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STUDIES ON THE CONSUMPTION AND UTILIZATION OF FOOD PLANTS BY *GRYLLUS BIMACULATUS* DEGEER (GRYLLIDAE, ORTHOPTERA)

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Studies on the consumption and utilization of food plants by *G. bimaculatus* DeGeer revealed that cotton and maize were consumed in significantly higher quantities than gourd, guara, berseem, moth, and tobacco. However, gourd and guara were utilized the most efficiently.

INTRODUCTION

The field cricket *G. bimaculatus* is a serious pest, both in the nymphal and adult stages, of field crops like cotton (*Gossypium hirsutum* Linn.), maize (*Zea mays* Linn.), berseem (*Trifolium alexandriumm* Linn.), tobacco (*Nicotiana tabacum* Linn.), and gourd (*Lagenaria vulgaris* Ser.). In general insects do not utilize in entirety what they consume. The quantitative measurements of a specific food plant consumed and utilized by a particular insect may thus serve as a good index of the food value of that plant. Such information can also be used to forecast the population distribution and build-up of the insect in areas where the plant grows.

MATERIALS AND METHODS

The nymphs and adults of *G. bimaculatus* were reared in the laboratory at ambient temperature and humidity to provide a continuous supply of adults. The leaves of cotton, maize, berseem, tobacco, gourd, moth and guara were fed to the insects. In each experiment five randomly picked adults, of uniform size and age and starved 4-5 hours, were used. Fifty grams of fresh leaves of each plant, weighed by Mettler's Unipan electric balance, were provided to each batch. All tests were replicated at least five times. An equal quantity of leaves, with the same number of repeats, was dried in an oven at 100°C for 24 hours to calculate the dry weight of the leaves fed to the insects. The coefficient of drying was calculated using the following formula after Akhtar (1966, unpublished) :

$$\text{Coefficient of drying} = \frac{\text{Dry weight of the leaves}}{\text{Fresh weight of the leaves}} \times 100$$

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The residual leaves and faeces produced during the 24 hours were transferred to glass beakers and dried in the oven and weighed. The consumption was measured by subtracting the dry weight of the residual leaves from the dry weight of the leaves provided to the insects. The following formula given by Evans (1939) was used to calculate the coefficient of utilization :

$$\text{Coefficient of utilization} = \frac{A-B}{A} \times 100$$

A = Dry weight of the food consumed
B = Dry weight of the faeces produced

The results are given n Table I.

RESULTS AND DISCUSSION

TABLE 1. *Consumption and Utilization of Different Food Plants by Adults of Gryllus bimaculatus DeGeer*

Name of the plants	*Dry weight of the leaves consumed (grams)	**Coefficient of utilization (per cent)
Moth	0.525±0.116	80.0±2.3
Cotton	1.076±0.119	87.6±3.8
Maize	0.915±0.179	87.2±4.0
Guara	0.672±0.118	94.8±1.8
Berseem	0.535±0.109	81.3±2.6
Gourd	0.705±0.056	96.9±2.2
Tobacco	0.494±0.058	79.6±3.0

*Confidence interval at the 5 per cent level
**Confidence interval at the 5 per cent level

Keeping both criteria, i.e., consumption and utilization, in view, it can be concluded from Table 1 that cotton and gourd were the most preferred plants in consumption and utilization respectively, with maize and guara next. These results are partly at variance with those of Dadd (1960), who concluded that the amount of food eaten by *Schistocerca* and *Locusta* was largely regulated by overall utilization. The present values of utilization are higher and are not comparable to those of Akhtar (1966, unpublished), Crowell (1941), Hussain *et al.* (1946) and Smith (1959), who calculated values of utilization for cabbage butterfly, southern army worm, desert ocust and migratory grasshoppers,

respectively feeding on cabbage, lima bean leaves, fig and wheat. These insects utilizd 46.7, 48.5, 50.0 and 32.0 per cent of the foliage consumed respectively. These different values can be attributed to differences in the physico-chemical characteristics of plants, in locality and micro-climatic conditions, and finally in the growth stage of the insect and in the age of the leaves. This conclusion is substantiated by the fact that Davey (1954) recorded a 78 per cent coefficient of utilization in case of locust hoppers feeding on grass leaves, while Soo Hoo and Fraenkel's (1966) coefficient was 70.32 per cent in the case of *Prodenia eridania* (Carmer.) larvae fed on lima bean. A slightly higher coefficient of utilization of cotton in *G. bimaculatus* as compared with some of the grain crops corresponds with the findings of Smith *et al.* (1952) that wheat, barley and Dandelion were the most favoured plants of *Melanoplus mexicanus mexicanus* (Sauss.).

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