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Housefly Breeding Intensity in Various Media During Different Seasons: A Study Around Anand Campus*

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ABSTRACT

The housefly nuisance to the newly imported Jersey heifers was considered a serious threat to their health. To keep the fly population at a tolerable level, studies were initiated on the ecology, breeding habits and control measures of the flies. Among the different breeding media studied, cattle manure was generally preferred permitting breeding almost throughout the year followed by city garbage and vegetable waste. On the other hand, poultry bedding and horse manure permitted breeding largely during monsoon period only. Among all the media studied, poultry bedding permitted very heavy breeding during monsoon months only indicating that it was the most nutritious and preferred medium if it remained moist. Therefore, poultry bedding should be disposed as manure during summer or winter months only and stored in dry area during monsoon to avoid fly breeding.

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INTRODUCTION

THE housefly, *Musca domestica* L. (Diptera: Muscidae) is the most widely distributed insect closely associated with man and animals all over the world. Besides causing annoyance, it carries and transmits several diseases to both man and his livestock. Though it breeds in a wide variety of media, the most attractive and preferred medium is highly uncertain. The housefly nuisance was considered very serious around the dairy barns of Anand Campus, Gujarat Agricultural University, because the newly introduced Jersey heifers had to be protected against indigenous diseases. To keep the fly population at low levels, studies were initiated on ecology, breeding habits and control measures so that the fly population in the herd can be economically and safely regulated by manipulation of breeding areas.

Although voluminous literature is available on biology and ecology of houseflies, only recent studies on their breeding preference are reviewed here. Makara (1935), Leikina (1942) and Larsen, Pfadt and Peterson (1966) found pig manure to be the most preferred medium. However, according to Mihalyi (1967), in rural areas flies breed in the dung of domestic animals while in urban areas they breed in human feces, rubbish bins and dumps etc. Kuzina (1938) from Russia noted that in case of fresh manures, 71% of flies chose horse dung, 24% pig dung and 5% cow dung. The pig dung was, however, most preferred if covered and allowed to ferment. Legner *et al.* (1973) observed a signi-

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ficantly lower emergence of *M. domestica* with increasing height of poultry manure pile wherein they bred. They suggested a minimum manure depth of 20-30 cm. for optimum fly reduction.

The work done in India is scanty as compared to other countries. Khan *et al.* (1965) studied the relative abundance of various species and found that *M. domestica nebulo* F. was the most abundant. Sehgal and Pawan Kumar (1966) investigated seasonal fluctuations of the fly population in two villages of U.P. According to them, cattle litter was the principal breeding source except during monsoon (July-September) when garbage was the most important medium. Human excrement though preferred in almost all seasons was more favoured during spring months.

MATERIALS AND METHODS

Preliminary surveys around the campus showed that the major sources for housefly breeding were cattle manure, horse manure, garbage, vegetable waste and poultry bedding. To estimate the larval population in these breeding media during different seasons, representative sites were selected and ten samples were studied from each site at weekly intervals. The sample was taken by placing 30 × 30 cm wooden frame at the observation point; and the breeding medium within this frame was scooped out to a depth at which no fly maggots were available. After spreading the sample on a paper, number of maggots at all instars was counted. During the first two weeks, exact counts were made, but later, visual judgement of number of maggots was confirmed periodically by exact counts. After recording the fly maggot count of the sample, the material was returned to the same place. In case the manure was removed for field use, further observations were made from a nearby similar site. The weekly counts thus recorded were averaged to obtain monthly housefly maggot population in these media. The climatological information was obtained from the campus observatory.

RESULTS AND DISCUSSION

The maggot counts recorded every week for each breeding site are averaged and presented in Table 1, and graphically represented in Fig. 1.

The results show that extensive breeding was observed in all the five breeding media when work was started in July, 1972. The population then declined slowly until November and remained at a rather low level until May the following year. From July onwards, population increased sharply and remained at a high level until August. Thus, in general, the larval population between July and October, 1972 and June, 1973 onwards was higher compared to the period from November to May. The work had to be abandoned after August, 1973 because of heavy rains in September. The larval population in the rainy season of 1972 was higher than that of 1973.

