

CHAPTER-IV

PHOTOPHILIC BEHAVIOUR OF SOME BLOWFLIES IN  
CALCUTTA

## INTRODUCTION

A survey of literature shows that various investigators carried out experiments to determine the activity of blowflies which visit various types of foodstuff in sunshine as well as in the shade. Investigations were also performed to study the role of blowflies in the matter of transmission of pathogens from faecal and other refuse materials to human food stored in shade as well as in sunshine. For example, Kirchberg and Bakri (1960) pointed out that in Berlin Lucilia caesar group of blowflies preferred shade whereas the same blowflies showed preference for sunshine in Bromarv, Finland (Nuorteva, 1963). This difference in the two places as explained by the investigator was due to the cooler weather prevailing in the study area in Finland than that prevailing in Berlin during experimental days.

Nuorteva (1963) performed experiments by placing traps in sunshine and in shade to show the preference of the different species to visit baits placed in either of the places. According to this investigator the most heliophilic species in Finland were Phormia terreae-novae, Lucilia richardsi and Lucilia sericata whereas Gnomyia mortorum, Calliphora erythrocephala, Calliphora vomitoria and Calliphora subalpina were the most scotophilic species. It was also pointed out that the females, in general, were more scotophilic than the males. This scotophilic habit of the female flies, as explained by Nuorteva (1963)

was connected with the tendency of the females for laying eggs in shady places. This motivation of the females to deposit their eggs in shady places reversed temporarily the normal positive reaction of blowflies to sunlight. This temporary scotophilic nature of blowflies was also pointed out by earlier authors like Graham-Smith (1916), Wardle (1930) and Green (1951). Nuorteva and Vesikari (1966) pointed out that Cynomyia mortuorum, having low grade of heliophily (Nuorteva 1963) apparently visited burrows of small mammals occurring in the shady places and could thus possibly carry germs from carcasses of wild subarctic voles to man.

The tendencies of the different blowfly species in Calcutta to visit baits placed in the shade or in sunshine as the case may be is investigated and discussed in the present chapter.

#### MATERIAL AND METHODS

Collection of flies were undertaken with traps of the type described in Chapter I (page 12 ) for the investigation of photophilic behaviour of blowflies. Trapping experiments were performed at Zoological Garden area of Kidderpore, Calcutta. The trapping site is described in Chapter I (page 10 ). Four traps, baited with 250 gms of raw fish, were operated simultaneously, two of these were placed in shade (under tree) and another two were

fully exposed to sunshine. Traps were placed at a distance of 100 meters from each other. This investigation was undertaken during the peak month of November (ascertained in Chapter I, page 17 ), for 6 days during the period from 16.11.75 to 21.11.75. Experiment commenced at 06 hours and continued upto 18 hours of the days of experiment. Baits for each trap were renewed at 06 hours of the day after 3 days of experiment. Trapped flies were collected at 18 hours on each day of experiment.

Trapping days were clear and cloudless. Meteorological data for the periods of the experiments (Table 13) were collected from the nearest Meteorological Station at Alipore, Calcutta which is about  $\frac{1}{2}$  km away from Zoological Garden area of Kidderpore where trapping took place.

#### OBSERVATION

The results of the traps placed in shade and in sunshine to study the photophilic behaviour of blowflies in Calcutta are summed up in Table 14. Total number of blowflies collected was 3697 of which 2289 (i.e., 61.91% of total catch of blowflies) were trapped in the shade and 1408 (i.e., 38.09% approximate of total catch of blowflies) were trapped in sunshine. Total number of female blowflies trapped was 2924, of which 1840 (i.e., 62.9% of total number of female blowflies) and 1084

Table 13 : Meteorological conditions during the experiment of photophilic behaviour of blowflies as per meteorological station, Alipore, Calcutta for 0830 hours observation

Date of experiment	Maximum temperature °C	Minimum temperature °C	Relative humidity (%)	Total rainfall in mm	Average wind speed of the days K.M.P.H. (Knots)
15.11.75	28.0	14.5	59	000.0	02(01)
16.11.75	28.1	15.3	60	000.0	01(01)
17.11.75	29.0	15.2	57	000.0	01(00)
18.11.75	29.4	15.8	89	000.0	01(00)
19.11.75	29.3	14.9	79	000.0	01(01)
20.11.75	28.6	14.2	56	000.0	01(01)
21.11.75	28.1	14.7	58	000.0	02(01)
22.11.75	28.3	14.2	50	000.0	03(01)
23.11.75	27.3	13.1	63	000.0	01(01)
24.11.75	28.1	14.8	65	000.0	01(01)
25.11.75	28.5	16.4	71	000.0	01(00)
26.11.75	27.8	15.5	64	000.0	01(01)
27.11.75	28.0	18.9	62	000.0	02(01)
28.11.75	24.1	18.9	60	000.1	02(01)
29.11.75	24.7	15.2	56	Trace	02(01)
30.11.75	26.6	14.1	59	000.0	03(02)

Table 14 - Photophilic behaviour of blowflies (Calliphoridae : Diptera) trapped during the peak month of November (16.11.75 to 21.11.75) in Calcutta

