

Species composition and breeding sites of fly communities (Diptera) in caged-layer houses in Hungary

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ABSTRACT. This is the first dipterological survey to reveal the species composition and breeding sites of fly communities, in poultry houses in Hungary.

In July, August and October 1987, manure and feed refuse samples were taken in a caged-layer house of a co-operative farm in the outskirts of Budapest. Flies were reared from the samples in laboratory (n=9275). Among the representatives of the 15 species reared, the housefly, the primary pest in poultry houses, was found in low numbers as a consequence of predation by the larvae of Hydrotaea ignava (Harris, 1780). A larger number of Fannia canicularis L. was reared and also Stomoxys calcitrans L. was found. A drosophilid species, Drosophila repleta Woll. was reared in the highest number and studies are proposed to evaluate its veterinary importance.

The primary breeding sites in the house are in the accumulated manure and feed refuses on collecting plates beneath both ends of the upper tiers. Areas beneath and near the feed containers (outside the house) are also important breeding sites. No differences were found between the July and August samples (518 specimens of 8 spp. in 11 samples vs. 405 specimens of 14 spp. in 15 samples, the latter with some accessorial species). The samples from October (8352 specimens of 5 spp. in 13 samples) were predominated by Drosophila repleta Woll.

KEY WORDS. Diptera, filth flies, poultry, breeding sites, species composition, Hungary.

In modern production systems the accumulation of large amount of manure and microclimatic as well as feed opportunities have produced excellent conditions for the breeding of filth flies, some of which are major pests of livestock and poultry. In order to estimate their actual veterinary and economic importance and to improve control methods, the species composition and the relative abundance of the species in fly communities have to be surveyed in the different production systems. This survey can be conducted effectively through a search of their breeding sites.

In Hungary we have rather numerous data on flies developing in cattle and sheep droppings (PAPP 1971, PAPP and GARZÓ 1985; PAPP 1985), in pig manure (PAPP 1974) and in horse droppings (PAPP 1974). So far dipterological studies in poultry houses have not been carried out, although fly problems have been very acute in high density poultry systems in our country as well as all over the world (see AXTELL 1985). For example, the direct costs of fly control of poultry per year in the USA was estimated at least at \$ 40 million (ANONYMOUS 1979). The fly problem in general is most serious in caged-layer houses with accumulated manure under the cages.

The object of the present project is to reveal the species composition and breeding sites of flies in poultry houses in Hungary. The first dipterological studies were carried out in a caged-layer house.

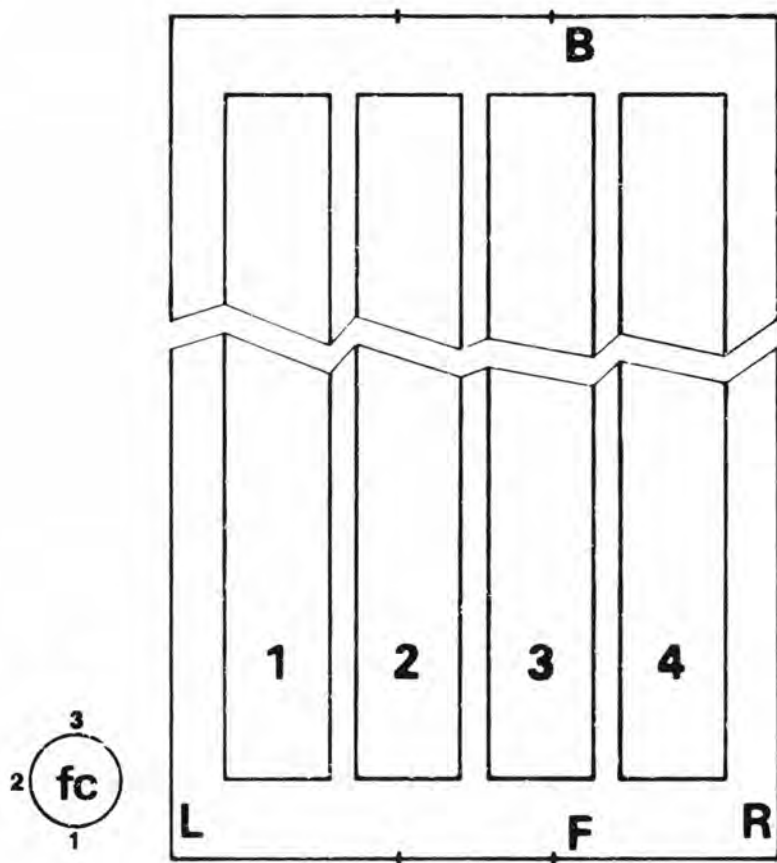


Fig. 1. A schematic ground-plan of the caged-layer house (B: back, F: front, L: left side, R: right side, 1-4: No. of the blocks of cages, fc: feed container)

Table 1

Flies reared from the July samples
(n = 11)

