FACTORS AFFECTING FLIGHT OF THE STABLE FLY, *STOMOXYS CALCITRANS* (L.) AND THE HOUSE FLY, *MUSCA DOMESTICA* (L.)

by 6408

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Major Professor

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INTRODUCTION

The stable fly is an important economic insect injurious to domestic animals. It is almost cosmopolitan in distribution and is associated with man and animals.

In domestic animals injury results from disturbance and irritation caused by insect attack. Where great numbers of flies are involved the loss of blood may be great.

Milk reduction and weight loss in cattle resulting from stable fly annoyance and feeding have been investigated by several workers, and estimated up to 30% loss or more. Losses may be attributed to pain, blood loss, interference with normal grazing habits and possibly anaphylaxis from fly-derived substances left in the animal (Bruce and Decker 1958).

Profitable reward can be expected in most cases from biting fly control. However, the success of a control program could be impaired by temperature and time of spraying, because temperature and time of day, besides influencing insect activity and periodicity, may also affect the toxicity of insecticides. For example, Bruce and Decker (1951) concluded that making fly counts of tabanids on animals when the air temperature is below 85° F is of little value.

In the present study, relative abundance and activity of stable and house flies as related to temperature and time of day were investigated.

LITERATURE REVIEW

Conditions affecting insect activity, density, and distribution in the atmosphere fall under two broad categories: (1) biological conditions such as life history, behaviour and species size; and (2) meteorological factors such as climate and weather (Freeman 1945). Climate and weather are important in that the former determines the geographic range of an insect while the latter is responsible for fluctuations that determine seasonal activity and population abundance.

Temperature is probably the single most important factor since it regulates the rate of development, flight activity, and population density of insects (Johnson 1952; Taylor 1963, 1966). According to Johnson and Taylor (1957) temperature is probably the effective trigger mechanism in Aphis fabae for take-off in the morning, and light is the inhibitor in the evening.

In analyzing the effect of temperature on insect flight, Taylor (1963) proposed a temperature threshold hypothesis stating that insects take flight between two temperatures, the lower and upper threshold; and that all insects of the same species in the same locality have similar take-off thresholds. In other words, temperature thresholds are species specific in the same locality.

Between the lower and upper threshold, the proportion of insects in flight is independent of temperature. He also noted that below the lower threshold, take-off is inhibited and flight does not occur. Aphid activity, for example, was low when average maximum temperatures were higher than 27° C or lower than 16° C (O'Loughlin 1963).

Lewis and Taylor (1965) believed that insect flight is determined largely by physiological responses to cyclic factors in the environment and that light intensity is usually the factor that affects the time of flight, whereas temperature influences amplitude. They cautioned that with a species having 2 periods of flight within each 24 hours, "until it has been shown that the insects in flight during one peak of activity are the same individuals as those in the other, we cannot assume that both distributions describe the same population." They also suggested that where short periods of flight occur, for example short periods at midday, they may be attributed to direct sunlight as being essential in some insects.

Both Williams (1923) and Freeman (1945) pointed out the importance of wind as a major physical factor influencing insect flight.

Hawkes (1961) observed the aerial density of Anisopus fenestralis above sewage bacteria beds and found that between 0-10 mph wind velocity, there was a gradual rise in the catch associated with a rise in temperature to an optimum beyond which the catch decreased. This optimum fell as wind velocities rose and occurred between 70°-75° F at winds between 2 and 4 mph; at 65°-75° F with winds 4-6 mph and at 60°-65° F between 6-8 mph. At all temperatures between 30°-80° F the catch decreased as wind velocity increased from 0 to 10 mph. Average regressions showed that for each $^{\circ}$F rise in temperature the log catch was raised by 0.14 and for each 1 mph rise in wind velocity the log catch was decreased by 0.19. Expressed arithmetically, the catch was doubled by a 2.2° F rise in temperature or by a decrease in wind velocity of approximately 1.5 mph.

Williams (1940) proposed that in a biological sense a trap catch is proportional to population x activity. For single species, Taylor (1963) extended the concept of "catch" by a further definition in time and stated that if aerial density remains fairly constant, catch is the simple product of mean aerial density and the flying time. This means that the effect of environmental factors as independent variates on the dependent variate, the catch, may be determined as much by the length of time they operate as by the intensity with which they operate.

Harley (1965) carried out surveys on Glossina, Stomoxys, and tabanids in Uganda, using black cattle as bait animals. He reported the species of tabanids and Stomoxys caught as well as seasonal abundance and diurnal variations in activity of the different species. The season of greatest abundance of most species was May through August, with the greatest numbers caught in June or July. This period coincides with the beginning of the dry season. A second period of increase in numbers occurred toward the end of the second rainy period in November and December. He reported that peak activity nearly always occurred between 11:00 and 14:00 hours but found slight and irregular differences in pattern of diurnal activity between sites as well as between species depending on season.

Three species of Stomoxys (S. nigra Macq.; S. omega Newst; and S. brunnipes Grunb.) exhibited similar patterns of activity with both sexes reaching peak activity twice a day, in morning and late evening. This was in contrast to S. calcitrans in which both sexes were the most active in the early afternoon, the females later than the males.

The males exhibited a tendency to reach a double peak in contrast to the single peak in females. Harley also reported that significantly more individuals of all species of tabanids and males of S. nigra were caught in the open rather than in the shade, but there were no significant differences in the females of this species and for both sexes of S. calcitrans. In the case of S. omega the catches were the opposite of the results for tabanids.

A diurnal cycle of flight activity in S. nigra was described by Cooker and Passmore (1958) which occurred between 3:00 p.m. and 6:00 p.m. with a second minimum peak of activity occurring between 11:00 a.m. and 2:00 p.m.

Jackson (1941) reported that the life expectancy of Glossina morsitans is shortest during the dry season. The males on the average live for 2 weeks while during the rainy seasons longevity is 5-6 weeks. He stated that "at all times the females live substantially longer, possibly twice as long."

Sömme (1958) studied the number of house flies, stable flies and Fannia species in Norwegian barns and showed that stable flies make up 74.5% of the fly population during the summer; 15.3% were house flies, and 10.2% Fannia. Dahm and Raun (1955) observed that there are periods during the fly breeding season when more than half of the flies in Iowa barns may be stable flies. DeFoliart (1956) noted only 3 to 4% of the most important flies in Wyoming barns to be stable flies. Hansens (1956), in New Jersey, established that to a great extent the fly population there may be stable flies. The same author (1951) reported on the annoyance of Stomoxys in seashore

recreational areas in New Jersey, and attributed most of the fly annoyance to westerly winds taking the flies to the beaches from breeding sites in fermenting aquatic vegetation washed ashore. Similar results were obtained by Quarterman et al. (1951) on coastal Florida.

Bruce and Decker (1958) investigated the relationship of the stable fly abundance to milk production in dairy cattle and found significant correlations between stable fly abundance and the reduction in milk and butterfat production during May-September. Average monthly losses were 0.7% and 0.65% per fly per cow. There was evidence of a lowered production which continued well after the end of the fly season. Freeborn et al. (1925) observed a loss of 9.26% and 3.33% in milk production by stable flies and horn flies, respectively, while the results of Bruce and Decker (1947) and Cutkomp and Harvey (1958) demonstrated similar trends in loss of milk and meat production.

Chemical control of Stomoxys calcitrans (L.), Siphona irritans (L.), and Tabanus quinquevittata (Wied.) by Tien-Hsi-Cheng (1958) resulted in a mean weight gain of the treated animals which was greater than the untreated by 1/2 to 2/3 pound per animal per day. Laake (1946) observed a mean weight gain of 42 to 70 pounds in 2 to 3 months of DDT-treated beef cattle in Kansas against horn flies and estimated the loss due to injury by horn flies in Kansas alone, in 1945, close to $10,000,000.

In sampling populations of flying insects, it is desirable to use a trapping method as independent as possible of wind speed and other meteorological factors. It is also essential to the study of flight periodicity, to know the time of arrival in the trap of any

particular insect. Segregation of catches during sampling also becomes almost imperative if sampling on a large scale or over long periods is contemplated. The suction trap originally designed by Johnson (1950) satisfies these requirements. It samples constant quantities of air thus making it more efficient with small insects in calm conditions than traps which depend on the variable flow of wind for much of their catching power.

The suction trap has increased accuracy in estimating insect density and will work in any weather. The insects are in excellent condition for preservation and identification and the trap does not depend on insect responses for its catching power. The disk-dropping mechanism can be set to drop disks at almost any interval. Its major disadvantage is the necessity of electricity.

Inherent weaknesses in the original disk-release mechanism, which became accentuated with long exposure to bad weather conditions, led to designing an improved suction trap (Taylor 1951).

Later Johnson and Taylor (1955) described the problems pertaining to the measurement of the aerial density of insects by suction traps as follows: (1) to collect an adequate amount of air in a measured time and at as constant a rate as possible; (2) to assess accurately the quantity of air collected per unit time and to define any variations in it; and (3) to estimate any loss of insects from the air as it enters the trap. They also described larger and more powerful traps, with a much greater air delivery designed to take adequate samples of insects from the air, particularly in exposed situations

where winds are above 15 mph or where insect densities are extremely low.

Taylor (1955, 1962) assessed how insect size, sampling rate and velocity, and wind speed affect the efficiency of suction traps and found that, at a wind velocity of 10 mph, the volume of the air sample was reduced by about 30%.

MATERIALS AND METHODS

The population of stable flies and house flies was assessed by two 22-cm diameter vent-axia suction segregating traps, set up about 4 meters apart in dairy barns of the Kansas State University, Department of Dairy and Poultry Science, at Manhattan, Kansas. The traps were set in the loafing sheds with the top of each trap level with the wooden stall in which it was located. The sheds were enclosed by iron sheet paneling on all sides except one and consisted of a series of stalls, each for accommodating one animal.

The traps were operated starting in mid-June and continuing until late November, 1970, giving an approximate total of 163 trap-days. Two traps were operated simultaneously throughout the study period except during the initial stages of this study when only one trap was in a working condition, and occasionally during the trapping period when either the electrical power was off because of weather conditions, or when the second trap was stopped for repair.

The traps measured and related the catch to volume of air samples, thus estimating aerial density. The traps were also reasonably

independent of wind velocity and other meteorological factors and neither attracted nor repelled insects, and took a more or less random sample whether during the day or night, whatever the sensory state of the flying insects. The insects were in good condition with well over 90% of the catch identifiable.

Each trap consisted of a horizontal mouth 22-cm diameter vent-axia fan by means of which air and insects are drawn into a gauze cone vertically mounted below the fan. The flies passed down the cone and the catch segregated at regular time intervals by disks dropping down a central guide disk-rod into the magazine. A solenoid-operated release mechanism controlled through a time-switch regulated the dropping of the disks. The traps were operated on a twenty-four hour period with time-switches adjusted to segregate successive catches into half-hour samples. They were emptied and reloaded after each twelve-hour collecting period, at 08:00 and 20:00 hours.

