

# INFLUENCE OF HUMIDITY ON FEED UTILISATION BY THE SILKWORM *BOMBYX MORI* L.

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## ABSTRACT

Digestibility and conversion efficiency data recorded for the silkworms reared under fully humid and normal atmospheric conditions of humidity have been presented. Saturating the rearing atmosphere with water vapour has been shown to be advantageous to the larval growth as well as for minimising the wastage in the valuable mulberry diet.

## INTRODUCTION

In an earlier report (Sharada and Bhat, 1957) it has been shown that rearing the silkworm under 100 per cent humid atmosphere as opposed to the humidity conditions obtaining in the laboratory results in a remarkable improvement of the larval body weight as well as in a significant decrease in the larval phase of life. In this paper are presented the results which tend to show that both digestibility and feed conversion efficiencies of the silkworms reared under atmosphere saturated with water vapour are of a higher order than those recorded for silkworm grown under normal atmospheric conditions.

## MATERIALS, METHODS AND RESULTS

One hundred silkworms were reared in the humidity chamber as described earlier (Sharada and Bhat, 1957). A control batch of another 100 worms was also reared under the normal atmospheric condition. The larvæ were given weighed amounts of mulberry diet. The procedure employed for the collection of unconsumed diet and excreta and for computing the dry weights of these as well as of larvæ was similar to that reported by Shyamala *et al.* (1956). Nitrogen contents of all samples were determined by the microkjeldahl method.

The digestibility and conversion efficiencies were calculated by making use of the following formulæ:

$$\begin{aligned} \text{Digestibility (\%)} &= \frac{\text{Amount of leaf (or nitrogen) digested}}{\text{Total consumed}} \times 100 \\ \left. \begin{array}{l} \text{Conversion efficiency} \\ \text{based on consumption} \\ \text{(\%)(A)} \end{array} \right\} &= \frac{\text{Increase in dry weight (or nitrogen) of larvæ}}{\text{Total consumed during that period}} \times 100 \\ \left. \begin{array}{l} \text{Conversion efficiency} \\ \text{based on digestion} \\ \text{(\%)(B)} \end{array} \right\} &= \frac{\text{Increase in dry weight (or nitrogen) of larvæ}}{\text{Total digested during that period}} \times 100 \end{aligned}$$

The results obtained have been calculated for 10 larvæ and presented in Tables I and II and Figs. 1 and 2.

TABLE I

*Percentage consumption of mulberry leaves during the III, IV and V instars (Dry weight basis)*

Treatment	Total supplied			Consumed			% consumed			Average consumption
	III instar	IV instar	V instar	III instar	IV instar	V instar	III instar	IV instar	V instar	
100% humidity	0.9395	4.7163	51.7075	0.3700	2.2326	19.7045	39.39	47.36	38.12	39.89
Control	1.6201	4.8980	40.5785	0.4234	1.6762	13.8644	26.13	34.22	33.65	39.31

TABLE II

*Amount of leaves eaten to produce unit body weight (Weight of dry leaves in g.)*

Treatment	III Instar	IV Instar	V Instar
100% humidity	4.762	5.423	4.695
Control	6.253	4.135	9.342

