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Flies (Diptera) on and in pasture dung in Hungary: a further contribution*

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Flies (Diptera) on and in pasture dung in Hungary: a further contribution. – Flies were collected on the bodies of cattle and sheep and on pasture dung of cattle, sheep, horse and red deer in Hungary; imagoes were reared from cattle and sheep dung samples. The results are summarized in three tables (altogether 8,815 specimens). It was found that regular sprayings on cattle did not change the basic ratios in the dominant dipterous populations (*Haematobia* spp. to *Musca autumnalis*) in two cattle farms in C Hungary. Two species of the ceratopogonid genus *Culicoides* (transmitters of viral diseases), a species of the genus *Limonia*, the drosophilid species *Scaptomyza pallida* and several other interesting species were reared from September cow pat samples in Hungary for the first time. A comparison of the species composition of the dipterous assemblages on sheep dung with those on dung of other hoofers does not indicate any significant difference, e.g. any species on red deer dung may occur on sheep dung in Hungary.

Introduction

The present author has investigated the dipterous species breeding in dung on pastures for more than 20 years. All that work was originally prompted to amass production data and ecological data on flies breeding in cattle pats; later it was widened to the species composition and breeding sites of the flies in stables and other animal houses, and to the species of veterinary importance. Thousands of data on hundred-thousands of dipterous specimens were resulted but they were – with few exceptions – improper for statistical or quantitative ecological approach/analysis. In the last years I was to move into this direction of research.

The scientific cognition of the flies breeding in sheep dung forms a separate problem. Sheep is an animal species alien to all landscapes of the present Hungary; it was introduced into the Carpathian Basin only seven thousand years ago. The fly populations found on and breeding in sheep dung on pastures are recruited from the flies breeding in cattle pats and dung of cervid games (Papp 1985). A project was launched here in 1982 to study the interactions of flies and dung beetles in dry sheep pastures (Papp and Ádám 1986), which resulted in a good bunch of important data but that pioneer work was not accomplished. It seemed necessary to collect more data on the species composition of the flies on sheep dung in all parts of Hungary. Indeed, some collectings had been made and results of those collectings were used when an ecological project including the flies and beetles on sheep dung was planned and launched (a project of the National Scientific Research Fund (OTKA) No. 3188), however, these new data have not been published.

Results on the flies breeding in dung pats of pastured cattle are significant indeed but ecological knowledge on the individual species is adequate for the most important species only and as a whole do not form a satisfactory basis for planning reasonable control measures against

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fly pests of cattle in most of the European countries (see Papp and Garzó 1985). In addition, there is an evident demand for those kinds of methods which measure the effect of chemical control at least semi-quantitatively; these methods must be suitable to detect the change in the abundance of flies quickly and on a simple way. A wide variety of methods were proposed for this purpose: sweep netting with a fixed number of sweeps (though some people regarded it as a rather subjective method), several types of mechanical traps, Malaise-, Manitoba- or Skufin-traps unbaited or baited with CO_2 or other odours. Two of those methods were applied in a cattle farm at Izsák.

Data published in this paper are supplementary to the former studies in Hungary (consequently they are not to be interpreted properly without former publications), on the other hand, they serve as basis for ecological studies of higher level.

Materials and Methods

Imagos were collected in two cattle farms in the outskirts of Izsák at Balázs-puszta and at Mózes-major by sweep netting and by a Malaise trap on the 8th of May and on the 20th of June, 1984 (see Table 1); similar collectings were made in a sheep farm at Polgár in 1982. Cattle pat samples for rearing flies were collected on the 20th of June (8 samples) and on the 25th of September, 1984 (9 samples) (see Table 2). The Malaise trap was set up next to the stock-yard for three hours and in the meantime flies were netted from the posts and sides of the stock-yard by 100 sweeps each at 10:30 and 11:30 a.m.

Imagos were collected on fresh sheep dung and on more or less fresh dung of red deer by covering the droppings with a sweeping net. The flies crawled up into the net and were drifted to its tip by some quick sweeps. Several droppings per sampling site were so covered.

Rearing was made after the method of Mihályi (1965) in a laboratory at air temperature of 24±1 °C.