The disks were fringed with cotton cloth and cemented in place on the underside of the disk with shellac dissolved in 95% alcohol to leave a fringe of about .2 cm wide around the edge. Before use, 50 disks were laid underside up on a paper towel and coated with 'ortho-fly spray' insecticide containing 0.05% pyrethrum, 0.50% piperonyl butoxide, 0.25% thanite and 0.50% methoxychlor dissolved in 98.65% petroleum distillate. Insects entering the trap and contacting the cloth were immediately knocked down, preventing escape or accidental insect leakage into samples collected at subsequent times. However, about 2% of the total catch segregates into the wrong sample. After

drying, 25 disks were put on each extractor rod before replacing in the magazine.

To load into the trap, the end of the extractor rod was fitted into the grooved end of the disk-rod and the disks were pushed up past the release gate with the loading rod after which the magazine and base cap were inserted and kept firmly in position by a nut screwed at the end of the disk-rod.

For emptying the trap, the magazine with its catch was held in place with one hand, while the other hand unscrewed the base cap. The pointed end of the extractor rod was then inserted into the groove on the end of the disk-rod. Next, the magazine was lowered gently over the extractor rod to avoid disturbing the disks with their catches until it was completely removed from the trap. Finally, the top lid of the magazine was put on and the nuts were screwed on to hold the lid, disks, and base cap together firmly. The disk-rods were cleaned and sparingly oiled every three days to prevent the disks from getting stuck on the rod above the release gate.

In the laboratory the disks were emptied from the magazine, each with its catch, into 60 x 15 mm petri dishes placed on a chart labeled with the sampling time intervals. After the catches were counted and sexed, the disks were cleaned and washed in petro-ether before they were recoated with the insecticide. They were allowed to dry prior to being reloaded into the traps. The house flies were not sexed in this study and the sampling rate of the traps was not measured.

Outside air temperature was recorded by means of a spring-driven Cambridge double bulb mercury thermograph that ranged from -20^{o} C to

+50° C. The two stainless steel thermograph bulbs, each with a 3 m capillary lead, were connected to the chart through an opening at the bottom of the instrument trailer. The bulbs were located inside a white-painted stove pipe which had a small exhaust fan at one end. A white metal sheet was mounted above the stove pipe to form a second shield. A third metal shield, painted green, was mounted on a four-legged metal frame stand above the first two shields. The fan was operated by relays from the instrument trailer. Temperatures taken every half hour were estimated to the nearest one-tenth degree, after which the median temperatures over 30-minute intervals were obtained.

Transformed data of monthly catches at half-hour average temperatures were used in a mathematical model to describe the relationship among log catches and varying conditions of temperature and time of day.

Regression analysis on the model

$$Y_5, Y_6, Y_7, Y_8 = C + \beta_1 X_9 + \beta_2 X_1 + \beta_3 X_{10} + \beta_4 X_2 + E(1)$$ provided correlation coefficients of Y_i log transformations which on the average would be associated with any particular combination of X_i values.

In the equation,

Y_5 = log ♂ stable fly

Y_6 = log ♀ stable fly

Y_7 = log (♂ + ♀) stable fly

Y_8 = log house fly

X_1 = time

X_2 = temperature

X_9 = log time

X_{10} = log temperature

and β_i = regression coefficients of X_i variables. E(1) = deviation of the Y_i value from the regression surface.

RESULTS AND DISCUSSION

Numbers Collected

A total of 9,942 stable flies was collected during the experimental period from June 14 to November 23. There were 6,377 females and 3,565 males. This represents 64.14% females and 35.86% males of the total stable fly population collected. Of this total 184 males and 450 females were collected during the night hours 20:00 to 8:00 a.m.

A total of 16,663 house flies was collected from July-November. This was significantly more than the total number of stable flies collected.

The stable flies represented 33.7% of the population of the two species collected during the test periods. This is in contrast to the findings of Sömme (1958) in Norwegian barns where the stable fly population density was 74.5% of the estimated total population of house flies, stable flies and Fannia. On the other hand, DeFoliart (1956) reported only 3% to 4% of the most important flies in Wyoming barns to be stable flies. Dahm and Raun (1955) noted that at certain times during the breeding season more than half of the flies in Iowa barns may be stable flies. In New Jersey, Hansens (1956) reached similar conclusions.

These differences in populations are to be expected in different areas depending on local weather conditions and breeding sites available for different species. Jackson (1941) reported that females of Glossina morsitans live substantially longer, possibly twice as long, than males. This difference in longevity could account for the difference in the number between sexes of S. calcitrans.

Fig. 1. Number of male S. calcitrans collected in suction trap at 30-minute intervals during 24-hour periods June 14 through November 23, 1970.

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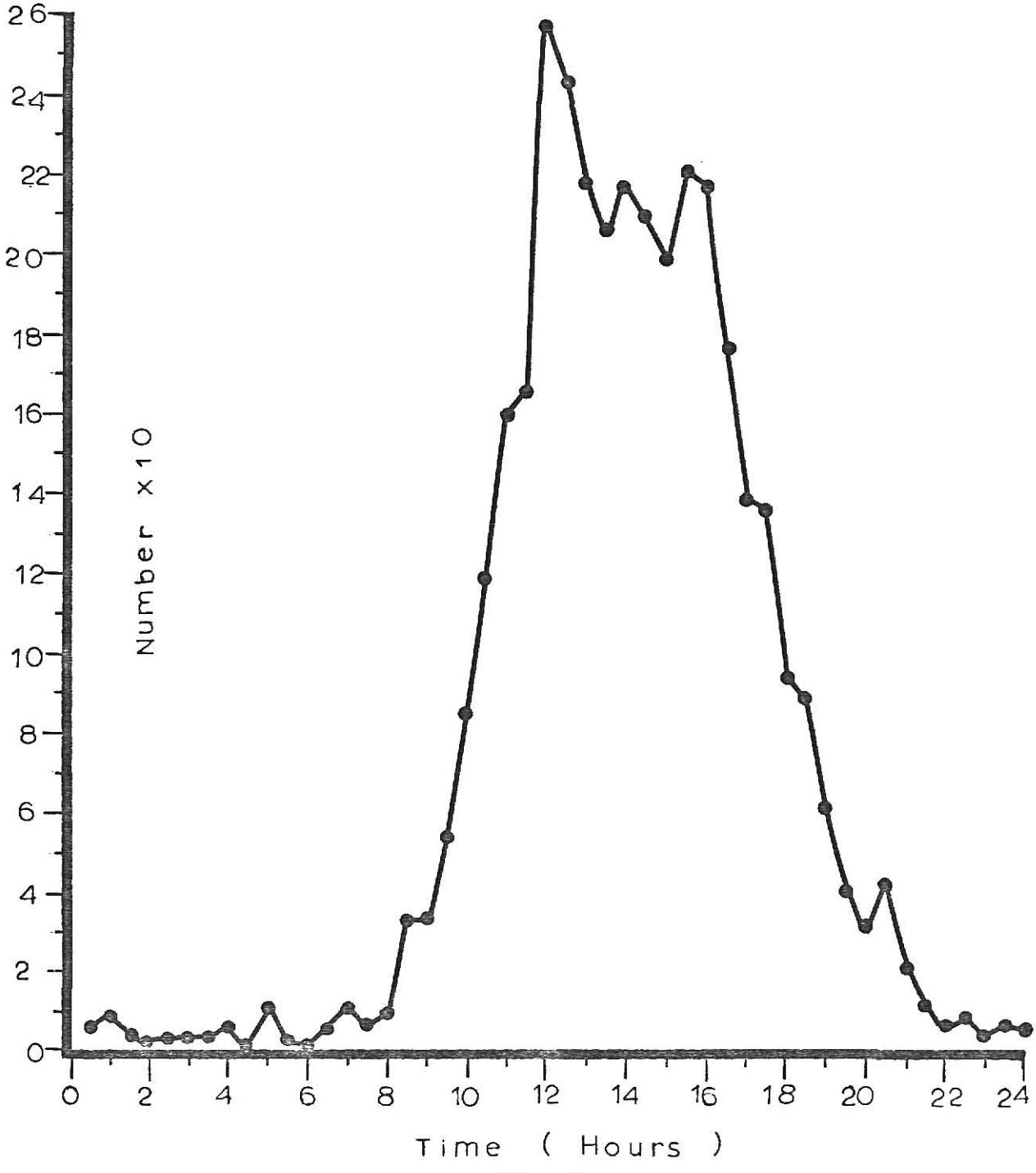
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24
22
20
18
16
14
12
10
8
6
4
2
0
Number x 10
0
2
4
6
8
10
12
14
16
18
20
22
24
Time (Hours)

Fig. 1

THIS BOOK CONTAINS NUMEROUS PAGES THAT WERE BOUND WITHOUT PAGE NUMBERS.

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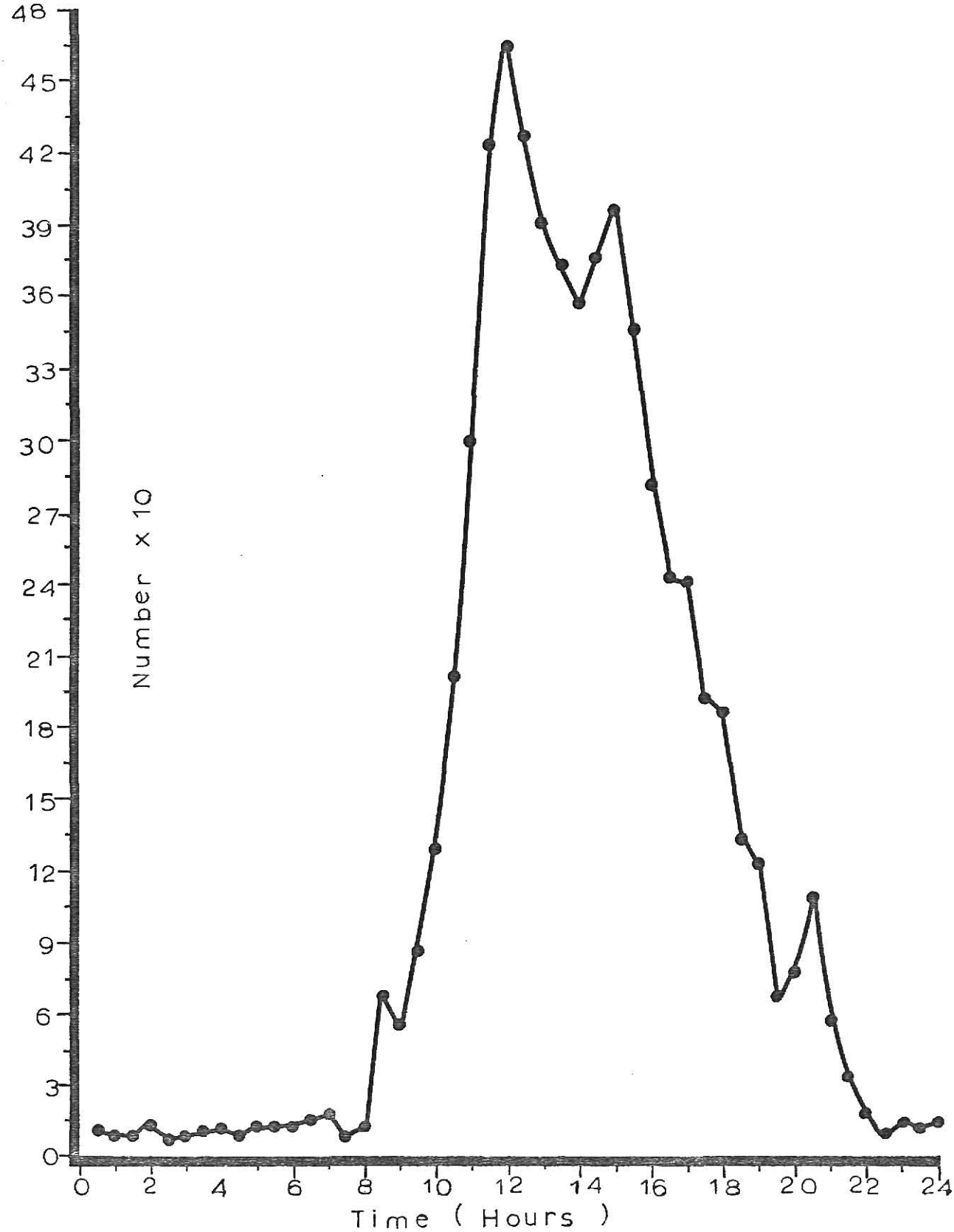
Fig. 2. Number of female S. calcitrans collected in suction trap at 30-minute intervals during 24-hour periods, June 14 through November 23, 1970.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36
33
30
27
24
21
18
15
12
9
6
3
0
Number x 10
0
2
4
6
8
10
12
14
16
18
20
22
24
Time (Hours)

