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Sheep Blowfly Research IV.—Field Tests with Chemically Treated Carcasses.*

By G. A. HEPBURN, Division of Entomology and M. C. A. NOLTE, Division of Chemical Services, Pretoria.

THE experiments described in this paper form part of a project which was planned to be continued later. After carrying out the following preliminary tests certain weaknesses in the method were revealed, but at the same time some facts, worthy of notice, emerged.

OBJECTS.

(*a*) To regulate the pH, if possible, of carcasses at a stage attractive to primary flies.

(*a*) To try to find a poison which would meet the above requirement and render the carcasses toxic to visiting flies and their progeny.

An account of experiments on the addition of buffering agents and other substances to minced meat bait has been given in paper III of this series, but a full discussion of the rôle played by pH was deferred to this paper for consideration. In addition the question of pH of chemically treated whole carcasses will be discussed.

METHODS.

As guinea-pig carcasses which were very uniform in size and convenient to handle in traps could readily be obtained, they were used in the tests on the chemical treatment of carrion. The fresh carcasses were opened from the oesophagus to the anus, and the test substances were dusted over the internal organs, exposed meat surfaces, tissues and the natural orifices. The pH, taken in a thigh muscle each time, was measured before, and immediately after the chemical was applied, thereafter at frequent intervals.

With the exception of experiment 6 the treated carcasses were placed in large oil drum traps. These traps are made from forty-four gallon oil drums with removable lids and bottoms. The metal lid of each has been almost completely cut out and a circular piece of cello-glass inserted to provide light for the flies. The blowflies enter the traps through eight wire mesh cones which have been inserted equidistantly around the wall of the drum. These cones are situated about fifteen inches above the base of the drum. The bait, kept in a suitable container, is placed inside the drum and

* See footnote to article I of this series.

rests on a metal lid fitted to the base. Above the bait container and a few inches below the cones a circular wire-mesh screen is attached to the inside of the drum. This prevents the trapped flies from having access to the bait and, to protect the bait from eggs or maggots falling through, a circular piece of stout paper slightly greater in area than that of the bait container, is fastened to the wire-mesh screen. The trapped flies are removed after being killed by spraying the interiors of the drums with pyrethrum oil spray.

Each treatment, as far as possible, was made in duplicate. The traps were set out in a rough circle in a paddock and they were alternated in position so that no two carcasses with the same chemical treatment were adjacent. Only in the last experiment in which four small traps were used were the traps changed in position daily. The results are shown in the following tables, Nos. 1 to 6.

The untreated carcasses (see Table 1) attracted more *L. cuprina* than the treated ones though no significant differences in total catches between the talc treatment and controls are shown. The experiment was designed to test the effect of dusting a carcass with an inert powder. Flies appear to come more readily in the first two days to untreated carcasses than to those with talc, but after that the latter seem to be as attractive.

The reasons for the low catch of the calcium carbonate may be due largely to position factors. (In this experiment the baits were not changed in position during the period of exposure.)

The pH of the thigh muscle was measured each time catches were recorded. No significant differences in values were noted and no correlation of pH with catch can be seen.

In the second experiment (see Table 2) the poisons were mixed with talc, one to three parts respectively. The amount of poison used was 0·25 per cent. of the weight of the carcass. The control carcass attracted relatively more flies of each species than the poisoned carcasses. The carcasses treated with sodium fluoride attracted fewer *L. cuprina* than the others but the data are insufficient to warrant the deduction of general conclusions.

In the third experiment ants interfered with the calcium chloracetate bait traps. The indication is that the untreated carcass attracts more flies, except perhaps *L. sericata*, than the chemically treated ones. (See Table 3.)

A comparison of the results of the fourth experiment (see Table 4) shows that sodium thiosulphate increases the catch of all species, but more particularly for *Ch. albiceps* and *Ch. marginalis*. Whereas borax shows little difference from that of the control for *Lucilia* species, it catches very few of the other species, viz., *Ch. chloropyga*, *Ch. albiceps* and *Ch. marginalis*.

