.92	16.70		6.56	18.51		0.46	1.31	

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