

SOME EXPERIMENTS ON FLY CONTROL IN THE CENTRAL FARM, COIMBATORE

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Introduction.—Before giving an account of the various experiments tried at the Central Farm towards Fly control it may be useful to consider what flies are, and how their control is of importance.

What are flies? Flies are insects with a single pair of wings and belong to the order *Diptera*. Their mouth parts are adapted for sucking in liquid food. They pass through four stages in their life history, viz., egg, larva, pupa and adult. In the case of the common housefly, eggs are laid by the female in manure heaps, etc. After a short period of 8 to 24 hours, maggots hatch out of the eggs and feed on nutrient substances in the manure. When full fed, they pupate and in course of time, emerge as adult flies. The whole life-cycle of a fly worked out in November (1930), came to about 10 days, the egg, larval and pupal periods being 8 hours, 3 days and 6 days respectively. The total life-cycle may vary according to the different seasons.

Economic importance of flies.—Flies are of various kinds and may broadly be divided into two groups, *i.e.*, those which are beneficial and those which are injurious. Among the former may be mentioned the hover flies (Fam. *Syrphidae*), the robber flies (Fam. *Asilidae*) and the parasitic flies (Fam. *Tachinidae*), the former two being predaceous and the latter parasitic on crop pests. Among the injurious forms may be noted the crop pests, the disease carriers and those which annoy live stock and human beings by sucking their blood, or in other ways.

Among the disease carriers may be included the mosquitoes, tsetse flies, Tabanids, and house-flies. Mosquitoes, in addition to their annoying blood-sucking habits, are well known as carriers of the protozoan diseases: Malaria and Yellow Fever. Tsetse flies are the carriers of another protozoan disease in man known as *Trypanosomiasis* or sleeping sickness. Tabanids, in addition to their biting habits, are carriers of the *surra* disease in domestic animals. Germs of Typhoid, Cholera, Dysentery, Infantile diarrhoea etc., are also carried by the house fly by feeding on infected material and transferring the germs later on to human food.

Several species of flies form quite a nuisance to live stock. In this category are included several species of the house fly and other flies also of the family *Muscidae*, some of which like *Stomoxys calcitrans* are blood suckers. It is mainly against flies affecting live stock that the present trials of control methods were made on the Central Farm. A list of these flies is given below.

TABLE I

List of Flies reared, caught on live stock or trapped with baits in the Central Farm, Coimbatore.

No.	Name of fly	Family	Baited in Minnesota trap with	Reared from	Caught on	Remarks
1	<i>Musca nebul</i> , F.	Muscidæ	Mutton	Loose box	Bullock.	These flies formed the bulk of those trapped with baits.
2	<i>Musca conducens</i> , Walk.	do.	do.	do.	do.	These formed about 10 per cent of baited flies.
3	<i>Musca vicina</i> , Macq.	do.	do.	do.	do.	...
4	<i>Musca crassirostris</i> , Stein.	do.	do.	Fresh cattle dung	do.	...
5	<i>Musca spinohumera</i> , Awati.	do.	do.	do.	Buffalo.	...
6	<i>Stomoxys calcitrans</i> , L.	do.	do.	Loosebox.	do.	...
7	<i>Chrysomya megacephala</i> , F.	do.	do.	do.	do.	...
8	<i>Chrysomya ænea</i> Feb.	do.	do.	Manure pit	do.	...
9	<i>Sarcophaga</i> sp ...	Sarcophagidæ	do.	do.	do.	...
10	<i>Psychoda</i> sp. ...	Psychodidæ	do.	Fresh cattle dung	do.	...
11	Sepsid flies ...	Sepsidæ	do.	Fresh cattle dung	do.	...
12	Anthomyiid flies.	Anthomyiidæ	do.	do.	do.	...
13	<i>Culicoides kief-feri</i> , Patton.	Chironomidæ	do.	do.	Bullock.	During day time resting on pillars of byres but at night sucking blood of live stock.

Control experiments.—That the control of flies is a problem bristling with difficulties, is the experience not only in this Presidency but also in other parts of India and other countries of the world. A few of these difficulties will be noted in the course of the accounts of the various methods tried at the Central Farm.

Broadly speaking, fly nuisance to live stock may be tackled in three ways :—

- (1) By the use of repellents,
- (2) by controlling the breeding of flies and
- (3) by trapping adult flies.

The Use of Repellents.—This method, it is true, does not effect a permanent cure but it gives temporary relief to live stock.

Floors of byres in the farm were washed with Cresol in the mornings to see whether flies could thereby be prevented from settling on cattle tied therein. It was found that for an hour or so, there was some relief but after a while flies were seen in numbers as before.

A light coating of *neem* (*Melia indica*) oil was given on the forehead and round about the eyes of the bullocks, but this was also found to be of little effect.

Foreheads of bullocks where flies used to settle in large numbers, were washed with boric solution. This too had only a temporary effect and a few hours later, the fly infestation was just as bad as before. Thus the repellents so far tried, would appear to be of little use.

