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A PRELIMINARY STUDY ON FOOD PREFERENCE OF *MYRMICARIA BRUNNAE* SAUNDERS, 1842 (INSECTA : HYMENOPTERA : FORMICIDAE) DURING NON BREEDING SEASON

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ABSTRACT – Experiments are carried out to note the preference of food viz. carbohydrate (sucrose, glucose, fructose), protein and fat of *Myrmicaria brunnae*. The ants showed an increasing preference for liquid food to solid food. The ascending order of preference of liquid food items was sucrose, fructose, glucose and fat. Experiments were conducted for a period of three months (December' 2010 to February '2010) and time ranging between 9:30 am to 1:30 am. In another set of experiments, it was observed that the acceptability of ants to liquid food was upto a concentration of about 20%.

Key words : Myrmicaria brunnae, *food preference, acceptability.*

INTRODUCTION

Myrmicaria brunnea is a species of ant, sluggish in nature, attracted towards sweets and build the characteristic crater nests generally towards of tree bases in soil. While moving they look smaller in size, for their peculiar articulation of peduncle. They have a distinctive down-curved abdomen and spines on the thorax.

Ants are a diverse group of organisms which explore different feeding strategies (Evans and Leston, 1971; Holldobler, 1978, 1986). The foraging workers of the *Myrmicaria brunnae* colonies mostly collect honeydew and forage for sweets, protein and fats in the vicinity of their nest. Ants belonging to the genus *Myrmicaria* build their characteristic crater nest generally toward the bases of tree. The adult workers primarily feed on carbohydrates to meet their nutritional need, where as larvae feed primarily on nitrogenous foods, though sexual larvae also require great quantities of lipid. The foraging workers are chiefly responsible for food collection, storage and distribution, nest and trail maintenance and other aspects related to feeding behaviour of the *Myrmicaria* ants.

MATERIALS AND METHODS

A colony of the ant, Myrmicaria brunnae at field was located and the movement of the workers was observed for the purpose of estimation of food preference in non breeding season.

Preliminary test to detect the preference of nature of food: Acceptability tests were done in the field to determine preference among representative samples within each of the three-macronutrient groups, and the nature (i.e. liquid or solid) in which they are most accepted. A variety of laboratory chemicals and processed foods were tested. (Since these ants are household pests, processed foods could be considered part of their natural diet). Processed foods included the following sources of lipid: coconut oil, soy oil, butter; and the following sources of nitrogen: panner cheese dead cockroach. Laboratory chemicals were also tested, such as: the simple sugars fructose, glucose, and sucrose.

Tests comparing the acceptability of fructose, glucose, sucrose, protein and fat were undertaken in the field. In field nest was given a choice between different foods in both solid and liquid forms (in different experiments).

Macronutrient Choice test

Based on the mentioned preliminary tests, the following choice tests were performed. Two gms of different carbohydrates (viz, glucose, fructose, sucrose) each were diluted in 100 ml of water to prepare 2% solution and 2 ml of each different carbohydrate solution were kept in the experimental field to observed the number of ants gathering to a particular carbohydrate solution.

Concentration acceptability test

10%, 20%, 30% solutions of sucrose were prepared and kept in the experimental field to observed the maximum gathering of ants at a particular concentration of carbohydrate solutions provided.

REMARK : Preference was assessed by counting the number of ants feeding on each material; counts were done every 30 minutes for a period of up to 240 minutes.

RESULTS AND DISCUSSION

Within 30 minutes of provisioning, some ants are seen approaching towards food source. After a period of one