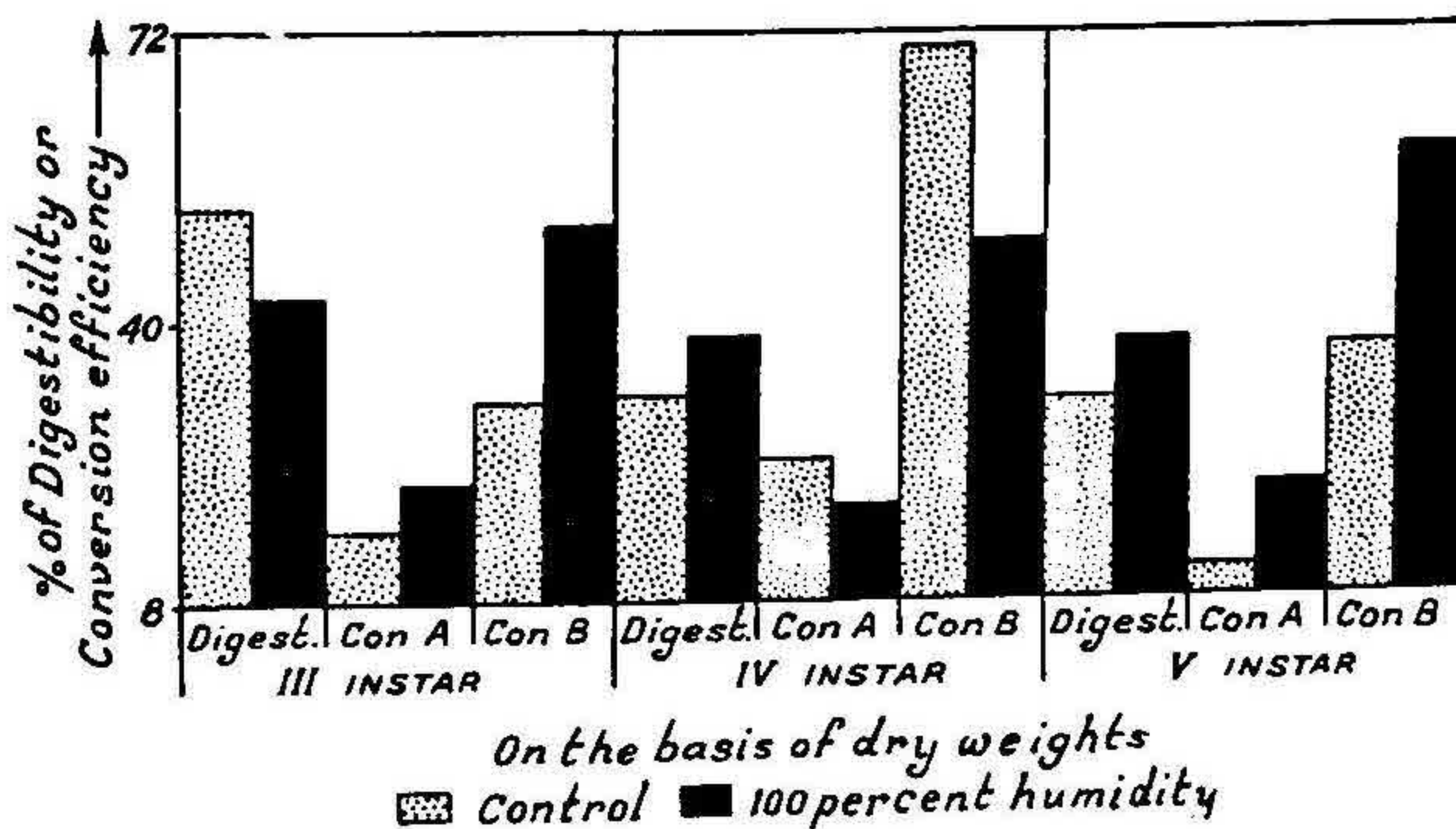


FIG. 1.