In experiment five (see Table 5) the chemicals were used at a higher concentration than in the preceding ones. The carcasses treated with barium carbonate caught appreciably fewer flies than the other baits. A comparison of the results shown in Tables 4 and 5 shows that with an increase in concentration of sodium thiosulphate, the relative catches of *Lucilia* spp. by untreated and treated baits is not appreciably altered. There is actually a decrease in the total catch of *L. cuprina*, but the results show that the sodium thiosulphate-treated bait catches *L. cuprina* when the control has ceased to do so, and were the experiment prolonged, this treated bait might be found to be attractive for a longer period.

Table 1 TABLE

Treatment.	Untreated Guinea-pig Carcass (i).					Total Flies Trapped.	Untreated (ii).					Total Flies Trapped.
Age of bait in days	1	3	5	7	8	—	1	3	5	7	8	—
Flies trapped :—												
Lucilia cuprina	2	19	8	5	—	34	1	29	8	2	1	41
Lucilia sericata	1	4	2	—	—	7	—	7	8	—	—	15
Chrysomyia chloropyga	—	7	3	—	1	11	—	3	7	—	2	12
Ch. albiceps	2	57	34	7	14	114	7	88	70	16	9	190
Ch. marginalis	—	6	1	—	—	7	1	22	5	—	—	28
Musca spp	15	2,375	2,928	180	150	5,648	12	2,028	2,560	400	140	5,190
Sarcophaga spp	8	33	24	10	4	79	12	39	32	6	2	91
pH in thigh muscle	6·6	7·8	8·0	80·	8·0	—	6·6	7·2	8·0	8·0	7·9	—
pH just after treatment	6·9	—	—	—	—	—	6·9	—	—	—	—	—

Table 2 TABLE

Treatment.	Untreated Guinea-pig Carcass.					Total Flies Trapped.	Sodium Fluosilicate, 0·25 Per Cent. of Bodyweight (i).					Total Flies Trapped.
Age of bait in days	2	3	5	8	10	—	2	3	5	8	10	—
Flies trapped :—												
Lucilia cuprina	1	4	11	—	—	16	—	—	1	8	—	9
Lucilia sericata	2	3	7	—	—	12	—	—	—	2	—	2
Chrysomyia chloropyga	—	2	—	2	—	4	—	—	—	1	—	1
Ch. albiceps	11	56	42	29	1	139	—	2	15	49	1	67
Ch. marginalis	1	8	4	—	—	13	—	—	1	—	—	1
Musca spp	56	548	1,376	1,416	86	3,482	4	29	363	1,138	211	1,745
Sarcophaga spp	4	10	11	14	—	39	1	2	4	13	2	22
pH in thigh muscle	7·8	7·9	8·0	7·9	7·8	—	7·7	7·7	7·8	7·9	7·6	—
pH just after treatment	7·7	—	—	—	—	—	5·6	—	—	—	—	—

Table 3 TABLE

Treatment.	Untreated Guinea-pig Carcass.					Total Flies Trapped.	Boric Acid, 1 Per Cent. of Body Weight (i).					Total Flies Trapped.
Age of bait in days	2	4	7	9	11	—	2	4	7	9	11	—
Flies trapped :—												
Lucilia cuprina	7	5	5	1	—	18	3	1	—	—	—	4
Lucilia sericata	2	5	1	—	—	8	8	6	—	—	—	14
Ch. chloropyga	4	5	—	—	—	9	—	2	—	1	—	3
Ch. albiceps	20	104	10	—	1	135	1	66	29	2	—	98
Ch. marginalis	2	10	—	—	—	12	—	2	2	—	—	4
Musca spp	633	8,700	4,800	933	82	15,148	4	823	2,300	432	78	3,237
Sarcophaga spp	6	17	6	2	4	35	1	12	14	9	4	40
pH in thigh muscle	7·5	7·9	7·6	7·9	7·6	—	6·4	8·0	7·9	7·9	7·8	—
pH just after treatment	7·8	—	—	—	—	—	5·4	—	—	—	—	—