Fig. 2

with only 3.1% males and 3.9% females collected. The proportion in flight between 8:00-11:00 hours was rapidly increasing from about 1% to 13% for both sexes.

Flight Periodicity of *Musca domestica*

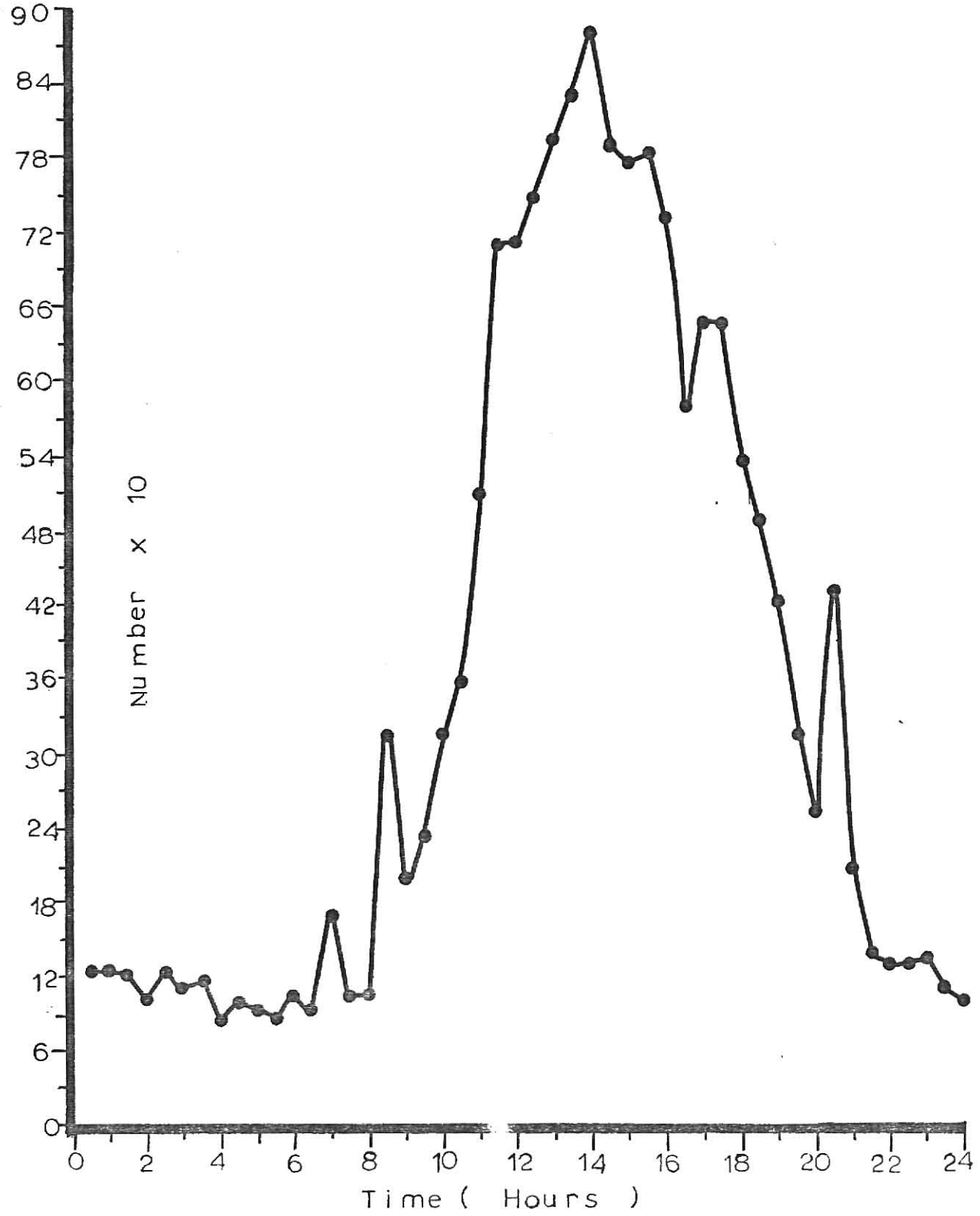
The periodicity distribution of *M. domestica* is shown in Fig. 3. The general pattern of activity was comparable to that of the stable fly. The major difference was in peak activity occurrence and more numbers of *M. domestica* flying at any 30-minute interval (e.g., Table 1).

In comparison with the stable fly, afternoon peak activity of *M. domestica* was delayed 1 1/2 to 2 1/2 hours. It occurred between 13:00-14:30 and from 16:30-18:00 hours. The largest numbers of flies was collected between 13:30-14:00 hours. A peak was observed in the evening between 20:00-21:00 hours, similar to the stable fly, and in the morning from 8:00-9:00 hours. This latter peak activity was not apparent in the stable fly.

Seasonal Variation and Population Abundance

Weekly catches of stable and house flies were used to determine seasonal variation and population abundance. Fluctuations in population densities of *S. calcitrans* and *M. domestica* during the study period are shown in Figs. 4, 5, and 6. Rainfall data for Manhattan, Kansas, for each month was obtained from the Physics Department for correlation. Variations of trap-days in monthly catches were reduced by computing an average seasonal index for each month. This was necessary because

Fig. 3. Number of M. domestica collected in suction trap at 30-minute intervals during 24-hour periods July 1 through November 23, 1970.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72
66
60
54
48
42
36
30
24
18
12
6
0
Number x 10
0
2
4
6
8
10
12
14
16
18
20
22
24
Time (Hours)

Fig. 3

Fig. 4. Weekly catches of male S. calcitrans collected in suction trap at 30-minute intervals during 24-hour periods, June 14 through November 23, 1970.

