DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY DUGWAY PROVING GROUND
DUGWAY UT 84022-5000

April 14, 2010

REPLY TO
ATTENTION OF:

Office of the Command Judge Advocate

Mr. John Greenewald, Jr.
[redacted]

Dear Mr. Greenewald:

We previously advised that your request made under the provisions of the Freedom of Information Act (FOIA), 5 U.S.C. Section 552 was forwarded to our office as a matter under our purview. The document you requested was titled "Entomological Field Test Technology, Bellwether II, BIO 531." We advised you in a letter that the document was located in our Technical Library but that it was still classified at the Confidential level and would be withheld at that time under Exemption (b)(1) of the FOIA.

After considerable review, it has been determined that this document has been regraded to unclassified. It is now enclosed to fulfill your request.

All fees assessed to this point are less than the minimum charge.

If you have questions regarding this letter, please address them to Ms. Teresa S. Shinton, FOIA Officer, (435) 831-3333; email: teresa.shinton@us.army.mil.

Sincerely,

Teresa Shinton

for Kateni T. Leakehe
Major, U.S. Army
Command Judge Advocate

[redacted] 50302

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TECHNICAL REPORT DPGR 293

DECEMBER 1961

REGRADED ~~CONFIDENTIAL~~ on event of
~~(New Classification)~~
~~DOD 5200.1R~~
~~(Description of event)~~
~~Hazel Simon   14 Mar 74~~
~~(Signature of Classifying Authority)   (Date Signed)~~
~~(Typed name, rank, position of Classifying Authority)~~

ENTOMOLOGICAL FIELD TEST TECHNOLOGY, BELLWETHER-II, BIO 531 (U)

SHORT TITLE: BELLWETHER-II (U)

~~Regraded Unclassified~~
~~Rev Bd~~
~~H Holman   14 Dec 74~~

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U.S. ARMY
CHEMICAL CORPS RESEARCH AND DEVELOPMENT COMMAND
DUGWAY PROVING GROUND
DUGWAY, UTAH

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U. S. ARMY CHEMICAL CORPS RESEARCH AND DEVELOPMENT COMMAND
DUGWAY PROVING GROUND
Dugway, Utah

Technical Report DPGR 293

ENTOMOLOGICAL FIELD TEST TECHNOLOGY
BELLWETHER-II, BIO 531 (U)

Short Title: BELLWETHER-II

December 1961

Biological Branch
Test Design and Analysis Office
Technical Operations Directorate

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FOREWORD

(C) The U. S. Army Chemical Corps has been assigned the task of providing the Department of Defense with adequate CBR weaponry. Certain entomological vector-agent systems, after a period of laboratory demonstrations, qualitative field experience, and theoretical evaluations, have reached the quantitative field test stage and Dugway Proving Ground has been assigned the field testing responsibility. The present volume, containing the field experimentation of BELLWETHER-II, reports on the endeavors of Dugway Proving Ground to standardize an entomological field test technology.

(U) This material contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

(U) The authority for conducting this test is contained in Dugway Proving Ground Operating Program, FY 1962-1966, Target Year FY 1962, Appendix 1 to Annex C, Operating Schedule, Dugway Proving Ground, Utah, 1 July 1961, revised 1 October 1961. Secret. Tests were funded under Dugway Proving Ground Job Order Numbers 1-02-10-1 and 1-02-10-2 in support of Department of the Army Research and Development Project Number 4D98-05-028-02.

(U) When this document has served its purpose, it should be destroyed. It should not be returned to the originating office.

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DIGEST

(S) The objectives of BELLWETHER-II, using releases of uninfected, starved, virgin female Aedes aegypti mosquitoes, were, in part:

1. To evaluate the effects of varying the host distance, the host concentration, and the vector/host ratio:

2. To determine the effect of the presence or absence of overt movement of the human samplers upon the outdoor biting rate; and

3. To investigate methods of placement of human samplers in open terrain and within built-up areas.

(U) Inherent throughout the entire test was the development and improvement of a basic entomological field test technology.

(C) A total of 14 field trials were conducted in the period extending from 6 September to 20 October 1960. Up to 100 assigned military personnel were used as samplers in each trial, and grid arrays involving dispersal distances much greater than those involved in BELLWETHER-I were incorporated in this test design.

(S) From the data generated in this test, and under the specific conditions encountered, it is concluded that:

1. In a 30-minute sampling period, there was no significant difference in vector biting activity at distances up to 100 feet from the release point, but maximum biting activity occurred at distances of less than 200 feet.

2. Intervening hosts did not interfere with either the vectors' outward spread or biting activity.

3. No conclusive findings were generated as to the effect of host concentration.

4. When the number of vectors was increased by a factor of 10, approximately 10 times as many bites were received and the proportion of hosts bitten was increased an average of 36 per cent.

5. Vector biting activity showed a tendency to be highest when the hosts were alternately in motion and then motionless for recurring 5-minute periods, and to be lowest when the hosts moved continuously.

[redacted]

[redacted]

6. Hosts located near buildings were subjected to significantly greater vector biting activity than were hosts located in open areas.

7. Vectors did not tend to distribute themselves evenly throughout an isolated built-up area, and, further, they did not tend to redistribute themselves evenly during the interims between host occupations.

8. No conclusive findings were generated as to the optimum sampling duration.

9. No evidence of crepuscular-period biting preference was obtained in these trials.

10. No conclusive findings were generated concerning the average longevity of this species when exposed to ambient desert conditions.

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INTRODUCTION

BACKGROUND

(S) The U. S. Army Chemical Corps Research and Development Command in June 1960 (1) directed Dugway Proving Ground (DPG), Utah, to investigate and develop entomological field testing techniques designed to permit the quantitative evaluation of entomological munitions. These techniques were required to be adequate for evaluating entomological weapon systems against strategic targets such as built-up areas of cities, industrial centers, and logistical complexes; jungles and heavily wooded areas containing dispersed enemy personnel; and any type of terrain containing well equipped and well organized guerrilla forces. Of physical necessity, the present test had to exclude the effects of coniferous, deciduous and rain forests, and of heavily built-up areas if it was to be conducted at DPG. (Rather stringent time limitations precluded conducting these trials elsewhere and still utilize the autumn 1960 testing season.) Trials in the southern United States incorporating these and other target aspects are being considered for FY 1962.

(U) The general background and the problems associated with the development of an entomological field test technology have been adequately described in DPGR 259, BELLWETHER—I (2), and need not be repeated here. The basic problem of obtaining and evaluating valid, quantitative data gathered by relatively untrained, military personnel (3) has not been completely resolved in the present test series. However, progress has been made, and, as a result, data should improve in the future.

OBJECTIVES

(S) The specific objectives of this test, using releases of uninfected, starved, virgin female Aedes aegypti mosquitoes, were:

1. To evaluate the effects of varying the host distance, the host concentration, and the vector/host ratio (Phases B and C);

2. To determine the effect of the presence or absence of overt movement of the human samplers upon the outdoor biting rate of this mosquito (Phase D);

3. To investigate methods of placement of human samplers in open terrain (Phases B and C) and within built-up areas (Phase E);

4. To determine the optimum sampling period duration (various phases), and whether time of day need be considered (Phase E); and

5. To determine the average longevity of the A. aegypti mosquito when exposed to ambient desert conditions (Phase F).

(U) Inherent throughout the entire test was the development and improvement of a basic entomological field test technology. This was to be achieved in the various data phases, in observations of the conduct of the trials, and in evaluating the data received.

SCOPE

(C) This test, comprising six phases, was conducted in a series of orientation trials (Phase A), 14 field trials (Phases B through E), and 2 laboratory-scale trials (Phase F). The testing period began 29 August 1960 and extended to the effective end of the autumnal testing season, late October 1960. For the conduct of this test, it was necessary to orient and train a total of 100 military assignees. Together with the experience of using troops as sampling units on more complex grid arrangements, further basic data on the behavior of the A. aegypti mosquito were also gained, as were guidelines for designing future field trials wherein different grid configurations and terrain types would be used.

METHODS AND MATERIALS

TEST SITE

(U) The possibility of vector persistence within a trial area decreed that several days elapse before a further trial be conducted in the particular area of a previous trial. This fact necessitated using several widely dispersed areas for the full conduct of these trials. These areas, shown in Figure 1, were the Clay Flats Target, the region west of the West Gate, the vicinity of the road leading north from Baker Laboratory, sections of the Downwind Grid, and in the built-up section of GPI-2. The Phase F studies were conducted just outside of Baker Laboratory.

TEST VECTOR

(C) The test vectors were uninfected, virgin female CD strain A. aegypti mosquitoes, raised in the standard manner from egg papers furnished by the U. S. Army Chemical Corps Biological Laboratories (BioLabs), Fort Detrick, Frederick, Maryland. The mosquitoes were reared in the insectary at Baker Laboratory; the sexes were separated in the pupal stage by means of a BioLabs pupal separator; and all the adults were 6 days or older and starved 16 to 24 hours prior to release when used.

TEST FIXTURE

(U) Cardboard ice-cream-carton test fixtures, as used successfully

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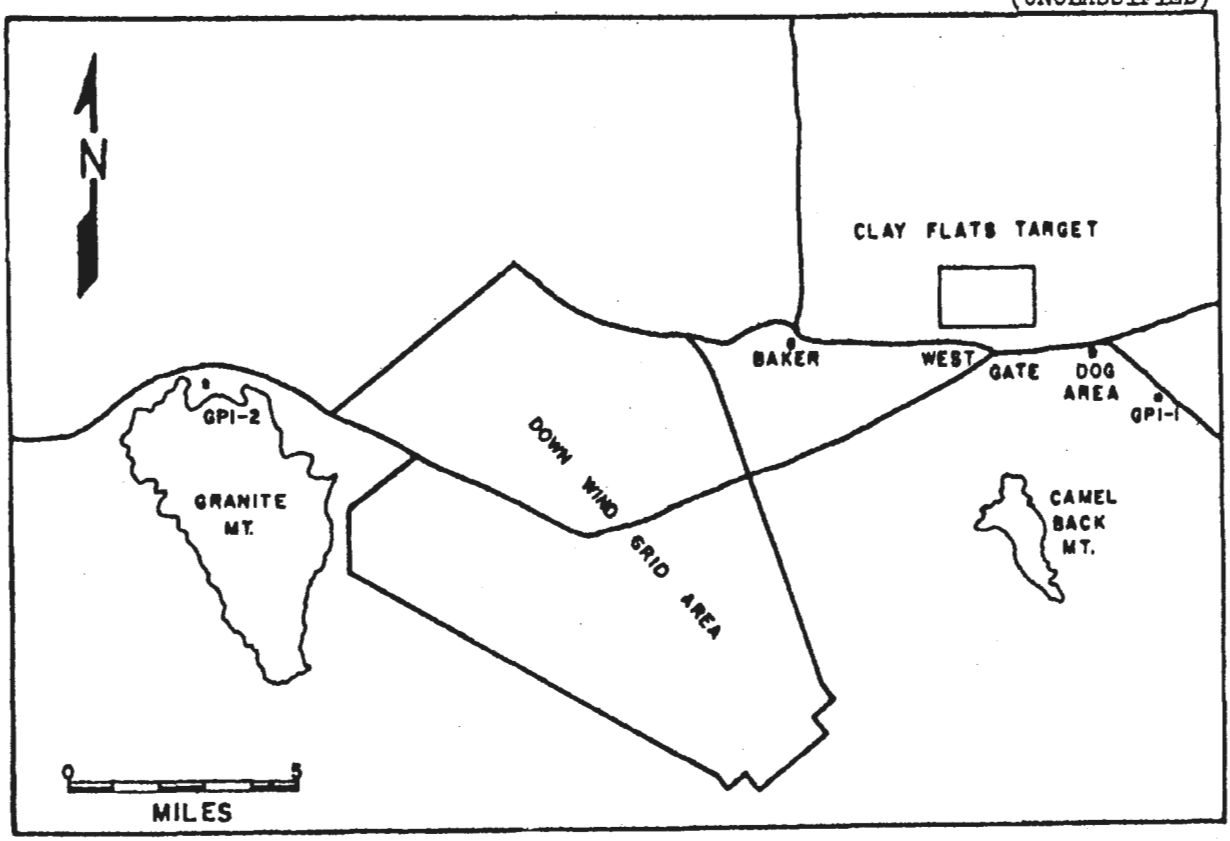

Fig. 1. - Map showing test areas, Bio 531, BELLWETHER-II.

in BELLWETHER-I, were also used in BELLWETHER-II. The 1-quart size was used for fills of up to 250 vectors and the 1-gallon size was used for fills to 2500 vectors. In the 5000-vector releases of Phase E, two 1-gallon fixtures were used (in the first Phase E trial, the 1-gallon containers were not yet available, and, therefore, a 2-gallon 'hat box' was used). The cardboard tops of the ice cream cartons were pushed out and replaced by a small square of nylon bobbinet. The string harnesses used in BELLWETHER-I were replaced by reuseable wire and clip harnesses.

(U) Prefabricated test fixture stands were constructed for this test, replacing the driven stakes used in BELLWETHER-I; one of these is shown in Figure 2. The use of this device also facilitated moving the fixtures to keep them upwind of the sampling array at function time in the Phase C trials.

SAMPLING PERSONNEL

(U) One hundred military personnel were assigned from the 2nd

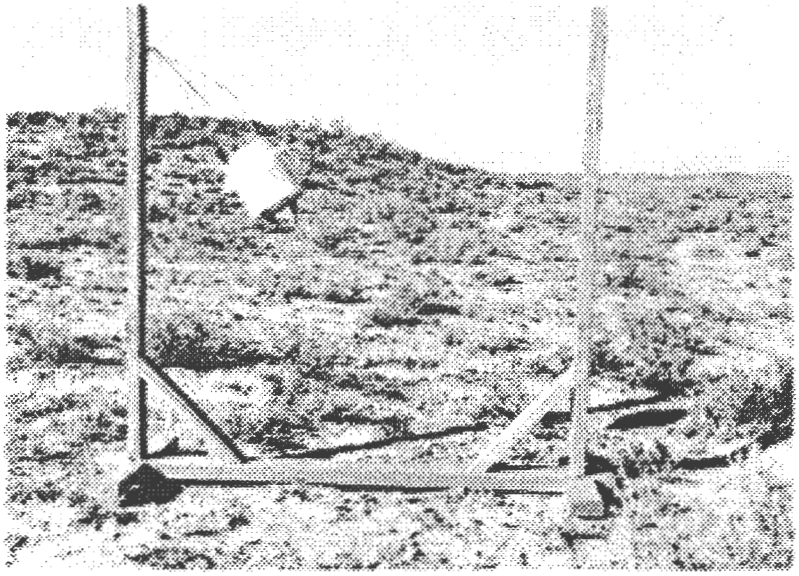

Fig. 2. - Test fixture used in the BELLWETHER-II trials.

Chemical Battalion (Smoke Generator) stationed at DPG. These men were given an unclassified briefing on what was expected of them, and they were shown two applicable U. S. Public Health Service orientation films. Except for several carry-overs from the BELLWETHER-I trials, all of these men were new. The men were clothed in the standard Army work uniform, with fatigue trousers bloused into combat boots, and fatigue caps. The troops supplied their own vehicles and officers.

GENERAL TEST PROCEDURES

(U) The positioning of the men on the various grid patterns was accomplished in each trial by the use of randomization tables prepared by the Biological Branch, Test Design and Analysis Office (TD&A). The use of these tables eliminated all personnel bias. Prior to leaving for the test area, the troops were assembled and each man was randomly assigned a number--which corresponded to a particular position on the grid and belonged to a particular group. The troops were then re-assembled into groups, and each group was assigned to a vehicle. When the briefing was completed, the groups left for the test area in convoy.

(U) Each vehicle was driven to its assigned position and unloaded; it was then driven 0.25 to 0.5 mile upwind or to the meteorological

station until the completion of the trial. In those trials where radio communication was required to synchronize the times of test fixture functioning, the vehicle was driven a few hundred feet upwind and parked until the command to release was received. This was relayed to the test personnel and the vehicle was then driven rapidly upwind.

TEST PROCEDURE BY PHASES

(U) This test was conducted in six phases--A through F.

Phase A

(U) Phase A was a familiarization phase that followed the general orientation briefing. In this phase, in which several groups were tested concurrently, each group consisted of 10 men positioned equidistantly around the perimeter of a circle having a radius of 15 feet--in the manner of BELLWETHER-I. One hundred vectors were released in the center of each circle, and the men recorded the number of bites and probes received in a 20-minute period. The purpose of this phase was to familiarize the men with the procedures to be used in the forthcoming trials and with entering data on the data card (see Fig. 3). Severe reactors were removed from the test series following Phase A.

Subsequent Phases

(U) The specific methods followed in the various data phases (B through F) of this test are presented, preceding the statistical analysis of the results of each phase, in the Investigational Procedures and Analyses section.

METEOROLOGICAL PROCEDURES

(U) In all phases except A and F, two 2-meter meteorological stations were used, and, wherever possible, these stations were located at least 0.25 mile upwind of the test site to reduce the possibility that these positions would serve as shelters to the insects and thus bias the results. The locations of these stations are depicted in Figures 4 through 7. These stations recorded the 2-meter wind speed and direction on chart rolls; the relative humidity, ground temperature, and air temperature were determined and manually recorded at 10-minute intervals throughout each trial. A device for determining incident ultraviolet radiation was also utilized. On those trials conducted within several miles of the West Gate, this device was installed at the West Gate and was operated from the line current available there. On the other trials, a separate generator was provided and the instrument was located in the field at one of the meteorological stations. It recorded all incident ultraviolet radiation falling between 2000 and 3760 Å that struck an exposed hemisphere. However, no correlation between biting activity and ultraviolet radiation could be detected.

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DATA CARD – ENTOMOLOGY FIELD TEST–531–1960 Ext. S_____

Name: _____ (Please Print–Last Name First) Number: _____ (Assigned Number)

Phase and Trial Number: _____ (For Example: C-2) Position Designation: _____ (For Example: Ring D, 250-Foot Circle, Position 8)

Date and Function Time: _____, _____ MST

	TIME INTERVAL (minutes)	NUMBER OF BITES	ACCUMULATION (do not write in this column)	REMARKS (Unusual behavior, etc.)	
1.	0 to 5				
2.	5 to 10				
3.	10 to 15				
4.	15 to 20				
5.	20 to 25				
6.	25 to 30				
	Total				

First Observation: _____ (Time from function time–Remarks)

First Bite: _____ (Time from function time–Remarks)

M = moving
S = sitting

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EXTENDED SAMPLING SHEET

	TIME INTERVAL (minutes)	NUMBER OF BITES	ACCUMULATION (do not write in this column)	REMARKS (Unusual behavior, etc.)	
7.	30 to 35				
8.	35 to 40				
9.	40 to 45				
10.	45 to 50				
11.	50 to 55				
12.	55 to 60				
13.	60 to 70				
14.	70 to 100				
15.	100 to 110				
16.	110 to 120				
	Total (extended)				
	Grand Total				

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Fig. 3. - Data card used in the BELLWETHER-II trials.

[redacted]

(U) No meteorological coverage was provided in the Phase A orientation trials. In Phase F, a 24-hour recording hygrothermograph placed on the ground near the two groups of cones recorded ambient temperature and relative humidity throughout the trial periods.

PHOTOGRAPHIC PROCEDURES

(U) In order to produce a general orientation film for training personnel for biting rate assessment in future entomological field trials, a scenario of scene sequences was prepared. Photographic Section, Target Operations Branch, photographed these various sequences on 16-millimeter Kodachrome film. The processed film was then roughly edited and stored. Further test sequences and selected sections of a U. S. Public Health Service film will be obtained and incorporated before final editing is attempted.

INVESTIGATIONAL PROCEDURES AND ANALYSES

GENERAL

(U) A summary of the average meteorological conditions and other appertaining data relative to these trials is given in Table 1. Complete meteorological data are presented in Appendix A.

PHASE B

(C) Phase B was conducted to determine the effect of release distance and intervening hosts upon the biting activity of the test vector. In each trial, six circles were used: three individual circles with 100-, 150-, and 250-foot radii and three concentric circles with 100-, 150-, and 250-foot radii. The three individual circles and the concentric configuration were each located 0.5 mile apart on a line perpendicular to the expected mean wind direction (see Fig. 4).

(C) Three trials were conducted under this phase, with 100 hosts being used in each trial. Ten hosts were positioned equidistantly around the circumference of each of the 100-foot circles, 15 hosts around each of the 150-foot circles, and 25 hosts around each of the 250-foot circles. Simultaneously, 1000 vectors were released in the center of each of the separate circles, and 3000 vectors were released in the center of the concentric configuration. Bites were then recorded by each of the hosts for six consecutive 5-minute time periods so that there was a total of 600 host-time units. Therefore, the total number of bites recorded in a trial divided by 600 was the mean number of bites per host-time unit, the so-called average bite number.

(U) For every time-unit, each of the six circles produced a number signifying the proportion of hosts on that circle whose reported bites exceeded the average bite number. Thus, if the average bite number was

TABLE 1: Summary of the General Test Data and the Average Meteorological Conditions Existing in the Trials of BELLWETHER-II, Bio 531 (CONFIDENTIAL)

PHASE AND TRIAL NUMBER	DATE(S) OF TRIAL (1960)	FUNCTION TIME (MST)	AVERAGE 2-METER WIND (STATION 1--E or S)		AVERAGE 2-METER WIND (STATION 2--W or N)		AVERAGE 2-METER AIR TEMPERATURE (°F)	AVERAGE GROUND TEMPERATURE (°F)	AVERAGE RELATIVE HUMIDITY (%)	AVERAGE ULTRA-VIOLET READING (Micro-watts-sec/cm^2)	TOTAL NUMBER OF VECTORS RELEASED	TOTAL NUMBER OF BITES RECEIVED	AVERAGE BITES PER VECTOR
			Speed (mph)	Direction (°)	Speed (mph)	Direction (°)							
Phase B													
B-1	6 Sep	1405,1410, 1428	6.2	168	7.0	134	90.6	90.0	19.5	73,962	6000	490	0.082
B-2	23 Sep	1132	2.7	311	4.2	037	70.3	72.2	20	91,700	6000	8937	1.490
B-3	19 Oct	1457	3.4	222	2.7	156	70.0	ND*	23	24,347	1500	1059	0.706
Phase C													
C-1	19 Sep	1140	7.3	185	6.9	183	86.1	103.5	13	96,231	4400	972	0.221
C-2	22 Sep	1458	6.2	321	8.5	325	70.5	91.2	31.8	75,133	4400	712	0.162
C-3	29 Sep	1045	4.4	272	3.4	276	53.7	68.0	28	34,475	4400	1626	0.370
C-4	5 Oct	1353	6.2	285	Inop**	Inop	80.6	80.2	16	46,550	4400	3506	0.797
C-5	17 Oct	1350	4.2	300	Inop	Inop	64.7	ND	23	20,672	4400	1606	0.365
C-6	20 Oct	1514	2.6	328	3.2	318	66.5	64.8	35	10,675	4400	1920	0.436
Phase D													
D-1	15 Sep	1105	6.7	255	5.8	240	75.3	91.9	30	62,300	900	238	0.264
D-2	28 Sep	1005	4.2	313	3.1	279	77.6	73.9	15	52,308	900	616	0.684
D-3	19 Oct	1248	4.7	297	3.2	289	65.9	59.8	37	60,392	900	284	0.316
Phase E													
E-1	19 Sep	1711	2.8	089	5.0	127	82.6	96.9	11	245	5000		
E-2	3 Oct	1725	3.3	214	2.5	145	68.4	ND	15	ND	5000	1564	0.313
	second period		2.3	172	2.4	137	60.0	53.9	28	ND			
E-3	19 Oct	1700	2.7	172	2.3	126	61.2	ND	30	ND	5000	6	0.001
	second period		ND	ND	2.8	256	59.5	53.7	35	38,098			
Phase F													
F-1	19-20 Sep	1600	-*3	-	-	-	66	-	27	-	-	-	-
F-2	27 Sep	1000	-	-	-	-	77	-	20	-	-	-	-

*No data.
**Inoperative.
*3Not applicable.

