SURVIVAL AND DAILY CONSUMPTION OF *MENOCHI LUS SEXMACULATUS* FAB. ON DIFFERENT ARTIFICIAL DIETS IN LABORATORY

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ABSTRACT: *experiments were conducted in laboratory conditions at the Department of Entomology, Faculty of Crop Protection, Sindh Agriculture University, Tandojam. In this experiment five arificial diets were tested to determined the survival and daily consumption of M. sexmaculatus adult. The result showed that adult male and female consumed maximum per day and per life was observed on honey diet followed by Dry diet, Protein diet, Yolk diet and Whole egg diet, respectively. The result further revealed that the highest adult longevity (days) was recorded on Honey diet followed by Dry diet, Yolk diet, Protein diet and Whole egg diet, respectively. The result further depicted that the daily weight gained by adult male and female on honey diet followed by Dry diet, Yolk diet, Protein diet and Whole egg diet, respectively. The male gained more weight on honey, protein and whole egg diet as compare to female. The male live longer on honey diet, protein diet and whole egg diet than female. The result showed significantly better response in acquiring the high survival, daily weight, feeding rat and faster development of adult when fed on Honey diet compared with other artificial diets. The least preferred diet was Whole Egg diet. No egg production was observed on any diet. The analysis of data suggested that there was significant (P<0.05) difference between survival days of male and female adults on different artificial diets.*

KEYWORDS: *Menochilus sexmaculatus*, artificial diets, survival and consumption

INTRODUCTION

The coccinellids have a significates economic influence in agro-ecosystem due to effectual and efficient predation against many serious insect pests. [1]. In the environmental factor the temperature has adverse effect on coccinellid development rate as well as effect on reproduction, observe the predatory efficiency. The predatory coccinellids has a great economic value in the field of biocontrol to reduce the insects attack [2]. Integrated Pest Management (IPM) are great tool of entomologists with great techniques, economically affordable, ecologically sound and environment friendly insect pest control measures are applied. Being environment friendly, the use of natural enemies is conceived as the back bone of ntegrated Pest Management program. Approximately 90% possibility to control insect pests through biological control. [3]. The zigzag beetle *Menochilus sexmaculatus* is a generalist predator that fed on many soft bodied insects. The adult beetles is about to 2 mm in size with bright yellow color using black vertical zigzag lines on the dorsal side of both the elytra. There may be polymorph of innumerable coloration within the species [4]. *M. sexmaculatus* adult is bright yellow in colour with black vertical zigzag appearances. The both stages of coccinellids are voracious feeder of aphid as well as soft bodies [5]. The artificial diets significantly influenced pre oviposition, post oviposition period and fecundity of adult females [6 and 7]. Besides artificial diet, natural diet is also influenced on adult life. This can be essential for mass rearing program but it results in the economic breakdown of costs for the production of this predator [8]. Many artificial diet formulations havetested on *H. convergens* adults [9]. Diet may sustains for larval development and oviposition measured as essential food whereas the diet that serve only as a source of energy that prolong development period may cause the poor survival is reflected as alternative food [10].

MATERIALS AND METHODS

2.3 Artificial diets

2.3.1 Preparation of artificial diets

Five artificial diets i.e. yolk diet, whole egg diet, honey diet, dry diet and protein diet were prepared in the laboratory and provided to larvae (grubs) and both adults (male and female) to determine their longevity, fecundity, and development.

Yolk diet: The diet included 2gm hen egg yolk, 1gm distilled water and 0.03 gm sodium Benzoate (antibiotic) measured on electric micro weight balance. The yolk obtained from boiled hen eggs. The diet mixed for 5 to 8 min. A total of 3.03 gm diet was obtained. The resulting diet was airtight in aluminum foil and stored at 04˚C. The diet was 10-40 mg/day provided to each larvae and adults of zigzag beetle on parafilm sheet in Petri dishes. The diet was changed every 24 hrs.

Whole egg diet: It contained, 5gm whole hen eggs liquid except yolk, 7.5gm distilled water and 0.12 gm sodium Benzoate (antibiotic). Hen egg was broken with the help of forceps and yolk was separated from white liquid. 5gm of white liquid and 7.5gm distilled water measured on electric balance. The whole ingredients mixed for 5 minute. In this way a total diet 12.62 gm was obtained. The diet was sealed in aluminum foil and stored at 04˚C. A small piece of cotton wool was weight before and after dipping in the die. The diet was 10-35 mg/day provided to each larvae and adults of zigzag beetle in on parafilm sheet Petri dishes. The diet was changed after 24 hrs.

