CHAPTER-V

RELATIVE EFFICIENCY OF DIFFERENT BAITS USED FOR TRAPPING BLOWFLIES IN CALCUTTA

INTRODUCTION

Nuorteva (1963) used baits such as faeces, raw fish, tinned meat and fresh liver to study the role of blowflies in the transmission of pathogens from faeces and carcasses to human food. Phormia terras-novae, according to this author, occurred most abundantly on faecal material in Finland but this was not so in Germany (Kirchberg, 1951; Teschner, 1958, 1959, 1961) and in Czechoslovakia (Gregor and Povolny, 1958; Havlik and Batova, 1960). Lucilia sericata was a common species visiting faecal material in Finland and in Central Europe (Nuorteva, 1963), but the same species did not occur in faecal material in Greece (Kirchberg, 1961). Lucilia illustris was found in faecal material in Berlin (Kirchberg, 1951) as well as in Finland (Nuorteva, 1963). Lucilia caesar was found to visit faecal material frequently in different parts of Europe (Gregor and Povolny, 1958, 1959, 1960, 1961; Teschner, 1958, 1959, 1960, 1961; Havlic and Batova, 1960). But this species was found to be a rare visitor of faecal material at Bromarv, Finland (Nuorteva, 1963).

Webber (1958) pointed out that the efficiency of the faecal material passed by sheep and used as a bait for Lucilia cuprina, varied with the nature of food consumed by sheep.

Calliphora uralensis showed strong preference to faecal materials in Russia (Sukhova, 1950 1962; Stackelberg, 1956;

Derbeneva-Ukhova, 1962). Similar observation in respect of the same species was made by Nuorteva (1963) in Finland.

Nuorteva (1963) also pointed out that the efficiency of human faecal material used as bait is dependent on food habits of the people of different regions. Thus arises regional differences in the reactions of blowflies to faecal matters collected from different regions and used as bait.

In connection with his work on zonal distribution of blowflies on the Aretic Ailigus Hill in Finland, Nuorteva (1964b) used baits of different types such as :

(a) Fresh liver was stored for two days before using as a bait,

(b) Tinned pork and beef. The tins were opened just before the meat was used as bait.

(c) Fresh human faeces of standardized diet consumed by the person on the previous day.

Kano et al. (1964) used raw fish and 'sake dregs' as bait for collection of flies in the southernmost part of Japan.

Nuorteva (1965) collected flies by traps baited with 230 gm tinned pork and beef of different grades of freshness, i.e., tins of which opened one day earlier, two days earlier and three days earlier before using baits for the trap. The purpose of using such different types of baits, according to this author,

was to reduce the significance of age of the bait as an error in observations on the diet periodicity of flies.

Hedström and Nuorteva (1971) during their investigation used baits of (a) 100 gm fresh liver for two days (22.6.62 and 23.6.62); (b) 230 gm of tinned pork and beef for three days (24.7.62 to 26.7.62); and (c) 100 gm of human faeces for four days (27.7.62 to 30.7.62).

Park (1977) collected flies during his investigations with baits of (i) a mixture of putrefied fish intestines as used by Kawai and Suenaga (1960) and (ii) dregs of Takju (a Korean native liquor made from rice).

The purpose of the present work is to elucidate the incidence of different blowflies in relation to different food substances used as bait so as to obtain an idea of the efficiencies of various types of food used as bait for trapping blowflies in Calcutta.

MATERIAL AND METHODS

Flies were collected with traps of the type described in Chapter I (page 12) to study relative efficiency of different food used as bait for attracting blowflies. Trapping experiments were performed at Zoological Garden area of Kidderpore, Calcutta. The trapping site is described in Chapter I, page 10 .

Experiment-I :

Five traps were operated simultaneously from 06 hrs to 18 hrs for consecutive 3 days (1.6.78 to 3.6.78). Trappings were undertaken during the month of June (summer - 1978). During this season the blowflies occur in large numbers in human dwellings and are very much attracted to ripe fruits such as jackfruit and mango. They are also easily attracted to molasses, fish and meat. Five traps baited with 250 gm of each of the above substances (jackfruit, mango, molasses, fresh fish and fresh meat) were placed at a distance of 100 meters from each other. Trappings were undertaken in shade (under tree) as it was observed that the majority of blowflies prefer red shade to sunshine. Trapped flies were collected at 18 hrs on each day of experiment.

Experiment-II :

Trapping experiments were also undertaken to observe the effectiveness of bait of one day old fish and meat in contrast to fresh fish and meat. These baits were used for three successive days (4.6.78 to 6.6.78). Weather conditions were very suitable for fly activity. Meteorological data for the periods of experiment were obtained from the nearest meteorological station at Alipore, Calcutta located about ½ km. away from the Zoological Gardens, Alipore which was the trapping site (Table 33, June, 1978).