Statistical analysis of the maggot population in different breeding media showed that cattle manure produced signi-

TABLE 1

Monthly rainfall distribution and average number of housefly maggots per 0·09 sq m in different breeding media.

Month and year	*Rainfall (cm)*	*Average No. of housefly maggots per 0·09 sq m in different breeding media*									
		Cattle manure		*Horse manure*		*City garbage*		*Vegetable waste*		*Poultry bedding*	
1972											
July	16·76	1017·25	(3·008)*	886·90	(2·948)	480·10	(2·683)	439·90	(2·644)	2299·60	(3·362)
August	18·69	920·17	(2·964)	398·17	(2·601)	298·90	(2·478)	270·42	(2·032)	881·00	(2·945)
September	1·47	584·50	(2·768)	217·80	(2·340)	199·80	(2·303)	199·40	(2·302)	578·50	(2·763)
October	—	501·50	(2·701)	52·67	(1·720)	72·00	(1·863)	72·12	(1·864)	30·00	(1·491)
November	—	278·75	(2·448)	12·52	(1·131)	45·52	(1·665)	24·07	(1·399)	—	—
December	—	64·30	(1·815)	9·30	(1·013)	15·28	(1·212)	12·66	(1·135)	—	—
1973											
January	—	38·05	(1·592)	0·30	(0·114)	16·25	(1·237)	14·30	(1·190)	—	—
February	—	39·00	(1·602)	0·70	(0·230)	22·00	(1·362)	13·84	(1·172)	—	—
March	—	72·60	(1·867)	0·08	(0·033)	13·84	(1·172)	22·56	(1·372)	—	—
April	—	114·00	(2·061)	0·75	(0·243)	20·65	(1·336)	15·90	(1·228)	—	—
May	0·10	71·25	(1·859)	1·75	(0·439)	19·75	(1·317)	30·62	(1·500)	—	—
June	7·23	168·70	(2·230)	37·40	(1·584)	52·50	(1·728)	50·00	(1·708)	32·00	(1·519)
July	16·68	602·50	(2·781)	382·37	(2·584)	267·25	(2·428)	239·00	(2·380)	827·50	(2·918)
August	34·39	658·75	(2·819)	386·87	(2·589)	294·12	(2·470)	348·75	(2·544)	886·25	(2·948)
Treatment average	—	—	2·322	—	1·397	—	1·803	—	1·776	—	1·281

S. Em. 0·117
C.D.@5% *0·332*
C.V.% 27·83

* Figures in parenthesis are logarithmic transformation of the original data and are used for statistical analysis.

ficantly higher number of maggots compared to the other media. Differences in the number of larvae developing in city garbage, vegetable waste, horse manure and poultry bedding were not significant. The preferential order for breeding medium was *cattle manure*, city garbage, vegetable waste, horse manure and poultry bedding.

The cattle manure, vegetable waste and city garbage permitted housefly breeding at a relatively higher rate even during the dry periods of the year. On the other hand, the poultry bedding and horse manure which were quite suitable for fly breeding during monsoon period produced almost no flies during the dry periods. If the maggot counts from different breeding media are considered for monsoon months only, the poultry bedding is the most suitable medium permitting very heavy breeding. Therefore, poultry bedding should be disposed as manure during summer and winter months, and stored in dry place

