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Life Cycle Duration of *Philosamia ricinii (L.)* on Thirteen Released Castor Varieties as Different Host Plants for Appraisal of Best Variety / Varieties.

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Life cycle duration of *philosamia ricinii* (L.) was studied on thirteen released castor varieties for the evaluation of best host variety, in the experiment designed as bio-assay of the castor leaves using erisilk worm and it was found that variety RHC-1 to be the best as the eriworm complete its life cycle very early about (35.2 ± 6.1) days, followed by variety TMV-5 (35.3 ± 4.8) days and on Aruna (36.0 ± 4.8) days respectively. This worm takes longer time to complete its life cycle when reared on variety SKI-73 (41.7 ± 9.6) days and longest on variety CO-1 (44.7 ± 12.5) days. Temperature light, humidity and overcrowding of the worms in the container was also considered to be the factors responsible for effecting the life cycle duration of the worm.

Keyword : *Philosamia ricinii* (L.), Castor, Larvae and Bio-assay.

Introduction :

It is well known that plants play multifaceted role in governing the overall activities of phytophagous insects, be it oviposition, life cycle duration, longevity, reproductive potential, adaptation and other behavioural and ecophysiological aspects. In Pierid butterflies most of these relationships are well documented (Chockalingam, 1979). But in *Philosamia ricinii* (L.), some work has been done but such relationships are not well known. An understanding of insect ecology has been hampered by inadequate knowledge of nutritional physiology. The effects of good plants upon physiology and behaviour at the population and ecosystem & levels are too often neglected, So careful consideration of the present and future information on this topic can lead to better predictive capabilities in both evolutionary theory and pest management although *Philosamia ricinii* is not a pest to castor host plant (Kaushal and Vats, 1983).

With regards to *Philosamia ricinii* (L.) lep: Pieridae, a common feader of castor leaves, very little work has been carried out specially in

relation to the effects of host plants on its life history. Some workers have reported on rearing of larvae on artificial diets, and metabolism of some physiological states of the larvae and pupa (Gupta, 1981). The present investigation was taken up with a view to find out the role played by various varieties of castor host plants in regulation of the life cycle duration of *Philosamia ricinii* (L.) and also to have little knowledge of overall activities like oviposition, life cycle duration, longevity, reproductive potential, adaptation and other behavioural and ecophysiological aspects as very little work has been carried out for the above written research problem.

Materials and Methods :

The dual study *i.e.* life cycle duration of *Philosamia ricinii* of castor varieties and evaluation of best castor variety/varieties through physiological indices using eriworm, for this laboratory culture of erisilk worm (*Philisamia ricinii*) was maintained at culture room of ecology laboratory, Botany Department, Jai Narain Vyas University, Jodhpur. Eriseeds as well as cocoons were obtained from Eriseeds grainage farm, Nongpoh (Meghalaya), Eriseeds Grainage, Borduar (Assam) and Eriseeds Research Center, Mendipather (Meghalaya) during 1997-98.

To start the life cycle, adults obtained from these cocoons were allowed to lay eggs on the bomboo sticks (*Kharikas*). The larvae emerging from these eggs were brushed and used in the experiments, were kept on wet fitter paper which was used as a lining on petri-dish and thus was finally covered with nylon mesh, and the entire experiment was maintained under the culture room conditions (photo period L: D 12: 12, temperature 28-30°C. To enhance the humidity, a wet cloth cover was placed on all the containers used in experiment, thus maintaining relative humidity as (RH 80-92%).

Five replicates each consisting of 10 (ten) larvae of first and second instars were fed with the tender leaves for all the thirteen varieties *viz*., (Aruna, Bhagya, DCS-9, SKI-73, 48-1, GCH-4, RHC-1, SH-41, TVC-31, TVC-15, TMV-5, NES-6, and CO-1, those in the third instar stage were fed with the leaves of medium growth, while the forth and fifth instar larvae were fed with mature leaves. From second to fifth instar the food (castor leaves) was replenished daily two times *i.e*. in the morning and in the evening. Each day, the residual food of the previous day and also the faeces

were collected and dried in an oven (80°C for 24h) and weighed. The average weight of food consumed, faeces voided and weight gained per larva for the fifth instar were determined on oven dry basis, including that of larva dry weight by killing fifteen larvae with the help of absolute alcohol, air dried, oven dried and weighed that which were maintained separately and parallely with the rearing units of the experiment.