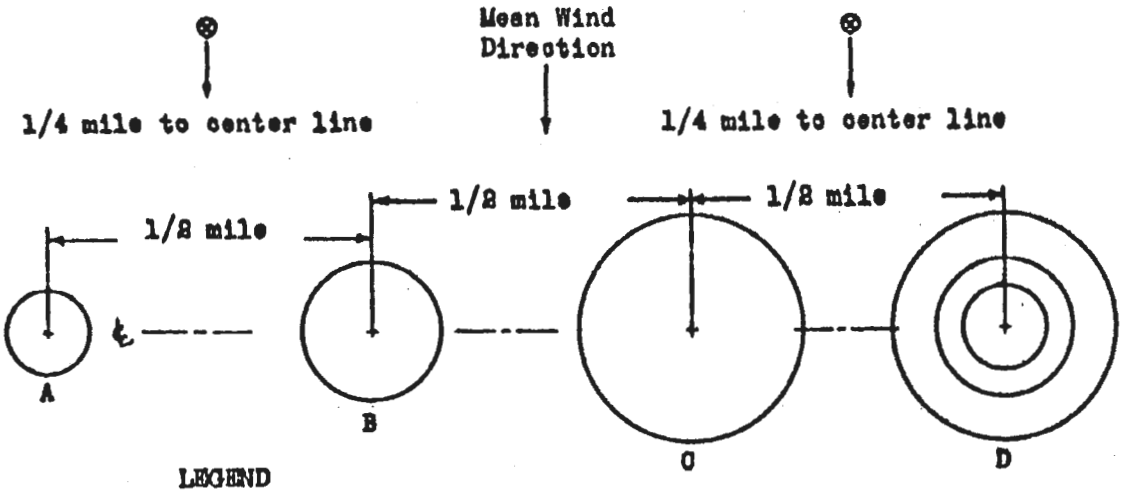


Fig. 4. - Grid array for Phase B, BELLWETHER-II.

14.9 and 10 of 25 hosts in a circle reported 15 bites or more during a given time interval, the appropriate proportion for that time-circle unit was 0.40. In this way, each trial produced 36 proportions (6 time-units x 6 circles).

(U) An analysis of variance, based on the three-way cross classification of time, radius, and type of circle (individual versus concentric), was performed on the proportions obtained in each trial, weighting each proportion according to the number of hosts involved. The test of significance for each component was made in the analysis by means of the chi square (χ^2) distribution, where the sum of squares for each component had first been converted to a chi square value by the formula:

$$\frac{\text{sum of squares}}{\bar{p}\,\bar{q}} = \chi^2 ,$$

where 600 $\bar{p}$ equals the total number of host-time units over the entire trial with reported bites not less than the average bite number, and $\bar{q}$ equals 1 - $\bar{p}$.[1] The results of these analyses are presented in Table 2.

[1](U) From an examination of the raw data, it was evident that the assumptions required for the standard methods of analysis were not satisfied. Further, the appropriate transformation of the data could not be made since the form of the distribution of bites was unknown. Therefore, the above-described distribution-free analysis was used instead. Standard analytical data such as bite means, their standard deviations, etc., tabulated for unit time intervals, are presented in Appendix B.

[redacted]

TABLE 2: Results of the Chi Square Analysis, Trials B-1 through B-3, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

SOURCE OF VARIATION	DEGREES OF FREEDOM	CHI SQUARE VALUES FOR INDICATED TRIAL		
		Trial B-1	Trial B-2	Trial B-3
Radius, R	2	151.2*	158.4*	37.5*
Circle Type, C	1	8.3*	1.1	5.5*
R x C	2	33.8*	30.5*	10.4*
Time, T	5	17.0*	4.8	41.2*
R x T	10	17.2	2.4	9.9
C x T	5	9.8	1.4	2.6
R x C x T	10	8.9	1.9	13.7

*Statistically significant at the 5.0 per cent level.

(U) As shown in Table 2, there was a tendency for every main effect and the two-factor interaction R x C to be statistically significant. The effects of these components are, therefore, discussed below.

Effect of Radius and Type of Circle

(U) It proved difficult in these trials to compare biting activity on individual circles with that on concentric circles, because in the former, 1000 vectors were released in the center of each of three circles, while in the latter, 3000 vectors were released in the center of a single set of three circles. An alternate method, releasing 1000 vectors in all cases, might have been used. However, using that method, the vector/host ratio in the separate circles would be three times the ratio in the concentric circles, and this would not permit meaningful comparisons. The present trials are well suited to comparing the relative effects of the different radii of circles and the different time periods, as well as the interactions of these factors with the "circle-type" factor.

(C) Interpretation of the R x C interaction was complicated by the fact that there were three (i.e. more than two) different radii. Ignoring the 150-foot circles, the effect of "radius" was considered by simply comparing the results from the 100-foot circles with the results from the 250-foot circles (see Table 3). In every trial, significantly higher biting activity per host was found at the 100-foot circle than at the 250-foot circle. Further, there was a general tendency in all trials for the values from the 150-foot circles to fall below the values from the 100-foot circles. This suggests that optimum biting activity in the initial primary time period (30 minutes) occurred at less than 150 feet, but this distance was doubtlessly affected by the wind speed. In addition, the "radial effect" (100-foot activity)-(250-foot activity) for the concentric circles was compared with the same effect for the separate circles. No significant difference was detected in Trials B-1 and B-2, but the difference in Trial B-3 was significantly larger in the concentric circles than in the separate circles. This may have resulted because of the peculiarly low biting activity observed on the 100-foot

[redacted]

TABLE 3: Proportion of Hosts Exceeding the Average Bite Number, Summarized Over the Time Units and Segregated With Respect to Radius and Type of Circle, Trials B-1 through B-3, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

RADIUS (Feet)	PROPORTION OF HOSTS EXCEEDING THE AVERAGE BITE NUMBER IN THE INDICATED TRIAL		
	Type of Circle		Average per Radius per Trial
	individual	concentric	
	Trial B-1		
100	0.60	0.58	0.59
150	0.68	0.24	0.48
250	0.04	0.09	0.07
Average proportion per circle per trial	0.34	0.24	0.29
	Trial B-2		
100	0.95	0.68	0.82
150	0.17	0.44	0.31
250	0.25	0.11	0.18
Average proportion per circle per trial	0.36	0.32	0.34
	Trial B-3		
100	0.45	0.68	0.57
150	0.18	0.38	0.28
250	0.29	0.25	0.27
Average proportion per circle per trial	0.29	0.38	0.33

[redacted]

separate circle (0.45), and, since it was not demonstrated in Trials B-1 and B-2, the interpretation for this phase might be that, under the conditions encountered, the 150-foot circle of hosts did not significantly interfere with the passage of vectors from the 100-foot to the 250-foot circle.

Effect of Time

(C) As indicated by the results of the chi square analysis in Table 2, there were significant differences in the proportions determined for the six time intervals in both Trials B-1 and B-3. The composite data presented in Table 4 show that in both of these trials the proportional value reached a maximum in the second time period (5-10 minutes) and declined thereafter. In contrast, no significant difference could be detected in the proportions obtained for the six time intervals of Trial B-2. Thus, biting activity in this trial did not decrease with an increase of time, and, presumably, if the trial had been extended beyond the 30-minute time period, a considerable number of additional bites would have been obtained. However, even within the 30-minute sampling period, the average number of bites per vector (1.49) was greater than that obtained in any other entomological field trial conducted at DPG. The precise reason or reasons for the greatly enhanced results of this trial over all others conducted at DPG, however, could not be ascertained.

PHASE C

(C) Phase C was conducted to examine three host-vector relationships, viz.: the host distance (the distance of the hosts from the vector release), the host concentration (the number of hosts per unit area), and the vector/host ratio (the number of vectors per host). Each of these relationships was evaluated at two levels--an arbitrary high and a low. A total of 80 hosts were used in each trial, and they were arrayed along a crosswind line in eight 20-foot squares, each 0.5 mile distant from the adjacent squares, as shown in Figure 5. The hosts were divided into four groups (A, B, C, and D), with each group comprising two of the 20-foot squares. In each group, one of the squares contained 4 men with 1 man at each corner, and the other square contained 16 men spaced 5 feet apart. These arrays represented the variation in host concentration at the arbitrary low and high levels, respectively.

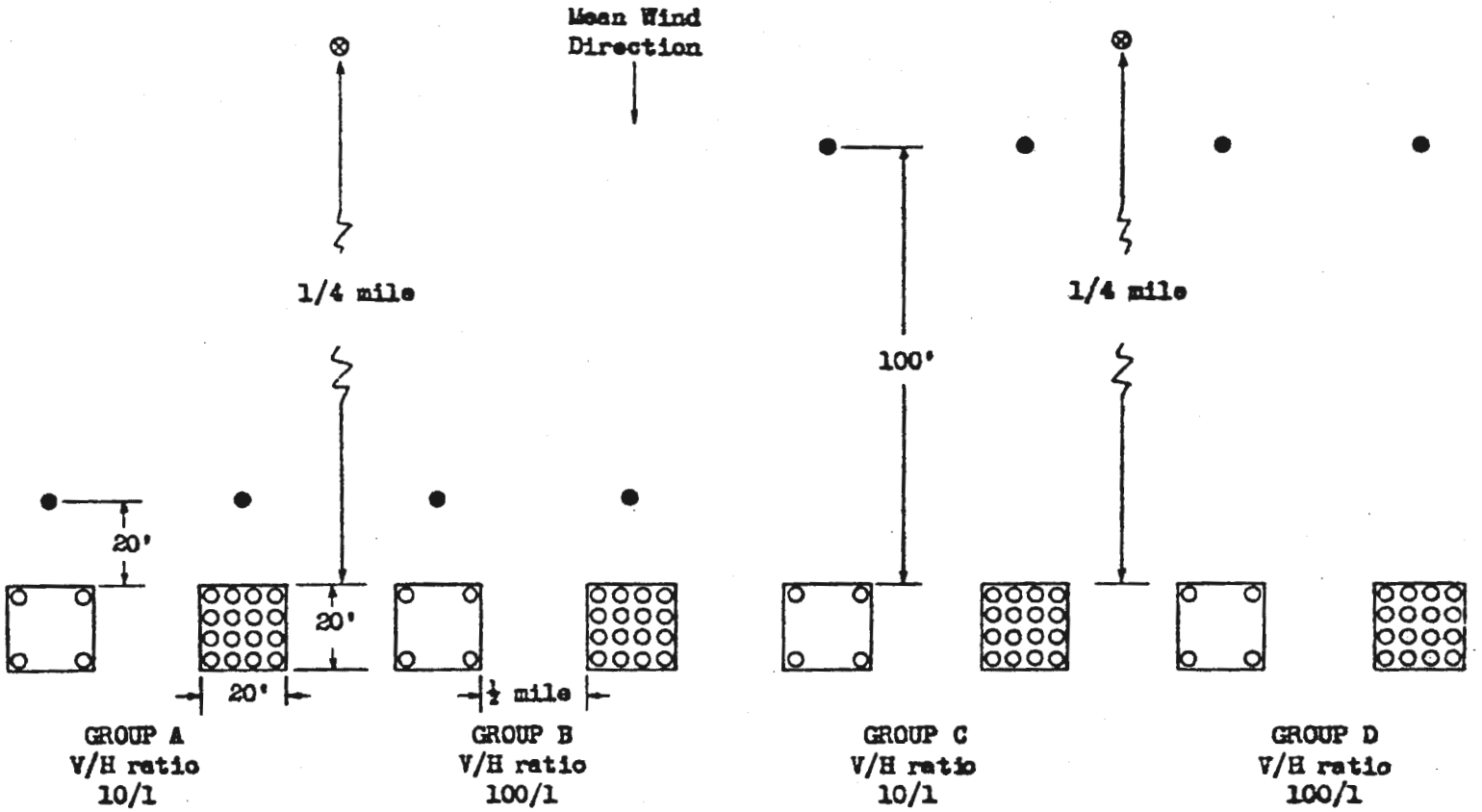
(U) In four of the eight squares, the vector release points were located 20 feet upwind of the hosts; at the other four, 100 feet upwind. As such, they represented the arbitrary low and high level, respectively, of host distance. The third variable studied, vector/host ratio, was varied by using either a 10/1 or a 100/1 ratio release upwind of each 20-foot square. The test fixtures were functioned simultaneously upon a signal from the Test Officer, and sampling was continued for 30 minutes.

(U) A total of six trials was conducted in this phase (a nondetailed mixup of test fixtures in Trial C-4 resulted in that trial being classified as an abort). Since 80 human samplers were used in each trial and

TABLE 4: Proportion of Hosts Exceeding the Average Bite Number Summarized Over the Types of Circles and Segregated With Respect to Radius and Time, Trials B-1 through B-3, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

TIME INTERVAL (Minutes)	PROPORTION OF HOSTS EXCEEDING THE AVERAGE BITE NUMBER IN THE INDICATED TRIAL AT THE SPECIFIED CIRCLE			
	Radius of Circle (Feet)			Average
	100	150	250	
	Trial B-1			
0- 5	0.65	0.50	0.04	0.30
5-10	0.90	0.64	0.08	0.41
10-15	0.70	0.50	0.12	0.35
15-20	0.55	0.50	0.04	0.28
20-25	0.35	0.40	0.06	0.22
25-30	0.45	0.24	0.06	0.18
Average	0.59	0.48	0.07	0.29
	Trial B-2			
0- 5	0.80	0.20	0.08	0.26
5-10	0.75	0.33	0.20	0.35
10-15	0.80	0.37	0.24	0.39
15-20	0.85	0.33	0.16	0.35
20-25	0.85	0.30	0.14	0.33
25-30	0.85	0.30	0.24	0.38
Average	0.82	0.31	0.18	0.34
	Trial B-3			
0- 5	0.65	0.30	0.14	0.29
5-10	0.80	0.53	0.44	0.58
10-15	0.70	0.33	0.36	0.42
15-20	0.60	0.27	0.26	0.33
20-25	0.35	0.17	0.14	0.26
25-30	0.30	0.07	0.07	0.15
Average	0.57	0.28	0.27	0.33

[redacted]



LEGEND

● Release point.
○ Sampling position.
⊗ 2-meter meteorological station.

Fig. 5. - Grid array for Phase C, BELLWETHER-II.

each host recorded bites for six consecutive 5-minute time intervals, there was a total of 480 host-time units in each trial. The number of bites obtained in each of these 480 units was recorded, and the median of these numbers was the so-called median bite number. For every time unit, each of the eight squares produced a value--namely, the proportion of hosts in that square with reported bites exceeding the median bite number. Thus, each trial produced 48 proportions.

(U) For each trial, an analysis of variance based on the four-way cross classification of time, host distance, host concentration, and vector/host ratio was performed on the proportions, weighting each proportion according to the number of hosts involved. In every analysis, the test of significance for each component was made by means of the chi square distribution, the chi square value for each component being obtained in a manner similar to that used in Phase B. The results of these analyses are summarized in Table 5.

(C) As shown in Table 5, the results of the chi square analyses indicated that the difference between the effects of the high and the low vector/host ratios was highly significant in all trials. Further, host concentration was usually significant, and host distance was significant only in Trial C-3. None of the two- or three-way interaction terms, however, showed a tendency for statistical significance. The individual effects of the three host-vector relationships are discussed below.

Effect of Vector/Host Ratio

(U) Table 6 gives the proportions of host-time units which exceeded the median bite number in each trial summarized over the two distances and six time units and segregated with respect to vector/host ratio and the host concentration.

(C) As shown in Table 6, the proportion of host-time units exceeding the median bite number was greater, in each comparison, for that square associated with the higher vector/host ratio (100:1). Further, as shown in Table 7, the data indicate, in general, that when the number of vectors is increased by a factor of 10, approximately 10 times as many bites are received.

(C) Table 7 also shows that the percentage of hosts receiving one or more bites ranged from 40 to 72 per cent, with an average of 60 per cent, when 10 vectors per host were released, and from 95 to 100 per cent with an average of 96 per cent, when 100 vectors per host were released.

Effect of Host Concentration

(U) Since the higher host concentration squares presented greater bulk and contrast it might be expected that they would be subjected to greater biting activity than the lower host concentration squares. This

[redacted]

TABLE 5: Results of the Analysis of Chi-Square, Trials C-1 through C-6, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

SOURCE OF VARIATION	DEGREES OF FREEDOM	χ^2 VALUES FOR INDICATED TRIAL				
		Trial 1	Trial 2	Trial 3	Trial 5	Trial 6
Vector/Host Ratio, V,	1 (1)*	173.49**	87.71**	128.28**	122.11**	168.14**
Host Distance, D	1 (0)	-*3	1.23	38.58**	0.41	0.03
Host Concentration, H	1 (1)	8.03*4	2.32	6.78*4	9.36*4	4.41*5
Time, T	5 (5)	18.47*4	4.79	6.78	13.45*5	9.47
V x D	1 (0)		3.43	2.14	29.44**	0.53
V x H	1 (1)	0.40	5.37*5	0.92	1.75	1.01
H x T	5 (5)	1.20	10.07	3.87	2.73	5.49
H x D	1 (0)		1.68	2.27	15.78**	4.80
V x T	5 (5)	4.4	2.54	18.79*4	1.84	5.57
D x T	5 (0)		2.32	8.38	7.05	2.77
D x T x H	5 (0)		2.73	1.52	0.72	0.90
H x T x V	5 (5)	1.60	7.65	3.67	2.58	2.64
D x V x H	1 (0)		0.00	0.92	0.84	10.81*4
V x D x T	5 (0)		1.86	2.37	4.04	2.67
V x D x H x T	5		5.25	8.24	1.89	10.24
Error	(24)	39.36*5				

*Values in parentheses indicate the number of degrees of freedom for Trial C-1.

**Statistically significant at the 0.1 per cent level.

*3The effects of distances were not determined in Trial C-1 because all of the test fixtures were inadvertently placed 20 feet upwind of each sampling array. The analysis actually made was a three-way analysis of variance with two observations per cell. In Trial C-3, the distances were doubled (see text); in Trial C-4, the test design was followed improperly, and, as a result, the data could not be analyzed.

*4Statistically significant at the 1.0 per cent level.

*5Statistically significant at the 5.0 per cent level.

[redacted]

TABLE 6: Proportions of Hosts Exceeding the Median Bite Number Summarized Over Time and Host Distance and Segregated With Respect to Vector/Host Ratio and Host Concentration for Trials C-1 through C-6, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

VECTOR/HOST RATIO	PROPORTION OF HOSTS EXCEEDING THE MEDIAN BITE NUMBER WITH RESPECT TO THE INDICATED VARIATIONS		
	Host Concentration		Average
	$H_1 = 4$	$H_2 = 16$	
		Trial C-1	
$V_1 = 10:1$	0.33	0.13	0.18
$V_2 = 100:1$	0.88	0.75	0.78
Average	0.60	0.44	0.48
		Trial C-2	
$V_1 = 10:1$	0.21	0.21	0.21
$V_2 = 100:1$	0.83	0.57	0.62
Average	0.52	0.39	0.42
		Trial C-3	
$V_1 = 10:1$	0.33	0.24	0.25
$V_2 = 100:1$	0.94	0.73	0.78
Average	0.64	0.48	0.52
		Trial C-5	
$V_1 = 10:1$	0.08	0.31	0.26
$V_2 = 100:1$	0.69	0.78	0.76
Average	0.37	0.55	0.51
		Trial C-6	
$V_1 = 10:1$	0.27	0.33	0.32
$V_2 = 100:1$	0.77	0.95	0.91
Average	0.52	0.64	0.61

[redacted]

TABLE 7: Summary of Total Number of Bites Received Segregated With Respect to Vector/Host Ratio, Phase C, Trials 1 through 6, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

TRIAL NUMBER	TOTAL NUMBER OF BITES RECEIVED		RATIO OF TOTAL NUMBER OF BITES RECEIVED	PERCENTAGE OF HOSTS RECEIVING ONE OR MORE BITES (%)	
	10:1 Vector/ Host Ratio	100:1 Vector/ Host Ratio	(10:1 vector/Host Ratio: 100:1 Vector/Host Ratio)	10/1 Vector/ Host Ratio	100/1 Vector/ Host Ratio
C-1	85	887	1:10.4	40	98
C-2	66	646	1: 9.8	60	95
C-3	110	1516	1:13.8	68	98
C-5	108	1498	1:13.9	62	90
C-6	185	1735	1: 9.4	72	100

was not generally the case in the five trials. In Trials C-1, C-2, and C-3, the lower host concentration squares exhibited greater biting activity, significantly so in Trials C-1 and C-3. In Trials C-5 and C-6, the squares containing the larger number of hosts exhibited significantly greater biting activity. As a result of these contradictory findings, a decision at this time concerning the effects of host concentration on biting activity must be deemed premature.

Effect of Host Distance

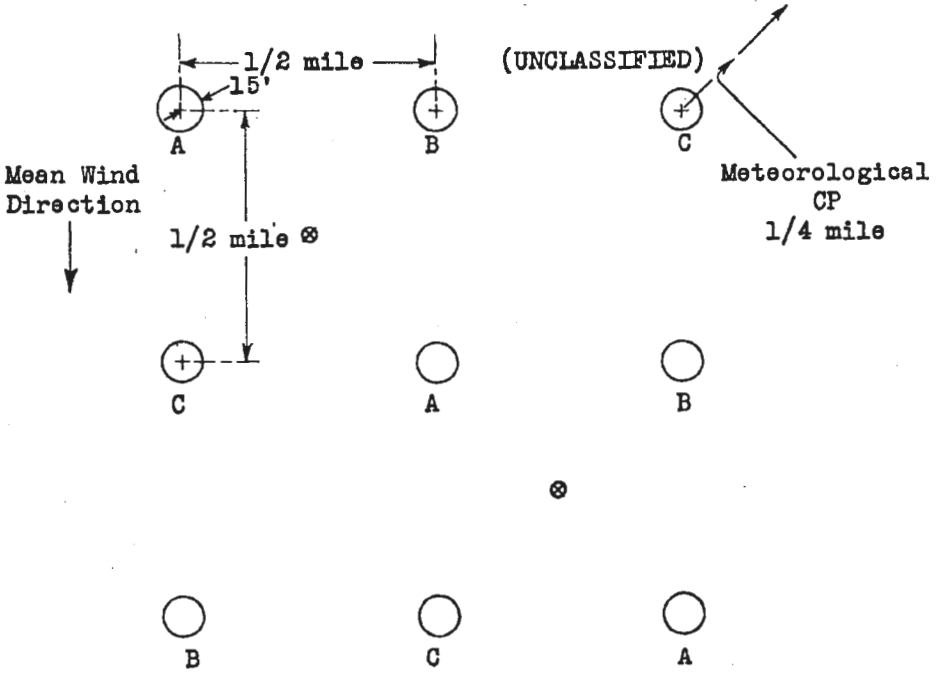
(C) As indicated by the results of the chi-square analyses given in Table 5, only in Trial C-3 were the effects of host distance upon biting activity significantly different. In this trial, however, the actual host distances were doubled--the low level from 20 to 40 feet and the high level from 100 to 200 feet. (This change was made as a result of the numerous complaints from the host samplers concerning the high biting activity in the two previously conducted field trials--Trials B-2 and D-2). Thus, the results of these five trials suggest that under the specific conditions encountered there is little difference in the biting activity at distances up to 100 feet from the release point, but that optimum biting activity occurs at distances less than 200 feet. This finding is similar to the finding of Phase B.