The voucher specimens are deposited in the collection of the Zoological Department, Hungarian Natural History Museum, Budapest.

Results and Discussion

Data of flies captured and reared are summarized in Tables 1-3.

Results on flies netted and trapped in cattle farms (Table 1, altogether for 2,633 specimens) show that 100 net sweeps are not enough to yield result in comparable numbers of imagos, or to have collected representatives of all the species present in the stock-yard. The Jaccard index (species identity) of the two samples is 6/12 = 0.5, however at least for the two dominant species (*Musca autumnalis, Haematobia irritans*) it gave similar results. The Malaise-trap catches specimens of the dipterous species of veterinary importance but these numbers are much deformed: the ratio of the deer flies is much higher than their true ratio on bodies of cattle and at the same time far less specimens of *Musca autumnalis* and *Haematobia irritans* were captured rather than necessary for a suitable method for evaluating the change in numbers of the population in question (e.g. for measuring the effect of a chemical control measure). In addition, Malaise trap catches so numerous other insects which is inconvenient for the original purpose. This limited number of data does not support the use of Malaise traps in evaluating chemical control of the pests of cattle.

A paired comparison of samples 1 and 2, and 3 and 4, respectively show that imagos of *Musca autumnalis* are far more abundant in the surroundings of cattle than on the bodies of cattle (cf. Papp and Garzó 1985). The ratio in the number of the imagos of *Haematobia spp.* to those of *Musca autumnalis* is 61.5 in sample 1, 48.0 in sample 2. These ratios were found

in cattle populations where regular sprayings were applied against dipterous pests; i.e. sprayings did not change the basic ratios in the dominant dipterous populations (cf. Papp and Garzó 1985). As it is well known those sprayings kill all specimens of *Haematobia* since almost all imagos at a given time are present on the bodies of cattle. At the same time only those specimens of *Musca autumnalis* are killed which are actually on the bodies of cattle, which is a minute ratio of the whole population of that species (i.e. 0.1-0.2 % plus those specimens which land on cattle while the compound is still in a quantity enough to kill them).

A surprisingly high number of *Musca autumnalis* and a good number of *Musca tempestiva* were collected on the bodies of sheep at Polgár. It is possible that those specimens are from the pastures of cattle (rather distant from this sheep pasture) but it seems likely that at least a part of those specimens emerged from sheep dung on their pasture.

Flies reared from samples of cow pats (Table 2) are interesting indeed, particularly so for the species emerged from the September samples (Table 2). Though the number of specimens are lower than in the summer samples owing to the cool and rainy weather in September. It seems most remarkable that specimens of two species of the ceratopononid genus *Culicoides* were reared from cow pats for the first time in Hungary (as Nibaruta (1982) did it in Belgium), which are very important from a point of view of the veterinary science as they are transmitting viral diseases. It is worth mentioning that a species of the limoniid genus *Limonia* was reared from cow pats (cf. Nibaruta 1982) as well as one specimen of the drosophilid species *Scaptomyza pallida* (Zetterstedt, 1847); it was made for the first time.

An analysis of the flies emerged from eight cow-pat samples collected on the 20th of June at Mózes-major is rather illuminating from a special point of view. It is well known that females of *Musca autumnalis* lay eggs rather unevenly on cow-pats (cf. e.g. Papp 1971) as for space and time. If weather is unsuitable females do not lay any eggs and since fresh cow pats lose most of their odours attractive for *Musca autumnalis* females during one day (and night), one day later a given cow-pat is far less attractive for them than the fresh ones. Our samples represent such a situation. There were only 3 specimens of *M. autumnalis* among the 3,500 specimens of flies reared, contrarily to the fact that the abundance of this species is 10 to 15 % among the flies emerge from cow pats in Hungary in the summer months. The results of rearing can be regarded as results of an unplanned „natural trial" for the situation when *Musca autumnalis,* whose larvae play the most important role in the rapid decomposition of cow pats on pastures in summer, would be exterminated.

