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Quantities of Consumption and Digestion of Nutrients during the Grub Period with Respect to Tested Cucurbits in *Raphidopalpa fovecollis*

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Abstract: ***A knowledge of nutrient requirements of insect pests can provideclues as to how one plant/crop or its varieties are differentially damaged and may provide a suitable basis for breeding insect resistant plant/ crop an insects can evaluate the nutritive composition of foodstuffs on the basis of nutritional superiority. In view of these facts, it was expected that an investigation of the nutritional qualities of food plants and corresponding performance of R. fovecollis, might elucidate factor(s) responsible for the insects' differential association with differen food plants. The results of such an analysis may provide clues for breeding resistant plants.***

Keywords: Nutrient Balance, Grub**,** Balenced Diet Ubalanced Diet

1. Introduction

The red pumpkin beetle Raphidopalpa *fovicolis (Coleoptera; Chrysomelidae)* is also known as *Aulacophora fovicolis.* It is a highly destructive polyphagous pest causing serious damage to many economically important cucurbitaceous and solanaceous plant) such as pumpkin, kakari, gourd, sponge gourd, ridged gourd, bitter gourd. The effects of 06 Cucurbitaceous Plant (*Cucumis utilissmus, Cucurbita pepo, Lagenaria cylindrica Luffa acutangula, Luffa aegyptiaca, Memordica charantia*) on nutritional indices of the red beetle ***Raphidopalpa fovicolis (Coleoptera; Chrysomelidae)***.

The nutritional qualities of different food plants (*Cucurbita pepo, Cucumis utilissmus, Lagenaria cylindrica, Luffa acutangula, Luffa aegyptica, Momordica charantia*) were determined by their to support the growth, development, and survival, of the insect when temperature ranged from 22-31 C and R.H. varied from 48-60%.

2. Material and Method

Utilization of food plants was assessed by an experiment designed independently for each food plant. The experiment designed was similar to that of Pandey and Chatterji (1974). The amount of food ingested, digested and assimilated during grub period was assessed by cutting leaves along the midrib into two identical halves, one half was supplied to grubs and the other half was kept without grubs to calculate weight loss due to evaporation of water. The newly hatched grube of known weight per replicate vere transferred to fresh tender leaf discs of known weight of a particular plant in a petridish (15 cm dia.). Food was provided at every 24 h interval until grubs reached second instar, then it was supplied at 12h intervals. Before supplying the other instalment of fresh food, the consumed food and faecal matter released by the grubs were collected and their weight was recorded.

The other half portions of the leaves were kept in a petridish which was covered with fine muslin cloth secured with a rubber band. Here also, the leaves of known weight were replaced; everytime fresh food was given to the grubs. The weight of the renewed leaves was recorded. The difference in the weight of the leaves after 24 h or 12h, at the case may be, provided that the quantity of water loss from the leaves due to evaporation.

1) Quantity of carbohydrates consumed= Quantity ofa food plant consumed x % concentration of the carbohydrates in the food plant

2) Quantity of fats consumed= Quantity of a food plant consumed x% concentration of the fats in the food plant

3) Quantity of protein consumed= Quantity of a food plant consumed x % concentration of the protein in the food plant

For obtaining the digestible quantities of above constituents, the excreta was analysed for the per cent concentration in it and their quantities were determined as under:

4) Quantity of a particular constituent present in the excreta = Quantity of excreta and the %concentration of that constituent present in the excreta

From this, the digestible quantity of a particular food constituent was obtained as under:

5) Digested quantity of a particular constituent = Consumed quantity of that constituent – Excreted quantity of the same

The percent digestible nutrients were calculated by following expressions:

6) % digestable proteins/ fats/carbohydrate= Quantity of proteins/ fats/carbohydrates x100
Quantity of proteins/ fats/carbohydrates consumed

7) Aproximate digestibility (AD)= Dry weight of ingested food- Dry weight of faeces produced x100
Dry weight of ingested food

3. Result

The quantity of carbohydrates consumed varied from 163.42 to 233.96 mg among (Table) cucurbits; it was maximum on L. cylindrica (233.96) and minimum on C. utilissmus (163.42 mg). Likewise, the quantity of proteins consumed also varied from 46.85 to 143.57 mg among the tested food plants; it was 143.5 mg on L. cylindrica and 46.85 mg on C. utilissmus.

The quantities of fats consumed with respect to L. cylindrica, C. pepo and C. utilissmus were 191.68, 134.23 and 107.09 mg, respectively. The digestible quantity of the above food constituents (Table) was also fairly variable among the tested cucurbits. The grub digested 95.90, 86.59 and 39.59 mg carbohydrates when reared on L. cylindrica, C. quantities of pepo and C. utilissmus. Likewise, the digested proteins with respect rearing on these plants were 112.37, 86.50, 31.12 mg, respectively. Further, the grub digested 116.96, 90.34 and 76.17 mg of fats when reared on L. cylindrica, C. pepo and C. utilissmus, respectively. The digestibility of the above food constituents was found to vary among the above three cucurbits (Table 14); that Carbohydrates, proteins and fats it varied from 36.46 to 46.32%, 66.42 to 87.64% respectively, among them. and 61.02 to 71.13%, of the to

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Plants	Quantities of constituents consumed (mg)								
	Carbohydrates			Protein			Fat		
	Consume	digested	AD %	Consumed	digested	AD %	Consumed	digested	AD%
Cucurbita pepo	186.92	86.59	46.32	98.7	86.50	87.64	134.23	90.34	67.30
Cucumis utilissmus	163.42	39.59	36.46	46.85	31.12	66.42	107.09	76.17	71.13
Lagenaria cylindrica	233.96	95.90	40.99	143.57	112.37	78.268	91.68	116.96	61.02
Luffa acutangula	*	*	*	*	*	*	*	*	*
Luffa aegyptiaca	-	-	-	-	-	-	-	-	-
Momordica charantia	-	-	-	-	-	-	-	-	-

*: Records could not be obtained as grabs died before pupation

4. Discussion

The feeding response of an insect to a plant which determines the degree of the damage caused can be identified with the quantity of the food consumed with respect to the same (Pant, 1977). The results show that the insect caused differential damage to cucurbit food plants. This was. Likely to differ with the concentration of bulk nutrients namely carbohydrates, fats and proteins which determine the palatability of a food but the concentration of none of these nutrients was found to be correlated with the quantity of significant the food direct consumed. However, proportionality there between is the concentration of sugars present in the food plant and the quantity of food consumed with respect to CUCURBITACEOUS food plants.

5. Literature Review

Perhaps green plants contain all those nutrients which are needed to meet the nutritional requirements of insects that feed on them (Fraenkel, 1953), but plants certainly do not have equal food value for farm animals (Morrison, 1941) and for insects, Evans (1939) Waldbauer, 1962 & 1964; Soo Hoo Fraenkel, 1966b and others in House, 1961 & 1962). Usefulness of a foodstuff (plant or other biomaterial) depends on its digestibility and availability of different types of nutrient to the animals. Therefore, animal nutritionist uses certain criteria in order to ascertain the nutritive value of foodstuffs. A number of measures of the usefulness of food material recognized (Morrison, 1941). Each of them serves evaluate some quality of the foodstuff. These measures include 1. Coefficient of digestibility, i.e., the percentage of foodstuff digested, 2. Efficiency of Conversion, i.e., the foodstuffs converted into body material, and 3. The nutritive ratio, .

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