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IMPACT OF POPULATION DENSITY OF (*Antheraea Proylei*) LARVAE OF TASAR

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Abstract

The relationships in respect of the population density (larval number) and larval weight, shell weight and total shell weight obtained from 100 first instar larvae of the Tasar silk Insect(*Antheraea Proylei*) are observed to be negative and statically significant. But the population density is significant related with mortality percentage showing positive relationship. The biological significance of the population density in relation to the yield of tasar is discussed.

Key Words: Population Density, Tasar, Biological Significance, Larval Weight etc.

I. Introduction

Antharaea Proylei is the source of tasar silk. It is a bivoltine species giving two crops of cocoons in a year. Its economically profit is an old age practice of tribal people of south Bihar. However it seems worthwhile to know that if there is any effect of population density of larvae of this insect on the yield of tasar? The present results obtained by the author while attempting to answer the above mentioned question.

II. Material and Methods

Healthy seed cocoons of bivoltine race of tasar silk worm *A. Proylei* where obtained from the GRM Centre , Chaibasa, Bihar, in May and maintained in lab till the emergence of Moth , which took place in July. The adults copulated , laid eggs and the larvae hatched out . these were the seed crop larvae. The same way the commercial crop larvae also were obtained in the last week of October. The total grainage operation was conducted as per description given by Krishnaswamy et. Al. (1973) and Jolly (1983).

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Picking up randomly five larval density containing 10, 20, 40, 80, and 160 newly hatched larvae were formed and mounted on mature pruned Sal leaves. The area upon which these were mounted was limited (same for all the 5 densities) by using the mosquito net. The larvae were allowed to feed and develop up the 5^{th} instar stage which formed the cocoons. The data were recorded for important charactors like larval weight, mortality , cocoon weight and shell weight. By the application of statically analysis the correlation coefficient (r) and regression equation (Y=mx + c) were calculated and graph was plotted. The experiment was conducted during both (the seed crop and commercial crop) the rearing seasons.

III. Observations

The effects of population density of the larvae of *A. proylei* are summarized in various parameter in Table – 1

Table -1 show that during seed crop season with increase in larval number the average weight of the 5^{th} instar larvae and average shell weight decreases from 32.01 to 79.89g and 1.34 to 1.23g respectively. The mortality percentage increases from 29 to 40.16 resulting to the decreases in the total shell weight obtained from 100 first instar larvae(from 89.20 to 69.50g). Similar trend is observed during the commercial crop season.

The different parameters conform to the general equation Y = mx +c where Y = dependent variable(ordinate) m = slop of the line , x = independent variable(abscissa) and c = intercept. Which are common for both the crops have been observed in following relationships.

(a) Population density and percent mortality;

r= 0.798, positive
significant, P>0.05
Y=9.381 log x + 20.239

(b) Population density and Average weight of 5^{th} instar larve: r= -0.638 Negative Significant
P>0.05,
Y= - 0.548 log x + 33.264.

(c)Population density and average shell weight:

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r= -0.846, Negative
Significant, P= 0.05
Y = - 0.0824 log x + 2.03

(d)Population density and total shell weight obtained from 100 first instar larvae: r= -0.946, Negative significant
P>0.001

Log Y= -17.45683 log x + 109.465.

THE EFFECT OF POPULATION DENSITY OF A. *PROYLEI* LARVA ON VARIOUS PARAMETERS

Table: 1

Replicates	No. of larvae introduced (1^{st} instar)	Av. larval weight(g) (5^{th} instar)	No. of cocoons obtained	Mortality %	Av. Cocoon Weight(g)	Av. Shell Weight(g)	Total shell weight (g) obtained from 100 1^{st} instar larvae
1.	10	32.01	7	30	12.36	1.34	89.20
2.	20	31.84	13	30	12.32	1.32	88.41
3.	40	31.71	28	35	12.16	1.28	83.22
4.	80	31.42	46	38.71	12.11	1.26	69.17
5.	160	31.08	92	40.52	12.00	1.23	65.01

IV. Discussions:

It is found that during the seed crop season the weight of 5th instar larvae and average shell weight decrease from 32.33 to 31.89g and 1.27 to 1.21g respectively whereas the mortality rate increases from 30.0 to 41.75 resulting into the decrease in the total shell weight obtained from 100 1st instar larvae (89.20 to 69.50g). Similar trend is observed during commercial crop.

It is clear that negative correlation between the population density and 5th instar larval weight (r= -0.536, P>0.05)and also population density and average shell weight (r= -0.846 , P>0.05) one hand and another hand is a positive relationship between the population density and the mortality rate (r= 0.846 , P>0.05) which cuses fall the total shell weight (r= -0.946 , P>0.05) which causes fall in the total shell weight (r= -0.946 , P>0.001).

Long (1953) found that crowded Plusia gamma appeared to gain more weight in isolation but in crowded condition they completed the larval stage more quickly than isolated individuals. The same result was observed by Gare (1958) in *Hyphantria cunea* larvae. The finding of Robert (1978) in Gypay moth *Lymantria dispar* concluded that higher larval density adversely affects the fecundity of moth . Devid et al (1978) observed the same phenomenon in bitten gnat *Culicidae veriepennis* .Fattah *et. al.* (1977) in Cotton leaf worm *Spodoptera littorelis and* Kar et. al. (2000) change in voltinism in some population of *A.mylitta* .

Hence the above reference is clear that in crowded density , shortage of food which keep the larvae starved due to which the larval weight gets down and the unhealthy larvae either die of starvation or prepare small cocoons resulting into fall in the total production. The rearers are advised the optimum number of the larvae to the unit area of the host plant otherwise the larvae will become unhealthy and production of silk is loses .

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