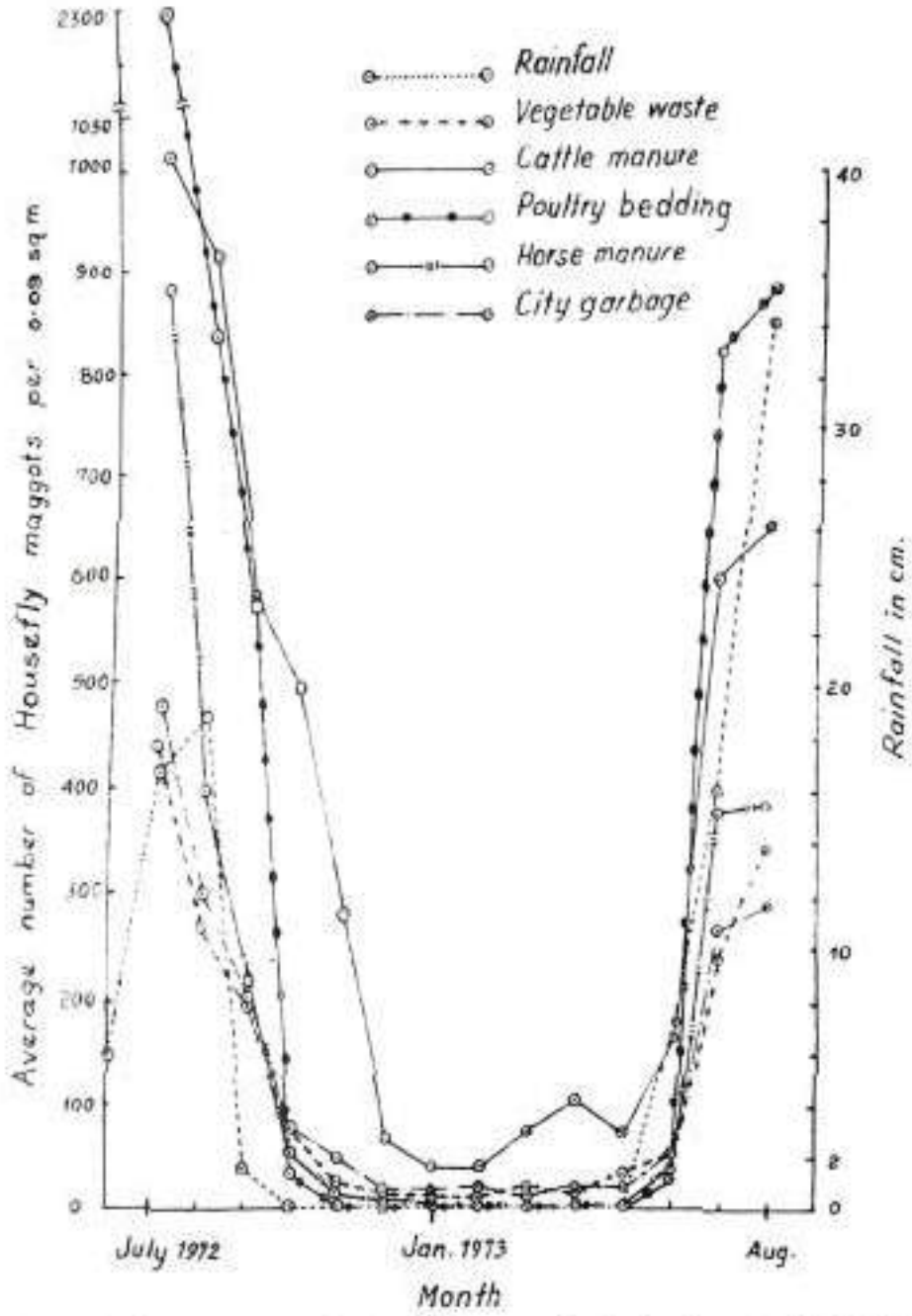


Fig. 1 : Intensity of housefly breeding in different media during the year 1972 and 1973 in relation to the rainfall.

during monsoon to avoid heavy breeding of the flies.