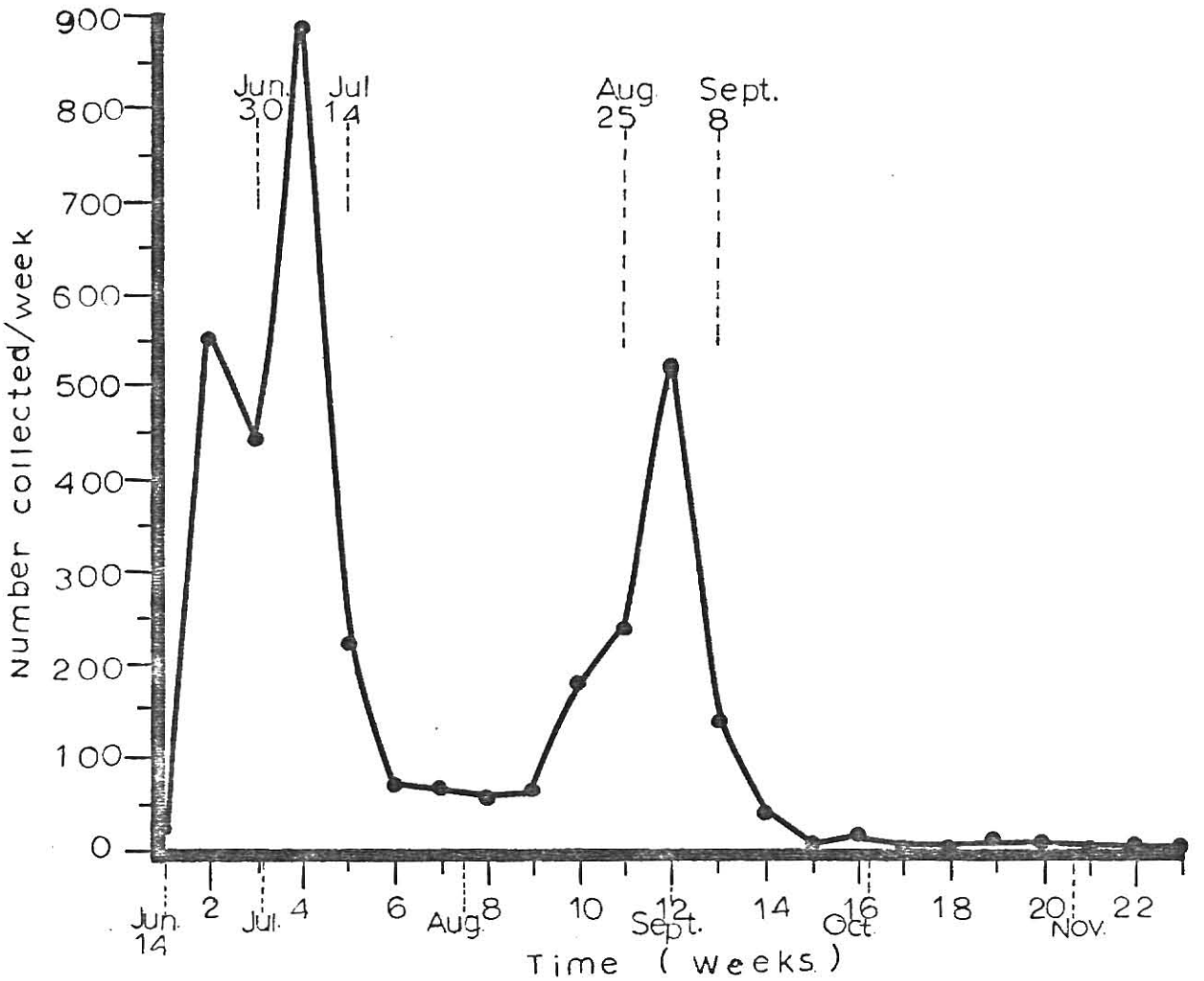
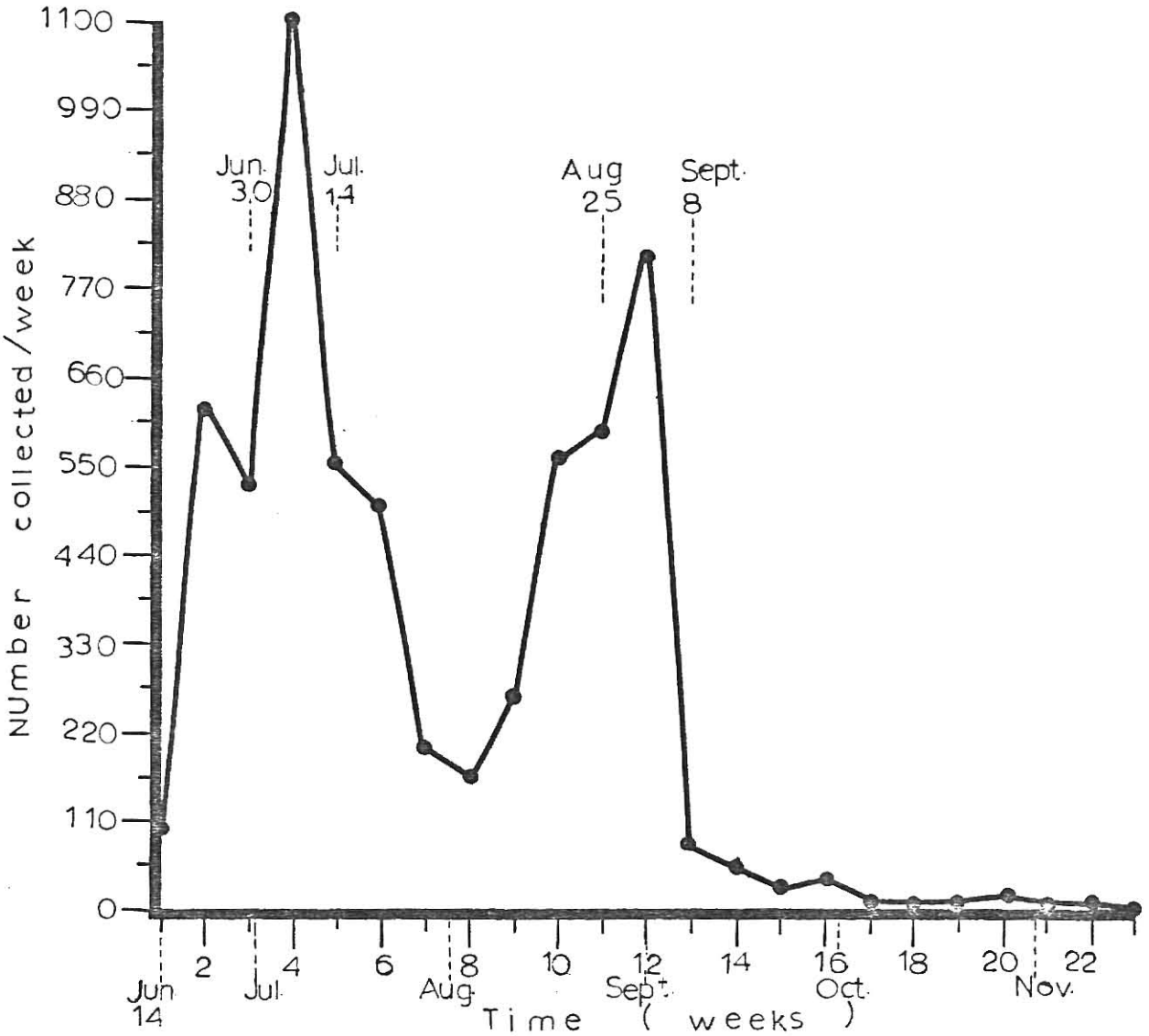

900
800
700
600
500
400
300
200
100
0
Number collected/week
Jun. 30
Jul 14
Aug 25
Sept. 8
Jun 14
2
Jul.
4
6
Aug.
8
10
12
Sept.
14
Oct.
16
18
20
Nov.
22
Time (weeks)

Fig. 4

Fig. 5. Weekly catches of female S. calcitrans collected in suction trap at 30-minute intervals during 24-hour periods, June 14 through November 23, 1970.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990
880
770
660
550
440
330
220
110
0
Number collected/week
Jun. 30
Jul. 14
Aug 25
Sept. 8
2
4
6
8
10
12
14
16
18
20
22
Jun 14
Jul.
Aug.
Sept.
Oct.
Nov.
Time (weeks)

Fig. 5

Fig. 6. Weekly catches of M. domestica collected in suction trap at 30-minute intervals during 24-hour periods, July 1 through November 23, 1970.

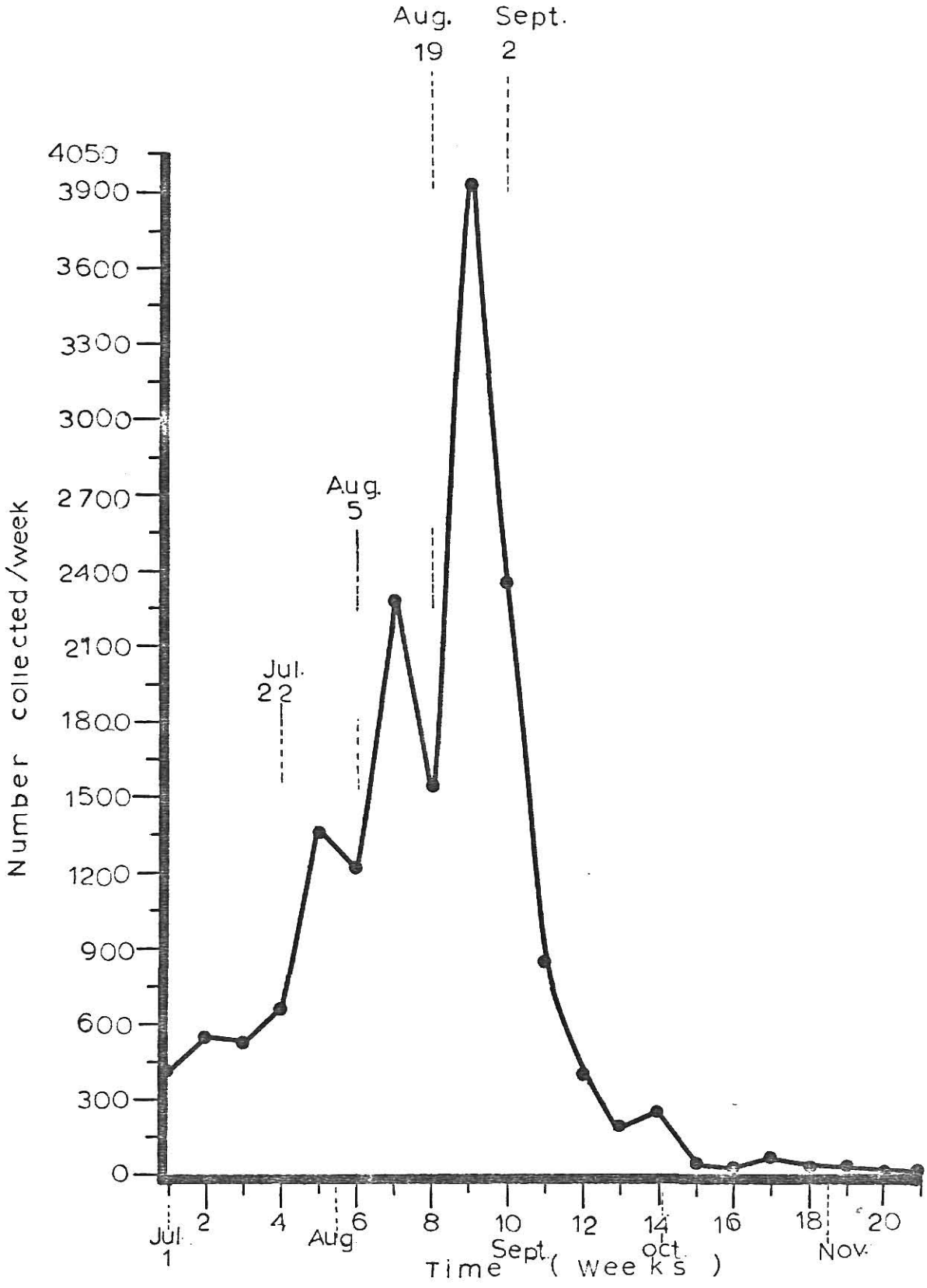

Aug. 19
Sept. 2
Aug. 5
Jul. 22
4050
3900
3600
3300
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
Number collected/week
Jul. 1
2
4
Aug.
6
8
10
Sept.
12
14
oct.
16
18
Nov.
20
Time (Weeks)

Fig. 6

data were not collected for the complete month in June and November, and because on some days the traps were not operating due to irregularities requiring repair. Monthly indexes were used to illustrate how activity, on the average, varied from month to month.

Both sexes of S. calcitrans showed similar patterns of seasonal variation with three periods of high population density. A first peak of abundance occurred from about the middle to the end of June. A second period of population build up, with the greatest number of Stomoxys, occurred during the first half of July, coinciding with the end of heavy rains in June and the beginning of a dry period in July. A third population increase did not appear until after some rains in August and reached a peak between late August and the first week of September. In spite of the heavy rainfall during September, the population density started declining early during the month, probably because of diapause. In Uganda Harley (1965) observed a similar trend in seasonal variation and population abundance of Stomoxys with regard to occurrence of rainy seasons.

Of the total number of house flies collected between July-November, 52.4% were caught during August. House flies were most abundant between August 19 and September 2, while an earlier *medium* population increase occurred between August 5 and August 19.

Computed seasonal indexes suggest that on the average, the following percentages of stable and house fly are to be expected in the Manhattan dairy barns during summer and fall:

	June	July	August	September	October	November
S. calcitrans	26.45	36.98	19.35	16.08	.98	.16
M. domestica	?	16.10	51.85	29.50	2.23	.33

Effect of Temperature on Flight

Median temperatures computed over 30-minute intervals were used in analyzing the effect of temperature on flight. The number of occasions when flight occurred were expressed as a percentage of the total number of occasions when temperature occurred within each 1^{o} C interval. Flight occurrence percentages were then plotted against corresponding temperatures (to the nearest degree) (Figs. 7, 8, and 9).

