

## Effect of Temperature on Growth (Weight) of Chironomus Larvae

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**Abstract** The larvae of the Chironomus midges are named as blood worms and useful live food for aquatic organisms. The present study was conducted during October 2008 to March 2009 in 675 m<sup>2</sup> fiber tank for 50 days to find out the effect of temperature on growth in terms of weight of Chironomus larvae (Diptera : Chironomidae). The results show that its maximum growth in 140 kg at 15 °C temperature while minimum 132 kg at 27 °C temperature. The findings depicted meaning full association between temperatures and weight, they dependent on each other. This study provide the important and helpful information for the culture of live feed Chironomus larvae which is cheap and good source of nutrients for the aquatic organism.

**Keywords** Growth rate, Chironomus larvae, Blood worm, Temperature.

### Introduction

Aquatic insects can be easily recognized by their chitinous body with joint appendages and various growth stages. The midges (Diptera : Chironomidae) account for most common macro invertebrates in freshwater environment [1]. Chironomus larvae are one of the most ubiquitous and usually the most common insect found in all types of freshwater, often attaining densities of many thousands per square meter [2]. They form a major constituent of benthic macro invertebrates [3], play an important role in nutrient recycling of aquatic resources and are important source of fish food [4]. It plays an important role in the food webs of aquatic communities, representing a major link between producers and secondary consumers [5]. Chironomus larvae are opportunistic omnivorous mainly feed on detritus, diatoms and small plants and animals, ingesting a wide variety of food items [6]. Several study on the Chironomus culture in different nutrients media and its growth [7—12]. The objective of the present study is found out the effect of temperature on growth of Chironomus larvae in composed cattle dung (organic manure) as a nutrient media.

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### Materials and Methods

For the study experiment was conducted in fiber tank

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**Fig. 1.** Life stages of Chironomus larvae A. Midges and B. Blood worm.

filled in 675 m<sup>2</sup> with fresh water up to a height of 0.60 meter added 1.0 kg of composted cattle dung which attracts the Chironomus flies to lay the eggs. This organic manure is acts as a fertilizer to produce algal blooms which used by larvae as feed. The fiber tanks were covered by mosquito net to prevent the entry of mosquito and other insects. Worm like light red colored larvae comes out from the tube and with the growth larvae turn to blood red color and harvest with scope net of 500 micro mesh (Fig 1.). The number of larvae was counted by cell counting method "Sedgwick Rafter" [13].

$$N = (A \times 1000 \times C) / L$$

Where, N= Number of Chironomus larvae/litter of water, A = Average number of Chironomus larvae, C = Volume of water sample (ml), L = Volume of water (l).

For the identification of larvae compound microscope were used. The statistical and graphical analysis of the data Microsoft Excel 2007 were used.

### Results and Discussion

Chironomus culture was cultured in composed cattle dung as a nutrient media and effect of temperature on its growth in terms of weight was investigated . The larval period was so longed in reared on composed cattle dung and larval development mainly depends on the tempearature if the temperature falls below 10 °C mortality was observed during the study period. During the study the yield of Chironomus larvae was 140 kg at 15 °C temperature in the months

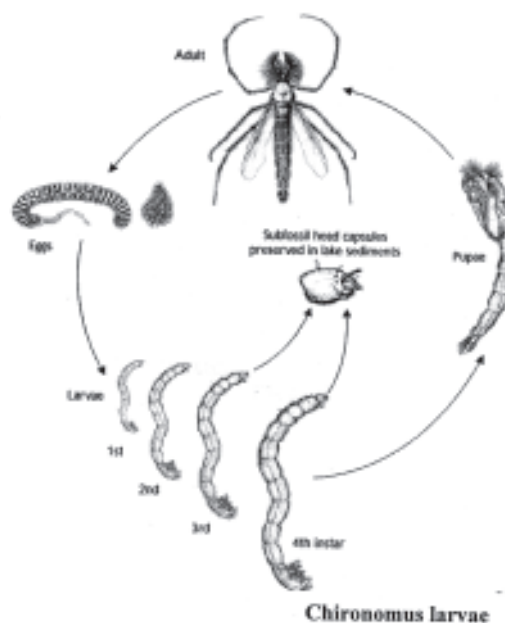
**Table 1.** Weight gain of Chironomus larvae weight at the temperature.

| Months       | Teperature (°C) | Weight (kg) |
|--------------|-----------------|-------------|
| Oct-Nov 2008 | 15              | 140         |
| Dec-Jan 2009 | 20              | 139         |
| Feb-Mar 2009 | 27              | 132         |

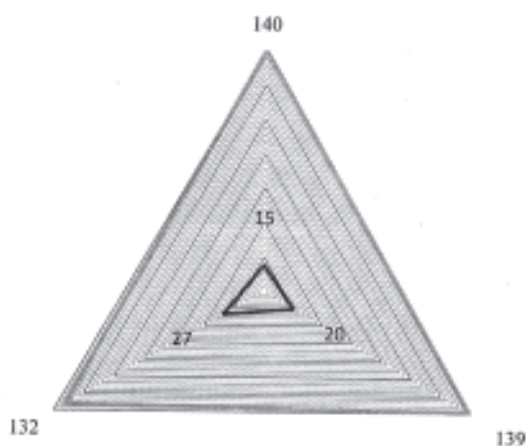
of October and November consequently it was decreased and found 139 kg at the 20 °C during December and January and 132 kg at the 27 °C during February and March (Table 1 and Figs. 2 and 3). The high growth at low temperature may be due to fluctuation in production of primary producers. The similar findings were described by Kumar and Ramesh [14] and they out the best growth of reared larvae in cow dung medium. Shafruddin et al. [15] were also given the similar results in chicken manures and got 140 kg Chironomus larvae reared for 50 days .

### Conclusion

The composed cattle dung is easily available and it



**Fig. 2.** Life cycle of Chironomus larvae.



**Fig. 3.** Relationship between temperature and growth (weight) of *Chironomus* larvae.

use in *Chironomus* (blood worm) culture in the aquaculture farms, its extract should be given in the culture system and harvest the worms at the time of larval stage because it is a better source of nutrients, cheap and suitable for maximizing the productivity of *Chironomus* midges. The result of present study was revealed that growth of *Chironomus* larval was affected by temperature and it was found the maximum in winter season reared in organic matter.

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