mosquito indices, mosquito infection rates, and transmission rates can be obtained concurrently.

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RESISTANCE TO DESICCATION IN SIX STRAINS OF THE *CULEX PIPIENS* COMPLEX

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INTRODUCTION. While studying the feeding preferences in six strains of the *Culex pipiens* complex (Chamberlain, Sudia and Gillett, 1959) it was noticed that mosquitoes in some of the containers survived the conditions imposed on them better than those in others. It appeared that there were differences between strains in their capacity to withstand desiccation, and two experiments were carried out to test this; the results are described below.

MATERIALS AND METHODS. Two strains of *Culex pipiens* L., and four of *C. quinquefasciatus* Say (= *C. fatigans* Wied.) were used; their places of origin and history are shown in Table 1. The mosquitoes were kept in standard 0.6 litre ice-cream cartons, both ends of which had been replaced with netting (Chamberlain *et al.*, 1959). For the survival tests the cartons were placed inside desiccators co taining 87.5 gm KOH/100 ml. H_2O These were kept at 26.5° C. and provide a relative humidity of around 32 perce (Peterson, 1959). Records of the numb of mosquitoes that had died in each ca ton were made at two-hourly intervals f 22 hours (in the first experiment thr more readings were made at 25, 27 an 32 hours respectively).

Experiment 1 was carried out in Dr. W. Chamberlain's laboratory at the Co municable Disease Center, Montgomer Alabama (31 December 1955–1 Januar 1956); Experiment 2 was carried out Professor L. E. Rozeboom's department Medical Entomology, Johns Hopkins Un versity, Baltimore, Maryland (19–20 Ja uary, 1956).

RESULTS. In Experiment 1 (Table

TABLE 1.—History of six strains of the *Culex pipiens* complex.

Species	Strain	Origin	Contributor	Colonized
pipiens	C-1	Sandy Hills, N.J.	P. P. Burbutis	1½ yrs.
"	CH	Hoboken, N.J.	P. P. Burbutis	1 yr.
quinquefasciatus	Montgomery	Montgomery, Ala.	R. W. Chamberlain	7 yrs.
"	California Colony (KMAD)	Kern Co., Calif.	R. E. Bellamy	Several yrs.
"	California Wild (REB-1)	"	R. E. Bellamy	Newly
"	Pharr	Pharr, Tex.	W. D. Sudia	"

TABLE 2.—Number of mosquitoes dying (cumulative) in six strains of the *C. pipiens* complex exposed to dry air (Experiment 1).

ain	Age (days)	No. used	Time of recording in hours													
			0	2	4	6	8	10	12	14	16	18	20	22	25	27	32
ntgomery	20	30	0	0	0	0	0	2 7%	5 17%	11 37%	16 53%	19 63%	24 80%	26 87%	28 93%	28 93%	28 93%
arr	30	30	0	0	0	0	2 7%	3 10%	7 23%	13 43%	17 57%	18 60%	20 67%	24 80%	27 90%	28 93%	29 97%
, C-1	29	30	0	0	0	1 3%	4 13%	7 23%	10 33%	16 53%	19 63%	23 77%	28 93%	29 97%	30 100%	..	..
lifornia Colony	30	30	0	0	0	0	0	0	0	0	2 7%	7 23%	12 40%	15 50%	16 53%	18 60%	23 77%
lifornia Wild	17	30	0	0	0	0	0	0	0	0	1 3%	4 13%	6 20%	8 27%	12 40%	13 43%	19 63%
, CH	30	30	0	0	0	0	0	1 3%	3 10%	3 10%	3 10%	8 27%	15 50%	18 60%	23 77%	24 80%	24 80%

TABLE 3.—Number of mosquitoes dying (cumulative) in six strains of the *C. pipiens* complex exposed to dry air (Experiment 2).

ain	Age (days)	No. used	Time of recording in hours											
			0	2	4	6	8	10	12	14	16	18	20	22
ntgomery	2–4	32	0	0	1 3%	3 9%	4 13%	4 13%	6 19%	10 31%	17 53%	21 66%	29 91%	29 91%
arr	2–4	30	0	1 3%	2 7%	9 30%	9 30%	12 40%	19 63%	25 83%	25 83%	25 83%	27 90%	27 90%
, C-1	2–4	31	0	0	4 13%	11 36%	17 55%	22 71%	26 84%	30 97%	31 100%	..	..	..
lifornia Colony	2–4	32	0	1 3%	1 3%	1 3%	2 6%	2 6%	3 9%	4 13%	7 22%	11 34%	17 53%	23 72%
lifornia Wild	2–4	32	0	0	2 6%	3 9%	3 9%	4 13%	6 19%	12 38%	16 50%	16 50%	21 66%	25 78%
, CH	2–4	31	0	0	0	0	0	1 3%	3 10%	3 10%	5 16%	6 19%	10 32%	14 45%