Average percentage activity at various temperatures for the entire study period is shown in Tables 2, 3, and 4, while Tables 11 to 26 refer to flight occurrence and activity percentages for monthly catches. The numbers of S. calcitrans and M. domestica related to time of collection and monthly average temperatures per 30-minute intervals are shown in Tables 5 to 10.

Flight occurrence and activity percentages were based on a 24-hour trap period with the assumption that a catch of one or more insects is evidence of flight occurring. It was further assumed that catches at various temperatures were of insects already in flight, and therefore, the relevant factor being measured was the effect of temperature on continued flight, rather than on take-off.

The response curves of male and female S. calcitrans are shown in Figs. 7 and 8. In both cases flight response rose to a peak between 32^{o} C and 34^{o} C, with the largest numbers and occasions for flight per temperature interval occurring at 33^{o} C (Tables 2 and 3). The average percent activity and flight occasions decreased rather rapidly per 1^{o} C rise in temperature (34^{o} C to 37^{o} C). Activity declined rather slowly

Fig. 7. Flight response curve of male S. calcitrans obtained by plotting percentage occasions that flight occurred against temperature at 30-minute intervals during 24-hour periods, June 14 through November 23, 1970.

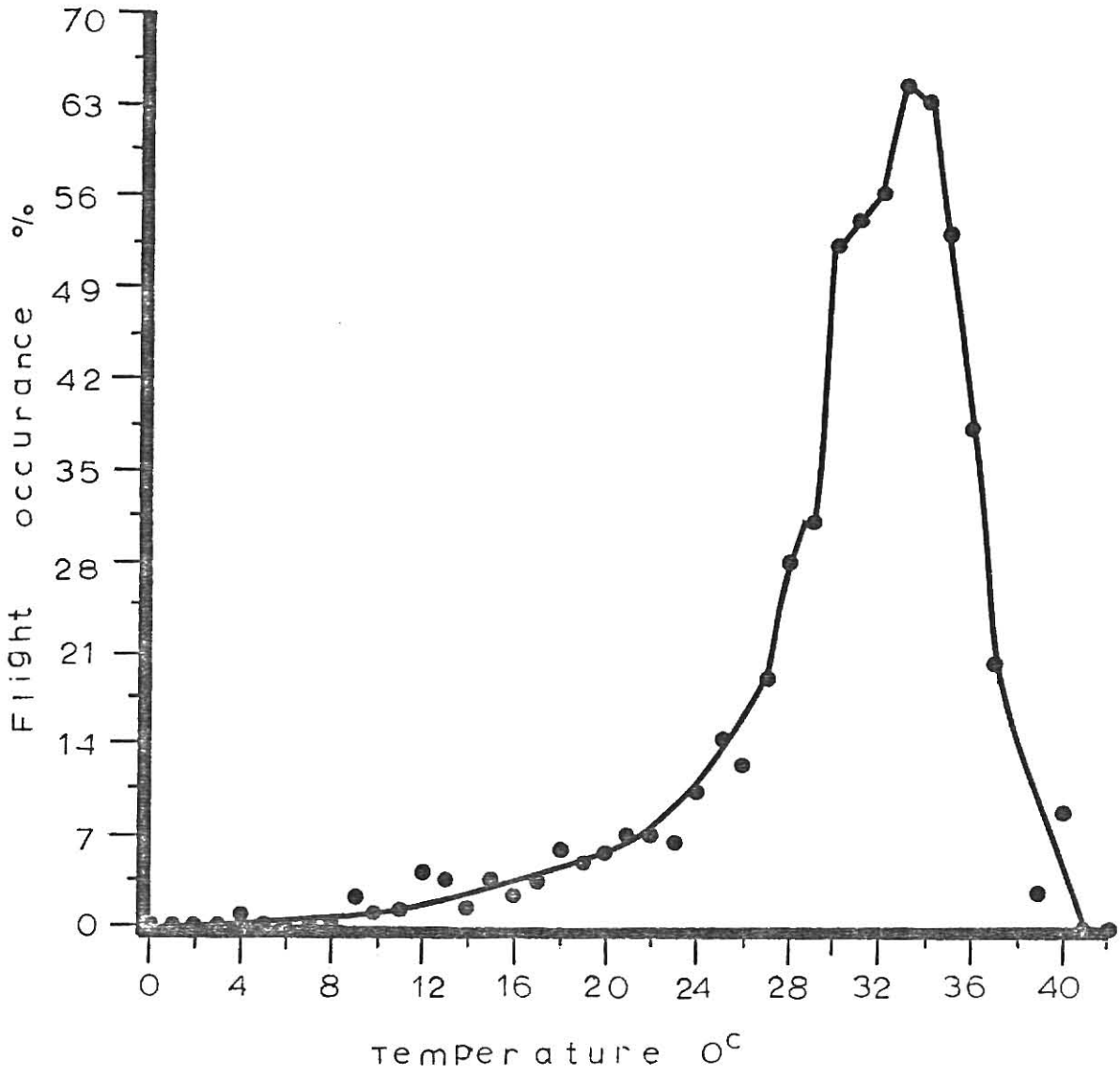
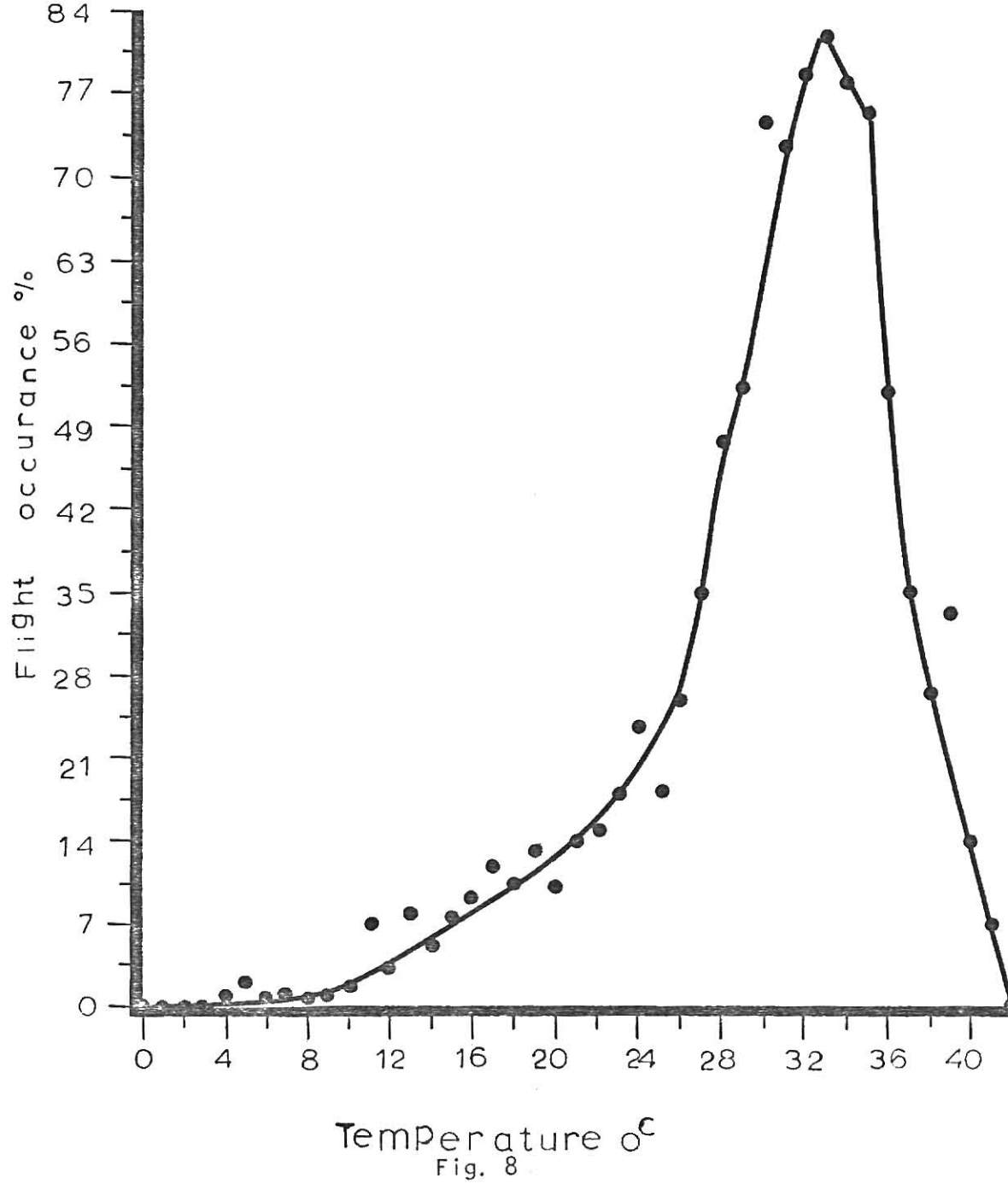

70
63
56
49
42
35
28
21
14
7
0
Flight occurance %
0
4
8
12
16
20
24
28
32
36
40
Temperature °C

Fig. 7

Fig. 8. Flight response curve of female S. calcitrans obtained by plotting percentage occasions that flight occurred against temperature at 30-minute intervals during 24-hour periods, June 14 through November 23, 1970.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Flight occurance %
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8
12
16
20
24
28
32
36
40
Temperature °C

Fig. 8

Fig. 9. Flight response curve of M. domestica obtained by plotting percentage occasions that flight occurred against temperature at 30-minute intervals during 24-hour periods, July 1 through November 23, 1970.