From the results it is clear that the period from June to September is the most favourable for housefly breeding *whereas in the remaining months, the* breeding remained at a considerably low level. This is due to the rains during June-September keep the breeding media moist and in fermenting condition to favour extensive housefly breeding. Heavy showers on the other hand, wash down the breeding media, destroy maggots and adults and are thus unfavourable *for housefly breeding.* This is evident from the results of monsoon 1973 which show low maggot population in July and August because of continuous heavy

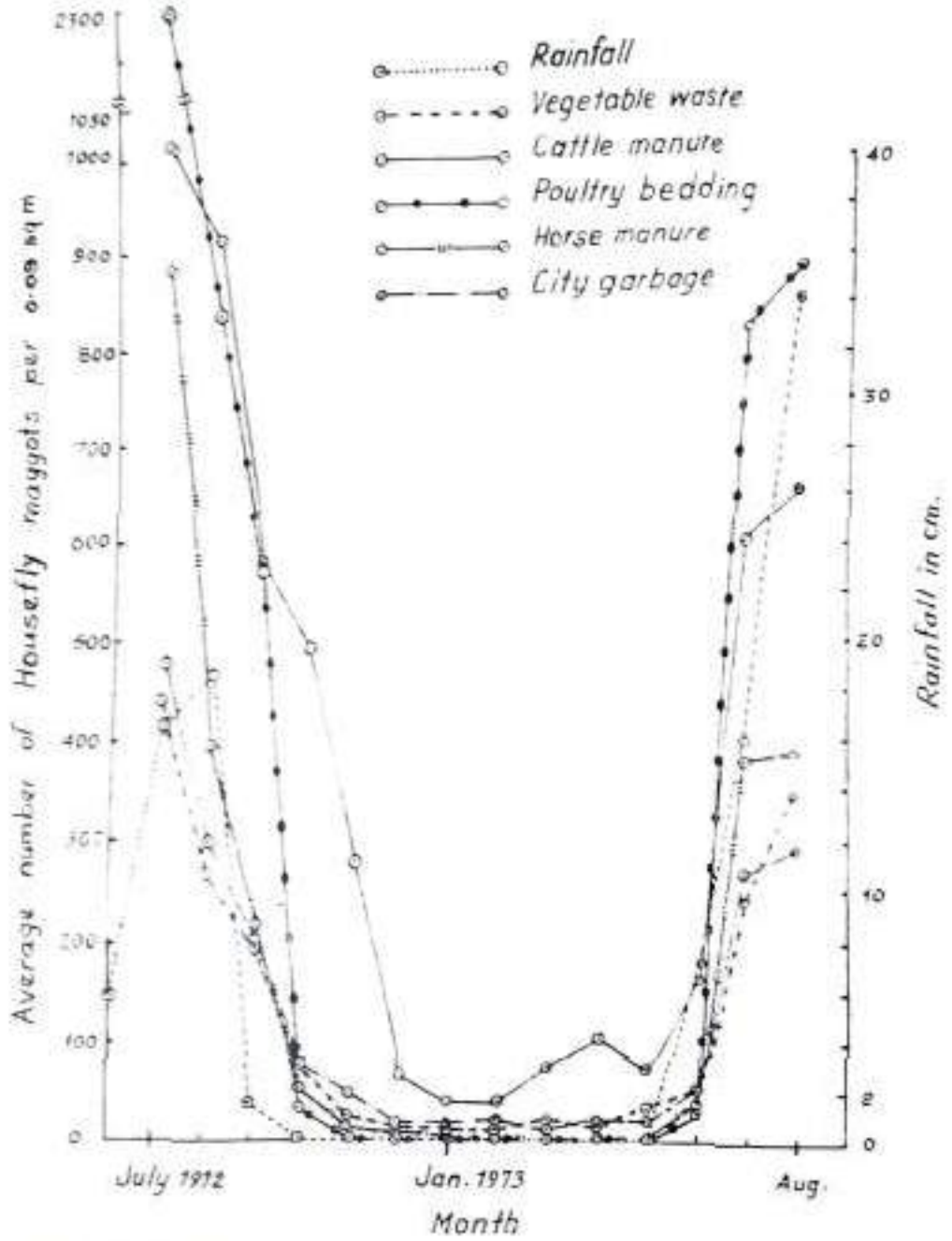


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rains (16·88 and 34·39 cm respectively). Poor fly breeding in horse manure and poultry manure during dry periods of the year was due to low moisture content in these media.

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