PHASE D

(C) Indoor biting rate studies at Fort Detrick, Frederick, Maryland, (4) involving simulated sleeping (sitting), standing, and walking hosts demonstrated that more bites were received indoors as the level of human activity decreased. In BELLWETHER-I, the outdoor biting assessments had all been made with the men seated and relatively motionless. Phase D of BELLWETHER-II was designed to ascertain the effect of overt movement of the hosts upon the outdoor biting activity of this vector.

[redacted]

(U) In each trial, three groups of three 15-foot radius circles, 0.5 mile apart on parallel crosswind lines, were located and scribed, and 10 hosts were positioned equidistantly along each circumference. Concurrent releases of 100 vectors were made in the center of each of the circles, and the resultant biting activity was assessed. In each line group, the circles were designated A, B, and C (see Fig. 6). In the A circles, the men were seated on the ground and remained relatively motionless. In the B circles, the hosts walked around their positions, talked, and otherwise occupied themselves in motion-associated activity. In the C circles, the hosts were seated for the first 5 minutes, walked, talked, and moved around for the second 5 minutes, were seated for the next 5 minutes, and so on until the end of the 30-minute sampling.



⊗ 2-meter wind speed and direction head.

Fig. 6. - Grid array for Phase D, BELLWETHER-II.

(U) The number of bites received in each consecutive 5-minute period was recorded by each of the 90 hosts, so that there was a total of 540 host-time units. The number of bites obtained in each of these 540 units was recorded, and the median of these numbers is the so called median bite number.

(U) For every time unit, each of the nine circles produced a number--namely, the proportion of hosts on that circle whose recorded bites exceeded the median bite number. An analysis of variance based on the two-way cross classification of time and host activity was then performed on the proportions obtained in each trial, and the test of significance for each component was made by means of the F distribution. The results of these analyses are given in Table 8.

[redacted]

TABLE 8: Analysis of Variance of Proportions Exceeding Median Bite Number, Trials D-1 through D-3, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

SOURCE OF VARIATION	RESULTS OF THE ANALYSIS OF VARIANCE FOR THE INDICATED TRIALS								
	Trial D-1*			Trial D-2			Trial D-3		
	df**	mean square	F value	df	mean square	F value	df	mean square	F value
Host Activity, H	2	5.15	<1	2	39.46	2.17	2	45.35	3.02
Inter-circle Error	2	22.42		6	18.20		6	15.04	
Time, T	5	24.46	18.53*3	5	26.20	9.13*3	5	23.80	10.97*3
H x T	10	1.57	1.19	10	2.48	<1	10	3.37	1.55
Intra-circle Error	10	1.32		30	2.87		30	2.17	

*In Trial D-1, two of the test fixtures contained 40 vectors, and two, 160 vectors; consequently, the data obtained at these circles were not used in the analysis.

**Degrees of freedom.

*3Statistically significant at the 1.0 per cent level.

(U) As shown in Table 8, host activity (H) and its interaction with time (H x T) were non-significant in all three trials, but time, by itself, was highly significant. For all three trials, vector biting activity was at a maximum in the first time period and steadily declined thereafter. This trend--a decrease in biting activity with an increase in time--was gnerally true for all BELLWETHER-I and -II circle-type trials.

(C) As compared to the Fort Detrick (4) findings where increased host activity was associated with decreased biting activity, in every one of these three trials host activity, although not statistically significant, showed the C-circles (alternating activity-nonactivity) with the highest and the B-circles (continuous motion) with the lowest biting activity. That these results were not statistically significant is perhaps at least partly due to the paucity of circle replication and the high "inter-circle" variation. This latter variation may have been induced by meteorological differences from one site to another. (In each trial, the average wind speed difference between the two meteorological stations exceeded 1 mile per hour.)

PHASE E

(U) The three trials of Phase E were conducted to investigate methods of placement of human samplers in a built-up area and to evaluate, in part,

[redacted]

vector persistency in a desert built-up area. For this phase, 47 stations[2] in Granite Peak Installation Number 2 (GPI-2) were used. At each station two positions were designated, one near a building, vehicle, or other structure (Group I) and the other position in an open area 30 feet away from that structure (Group II). A randomly selected host (from the 94 available) was placed at each of the 94 positions so that the hosts were classified by station and group.

(U) In order to compare biting activity in different sections of the test area, GPI-2 was somewhat arbitrarily divided into eight sub-areas, as shown in Figure 7. This was accomplished using seven groupings of buildings and an additional location for the parked troop vehicles (Area H).

(U) In each trial, 5000 vectors were released off target at a distance of approximately 100 yards upwind of the nearest building. Release time was either in the early morning or late afternoon and when the temperature was at least 65°F. Bites received by each host were recorded for each 5-minute interval, and sampling was conducted from the time of release to the time when biting appreciably slackened. In addition, the hosts returned to sample the area during the following one or two crepuscular periods.

(U) Three Phase E trials were conducted; however, only one, Trial E-2, generated sufficient data for analysis. In Trial E-1 a confusion in regard to the beginning and length of sampling time produced unreliable data, while, in Trial E-3, anomalously behaving vectors (see DISCUSSION section) yielded very few bites, and no meaningful analysis of the data was possible.

(U) An analysis of variance, based on the four-way cross classification of time, area, group, and station (paired Group I and II positions), was performed on the number of bites obtained in Trial E-2, weighting the total number of bites obtained in each area according to the number of hosts involved. The results of this analysis are given in Table 9.

Variability Among Areas

(C) As shown in Table 9, no significant difference in biting activity could be detected among areas. The variance among stations within areas (Error A), however, was quite large, and, consequently, the test of significance, although appropriate, was not sensitive.[3] Therefore, biting activity among the various areas was empirically examined. Figure 8 shows the average number of bites per host-time unit in Trial E-2 in each of the

[2](U) This total was later reduced to 40 after the completion of Trial E-1. This reduction resulted in removing certain stations located near the release point where too many bites had been received (Stations 4, 5, 6, and 7), and at the north meteorological station where no bites had been reported (Stations 1, 2, and 3).

[3](U) It is not surprising that Error A is large, since the stations within areas were not chosen as random samples; on the contrary, hosts were positioned at the expected extremes in order to gain information concerning the behavior of the test vectors.

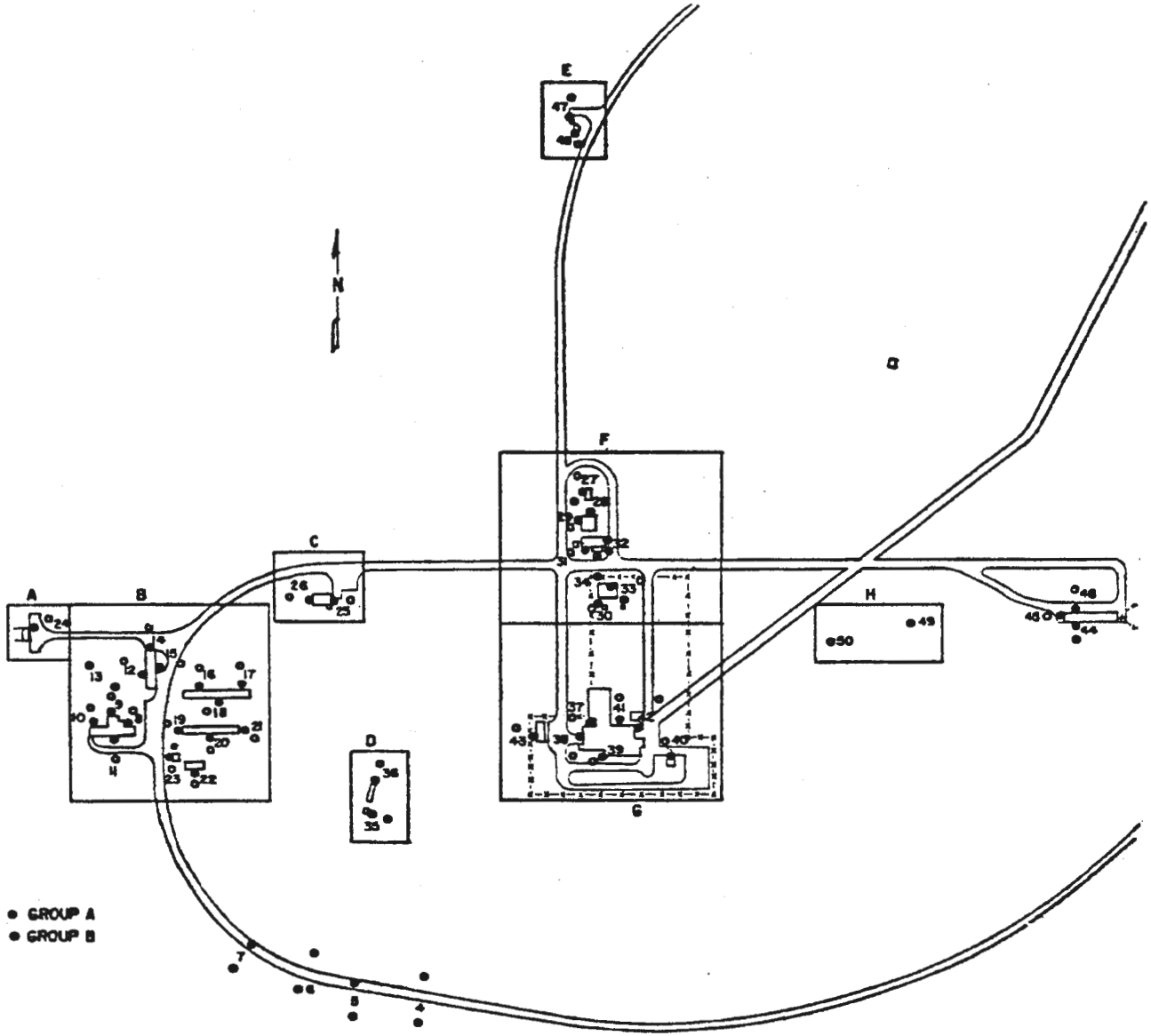


Fig. 7. - Map of GPI-2 area showing sampling stations and areas, Phase E, BELLWETHER-II.

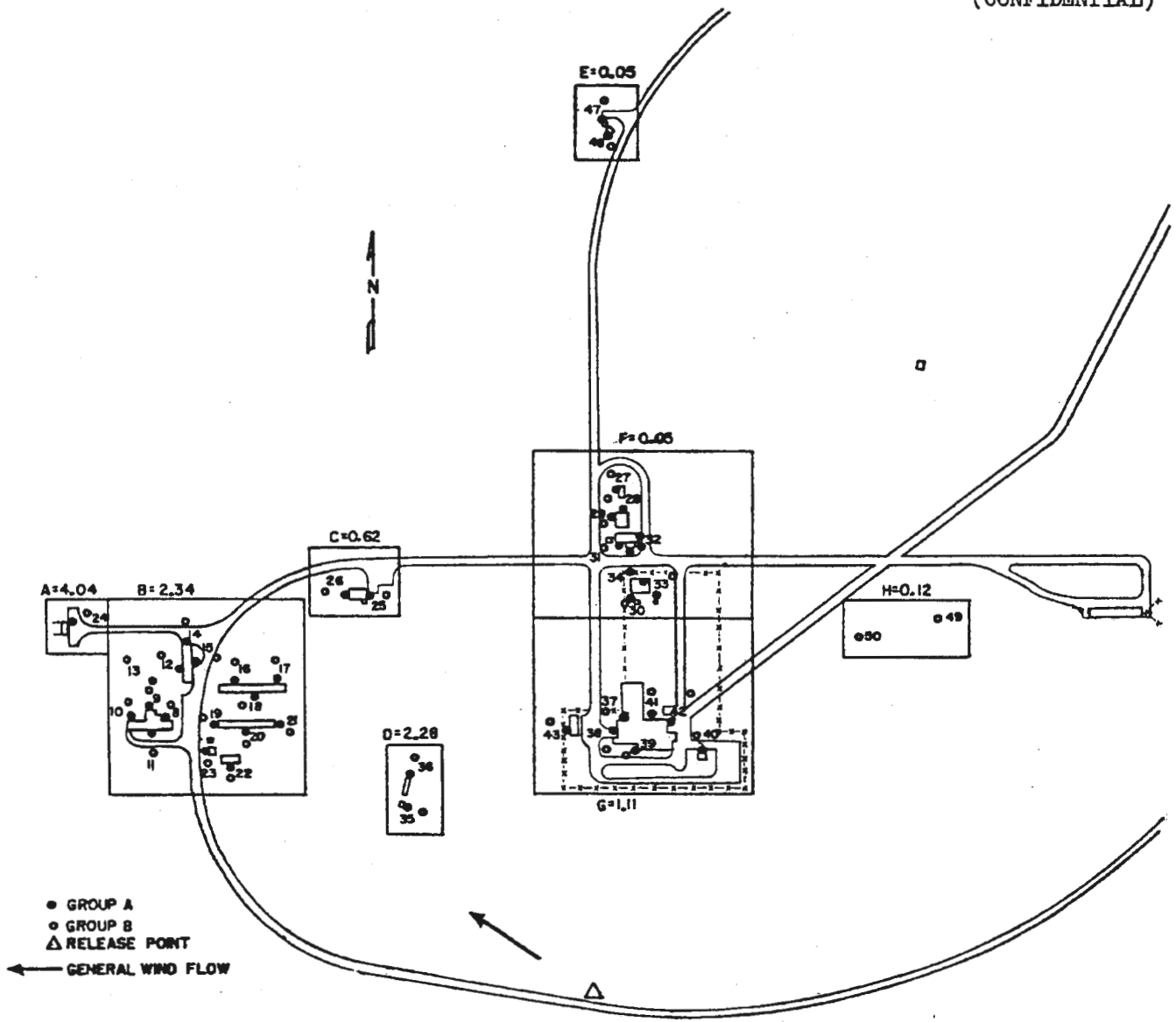


Fig. 8. - Average number of bites per host time unit, Trial E-2, BELLWETHER-II.

TABLE 9: Analysis of Variance of the Numbers of Bites Received, Trial E-2, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

SOURCE OF VARIATION	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE
Areas, A	7	205.289	1.94
S(Stations)/A (Error A)	32	106.070	
Groups (Group I versus Group II), G	1	230.414	15.10*
G x A	7	57.078	3.74*
G x S/A (Error B)	32	15.260	
Time, T	13	39.766	8.20*
T x A	91	12.383	2.55*
T x G	13	4.859	1.00
T x S/A (Error C)	416	4.847	
T x G x A	91	9.793	4.01*
T x G x S/A (Error D)	416	2.440	
Total	1119		

*Statistically significant at the 1.0 per cent level.

eight areas together with the release point and general wind direction prevailing during the 70 minutes of initial sampling (see also Figs. 9 through 12).[4] It may be seen that biting activity was greatest in those

[4](U) The direction of wind flow in the GPI-2 area during Trial E-2 perhaps needs further elucidation. GPI-2 lies in the mouth of the canyon which contained the southernmost of the two meteorological stations. This station was located near the water tank (see Figs. 9-12). At this station the winds reported were generally southwest. The other station was situated on the flattening slope in the open 0.5 mile to the north of the area, and there the winds were generally southeast. An assumed southeast wind flow for the built-up area in the canyon mouth was made for several reasons. The presence of two side canyons, with the larger one oriented southwest-to-northeast (see Figs. 9 and 12), could account for the southwest winds reported at the south meteorological station. The fact that the south-to-north extending upper canyon with its sharply rising walls would be in shadow earlier than the mouth would most probably result in a downflowing of relatively cool, dense air. This underiding, downflowing dense air would be subjected to a westward deflection both by the curving ridge of rock at the canyon mouth (see Figs. 9, 10, and 11) and by the general southeast windflow. Finally, this deflected air would be given a northerly impetus when it reached the western canyon wall, bringing it past Station 24. The observed pattern of mosquito movement would further support this belief that the actual wind flow pattern in the built-up area was southeast to northwest. The known need *for close-in meteorological* support in entomological field testing was clearly evidenced in this phase.

Fig. 9. - Oblique aerial view of GPI-2 area and environs. The dashed arrowed lines depict the probable wind tracks in the area for the release period of Trial E-2, Bio 551, HELIMETHER-II.

Fig. 10. - Panoramic view taken from a position up in the canyon and looking north toward mouth and GPI-2 area. The X shows the location of the deflecting ridge that is shown in a close-up view in Figure 11.

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Fig. 11. - Close-up view looking southwest, of the deflecting ridge marked as X in Figure 10. Water tank in right background (φ) denotes location of south meteorological station.

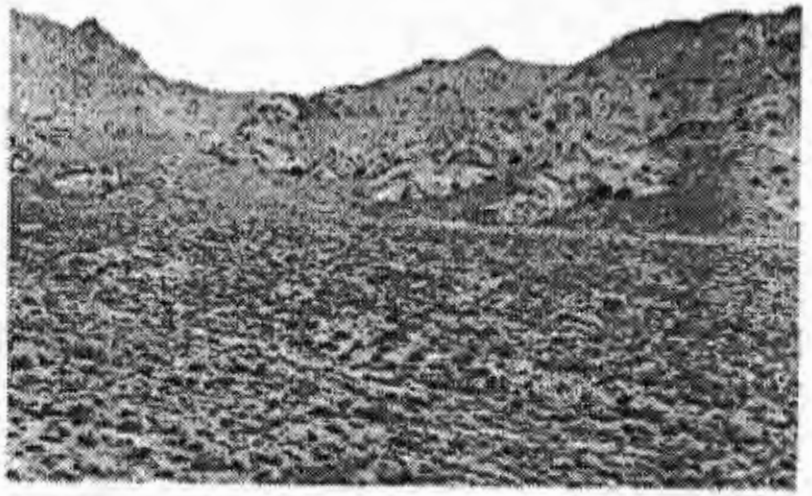

Fig. 12. - View, looking southwest, of the water tank location of the south meteorological station. The side canyons in the background contributed to the southwest wind flow reported here.

areas (A, B, and D) directly downwind from the release point and decreased with an increase in crosswind distance. Since this was generally true for the later as well as the initial sampling periods, it indicated that the vectors did not distribute themselves evenly throughout the built-up area.

(C) It should be noted that the southeast windflow moved the mosquitoes from the release point successively through Areas D, B, and A, and that the biting activity (average number of bites per host-time unit) increased with an increase in downwind distance. These two facts lend strong support to the conclusion reached in Phase B that intervening hosts do not interfere with the vector's downwind spread.

Variability Among Stations Within Areas

(U) Figure 13 illustrates the variability in the total biting activity reported among stations (Group I + Group II) within Area B in the initial sampling period. Although other areas showed similar variability, Area B was chosen since it contained more stations and had more reported bites. In addition, the distribution of bites in Area B, contrary to that observed in other areas, was unexpectedly systematic, and it was felt that these data should be particularly noted.

(C) It may be seen in Figure 13 that the total number of bites obtained at stations in Area B varied considerably, ranging from 0 at Station 15 to 254 at Station 20. Further, the total number of bites obtained at each of the stations in the southern section of Area B (Stations 8 through 11 and 19 through 23) was relatively high; while, in comparison, very few bites were recorded at stations to the north (Stations 12 through 17). The assumed general wind flow (see Footnote 4, above) probably directed a majority of the vectors to the southern part of Area B. The presence of the rows of generators on the southern loop road (see Fig. 14) would also contribute to this. When the vectors reached Area B, the orientation of the buildings may have hindered the spread of the vectors to the northern stations. However, other factors, such as flight in the crosswind direction, terrain slope, host density, or a combination of these or other factors might equally explain the results. Therefore, at present, the exact reason for the observed lack of uniformity in the distribution of bites throughout the area is not known.

Effect of Position (Group I versus Group II)

(C) The results of the analysis of variance (Table 9) indicated that there was a significant difference between the number of bites obtained at positions located near structures (Group I) and those located in open areas (Group II). Table 10 shows that the average number of bites per host-time unit was approximately twice as large for the Group I as for the Group II positions (Columns 17 and 18); however, the magnitude of the difference changed significantly with area. If the areas where higher biting occurred are examined (Areas A, B, and D), it may be seen that in Area A approximately three times as many bites were obtained at Group I positions

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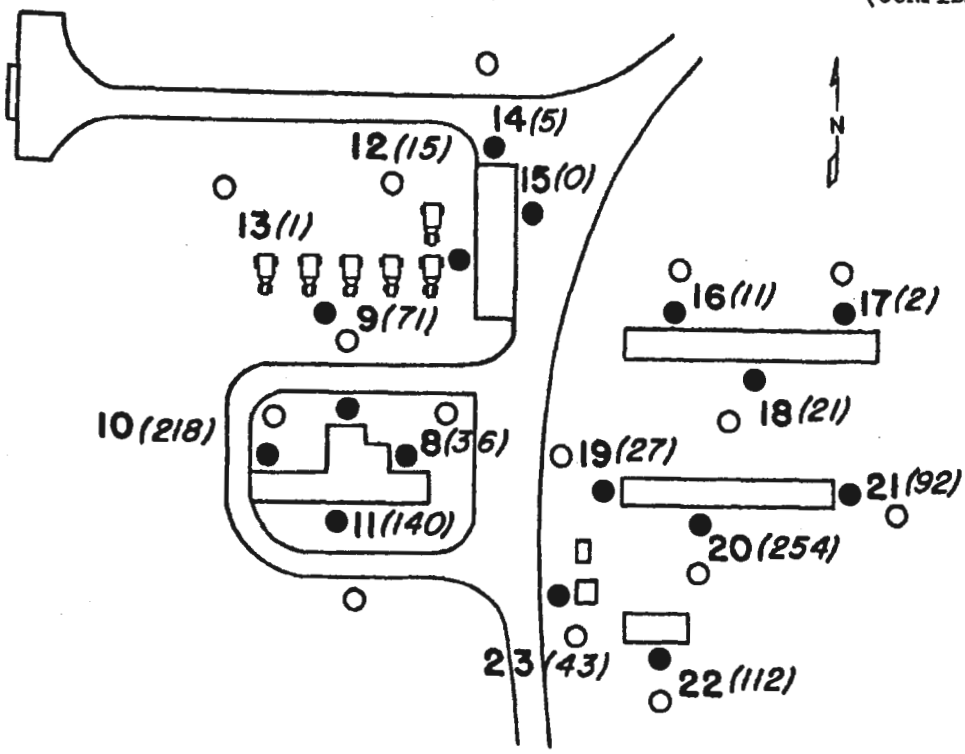

○ Sampling station 30 feet from building (Group II)

● Sampling station next to building (Group I)

Vehicle

8 Station number

(2) Total count per station

Relative biting activity reported by Group I and II hosts

STATION NUMBER	TOTAL BITES	
	Group I	Group II
8	30	6
9	71	1
10	126	92
11	107	33
12	13	2
13	0	1
14	5	0
15	0	0
16	9	2
17	0	2
18	11	10
19	4	23
20	152	102
21	13	79
22	67	45
23	31	12

Fig. 13. - Map showing the variability in biting activity (Group I + Group II) reported by stations in Area B for the initial sampling period, Trial E-2, BELLWETHER-II.