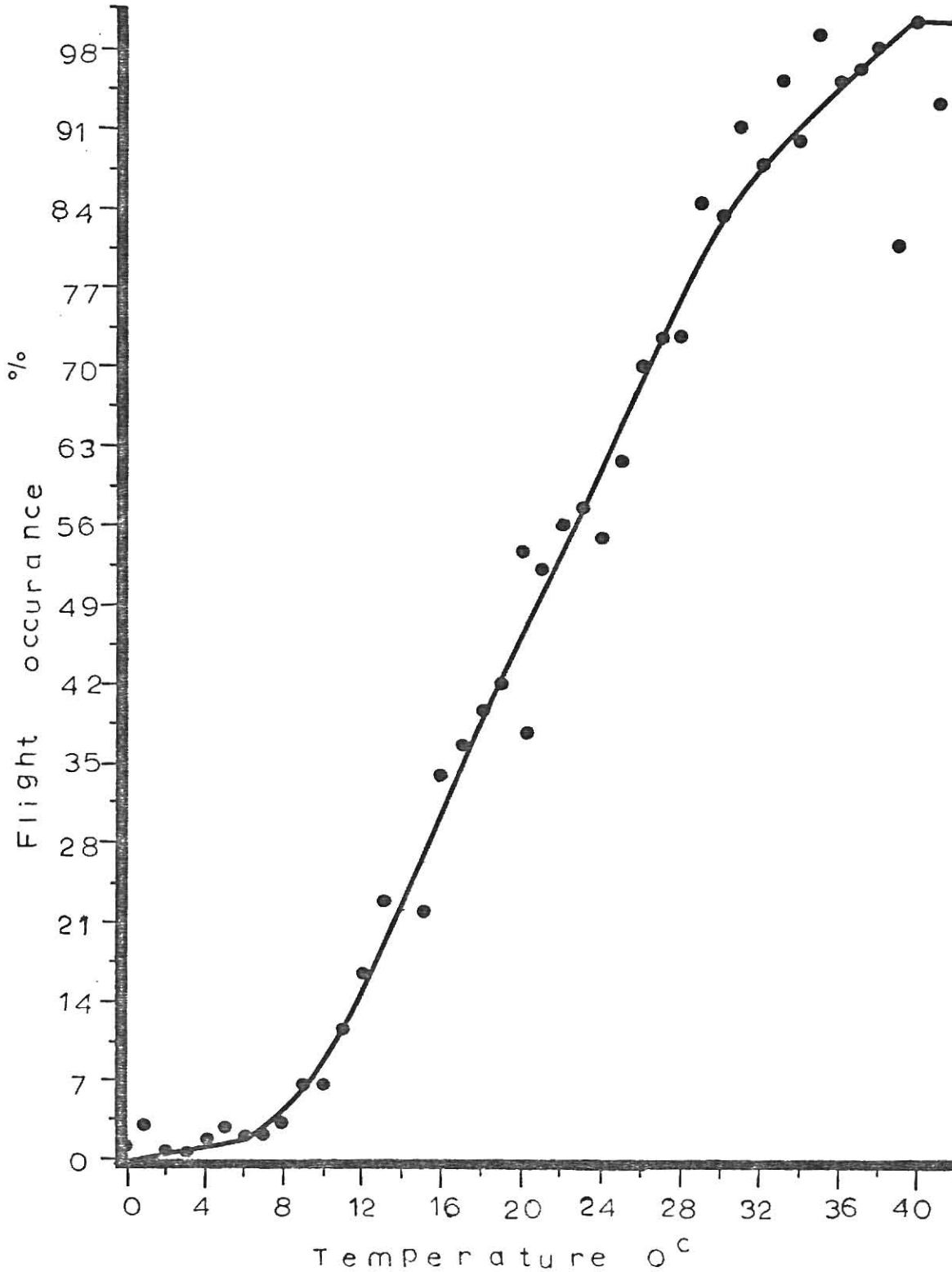
Flight occurance %
98
91
84
77
70
63
56
49
42
35
28
21
14
7
0
0
4
8
12
16
20
24
28
32
36
40
Temperature °C

Fig. 9

with rise in temperature from 37° C up to 42° C when activity was completely inhibited in both sexes. Flight occurrence was limited at temperatures below 11° C (Figs. 7 and 8). The cumulative average percent frequency (Tables 2 and 3) indicates that less than 5% males and 6% females were collected at temperatures below 24° C.

Between 24° C and 30° C male flight activity rose from 11% to 52%. The average percent collected at these temperatures increased by 22.4%. Female occasions for flight under the same temperature conditions rose from 23% to 74% and the average percent collected increased by 23.4% (Tables 2 and 3). Male flight activity occurrence increased from 52% to 64% within the optimal temperature range from 30° C to 35° C, and the average percent collected increased by 66.7%. Under the same conditions, female flight activity occurrence varied from about 74% to 84%, during the same interval the average percent collected increased by 61.2%.

A flight response curve of M. domestica, with regard to temperature, is shown in Fig. 9, while Table 4 gives the numbers and average percentages collected at various temperature intervals. The numbers in flight between 20° C and 38° C were large, with about 79% collected under these temperature conditions. The cumulative average percent frequency indicates that below 20° C less than 6% were flying. The most favorable temperature range for flight was from 31° C to 38° C with the largest numbers collected between 31° C and 35° C. Fourteen and eight-tenths percent of the houseflies were collected within a 5° C temperature interval, 38° C to 42° C, in comparison to 14.4% collected

below 26° C (Table 4). The flight temperature response of each species suggests a wider tolerance temperature range for flight activity in the house fly than in the stable fly.

SUMMARY AND CONCLUSIONS

A dairy barn fly population estimated by two 22-cm diameter Vent-Axia suction traps between mid-June and late November 1970, consisted of 9,942 stable flies and 16,663 house flies. Sixty-four and four-tenths per cent of the stable flies were females. This majority was probably due to females living longer than males.

Female and male S. calcitrans exhibited similar patterns in optimal activity between 11:30 and 13:00 hours but slight differences in peak activity occurred from 13:00 to 16:30 hours. In contrast, optimal activity of M. domestica occurred 1 1/2 hours later between 13:00 and 14:30 hours and a second peak in activity appeared between 16:30 and 18:00 hours. In all cases a late evening peak starting at 20:00 hours until 21:00 hours was observed, after which activity was slight during the night. There was rapid increase in percentage activity in both species from 8:00 hours.

Weekly catches of stable and house flies indicated three periods of population build-up in both species. The first increase in the stable fly population appeared during mid-June to about the beginning of July, while a second and more abundant population density was observed in the first half of July. A third period of population increase occurred in late August to the first week of September. In the house fly, the period

of greatest abundance was represented by two peaks in August during which time 52.4% of the total number collected between July and November was active. The first population build-up occurred between late July and early August. In both species, population density markedly declined during September, probably because of a high incidence of diapause.

Temperatures above 40° C, up to at least 42° C, and below 11° C inhibited activity in the stable fly. Flight activity of Musca domestica was not inhibited by temperatures up to 42° C, but temperatures below 7° C probably inhibit flight. Measured percentages of the stable and house fly suggested an optimal temperature range for the stable fly to occur between 30° C and 35° C and between 31° C and 38° C in the house fly. Seventy-nine per cent of the house flies were active between 20° C and 38° C. Within the optimum temperature range the average per cent of the stable flies that were active increased by about 67% in males and 61% in females. At lower temperatures, particularly below 24° C, stable fly activity was reduced. The results also indicated that the house fly has a wider tolerance for temperature than the stable fly.

Correlation coefficients suggested a strong linear relationship between log catches and either time, temperature, or the logarithms of any of these variables. Multiple correlation coefficients demonstrated a very strong degree of association among variables. Temperature was found to be the most important factor influencing flight activity in the house fly and stable fly. Correlation coefficients of male and female stable flies with respect to temperature were very comparable which would imply similar temperature thresholds between sexes of this species in a given locality.

Table 27 gives means and standard deviations of X and Y variables while Table 28 gives values of the estimated parameters in the regression equation and their standard deviations. Table 29 shows simple correlation coefficients. Table 30 indicates R^2 values and multiple correlation coefficients.

R^2 values for various months suggested that 80% to approximately 90% of the variation in log catches was accounted for by the relationship of log catches with the other X_i variables.

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A P P E N D I X

Table 1. Collections of S. calcitrans and M. domestica at 30-minute intervals, June 14 to November 23, 1970, Manhattan, Kansas.

Time hrs.	No. collected			% Total catch			% Cumulative total		
	Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
	Male	Female	Total	Male	Female	Total	Male	Female	Total
08:00-08:30	33	68	311	.93	1.07	1.87	.93	1.07	1.87
08:30-09:00	33	55	197	.93	.86	1.18	1.86	1.93	3.05
09:00-09:30	53	86	235	1.49	1.35	1.41	3.35	3.28	4.46
09:30-10:00	84	128	315	2.36	2.00	1.89	5.71	5.28	6.35
10:00-10:30	118	201	357	3.31	3.15	2.14	9.02	8.43	8.49
10:30-11:00	159	299	507	4.46	4.69	3.04	13.48	13.12	11.53
11:00-11:30	164	423	709	4.60	6.63	4.25	18.08	19.75	15.78
11:30-12:00	256	464	712	7.18	7.28	4.27	25.26	27.03	20.05
12:00-12:30	242	427	746	6.79	6.70	4.48	32.05	33.73	24.53
12:30-13:00	217	390	790	6.09	6.12	4.74	38.14	39.85	29.27
13:00-13:30	205	373	828	5.75	5.85	4.97	43.89	45.70	34.24
13:30-14:00	216	356	878	6.06	5.58	5.27	49.95	51.28	39.51
14:00-14:30	208	376	787	5.83	5.90	4.72	55.78	57.18	44.23
14:30-15:00	197	396	773	5.53	6.21	4.64	61.31	63.39	48.87
15:00-15:30	220	346	782	6.17	5.43	4.69	67.48	68.82	53.56
15:30-16:00	216	281	729	6.06	4.41	4.37	73.54	73.23	57.93
16:00-16:30	176	242	578	4.94	3.79	3.47	78.48	77.02	61.40
16:30-17:00	138	240	646	3.87	3.76	3.88	82.35	80.78	65.28
17:00-17:30	135	192	644	3.79	3.01	3.86	86.14	83.89	69.14

Table 1 (cont'd).

Time hrs.	No. collected			% Total catch			% Cumulative total		
	Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
	Male	Female	Total	Male	Female	Total	Male	Female	Total
17:30-18:00	93	186	535	2.61	2.92	3.21	88.75	86.71	72.35
18:00-18:30	88	133	486	2.47	2.09	2.92	91.22	88.80	75.27
18:30-19:00	60	122	419	1.68	1.91	2.51	92.90	90.71	77.78
19:00-19:30	39	66	312	1.09	1.04	1.87	93.99	91.85	79.65
19:30-20:00	31	77	253	.87	1.21	1.52	94.86	92.96	81.17
20:00-20:30	41	108	429	1.15	1.69	2.57	96.01	94.65	83.74
20:30-21:00	21	57	206	.59	.89	1.24	96.60	95.54	84.98
21:00-21:30	11	33	138	.31	.52	.83	96.91	96.06	85.81
21:30-22:00	6	18	128	.17	.28	.77	97.08	96.34	86.58
22:00-22:30	8	9	130	.22	.14	.78	97.30	96.48	87.36
22:30-23:00	3	15	136	.08	.24	.82	97.38	96.72	88.18
23:00-23:30	6	12	111	.17	.19	.67	97.55	96.91	88.85
23:30-24:00	5	14	100	.14	.22	.60	97.69	97.13	89.45
00:00-00:30	6	11	122	.17	.17	.73	97.86	97.30	90.18
00:30-01:00	9	9	124	.25	.14	.74	98.11	97.44	90.92
01:00-01:30	4	9	119	.11	.14	.71	98.22	97.58	91.63
01:30-02:00	2	13	101	.06	.20	.61	98.28	97.78	92.24
02:00-02:30	3	7	122	.08	.11	.73	98.36	97.89	92.97
02:30-03:00	3	9	111	.08	.14	.67	98.44	98.03	93.64
03:00-03:30	3	11	118	.08	.17	.71	98.52	98.20	94.35
03:30-04:00	6	12	85	.17	.19	.51	98.69	98.39	94.86
04:00-04:30	1	9	98	.03	.14	.59	98.72	98.53	95.45

Table 1 (concluded).