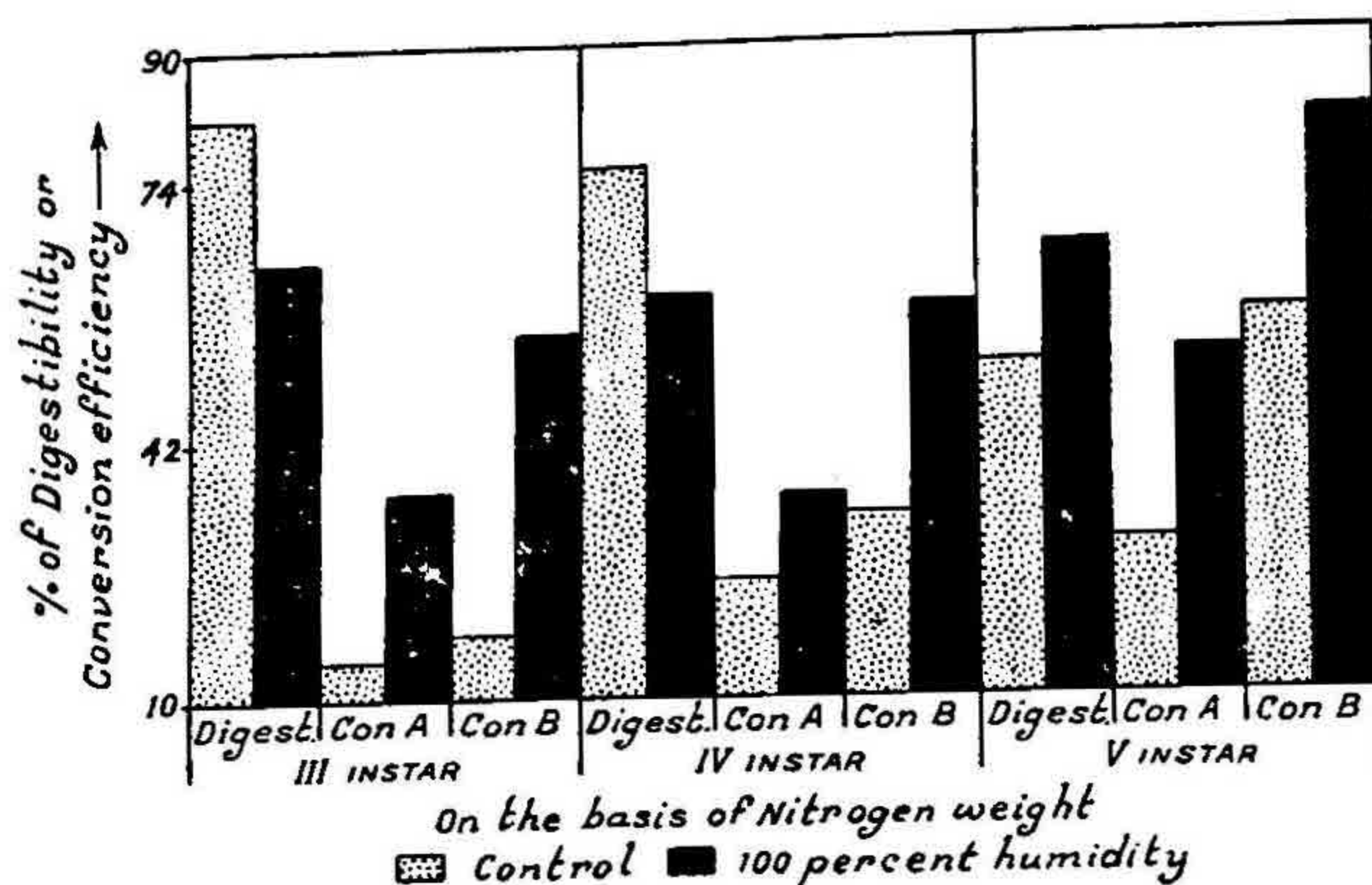


FIG. 2.

## DISCUSSION

Table I indicates that the percentage feed consumption is higher for the worms reared under 100 per cent humid atmosphere than for the control for all instars studied. It would thus appear that rearing the silkworms under the prevailing conditions of humidity of the atmosphere entails a considerable wastage of the mulberry feed, though the average percentage of consumption for the entire period works out to be the same.

From Fig. 1 it is clear that the digestibility on the basis of dry weight of leaves remains fairly constant in the neighbourhood of 35 per cent for the worms reared under the saturated atmosphere in contrast to the widely fluctuating values (nitrogen basis) for the control worms. Similar results have been obtained for the conversion efficiencies based on consumption (A) and digestion (B) which lie in the vicinity of 20 per cent and 50 per cent for the experimental worms.

Fig. 2 also indicates more or less constant values (nitrogen basis) for the digestibility and conversion efficiencies for the worms recorded under the water-saturated atmosphere. These values, it may be observed, are always at a considerably high level due perhaps to the intense protein metabolism occurring in the silkworms in the humidity chamber.

Table II shows that more food is consumed by the larvæ at low humidities in order to build up a given unit body weight. This is in accordance with the observations of Fraenkel and Blewett (1944) on *Tribolium confusum*, *Ephesia kuchiella* and *Dermestes vulpinus*. This would lead one to the conclusion that a part of mulberry diet consumed at low humidities serves the purpose of maintaining the water balance that gets disturbed during rearing conditions under varying atmospheric conditions of humidity.

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REFERENCES

1. Fraenkel, F. and Blewett, M. *Bull. Ent. Res.*, 1944, 35, 127.
2. Sharada, K. and Bhat, J. V. *J. Indian Inst. Sci.*, 1957, 39, 49.
3. Shyamala, M. B.,  
Venkatachala Murthy,  
M. R. and Bhat, J. V. *Ibid.*, 1956, 38, 177.