Honey diet: It contained, 2gm drone powder + 2gm yolk + 1gm fructose + 0.5 gm sucrose+3.5gm honey+1gm agar+2gm distilled water+0.12gm sodium Benzoate (antibiotic). Honeybee drone was obtained from honey hive. The collected hives were kept in freezer at 04 ^{0}C in close container (18×6 cm) for 24 hrs. The frozen drone were picked out with the help of needle, and then placed in the

oven at 65˚C for 3 hrs. Dry drone blended into powder form. The above materials measured on electric micro weight balance. The partial elements varied for 10-15 minutes until the paste obtained. Total 12.12 gm of diet was obtained. The resulting diet was sealed in aluminum foil and stored at 04˚C. The diet was 10-70 mg/day provided to each larvae and adults of zigzag beetle on parafilm sheet in Petri dishes. The diet was changed after 24 hrs.

Dry diet: It contained 4 gm casein; 1gm yeast; 5gm sucrose; 0.10gm sodium Benzoate (antibiotic). First the yeast grinded in grinder until it changed into powder form. All the ingredients mixed with each other and then grinded for 3-5 minutes to make it into powder form. The resulting dry diet was sealed in aluminum foil and stored at 04^0C. The artificial diet about 10-40 mg was provided to larvae (1^{st} to 4^{th} instars) and adults (male and female). The diet was changed after 24 hrs.

Protein diet: It contained 3gm of yolk; 2gm casein; 1 gm agar; 3gm sucrose; 2gm cholesterol; 3gm protein hydrolysate; 3gm vitamin-E; 1gm yeast; 2gm honey; 0.20gm sodium Benzoate (antibiotic). The above ingredients measured on electric micro weight balance. The whole ingredients mixed for 15-20 minutes. Total 20.20 gm diet was obtained. The resulting diets were airtight with aluminum foil and stored at 04˚C. The artificial diet about 10-40 mg was provided larvae (1^{st} to 4^{th} instars) and adult (male and female) on parafilm sheet in the peteri dishes. The diet was provided every day to avoid contamination. Small piece of parafilm were placed in plastic dishes.

RESULTS

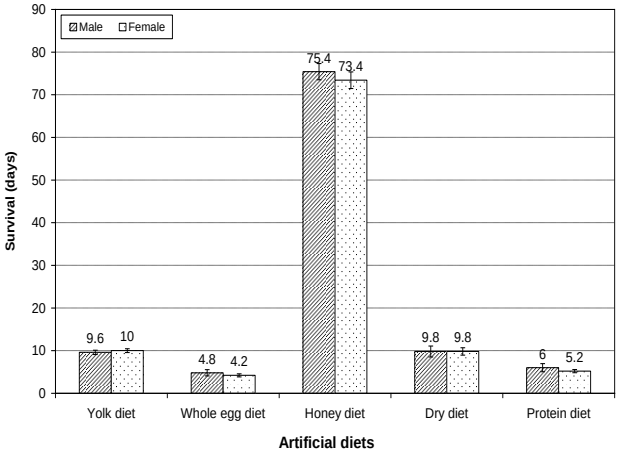
The artificial diets included yolk diet, whole egg diet, honey diet, dry diet and protein diet. These diets were prepared in laboratory according to the procedure mentioned early in the chapter Materials and Methods. The data in Fig. I indicated the survival and daily consumption of *M. sexmaculatus* adult on five artificial diets tested. The adult male and female consumed honey diet (17.22 mg/day; 17.26 mg/day) and (1300.1 mg/life; 1278.98 mg/life) respectively. It was followed by Dry diet (8.32 mg/day; 8.43mg/day and 83.65 mg/life; 84.09 mg/life), Protein diet (7.83 mg/day; 7.41mg and 48.78 mg/life; 38.7 mg/life), Yolk diet (4.38 mg/day; 4.98 mg/day and 42.54 mg/life; 49.12 mg/life) and Whole egg diet (2.12 mg; 2.11 mg/day and 10.44 mg/life; 8.89 mg/life) male and female respectively. Whereas the daily weight gained by adult male and female (1.05 mg/day and 1.01 mg/day) respectively. It was followed by Dry diet (0.59 mg/day; 0.62mg/day), Yolk diet (0.45 mg/day; 0.48 mg/day), Protein diet (0.35 mg/day; 0.30 mg/day), and Whole egg diet (0.25 mg; 0.22 mg/day) respectively. The male gained more weight on honey, protein and whole egg diet as compare to female. The mean duration of adult male and female longevity on Honey diet was 45.4 ± 1.91 and 73.4 ± 1.96 days respectively. It was followed by Dry diet (9.8 ± 1.28 and 9.8 ± 0.86 days), Yolk diet (9.6 ± 0.50 and 10.0 ± 0.44 days), Protein diet (6.0 ± 0.94 and 5.2 ± 0.37 days) and Egg diet (4.8 ± 0.73 and 4.2 ± 0.37 days) respectively.