Name of species	Sign ^x of sample											Total number of flies
	fc1	fc3	1FR	1FL	2FL	3FR	3FL	4FR	4FL	4BR	4BL	
<i>Coboldia fuscipes</i>	-	-	13	-	-	-	-	-	-	-	-	13
<i>Drosophila repleta</i>	-	-	-	-	-	-	1	-	-	-	-	1
<i>Muscina stabulans</i>	-	-	1	-	1	2	-	-	-	-	-	4
<i>Musca domestica</i>	-	-	-	-	-	25	1	-	-	56	58	140
<i>Hydrotaea ignava</i>	3	1	-	1	1	-	-	7	29	9	4	55
<i>Stomoxys calcitrans</i>	-	-	-	-	-	1	-	1	-	-	-	2
<i>Fannia canicularis</i>	-	-	2	10	23	102	10	1	44	18	75	285
<i>Fannia leucosticta</i>	-	-	-	-	-	-	-	-	1	-	13	14
Total number of flies:	3	1	16	11	25	130	12	9	74	83	154	518

Table 2

Flies reared from the August samples
(n = 15)

Name of species	Sign ^x of sample														Total number of flies	
	fc1	fc2	fc3	1FR	1FL	1BR	1BL	2BR	2BL	2FR	2FL	3BR	3BL	4FR		4FL
<i>Coboldia fuscipes</i>	4	-	82	5	-	-	-	-	-	9	-	-	-	1	-	101
<i>Meroplius stercorarius</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Drosophila funebris</i>	-	-	-	5	3	-	-	-	-	-	-	-	-	-	1	9
<i>Drosophila repleta</i>	-	-	-	11	18	-	-	-	-	11	-	-	-	7	19	66
<i>Coproica hirtula</i>	-	-	-	-	-	30	19	-	-	-	-	-	-	-	-	49
<i>Coproica vagans</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
<i>Leptometopa latipes</i>	-	-	-	-	-	10	-	-	-	-	-	1	-	-	-	11
<i>Muscina stabulans</i>	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2
<i>Musca domestica</i>	-	-	-	-	-	-	-	1	-	-	1	4	33	-	-	39
<i>Hydrotaea ignava</i>	38	-	-	-	-	-	-	-	-	-	-	9	-	-	-	47
<i>Stomoxys calcitrans</i>	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	2
<i>Fannia canicularis</i>	-	-	-	2	-	-	1	-	2	1	2	1	64	2	-	75
<i>Fannia leucosticta</i>	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Hylemya sp.</i>	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Total number of flies:	42	2	83	23	21	40	20	1	2	12	13	2	79	45	20	405

Table 3

Flies reared from the October samples
(n = 12)

Name of species	Sign ^x of sample												Total number of flies
	1FR	1FL	1BL	1BR	2BR	3BR	3BL	3BL	4FR	4FL	4BR	4BL	
<i>Psychoda alternata</i>	-	-	-	-	-	-	-	-	24	-	-	-	24
<i>Coboldia fuscipes</i>	-	-	-	-	-	-	-	-	2	-	-	-	2
<i>Drosophila funebris</i>	-	28	9	-	-	-	-	-	2	-	-	-	39
<i>Drosophila repleta</i>	9	699	218	230	677	501	1063	170	335	2752	10	1584	8248
<i>Fannia canicularis</i>	-	10	5	2	-	-	3	-	11	6	-	2	39
Total number of flies:	9	737	232	232	677	501	1066	170	374	2758	10	1586	8352

x = See Fig. 1

MATERIALS AND METHODS

We monitored the fly breeding sites of a caged-layer house of a co-operative farm (Rákos-mezeje MGTSz, Budapest) inside and under the feed container outside (Fig. 1). Samples were taken three times, in July, August and October 1987. The house is fully closed and it contained about 25 000 layers kept in wire-cages. The manure and feed refuses accumulated on collecting plates beneath the cages, which were daily cleaned by tractor-mounted scrapers. Manure samples including feed refuses were collected from those areas where fly larvae could be seen. Samples (cca 200 g each) were kept in laboratory at $27 \pm 3^\circ\text{C}$ and wetted if needed. The emerged imagoes were identified and counted.

RESULTS AND DISCUSSION

In the course of our study aimed to mapping the breeding sites of dipterous larvae a lot of places with developing larvae were found, despite daily removal of manure. The primary breeding sites were on collecting plates under both ends of the upper tiers. On these areas huge amount of manure and feed refuses were accumulated by the scrapers which cannot reach and clean these parts of the plates satisfactorily. All the feed refuses under the feed container outside the house were also found to be important fly breeding sites.