A train of thoughts to evaluate these results may be the following: The semiliquid substances of high nitrogen content of the cow pats, which are cementing the undigested macroscopic grass particles when dried, can pass more or less completely through the guts of dipterous larvae (and thus disintegrating them) if the amount of larvae developing there is about 5 per cent of the weight of cow pat (measured in dry weights, see Papp 1971). We found formerly that the activity of about one-fourth to one-third of that amount of larvae (i.e. a ratio of 1.25 to 1.7 %) is required to a rapid disintegration of cow pats on pastures in the summer months. According to our estimate (based on the papers of Papp (1971, 1976) and of Papp and Garzó (1985) only the production value of the sample No. 1 is high enough to this requirement (1.40 %), and, production values of two other samples (Nos 2 and 6) approximate that value (0.89 %, 0.86 %, see Table 2). For the moment we can propose only a carefully planned and precisely realized series of experiments in order to know more on the parallel ways of decomposition. A hypothesis that in lack of the larvae of *Musca autumnalis* the larval populations of the other obligate coprophagous species are able to take over the role of the *M. autumnalis* larva is to be tested and should not to be rejected (cf. Papp and Garzó 1985).

The species composition of the dipterous assemblages on sheep dung does not seem less rich than that of the flies on other dung (Table 3). Although no species was found which was not included in Papp's (1992) table for dipterous species developing in pasture dung in Hungary, it is important to have data from localities very much different from those dry

pastures which were formerly sampled. As it was experienced in very dry sites like localities in Afghanistan that not only coprophagous species are collectible on dung but all those flies which are attracted by the higher humidity on or just beside dung (e.g. sample 8). A comparison of the species composition of the dipterous assemblages with those on dung of other hoofers does not indicate any significant difference, i.e. any species on red deer dung may occur on sheep dung. It is probable that only the assemblages on horse dung contain species which develop *mainly though not exclusively* in horse dung. Samples of these sizes (with these numbers of specimens) are not large enough to represent more than the dominant-subdominant species of the assemblages *and* representatives of some rare species *randomly*. This is why the differences are seemingly so large between the samples.

Table 1. Flies netted and trapped in cattle and sheep farms (Izsák, 1984 and Polgár, 1982)

Samples: **1**: Balázs-puszta, netted from backs of cows, 8 May; **2-5**: Mózes-major, 20 June: **2**: netted from backs and sides of heifers; **3**: 100 net sweeps on posts of the stock-yard; **4**: same, other 100 net sweeps; **5**: Malaise trap beside stock-yard, 9:20 to 12:20; **6**: Polgár, netted from backs of sheep in paddock, 14 July; **7**: Polgár, netted in sheep-paddock and on its outer posts, a flock with heavy myiasis, 14 July

samples	cattle farm					sheep farm	
species	1	2	3	4	5	6	7
Cecidomyiidae indet.	–	1	–	–	10	–	–
Sciaridae indet.	–	3	–	–	50	–	–
Chironomidae indet.	–	20	–	16	–	–	
Aedes sp.	–	–	–	–	1	–	–
Coboldia fuscipes	–	4	–	1	1	–	2
Psychoda alternata	–	1	–	–	–	–	–
Haematopota pluvialis	–	3	3	1	24	–	–
Tabanus bovinus	–	2	–	–	–	–	–
Tabanus bromius	–	2	–	–	2	–	–
Syritta pipiens	–	1	–	–	–	–	–
Saltella nigripes	–	1	–	–	1	–	–
Saltella sphondylii	–	–	–	–	1	–	–
Sepsis fulgens	–	1	–	–	8	–	–
Sepsis thorarica	–	–	–	–	2	–	–
Sphaerocera curvipes	–	–	1	–	–	–	–
Coproica ferruginata	–	6	–	1	3	–	29
Coproica hirticula	–	1	–	–	–	–	–
Coproica hirtula	–	2	–	–	–	–	–
Coproica vagans	–	28	11	1	1	–	8
Scatella stagnalis	–	–	–	–	–	–	1
Platystoma lugubre	–	5	–	–	–	–	–
Physiphora demandata	–	–	–	2	2	–	–
Meoneura flavifacies	–	1	–	–	–	–	–
Paregle cinerella	–	–	1	1	8	–	–
Neomyia cornicina	–	–	–	1	1	–	–
Hydrotaea armipes	–	1	–	3	–	–	–
Hydrotaea glabricula	–	4	–	–	–	–	–

