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Research Note

Effect of low temperature storage on the viability of puparia of *Sturmiopsis inferens* Townsend (Diptera: Tachnidae) a larval parasitoid of sugarcane moth borers

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ABSTRACT: **Attempts have been made to store the puparia of the tachinid, *Sturmiopsis inferens* Townsend, a larval parasitoid of sugarcane moth borers at low temperatures. Storage at 5 and 10°C adversely affected the adult emergence, fertility and longevity when the puparia were stored for 30 days. The puparia could be stored for 30 days at 15°C without any adverse effects on fly emergence, female mating and male longevity. Storage at this temperature slightly reduced the fertility of females. An increase in the duration of storage at 15°C resulted in the reduction of emergence, mating and fertility.**

KEY WORDS: Cold storage, puparia, *Sturmiopsis inferens*

The tachinid, *Sturmiopsis inferens* Townsend is an important larval parasitoid of sugarcane shoot borer, *Chilo infuscatellus* Snellen, in Tamil Nadu (David and Easwaramoorthy, 1986). It also parasitises the sugarcane stalk borer, *Chilo auricilius* Dudgeon (Singh and Yadava, 1979) and Gurdaspur borer, *Acigona steniellus* (Hampson) (Chaudhary *et al.*, 1980) in subtropical India. Studies carried out in the laboratory (Jai Rao and Baliga, 1968; David *et al.*, 1980) showed that it is an effective parasitoid of several species of moth borers infesting sugarcane. The parasitoid can be colonised against shoot borer (David and Kurup, 1988) and stalk borer in endemic locations. The maggots could be kept alive in distilled water for a considerably longer period at 10°C (Jai Rao and Baliga, 1968), however, for shipment of the parasitoid to various locations within the country and to have synchronised adult emergence for field release, it becomes empirical to store the puparia beyond the normal pupal period without adversely affecting adult emergence, mating, fertility and fecundity. In this research note, observations made on the feasibility of storing the puparia at low temperatures are presented.

The stock culture of the parasitoid was maintained in the laboratory at 27±1°C and 80±10 per cent relative humidity. The gravid females were dissected and the maggots were inoculated on third and fourth instar larvae of laboratory reared alternative host insects *viz.*, *Sesamia inferens* Walker and *Galleria mellonella* Linnaeus @ 2 maggots/larva. The parasitoid inoculated larvae were maintained on artificial diets. From the seventh day onwards puparial recovery started. Freshly recovered puparia were surface sterilised with 70 per cent alcohol, rinsed in distilled water and air dried over filter paper. These puparia were placed in plastic boxes (7.0cm dia. x 7.5cm ht.)

@ of 10 per box. The boxes were lined with filter paper at the bottom and the lids were fitted with brass wire mesh. The boxes were placed in BOD incubators maintained at 5, 10 and 15 ± 1°C. The puparia were removed after 10, 15, 20, 25 and 30 days storage. For each treatment 3 replications (10 puparia/replication) were maintained. Suitable control, without cold storage, was also maintained for comparison. After initial results, puparia were stored further for 35, 40, 45, 50, 55 and 60 days at 15°C.

At the end of storage period, puparia were taken out and placed in fly emergence cages (34 x 27 x 25cm). The emerging adults were collected daily in glass tubes (2.5 x 15 cm). These adults were sexed and freshly emerged females were mated with 2 to 3 day old males. The mated females were transferred to gestation cages (12 x 11 x 9cm). Observations were made on fly emergence in both males and females, mating and fertility in females and adult longevity only in males as females were dissected after completing the gestation period. Fertility was recorded in terms of number of females fertilised to total number of females mated.

In the puparia stored for 30 days at 5°C, there was cent per cent reduction in fly emergence, and hence no data could be collected on mating, fertility and adult longevity. There was 70.5 per cent reduction in fly emergence when the puparia were stored at 10°C for 30 days (Table 1). All the females emerged could not mate and there was 58.3 per cent reduction in mating of females. None of the mated females produced viable progeny. Adult longevity was also reduced drastically (87.2%). On the contrary, storage of the puparia at 15°C for 30 days showed no reduction in fly emergence, mating and adult

Table 1. Per cent reduction* in emergence, mating, fertility and longevity of flies when puparia were stored for 30 days

Storage temperature °C	Fly emergence	Mating	Fertility	Adult longivity
5	100.0	-	-	-
10	70.6	58.3	100.0	87.2
15	0.0	0.0	18.5	0.0

*Per cent reduction was calculated in comparison with control having freshly formed puparia not subjected to cold storage.

Table 2. Effect of storage of puparia for different periods at 15°C

Storage period (days)	Adult emergence (%)	Mating of females (%)	Fertilized females (%)	Adult longevity (days)
0	80.0	90.0	86.4	11.2
10	76.7	90.0	73.3	11.4
15	80.0	86.7	76.7	15.4
20	73.3	100.0	76.7	11.3
25	76.7	86.7	76.7	14.2
30	76.7	83.3	73.3	11.0
Between periods				
CD (P=0.05)	3.1	4.8	3.4	NS

longevity. There was only 18.5 per cent reduction in the fertility of mated females. There was no difference in per cent adult emergence, female mating and adult longevity among the puparia stored at 15°C for 10, 15, 20, 25 and 30 days (Table 2). However, when the storage time was prolonged to 60 days, per cent reduction in fly emergence, mating and fertility was 60.8, 56.5 and 50.0 per cent, respectively.

This study indicated that *S. inferens* puparia can be stored up to 30 days at 15°C without any adverse effect. In the case of *Leptomastix dactylopii* Howarth also storage of mummies and adults at 5 and 10°C was detrimental, whereas storage at 15°C for shorter period (up to 30 days) was ideal (Krishnamoorthy, 1989).

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