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TABLE 1. *(cont.)*

Talc, 1 Per Cent. of Body Weight of Guinea-pig (i).					Total Flies Trapped.	Talc, 1 Per Cent. (ii).					Total Flies Trapped.	Calcium Carbonate, 1 Per Cent. of Body Weight.					Total Flies Trapped.
1	3	5	7	8	—	1	3	5	7	8	—	1	3	5	7	8	—
—	3	5	11	—	19	—	10	14	12	1	37	1	6	8	—	—	15
—	5	2	2	—	9	1	5	2	1	—	9	—	2	1	—	—	3
—	6	1	3	—	10	—	7	6	2	—	15	—	3	3	—	—	6
—	58	0	47	1	156	—	81	61	55	—	197	2	16	30	6	2	56
—	1	1	1	—	3	—	3	4	—	—	7	—	—	1	—	—	1
—	1,765	2,928	600	120	5,413	—	2,025	2,200	600	33	4,858	22	800	800	84	12	1,718
2	26	18	16	13	75	2	37	10	20	9	78	10	15	19	4	1	49
6·7	7·9	8·0	7·9	7·8	—	6·5	7·9	8·0	8·0	8·1	—	6·4	7·6	7·6	7·8	7·7	—
7·2	—	—	—	—	—	7·3	—	—	—	—	—	6·7	—	—	—	—	—

TABLE 2. *(cont.)*

Sodium Fluosilicate, 0·25 Per Cent. of Body Weight (ii).					Total Flies Trapped.	Sodium Fluoride, 0·25 Per Cent. of Body Weight (i).					Total Flies Trapped.	Sodium Fluoride, 0·25 Per Cent. of Body Weight (ii).					Total Flies Trapped.
2	3	5	8	10	—	2	3	5	8	10	—	2	3	5	8	10	—
2	1	6	3	—	12	1	3	2	—	—	6	—	—	—	—	—	—
—	2	3	1	—	6	1	5	3	—	—	9	—	1	3	—	—	4
—	1	—	—	—	1	—	1	—	—	—	1	—	—	1	—	—	1
1	13	24	17	1	56	3	38	7	3	2	53	5	21	1	11	4	42
—	2	2	—	—	4	1	6	4	—	—	11	1	4	1	1	—	7
28	50	896	412	148	1,534	8	166	130	327	113	744	23	95	143	329	253	843
2	2	11	12	4	31	1	5	13	12	5	36	1	4	4	8	2	19
7·8	7·6	7·6	8·2	8·2	—	7·2	7·9	7·9	·78	8·0	—	7·1	7·6	7·8	8·0	8·2	—
5·6	—	—	—	—	—	7·9	—	—	—	—	—	7·9	—	—	—	—	—

TABLE 3. *(cont.)*

Boric Acid, 1 Per Cent. of Body Weight (ii).					Total Flies Trapped.	Calcium Chloracetate, 1 Per Cent. of Body Weight (i).					Total Flies Trapped.	Calcium Chloracetate, 1 Per Cent. of Body Weight (ii).					Total Flies Trapped.
2	4	7	9	11	—	2	4	7	9	11	—	2	4	7	9	11	—
7	12	—	—	—	19	1	—	—	—	—	1	—	—	1	—	—	1
3	11	—	1	—	15	2	1	—	—	—	3	—	6	—	—	—	6
—	2	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
—	69	9	4	—	82	—	4	2	—	—	6	—	9	1	—	—	10
—	4	—	—	—	4	—	—	—	—	—	—	—	1	—	—	—	1
3	3,200	800	213	36	4,252	4	34	415	11	21	485	4	234	200	1	—	439
1	23	12	6	2	44	—	1	7	1	—	9	1	6	2	—	—	9
6·0	7·9	7·7	7·6	7·5	—	5·6	6·8	7·2	6·7	7·4	—	5·7	6·5	7·6	7·5	7·5	—
5·4	—	—	—	—	—	5·6	—	—	—	—	—	5·6	—	—	—	—	—

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TABLE 4

TABLE 4.