[redacted]

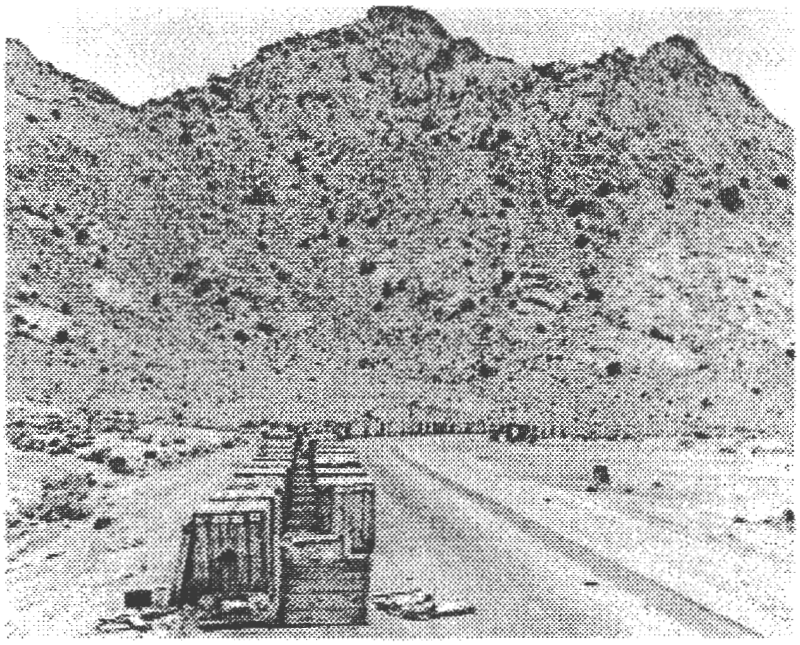

Fig. 14. - View of generators in open storage at GPI-2 area, BELLWETHER-II.

over Group II, while in Areas B and D the magnitude of the difference was less than two-fold. Since the total number of bites obtained in Area A was considerably larger than that in either Area B or D, this suggests that the magnitude of difference in bites obtained at positions near and away from structures increases with an increase in the total number of bites.

Effect of Time

(C) As shown in Column 19 of Table 10, biting activity, in general, reached a maximum 25 to 30 minutes after release and declined continually thereafter; however, the significant T x A and T x S interaction terms indicated that the amount of biting observed during various time periods was influenced by the area and station considered. This was as expected, for, presumably, more time would be needed for vectors to reach areas and stations located at greater distances from the release point than for those closer in. In general, the data for the various areas and stations (see Table 11) showed that the greater the distance from the release point, the later was the time when peak biting activity occurred.

TABLE 10: Vector Biting Activity Segregated With Respect to Area, Group, and Time, Trial E-2, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

TIME (Minutes)	AVERAGE NUMBER OF BITES PER HOST IN INDICATED GROUP OF INDICATED SUB-AREA																AVERAGE NUMBER OF BITES PER HOST		AVERAGE NUMBER OF BITES PER TIME PERIOD/ TRIAL
	Area A		Area B		Area C		Area D		Area E		Area F		Area G		Area H				
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	Group I	Group II	
0- 5	0.00	0.00	1.56	2.19	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.86	0.29	0.00	0.00	0.85	0.92	0.89
5-10	0.00	0.00	2.75	2.43	0.00	0.00	5.00	1.00	0.00	0.00	0.00	0.00	1.86	0.00	0.00	0.00	1.68	1.02	1.35
10-15	9.00	1.00	3.88	2.43	0.00	0.00	3.50	1.00	0.00	0.00	0.12	0.00	2.57	0.00	0.00	0.00	2.42	1.05	1.76
15-20	12.00	1.00	4.94	3.44	0.50	0.50	4.00	6.00	0.50	0.00	0.25	0.00	1.57	0.71	0.50	0.00	2.90	1.85	2.38
20-25	33.00	1.00	4.19	3.38	3.00	0.00	6.00	2.00	0.00	0.00	0.00	0.00	3.29	0.29	0.00	0.00	3.50	1.52	2.51
25-30	11.00	1.00	4.75	3.12	4.00	0.50	4.50	6.50	0.50	0.00	0.12	0.00	3.00	0.43	0.00	0.50	3.18	1.72	2.45
30-35	7.00	4.00	3.62	2.06	2.00	0.00	4.00	4.00	0.50	0.00	0.12	0.12	0.71	0.43	0.00	0.50	2.10	1.25	1.68
35-40	10.00	3.00	3.31	2.19	3.00	0.00	2.50	1.50	0.00	0.00	0.25	0.00	1.00	1.00	0.00	1.00	2.08	1.25	1.66
40-45	3.00	5.00	2.44	1.88	1.50	0.00	2.50	2.50	0.00	0.00	0.50	0.00	2.00	0.57	0.00	0.00	1.07	1.10	1.40
45-50	0.00	2.00	1.94	0.75	1.00	0.00	2.50	0.50	0.00	0.00	0.00	0.00	1.29	0.29	0.00	0.00	1.18	0.42	0.80
50-55	0.00	1.00	2.38	0.81	1.50	0.00	0.50	0.00	0.00	0.00	0.00	0.00	2.71	0.00	1.00	0.00	1.58	0.35	0.96
55-60	0.00	3.00	2.06	0.69	0.00	0.00	2.00	0.50	0.00	0.00	0.00	0.00	1.57	0.14	0.00	0.00	1.20	0.40	0.76
60-65	0.00	2.00	0.88	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.14	0.00	0.00	0.88	0.12	0.50
65-70	0.00	4.00	1.25	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.29	0.00	0.00	0.68	0.20	0.44
Average Number of Bites Per Host-Time Unit	6.07	2.00	2.85	1.83	1.18	0.07	2.75	1.82	0.11	0.00	0.10	0.01	1.89	0.33	0.11	0.14	1.85	0.94	1.40
Average Per Area	4.04		2.34		0.62		2.28		0.05		0.05		1.11		0.12				
Column Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

TABLE 11: Summary of Biting Data Obtained in Trial E-2, BELLWETHER-II, Bio 532 (CONFIDENTIAL)

AREA	A		B		B		B		B		B		B		B		B		B	
STATION	24		8		9		10		11		12		13		14		15		16	
GROUP	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Time (minutes)																				
0- 5	0	0	0	0	1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
5-10	0	0	0	0	3	0	5	0	4	3	0	0	0	0	0	0	0	0	1	0
10-15	9	1	2	0	7	0	12	0	11	5	0	1	0	0	0	0	0	0	0	0
15-20	12	1	4	0	6	1	20	0	18	5	2	0	0	1	0	0	0	0	0	0
20-25	33	1	3	1	6	0	20	16	10	2	1	1	0	0	1	0	0	0	0	0
25-30	11	1	5	1	8	0	17	17	14	4	2	0	0	0	1	0	0	0	1	0
30-35	7	4	4	0	8	0	14	8	7	3	1	0	0	0	0	0	0	0	2	0
35-40	10	3	2	1	9	0	12	14	6	2	2	0	0	0	0	0	0	0	1	2
40-45	3	5	3	2	6	0	5	18	6	0	1	0	0	0	0	0	0	0	1	0
45-50	0	2	3	0	3	0	6	7	7	1	1	0	0	0	0	0	0	0	0	0
50-55	0	1	2	0	4	0	5	5	10	2	1	0	0	0	1	0	0	0	2	0
55-60	0	3	1	0	5	0	5	7	6	1	2	0	0	0	2	0	0	0	1	0
60-65	0	2	1	0	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0
65-70	0	4	0	1	3	0	3	0	4	0	0	0	0	0	0	0	0	0	0	0
Group Totals	85	28	30	6	71	1	126	92	107	33	13	2	0	1	5	0	0	0	9	2
Station Total	113		36		72		218		140		15		1		5		0		11	

Continued

TABLE 11: (Continued)

AREA	B		B		B		B		B		B		B		C		C		F	
STATION	17		18		19		20		21		22		23		25		26		27	
GROUP	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Time (minutes)																				
0- 5	0	0	0	0	0	0	20	16	3	11	1	3	0	0	0	0	0	0	0	0
5-10	0	1	1	0	0	0	17	15	2	14	10	3	1	3	0	0	0	0	0	0
10-15	0	0	2	2	0	2	17	12	0	8	7	8	4	1	0	0	0	0	0	0
15-20	0	1	0	3	0	19	15	8	0	10	8	5	6	2	1	1	0	0	1	0
20-25	0	0	0	0	3	2	13	10	0	13	8	9	2	0	6	0	0	0	0	0
25-30	0	0	2	0	1	0	15	12	2	7	5	6	3	3	8	1	0	0	0	0
30-35	0	0	1	0	0	0	12	8	0	7	7	4	2	3	4	0	0	0	0	0
35-40	0	0	0	0	0	0	13	8	2	5	4	3	2	0	6	0	0	0	0	0
40-45	0	0	2	0	0	0	10	6	0	2	3	2	2	0	3	0	0	0	0	0
45-50	0	0	0	0	0	0	9	4	1	0	0	0	1	0	2	0	0	0	0	0
50-55	0	0	0	5	0	0	7	0	3	0	1	1	2	0	3	0	0	0	0	0
55-60	0	0	1	0	0	0	3	3	0	0	4	0	3	0	0	0	0	0	0	0
60-65	0	0	0	0	0	0	0	0	0	2	4	0	1	0	0	0	0	0	0	0
65-70	0	0	2	0	0	0	1	0	0	0	5	1	2	0	0	0	0	0	0	0
Group Totals	0	2	11	10	4	23	152	102	13	79	67	45	31	12	33	2	0	0	1	0
Station Total	2		21		27		254		92		112		43		35		0		1	

Continued

TABLE 11: Summary of Biting Data Obtained in Trial E-2, BELLWETHER-II, Bio 531 (Continued)

AREA	F		F		F		F		F		F		F		D		D		G		G	
STATION	28		29		30		31		32		33		34		35		36		37		38	
GROUP	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Time (minutes)																						
0- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3	0	0	1
5-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	4	1	5	0	1	0
10-15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	2	3	0	10	0	3	0
15-20	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	8	3	4	7	0	0	1
20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	4	2	4	1	1	0
25-30	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7	12	2	1	3	1	0	0
30-35	0	0	0	0	0	0	1	0	0	1	0	0	0	0	6	7	2	1	3	1	0	0
35-40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	1	0	5	0	1	1
40-45	0	0	0	0	0	0	1	0	3	0	0	0	0	0	4	5	1	0	8	0	1	0
45-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	1	3	0	2	0
50-55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	0	0	0
55-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0	7	0	1	0
60-65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	1	0
65-70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1
Group Totals	2	0	1	0	0	0	3	0	4	1	0	0	0	0	51	41	26	10	75	4	11	4
Station Total	2		1		0		3		5		0		0		92		36		79		15	

Continued

TABLE 11: (Concluded)

AREA	G		G		G		G		G		E		E		H		H		Total	Total
STATION	39		40		41		42		43		47		48		49		50		A	B
GROUP	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II		
Time (minutes)																				
0- 5	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	34	37
5-10	0	0	2	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	67	41
10-15	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	97	42
15-20	0	0	3	1	0	0	0	2	1	1	1	0	0	0	1	0	0	0	116	74
20-25	2	0	4	0	1	0	10	1	1	0	0	0	0	0	0	0	0	0	140	61
25-30	7	0	1	2	2	0	8	0	0	0	1	0	0	0	0	1	0	0	127	69
30-35	2	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	0	0	84	50
35-40	0	4	0	2	1	0	0	0	0	0	0	0	0	0	0	2	0	0	83	50
40-45	5	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	44
45-50	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	17
50-55	4	0	4	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	63	14
55-60	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	16
60-65	1	0	4	0	1	0	10	0	0	0	0	0	0	0	0	0	0	0	35	5
65-70	1	0	1	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	27	8
Group Totals	24	9	25	8	8	0	28	5	14	2	3	0	0	0	3	4	0	0	1036	528
Station Total	33		33		8		33		16		3		0		7		0		1564	

Variability Among Stations

(U) From an empirical examination of the various stations, it was evident that there existed considerable differences among them, and, moreover, it was not reasonable to expect similar biting activity. Two important differences in stations were:

1. The station location in relation to the release point and the general wind flow, and

2. The amount of protection from the wind that the building offered to the mosquitoes.

These differences are depicted, in part, by the selected stations shown in Figures 15 through 19.

(C) Station 20 (Fig. 15) was located near and downwind from the release point, while Stations 33 and 34 (Fig. 16) and Stations 47 and 48 (Fig. 17) were located at both greater distances and crosswind from the release point. A total of 254 bites was recorded at Station 20 as compared to 0, 0, 3, and 0 bites at Stations 33, 34, 47, and 48, respectively. This illustrates a general observation of Trial E-2--namely, that high vector biting activity was usually found only near and/or downwind from the release point.

(C) Station 24 (Fig. 18) was located downwind and at a distance approximately twice as far from the release point as were Stations 33 and 34 (Fig. 16). A total of 113 bites was obtained at Station 24. Comparing this result with the results obtained at Stations 33 and 34 illustrates the general finding that, under the conditions of this trial, vector biting activity had a higher correlation with downwind location than with distance from the release point. It should also be noted that Station 24 was approximately 1400 feet from the release point, an effective distance considerably greater than one would expect from examining the Phase B and C data.

(C) A total of 79 bites was obtained at Station 37, 75 of which were received at the position near the building. This comparison indicates that alcoves (see Fig. 19) offering shelter from the wind are highly attractive to the vectors. In support of this view, it may also be pointed out that at the remaining six stations of Area G, possessing no alcoves, an average of only 23 bites per station was obtained.

Results of the Second Crepuscular Period of Trial E-2

(U) In the morning (4 October 1960) following the evening vector release of Trial E-2, the troops returned to their assigned positions in the GPI-2 area. Bites received by each host were recorded for each 5-minute interval, and sampling was conducted from 0630 to 0830 MST and from 0920 to 1000 MST.

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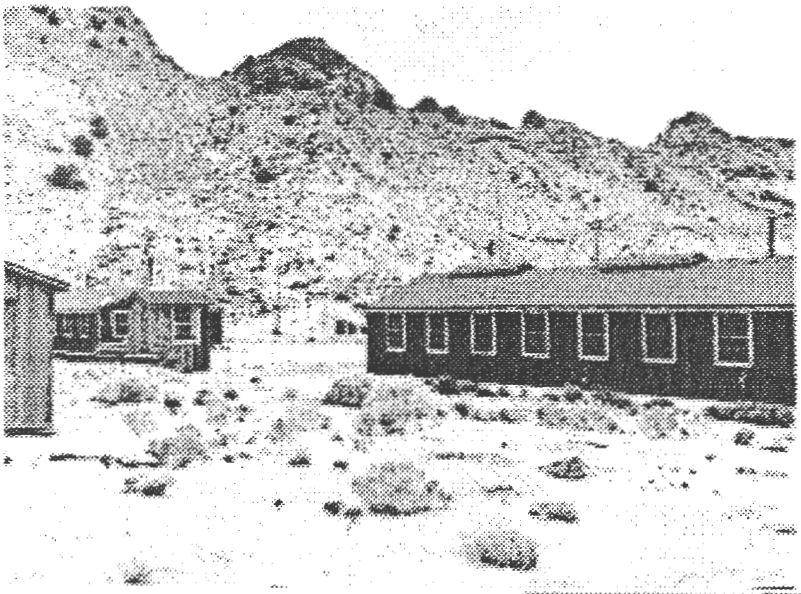

Fig. 15. - View of Station 20 (right center) Phase E, BELLMETHER-II.

(UNCLASSIFIED)

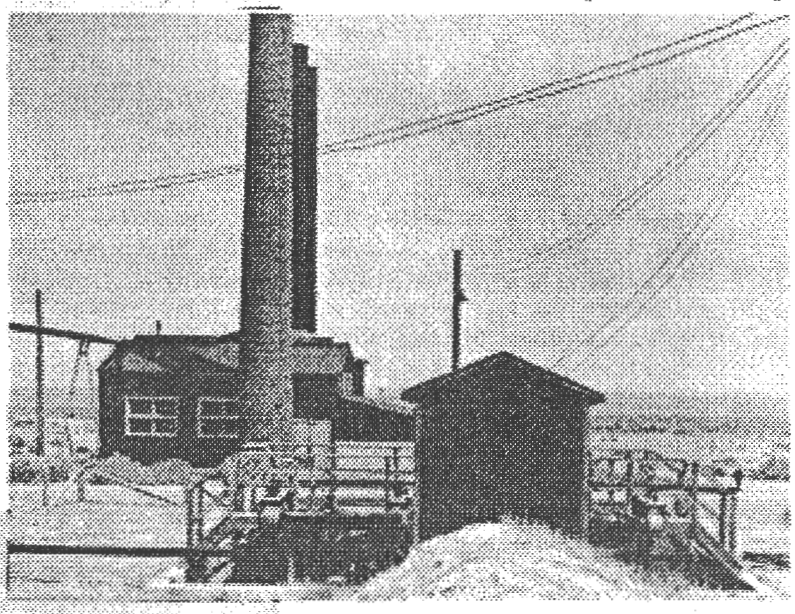

Fig. 16. - View of Stations 33 (right) and 34 (left) in the foreground, Phase E, BELLMETHER-II.

(UNCLASSIFIED)

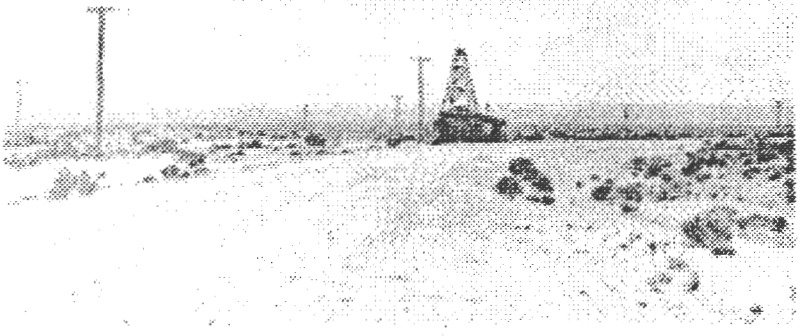

Fig. 17. - View of Stations 47 (front) and 48 (rear) located near building in center, Phase E, BELLMETHER-II.

(UNCLASSIFIED)

Fig. 18. - View of Station 24, Phase E, BELLMETHER-II.

(UNCLASSIFIED)

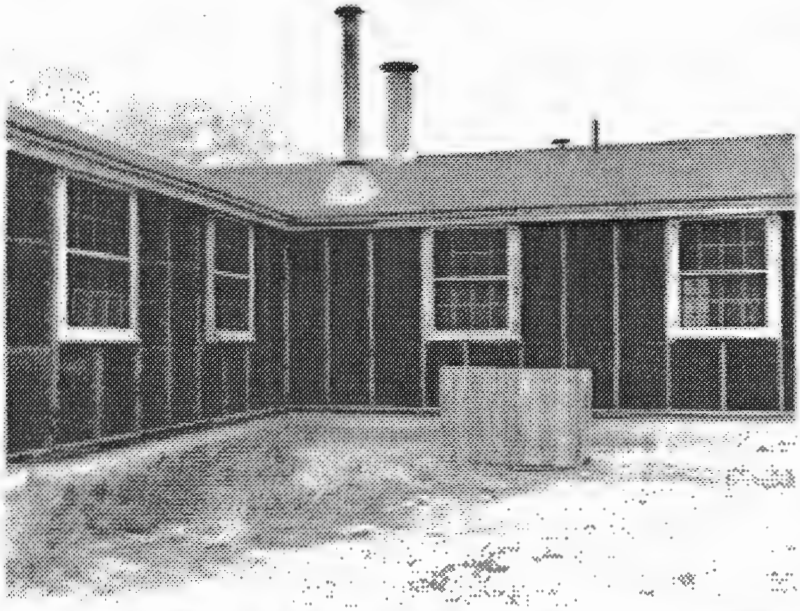

Fig. 19. - View of Station 37 showing alcove, Phase E, BELLMETHER-II.

[redacted]

(C) Only one bite was obtained throughout the test area from 0630 to 0800 MST; however, during this time, the air temperatures recorded at 0.5 meter averaged only 53.2°F. From 0800 to 0830 MST, the temperature increased to an average of 59.2°F, and in this interval a total of 25 bites was recorded.

(C) From 0920 to 1000 MST, with an average temperature of 72.6°F, a total of 128 bites was obtained. These results, segregated with respect to time and group, are presented in Table 12.

TABLE 12: Biting Results Obtained from 0920 to 1000 MST Segregated With Respect to Time and Group, Trial E-2, BELLWETHER-II, Bio 531 (CONFIDENTIAL)

TIME INTERVAL (MST)	TOTAL NUMBER OF BITES PER INDICATED GROUP		TOTAL NUMBER OF BITES
	Group I	Group II	
0920-0925	13	4	17
0925-0930	4	7	11
0930-0935	13	12	25
0935-0940	15	4	19
0940-0945	11	4	15
0945-0950	7	0	7
0950-0955	20	3	23
0955-1000	8	3	11
TOTAL	91	37	128

(U) As a result of comparing this low vector biting activity with that obtained during the previous crepusoular period, sampling was terminated at 1000 MST and was not reinstituted that evening.

PHASE F

(C) The purpose of the Phase F trials was to determine the average longevity of the A. aegypti mosquito when exposed to ambient desert conditions. To answer this objective, four 100-vector exposure cage cones, two containing guinea-pig-fed mosquitoes and two with starved mosquitoes, were exposed to ambient desert conditions at ground level. One cage of guinea-pig-fed and one of starved vectors were placed in relatively dense, indigenous vegetation; the other two cages were positioned in the open nearby. Observations were to be made as to the total number of survivors at the end of each hour for a period of 24 hours or until at least 50 per cent of the vectors had died. Four trials were originally scheduled. These trials were conducted near Baker Laboratory under the direction of the Test Officer.

