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Laboratory Diet for Adult Eye Fly *Siphunculina funicola* (Diptera: Chloropidae), A Forensic and Medical Pest

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ABSTRACT
The oriental eye fly *Siphunculina funicola* (Diptera : Chloropidae) is nuisance to humans and domestic animals which feed on mucus membrane secretions and other moist surfaces of their hosts and transmit fatal pathogens like bacteria, viruses, fungi etc. to humans and other hosts. They aggregate on many hanging substrates like strings, electrical lines, ropes, electrical wires, nest trailing decorations, cob webs, clothes hangers, etc. Being its medical and forensic importance, rearing of this insect is essential part for experimental studies. Therefore, in the present study attempts have been made on unnatural diets for adult eye fly *S. funicola*. Honey 100%, Sucrose 50%, Glucose 50%, Kokum, Citrus juice and Apple juice have been tried. Out of which honey 100% proved to be best diet for eye flies, they survived 18.00 days while flies survived for 5.5 days and 6.5 days 4.00 days, 4.5 days on 50% sucrose, 50% glucose, citrus juice and apple juice respectively. With kokum, water and control the flies died within 2.0 days.
Keywords: Eye fly, artificial diet, medicinal and forensic insect.

INTRODUCTION

The oriental eye fly *Siphunculina funicola* (Diptera : Chloropidae) is nuisance to humans and domestic animals which feed on mucus membrane, various secretions including eye secretions and other moist surfaces of their hosts and carry and transmit fatal pathogens like bacteria, viruses, fungi etc. to humans and other hosts. Naturally, eye flies found aggregating on many hanging substrates like strings, electrical lines and wires, ropes, nest trailing, decorators, cobwebs, clothes hangers, cotton threats etc. Being their medical and forensic importance, rearing of them is essential part in experimental studies.

According to House [1] insect nutrition concerns more than mere dietetics which involves in many metabolic processes and is a bond between physiologic and ecologic phenomenon Gordon [2]. Adult survival can affect the reproductive potential in insects [3]. Review of literature indicates that Somchoudhary & Dutt [4], Pillai & Saxena [5], Singh & Brown [6], Dadd [7], Uberoi [8], Vanderzant *et al*. [9], Canas & O'Neil [10,12] and Sathe & Margaj [3] investigated nutritional requirements for insects for mass propogations.

MATERIALS AND METHODS

15-20 eye flies were confined in glass cage, 25 x 25 x 25 cm for mating and further for oviposition on loose soil of decaying organic matter, placed at the bottom of the cage, normally of a layer breadth of half an inch. Eggs are laid in loose soil. After hatching the eggs larvae feed on decaying organic matter and transformed into pupae and then adults. Within 3-4 weeks eye flies developed from eggs to adults. Newly emerged 10 adult males and 10 adult females were taken into individual test tubes (2.5 x 10 cm) and a cotton boll soaked with a food was placed in the test tube and adult longevity was noted. Honey 100%, sucrose 50%, glucose 50%, citrus juice, apple juice, kokum and water have been tried as food for eye flies. In control, adults were starved. Observations were taken on the adult longevity from emergence as an adult till the death. Experiments were replicated for five times with each sex and food.

RESULTS AND DISCUSSION

Results recorded in the table-1 and figs 1 to 3 indicate that honey 100% was the best food for maximum survival, 19 day of the adult eye flies. The mean survival of males averaged 17.00, 5.00, 6.5, 5.5 and 4.00 days and the females averaged 18.00, 5.5, 6.5, 4.00 and 4.5 days with 100% honey, 50% sucrose, 50% glucose, citrus juice and apple juice respectively. Neither of sex survived for more than 2 days with kokum and control. However, water alone extended the survival of females hardly for 3 days. On an average both sexes survived for 1.5 days with kokum, water and control. 50% sucrose and 50% glucose have increased the adult longevity significantly (table-1) but no

significant difference was noted with citrus and apple juice. The ratio of male: female adult longevity was found favoring the females.

According to House [1] nutritional data came from a spectrum of works ranging from those on natural food stuff to those for precisely determining nutritional requirements on chemically defined diets. Useful techniques with labeled isotopes and with antimetabolites have been investigated but feeding tests are most commonly used. According to House [1] intricate relations are known between insects and their food plants. The food must be chemically and physically attractive to incite satisfactory feeding responses [1]. Utilization of carbohydrates varies with the species and depends on abilities to digest poly and oligosaccharides to diffusible absorptive forms and on the degree of absorption [5].