samples	cattle farm					sheep farm	
species	1	2	3	4	5	6	7
Hydrotaea pilipes	–	–	–	1	–	–	–
Musca autumnalis	13	15	81	56	4	76	–
Musca domestica	–	1	–	4	–	–	268
Musca osiris	–	2	7	3	5	–	–
Musca tempestiva	–	–	–	2	1	3	–
Morellia simplex	–	–	1	–	–	–	–
Muscina stabulans	–	–	–	–	–	–	6
Helina depuncta	–	–	1	–	1	–	–
Stomoxys calcitrans	–	–	1	–	–	–	–
Haematobosca atripalpis	–	–	–	–	–	–	1
Haematobia irritans	768	704	81	69	6	1	–
Haematobia titillans	37	27	–	–	2	–	–
Phormia regina	–	–	–	–	–	–	1
Parasarcophaga similis	–	–	–	–	–	1	1
Wohlfahrtia magnifica	–	–	–	–	–	–	10
Diptera total	818	845	188	146	228	81	327

Flies omitted from Table: **2**: *Halidayina spinipennis* 4, *Elachisoma aterrimum* 1, *Elachisoma pilosum* 2, *Opalimosina mirabilis* 1, *Minilimosina albinervis* 1. **5**: Mycetophilidae indet. 1, *Ectaetia clavipes* 1, Hybotidae indet. (5 spp) 15, Dolichopodidae indet. (3 spp) 6, Syrphidae indet. (2 spp) 4, Phoridae indet. (2 spp) 2, *Solva marginata* 2, *Chloromyia formosa* 5, *Lotophila atra* 1, *Trixoscelis marginella* 1, Agromyzidae indet (3 spp) 3, Chloropidae indet. (2 spp) 2, *Anthomyia pluvialis* 2, Coenosiinae indet (3 spp) 31, Rhinophoridae indet. 1, Tachinidae indet. (2 spp) 2; other insect orders: Psocoptera 3, Hemiptera 14, Homoptera 4, Sternorhyncha 34, Coleoptera 8, Rhaphidioptera 1, Hymenoptera 86, altogether 150 insects other than flies.

Table 2. Flies emerged from cow pat samples, Izsák, Hungary, 1984.