[redacted]

(U) Two Phase F trials were completed, both of which were subsequently classified as aborts. This resulted primarily because 100 vectors proved to be too large a number in one cage for adequately classifying them as to either dead or alive without removing the dead from the cage. In attempting to remove the dead mosquitoes from the cage, the procedure followed was to invert the cone, thereby shaking the dead into the cap and (hopefully) inducing the live ones to fly to the upper parts of the cone. However, a number of live vectors remained in the cap area and escaped when it was removed. As a result, it was impossible to determine the percentage of vectors surviving.

DISCUSSION

(C) BELLWETHER-II was conducted primarily to develop a field test technology that would be useful for the testing of various arthropod vector systems. Approximately 100 military personnel from the 45th and 46th Chemical Companies of the 2nd Chemical Battalion (Smoke Generator) were assigned to be samplers in these trials. The lack of security clearance for the military personnel posed a difficult situation. The men could not be expected to perform their tasks to the best of their ability when the test design did not make sense to them; yet the purposes of these procedures could not safely be made meaningful to uncleared personnel.

(U) Other field test technology problems that developed in BELLWETHER-II included meteorological instrumentation and laboratory procedures.

(U) The meteorological stations were both too few and too far away from the points of primary interest--the centers of the circles, squares, and areas. The meteorological stations had been moved away from the testing network to prevent their bulk and personnel from distorting the test results. During periods of large-scale weather phenomena--i.e., pre- and post-frontal passages, strong low pressure systems located close by, etc.--the wind movements are relatively steady and close-in meteorological support is not critical. However, the requirements for low wind speeds in field testing mosquitoes would usually rule out general, steady wind flows; therefore, light winds, variable in both speed and direction, are the rule. Since mosquitoes have been found to be so extremely sensitive to winds (see 2), only data selecting the variable wind movements to which the vectors are actually exposed will yield information resolving much of the variability occurring between trials. Because of the imperative need for reducing the excessive trial-to-trial variability, it is necessary that close-in meteorological support be furnished for future field trials.

(U) The second problem was laboratory control. The general procedures followed for rearing the test vectors used in the DPG tests have been for Baker Laboratory to grow the mosquitoes from egg papers furnished by BioLabs. When a batch of larvae reached the pupal stage, the sexes were separated and female pupae were counted out into ice cream cartons of

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a size dependent upon the particular trial for which they were scheduled. Here they were held, fed when necessary, and then used in the various trials. The vectors were required to be 6 to 10 days of age (as adults) and starved for 12 to 24 hours prior to use.

(U) Under the belief that these general laboratory procedures would yield a standard product, no specific laboratory controls were made. However, certain anomalous vector behavior situations were observed during the course of BELLWETHER-II. In Trial B-3, those mosquitoes released at the center of the single 250-foot circle failed to reach the periphery. Although this probably could have been resolved by having the men, at the end of the trial, move in toward the center noting where the mosquitoes were, it was not done. In Trial E-3, the vectors stayed in a ball on the ground at the release point; they were alive but failed to move out. (A footnote to Table XX of Technical Study 7B (4) states that, on a 40-mosquito release, "12 mosquitoes did not leave the floor." This could be the same phenomenon.) The reasons for this anomalous behavior could probably have been ascertained had laboratory control batches of the same lots of vectors been maintained and observed in the insectary. Since these behavioral anomalies could have developed anywhere from variations in egg papers to the environment immediately before the trial, tighter laboratory controls are an obvious necessity and will be implemented in future testing. In addition, sample batches will also be transported to the field, and, although they will not be released, they will be exposed to the same ambient conditions as the test lots. After the completion of the trial, these will be returned to the insectary and observed. Complete records will be kept on all batches and lots. It has proved impossible to find any logical reason for the greatly enhanced biting incurred in Trial B-2 (see Table 1), and more comprehensive laboratory control work might possibly have shown the reason(s).

(C) The mosquitoes used in BELLWETHER-I and -II were reared in an insectary having an 82°F temperature and a relative humidity of 80 per cent. While these conditions are ideal for a tropical mosquito scheduled for release under tropical conditions, the sudden change to ambient desert conditions of often widely differing temperatures and much lower humidities might constitute a shock to the mosquito's physiological system. Therefore, pre-trial temperature conditioning will be investigated prior to and in future testing.

(U) Parker (5), commenting on the observed differences in the mosquito responses to dry and moist surfaces at different temperatures as contrastingly reported both by him and by Christophers (6), suggests that the subsequent mosquito behavioral patterns were more dependent on the temperature-humidity conditions during rearing and holding than were generally realized. In both investigations the insects had been exposed from, or very nearly from, the time of emergence to the temperatures and humidities at which the experiments were later performed: Parker's at 82.4°F (28°C) and 50 to 70 per cent relative humidity and Christophers' at 77.0°F (25°C) and 80 to 90 per cent relative humidity. Parker further suggests that a temperature-humidity difference operating before an experiment can so condition the females as to produce the same type of difference in response as can a similar temperature and humidity difference operating during the

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experiment. These thoughts strongly indicate a further need for additional laboratory work to ascertain the optimum rearing-holding conditions for different environmental releases.

CONCLUSIONS

(S) From the data generated in BELLWETHER-II, and under the specific conditions encountered, it is concluded that:

1. In a 30-minute sampling period, there was no significant difference in vector biting activity at distances up to 100 feet from the release point, but maximum biting activity occurred at distances less than 200 feet.

2. Intervening hosts did not interfere with either the vector's outward spread or biting activity.

3. No conclusive findings were generated as to the effect of host concentration.

4. When the number of vectors was increased by a factor of 10, approximately 10 times as many bites were received and the proportion of hosts bitten was increased an average of 36 per cent.

5. Vector biting activity showed a tendency to be highest when the hosts were alternately in motion and then motionless for recurring 5-minute periods, and to be lowest when the hosts moved continuously.

6. Hosts located near buildings were subjected to significantly greater vector biting activity than were hosts located in open areas.

7. Vectors did not tend to distribute themselves evenly throughout an isolated built-up area and, further, they did not tend to redistribute themselves evenly during the interims between host occupations.

8. No conclusive findings were generated as to the optimum sampling duration.

9. No evidence of crepuscular-period biting preference was obtained in these trials.

10. No conclusive findings were generated concerning the average longevity of this species when exposed to ambient desert conditions.

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LITERATURE CITED
(UNCLASSIFIED)

1. Letter, CMLRD-A, to Commanding Officer, Dugway Proving Ground, Utah, 21 June 1960, subject: Entomological Field Testing (U). Secret.

2. Technical Report DPGR 259, Outdoor Mosquito Biting Activity Studies, Project BELLWETHER-I, BW 459 (U), Dugway Proving Ground, Utah, December 1960. Secret.

3. Technical Memorandum Number 9-18, Operation QUICKHENRY, BW 445 Series, Entomology Division, U. S. Army Chemical Corps Biological Laboratories, Fort Detrick, Frederick, Maryland, June 1960. Secret.

4. Technical Study 7B, Short Title XYA-8121 (U), Biological Warfare Laboratories, Fort Detrick, Frederick, Maryland, July 1958. Secret.

5. A. H. Parker. The effect of a difference in temperature and humidity on certain reactions of female Aedes aegypti (L). Bulletin of Entomological Research. Volume 43, 1953, Unclassified.

6. S. R. Christophers. Mosquito repellents, being a report on the work of the Mosquito Repellent Enquiry, Cambridge, 1943-45. Journal of Hygiene, Volume 45, 1947, Unclassified.

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APPENDIX A

METEOROLOGICAL DATA

(UNCLASSIFIED)

TABLE 1: Wind Direction and Speed Data for Trial B-1, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	EAST POSITION, 2.0 METERS				WEST POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	198	164-226	5.8	2.4 - 9.1	097	063-138	6.7	2.7 - 12.4
Z to Z+5	201	088-315	4.6	1.2 - 13.6	122	072-176	6.9	1.3 - 14.2
Z+5 to Z+10	156	072-252	4.4	1.4 - 13.2	074	000-203	5.3	<0.5 - 10.0
Z+10 to Z+15	121	041-204	6.2	1.0 - 13.5	095	355-173	4.8	1.2 - 9.4
Z+15 to Z+20	158	007-324	3.3	<0.5 - 7.0	177	123-237	8.4	4.6 - 13.1
Z+20 to Z+25	147	093-192	6.2	2.5 - 10.6	154	108-214	6.2	2.3 - 12.0
Z+25 to Z+30	194	156-264	6.2	2.5 - 10.3	147	099-192	7.6	3.0 - 12.6
Z+30 to Z+35	169	135-264	6.7	2.5 - 13.6	138	077-176	8.8	3.5 - >15.0
Z+35 to Z+40	182	106-221	6.7	4.3 - 13.1	144	081-196	5.7	2.4 - 10.8
Z+40 to Z+45	178	129-217	5.7	3.1 - 10.4	147	084-198	6.2	2.1 - 11.1
Z+45 to Z+50	183	126-259	6.5	1.5 - 12.1	158	114-182	7.1	3.9 - 12.8
Z+50 to Z+55	180	086-239	9.3	4.0 - 13.9	146	081-204	8.2	2.3 - 13.6
Z+55 to Z+60	117	086-150	8.8	5.4 - 12.5	147	090-182	9.6	4.1 - 14.8
Average	168		6.2		134		7.0	

This information was taken on 6 September 1960 at the indicated positions. Function times were 1405, 1410, and 1428 MST. Z denotes 1410 MST function time.

TABLE 2: Cloud Cover, Temperature, and Relative Humidity Data for Trial B-1, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
Z +10	4	89.9	90.3	23
Z +5	4	89.8	85.7	23
Z +20	5	90.0	92.0	20
Z +35	5	90.1	90.8	21
Z +50	4	90.0	92.0	20
Z +60	4	90.1	92.6	19
Average		90.0	90.6	21.0

These data were taken at the East Position.

TABLE 3: Ultraviolet Radiation Data, Trial B-1, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1401 to 1406	33075
1406 to 1411	44100
1411 to 1417	42875
1417 to 1422	80850
1422 to 1425	49000
1425 to 1430	78400
1430 to 1435	74725
1435 to 1440	75950
1440 to 1445	75950
1445 to 1451	84525
1451 to 1455	52675
1455 to 1500	72275
1500 to 1505	63700
1505 to 1510	67375
Average	73,962

[redacted]

TABLE 4: Wind Direction and Speed Data for Trial B-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	EAST POSITION, 2.0 METERS				WEST POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	355	180 - 171	2.8	<0.5 - 7.2	348	309 - 039	5.6	1.0 - 10.2
Z to Z+5	345	295 - 064	2.6	<0.5 - 5.4	216	324 - 243	1.6	0.5 - 6.2
Z+5 to Z+10	032	342 - 079	2.2	<0.5 - 4.2	337	196 - 020	3.6	0.5 - 6.8
Z+10 to Z+15	068	347 - 126	2.4	0.5 - 4.8	330	240 - 015	5.0	1.1 - 11.0
Z+15 to Z+20	312	232 - 036	3.4	<0.5 - 7.7	354	262 - 132	4.6	0.5 - 9.1
Z+20 to Z+25	005	266 - 060	2.8	1.0 - 8.8	280	201 - 019	4.6	1.2 - 7.4
Average	037		2.7		311		4.2	

This information was taken on 23 September 1960 at the indicated positions. Function time (Z) was 1132 MST.

TABLE 5: Cloud Cover, Temperature, and Relative Humidity Data for Trial B-2, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
East Position				
Z -32	-*	-	68.9	17
Z	-	-	70.8	19
Z +10	-	-	71.7	15
Z +20	-	-	73.8	14
Z +30	-	-	73.0	15
Average			71.6	16
West Position				
Z -32	2	74.5	68.4	25
Z	1	74.5	71.6	20
Z +10	1	72.4	69.2	19
Z +20	1	70.3	70.7	17
Z +30	1	69.5	71.6	18
Average		72.2	70.3	20

*No data.

TABLE 6: Ultraviolet Radiation Data, Trial B-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1125 to 1130	102,900
1130 to 1135	90,650
1135 to 1140	74,725
1140 to 1145	117,600
1145 to 1150	88,200
1150 to 1155	84,525
1155 to 1200	83,300
Average	91,700

[redacted]

TABLE 7: Wind Direction and Speed Data for Trial B-3, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	211	139 - 273	4.7	1.7 - 8.0	178	116 - 265	2.8	0.7 - 5.9
Z to Z+5	192	114 - 216	1.9	<0.5 - 4.0	151	099 - 183	2.5	0.8 - 4.6
Z+5 to Z+10	237	100 - 285	3.8	1.0 - 6.1	207	124 - 313	3.1	0.7 - 6.7
Z+10 to Z+15	250	194 - 300	2.1	<0.5 - 3.9	272	251 - 324	4.6	2.4 - 7.1
Z+15 to Z+20	011	185 - 051	3.8	1.5 - 7.7	209	099 - 274	1.9	0.6 - 5.1
Z+20 to Z+25	048	031 - 185	1.0	<0.5 - 2.3	259	136 - 270	5.0	2.5 - 6.7
Average	156		2.7		222		3.4	

This information was taken on 19 October 1960 at the indicated positions. Function time (Z) was 1457 MST.

TABLE 8: Cloud Cover, Temperature, and Relative Humidity Data for Trial B-3, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z -10	1	-*	69.4	25
Z	1	-	69.6	24
Z +10	1	-	70.4	17
Z +20	2	-	70.3	24
Z +30	2	-	70.1	23
Average			70.0	23
South Position				
Z -10	1	-	71.0	28
Z	1	-	70.0	28
Z +10	1	-	-	-
Z +20	1	-	69.8	-
Z +30	2	-	69.9	-
Average			70.2	28

*No data.

TABLE 9: Ultraviolet Radiation Data, Trial B-3, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1450 to 1455	31,850
1455 to 1500	30,625
1500 to 1505	28,175
1505 to 1510	25,725
1510 to 1515	23,275
1515 to 1520	20,825
1520 to 1525	15,925
1525 to 1530	18,375
Average	24,347

TABLE 10: Wind Direction and Speed Data for Trial C-1, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	EAST POSITION, 2.0 METERS				WEST POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	172	138-197	8.0	1.0 - 13.0	174	094-228	5.2	1.1 - 9.0
Z to Z+5	198	155-283	6.6	1.2 - 10.0	192	174-206	7.9	4.6 - 11.6
Z+5 to Z+10	158	112-213	6.8	3.1 - 13.1	199	162-225	6.5	4.3 - 10.0
Z+10 to Z+15	180	136-212	7.4	4.4 - 11.9	190	155-213	7.0	2.6 - 12.2
Z+15 to Z+20	185	139-219	8.3	5.0 - 11.4	181	156-204	7.1	0.8 - 11.4
Z+20 to Z+25	180	152-220	8.0	5.5 - 12.8	189	159-209	7.6	1.9 - 13.7
Z+25 to Z+30	198	143-278	5.8	1.0 - 11.2	175	151-206	6.8	4.0 - 12.4
Z+30 to Z+35	208	169-242	7.4	3.8 - 12.5	162	135-190	6.8	1.8 - 10.6
Average	185		7.3		183		6.9	

This information was taken on 19 September 1960 at the indicated positions. Function time (Z) was 1140 MST.

TABLE 11: Cloud Cover, Temperature, and Relative Humidity Data for Trial C-1, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
East Position				
Z -10	-*	102.8	84.4	14
Z	-	103.1	84.7	15
Z +10	-	103.7	87.0	11
Z +20	-	103.9	87.0	13
Z +30	-	104.1	87.2	13
Average		103.5	86.1	13
West Position				
Z + 5	-	103.4	85.0	14
Z +15	-	103.6	84.6	13
Z +25	-	103.8	83.8	8
Z +35	-	104.0	84.9	15
Average		103.7	84.6	

*No data.

TABLE 12: Ultraviolet Radiation Data, Trial C-1, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1130 to 1135	94,325
1135 to 1141	113,925
1141 to 1145	74,725
1145 to 1150	93,100
1150 to 1155	98,000
1155 to 1200	96,775
1200 to 1205	98,000
1205 to 1210	98,000
1210 to 1215	99,225
Average	96,231

[redacted]

TABLE 13: Wind Direction and Speed Data for Trial C-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	INOPERATIVE		9.5	5.0 ->15.0	315	294-339	9.5	4.2 - 14.8
Z to Z+5	319	272-360	5.7	1.6 - 9.8	318	285-351	6.7	3.2 - 10.6
Z+5 to Z+10	321	240-063	6.4	1.9 - 14.5	329	286-007	9.5	5.8 - 13.3
Z+10 to Z+15	328	240-039	6.7	3.1 - 13.5	336	302-011	7.6	1.8 - 11.1
Z+15 to Z+20	321	293-348	7.6	3.4 - 11.7	313	279-344	8.4	5.3 - 12.7
Z+20 to Z+25	326	273-352	4.5	1.3 - 7.7	315	278-330	8.7	4.3 - 13.1
Z+25 to Z+30	311	268-111	3.1	1.2 - 13.9	347	312-014	8.9	6.6 - 11.4
Average	321		6.2		325		8.5	

This information was taken on 22 September 1960 at the indicated positions. Function time (Z) was 1458 MST.

TABLE 14: Cloud Cover, Temperature, and Relative Humidity Data for Trial C-2, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z -48	-*	87.0	70.0	29
Z	-	90.1	70.0	35
Z +10	-	93.0	70.1	36
Z +20	-	92.9	70.3	30
Z +30	-	92.9	72.1	29
Average		91.2	70.5	31.8
South Position				
Z -28	3	73.7	70.8	30
Z +2	2	71.5	69.6	30
Z +12	2	71.6	70.1	31
Z +22	2	71.1	70.4	29
Z +32	2	70.9	70.6	30
Average		71.8	70.3	30

*No data.

TABLE 15: Ultraviolet Radiation Data, Trial C-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 A (Microwatts per second per cm^2)
1430 to 1445	207,025
1445 to 1450	63,700
1450 to 1500	117,600
1500 to 1505	56,350
1505 to 1510	52,675
1510 to 1515	49,000
1515 to 1520	45,325
1520 to 1525	44,100
1525 to 1530	40,425
Average	75,133

TABLE 16: Wind Direction and Speed Data for Trial C-3, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	EAST POSITION, 2.0 METERS				WEST POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	261	198-319	4.0	0.9 - 7.0	275	191-012	2.4	<0.5 - 5.1
Z to Z+5	279	230-332	5.0	2.2 - 8.7	268	231-332	4.3	0.7 - 6.5
Z+5 to Z+10	270	215-314	5.1	2.5 - 7.7	268	216-324	3.1	<0.5 - 5.6
Z+10 to Z+15	282	189-327	2.6	<0.5 - 4.9	293	212-331	2.9	0.5 - 7.9
Z+15 to Z+20	279	200-324	4.2	1.4 - 7.2	269	230-334	3.6	<0.5 - 7.2
Z+20 to Z+25	281	204-313	5.2	2.3 - 8.1	282	235-306	2.5	0.6 - 5.6
Z+25 to Z+30	245	191-297	4.1	2.3 - 7.7	289	250-324	3.5	1.1 - 5.9
Z+30 to Z+35	282	252-314	4.9	1.8 - 7.7	269	226-340	4.6	<0.5 - 6.4
Average	272		4.4		276		3.4	

This information was taken on 29 September 1960 at the indicated positions. Function time (Z) was 1045 MST.

TABLE 17: Cloud Cover, Temperature, and Relative Humidity Data for Trial C-3, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
East Position				
Z -5	-*	67.7	53.5	30
Z +5	-	68.5	53.5	30
Z +15	-	68.0	54.1	26
Z +25	-	67.8	53.5	26
Z +35	-	68.0	53.8	27
Average		68.0	53.7	28
West Position				
Z -5	2	-	71.8	28
Z +5	2	-	72.2	28
Z +15	2	-	72.6	28
Z +25	1	-	73.1	28
Z +35	1	-	74.2	26
Average			72.8	28

*No data.

TABLE 18: Ultraviolet Radiation Data, Trial C-3, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1040 to 1050	73,500
1050 to 1055	26,950
1055 to 1100	34,300
1100 to 1105	34,300
1105 to 1110	20,825
1110 to 1115	26,950
1115 to 1120	24,500
Average	34,475

[redacted]

TABLE 19: Wind Direction and Speed Data for Trial C-5, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	EAST POSITION, 2.0 METERS				WEST POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	327	295-012	5.6	3.0 - 8.7	INOPERATIVE*		INOPERATIVE	
Z to Z+5	325	277-012	3.9	1.0 - 7.0	INOPERATIVE		INOPERATIVE	
Z+5 to Z+10	301	277-352	4.6	1.3 - 8.4	INOPERATIVE		INOPERATIVE	
Z+10 to Z+15	307	261-354	4.2	0.7 - 7.3	INOPERATIVE		INOPERATIVE	
Z+15 to Z+20	288	255-319	5.2	2.1 - 7.9	INOPERATIVE		INOPERATIVE	
Z+20 to Z+25	297	275-341	4.5	1.8 - 7.2	INOPERATIVE		INOPERATIVE	
Z+25 to Z+30	274	216-317	3.1	0.5 - 5.7	INOPERATIVE		INOPERATIVE	
Z+30 to Z+35	277	215-347	2.3	0.9 - 4.7	INOPERATIVE		INOPERATIVE	
Average	300		4.2					

*West position inoperative in Trial C-5.

This information was taken on 17 October 1960 at the indicated position. Function time (Z) was 1350 MST.

TABLE 20: Cloud Cover, Temperature, and Relative Humidity Data for Trial C-5, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
East Position				
Z-10	9	-*	63.8	26
Z	9	-	64.3	24
Z+10	9	-	64.9	23
Z+20	9	-	65.0	22
Z+30	9	-	65.7	22
Average			64.7	23

*No data.

TABLE 21: Ultraviolet Radiation Data, Trial C-5, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1345 to 1350	24,500
1350 to 1355	23,275
1355 to 1400	22,050
1400 to 1405	22,050
1405 to 1410	17,150
1410 to 1415	18,375
1415 to 1420	18,375
1420 to 1425	19,600
Average	20,672

TABLE 22: Wind Direction and Speed Data for Trial C-6, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	315	263-014	3.6	1.5-6.5	291	263-317	3.8	1.3-6.5
Z to Z+5	340	310-013	3.7	0.7-6.9	289	267-333	2.4	<0.5-5.4
Z+5 to Z+10	315	263-006	4.0	1.5-8.0	346	253-036	1.1	<0.5-2.4
Z+10 to Z+15	294	270-341	4.4	2.3-6.5	342	302-003	1.2	<0.5-2.9
Z+15 to Z+20	311	264-342	3.9	1.4-6.1	349	309-018	3.3	0.7-4.9
Z+20 to Z+25	322	290-068	3.0	<0.5-6.1	351	342-360	3.4	2.1-5.3
Z+25 to Z+30	357	270-065	1.7	<0.5-3.3	341	333-351	3.3	0.9-5.5
Z+30 to Z+35	293	254-351	1.6	<0.5-3.7	311	264-337	2.6	<0.5-4.9
Average	318		3.2		328		2.6	

This information was taken on 20 October 1960 at the indicated positions. Function time (Z) was 1514 MST.