Treatment.	Untreated Guinea-pig Carcass. (i)							Total Flies Trapped.	Untreated Carcass (ii).							Total Flies Trapped.	Sodium Borate, 1 Per Cent. (i).						
Age of bait in days	1	2	3	4	7	8	10	—	1	2	3	4	7	8	10	—	1	2	3	4	7	8	10
Flies trapped :—																							
Lucilia cuprina	4	7	10	4	7	—	9	41	1	4	5	8	5	—	—	23	1	4	6	7	4	1	1
Lucilia sericata	19	3	2	1	—	—	—	25	4	—	2	—	1	—	—	7	—	—	—	—	—	—	—
Ch. chloropyga	2	1	2	1	—	—	—	6	—	—	3	2	2	—	—	7	—	—	—	1	—	—	—
Ch. albiceps	15	19	61	29	13	1	29	167	18	21	57	34	46	—	1	177	—	2	10	4	11	—	—
Ch. marginalis	1	2	4	1	1	—	1	10	1	1	3	3	1	—	—	9	—	—	2	—	—	—	—
Musca spp.	260	927	2,360	2,100	1,400	62	67	7,176	200	577	1,200	1,240	1,300	88	62	4,667	264	278	1,043	1,100	1,800	264	164
Sarcophaga spp.	5	13	9	7	8	6	3	51	7	21	21	7	9	1	3	69	1	2	6	7	1	—	1
pH in thigh muscle	7·0	7·8	7·8	7·7	7·5	7·6	7·8	—	7·1	8·0	7·8	7·8	7·6	7·5	7·4	—	8·0	7·0	7·7	8·0	7·8	7·8	7·5
pH measured just after treatment	7·3	—	—	—	—	—	—	—	7·3	—	—	—	—	—	—	—	8·4	—	—	—	—	—	—

TABLE 4 *(cont.)*

Treatment.	Total Flies Trapped.	Sodium Borate, 1 Per Cent. (ii).							Total Flies Trapped.	Sodium Thiosulphate, 1 Per Cent. (i).							Total Flies Trapped.	Sodium Thiosulphate, 1 Per cent. (ii).							Total Flies Trapped.
Age of bait in days	—	1	2	3	4	7	8	10	—	1	2	3	4	7	8	10	—	1	2	3	4	7	8	10	—
Flies trapped :—																									
Lucilia cuprina	24	5	18	3	5	1	1	3	36	1	4	7	11	5	2	—	30	10	9	10	9	17	3	6	64
Lucilia sericata	—	20	5	5	—	—	—	—	30	1	3	5	—	7	4	—	20	10	17	5	1	12	—	1	46
Ch. chloropyga	1	—	—	—	1	—	—	—	1	—	—	—	1	6	1	—	8	1	1	2	1	11	—	—	16
Ch. albiceps	27	4	15	16	8	11	2	2	58	15	6	73	31	138	51	—	314	23	41	78	72	236	57	53	560
Ch. marginalis	2	1	1	—	—	—	—	—	2	6	2	9	9	33	1	—	60	2	6	9	16	22	5	5	65
Musca spp.	4,913	69	114	475	530	1,800	117	259	3,314	284	263	1,500	1,600	4,300	800	1,600	10,347	151	455	1,620	2,200	7,100	1,680	3,800	17,006
Sarcophaga spp.	18	3	6	5	6	5	8	15	48	4	11	13	13	25	13	27	106	3	9	16	15	17	15	27	102
pH in thigh muscle	—	7·8	7·0	7·7	7·8	7·8	7·9	7·8	—	6·5	7·4	7·8	7·8	7·6	7·6	7·4	—	6·5	7·6	7·6	7·5	7·7	7·5	7·6	—
pH measured just after treatment	—	8·4	—	—	—	—	—	—	—	7·6	—	—	—	—	—	—	—	7·6	—	—	—	—	—	—	—

TABLE 5.