Checking the Breeding of Flies.—The chief places of breeding in the Central Farm are four permanent and two temporary manure pits outside the farm-yard, and two byres, one loose box and one circular pit inside the farm-yard. In the byres, there is no breeding worth taking into account, except stray cases under the feeding troughs, but in the loose box and manure pits, there is a good deal of breeding going on. This statement may easily be verified if some of the dung were raked up, when large numbers of eggs, maggots and puparia would be revealed to view. It is essential that such extensive breeding should be checked if it is desired to control the flies effectively.

Trials of a spray of crude oil emulsion on the surface of the manure heaps in pits did not give very encouraging results. Besides, the use of such chemicals has the great drawback of lowering the manurial value of the dung since the fermentative activity of bacteria is thereby affected. Experiments in this direction had therefore to be given up.

Again, another difficulty cropped up in the course of these experiments. At first, it was considered that by putting up wire-gauze covers over the manure pits, flies could be prevented from breeding. But later, it was found that egg-laying took place even in the fresh dung cast by bullocks in the byres and the loose box. Actual observations have shown that egg-laying began even within half-an-hour of casting the dung. When one takes into consideration the fact that it is this dung which is later dumped into the manure pit, the futility of using wire-gauze covers as protection against egg-laying could easily be realized.

In the case of the loose box, a slight reduction in breeding was noticed when the litter and dung were well pressed in by trampling but further detailed observations are necessary before any definite statement can be made.

Trapping of Adult flies.—It is only in experiments in regard to the trapping of adult flies that some success has been achieved. Three methods of trapping were tried, viz., formalin and milk, fly paper, and the Minnesota fly trap. Of these, the last one gave the best results.

Formalin and Milk.—Formalin and milk exposed in shallow vessels, kept on the walls of byres and loose box, did not give encouraging results though it is reported that this method has been found effective in houses.

Fly paper.—Fly papers coated with a sticky mixture prepared of rosin, castor oil and jaggery were tried to trap adult flies. Twenty papers hung vertically in the byres just over the bullocks and kept exposed for six days (renewed on the fourth day) gave a total catch of 216 flies. Besides these Muscid flies, blood-sucking gnats (of the family *Chironomidae*) were also found trapped in large numbers on some nights. Apart from this fact, the catch of 216 flies for 6 days should be considered very poor indeed. Fly papers were also kept flat on the floor, but gave similarly disappointing results.

Minnesota Fly trap.—This is a trap devised by Washburn (*vide* illustration), and is about 2 feet long, one foot high and 8 inches wide. It consists of three portions, namely, a base-board with two bait pans (A), another board which carries two wedge-shaped structures having wire gauzed sides, open at the top and bottom (B), and a wire-gauze cover (30 finesse) (C) fitted over (A) and fully enclosing (B) for encaging the adult flies trapped. The trap is assembled by placing (B) over (A) and (C) over (B). Figure (D) gives the general view of the trap.

Baits are placed in the two receptacles, and flies attracted by the bait enter through the spaces between (A) and (B) and feed on the bait but later fly up through the slits on top of the roof-shaped structures (B) and are practically imprisoned inside the receptacle (C).

The following baits were used for the experiments:—Jack-fruit, (*Artocarpus integrifolia*), sugar-cane, mutton, beef and fish, of which the first two were tried in August and the last three during November and December. Contrary to expectations, the catches with the former two were very poor, the number being less than hundred per day. Much greater success was however achieved with the last three baits. It may be interesting to note that the number of flies caught increased when the baits became slightly putrefied. The maximum number caught one day rose as high as 6,081 while the average for 22 days was 1,388 per day. A table of daily catches recorded is given in Table II. The flies were killed by covering the trap with a gunny bag and fumigating it with Calcium cyanide dust. Flies could also be killed by immersing the trap in hot water.

TABLE II.

Daily catches of flies with the Minnesota trap in November-December 1930

Date	No. Caught	Bait	Remarks
Nov. '30			
16	2,404	Mutton	Bait putrefied.
17	370	Do.	do.
18	317	Do.	do.
19	65	Do.	do.
20	2,045	Beef	Putrefied.
21	463	Do.	do.
22	2,473	Do.	Putrefied.
23	653	Do.	do.
24	783	Do.	do.
25	71	Do.	Fresh beef-bait used only for three hours.
26	953	Do.	do.
27	5,863	Do.	Putrefied.
28	6,081	Beef and Fish	Flies removed thrice during the day. 677 from beef, and 3,554 plus 1,850 from fish.
29	2,402	Fish	...
30	2,452	Do.	...
Dec. '30			
1	863	Do.	...
2	504	Do.	...
3	270	Do.	...
4	718	Mutton	Putrefied. Trap used only for 6 days.
5	584	Do.	...
6	97	Do.	Poor catches due to holes in wire-gauze.
7	104	Do.	Do.

Total for 22 days : 30,535 flies.
Average per day : 1,388 "

If trapping is carried out daily throughout the year, it is hoped that there will be considerable reduction in the number of flies. The cost of making a trap is about Rs. 5, and the cost of meat or fish used as bait is about 4-6 annas per month.

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