TABLE 23: Cloud Cover, Temperature, and Relative Humidity Data for Trial C-6, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z -4	1	65.3	68.2	34
Z +6	1	65.0	67.0	34
Z +16	1	66.0	65.1	39
Z +26	1	64.1	65.0	37
Z +36	1	63.8	67.0	31
Average		64.8	66.5	35
South Position				
Z -4	0	76.1	73.5	19
Z +6	0	68.2	75.0	17
Z +16	0	67.5	76.5	17
Z +26	0	66.9	74.6	17
Z +46	0	66.0	72.1	19
Average		68.9	74.3	18

TABLE 24: Ultraviolet Radiation Data, Trial C-6, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1515 to 1520	14,700
1520 to 1525	15,925
1525 to 1530	11,025
1530 to 1535	9,800
1535 to 1540	8,575
1540 to 1545	7,350
1545 to 1550	7,350
Average	10,675

TABLE 25: Wind Direction and Speed Data for Trial D-1, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	246	243-248	4.8	0.7 - 9.8	229	130-279	5.6	<0.5 - 8.5
Z to Z+5	244	194-261	4.7	1.4 - 8.7	229	188-269	6.4	2.3 - 9.0
Z+5 to Z+10	221	198-262	7.5	2.0 -10.0	252	174-297	6.0	2.5 - 10.9
Z+10 to Z+15	221	183-256	5.2	2.2 - 9.2	268	224-351	6.2	1.8 - 10.6
Z+15 to Z+20	239	214-265	6.9	1.8 - 8.9	252	203-309	5.6	2.6 - 10.0
Z+20 to Z+25	246	219-270	5.4	0.6 - 7.3	254	225-318	6.2	3.9 - 10.0
Z+25 to Z+30	239	189-295	5.3	<0.5 - 8.6	270	249-303	9.8	5.0 - 12.8
Z+30 to Z+35	268	238-294	6.6	3.9 - 9.9	259	230-310	6.2	2.2 - 8.6
Z+35 to Z+40	-*	-	-	-	280	240-332	8.0	2.2 - 11.3
Average	240		5.8		255		6.7	

*No data.

This information was taken on 15 September 1960 at the indicated positions. Function time (Z) was 1105 MST.

TABLE 26: Cloud Cover, Temperature, and Relative Humidity Data for Trial D-1, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
South Position				
Z-5	0	92.2	74.0	32
Z+5	0	90.9	74.8	30
Z+15	0	91.4	75.2	30
Z+25	0	91.3	75.5	31
Z+35	0	93.8	77.0	26
Average		91.9	75.3	30

TABLE 27: Ultraviolet Radiation Data, Trial D-1, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1100 to 1105	67,375
1105 to 1110	57,575
1110 to 1115	50,225
1115 to 1120	60,025
1120 to 1125	67,375
1125 to 1130	67,375
1130 to 1135	66,150
Average	62,300

TABLE 28: Wind Direction and Speed Data for Trial D-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	315	286-037	2.5	1.4 - 3.7	340	264-036	2.5	<0.5 - 5.5
Z to Z+5	295	288-351	1.8	<0.5 - 3.4	330	288-360	4.0	1.0 - 7.2
Z+5 to Z+10	286	209-344	2.8	<0.5 - 5.3	284	250-340	4.8	1.8 - 7.4
Z+10 to Z+15	265	214-312	1.9	<0.5 - 4.9	303	250-352	3.7	<0.5 - 5.7
Z+15 to Z+20	252	141-313	1.6	<0.5 - 3.4	337	306-040	3.6	1.0 - 5.8
Z+20 to Z+25	249	219-288	1.8	<0.5 - 3.6	294	246-342	3.9	1.1 - 5.1
Z+25 to Z+30	248	189-063	3.4	1.2 - 5.4	328	283-009	4.8	2.1 - 10.4
Z+30 to Z+35	285	063-023	6.0	3.8 - 8.0	349	245-030	6.1	3.3 - 10.2
Z+35 to Z+40	312	275-360	5.9	3.3 - 8.9	252	216-282	INOPERATIVE	
Average	279		3.1		313		4.2	

This information was taken on 28 September 1960 at the indicated positions. Function time (Z) was 1005 MST.

SECRET

TABLE 29: Cloud Cover, Temperature, and Relative Humidity Data for Trial D-2, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z-5	-*	-	75.3	17
Z+5	-	-	75.2	16
Z+15	-	-	75.9	16
Z+25	-	-	77.6	15
Average			76.0	16
South Position				
Z-5	-	71.8	75.9	16
Z+5	-	73.1	76.7	17
Z+15	-	74.1	76.5	17
Z+25	-	74.5	78.6	17
Z+35	-	76.0	80.1	10
Average		73.9	77.6	15

*No data.

TABLE 30: Ultraviolet Radiation Data, Trial D-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
0954 to 0955	7,350
0955 to 1000	42,875
1000 to 1005	55,125
1005 to 1010	30,625
1010 to 1015	58,800
1015 to 1020	61,250
1020 to 1025	63,700
1025 to 1030	63,700
1030 to 1035	71,050
1035 to 1040	68,600
Average	52,308

TABLE 31: Wind Direction and Speed Data for Trial D-3, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	256	246-270	4.9	2.3 - 7.4	243	148-324	3.5	<0.5 - 4.8
Z to Z+5	310	236-360	1.2	<0.5 - 3.3	282	234-324	4.1	<0.5 - 7.5
Z+5 to Z+10	303	265-348	3.5	0.6 - 7.7	289	217-333	4.5	<0.5 - 6.2
Z+10 to Z+15	298	269-348	3.1	0.8 - 5.6	288	249-320	5.4	3.0 - 7.3
Z+15 to Z+20	316	271-349	3.1	0.9 - 5.0	300	273-325	5.5	3.2 - 7.8
Z+20 to Z+25	259	252-271	4.0	2.4 - 5.9	325	301-351	5.0	1.5 - 8.6
Z+25 to Z+30	252	212-288	2.7	0.7 - 4.7	337	292-027	4.7	1.9 - 7.0
Z+30 to Z+35	315	274-351	3.0	<0.5 - 6.5	314	270-012	5.2	2.2 - 7.3
Average	289		3.2		297		4.7	

This information was taken on 19 October 1960 at the indicated positions. Function time (Z) was 1248 MST.

TABLE 32: Cloud Cover, Temperature, and Relative Humidity Data for Trial D-3, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z-10	0	58.6	64.7	40
Z	0	60.0	65.0	40
Z+10	0	60.9	M*	M
Z+20	0	M	67.0	34
Z+30	0	M	66.1	35
Z+40	0	M	66.9	38
Average		59.8	65.9	37
South Position				
Z-10	0	0	65.0	32
Z	0	0	65.0	32
Z+10	0	0	65.2	31
Z+20	0	0	64.8	31
Z+30	0	0	65.4	31
Z+40	1	0	66.5	29
Average			65.3	31

*Missing.

TABLE 33: Ultraviolet Radiation Data, Trial D-3, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (MST)	TOTAL ULTRAVIOLET ENERGY FROM 2000 to 3675 Å (Microwatts per second per cm^2)
1240 to 1245	51,450
1245 to 1250	60,025
1250 to 1255	60,025
1255 to 1300	63,700
1300 to 1305	66,150
1305 to 1310	62,475
1310 to 1315	62,475
1315 to 1320	64,925
1320 to 1325	60,025
1325 to 1330	52,675
Average	60,392

TABLE 34: Wind Direction and Speed Data for Trial E-2, Bio 531 (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z-5 to Z	INOPERATIVE		3.5	<0.5 - 5.7	INOPERATIVE		3.9	1.7 - 7.6
Z to Z+5	194	150-268	4.0	1.5 - 7.8	228	207-250	2.8	<0.5 - 4.9
Z+5 to Z+10	190	108-275	2.3	<0.5 - 6.6	221	184-284	1.9	<0.5 - 4.2
Z+10 to Z+15	171	119-222	1.8	<0.5 - 4.1	252	216-300	1.2	<0.5 - 2.9
Z+15 to Z+20	135	096-169	2.7	1.1 - 4.1	225	147-288	2.6	1.5 - 3.7
Z+20 to Z+25	125	090-164	1.8	<0.5 - 3.0	234	153-290	3.2	1.4 - 4.7
Z+25 to Z+30	147	115-173	1.0	<0.5 - 2.0	213	180-277	3.4	1.2 - 4.8
Z+30 to Z+35	185	169-192	3.2	1.1 - 4.2	210	183-224	4.6	3.5 - 5.3
Z+35 to Z+40	126	092-175	2.1	<0.5 - 3.9	204	177-230	2.5	1.1 - 3.7
Z+40 to Z+45	146	048-190	1.7	<0.5 - 4.0	210	189-248	5.3	4.3 - 6.3
Z+45 to Z+50	099	009-176	1.6	<0.5 - 3.3	219	198-237	3.7	2.2 - 5.2
Z+50 to Z+55	105	070-128	1.9	<0.5 - 4.0	214	203-235	3.7	1.2 - 5.1
Z+55 to Z+60	138	061-177	2.7	1.7 - 3.7	201	174-225	3.4	1.8 - 5.3
Z+60 to Z+65	095	063-123	3.7	2.3 - 6.4	192	128-219	3.1	<0.5 - 6.9
Z+65 to Z+70	132	106-160	3.3	1.8 - 4.4	201	183-219	4.5	1.6 - 5.8
Z+70 to Z+75	153	132-171	3.3	1.8 - 5.3	193	164-225	2.4	<0.5 - 3.1
Z+75 to Z+80	146	UNAVAILABLE	3.1	<0.5 - 5.2	202	162-218	4.0	1.3 - 5.5
Z+80 to Z+85	183	133-240	1.2	<0.5 - 2.8	216	207-235	3.7	2.7 - 4.8
Average	145		2.5		214		3.3	

This information was taken on 3 October 1960 at the indicated positions. Function time (Z) was 1725 MST.

TABLE 35: Wind Direction and Speed Data for Trial E-2, Bio 531, Second Sampling Period (UNCLASSIFIED)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
Z+785-790	120	102-198	2.7	<0.5 - 4.4	284	219-353	1.2	<0.5 - 2.8
790-795	177	129-203	2.2	1.5 - 4.0	210	192-225	1.1	<0.5 - 4.2
795-800	180	165-200	3.1	2.0 - 4.6	219	209-236	1.7	<0.5 - 4.0
800-805	186	171-204	3.2	<0.5 - 5.3	213	191-240	3.5	1.2 - 5.0
805-810	245	201-304	2.2	<0.5 - 2.7	182	109-255	4.1	1.3 - 6.5
810-815	285	246-319	1.3	<0.5 - 4.8	156	050-203	3.4	<0.5 - 5.5
815-820	131	039-278	INOPERATIVE		141	054-237	1.5	<0.5 - 3.6
820-825	196	113-230	INOPERATIVE		255	177-096	2.3	<0.5 - 5.1
825-830	221	105-320	INOPERATIVE		333	243-092	1.9	<0.5 - 3.9
830-835	130	096-189	INOPERATIVE		324	261-111	1.6	<0.5 - 3.5
835-840	186	179-192	INOPERATIVE		275	231-312	1.0	<0.5 - 3.7
840-845	219	192-243	INOPERATIVE		210	184-240	1.1	<0.5 - 2.4
845-850	157	044-252	INOPERATIVE		198	184-234	1.4	<0.5 - 3.4
850-855	079	038-119	INOPERATIVE		216	211-234	3.6	1.9 - 5.3
855-860	048	002-140	INOPERATIVE		210	199-219	3.2	1.4 - 4.9
860-865	342	255-126	INOPERATIVE		270	199-349	3.9	2.7 - 5.5
865-870	084	360-153	INOPERATIVE		263	096-308	3.9	2.9 - 5.4
870-875	116	005-190	INOPERATIVE		292	250-340	1.4	<0.5 - 4.4
875-880	148	085-200	3.2	1.5 - 4.1	INOPERATIVE		0.7	<0.5 - 2.0
880-885	153	070-357	0.7	<0.5 - 1.4	INOPERATIVE		0.8	<0.5 - 1.9
885-890	036	324-090	1.5	<0.5 - 3.0	INOPERATIVE		1.4	<0.5 - 2.8
890-895	060	000-127	1.0	<0.5 - 2.3	INOPERATIVE		1.9	<0.5 - 4.1
895-900	062	022-099	1.4	<0.5 - 3.2	INOPERATIVE		0.9	<0.5 - 2.9
900-905	042	320-093	1.3	<0.5 - 2.6	INOPERATIVE		1.1	<0.5 - 2.4
905-910	103	004-171	1.4	<0.5 - 2.1	INOPERATIVE		0.9	<0.5 - 3.5

(Continued)

This information was taken on 4 October 1960 at the indicated positions. Function time (Z) was 1725 MST.

TABLE 35: Wind Direction and Speed Data for Trial E-2, Bio 531, Second Sampling Period (Concluded)

TIME INTERVAL (Minutes)	NORTH POSITION, 2.0 METERS				SOUTH POSITION, 2.0 METERS			
	Direction (°)		Speed (mph)		Direction (°)		Speed (mph)	
	avg	range	avg	range	avg	range	avg	range
910-915	120	004-275	0.7	<0.5 - 1.7	INOPERATIVE		3.0	1.4 - 4.7
915-920	113	036-198	1.5	<0.5 - 3.2	INOPERATIVE		2.9	2.0 - 4.4
920-925	166	016-221	2.2	<0.5 - 4.2	076	020-107	2.0	<0.5 - 4.3
925-930	122	056-180	1.6	<0.5 - 2.9	059	225-135	1.6	<0.5 - 3.8
930-935	102	053-175	1.0	<0.5 - 2.9	133	072-173	1.0	<0.5 - 2.1
935-940	096	053-175	1.2	<0.5 - 2.2	048	025-068	1.3	<0.5 - 3.2
940-945	093	044-155	1.0	<0.5 - 2.8	069	246-102	2.3	0.9 - 3.5
945-950	099	057-145	2.0	<0.5 - 4.3	045	244-105	3.7	1.6 - 5.1
950-955	121	067-176	1.8	<0.5 - 3.6	068	UNAVAILABLE	2.8	<0.5 - 5.7
955-960	131	079-171	3.2	0.6 - 5.5	054	228-117	2.4	0.8 - 4.0
960-965	122	078-185	3.1	<0.5 - 4.6	063	291-090	1.4	<0.5 - 2.8
965-970	081	020-160	3.3	1.2 - 5.6	070	026-104	2.4	0.6 - 3.7
970-975	027	230-103	3.1	1.1 - 6.4	081	276-157	2.6	0.6 - 4.0
975-980	045	216-135	4.6	2.3 - 6.8	135	UNAVAILABLE	1.4	<0.5 - 5.2
980-985	030	000-081	4.3	1.6 - 6.8	171	120-250	2.2	<0.5 - 6.2
985-990	306	UNAVAILABLE	4.8	2.3 - 7.5	180	125-254	4.6	1.0 - 7.8
990-995	324	UNAVAILABLE	3.8	1.6 - 5.7	176	138-214	7.2	2.0 -12.6
995-1000	033	UNAVAILABLE	5.4	3.3 - 7.6	183	146-210	6.4	3.4 -12.3
Average	137		2.4		172		2.3	

TABLE 36: Cloud Cover, Temperature, and Relative Humidity Data for Trial E-2, Bio 531 (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z-10	3	-*	73.4	9
Z+5	3	-	72.7	10
Z+15	3	-	70.2	12
Z+25	3	-	69.9	14
Z+35	3	-	67.1	19
Z+45	3	-	67.0	18
Z+55	3	-	67.0	18
Z+65	3	-	66.7	18
Z+75	3	-	66.4	17
Z+85	3	-	66.2	18
Z+95	3	-	66.1	17
Average			68.4	15
South Position				
Z+5	1	-	75.6	13
Z+15	1	-	74.3	12
Z+25	1	-	72.3	14
Z+35	1	-	69.9	14
Z+45	1	-	69.8	14
Z+55	1	-	68.9	13
Z+65	1	-	72.1	14
Z+75	1	-	67.0	19
Average			71.2	14

*Unavailable

This information was taken on 3 October 1960 at the indicated positions. Function time (Z) was 1725 MST.

[redacted]

TABLE 37: Cloud Cover, Temperature, and Relative Humidity Data for Trial E-2, Bio 531, Second Sampling Period (UNCLASSIFIED)

TIME	CLOUD COVER (10ths of sky covered)	TEMPERATURE (°F)		RELATIVE HUMIDITY (%)
		Ground	0.5 Meter	
North Position				
Z+785	2	47.2	49.8	29
Z+795	2	47.6	49.5	30
Z+805	2	48.8	49.1	35
Z+815	2	48.1	52.0	34
Z+825	2	49.6	52.8	33
Z+835	2	51.2	53.5	32
Z+845	2	51.3	55.3	31
Z+855	2	50.5	58.0	30
Z+865	2	50.9	57.9	31
Z+875	2	52.7	58.8	30
Z+885	2	54.1	60.3	27
Z+895	1	54.2	60.4	28
Z+905	1	54.7	60.8	28
Z+955	1	59.5	71.6	23
Z+965	1	59.6	72.0	20
Z+975	1	59.7	71.8	20
Z+985	0	63.5	72.1	20
Z+995	0	66.5	74.9	19
Average		53.9	60.0	28
South Position				
Z+785	1	UNAVAILABLE	51.4	29
Z+795	1		50.9	29
Z+805	1		52.0	28
Z+815	1		53.0	27
Z+825	1		57.2	25
Z+835	1		54.9	25
Z+845	1		54.1	26
Z+855	1		52.8	25
Z+865	1		53.2	27
Z+875	1		54.3	30
Z+885	1		56.7	31
Z+895	1		60.0	29
Z+905	1		62.2	26
Z+915	1		62.5	25
Z+955	1		69.9	20
Z+965	1		71.0	21
Z+975	1		71.9	20
Z+985	1		72.3	20
Z+995	1	UNAVAILABLE	72.0	20
Average			59.6	25

This information was taken on 4 October 1960 at the indicated positions. Function time (Z) was 1725 MST, 3 October 1960.

APPENDIX B

SAMPLING DATA

(CONFIDENTIAL)

Relative humidity: 19.5%
Temperature at 2 meters: 90.6°F
Average wind speed: 6.6 mph

TABLE 1: Sampling Results of Trial B-1, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER*																									AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL ($\bar{x}$)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
100-foot Radius Individual Circle	0- 5	2	0	2	2	2	2	4	1	1	2																2.40	2.22	
	5-10	2	2	6	1	3	1	6	5	3	3																3.20	1.87	
	10-15	2	0	1	3	0	1	0	2	4	0																1.30	1.42	
	15-20	1	0	0	0	0	0	2	4	3	1																1.10	1.45	
	20-25	0	0	0	0	3	0	0	1	1	0																0.50	0.97	
	25-30	1	0	0	0	0	0	0	1	1	0																0.30	0.48	
	Totals	8	2	15	6	8	4	12	14	13	6																8.80	4.46	1000
150-foot Radius Individual Circle	0- 5	0	4	3	1	4	6	0	3	3	6	9	2	0	3	0											2.93	2.63	
	5-10	5	3	2	3	5	5	5	2	2	8	4	1	1	3	3											3.47	1.88	
	10-15	3	0	4	1	4	3	1	2	0	0	0	0	4	1	2											1.67	1.59	
	15-20	0	1	1	0	3	3	2	0	1	1	1	1	2	1	1											1.20	0.94	
	20-25	3	2	2	1	2	1	0	0	0	3	0	0	0	1	0											1.00	1.13	
	25-30	1	0	3	0	2	0	0	0	0	0	2	0	0	2	0											0.67	1.05	
	Totals	12	10	15	6	20	18	8	7	6	18	16	4	7	11	6											10.93	3.30	1000
250-foot Radius Individual Circle	0- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	5-10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	1	0	0	0	0	0.20	0.64	
	10-15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0.08	0.31	
	15-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.04	0.20	
	25-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0	2	0	0	0	0	0.32	0.95	1000
100-foot Radius Concentric Circle	0- 5	2	0	0	0	0	0	0	6	2	4																1.40	2.12	
	5-10	2	2	2	7	2	0	0	7	3	7																3.20	2.78	
	10-15	2	0	1	0	2	2	2	9	3	8																2.90	3.11	
	15-20	0	0	0	1	3	0	1	6	1	5																1.70	2.21	
	20-25	0	0	0	2	0	0	0	6	2	3																1.30	2.00	
	25-30	2	0	0	4	0	0	1	3	0	2																1.20	1.48	
	Totals	8	2	3	14	7	2	4	37	11	29																11.70	10.71	3000
150-foot Radius Concentric Circle	0- 5	0	0	0	0	0	0	0	1	7	0	2	2	0	0	0											0.80	0.72	
	5-10	0	0	0	0	0	0	0	0	12	2	3	5	0	0	0											1.47	3.27	
	10-15	0	0	0	0	0	0	0	0	13	3	1	1	0	1	0											1.27	3.35	
	15-20	0	0	0	0	0	0	0	0	6	0	1	3	0	0	0											0.67	1.68	
	20-25	0	0	0	0	0	0	0	0	4	4	0	5	1	0	0											0.93	1.79	
	25-30	0	0	0	0	0	0	0	0	3	0	0	4	0	0	0											0.47	1.26	
	Totals	0	0	0	0	0	0	0	1	45	9	7	20	1	1	0											5.60	12.21	N/A**
250-foot Radius Concentric Circle	0- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0.16	0.62	
	5-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0.24	1.20	
	10-15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	1	0	0	0	0	0	0	0.24	0.60	
	15-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	1	0	0	0	0	0	0.32	1.41	
	20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0.16	0.55	
	25-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	1	0.16	0.47	
	Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	1	19	8	0	0	2	1	0	0	0	0	1	1.28	4.04	N/A

*Positions are numbered consecutively in the clockwise direction with Position Number 1 being located at true north.
**Not applicable.