Time taken by the eggs to hatch, larval and pupa duration till adult emergence in days were all recorded for all the thirteen varieties and for all the five instar stages as to have knowledge about the time taken by the eriworms to complete its life cycle duration on the respective host castor variety/varieties as bioassay for the best one.

Result and Discussion :

The results of the present study which has been summed up in the tabular form in (Table 1). clearly indicate that *Philosamia ricinii* exhibits a variation in its life cycle duration when reared on different released castor varieties as host plants. The duration of larval and pupa stages differs depending on various castor host varieties, but the incubation period remains more or less the same on all the released castor varieties used as host plants, as shown in table 1. If the total duration is taken into consideration, this worm species complete its life cycle very early on variety RHC-1 (35.2 ± 6.1) days, followed by variety TMV-5 (35.3 ± 4.8) days and variety Aruna (36.0 ± 4.8) days respectively. The duration is longer when reared on variety SKI-73 (41.7 ± 9.6) days and longest on variety CO -1 (44.7 ± 12.5) days.

But this is very clear that as each only host plants do not singly effect the variation of life cycle of any species of insect, numerous other physical and biological factors are also responsible. Temperature and quality of light have been observed to reduce the development time in *Philosamia ricinii.* (Dookia and Mishra, 1979), (Peter and Pandian, 1980) and (Joshi, 1981). Besides various physical and biological factors if we see, the crowding behaviour of the larval stages, may often lead to suppression of faster development, because of competition for food resources as observed by (Hans, 2005). Low efficiencies of conversion and digestibility are observed in certain cases, which may be due to parasitic infection and disease (Hans, 2002).

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Table 1: Life Cycle Duration (in days approxx.) of *Philosamta ricinii (Linn.)* from egg to admit emeragence on Thirteen Released Castor varities. (Mean±SD).

Host varieties	Egg-Ist stage Incubation Period	Ist-Vth stage	Pupa-Adult	Total Duration
Aruna	3.8 ± 0.3	14.0 ± 2.4	18.2 ± 5.9	36.0 ± 4.8*
Bhagya	4.9 ± 0.3	13.5 ± 3.6	20.5 ± 3.5	38.9 ± 6.1**
DCS-9	4.8 ± 0.4	14.4 ± 1.9	19.8 ± 2.3	39.0 ± 2.4 ns
SKI-73	4.7 ± 0.3	15.3 ± 1.9	21.7 ± 4.1	41.7 ± 9.6 ns
48-1	3.9 ± 0.3	13.2 ± 2.4	20.8 ± 1.2	37.9 ± 2.4**
GCH-4	4.5 ± 0.4	16.1 ± 2.4	19.6 ± 2.4	40.2 ± 4.8*
RHC-1	4.4 ± 0.3	13.4 ± 1.9	17.4 ± 4.7	35.2 ± 6.1**
SH-41	3.9 ± 0.4	14.3 ± 1.9	20.3 ± 3.5	38.5± 10.2ns
TVC-31	4.2 ± 0.4	15.2 ± 2.4	18.5 ± 8.6	37.9 ± 6.1**
TVC-15	4.1 ± 0.3	13.1 ± 2.4	21.4 ± 7.8	38.6 ± 4.6*
TMV-5	4.0 ± 0.0	12.0 ± 1.9	19.3 ± 6.2	35.3 ± 4.8*
NES-6	4.1 ± 0.3	12.1 ± 2.4	20.4 ± 9.4	36.6 ± 6.6**
CO-1	4.9 ± 0.4	16.2 ± 2.4	23.6 ± 5.8	44.7± 12.5 ns

ns = Non- Significant, * = Significant at 1% probability level (P = 0.01), ** = Significant at 5% probability level (P = 0.05)

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