Treatment.	Untreated Guinea-pig Carcass (i).					Total Flies Trapped.	Untreated Carcass (ii).					Total Flies Trapped.	Sodium Thiosulphate, 2·5 Per Cent. of Body Weight (i).					Total Flies Trapped.
Age of bait in days	2	4	6	8	11	—	2	4	6	8	11	—	2	4	6	8	11	—
Flies trapped :—																		
Lucilia cuprina	18	19	3	4	3	47	8	6	4	—	—	18	4	7	6	7	8	32
Lucilia sericata	28	7	7	3	0	45	58	16	1	1	—	76	37	40	20	7	8	112
Ch. chloropyga	—	2	1	1	—	4	—	1	—	—	—	1	—	6	6	2	2	16
Ch. albiceps	37	105	29	20	49	240	35	64	15	1	—	115	8	64	168	115	116	561
Ch. marginalis	8	8	1	—	—	17	27	—	—	—	—	27	1	5	15	18	4	43
Musca spp.	720	1,280	800	456	148	3,404	400	1,600	400	67	23	2,490	143	600	1,000	1,440	1,360	4,543
Sarcophaga spp.	16	35	22	10	6	89	20	46	13	10	—	89	9	35	34	44	53	175
pH in thigh muscle	7·7	7·9	8·0	8·0	8·0	—	7·6	8·0	7·8	7·9	7·8	—	7·3	7·9	7·9	7·8	7·6	—
pH just after treatment	7·1	—	—	—	—	—	7·4	—	—	—	—	—	6·8	—	—	—	—	—

Table 5 (cont.)

Sodium Thiosulphate, 2·5 Per Cent. of Body Weight (ii).					Total Flies Trapped.	Barium Carbonate, 3 Per Cent. of Body Weight (i).					Total Flies Trapped.	Barium Carbonate, 3 Per Cent. of Body Weight (ii).					Total Flies Trapped.
2	4	6	8	11	—	2	4	6	8	11	—	2	4	6	8	11	—
11	4	0	2	8	25	3	4	2	1	—	10	7	—	1	1	—	9
33	56	6	7	4	106	5	2	2	1	1	11	18	2	1	—	—	21
—	—	1	1	—	2	—	—	1	—	1	2	—	2	1	—	—	3
1	36	12	19	73	141	22	34	29	8	—	93	3	19	20	16	—	58
—	2	—	—	—	2	—	—	2	—	—	2	—	—	1	—	—	1
58	136	220	340	200	954	52	200	450	160	2	864	192	200	290	244	3	929
6	30	33	31	40	140	8	33	21	13	5	80	10	32	21	22	6	81
7·7	7·8	7·9	7·8	7·4	—	7·7	8·0	7·9	8·0	8·0	—	7·7	7·7	7·9	7·9	7·8	—
6·8	—	—	—	—	—	7·6	—	—	—	—	—	7·6	—	—	—	—	—

Table 6

TABL

Treatment.	Untreated Guinea-pig Carcass.				Total Flies Trapped.	Sodium Arsenate (0·5 Per Cent. of Carcass Weight), in Kaolin.								Total Flies Trapped.
Age of bait in days	1	2	3	4	—	1	2	3	4	7	10	11	15	—
Flies trapped:—														
Lucilia cuprina	1	29	34	2	66	—	1	—	—	—	—	—	—	1
Lucilia sericata	31	98	68	2	199	—	2	—	1	—	—	—	—	3
Ch. chloropyga	70	31	296	28	425	—	—	—	—	—	—	—	—	—
Ch. albiceps	17	164	520	169	870	—	—	—	—	—	—	—	—	—
Ch. marginalis	27	19	34	2	82	—	—	—	—	—	—	—	—	—
Musca spp	25	224	1,360	480	2,089	—	12	—	—	4	—	—	—	16
Sarcophaga spp	12	9	14	6	41	—	10	1	—	6	5	—	—	22
pH in thigh muscle	7·4	7·6	?	?	—	7·6	6·5	6·8	7·0	7·8	7·9	7·9	7·8	—

BLE 6.