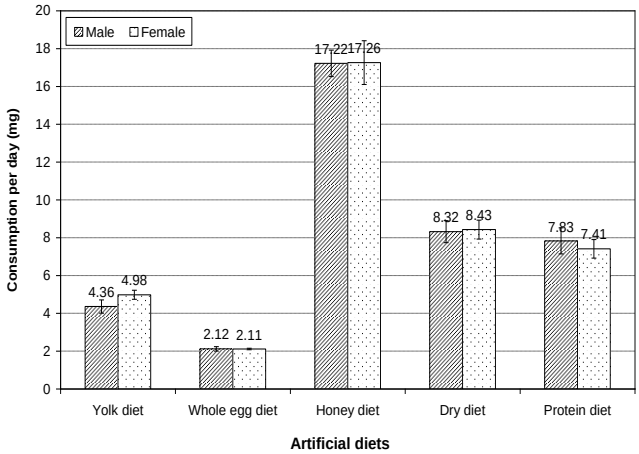
DISSCUSSION:

The findings of present study more or less supported with those of [11] studied that adult *M. sexmaculatus* was lived longer when fed with artificial diet i.e. Frozen and dried aphids, chicken liver and Sucrose [12] described that Beef liver was found best diet for predator's developments but no egg production was obtained. Our findings have agreements with those of [13] reported that adults of *Coccinella septempunctata* L. and *Coccinella transversoguttata* Faldermann no egg produce but body weight increased gradually, when fed on larvae of weevil. The same have also been seen in *Coleomegilla maculata* [14 and 12] described the ox liver is a balanced as a diet for predator growth but no any single egg was produce. It is proved that the artificial diet contained chicken liver, yeast and sucrose support the growth of *C. sexmaculata* [15]. The findings of present study have conformity with the result of [16] narrated that longevity of predator much longer when reared on artificial diets. [17] reared the predators on honey bee brood drone powder and eleven generations successfully completed.

CONCLUSION:

The result showed significantly better response in acquiring the high survival, daily weight, feeding rat and faster development of adult when fed on Honey diet compared with other artificial diets. No egg production was observed on any diet.





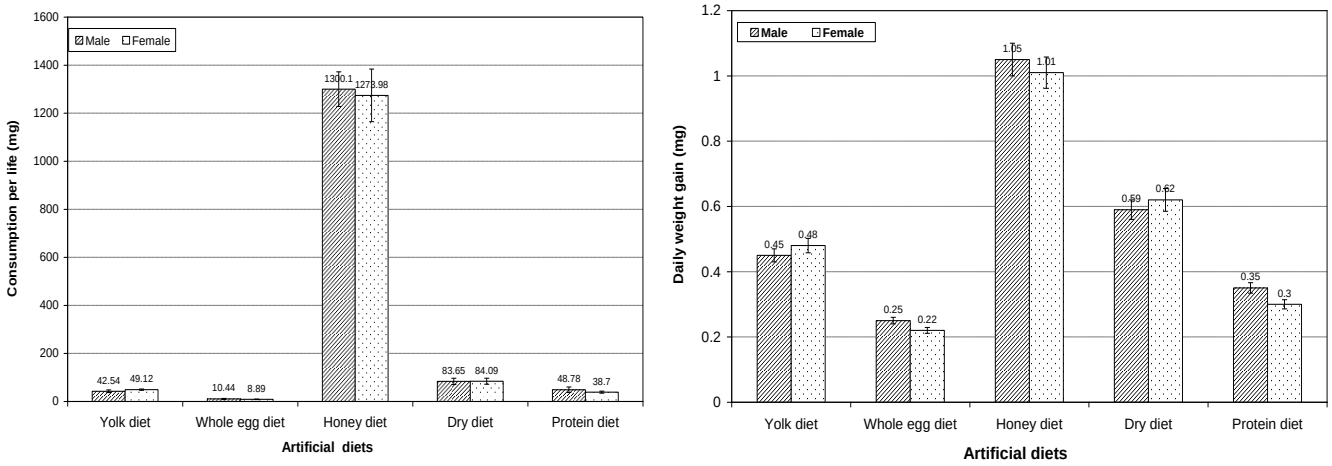


Fig.I. Mean survival (days), consumption per day (mg), consumption per life (mg) and daily weight gain (mg) on different artificial diets

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