Relative humidity: 20%
Temperature at 2 meters: 70.3°F
Average wind speed: 3.45 mph

TABLE 2: Sampling Results of Trial B-2, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER*																							AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL (x̄)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
100-foot Radius Individual Circle	0- 5	19	3	30	25	27	33	20	15	16	21																20.90	8.61	
	5-10	68	7	26	35	46	57	35	22	14	32																34.20	18.77	
	10-15	35	36	39	68	59	75	30	36	55	25																45.80	17.13	
	15-20	52	40	65	76	78	71	50	66	85	23																60.60	19.20	
	20-25	45	46	62	97	90	93	65	97	67	21																68.30	25.94	
	25-30	52	43	95	87	61	38	44	40	55	33																54.80	20.90	
	Totals	271	175	317	388	361	367	250	276	292	155																285.20	77.95	1000
150-foot Radius Individual Circle	0- 5	0	0	7	13	4	5	5	12	27	12	7	12	5	7	3											7.93	6.72	
	5-10	0	1	8	14	8	10	10	10	59	23	6	20	11	4	4											12.53	14.31	
	10-15	0	5	4	15	5	12	1	15	44	49	4	8	7	6	4											11.93	14.74	
	15-20	0	3	2	12	3	8	2	9	47	61	10	17	6	4	3											12.47	17.65	
	20-25	0	1	2	10	9	7	0	10	39	68	7	6	5	5	2											11.33	18.29	
	25-30	0	0	1	9	1	6	6	8	64	42	10	9	9	3	1											11.27	17.82	
	Totals	0	10	24	73	30	48	24	64	280	255	44	71	43	29	17											67.47	84.10	1000
250-foot Radius Individual Circle	0- 5	20	10	5	5	10	30	12	11	4	8	12	0	0	2	3	0	12	0	0	0	5	2	8	2	0	6.44	7.23	
	5-10	30	20	12	4	18	25	27	17	14	6	8	3	0	10	18	2	3	1	11	0	10	3	10	4	5	10.44	8.70	
	10-15	15	8	23	6	20	29	29	22	12	10	4	5	2	7	23	6	2	1	15	1	8	1	8	5	10	10.68	8.78	
	15-20	25	12	10	10	18	36	21	18	14	6	10	4	1	5	12	10	0	0	4	0	5	1	7	4	28	10.44	9.44	
	20-25	10	5	8	8	12	38	35	23	8	3	0	3	3	8	13	15	1	6	4	0	4	2	6	6	24	9.80	10.13	
	25-30	20	7	9	15	14	34	25	20	4	0	0	2	3	6	18	17	0	0	16	0	4	2	7	7	21	10.04	9.30	
	Totals	120	62	67	48	92	192	149	111	56	33	34	17	9	38	87	50	18	8	50	1	36	11	46	28	88	58.04	46.94	1000
100-foot Radius Concentric Circle	0- 5	60	50	25	22	0	35	70	17	10	9																29.80	23.39	
	5-10	40	50	30	18	0	24	90	31	5	8																29.60	26.43	
	10-15	20	50	22	10	0	22	40	46	10	11																23.10	16.89	
	15-20	20	50	20	20	0	32	54	40	10	14																26.00	17.56	
	20-25	20	40	20	21	0	43	30	36	10	12																23.20	13.93	
	25-30	20	35	24	33	0	31	60	25	10	4																24.20	17.43	
	Totals	180	275	141	124	0	187	344	195	55	58																155.90	104.32	3000
150-foot Radius Concentric Circle	0- 5	1	1	2	22	25	25	50	21	12	2	6	3	6	3	2											12.07	13.98	
	5-10	2	6	3	16	20	21	41	25	10	1	21	26	5	12	6											14.33	11.32	
	10-15	2	9	5	18	33	8	30	23	18	1	18	29	5	9	11											14.60	10.47	
	15-20	2	24	9	12	20	4	24	19	17	1	13	20	4	24	14											13.80	8.23	
	20-25	2	34	7	30	21	5	15	16	18	1	12	21	5	9	9											13.67	9.82	
	25-30	2	25	4	22	27	3	20	20	20	0	9	17	5	12	5											12.73	9.25	
	Totals	11	99	30	120	146	66	180	124	95	6	79	116	30	69	47											81.20	50.99	N/A**
250-foot Radius Concentric Circle	0- 5	0	0	0	0	7	1	8	2	12	17	18	5	2	0	0	0	0	0	0	0	0	1	0	0	0	2.92	5.37	
	5-10	2	0	2	6	10	15	10	9	20	13	22	11	2	0	0	0	0	0	0	0	0	2	0	0	0	4.96	6.82	
	10-15	1	1	5	8	23	9	9	10	22	19	15	14	5	6	0	0	0	0	9	1	2	1	1	5	3	6.76	7.04	
	15-20	1	0	3	5	8	1	8	6	8	26	16	7	13	10	1	1	0	0	13	2	0	1	2	5	4	5.64	6.26	
	20-25	3	1	2	6	22	0	3	3	11	18	11	9	11	3	2	1	0	0	11	2	0	0	2	3	6	5.20	5.89	
	25-30	6	0	6	14	39	3	8	1	6	10	8	7	18	3	4	0	0	9	9	3	1	1	0	6	17	7.16	8.36	
	Totals	13	2	18	39	109	29	46	31	79	103	90	53	51	22	7	2	0	9	42	8	3	6	5	19	30	34.64	32.48	N/A

*Positions are numbered consecutively in the clockwise direction with position number being located at true north.
**Not applicable.

Relative humidity: 23%
Temperature at 2 meters: 70°F
Average wind speed: 3 mph

TABLE 3: Sampling Results of Trial B-3, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER*																									AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL ($\bar{x}$)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25			
100-foot Radius Individual Circle	0- 5	1	5	0	4	0	4	1	1	0	2																1.80	1.87	
	5-10	3	2	5	5	3	6	2	4	1	4																3.50	1.58	
	10-15	3	1	2	2	1	3	0	1	2	3																1.80	1.03	
	15-20	2	0	2	2	0	4	0	2	0	5																1.70	1.77	
	20-25	1	1	0	0	0	2	1	0	0	0																0.50	0.22	
	25-30	0	0	0	0	0	3	1	1	0	0																0.50	0.97	
	Totals	10	9	9	13	4	22	5	9	3	14																9.80	5.59	250
150-foot Radius Individual Circle	0- 5	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0											0.20	0.77	
	5-10	2	2	0	6	0	2	1	3	0	4	0	1	0	0	0											1.40	1.80	
	10-15	2	0	0	3	0	1	0	2	0	1	0	0	0	0	0											0.60	0.99	
	15-20	1	2	0	4	0	1	0	1	0	0	1	0	0	1	0											0.73	1.10	
	20-25	2	0	1	0	0	0	0	2	0	0	0	0	0	1	0											0.40	0.74	
	25-30	1	1	0	0	0	1	0	1	0	0	0	0	1	2	0											0.47	0.64	
	Totals	8	5	1	13	0	5	1	9	0	8	1	1	1	4	0											3.80	4.07	250
250-foot Radius Individual Circle	0- 5	1	1	1	2	0	0	3	0	0	0	0	0	0	4	1	1	0	0	0	0	0	1	0	2	2	0.76	1.09	
	5-10	4	2	6	5	8	0	1	1	0	3	0	0	0	2	2	0	3	1	0	0	0	2	0	4	1	1.80	2.18	
	10-15	3	5	2	4	7	1	2	7	2	2	0	0	0	0	1	1	1	1	0	0	0	2	0	3	0	1.76	2.09	
	15-20	3	4	1	1	2	0	1	2	1	1	0	0	0	0	0	2	1	1	0	0	0	3	0	4	0	1.08	1.29	
	20-25	2	1	0	3	3	0	1	2	0	0	0	0	0	0	2	1	0	0	0	0	0	2	0	1	0	0.72	1.02	
	25-30	3	1	0	4	3	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0.60	1.12	
	Totals	16	14	10	19	23	1	8	12	3	7	0	0	0	6	6	5	6	3	0	0	0	11	0	15	3	6.72	6.69	250
100-foot Radius Concentric Circle	0- 5	18	2	6	9	10	5	10	2	6	0																6.80	5.25	
	5-10	16	1	1	14	11	7	18	4	5	0																7.70	6.63	
	10-15	17	1	2	7	10	4	11	6	6	0																6.40	5.19	
	15-20	14	0	0	6	9	5	6	5	3	0																4.80	4.44	
	20-25	6	0	4	1	4	3	1	3	2	0																2.40	1.96	
	25-30	7	0	0	2	5	3	1	1	3	0																2.20	2.35	
	Totals	78	4	13	39	49	27	47	21	25	0																30.30	23.60	750
150-foot Radius Concentric Circle	0- 5	1	0	0	3	1	3	8	10	3	11	0	0	3	0	4											3.13	3.70	
	5-10	3	1	0	4	3	1	4	1	2	3	3	2	4	0	5											2.40	1.55	
	10-15	2	0	0	1	2	1	3	2	0	0	2	1	2	0	3											1.27	1.10	
	15-20	2	0	0	0	1	1	3	0	0	0	4	2	0	4	1											1.20	1.47	
	20-25	3	1	0	0	0	0	0	0	0	0	1	1	0	2	3											0.73	1.10	
	25-30	2	0	0	0	0	0	0	0	0	1	0	0	0	1	2											0.40	0.74	
	Totals	13	2	0	8	7	6	18	13	5	15	10	6	9	7	18											9.13	5.37	N/A**
250-foot Radius Concentric Circle	0- 5	0	2	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.40	0.64	
	5-10	2	3	0	0	0	1	1	2	1	0	2	1	2	2	3	0	0	0	1	0	1	3	2	4	2	1.32	1.18	
	10-15	0	3	0	0	2	3	0	1	0	0	5	1	1	0	2	0	1	1	0	0	2	2	0	1	1	1.04	1.27	
	15-20	0	4	0	0	1	2	0	0	0	0	4	0	0	1	1	0	0	1	0	0	2	1	4	0	2	0.92	1.35	
	20-25	0	5	1	0	0	1	1	0	0	0	3	0	0	2	2	0	0	0	0	1	1	2	2	4	2	1.08	1.38	
	25-30	0	4	0	0	0	0	0	0	0	0	0	1	0	2	1	0	0	0	0	3	0	0	0	0	3	0.56	1.16	
	Totals	2	21	2	0	3	7	2	5	1	0	14	3	3	7	9	0	1	2	1	4	7	9	9	10	11	5.32	5.11	N/A

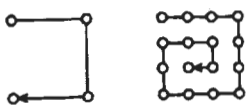
*Positions are numbered consecutively in the clockwise direction with Position Number 1 being located at true north.
**Not applicable.

Relative humidity: 13%
Temperature at 2 meters: 86.1°F
Average wind speed: 7.1 mph

TABLE 4: Sampling Results of Trial C-1, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	DISTANCE FROM RELEASE POINT (Feet)	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER																AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL (x)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
A-4	20	0- 5	0	2	1	0													0.75	0.96	
		5-10	0	4	1	1													1.50	1.73	
		10-15	3	1	0	1													1.25	1.26	
		15-20	0	0	0	2													0.50	1.00	
		20-25	0	0	0	1													0.25	0.50	
		25-30	1	0	1	2													1.00	0.82	
		Totals	4	7	3	7													5.25	2.06	40
A-16	20	0- 5	7	5	5	1	0	0	0	0	2	0	0	0	1	0	1	0	1.38	2.25	
		5-10	2	8	2	1	3	0	0	0	1	0	0	0	0	0	1	0	1.13	2.06	
		10-15	0	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.25	0.58	
		15-20	1	3	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0.44	0.89	
		20-25	0	6	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.56	1.50	
		25-30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25	
		Totals	10	25	8	2	3	0	0	0	4	3	1	0	1	1	3	0	3.81	6.36	160
B-4	20	0- 5	3	5	2	2													3.00	1.41	
		5-10	6	5	3	1													4.00	2.45	
		10-15	7	5	6	1													5.00	2.71	
		15-20	4	4	4	2													3.50	1.00	
		20-25	2	6	2	2													3.00	2.00	
		25-30	2	3	1	2													2.00	0.82	
		Totals	24	30	18	10													20.50	8.54	400
B-16	20	0- 5	6	2	1	2	4	2	5	2	4	15	1	0	2	2	2	2	3.25	3.49	
		5-10	8	1	2	1	3	2	6	8	6	7	0	0	3	1	1	0	3.06	2.93	
		10-15	6	1	1	1	2	3	4	5	3	4	1	7	4	1	0	0	2.69	2.15	
		15-20	2	5	2	2	1	0	7	4	1	5	2	6	2	1	2	0	2.63	2.13	
		20-25	2	2	0	3	0	0	5	3	4	1	0	4	1	0	2	0	1.69	1.70	
		25-30	1	0	0	0	1	0	7	4	2	3	1	5	0	0	0	0	1.50	2.16	
		Totals	25	11	6	9	11	7	34	26	20	35	5	22	12	5	7	2	14.81	10.68	1600
C-4	20	0- 5	0	0	1	0													0.25	0.50	
		5-10	0	0	0	0													0.00	0.00	
		10-15	0	0	1	0													0.25	0.50	
		15-20	0	0	1	0													0.25	0.50	
		20-25	0	0	0	0													0.00	0.00	
		25-30	0	0	0	0													0.00	0.00	
		Totals	0	0	3	0													0.75	1.50	40
C-16	20	0- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		5-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		10-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		15-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		25-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	160
D-4	20	0- 5	25	19	12	1													14.25	10.31	
		5-10	23	15	9	2													12.25	8.92	
		10-15	21	7	5	1													8.50	8.70	
		15-20	9	2	1	0													3.00	4.08	
		20-25	4	0	0	1													1.25	1.89	
		25-30	1	0	0	0													0.25	0.50	
		Totals	83	43	27	5													39.50	32.92	400
D-16	20	0- 5	5	12	4	13	13	5	1	2	2	6	20	3	0	3	5	0	5.88	5.68	
		5-10	2	4	6	18	11	4	5	3	3	9	15	2	0	5	9	0	6.00	5.16	
		10-15	6	1	2	8	3	0	3	2	7	7	6	3	5	8	6	0	4.19	2.76	
		15-20	1	5	0	3	0	0	10	4	0	9	6	1	0	4	4	0	2.94	3.29	
		20-25	0	0	1	3	0	0	20	0	3	10	3	0	7	3	4	0	3.38	5.29	
		25-30	0	0	3	1	0	0	25	0	5	5	4	0	4	2	2	0	3.19	6.12	
		Totals	14	22	16	46	27	9	64	11	20	46	54	9	16	25	30	0	25.86	18.11	1600

NUMBERING DIAGRAM

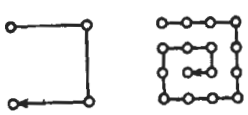


Relative humidity: 31.6%
Temperature at 2 meters: 70.5°F
Average wind speed: 7.3 mph

TABLE 5: Sampling Results of Trial C-2, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	DISTANCE FROM RELEASE POINT (Feet)	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER																AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL (Y)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
A-4	20	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	1	1	0													0.50	0.58	
		10-15	0	0	2	0													0.50	1.00	
		15-20	0	0	0	0													0.00	0.00	
		20-25	0	1	0	0													0.25	0.50	
		25-30	0	0	0	0													0.00	0.00	
		Totals	0	2	3	0													1.25	1.50	40
A-16	20	0- 5	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0.25	0.45	
		5-10	0	1	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0.31	0.48	
		10-15	0	0	0	1	0	1	0	0	1	0	1	0	1	0	0	0	0.31	0.48	
		15-20	0	1	1	3	0	0	0	0	0	0	0	0	2	0	1	0	0.50	0.89	
		20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.06	0.25	
		25-30	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0.12	0.34	
		Totals	0	3	1	4	2	1	0	1	1	1	3	0	5	0	4	0	1.56	1.66	160
B-4	20	0- 5	0	1	0	0													0.25	0.50	
		5-10	0	2	2	25													7.25	11.87	
		10-15	2	0	4	23													7.25	10.63	
		15-20	3	1	5	18													6.75	7.68	
		20-25	1	0	3	19													5.75	8.92	
		25-30	4	0	1	17													5.50	7.85	
		Totals	10	4	15	102													32.75	46.38	400
B-16	20	0- 5	4	0	0	0	7	3	3	1	2	0	0	1	5	1	3	0	1.88	2.13	
		5-10	3	0	0	0	4	1	1	0	6	0	1	1	3	0	0	0	1.25	1.81	
		10-15	6	0	0	0	1	2	1	1	6	0	0	2	3	3	1	0	1.62	1.99	
		15-20	5	1	0	0	3	4	0	1	10	0	0	0	5	0	2	0	2.00	2.92	
		20-25	0	1	1	0	3	1	0	0	7	0	1	0	4	0	0	1	1.19	1.94	
		25-30	0	1	0	0	0	5	0	1	6	0	1	0	1	0	0	0	0.94	1.84	
		Totals	18	3	1	0	18	16	5	4	37	0	3	4	22	4	6	1	8.88	10.41	1600
C-4	100	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	0	0	0													0.00	0.00	
		10-15	0	0	0	0													0.00	0.00	
		15-20	0	1	0	0													0.25	0.50	
		20-25	2	1	1	0													1.00	0.82	
		25-30	0	1	3	0													1.00	1.41	
		Totals	2	3	4	0													2.25	1.71	40
C-16	100	0- 5	0	3	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0.44	0.81	
		5-10	1	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.38	0.88	
		10-15	1	2	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0.56	0.89	
		15-20	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.19	0.40	
		20-25	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25	
		25-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		Totals	2	9	5	1	3	0	5	1	0	0	0	0	0	0	0	0	1.62	2.63	160
D-4	100	0- 5	9	7	6	0													5.50	3.87	
		5-10	5	6	9	2													5.50	2.89	
		10-15	6	5	4	3													4.50	1.29	
		15-20	2	5	8	2													4.25	2.87	
		20-25	5	6	7	3													5.50	1.73	
		25-30	3	4	5	4													4.00	0.82	
		Totals	31	33	39	14													29.25	10.72	400
D-16	100	0- 5	4	3	1	0	6	0	0	3	0	3	0	2	4	3	0	0	1.81	1.94	
		5-10	19	2	0	0	4	1	0	0	7	1	0	12	6	1	0	0	3.31	5.40	
		10-15	5	1	0	2	1	1	0	0	2	0	0	4	1	2	0	0	1.19	1.51	
		15-20	8	2	0	1	6	0	1	1	0	2	0	4	5	2	0	2	2.12	2.42	
		20-25	17	4	0	2	2	16	2	1	8	5	1	8	8	4	0	0	4.88	5.34	
		25-30	2	5	0	0	3	6	0	1	0	0	0	2	2	1	0	0	1.38	1.89	
		Totals	55	17	1	5	22	24	3	6	17	11	1	32	26	13	0	2	14.69	14.78	1600

NUMBERING DIAGRAM

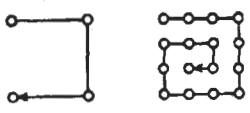


Relative humidity: 28%
Temperature at 2 meters 53.7°F
Average wind speed: 7.5 mph

TABLE 6: Sampling Results of Trial C-3, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	DISTANCE FROM RELEASE POINT (Feet)	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER																AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL (Y)	STANDARD DEVIATION OF x (S_x)	NUMBER OF VECTORS RELEASED
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
A-4	40	0- 5	1	0	1	4													1.50	1.73	
		5-10	2	0	2	2													1.50	1.00	
		10-15	1	0	1	1													0.75	0.50	
		15-20	2	0	0	0													0.50	1.00	
		20-25	0	0	0	0													0.00	0.00	
		25-30	0	0	0	0													0.00	0.00	
		Totals	6	0	4	7													4.25	3.09	40
A-16	40	0- 5	3	2	2	5	1	1	0	0	0	0	0	0	0	0	0	0	0.88	1.45	
		5-10	2	0	4	5	1	0	0	3	0	0	0	1	0	0	0	0	1.00	1.63	
		10-15	4	1	1	4	0	0	0	4	1	0	0	2	0	0	1	2	1.25	1.53	
		15-20	1	3	2	6	2	0	0	0	0	1	0	0	0	0	0	0	0.94	1.65	
		20-25	0	0	3	0	1	0	0	1	0	0	0	1	0	0	0	0	0.38	0.81	
		25-30	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0.19	0.40	
		Totals	10	6	12	20	5	1	1	8	1	2	0	4	1	0	1	2	4.62	5.51	160
B-4	40	0- 5	4	21	3	14													10.50	8.58	
		5-10	7	12	4	12													8.75	3.95	
		10-15	5	10	2	15													8.00	5.76	
		15-20	3	6	3	7													4.75	2.06	
		20-25	8	9	5	6													7.00	1.82	
		25-30	2	16	3	3													6.00	6.68	
		Totals	29	74	20	57													45.00	24.94	400
B-16	40	0- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		5-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		10-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		15-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		25-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	1600
C-4	200	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	0	0	0													0.00	0.00	
		10-15	0	0	0	0													0.00	0.00	
		15-20	0	0	0	0													0.00	0.00	
		20-25	0	0	0	0													0.00	0.00	
		25-30	0	0	0	0													0.00	0.00	
		Totals	0	0	0	0													0.00	0.00	40
C-16	200	0- 5	0	1	1	0	1	0	0	2	0	0	0	0	0	0	1	0	0.38	0.62	
		5-10	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.12	0.34	
		10-15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25	
		15-20	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0.25	0.58	
		20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		25-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
		Totals	0	2	2	2	1	2	0	2	0	0	0	0	0	0	1	1	0.81	0.91	160
D-4	200	0- 5	3	2	0	5													2.50	2.08	
		5-10	2	10	10	6													7.00	3.83	
		10-15	2	12	7	11													8.00	4.55	
		15-20	0	3	5	4													3.25	2.50	
		20-25	2	3	17	3													6.25	7.18	
		25-30	2	0	2	3													1.75	1.26	
		Totals	11	30	42	32													28.75	12.94	400
D-16	200	0- 5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25	
		5-10	3	0	2	0	0	0	0	0	0	0	0	0	3	1	3	2	0.88	1.26	
		10-15	3	1	2	0	2	0	0	1	0	2	0	0	3	1	8	2	1.56	2.03	
		15-20	2	4	0	1	1	0	3	4	1	2	2	2	2	1	6	2	2.06	1.57	
		20-25	0	1	3	2	0	0	2	6	1	1	0	0	2	0	5	0	1.44	1.86	
		25-30	1	1	1	4	0	0	2	3	1	1	0	0	1	0	5	3	1.44	1.55	
		Totals	10	7	8	7	3	0	7	14	3	6	2	2	11	3	27	9	7.44	6.45	1600

NUMBERING DIAGRAM



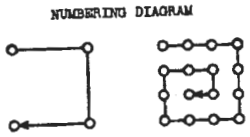
[redacted]

Relative humidity: 23%
Temperature at 2 meters: 64.7°F
Average wind speed: 4.2 mph