Table 6 (cont.)

Sodium Arsenate, 0·5 Per Cent. of Weight of Carcass, plus Calcium Carbonate 3 Per Cent.									Total Flies Trapped.	Calcium Arsenate, 0·5 per Cent. of Carcass Weight.									Total Flies Trapped.
1	2	3	4	7	8	10	11	15	—	1	2	3	4	7	8	10	11	15	—
1	—	—	—	1	—	—	—	—	2	—	—	—	—	—	3	2	—	—	5
3	—	—	1	2	—	—	1	—	7	3	1	—	6	15	3	2	—	—	30
—	—	—	—	1	2	1	—	—	4	1	—	—	—	—	10	—	—	—	11
—	—	—	—	1	5	6	1	—	13	3	—	—	—	4	86	1	—	—	94
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	—	—	—	40	2	1	—	—	45	7	—	—	—	22	123	—	—	—	152
5	—	2	1	18	26	18	5	3	78	3	—	—	7	16	52	11	2	—	91
7·0	6·5	6·5	7·0	7·5	7·7	7·8	7·9	8·0	—	7·9	6·6	7·5	7·6	8·0	8·0	8·2	7·9	8·0	—

In experiment six (see Table 6) the carcasses were exposed in "Improved" blowfly traps. The carcasses were put in porcelain dishes containing sand placed inside the lower portions or bait containers of the traps. Wire cones were fitted to the entrance holes of the traps to prevent the escape of visiting flies. The majority of the flies attracted to the traps passed from the bait container to the upper screened portion of the apparatus. The flies had access to the carcasses on which they deposited their eggs.

The effect of sodium arsenite on carcasses is well known. It renders them unattractive to flies causing them to mummify. The effect of the less commonly used insecticide, sodium arsenate, was not known. It was hoped that at fairly low concentrations (0·5 per cent.) the carcasses would develop highly attractive odours to blowflies and yet be sufficiently poisonous to them and their progeny.

Here, calcium arsenate, sodium arsenate plus kaolin, and sodium arsenate plus calcium carbonate were tested, together with an untreated control. Toxicity records of this experiment show that only a few larvae of *Sarcophaga* spp. survived; many eggs of blowflies were deposited on the carcasses, but in the treated carcasses larvae died in the first or second instars while very few reached the third instar. Many flies were reared from eggs deposited on the untreated carcass.

As far as attractiveness to flies is concerned it is clearly demonstrated that the treated carcasses are not attractive. The control carcass was highly attractive for four days after which it was destroyed by maggots.

The carcass containing calcium arsenate appears to be slightly more attractive than those containing sodium arsenate. Weaker concentrations of these poisons may, perhaps, be found not to exert such an inhibitory effect on attractiveness of carrion.

A study of the pH measurements given in each table reveals no correlation with the numbers of flies trapped.

It is possible that the change in pH of decomposing meat may be related to its variation in attractiveness to primary blowflies. If that is so, and if it could be shown at what particular pH maximum attractiveness is attained, an interesting avenue is opened for exploration. With this idea in mind pH measurements were made on meat baits and on the guinea-pig carcasses described above, as well as on the sheep carcasses of the experiments described in contribution No. V of this series. An attempt at correlation of a general trend of pH change in decomposing meat with its change in attractiveness could be made by means of laboratory tests in the olfactometer, by regular catches in traps, and by observation on the carcasses. As no standardized meat bait could be evolved for cage-olfactometer tests, only the last-mentioned two methods were used. It was soon found that there is a general trend of pH change, but there is also considerable variation (except in the case of carcasses) within wide limits. There appears to be a bigger variation in pH in different localities of a carcass than between different carcasses. This confuses the issue, especially as pH measurements (carried out by means of a set of standardized indicator papers) in the same locality, appear to vary little during the period the carcass remains particularly attractive to primary blowflies. The length of this period varies considerably, depending chiefly on the average air temperature prevailing at the time. In hot summer weather the carcass would probably still attract primary flies after two or three days were it not for the activities of the maggots developing in large numbers within the carcass. They quickly push up the pH of the tissue in their vicinity to 8·0, when the strongly ammoniacal vapour produced by the action of the maggots appears to deter the flies. Results of catches in traps and in the cage-olfactometer show that meat baits [consisting of meat and water (50:50)] of pH values varying between 5·6 and 8·1 may be attractive to primary flies. Below a pH of 5·6 meat baits were usually found unattractive. The variable catches did not allow of an assessment of the degree of attractiveness at various pH-levels. The pH of a bait, therefore, is not an adequate measure of the bait's potentialities.