species	Pasture at Mózes-major, 10.06.								Pasture at Balázs-puszta, 25.09.								
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9
Sylvicola fenestralis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Cecidomyiidae indet.	–	8	–	–	–	–	–	1	–	–	2	–	–	–	–	–	–
Sciaridae indet.	–	12	–	–	1	–	–	2	–	–	–	2	–	–	–	–	–
Swammerdamella brevicornis	–	6	–	–	–	–	–	–	–	12	–	–	–	–	–	–	1
Psychodidae indet.	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–
Chironomidae indet.	–	18	–	–	–	–	–	–	–	4	30	–	1	3	–	2	11
Culicoides sp. 1.	–	–	–	–	–	–	–	–	–	31	–	–	–	–	–	–	–
Culicoides sp. 2.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	8
Limonia sp.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–
Chloromyia formosa	–	–	–	–	–	–	–	–	–	–	16	–	–	–	–	–	–
Crossopalpus nigritella	–	–	–	–	1	–	–	1	–	2	–	–	–	–	–	–	–
Saltella nigripes	–	–	–	–	8	–	–	–	–	–	–	–	–	–	–	–	–
Saltella sphondylii	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–
Sepsis biflexuosa	737	379	–	139	105	188	74	55	–	–	–	–	2	–	–	–	–
Sepsis cynipsea	–	–	–	–	11	–	–	–	–	–	–	–	–	–	–	–	–
Sepsis fulgens	12	–	–	–	13	–	12	–	–	–	–	–	–	–	2	–	–
Sepsis orthocnemis	4	–	19	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sepsis duplicata (=pilipes)	–	24	–	–	–	–	–	13	–	–	–	–	–	–	–	–	–
Sepsis thoracica	202	108	103	71	89	305	34	110	1	24	2	25	–	9	7	–	3
Lotobia pallidiventris	–	3	–	–	1	–	–	12	2	10	–	–	4	–	–	–	–
Coproica lugubris	4	58	10	–	38	22	–	134	–	11	–	–	–	8	–	–	–
Spelobia clunipes	–	–	–	–	–	–	–	2	–	–	2	–	2	–	5	4	–
Telomerina pseudoleucoptera	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–
Scaptomyza pallida	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–
Scathophaga stercoraria	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Paregle cinerella	53	1	115	58	93	79	12	–	–	–	–	2	–	–	–	–	–
Neomyia cornicina	–	–	–	–	–	–	–	–	3	6	3	–	–	–	–	–	–
Musca autumnalis	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–
Hydrotaea armipes	–	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hydrotaea glabricula	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hebecnema umbratica	–	2	–	–	–	–	–	3	9	6	2	–	–	–	1	1	2
Myospila meditabunda	–	–	–	–	–	–	1	–	–	–	–	–	–	2	1	1	–
Morellia hortorum	–	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Haematobia irritans	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Muscidae indet. pupae	1	–	1	–	2	–	–	10	–	–	–	–	–	–	–	–	–
Diptera total	1014	637	250	268	367	594	133	345	16	106	58	29	9	23	16	8	27
Hymenoptera:	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Leptopilina spp.	45	16	5	25	24	10	30	4	–	3	1	4	–	–	–	–	–
Braconidae indet.	3	–	22	1	5	–	1	1	–	4	2	2	–	–	–	–	–
Proctotrupidae indet.	–	3	–	–	2	–	1	–	1	–	–	2	–	–	–	–	–
Total weight of larvae(g)	.842.	.536			.516												
dry weight of cow pat(g) ca.	60	60			60												
ratio (%)	1.4	89			86												

Table 3. Coprophagous flies collected on pastures in different parts of Hungary

Samples: **1**: emerged from five pieces of sheep dung, 28. 04. 1987. **2**: collected from sheep dung, 28. 04. 1987. **3**: idem, 08. 05. 1990. **4**: idem, 11. 05. 1988. **5**: idem, 11. 05. 1988. **6**: idem, 18. 05. 1989. **7**: idem, 20. 07. 1988. **8**: Almás-völgy, collected on sheep dung, 07. 05. 1990. **9**: Vörös-tó, from cow pats, 29. 04. 1987. **10**: Jósvafő, Gerge-bérc, from horse dung, 11. 05. 1988. **11**: Szögliget, collected from red deer dung, 27. 04. 1987. **12**: Nagyvisnyó, Nagymező, 850 m, from red deer dung, 09.10.1986.

