EXPERIMENT TO ASSAY THE TOXICITY AND TOXICITY PERSISTENCE OF 0.05% DIELDRIN WETTABLE POWDER AND 0.05% DIELDRIN EMULSIFIABLE CONCENTRATE SPRAYED ON TO CATTLE.

A.D. Marks. April 1967

METHOD

Two matching indigenous cattle were sprayed using "Cooper Spraywell" apparatus, and allowed to dry in the sun. One animal was sprayed with 0.05% Dieldrin wettable powder and the other with 0.05% Dieldrin emulsifiable concentrate. The whole body surface of both cattle was sprayed except the head and neck. Spraying was carried out at 10.00 hours on 1st April, 1967.

Fully fed flies were caught from the cattle in the afternoons of 1st, 2nd, 3rd, 4th and 5th April, and held in 3 x 1" tubes in the insectory. The cattle were stationed well apart during the catching period, and the catch for the first quarter-of-an-hour was rejected to avoid any possibility of the flies in the samples having contacted both cattle. Control flies were caught in exactly the same manner from an untreated ox stationed away from both the treated oxen. The flies from each ox were divided into batches according to whether they had fed above or below an arbitrary line joining the wrist and ankle joints.

On 1/4 and 2/4 only female Glossina pallidipes were caught, but as the catches were so small both sexes of Glossina pallidipes and Glossina morsitans were taken on 3/4, 4/4 and 5/4.

The flies were examined in the insectary every 12 hours, up to 72 after catching and mortalities plotted. At the end of their 72 hour holding period the catches of 3/4, 4/5 and 5/4 were examined to determine sex, species, age and "pregnancy". "Pregnant" flies were those in which the horns of a larva were visible, or which had a well developed larva or puparium in the tube. Flies were classed as "teneral" if the thorax was noticeably soft when squeezed.

RESULTS

Wettable Powder

Table I shows that mortality after 72 hours was 100% (10/10) for the first day's catch, but was lower for the following days' catches. The apparent increase in toxicity on the 3rd day's catch is because the samples for the last three days included Glossina morsitans which was more susceptible than G.pallidipes. Table II shows that kills for G.pallidipes remained low for the last three days' catches. The toxicity to G.morsitans dropped from 17/20 to 14/21 to 11/21 on the last three days respectively.

Table III shows that toxicity to male G.morsitans and teneral female G.morsitans was high throughout the experiment. Teneral male and teneral female G.pallidipes were relatively susceptible but non teneral G.pallidipes showed low mortality, particularly the females. Toxicity to pregnant females of both species was very low, no deaths being recorded after holding for 72 hours.

Table I shows/.....2

Table I shows that for the last three days the kill for the "high sample" i.e. above the line joining the ankle and wrist joints, was higher than for the "low" sample. Table II, however shows that the "low" sample contained predominately G.pallidipes while the "high" sample was mostly G.morsitans.

Table IV shows the mortalities of the different species, sexes and age groups for the catches of the last three days. There is a general drop in toxicity as time increases after treatment with all classes where numbers are large enough to indicate any trend.

Emulsifiable Concentrate

Toxicity was lower than that of the wettable powder throughout the experiment, the highest kill being 15/21 on the first day's catch after 72 hours. Toxicity decreased with the time after treatment of the ox from which the sample was taken. The apparent increase in toxicity in the third day's catch is again caused by the inclusion of G.morsitans in the sample. Table II shows a low toxicity to G.pallidipes for the last three days and that toxicity to both G.pallidipes and G.morsitans progressively decreased with time over this period.

Table III indicates that toxicity to teneral male G.morsitans was high, and fairly high for male non-teneral G.morsitans and teneral female G.morsitans. Toxicity to all classes of G.pallidipes was low with the exception of teneral females where mortality was 2/2. Toxicity to non-teneral females of both species was low, with no mortality being recorded amongst those that were "pregnant".

Cattle

The cattle were light brown oxen, weighing approximately 650 lb. The oxen showed no sign of ill health during the experiment.

Rough extimates of the amount of spray adhering to the hide were made by measuring the run off and subtracting from the spray used. An estimated one gallon of insecticide was applied in each case.

30th May, 1967. AM/JvdH

		W.P.	E.C.	CONTROL
Lot I	HIGH	10/10	15/21	0/5
	LOW	N.C	4/9	0/7
DAY 2	HIGH	1/5	2/8	0/13
	LOW	N.C	1/2	0/1
DAY 3	HIGH	13/20	10/20	2/30
	LOW	11/19	7/20	0/30
DAY 4	HIGH	11/20	10/20	0/30
	LOW	7/20	4/20	0/30
DAY 5	HIGH	11/20	6/20	1/30
	LOW	3/20	1/20	0/30
TOTAL KILL		67/134	60/160	
% Mortality		50%	37.5%	

TABLE I - Fly Mortality after Holding for 72 hours.