In view of these findings attention was turned to another aspect of the problem, i.e., buffering of meat baits. It was hoped that a few effective buffers for meat would be discovered, covering a fair range of pH. Olfactory tests with these buffered baits would then show at what pH optimum results are to be expected. Accordingly, a few chemicals were selected as possible buffers, viz., borax, disodium phosphate, calcium acetate, calcium chloracetate, sodium acetate, calcium carbonate, calcium sulphide, and sodium sulphide. These compounds were all added to a 50:50 meat-water bait, at the rate of 3 per cent. of the total weight of the bait. The baits were kept in Mason jars in a laboratory room where the temperature remained in the vicinity of 65 to 70° F. The pH determinations were made regularly on these baits for a period of fourteen days. The results indicated that borax was the most satisfactory buffer, keeping the pH at 8·2-8·3. Disodium phosphate was nearly as successful, keeping the pH at 7·5-7·7, whereas calcium carbonate was also fairly effective at buffering the bait at 7·8 to 8·0; both of these compounds could, however, not prevent an initial drop in pH in the first two days, corresponding to a similar but sharper drop in the control bait. Calcium chloracetate was very effective in buffering the bait at 5·6; it also acted as a preservative, as also did borax, thus preventing the baits from becoming very attractive.

At a later stage sodium carbonate was also employed (at 0·8 per cent.) in conjunction with other chemicals designed to produce attractive odours (e.g., cystine and phenothiazine). In this series pH measurements were also recorded regularly, and it was shown that sodium carbonate also acts as an effective buffer, at that concentration keeping the pH at 7·9 to 8·0.

This investigation could not be pursued very far, but the general conclusion appears to be that attractiveness does not depend on pH alone. The composition of the chemicals added also have an important bearing on the problem; e.g., where calcium and sodium sulphides were added to meat a pH of 12 was recorded, yet the baits were attractive. It is not clear whether here sulphur-containing gases were solely responsible for the attractiveness.

These experiments, which were only tentative, convinced us that under field conditions reliable data to which statistical methods of analysis could be applied, cannot be obtained unless several replicates are run concurrently and repeated. Certain trap positions are more favourable than others and repeated interchanging of trap positions does not eliminate this factor. By increasing the replicates in each experiment there will be a corresponding increase in the practical difficulties in handling the traps and fly catches. With a limited number of traps, therefore, the logical procedure is to reduce the number of test substances in any one experiment to two: with four replicates of each bait, including the control, twelve traps, therefore, will be required. The handling of such a number of traps, and of the fly catches entails a considerable amount of work and would virtually be a full-time proposition. As other lines of work offered more promising possibilities it was decided not to proceed with these experiments for the time being.

It was planned, therefore, to carry out olfactory tests with chemically treated carrion in the laboratory and to return later, if necessary, to field experiments.

Toxicity experiments to test the effect of poisoned carcasses on flies and blowfly larvae were planned to be done under laboratory conditions.

Conclusions.

1. The pH of opened carcasses could not be controlled satisfactorily by dusting chemicals on them; but it is also very unlikely that better results will be obtained by the use of solutions of chemicals instead of powders.

2. In view of the above finding is was not found possible to maintain the pH of carcasses at a stage attractive to flies.

3. The attractiveness of carcasses and meat baits appears to depend on a number of factors, and also on the nature of any added chemical. The pH-level alone does not appear a sufficient criterion for attractiveness.

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