Table 4 Flies emerging from manure samples of a caged-layer house (Budapest, 1987)

Species	Date of sampling			Number of flies
	July	August	October	
<i>Psychoda alternata</i> Say, 1824	-	-	24	24
<i>Coboldia fuscipes</i> (Meigen, 1830)	13	101	2	116
<i>Meroplius stercorarius</i> (Rob.-Desv., 1830)	-	1	-	1
<i>Drosophila funebris</i> (Fabricius, 1787)	-	9	39	48
* <i>Drosophila repleta</i> Wollaston, 1858	1	66	8248	8315
<i>Coproica hirtula</i> (Rondani, 1880)	-	49	-	49
<i>Coproica vagans</i> (Haliday, 1833)	-	1	-	1
<i>Leptometopa latipes</i> (Meigen, 1830)	-	11	-	11
* <i>Muscina stabulans</i> (Fallén, 1817)	8	2	-	10
* <i>Musca domestica</i> Linnaeus, 1758	140	39	-	179
* <i>Hydrotaea ignava</i> (Harris, 1780)	55	47	-	102
* <i>Stomoxys calcitrans</i> (Linnaeus, 1758)	2	2	-	4
* <i>Fannia canicularis</i> (Linnaeus, 1761)	285	75	39	399
<i>Fannia leucosticta</i> (Meigen, 1838)	14	1	-	15
<i>Hylemya</i> sp.	-	1	-	1

Number of flies:	518	405	8352	9275
Number of samples:	11	15	12	38

*Of veterinary importance

Data of the developed flies are summarized in Tables 1-4. Every sample was positive for flies. The number of flies emerging from one sample was between 1 and 1586. Altogether 9275 fly specimens belonging to 15 species (of nine dipterous families) were reared (Table 4). More than 500 specimens (518 ex.) of eight species emerged from the July samples (Table 1). The common housefly, *Musca domestica* L. and the lesser housefly, *Fannia canicularis* L. were dominant there. The black garbage fly, *Hydrotaea ignava* (Harris) emerged from eight of the eleven samples (this species is well known by its formerly used name, *Ophyra leucostoma* Wied.). The results of the August samples (Table 2) do not show any essential difference from the earlier data (cf. Table 1): 405 specimens of 14 species emerged; some of them are accessorial species. More than 8 000 imagoes of five species were reared from the October samples (Table 3), which were characterized by a predominance of the drosophilid species, *Drosophila repleta* Woll. (8248 ex. of the total of 8352).

Among the representatives of the 15 species reared there were at least three species of veterinary importance (*Musca domestica*, *Fannia canicularis* and *Stomoxys calcitrans*). The housefly which has been regarded as the primary pest in poultry houses (AXTELL 1985) was found in comparatively low numbers as a consequence of the predatory activity of *Hydrotaea ignava* larvae. It is well known that the larvae of this species are aggressive killers of housefly larvae (see e.g. ANDERSON and POORBAUGH 1964). However, their killing effect was not obviously detectable against *Fannia canicularis*. Some specimens of the stable fly, *Stomoxys calcitrans* were also reared whose ancestors had flown into the house from the nearby cattle farm. A drosophilid species, *Drosophila repleta* emerged in the highest number. Our visual observations confirmed that the small imagoes of this species are the most numerous ones but we have not known anything about its veterinary importance. All the other species occurred in smaller numbers and more irregularly in samples (see e.g. data for *Muscina stabulans*).

This is the first dipterological survey in poultry houses in Hungary. We plan to extend the studies to other places and to other types of poultry housing, as well as to study *Drosophila repleta* in order to assess its veterinary importance.

FARKAS R. és PAPP L.: Ketreces tojóházak légyegyütteseinek (Diptera) fajösszetétele és tenyészhelyei

A szerzők hazánkban először kezdtek vizsgálatokat a nagyüzemi baromftartás különféle istállótipusaiban fejlődő legyek faji összetételének és lárvák tenyészhelyeinek feltárására. Elsőként egy budapesti külterületi gazdaság ketreces tojóházában vettek mintákat.

1987. júliusában, augusztusában és októberében trágya- és takarmánymaradék mintákat gyűjtöttek, amelyekből a légyimágókat (össz.: 9275 egyed) laboratóriumban nevelték ki. A tojóházban a legfontosabb tenyészhelyek a trágyagyűjtő lemezek azon részein voltak (a felső ketreccsor mindkét végén), amelyeket a trágyalevonó lapátok nem értek el és így ott pangó anyag maradt. A tojóházon kívül álló takarmánytartály alatt és környékén kiszórt takarmánymaradványok ugyancsak elsőrendűen fontos tenyészhelyek. Nem találtak lényeges különbséget a július eleji (11 minta, 8 faj 518 egyede) és az augusztus végi (15 minta, 14 faj 405 egyede) minták között; utóbbiakból néhány járulékos faj egyedei is kelttek. Az októberi mintákra (13 minta, 5 faj 8352 egyede) a *Drosophila repleta* dominanciája jellemző.

A 15 kinevelt faj közül a baromfiistállók legfontosabb faja, a házilégy viszonylag alacsony számban kel, mert lárváit a Hydrotaea ignava ragadozó lárvái jelentős részben elpusztították. A Fannia canicularis-t nagyobb számban találták. Néhány szaronyos istállólegyet (Stomoxys calcitrans) is kineveltek. A tojóházban nyár végétől a Drosophila repleta a domináns légyfaj; e faj állatorvosi jelentőségének vizsgálatát tervezik.

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