	Szin,	sheep-run			Komjáti, sheep-run			Aggtelek		J.	Sz	BNP
								sh	c	h	d	d
	1	2	3	4	5	6	7	8	9	10	11	12
Cecidomyiidae indet.	13+	55	19	7	1	3	–	4/3	–	–	–	1
Sciaridae indet.	–	7	2	1	1	1	2	9/2	–	1	2	7
Chironomidae indet.	–	–	–	13	–	–	–	19/2	–	–	–	–
Megaselia sp. 1.	–	1	1	1	–	–	–	–	–	–	–	2
Megaselia sp. 2.	–	–	–	–	–	1	–	–	–	–	7	10
Phoridae indet.	–	1	–	3	2/2	3	1	7/2	–	–	–	–
Sepsis cynipsea	–	1	1	–	–	1	3	4	16	–	–	–
Sepsis fulgens	–	2	–	2	–	–	2	10	–	–	–	–
Sepsis orthocnemis	–	7	3	–	2	1	2	–	1	–	–	–
Sepsis thoracica	–	–	3	–	–	2	5	–	–	1	–	–
Sphaerocera curvipes	3	14	29	9	8	17	–	59	15	39	57	2
Ischiolepta pusilla	–	2	1	–	5	1	–	–	–	–	2	–
Ischiolepta vaporariorum	–	5	4	–	–	–	2	1	1	3	–	–
Lotobia pallidiventris	–	–	–	1	–	–	–	–	1	4	–	–
Lotophila atra	–	1	–	1	–	1	–	2	–	14	1	–
Alloborborus pallifrons	–	–	–	1	–	–	–	–	–	7	1	3
Crumomyia nigra	1	2	1	3	–	5	–	1	5	76	92	7
Norrbomia costalis	–	–	–	–	–	–	–	–	–	17	–	–
Norrbomia hispanica	–	–	–	–	–	–	–	–	–	7	–	–
Norrbomia somogyii	–	–	–	–	–	–	–	–	–	6	–	–
Norrbomia sordida	–	–	–	2	–	–	–	–	–	9	–	–
Copromyza equina	–	–	1	2	–	–	–	–	–	19	–	–
Coproica acutangula	–	1	–	1	–	–	3	1	–	2	–	–
Coproica ferruginata	–	6	10	13	1	1	–	43	–	17	10	–
Coproica hirticula	–	–	–	1	–	–	–	12	3	–	–	3
Coproica lugubris	–	72	67	59	2	19	9	5	1	173	–	26
Coproica vagans	–	12	7	9	2	6	–	68	1	73	3	2
Elachisoma aterrimum	–	8	1	–	–	1	–	29	–	3	1	–
Philocoprella italica	–	–	–	1	2	1	–	7	–	1	–	–
Halidayina spinipennis	–	–	13	12	3	7	–	24	1	61	17	–
Chaetopodella scutellaris	1	49	11	17	6	4	18	51	5	34	–	11
Spelobia clunipes	–	–	–	2	–	–	2	17	–	5	2	1
S. (Eulimosina) ochripes	–	–	1	–	–	1	–	–	–	2	5	–
Paralimosina fucata	–	–	–	–	–	1	–	–	–	–	1	2
Opalimosina mirabilis	–	1	–	1	1	–	–	1	2	13	27	–
Leptocera nigra	–	–	–	–	–	–	1	–	1	1	–	–
Meoneura flavifacies	–	–	1	–	–	1	2	2	–	–	–	–
Meoneura neglecta	–	–	–	1	–	–	–	2	–	–	–	–
Scathophaga stercoraria	3	–	7	1	1	1	–	–	1	1	–	–
Paregle cinerella	5	–	12	7	15	2	3	4	1	2	–	–
Hylemya variata	–	–	2	–	–	1	–	3	–	–	–	–
Calythea albicincta	–	–	2	2	1	–	6	2	–	–	–	–

Hydrotaea floccosa	–	–	–	1	–	–	–	2	–	–	–	–
Hydrotaea irritans	–	–	–	1	–	3	–	–	–	2	–	–
Hydrotaea sp.	–	–	1	–	–	–	1	–	–	1	1	–
Musca autumnalis	–	–	–	–	–	–	2	–	–	–	–	–
Ravinia striata	–	1	–	–	1	–	–	–	–	–	–	–
Sarcophaga moldavica	–	–	–	–	–	–	–	2	–	–	–	–
Total	26+	262	199	175	54	86	64	461	55	594	229	77
number of species	6	22	22	29	18	26	17	55	15	29	16	14

Remarks. x/x: specimens/species, +: more than preserved, J: Jósvafő, Sz: Szögliget, c: cow pats, h: horse dung, d: red deer dung.

Omitted from the Table: **2**: *Psilopa polita* 13, *Oscinella frit* 1. **8**: *Culicoides* 1, *Empididae indet.* 2+1, *Lonchoptera furcata* 1, *Pipunculidae indet.* 1, *Syrphidae indet.* 1, *Psilopa polita* 11, *Elachisoma pilosum* 17, *Coproica hirtula* 1, *Trachyopella leucoptera* 1, *Minilimosina vitripennis* 1, *Telomerina pseudoleucoptera* 3, *Meoneura minutissima* 2, *Ophiomyia sp.* 1, *Phytomyza sp.* 1, *Liriomyza sp.* 1, *Oscinella frit* 17, *Chloropidae indet.* 1+1+1+1, *Fannia sp.* 1, *Tachinidae indet.* 1.

Samples 1 to 12 altogether: 2,282 ex.

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