Time hrs.	No. collected			% Total catch			% Cumulative total		
	Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
	Male	Female	Total	Male	Female	Total	Male	Female	Total
04:30-05:00	11	13	93	.31	.20	.56	99.03	98.73	96.01
05:00-05:30	2	13	88	.06	.20	.53	99.09	98.93	96.54
05:30-06:00	1	13	106	.03	.20	.64	99.12	99.13	97.18
06:00-06:30	5	16	92	.14	.25	.55	99.26	99.38	97.73
06:30-07:00	11	18	169	.31	.28	1.01	99.57	99.66	98.74
07:00-07:30	7	8	102	.20	.13	.61	99.87	99.79	99.35
07:30-08:00	9	13	106	.25	.20	.64	100.00	100.00	100.00
Total	3,565	6,377	16,663						

Table 2. Collections of male S. calcitrans (median temperatures) at 30-minute intervals for 24-hour periods (8:00 A.M.-8:00 A.M.), June 14 to November 23, 1970.

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.% & freq.	% Flight occurrence
* ≤ 0.4	296	1	1	0	0	0	.34
0.5- 1.4	97	0	0	0	0	0	0
1.5- 2.4	125	0	0	0	0	0	0
2.5- 3.4	158	0	0	0	0	0	0
3.5- 4.4	166	1	1	.01	.05	.05	.60
4.5- 5.4	147	0	0	0	0	.05	0
5.5- 6.4	144	0	0	0	0	.05	0
6.5- 7.4	135	0	0	0	0	.05	0
7.5- 8.4	191	0	0	0	0	.05	0
8.5- 9.4	179	4	4	.02	.10	.15	2.23
9.5-10.4	222	2	2	.01	.05	.20	.90
10.5-11.4	166	2	2	.01	.05	.25	1.20
11.5-12.4	173	9	7	.05	.25	.50	4.05
12.5-13.4	221	9	8	.04	.20	.70	3.62
13.5-14.4	232	3	3	.01	.05	.75	1.29
14.5-15.4	190	7	7	.04	.20	.95	3.68
15.5-16.4	230	6	6	.03	.15	1.10	2.61
16.5-17.4	207	7	7	.03	.15	1.25	3.38
17.5-18.4	202	27	12	.13	.64	1.89	5.94

Table 2 (cont'd).

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.%& freq.	% Flight occurrence
18.5-19.4	219	12	11	.05	.25	2.14	5.02
19.5-20.4	246	16	14	.07	.35	2.49	5.69
20.5-21.4	325	27	23	.08	.40	2.89	7.08
21.5-22.4	340	32	24	.09	.45	3.34	7.06
22.5-23.4	348	35	23	.10	.50	3.84	6.61
23.5-24.4	264	56	28	.21	1.04	4.88	10.61
24.5-25.4	259	64	37	.25	1.24	6.12	14.28
25.5-26.4	275	87	34	.32	1.58	7.70	12.46
26.5-27.4	267	98	51	.37	1.83	9.53	19.10
27.5-28.4	242	211	68	.87	4.31	13.84	28.10
28.5-29.4	277	235	86	.85	4.21	18.05	31.05
29.5-30.4	230	429	120	1.87	9.26	27.31	52.17
30.5-31.4	179	447	97	2.50	12.38	39.69	54.19
31.5-32.4	175	529	98	3.02	14.96	34.65	56.00
32.4-33.4	163	564	105	3.46	17.14	71.79	64.42
33.5-34.4	134	345	85	2.57	12.73	84.52	63.43
34.5-35.4	113	217	60	1.92	9.51	94.03	53.10
35.5-36.4	78	55	30	.70	3.52	97.55	38.46
36.5-37.4	74	18	15	.24	1.19	98.74	20.27

Table 2 (concluded).

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.%& freq.	% Flight occurrence
37.5-38.4	49	7	7	.14	.69	99.43	14.29
38.5-39.4	30	1	1	.03	.15	99.58	3.33
39.5-40.4	22	2	2	.04	.46	100.00	9.09
40.5-41.4	14	0	0	0	0	100.00	0
41.5-42.4	4	0	0	0	0	100.00	0
Total		3,565		20.19			

* $\leq 0^{o}$ C represents -10.5^{o} C to -0.4^{o} C temperature range.

Table 3. Collections of female S. calcitrans (median temperatures) at 30-minute intervals for 24-hour periods (8:00 A.M.-8:00 A.M.), June 14 to November 23, 1970.

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.% & freq.	% Flight occurrence
* ≤ 0.4	296	0	0	0	0	0	0
0.5- 1.4	97	0	0	0	0	0	0
1.5- 2.4	125	0	0	0	0	0	0
2.5- 3.4	158	0	0	0	0	0	0
3.5- 4.4	166	2	2	.01	.03	.03	1.20
4.5- 5.4	147	3	3	.02	.05	.08	2.04
5.5- 6.4	144	1	1	.01	.03	.11	.69
6.5- 7.4	135	1	1	.01	.03	.14	.74
7.5- 8.4	191	1	1	.01	.03	.17	.52
8.5- 9.4	179	2	2	.01	.03	.20	1.12
9.5-10.4	222	4	4	.02	.05	.25	1.80
10.5-11.4	166	13	12	.08	.22	.47	7.23
11.5-12.4	173	6	6	.03	.08	.55	3.47
12.5-13.4	221	19	18	.09	.25	.80	8.14
13.5-14.4	232	12	12	.05	.14	.94	5.17
14.5-15.4	190	14	14	.07	.19	1.13	7.37
15.5-16.4	230	23	22	.10	.27	1.40	9.57
16.5-17.4	207	31	25	.15	.40	1.81	12.08
17.5-18.4	202	51	21	.25	.68	2.49	10.40
18.5-19.4	219	41	29	.19	.52	3.01	13.24

Table 3 (cont'd).

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.% & freq.	% Flight occurrence
19.5-20.4	246	36	25	.15	.41	3.42	10.16
20.5-21.4	325	61	45	.19	.52	3.94	13.85
21.5-22.4	340	72	51	.21	.57	4.51	15.00
22.5-23.4	348	87	63	.25	.68	5.19	18.10
23.5-24.4	264	103	60	.39	1.07	6.26	22.73
24.5-25.4	259	116	47	.45	1.23	7.49	18.25
25.5-26.4	275	164	71	.60	1.64	9.13	25.82
26.5-27.4	267	204	93	.76	2.08	11.21	34.83
27.5-28.4	242	391	115	1.62	4.43	15.64	47.52
28.5-29.4	277	471	144	1.70	4.65	20.29	51.99
29.5-30.4	230	786	171	3.42	9.36	29.65	74.35
30.5-31.4	179	816	130	4.56	12.48	42.30	72.63
31.5-32.4	175	787	137	4.50	12.32	54.62	78.29
32.5-33.4	163	837	133	5.13	14.04	68.66	81.60
33.5-34.4	134	619	104	4.62	12.65	81.31	77.61
34.5-35.4	113	395	85	3.50	9.58	90.89	75.22
35.5-36.4	78	112	41	1.44	3.94	94.83	52.56
36.5-37.4	74	54	26	.73	2.00	96.83	35.14

Table 3 (concluded).

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.%& freq.	% Flight occurrence
37.5-38.4	49	21	13	.43	1.18	98.01	26.53
38.5-39.4	30	17	10	.57	1.56	99.57	33.33
39.5-40.4	22	3	3	.14	.38	99.95	13.64
40.5-41.4	14	1	1	.07	.19	100.00	7.14
41.5-42.4	4	0	0	0	0	100.00	0
Total		6,377		36.53			

* $\leq 0^{o}$ C represents -10.5^{o} C to -0.4^{o} C temperature range.

Table 4. Collections of Musca domestica (median temperatures) at 30-minute intervals for 24-hour periods (8:00 A.M.-8:00 A.M.), July 1 to November 23, 1970.

Temperature °C	Total times temperature occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.% & freq.	% Flight occurrence
* ≤ 0.4	296	3	3	.01	.01	.01	1.01
0.5- 1.4	97	3	3	.03	.02	.03	3.09
1.5- 2.4	125	1	1	.01	.01	.04	.80
2.5- 3.4	158	1	1	.01	.01	.05	.63
3.5- 4.4	166	4	3	.02	.02	.07	1.81
4.5- 5.4	147	4	4	.03	.02	.09	2.72
5.5- 6.4	144	3	3	.02	.02	.11	2.08
6.5- 7.4	135	4	3	.03	.02	.13	2.22
7.5- 8.4	191	6	6	.03	.02	.15	3.14
8.5- 9.4	179	18	12	.10	.10	.22	6.70
9.5-10.4	222	22	15	.10	.10	.29	6.76
10.5-11.4	166	31	19	.19	.14	.43	11.45
11.5-12.4	170	41	28	.24	.28	.61	16.47
12.5-13.4	214	116	49	.54	.40	1.01	22.90
13.5-14.4	229	129	50	.56	.42	1.43	21.83
14.5-15.4	183	146	40	.80	.60	2.03	21.86
15.5-16.4	220	172	75	.78	.58	2.61	34.09
16.5-17.4	191	161	70	.84	.63	3.24	36.65
17.5-18.4	180	187	71	1.04	.78	4.02	39.44

Table 4 (cont'd).

Temperature °C	Total times temperatures occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.%& freq.	% Flight occurrence
18.5-19.4	189	211	79	1.12	.84	4.86	41.80
19.5-20.4	216	399	116	1.85	1.38	6.24	53.70
20.5-21.4	283	463	147	1.64	1.23	7.47	51.94
21.5-22.4	300	491	168	1.64	1.23	8.70	56.00
22.5-23.4	301	510	173	1.69	1.26	9.96	57.48
23.5-24.4	225	332	123	1.48	1.11	11.07	54.67
24.5-25.4	213	402	131	1.89	1.41	12.48	61.50
25.5-26.4	230	578	161	2.51	1.88	14.36	70.00
26.5-27.4	221	659	160	2.98	2.23	16.59	72.40
27.5-28.4	197	631	143	3.20	2.40	18.99	72.59
28.5-29.4	204	910	172	4.46	3.34	22.33	84.31
29.5-30.4	163	887	136	5.44	4.07	26.40	83.44
30.5-31.4	146	1,283	133	8.89	6.58	32.98	91.10
31.5-32.4	147	1,370	129	9.32	6.98	39.96	87.76
32.5-33.4	142	1,590	135	11.20	8.38	48.34	95.07
33.5-34.4	117	1,603	105	13.70	10.25	58.59	89.74
34.5-35.4	109	1,348	108	12.37	9.26	67.85	99.08
35.5-36.4	78	809	70	10.37	7.76	75.61	89.74
36.5-37.4	74	495	71	6.69	5.01	80.62	95.95

Table 4 (concluded).