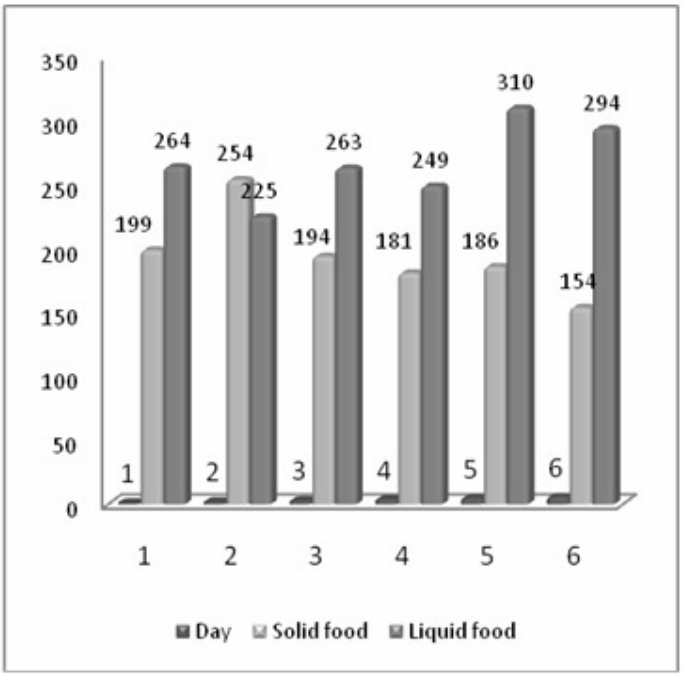

Fig. 1 : Graph showing preference to the physical nature of food.

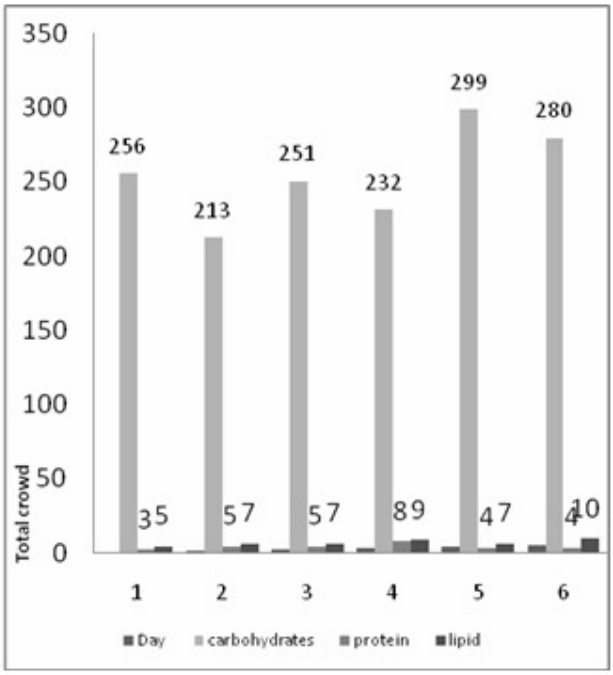

Fig. 2 : Graph showing preference to different liquid foods.

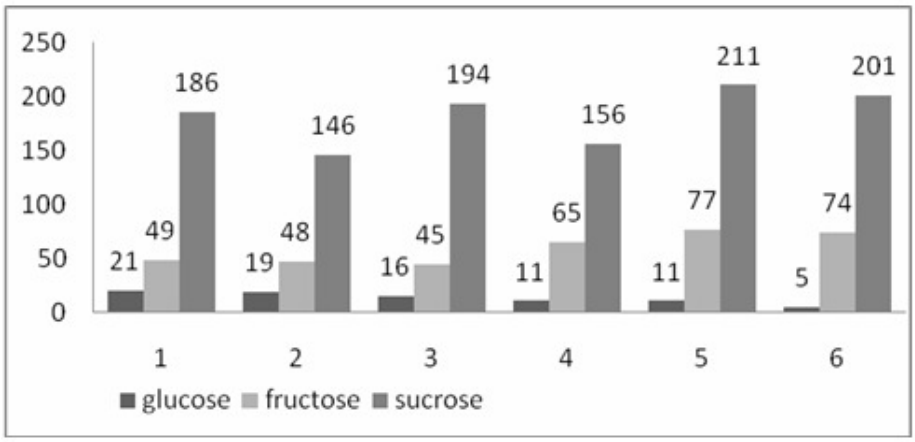

Fig. 3 : Graph showing preference to different types of carbohydrates.

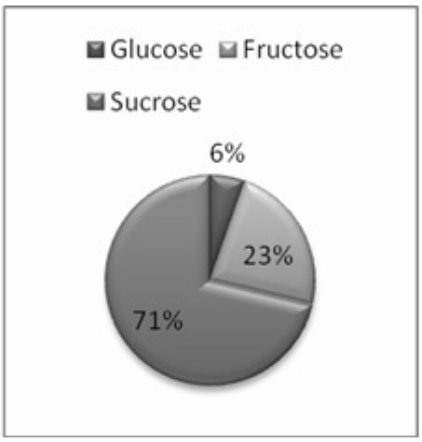

Fig. 4 : Percentage of different carbohydrate preference.