OBSERVATION

The role of different types of baits in trapping different blowflies species as determined in the present investigation is summarised in Table 15. A comparison of the abundance of blowflies trapped by fresh fish and fresh meat bait (collected on 1.6.78 to 3.6.78) and one day old fish and one day old meat bait (collected on 4.6.78 to 6.6.78) is shown separately in Table 16. It is observed that the total number of blowflies trapped during this experiment was 3674, of which 1445 blowflies (i.e., 40% of total catch of blowflies) were attracted to ripe jackfruit; 1123 blowflies (i.e., 31.4% of total blowflies) were attracted to ripe mango; 706 blowflies (i.e., 19.7% of total catch of blowflies) were attracted to fresh fish; 192 blowflies (i.e., 5.3% of total catch of blowflies) were attracted to fresh meat and 108 blowflies (i.e., 3% of total catch of blowflies) were attracted to molasses.

Blowflies attracted to Jackfruit:

It was observed (Table 17) that the total number of blowflies visiting ripe jackfruit was 1445 of which 1397 (i.e., 96.6% of total catch on jackfruit) were *Chrysomya megacephala*; 42 (i.e., 2.09% of total catch on jackfruit) were *Chrysomya rufifacies* and 2 were *Lucilia cuprina* and 4 were *Hemipyrellia ligurriens*.

Table 15 : The effectiveness of different types of bait for different blowfly species collected during the month of June (1.6.78 to 3.6.78) in Calcutta

Sl. No.	Species	Jackfruit (ripe)			Mango (ripe)			Molasses			Fish (fresh)			Meat (fresh)			Total
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	
1.	Chrysomya megacephala	542	855	1397	490	600	1090	39	62	101	88	490	578	14	68	82	3248
2.	Chrysomya rufifacies	18	24	42	11	20	31	3	4	7	8	58	66	6	50	56	202
3.	Chrysomya albiceps	-	-	-	-	-	-	-	-	-	1	9	10	1	10	11	21
4.	Chrysomya nigripes	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1
5.	Lucilia cuprina	1	1	2	-	1	1	-	-	-	3	29	32	4	24	28	63
6.	Lucilia sericata	-	-	-	-	-	-	-	-	-	-	2	2	-	1	1	3
7.	Hemipyrellia ligurriens	1	3	4	0	1	1	-	-	-	2	16	18	1	12	13	36
	Total flies	562	883	1445	501	622	1123	42	66	108	102	604	706	26	166	192	3574
	% of male & female for each type of bait	38.8	61.1		44.6	55.3		38.8	61.1		14.4	85.5		13.5	86.4		
	% of blowflies on each type of bait		40.0			31.4			3.0			19.7			5.3		

Table 16 : A comparison on the abundances of blowflies trapped by fresh bait of fish and meat and one day old bait of fish and meat during the month of June (4.6.78 to 6.6.78) in Calcutta

Sl. No.	Species	Bait (fresh)					Bait (one day old)				
		Fish		Meat		Total of meat and fish	Fish		Meat		Total of meat and fish
		Total	%	Total	%		To-tal	%	Total	%	
1.	Chrysomya megacephala	578	87.5	82	12.5	660	950	86.0	153	13.8	1103
2.	Chrysomya ruffacies	66	53.2	56	45.9	122	85	47.7	95	52.7	180
3.	Chrysomya albiceps	10	45.4	12	54.5	22	22	45.0	27	55.0	49
4.	Chrysomya nigripes	-	-	-	-	-	-	-	-	-	-
5.	Lucilia cuprina	32	53.3	28	46.5	60	61	54.0	50	45.0	111
6.	Lucilia sericata	2	66.6	1	33.3	3	2	66.6	1	33.3	3
7.	Hemipyrellia ligurriens	18	60.0	12	40.0	30	39	59.0	27	40.0	66
	Total blowflies	706	78.6	192	21.3	898	1159	76.6	351	23.3	1512

Table 17 : Percentage of blowflies collected on different types of bait for different species (Calliphoridae : Diptera) trapped during the month of June (1.6.78 to 3.6.78) in Calcutta

Sl. No.	Species	Jackfruit		Mango		Molasses		Fish		Meat		Total
		Total	%	Total	%	Total	%	Total	%	Total	%	
1.	Chrysomya megacephala	1397	96.6	1090	97.0	101	93.5	578	81.8	82	42.7	3248
2.	Chrysomya rufifacies	42	2.9	31	2.7	7	6.4	66	9.3	56	29.1	202
3.	Chrysomya albiceps	-	-	-	-	-	-	10	1.4	11	6.3	21
4.	Chrysomya nigripes	-	-	-	-	-	-	-	-	1	0.5	1
5.	Lucilia cuprina	2	0.1	1	0.08	-	-	32	4.5	28	14.5	63
6.	Lucilia sericata	-	-	-	-	-	-	2	0.2	1	0.5	3
7.	Hemipyrellia ligurriens	4	0.2	1	0.08	-	-	18	2.5	13	6.7	36
	Percentage of blowflies on each bait	1445	40.0	1123	31.4	108	3.0	706	19.7	192	5.3	3574

Blowflies attracted to mango:

Total number of blowflies visiting ripe mango was 1123 of which 1090 (i.e., 97% of total catch on mango) were Chrysomya megacephala; 31 (i.e., 2.7% of total catch on mango) were Chrysomya rufifacies and only one specimen of each species of Lucilia cuprina and Hemipyrellia ligurriens were trapped on mango.