Sl. No.	Specimens	Total No. of specimens			Number of specimens						Percentage of specimens					
					In shade			In sunshine			In shade			In sunshine		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	<u>Chrysomya</u> <u>megacephala</u>	545	1965	2510	315	1250	1565	230	715	945	57.7	63.6	62.3	42.2	36.3	37.6
2.	<u>Chrysomya</u> <u>rufifacies</u>	221	899	1120	130	549	679	91	350	441	58.8	61.0	60.6	41.1	38.9	39.3
3.	<u>Chrysomya</u> <u>albiceps</u>	0	1	1	0	1	1	0	0	0	0	100	100	0	0	0
4.	<u>Chrysomya</u> <u>nigripes</u>	0	1	1	-	-	-	-	1	1	0	0	0	0	100	100
5.	<u>Lucilia</u> <u>cuprina</u>	4	30	34	2	20	22	2	10	12	50.0	66.6	64.7	50.0	33.3	35.2
6.	<u>Lucilia</u> <u>sericata</u>	0	1	1	0	1	1	0	0	0	0	100	100	0	0	0
7.	<u>Hemipyrellia</u> <u>ligurriens</u>	3	27	30	2	19	21	1	8	9	66.6	70.3	70.0	33.3	29.6	30.0
Total :		773	2924	3697	449	1840	2289	324	1084	1408	58.2	62.9	61.9	41.9	37.0	38.0

(i.e., 37% of total number of female blowflies) were trapped in shade and in sunshine respectively. Total number of male blowflies trapped was 773, of which 449 (i.e., 58.1% of total number of male blowflies) and 324 (i.e., 41.9% of total number of male blowflies) were trapped in shade and in sunshine respectively.

Total number of Chrysomya megacephala collected during this experiment was 2510 of which 1565 (i.e., 62.3% of total catch of Chrysomya megacephala) and 945 (i.e., 37.6% of total catch of Chrysomya megacephala) were trapped in shade and in sunshine respectively. Total number of Chrysomya rufifacies collected was 1120, of which 679 (i.e., 60.6% of total catch of Chrysomya rufifacies) and 441 (i.e., 39.3% of total catch of Chrysomya rufifacies) were trapped in shade and in sunshine respectively. Total number of Lucilia cuprina was 34, of which 22 (i.e., 64.7% of total catch of Lucilia cuprina) and 12 (i.e., 35.2% of total catch of Lucilia cuprina) were trapped in shade and in sunshine respectively. Total number of Hemipyrellia ligurriens was 30, of which 21 (i.e., 70% of total catch of Hemipyrellia ligurriens) and 9 (i.e., 30% of total catch of Hemipyrellia ligurriens) were trapped in shade and in sunshine respectively. One specimen each of Chrysomya albiceps and Lucilia sericata were collected in shade and one specimen of Chrysomya nigripes was collected in sunshine.

### DISCUSSION

Present investigation on the tendency of different blowfly species to visit baits placed in shade and in sunshine revealed that majority of blowflies showed their preference for shade (61.91%) while the rest of the blowflies (38.09%) showed heliophilic behaviour. Similar observation on the preference of shade shown by Lucilia caesar group of blowflies in Berlin was reported by Kirchberg and Bakri (1960). However, a greater preference for sunshine shown by Lucilia caesar group of blowflies in cold climate prevailing in Bromorv in Finland was recorded by Nuorteva (1963).

The heliophilic behaviour of blowflies in Finland as recorded by Nuorteva (1963) contrasts sharply with scotophilic behaviour of blowflies in the study area in Calcutta. The cause of this differences may be attributed to differences prevailing in the climatic conditions of the two places, Calcutta, West Bengal and Bromarv, Finland.

The scotophilic species in the study area were Hemipyrellia ligurriens (70.3%), Lucilia cuprina (64.7%), Chrysomya megecephala (62.3%) and Chrysomya rufifacies (60.6%). Only one female specimen of each species of Chrysomya albiceps and Lucilia sericata were trapped in shade showing their scotophilic nature. Only one female specimen of Chrysomya nigripes was trapped in sunshine, showing the heliophilic nature of this fly. The result



of the present investigation revealed that the males of blowflies were more heliophilic than the females. The result also revealed that the female blowflies were more scotophilic than the males. Scotophilic nature of female flies was closely connected with the habits of laying eggs in the shady places. Similar observation on the female blowflies in Finland was made by Nuorteva (1963).

Scotophilic habits of blowflies, in general, in the study area, has a great hygienic importance as these blowflies might be visiting human food stored in the shady places and transfer pathogenic microbes to such foodstuff.

#### SUMMARY

1. All blowflies in the study area in Calcutta excepting Chrysomya nigripes showed their preference to shade i.e., they exhibited scotophilic behaviour in the study area. Such blowflies were Hemipyrellia ligurriens, Lucilia cuprina, Chrysomya megacephala and Chrysomya rufifacies. Scotophilic behaviour was also indicated in the case of Chrysomya albiceps and Lucilia sericata which were represented by a single female specimen in each case.
2. Only one female specimen of Chrysomya nigripes occurred in sunshine, showing its heliophilic behaviour.
3. The females of blowflies were more scotophilic than the males.
4. Males were more heliophilic than the females.