		W.P.		E.C.		CONTROL	
		G.m.	G.p.	G.m.	G.p.	G.m.	G.p.
DAY 3	HIGH	12/15	1/5	9/17	1/3	1/7	1/23
	LOW	5/5	6/14	3/3	5/17	0/3	0/27
DAY 4	HIGH	11/17	0/3	8/19	0/1	0/6	0/24
	LOW	3/4	0/16	0/25	4/18	0/2	0/28
DAY 5	HIGH	9/16	1/3	6/15	0/2	0/0	1/30
	LOW	2/5	0/11	1/11	0/9	0/2	0/28

TABLE II Comparison of the Mortality of G.morsitans and G.pallidipes on the 3rd, 4th and 5th day after Spraying

	W.P.								E.C.								CONTROL							
	G.morsitans				G.pallidipes				G.morsitans				G.pallidipes				G.morsitans				G.pallidipes			
	M	tM	F	tF	pF	M	tM	F	tF	pF	M	tM	F	tF	pF	M	tM	F	tF	pF	M	tM	F	tF	pF
GRAND TOTAL	17	11	25	5	4	14	5	28	7	3	21	5	31	5	5	17	4	24	2	6	8	-	11	-	1	25	5	109	2	17
TOTAL DEAD	16	9	12	5	-	5	4	1	4	-	14	5	7	2	-	4	1	3	2	-	1	-	-	-	-	-	1	1	-	-
M & F DEAD	25/28		17/34			9/19		5/38			19/26		9/41			5/21		5/32			1/8		0/12			1/30		1/128		
Spp DEAD	42/62					14/57					28/67					10/53					1/20					5/158				
EC/WP/CONTROL	56/119										38/120										6/178									

TABLE III Summary of the Mortality of the Different Class of Fly for the Catches of 3rd., 4th & 5th Day after Spraying.

			W.P.						E.C.						CONTROL					
			G.morsitans			P.pallidipes			G.morsitans			G.pallidipes			G.morsitans			G.pallidipes		
			M	tM		F	tF	pF	M	tM		F	tF	pF	M	tM		F	tF	pF
DAY 3	HIGH	TOTAL	6	1		7	-	1	1	-		1	1	2	3	-		13	-	1
		DEAD	6	1		5	-	-	-	-		1	-	-	3	-		6	-	-
	LOW	TOTAL	3	-		2	-	-	7	-		4	3	-	3	-		-	-	-
		DEAD	3	-		2	-	-	3	-		-	3	-	3	-		-	-	-
DAY 4	HIGH	TOTAL	5	-		9	2	1	-	-		3	-	-	12	-		4	1	2
		DEAD	5	-		4	2	-	-	-		-	-	-	8	-		1	1	-
	LOW	TOTAL	3	-		1	-	-	4	2		10	-	-	2	-		-	-	-
		DEAD	2	-		1	-	-	2	2		-	-	-	-	-		-	-	-
DAY 5	HIGH	TOTAL	-	7		4	3	2	-	1		-	2	1	-	4		8	3	-
		DEAD	-	6		-	3	-	-	1		-	1	-	-	4		-	2	-
	LOW	TOTAL	-	3		2	-	-	2	2		10	1	-	1	1		6	1	2
		DEAD	-	2		-	-	-	-	1		-	-	-	-	1		-	-	-

DAY 3	HIGH	TOTAL	1	-		1	1	2	3	-		1	-	2	3	-		3	-	1
		DEAD	-	-		1	-	-	3	-		-	-	-	1	-		-	-	-
	LOW	TOTAL	7	-		4	3	-	3	-		7	-	9	1	-	1	-	2	-
		DEAD	3	-		-	3	-	3	-		2	-	2	1	-	-	-	-	-
DAY 4	HIGH	TOTAL	-	-		3	-	-	12	-		4	1	2	-	-		-	-	1
		DEAD	-	-		-	-	-	8	-		1	1	-	-	-		-	-	-
	LOW	TOTAL	4	2		10	-	-	2	-		-	-	-	6	2		7	1	2
		DEAD	2	2		-	-	-	-	-		-	-	-	1	1		1	1	-
DAY 5	HIGH	TOTAL	-	1		-	2	1	-	4		8	3	-	1	2		2	-	-
		DEAD	-	1		-	1	-	-	4		-	2	-	-	-		-	-	-
	LOW	TOTAL	2	2		10	1	-	1	1		6	1	2	2	-		6	-	1
		DEAD	-	1		-	-	-	-	1		-	-	-	-	-		-	-	-

DAY 3	HIGH	TOTAL	-	-		-	-	-	1	-		2	-	-	5	-		12	1	5
		DEAD	-	-		-	-	-	-	-		-	-	-	-	-		1	-	-
	LOW	TOTAL	1	-		2	-	-	1	-		1	-	-	8	-		14	1	4
		DEAD	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
DAY 4	HIGH	TOTAL	2	-		4	-	-	5	1		16	-	-						
		DEAD	-	-		-	-	-	-	-		-	-	-						
	LOW	TOTAL	1	-		1	-	-	4	-		20	-	4						
		DEAD	-	-		-	-	-	-	-		-	-	-						
DAY 5	HIGH	TOTAL	-	-		-	-	-	3	3		23	-	1						
		DEAD	-	-		-	-	-	-	1		-	-	-						
	LOW	TOTAL	1	-		1	-	-	-	1		24	-	3						
		DEAD	-	-		-	-	-	-	-		-	-	-						

TABLE IV - Summary of Mortality of Flies for Catches of Days 3, 4 and 5.