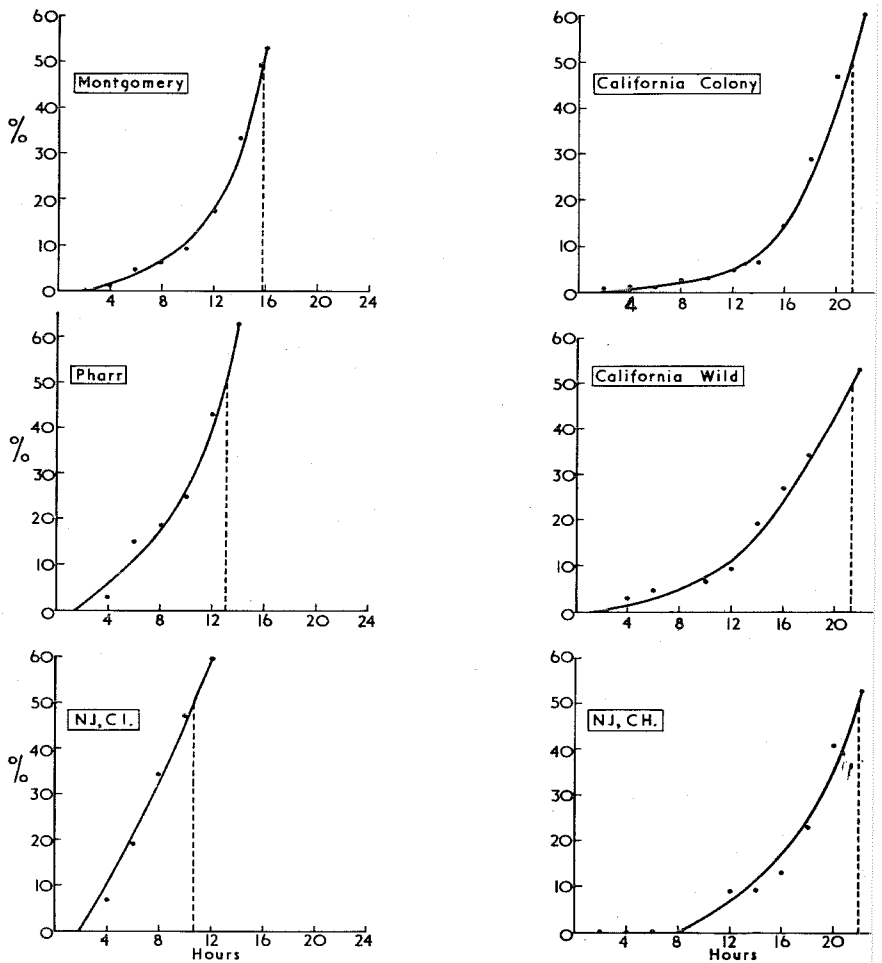

FIG. 1.—Cumulative mortality curves, showing the 50 percent end-points, in six strains of the *pipiens* complex kept in dry air at 26.5° C. (Curves fitted by eye).

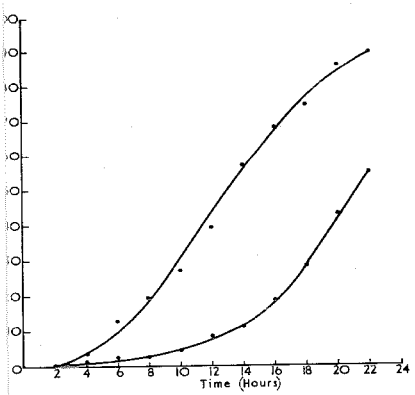

FIG. 2.—Cumulative mortality curves in two oups of three strains each of the *C. pipiens* nplex kept in dry air at 26.5° C. Curve on t—Montgomery, Pharr and New Jersey C-1; rve on right—California Colony, California ild and New Jersey CH (Curves fitted by eye).

e results fell into two groups: those with e 50 percent end-point < 16 hours Montgomery, Pharr and New Jersey C-1), d those with the 50 percent end-point 20 hours (the two Californian strains d New Jersey CH). In Experiment 2 Table 3) the results fell into two similar oups, although survival in California ild was somewhat shorter. The results the two experiments have been com- ned for each of the six strains in Figure and the difference between the two oups is clearly shown in Figure 2.

It is impossible to say at this stage hether these differences reflect adapta- ns to the natural environments of the iginal homes of these strains, or whether ey are products of laboratory rearing or erely laboratory artifacts. It is tempting relate the resistance to desiccation in e two Californian strains to the semi- sert conditions of their original home, d the similarity between the old estab- lished laboratory strain and the newly colonized 'wild' strain supports this view. Here it is important to note that the newly established Pharr strain showed very poor resistance to desiccation, and this again supports the view that these differences have a significance outside the laboratory. The most striking and consistent difference was that between the two New Jersey strains of *C. pipiens,* the anautogenous C-1 and the autogenous CH. One would like to know in what manner resistance to desiccation is associated with autogeny, and it is hoped to follow this work with some histological studies at a later date.

The writer has received help for this small-scale investigation out of all proportion to its size. He wishes to take this opportunity to acknowledge his debt to the Rockefeller Foundation, who generously provided funds by the award of a Fellowship to visit the U.S.A., and to thank those who provided the strains of mosquitoes (Table 1), and to thank Dr. R. W. Chamberlain and Professor L. E. Rozeboom for the provision of laboratory facilities, and Mr. W. C. Lewis, Topographer, Uganda Geological Survey, for drawing the graphs.

SUMMARY. 1. Resistance to desiccation has been studied in six strains of the *Culex pipiens* complex.

2. The strains can be divided into two groups: two strains of *C. quinquefasciatus* and one of *C. pipiens* that survived badly in dry air; two strains of *C. quinquefasciatus* and an autogenous strain of *C. pipiens* that survived well in dry air.

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