Blowflies attracted to molasses:

Total number of blowflies visiting molasses was 108, of which 101 (i.e., 93.5% of total catch on molasses) were Chrysomya megacephala; and 7 (i.e., 6.4% of total catch on molasses) were Chrysomya rufifacies.

Blowflies attracted to fresh fish:

Total number of blowflies visiting fresh fish bait was 706, of which 578 (i.e., 81.8% of total catch on fish) were Chrysomya megacephala; 66 (i.e., 9.3% of total catch on fresh fish) were Chrysomya rufifacies; 10 (i.e., 1.4% of total catch on fresh fish) were Chrysomya albiceps; 32 (i.e., 4.5% of total catch on fresh fish) were Lucilia cuprina and 2 were Lucilia sericata and 18 (i.e., 2.5% of total catch on fresh fish) were Hemipyrellia ligurriens.

Blowflies attracted to fresh meat:

Total number of blowflies visiting meat was 192 of which

82 (i.e., 42.7% of total catch on fresh meat) were Chrysomya megacephala; 56 (i.e., 29.1% of total catch on fresh meat) were Chrysomya rufifacies; 12 (i.e., 6.3% of total catch on fresh meat) were Chrysomya albiceps, 28 (i.e., 14.5% of total catch on fresh meat) were Lucilia cuprina; 13 (i.e., 6.7% of total catch on fresh meat) were Hemipyrellia ligurriens, and only one specimen of Chrysomya nigripes and Lucilia sericata were collected on fresh meat.

It was observed during comparison on the occurrence of blowflies on fresh fish and stale fish (one day old) and fresh meat and stale meat (one day old), that the total number of blowflies trapped on fish was 1865, of which 706 blowflies (i.e., 37.8% of total catch on fish bait) were trapped on fresh fish and 1159 blowflies (i.e., 62.1% of total catch on fish bait) were trapped on stale fish. The total number of blowflies trapped on meat bait was 543, of which 192 blowflies (i.e., 35.3% of total catch on meat bait) were trapped on fresh meat and 351 blowflies (i.e., 64.6% of total catch on meat bait) were trapped on stale meat.

DISCUSSION

Result of the present investigation revealed the effectiveness of fish and meat as bait which attracted all the species of blowflies collected in the study area. Similar observations

were performed by Nuorteva (1963) who used baits of different food substances at Bromarv, Finland. It was observed in the present study that maximum number of specimens trapped were Chrysomya megacephala. Similarly at Bromarv, Finland, the maximum number of specimens trapped were Lucilia illustris (Nuorteva, 1963).

Result of the present observation showed that the most attractive bait was ripe jackfruit which accounted for 40% of total blowflies collected followed by ripe mango which accounted for 31.4% of total blowflies collected. The least attractive bait was molasses which accounted for 3% of total blowflies collected. It was also found that the attraction of blowflies to fish was greater than that to meat. For these blowflies stale fish and meat were found to be greater attraction than fresh fish and meat. Similar findings were earlier recorded by Kawai and Suenaga (1960) and Nuorteva (1963).

The number of female flies attracted by fish and meat was much higher than those attracted to ripe jackfruit, ripe mango and molasses. It might be explained that fish and meat being the breeding media for blowflies, attracted female flies in larger number than the males. Similar observation regarding a greater number of female flies being attracted by fish and meat bait was recorded in Finland by Nuorteva (1963).

The percentage of male and female blowflies as seen in the trapped material obtained using ripe fruits as bait perhaps represent actual picture of male and female population of blowflies in the study area.

It was noticed that fish and meat attracted all the synanthropic blowflies in the study area. Being scotophilic in nature these blowflies might be the potential transmitter of pathogens from carcasses to human food. Similar transmission of pathogens from carcasses and faeces by blowflies to human food was pointed out by Nuorteva (1963). Extensive research work, on this aspect is necessary to find out the microbial content of faecal materials which the blowflies visit, as such microbes are likely to be carried to ripe fruit offered for sale.

SUMMARY

1. Largest number of blowflies attracted to jackfruit in the study area. Next in importance as bait are ripe mango, stale fish, stale meat, fresh fish, fresh meat and molasses. Each of these baits is found to be more effective than the one following it.

2. All the seven species of blowflies occurring in the study area were equally drawn to fish and meat bait. Stale fish and stale meat were found to be more effective than the fresh fish and fresh meat.

(3) The female blowflies were attracted in larger numbers to the fish baits and meat baits. This is possibly due to the habit of the female flies to deposit eggs on carcasses.

(4) The number of male blowflies were higher on the baits of ripe jackfruit, ripe mango and molasses.

(5) It is surmised that the blowflies because of their coprophilic habit may transfer pathogens from faecal materials to exposed foodstuff.