TABLE 7: Sampling Results of Trial C-5, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	DISTANCE FROM RELEASE POINT (Feet)	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER																AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL (X̄)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
A-4	20	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	0	0	0													0.00	0.00	
		10-15	0	0	0	0													0.00	0.00	
		15-20	0	0	0	0													0.00	0.00	
		20-25	0	0	0	0													0.00	0.00	
		25-30	0	0	0	0													0.00	0.00	
		Totals	0	0	0	0													0.00	0.00	40
A-16	20	0- 5	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4	0.38	1.09	
		5-10	0	1	0	0	3	0	2	0	1	2	0	0	1	0	1	2	0.81	0.98	
		10-15	2	3	0	0	1	0	2	0	1	1	1	0	0	0	0	2	0.81	0.98	
		15-20	2	0	0	0	2	1	1	1	1	0	1	0	2	1	1	0	0.81	0.75	
		20-25	1	2	4	3	1	0	2	0	1	0	1	0	0	1	0	0	1.00	1.21	
		25-30	4	0	6	2	3	2	1	0	1	0	0	0	3	1	1	0	1.50	1.75	
		Totals	9	6	10	5	10	3	8	1	7	3	3	0	6	3	3	8	5.31	3.16	160
B-4	20	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	0	0	1													0.25	0.50	
		10-15	0	1	0	2													0.75	0.96	
		15-20	0	2	0	1													0.75	0.96	
		20-25	0	0	0	1													0.25	0.50	
		25-30	1	2	0	2													1.25	0.96	
		Totals	1	5	0	7													3.25	3.30	400
B-16	20	0- 5	3	5	1	0	0	0	0	1	0	3	1	0	0	0	0	2	1.00	1.50	
		5-10	2	15	0	0	4	4	0	1	1	1	3	0	3	2	2	5	2.75	3.69	
		10-15	5	16	2	0	2	2	0	1	8	5	4	0	1	1	8	1	3.50	4.24	
		15-20	0	10	3	0	4	1	0	0	3	4	7	0	1	1	5	8	2.94	3.19	
		20-25	1	10	4	6	3	3	0	1	2	1	1	0	0	2	6	9	3.06	3.15	
		25-30	3	37	4	4	2	1	6	2	0	3	3	0	4	4	5	2	5.00	8.69	
		Totals	14	93	14	10	15	11	6	6	14	17	19	0	9	10	26	28	18.25	21.16	1600
C-4	100	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	0	0	0													0.00	0.00	
		10-15	0	0	0	0													0.00	0.00	
		15-20	0	0	0	0													0.00	0.00	
		20-25	0	0	0	0													0.00	0.00	
		25-30	0	0	0	0													0.00	0.00	
		Totals	0	0	0	0													0.00	0.00	40
C-16	100	0- 5	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0.19	0.54	
		5-10	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.19	0.54	
		10-15	0	3	0	3	1	0	0	3	1	0	1	0	0	0	0	0	0.75	1.18	
		15-20	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25	
		20-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.06	0.25	
		25-30	0	3	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0.31	0.79	
		Totals	0	8	0	5	1	0	0	7	1	0	1	0	1	0	0	1	1.56	2.63	160
D-4	100	0- 5	2	7	2	1													3.00	2.71	
		5-10	12	10	6	8													9.00	2.58	
		10-15	15	8	8	8													9.75	3.50	
		15-20	8	5	1	4													4.50	2.89	
		20-25	5	4	2	18													7.25	7.27	
		25-30	7	3	1	4													3.75	2.50	
		Totals	49	37	20	43													37.25	12.50	400
D-16	100	0- 5	20	1	0	12	10	0	8	10	0	2	0	6	6	0	2	6	5.13	5.74	
		5-10	27	6	0	27	17	0	9	15	5	4	5	5	9	0	20	7	9.75	8.90	
		10-15	24	8	3	31	24	0	18	22	7	3	6	8	14	0	28	6	12.63	10.38	
		15-20	18	10	5	49	27	2	17	40	5	6	2	5	24	0	16	8	14.63	14.23	
		20-25	12	1	4	19	21	0	22	35	3	4	3	3	13	0	23	4	10.44	10.60	
		25-30	14	1	6	3	10	0	19	25	4	5	1	9	8	0	26	5	8.50	8.41	
		Totals	115	27	18	141	109	2	93	147	24	24	17	36	74	0	115	35	61.06	51.19	1600

NUMBERING DIAGRAM

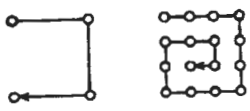


Relative humidity: 35%
Temperature at 2 meters: 66.5°F
Average wind speed: 2.9 mph

TABLE 8: Sampling Results of Trial C-6, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	DISTANCE FROM RELEASE POINT (Feet)	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER																AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL ($\bar{x}$)	STANDARD DEVIATION OF x (S_x)	NUMBER OF VECTORS RELEASED
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
A-4	20	0- 5	0	0	0	0													0.00	0.00	
		5-10	0	0	0	0													0.00	0.00	
		10-15	0	0	0	0													0.00	0.00	
		15-20	0	0	0	0													0.00	0.00	
		20-25	0	0	0	0													0.00	0.00	
		25-30	0	0	0	0													0.00	0.00	
		Totals	0	0	0	0													0.00	0.00	40
A-16	20	0- 5	0	0	2	0	0	0	0	0	0	0	0	0	8	0	0	6	1.00	2.42	
		5-10	0	0	2	0	0	0	0	0	0	0	1	0	10	0	0	4	1.06	2.62	
		10-15	0	2	3	2	0	0	0	3	0	3	1	1	11	0	0	5	1.94	2.86	
		15-20	0	1	2	0	0	0	0	0	0	2	0	0	4	0	0	3	0.75	1.29	
		20-25	0	1	7	0	0	0	0	0	2	2	0	2	2	3	0	1	1.25	1.84	
		25-30	0	0	5	0	2	0	0	0	1	1	2	0	2	2	0	0	0.94	1.39	
		Totals	0	4	21	2	2	0	0	3	3	8	4	3	37	5	0	19	6.94	10.19	160
B-4	20	0- 5	8	10	0	0													4.50	5.26	
		5-10	5	9	0	1													3.75	4.11	
		10-15	4	4	2	0													2.50	1.91	
		15-20	3	1	20	10													8.50	8.58	
		20-25	3	4	14	20													10.25	8.18	
		25-30	1	2	7	3													3.25	2.63	
		Totals																	32.75	7.97	400
B-16	20	0- 5	9	4	5	5	22	3	3	4	4	6	1	2	8	26	6	8	7.25	6.93	
		5-10	11	3	7	4	29	7	5	3	2	9	3	1	4	18	4	8	7.38	7.13	
		10-15	8	11	12	15	55	4	8	7	4	12	2	3	6	19	4	17	11.69	12.64	
		15-20	10	17	10	18	51	8	12	9	9	10	6	4	5	23	8	14	13.38	11.22	
		20-25	12	14	8	3	20	5	10	10	6	7	4	2	1	21	6	10	8.69	5.86	
		25-30	7	0	2	0	0	0	0	20	7	0	4	0	2	6	5	12	4.06	5.55	
		Totals	57	49	44	45	177	27	38	53	32	44	20	12	26	113	33	69	52.44	40.60	1600
C-4	100	0- 5	0	0	0	0													0.00	0.00	
		5-10	1	2	0	0													0.75	0.96	
		10-15	1	0	0	0													0.25	0.50	
		15-20	0	1	1	1													0.75	0.50	
		20-25	1	0	3	2													1.50	1.84	
		25-30	2	3	2	2													2.25	0.50	
		Totals	5	6	6	5													5.50	0.58	40
C-16	100	0- 5	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.19	0.54	
		5-10	1	0	2	0	1	1	0	0	1	0	0	0	1	0	1	3	0.69	0.87	
		10-15	0	0	2	2	0	1	0	0	0	0	2	3	2	1	0	2	0.94	1.06	
		15-20	0	0	0	3	0	0	0	0	0	0	1	1	0	0	0	2	0.44	0.89	
		20-25	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0.25	0.77	
		25-30	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	3	0.44	0.89	
		Totals	3	0	4	5	1	2	0	0	1	1	3	4	8	3	1	11	2.94	3.04	160
D-4	100	0- 5	1	0	0	7													2.00	3.37	
		5-10	3	0	3	5													2.75	2.06	
		10-15	7	3	2	7													4.75	2.63	
		15-20	2	1	0	3													1.50	1.29	
		20-25	1	0	1	2													1.00	0.82	
		25-30	4	0	0	4													2.00	2.31	
		Totals	18	4	6	28													14.00	11.19	400
D-16	100	0- 5	1	4	5	4	0	2	4	21	8	5	5	3	0	3	8	11	5.25	5.13	
		5-10	3	5	6	7	3	0	5	45	10	6	8	2	3	4	9	9	7.81	10.30	
		10-15	5	2	8	5	7	4	15	24	13	4	10	3	8	5	15	12	8.75	5.84	
		15-20	2	3	9	6	11	3	10	21	24	5	12	6	15	5	10	20	10.13	6.79	
		20-25	4	4	2	7	9	4	14	31	12	3	5	4	4	3	4	15	7.81	7.40	
		25-30	6	3	3	5	7	0	1	8	4	4	4	5	0	2	2	10	4.00	2.80	
		Totals	21	21	33	34	37	13	49	150	71	27	44	23	30	22	48	77	43.75	33.49	1600

NUMBERING DIAGRAM



Relative humidity: 30%
Temperature at 2 meters: 75.3°F
Average wind speed: 6.2 mph

TABLE 9: *Sampling Results of Trial D-1, Bio 531 (CONFIDENTIAL)*

SAMPLING UNIT	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER*										AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL (x)	STANDARD DEVIATION OF x (Sx)	NUMBER OF VECTORS RELEASED
		1	2	3	4	5	6	7	8	9	10			
Row I, Column 1, (Sitting)	0- 5	2	3	3	2	4	2	10	3	2	3	3.40	2.41	100
	5-10	1	2	0	0	1	1	3	1	1	0	1.00	1.94	
	10-15	1	0	0	1	0	0	1	1	0	2	0.60	0.70	
	15-20	0	2	0	0	0	0	4	0	1	0	0.70	1.34	
	20-25	1	1	0	0	0	0	2	1	0	0	0.50	0.70	
	25-30	0	0	1	0	0	0	0	1	0	1	0.30	0.48	
	Totals	5	8	4	3	5	3	20	7	4	6	6.50	5.02	
Row I, Column 2, (Walking)	0- 5	2	2	1	2	1	2	0	0	1	0	1.10	0.87	160
	5-10	2	0	2	1	2	1	0	1	0	0	0.90	0.87	
	10-15	0	1	0	0	1	1	0	0	0	0	0.30	0.48	
	15-20	0	1	1	1	0	0	0	1	0	0	0.40	0.52	
	20-25	1	1	0	2	0	0	1	0	0	2	0.70	0.82	
	25-30	0	0	0	0	0	0	1	0	0	0	0.10	0.32	
	Totals	5	5	4	6	4	4	2	2	1	2	3.50	1.64	
Row I, Column 3, (Sitting-Walking)	0- 5	2	0	2	5	2	3	0	0	2	1	1.70	1.57	100
	5-10	5	0	0	3	1	1	1	0	1	0	1.00	1.15	
	10-15	2	0	1	2	0	0	0	0	0	1	0.60	0.84	
	15-20	3	2	0	0	0	0	0	0	0	0	0.50	1.08	
	20-25	3	0	0	0	0	0	0	0	0	0	0.30	0.95	
	25-30	2	0	0	0	0	0	0	0	0	0	0.20	0.63	
	Totals	15	2	3	10	3	4	1	0	3	2	4.30	4.54	
Row II, Column 1, (Sitting-Walking)	0- 5	5	5	4	0	0	1	0	2	0	0	1.70	2.16	100
	5-10	1	2	2	4	0	0	1	0	1	0	1.10	1.28	
	10-15	2	2	1	3	0	2	2	0	2	0	1.40	1.07	
	15-20	2	1	0	0	0	0	0	0	0	0	0.30	0.67	
	20-25	3	1	0	0	0	0	0	0	3	0	0.70	1.25	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	13	11	7	7	0	3	3	2	6	0	5.20	4.42	
Row II, Column 2, (Sitting)	0- 5	0	0	2	0	0	0	0	0	0	0	0.20	0.63	40
	5-10	0	0	0	0	1	0	1	0	0	0	0.20	0.42	
	10-15	0	0	0	0	0	0	1	0	0	1	0.20	0.42	
	15-20	0	0	2	0	0	0	0	0	0	0	0.20	0.63	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	1	0	0	0.10	0.32	
	Totals	0	0	4	0	1	0	2	1	0	1	0.90	1.29	
Row II, Column 3, (Walking)	0- 5	3	4	2	1	1	1	2	2	0	1	1.70	1.16	160
	5-10	0	1	1	0	0	0	0	1	0	0	0.30	0.48	
	10-15	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	15-20	0	0	0	0	0	0	0	1	0	0	0.10	0.32	
	20-25	0	0	0	0	0	1	0	0	0	0	0.10	0.32	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	3	5	3	1	1	2	2	4	0	1	2.20	1.55	
Row III, Column 1, (Walking)	0- 5	3	1	3	1	1	0	0	1	1	0	1.10	1.10	100
	5-10	0	0	1	1	0	2	0	0	0	0	0.40	0.71	
	10-15	0	0	1	0	2	0	0	0	0	0	0.50	0.67	
	15-20	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	1	0	0	0	0	0	0	0	0.10	0.32	
	Totals	3	1	6	2	3	2	0	1	1	0	1.90	1.79	
Row III, Column 2, (Sitting-Walking)	0- 5	0	2	1	0	0	0	2	0	0	0	0.50	0.85	40
	5-10	0	3	0	0	0	0	0	0	1	1	0.50	0.97	
	10-15	2	0	0	0	0	0	0	0	0	0	0.20	0.63	
	15-20	0	1	0	0	0	0	0	1	0	0	0.20	0.42	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	2	6	1	0	0	0	2	1	1	1	1.40	1.77	
Row III, Column 3, (Sitting)	0- 5	0	1	0	0	0	0	1	1	1	0	0.40	0.52	100
	5-10	0	1	0	1	0	0	0	0	1	0	0.30	0.48	
	10-15	0	0	0	1	0	0	0	0	0	0	0.10	0.32	
	15-20	1	0	0	0	0	0	0	0	0	0	0.10	0.32	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	1	2	0	2	0	0	1	1	2	0	0.90	0.88	

*Positions are numbered consecutively in the clockwise direction with Position Number 1 being located true north.

Relative humidity: 15%
Temperature at 2 meters: 77.6°F
Average wind speed: 3.6 mph

TABLE 10: Sampling Results of Trial D-2, Bio 531 (CONFIDENTIAL)

SAMPLING UNIT	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER*										AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL ($\bar{x}$)	STANDARD DEVIATION OF x (s_x)	NUMBER OF VECTORS RELEASED
		1	2	3	4	5	6	7	8	9	10			
Row I, Column 1, (Sitting)	0- 5	2	2	4	5	2	1	0	3	3	5	2.70	1.63	100
	5-10	4	2	0	1	1	3	0	1	1	2	1.50	1.27	
	10-15	4	0	0	0	0	0	0	0	0	0	0.40	1.26	
	15-20	2	1	0	1	0	0	0	0	0	0	0.40	0.70	
	20-25	1	0	0	0	0	0	0	0	0	0	0.10	0.32	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	13	5	4	7	3	4	0	4	4	7	5.10	3.41	
Row I, Column 2, (Walking)	0- 5	0	0	2	0	0	0	0	0	0	0	0.20	0.63	100
	5-10	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	10-15	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	15-20	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	20-25	0	0	0	0	0	1	0	0	0	0	0.10	0.32	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	0	0	2	0	0	1	0	0	0	0	0.30	0.67	
Row I, Column 3, (Sitting-Walking)	0- 5	5	0	3	2	1	6	2	5	2	0	2.60	2.12	100
	5-10	0	0	0	1	1	1	3	0	0	0	0.60	0.97	
	10-15	0	0	1	2	0	2	2	2	0	0	0.90	0.99	
	15-20	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	20-25	2	0	0	1	0	1	0	2	1	0	0.70	0.82	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	7	0	4	6	2	10	7	9	3	0	4.80	3.55	
Row II, Column 1, (Sitting-Walking)	0- 5	0	3	6	14	14	4	0	1	0	5	4.70	5.35	100
	5-10	0	0	3	5	7	2	0	0	1	4	2.20	2.48	
	10-15	0	0	1	0	6	3	0	0	1	3	1.40	2.01	
	15-20	0	0	0	0	2	0	0	1	0	3	0.60	1.07	
	20-25	0	0	1	0	5	1	0	0	0	4	1.10	1.85	
	25-30	0	0	0	0	2	1	0	0	0	1	0.40	0.70	
	Totals	0	3	11	19	36	11	0	2	2	20	10.40	11.71	
Row II, Column 2, (Sitting)	0- 5	0	1	1	0	3	0	0	1	1	0	0.70	0.95	100
	5-10	5	1	7	0	3	3	0	6	0	0	2.50	2.72	
	10-15	0	0	5	0	2	1	1	3	1	0	1.60	2.46	
	15-20	3	5	3	0	1	0	0	0	0	0	1.20	1.61	
	20-25	0	0	0	0	0	3	0	4	0	0	0.70	1.49	
	25-30	4	0	0	0	1	1	0	0	1	0	0.70	1.25	
	Totals	12	7	19	0	10	8	1	14	3	0	7.40	6.47	
Row II, Column 3, (Walking)	0- 5	0	0	0	1	0	3	1	1	4	0	1.00	1.41	100
	5-10	1	0	1	0	0	1	0	1	2	5	1.10	1.52	
	10-15	1	0	1	0	0	0	0	0	1	0	0.30	0.46	
	15-20	1	2	1	0	0	0	0	0	1	1	0.60	0.70	
	20-25	1	1	0	0	0	0	0	0	0	0	0.20	0.42	
	25-30	0	1	0	0	0	0	0	0	0	0	0.10	0.32	
	Totals	4	4	3	1	0	4	1	2	8	6	3.30	0.77	
Row III, Column 1, (Walking)	0- 5	3	0	0	7	3	1	4	0	0	0	1.80	7.57	100
	5-10	4	0	0	3	4	0	7	0	0	0	1.80	2.53	
	10-15	1	0	2	3	3	0	0	1	0	1	1.10	1.19	
	15-20	0	0	0	1	1	0	0	0	1	1	0.40	1.63	
	20-25	0	0	0	0	2	0	0	0	0	0	0.20	0.63	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	8	0	2	14	13	1	11	1	1	2	5.30	5.67	
Row III, Column 2, (Sitting-Walking)	0- 5	15	2	2	5	2	3	2	2	6	3	4.20	4.05	100
	5-10	5	1	5	4	1	2	2	3	5	2	3.00	1.63	
	10-15	1	0	0	0	1	1	1	1	2	0	0.70	0.67	
	15-20	2	2	0	0	0	0	2	1	2	4	1.30	1.33	
	20-25	1	0	0	0	1	0	1	1	2	7	1.30	2.11	
	25-30	2	2	0	0	1	0	3	1	3	4	1.60	1.43	
	Totals	26	7	7	9	6	6	11	9	20	20	12.10	7.18	
Row III, Column 3, (Sitting)	0- 5	4	0	5	19	2	1	3	4	8	6	5.20	5.39	100
	5-10	3	0	6	5	1	0	0	3	3	4	2.50	2.17	
	10-15	1	0	4	1	0	0	1	6	2	4	1.90	2.08	
	15-20	0	0	4	0	0	0	1	3	4	1	1.30	1.70	
	20-25	0	0	3	1	1	0	2	1	2	1	1.10	0.99	
	25-30	0	0	2	0	0	0	1	0	0	0	0.30	0.67	
	Totals	8	0	24	26	4	1	8	17	19	16	12.30	9.37	

*Positions are numbered consecutively in the clockwise direction with Position Number 1 being located at true north.

[redacted]

TABLE 11: Sampling Results of Trial D-3, Bio 531 (CONFIDENTIAL)

Relative Humidity: 37%
Temperature at 2 meters: 65.9°F
Average wind speed: 3.9 mph

SAMPLING UNIT	TIME INTERVAL (Minutes)	NUMBER OF BITES PER HOST AT STIPULATED TIME INTERVALS FOR INDICATED POSITION NUMBER*										AVERAGE NUMBER OF BITES PER HOST FOR INDICATED TIME INTERVAL ($\bar{x}$)	STANDARD DEVIATION OF x (s_x)	NUMBER OF VECTORS RELEASED
		1	2	3	4	5	6	7	8	9	10			
Row I, Column 1, (Sitting)	0- 5	0	1	7	1	4	2	0	0	0	0	1.50	2.32	100
	5-10	0	1	2	1	2	2	0	0	0	0	0.80	0.92	
	10-15	0	1	0	0	2	0	0	0	0	0	0.30	0.67	
	15-20	0	0	0	0	2	1	0	0	0	0	0.30	0.67	
	20-25	0	2	2	0	1	0	0	0	0	0	0.50	0.85	
	25-30	0	3	0	0	0	0	0	0	0	0	0.30	0.95	
	Totals	0	8	11	2	11	5	0	0	0	0	3.70	4.69	
Row I, Column 2, (Walking)	0- 5	3	4	3	5	3	2	0	2	1	0	2.30	1.63	100
	5-10	2	0	2	1	1	1	0	1	1	1	1.00	0.67	
	10-15	0	1	0	0	1	1	0	0	0	0	0.30	0.48	
	15-20	1	2	0	0	0	0	0	0	0	0	0.30	0.67	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	6	7	5	6	5	4	0	3	2	1	3.90	2.33	
Row I, Column 3, (Sitting-Walking)	0- 5	2	0	0	3	4	1	1	2	1	3	1.70	1.33	100
	5-10	1	3	0	2	2	2	1	0	0	2	1.30	1.06	
	10-15	1	0	2	3	3	0	0	1	1	1	1.20	1.13	
	15-20	0	0	5	1	1	0	0	0	0	0	0.70	1.57	
	20-25	1	0	3	4	0	0	1	0	0	0	0.90	1.45	
	25-30	0	0	1	0	0	0	0	0	0	0	0.10	0.32	
	Totals	5	3	11	13	10	3	3	3	2	6	5.90	3.99	
Row II, Column 1, (Sitting-Walking)	0- 5	5	4	1	3	7	1	2	2	1	0	2.60	2.17	100
	5-10	3	0	0	4	4	1	2	0	0	2	1.60	1.64	
	10-15	2	1	2	1	0	2	1	1	2	0	1.20	0.79	
	15-20	0	0	1	0	0	1	1	0	0	1	0.40	0.52	
	20-25	0	2	1	0	1	1	2	0	1	0	0.80	0.79	
	25-30	0	0	0	0	0	2	1	0	0	0	0.30	0.67	
	Totals	10	7	5	8	12	8	9	3	4	3	6.90	3.07	
Row II, Column 2, (Sitting)	0- 5	0	0	2	0	0	2	0	0	1	2	0.70	0.95	100
	5-10	0	1	2	3	0	1	0	0	0	1	0.80	1.03	
	10-15	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	15-20	0	0	0	0	0	0	0	0	0	1	0.10	0.32	
	20-25	0	0	0	0	1	0	0	0	0	0	0.10	0.32	
	25-30	0	0	0	0	1	0	0	0	0	0	0.10	0.32	
	Totals	0	1	4	3	2	3	0	0	1	4	1.80	1.62	
Row II, Column 3, (Walking)	0- 5	0	0	0	0	0	0	0	0	0	0	0.00	0.00	100
	5-10	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	10-15	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	15-20	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Row III, Column 1, (Walking)	0- 5	0	0	0	0	0	0	0	0	0	0	0.00	0.00	100
	5-10	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	10-15	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	15-20	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
Row III, Column 2, (Sitting-Walking)	0- 5	3	0	2	0	3	0	1	1	0	2	1.20	1.22	100
	5-10	2	2	0	0	0	0	0	1	0	0	0.50	0.85	
	10-15	1	1	0	0	0	0	1	0	0	0	0.30	0.48	
	15-20	2	0	0	0	0	0	0	0	0	0	0.20	0.63	
	20-25	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	8	3	2	0	3	0	2	2	0	2	2.20	2.35	
Row III, Column 3, (Sitting)	0- 5	0	0	1	5	3	0	1	3	0	0	1.30	1.77	100
	5-10	0	0	2	3	3	0	1	2	5	0	1.60	1.71	
	10-15	0	0	0	0	0	1	0	3	0	0	0.40	0.97	
	15-20	0	0	0	1	1	1	0	2	0	0	0.50	0.71	
	20-25	0	0	0	0	0	0	0	2	0	0	0.20	0.63	
	25-30	0	0	0	0	0	0	0	0	0	0	0.00	0.00	
	Totals	0	0	3	9	7	2	2	12	5	0	4.00	4.16	

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