Table - 1: Effect of different food on adult longevity of *S. funicola*

S. No.	Food supplied	Sex	Average longevity	Range	Ratio M : F
1.	100% honey	Male Female	17.0 18.0	15 - 18 15 - 19	1 : 1.05
2.	50% sucrose	Male Female	5.0 5.5	4 – 6 4 - 6	1 : 1.10
3.	50% glucose	Male Female	6.5 6.5	4 – 6 4 - 6	1 : 1.00
4.	Citrus fruit juice	Male Female	3.5 4.0	3 – 4 3 - 5	1 : 1.142
5.	Apple fruit juice	Male Female	4.00 4.50	3 5 3 – 5	1 : 1.125
6.	Kokum	Male Female	1.5 1.5	1 – 2 1 - 2	1 : 1
7.	Water	Male Female	1.5 1.5	1 - 2 1 - 3	1 : 1
8.	Control	Male Female	1.5 1.5	1 – 2 1 - 2	1 : 1
					1 : 0.52

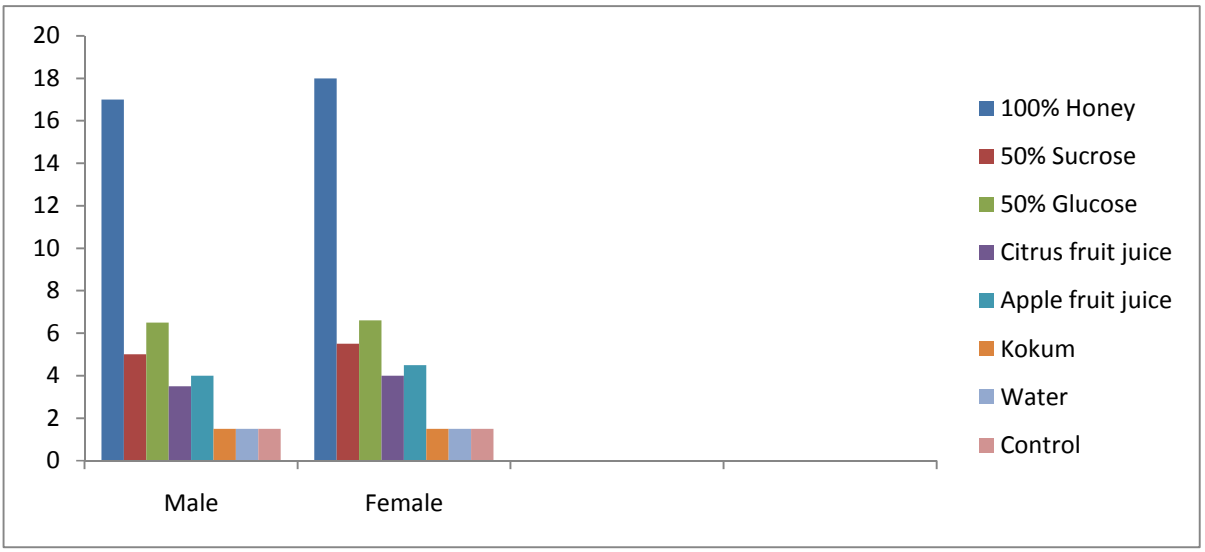

Fig.-1: Adult longevity of *S. funicola* with different food.

Quantitative vitamin requirements have been determined in several insects [1]. Several vitamins were responsible for increase in fecundity and fertility in tephritids (Diptera). However, no such effect was noticed due to vitamins in a mosquito *Aedes aegypti* (L.). For insect growth development 5-6 B-vitamins were commonly needed, but

requirement of others were vary with the insects. B12 though active in purine synthesis was not required to some insects. Without B12 vitamin growth of *Blatella germanica* L. was arrested [2] but inositol was essential for two species of cockroach. Similarly, ascorbic acid was found to be necessary for growth of *Schistocerca gregaria* (Forskal) [7]. Likely, carnitine or vitamin B_T was larval requirement of only several Tenebrionidae and that nucleic acids were needed only by dipterous larvae [6].

Fig.-2: *S. funicola* on hanging substrate

Fig.-3: *S. funicola* Adults.

The requirement of RNA in *Drosophilla melanogaster* Meigen was primarily one for adenylic acid essential for adenine. A need for a fatty acid, linoleic was shown in two lepidopterans and possibly in *B. germanica* [8]. In the present study, nutritional requirement of eye flies was studied in adult stage and 100% honey was the best artificial diet for the flies in the laboratory.

In an Ichneumonid *Diadegma argentcopilosa* Cameron (Hymenoptera: Ichneumonidae), a parasitoid of *Spodoptera litura* (Fab.) Sathe [11] reported maximum, 15.1 days longevity in adult females while, it was 14.6 days in males when fed with 100% honey. The present adult forms of *S. funicola* although, naturally fed on mucus membranes, secretions of wounds, eyes and other moist surfaces of the host body, under laboratory conditions (25±1°C, 65-70% R.H. and 12 hr photoperiod), they survived for 18.00 days (range 15-19 days) with 100% honey. Therefore, under laboratory conditions, the flies should be propagated by giving 100% honey as a best food in adult stage.

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