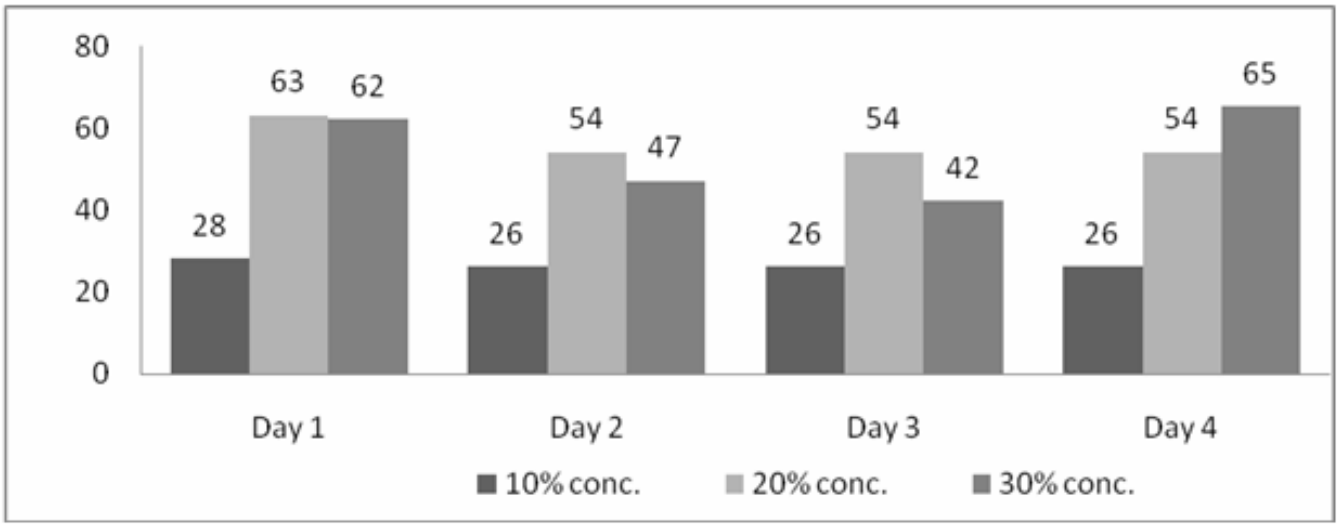

Fig. 5 : Graph showing preference of sucrose in different concentration.

hour or so the number of ants crowd near the food increase proportionally. Here the crowds of the ants near the food source are used as parameter for the prediction of the food preference of the ants belonging to the genus *Myrmicaria.*

The colony of Myrmicaria under natural condition builds their characteristic crater nest generally toward the bases of tree and forage in near vicinity. From the above sets of experiments one can try to estimate the preference of food and acceptability of food under natural condition, when foods were provided to them. The above experiment reveals that the ants shows a considerable preference of liquid food to the solid food, provided to them during the period of experiment. The foraging workers are found to gather near the liquid food more in numbers than the solid food. From fig: comparing the gathered crowd for solid and liquid food we can easily predict that they prefer liquid food over the solid. In the next set of experiments, we get the information about the choice of the food the ants prefer. It is known that during non-breeding season the ants prefer carbohydrates. And the data also suggest that the ants collect greater amount of carbohydrates than the others. The order of ant's carbohydrate preference can be estimated from the data. The ants found to prefer sucrose to other two carbohydrates (glucose and fructose) provided. The ascending order of carbohydrate preference is therefore glucose>fructose>sucrose. It is also observed that the concentration of food does affect the acceptability of the food by the ants. The ants were found to gather in large number at the 20% concentration of sucrose when experiment was carried out with three different concentrations (10%, 20%, 30%).

The preference of carbohydrate foods during non breeding season may be because of the fact that the foraging workers of ant colony during non breeding season collect greater amount of carbohydrate food to meet the nutritional requirement of the colony. During breeding season the ants mostly collect protein and lipid food for the colony, as these foods were necessary for the growth and development of larval and young forms. During the non breeding season, the colony is mostly had adult ants and the need of protein and lipid decreases. Thus the foragers engage themselves to collect large amount of carbohydrate food to store and supply food to the colony.

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