Temperature °C	Total times temperatures occurred	Total catch	Total times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg.% & freq.	% Flight occurrence
37.5-38.4	49	300	48	6.12	4.58	85.20	97.96
38.5-39.4	30	144	24	4.80	3.59	88.79	80.00
39.5-40.4	22	107	22	4.86	3.64	92.43	100.00
40.5-41.4	14	68	13	4.86	3.64	96.07	92.86
41.5-42.4	4	21	4	5.25	3.93	100.00	100.00
		16,663		133.61			

* $\leq 0^{\circ}$ C represent -10.5° C to -0.4° C temperature range.

Table 5. Collections of S. calcitrans, related to time and monthly average temperatures at 30-minute intervals, June 14 to June 30, 1970.

Time hrs.	Avg. temp. occurrence	No. collected Stomoxys		% Total catch Stomoxys		% Cumulative total Stomoxys	
		Male	Female	Male	Female	Male	Female
08:00-08:30	23.0	7	19	1.07	2.29	1.07	2.29
08:30-09:00	24.0	10	21	1.53	2.53	2.60	4.82
09:00-09:30	25.0	16	22	2.45	2.65	5.05	7.47
09:30-10:00	26.0	25	35	3.83	4.22	8.88	11.69
10:00-10:30	27.0	21	29	3.22	3.49	12.10	15.18
10:30-11:00	27.0	27	27	4.13	3.25	16.23	18.43
11:00-11:30	28.0	20	45	3.06	5.42	19.29	23.85
11:30-12:00	29.0	50	53	7.66	6.39	26.95	30.24
12:00-12:30	29.0	51	59	6.77	7.11	33.72	37.35
12:30-13:00	29.0	49	43	8.50	5.18	42.22	42.53
13:00-13:30	29.0	38	55	5.82	6.63	48.04	49.16
13:30-14:00	30.0	37	46	5.67	5.54	53.71	54.70
14:00-14:30	30.0	53	67	8.12	8.07	61.83	62.77
14:30-15:00	30.0	31	33	4.75	3.98	66.58	66.75
15:00-15:30	31.0	26	26	3.98	3.13	70.56	69.88
15:30-16:00	31.0	28	19	4.29	2.29	74.85	72.17
16:00-16:30	31.0	17	15	2.60	1.81	77.45	73.98
16:30-17:00	30.0	18	31	2.76	3.73	80.21	77.71
17:00-17:30	30.0	8	12	1.23	1.45	81.44	79.16
17:30-18:00	30.0	12	20	1.84	2.41	83.28	81.57

Table 5. (cont'd)

Time hrs.	Avg. temp. occurrence	No. collected Stomoxys		% Total catch Stomoxys		% Cumulative total Stomoxys	
		Male	Female	Male	Female	Male	Female
18:00-18:30	30.0	12	15	1.84	1.81	85.12	83.38
18:30-19:00	29.0	3	8	.46	.96	85.58	84.34
19:00-19:30	28.0	11	4	1.68	.48	87.26	84.82
19:30-20:00	28.0	5	10	.77	1.20	88.03	86.02
20:00-20:30	26.0	15	20	2.30	2.41	90.33	88.43
20:30-21:00	25.0	10	15	1.53	1.81	91.86	90.24
21:00-21:30	24.0	5	8	.77	.96	92.63	91.20
21:30-22:00	24.0	1	7	.15	.84	92.78	92.04
22:00-22:30	23.0	4	1	.61	.12	93.39	92.16
22:30-23:00	23.0	0	3	0	.36	93.39	92.52
23:00-23:30	23.0	3	2	.46	.24	93.85	92.76
23:30-24:00	23.0	2	2	.31	.24	94.16	93.00
00:00-00:30	22.0	2	1	.31	.12	94.47	93.12
00:30-01:00	22.0	2	4	.31	.48	94.78	93.60
01:00-01:30	22.0	1	4	.15	.48	94.93	94.08
01:30-02:00	22.0	1	4	.15	.48	95.08	94.56
02:00-02:30	22.0	2	1	.31	.12	95.39	94.68
02:30-03:00	22.0	2	3	.31	.36	95.70	95.04
03:00-03:30	21.0	1	3	.15	.36	95.85	95.40
03:30-04:00	21.0	4	2	.61	.24	96.46	95.64

Table 5 (concluded).

Time hrs.	Avg. temp. occurrence	No. collected Stomoxys Male	No. collected Stomoxys Female	% Total catch Stomoxys Male	% Total catch Stomoxys Female	% Cumulative total Stomoxys Male	% Cumulative total Stomoxys Female
04:00-04:30	21.0	0	4	0	.48	96.46	96.12
04:30-05:00	21.0	5	2	.77	.24	97.23	96.36
05:00-05:30	21.0	2	3	.31	.36	97.54	96.72
05:30-06:00	20.0	1	5	.15	.60	97.69	97.32
06:00-06:30	20.0	1	9	.15	1.08	97.84	98.40
06:30-07:00	21.0	7	6	1.07	.72	98.91	99.12
07:00-07:30	21.0	3	3	.46	.36	99.37	99.48
07:30-08:00	22.0	4	4	.61	.48	100.00	100.00
Total		653	830				

Table 6. Collections of S. calcitrans and M. domestica related to time and monthly average temperatures at 30-minute intervals from July 1 to July 31, 1970.

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
08:00-08:30	22.0	23	35	58	1.45	1.29	2.14	1.45	1.29	2.14
08:30-09:00	24.0	16	23	60	1.01	.85	2.21	2.46	2.14	4.35
09:00-09:30	26.0	23	24	44	1.45	.89	1.62	3.91	3.03	5.97
09:30-10:00	27.0	36	39	53	2.28	1.44	1.95	6.19	4.47	7.92
10:00-10:30	28.0	62	87	74	3.92	3.22	2.73	10.11	7.69	10.65
10:30-11:00	29.0	68	117	100	4.30	4.33	3.69	14.41	12.02	14.34
11:00-11:30	30.0	81	161	126	5.12	5.95	4.65	19.53	17.97	18.99
11:30-12:00	31.0	109	189	125	6.89	6.99	4.61	26.42	24.96	23.60
12:00-12:30	31.0	105	161	139	6.64	5.95	5.13	33.06	30.91	28.73
12:30-13:00	32.0	92	173	127	5.82	6.40	4.68	38.88	37.31	33.41
13:00-13:30	32.0	96	169	159	6.07	6.25	5.86	44.95	43.56	39.27
13:30-14:00	32.0	108	166	138	6.83	.14	5.09	51.78	49.70	44.36
14:00-14:30	33.0	92	156	131	5.82	5.77	4.83	57.60	55.47	49.19
14:30-15:00	33.0	85	191	110	5.37	7.06	4.06	62.97	62.53	53.25
15:00-15:30	33.0	107	167	125	6.76	.18	4.61	69.73	68.71	57.86
15:30-16:00	33.0	119	141	97	7.52	.21	3.58	77.25	73.92	61.44
16:00-16:30	33.0	73	106	73	4.61	3.92	2.69	81.86	77.84	64.13
16:30-17:00	33.0	61	110	75	3.86	4.07	2.77	85.72	81.91	66.90
17:00-17:30	32.0	61	93	83	3.86	3.44	3.06	89.58	85.35	69.96

Table 6 (cont'd).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
17:30-18:00	32.0	38	75	75	2.40	2.77	2.77	91.98	88.12	72.73
18:00-18:30	31.0	34	48	72	2.15	1.78	2.66	94.15	89.90	75.39
18:30-19:00	30.0	19	51	53	1.20	1.89	1.95	95.33	91.79	77.34
19:00-19:30	29.0	8	25	27	.50	.92	1.00	95.84	92.71	78.34
19:30-20:00	27.0	5	13	16	.32	.48	.59	96.16	93.19	78.93
20:00-20:30	26.0	16	61	96	1.01	2.26	3.54	97.17	95.45	82.47
20:30-21:00	25.0	9	23	46	.57	.85	1.70	97.74	96.30	84.17
21:00-21:30	24.0	2	13	16	.13	.48	.59	97.87	96.78	84.76
21:30-22:00	23.0	3	1	31	.19	.04	1.14	98.06	96.82	85.90
22:00-22:30	23.0	1	3	20	.06	.11	.74	98.12	96.93	86.64
22:30-23:00	23.0	2	5	23	.13	.18	.85	98.25	97.11	87.49
23:00-23:30	22.0	1	4	26	.06	.15	.96	98.31	97.26	88.45
23:30-24:00	22.0	1	5	18	.06	.18	.66	98.37	97.44	89.11
00:00-00:30	22.0	3	4	20	.19	.15	.74	98.56	97.59	89.85
00:30:01:00	21.0	4	2	21	.25	.07	.77	98.81	97.66	90.62
01:00-01:30	21.0	2	4	23	.13	.15	.85	98.94	97.81	91.47
01:30-02:00	20.0	1	6	18	.06	.22	.66	99.00	98.03	92.13
02:00-02:30	20.0	0	2	22	.00	.07	.81	99.00	98.10	92.94
02:30-03:00	20.0	1	5	19	.06	.18	.70	99.06	92.28	93.64

Table 6 (concluded).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
03:00-03:30	20.0	0	3	25	0	.11	.92	99.06	98.39	94.56
03:30-04:00	19.0	2	3	14	.13	.11	.52	99.19	98.50	95.08
04:00-04:30	19.0	0	2	15	0	.07	.55	99.19	98.57	95.63
04:30-05:00	19.0	5	7	19	.32	.26	.70	99.51	98.83	96.33
05:00-05:30	19.0	0	6	11	0	.22	.41	99.51	99.05	96.74
05:30-06:00	18.0	0	4	18	0	.15	.66	99.51	99.20	97.40
06:00-06:30	18.0	2	5	11	.13	.18	.41	99.64	99.38	97.81
06:30-07:00	19.0	2	8	28	.13	.30	1.03	99.77	99.68	98.84
07:00-07:30	19.0	2	4	15	.13	.15	.55	99.90	99.83	99.39
07:30-08:00	20.0	2	4	16	.13	.15	.59	100.00	100.00	100.00
Total		1,582	2,704	2,711						

Table 7. Collections of S. calcitrans and M. domestica related to time and monthly average temperature at 30-minute intervals from August 1 to August 31, 1970.

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
08:00-08:30	21.0	0	5	138	0	.30	1.58	0	.30	1.58
08:30-09:00	23.0	1	3	73	.17	.18	.84	.17	.48	2.42
09:00-09:30	24.0	6	26	92	1.03	1.57	1.05	1.20	2.05	3.47
09:30-10:00	26.0	12	35	166	2.06	2.11	1.90	3.26	4.16	5.37
10:00-10:30	28.0	16	58	206	2.75	3.49	2.36	6.01	7.65	7.73
10:30-11:00	29.0	24	106	292	4.12	6.39	3.34	10.13	14.04	11.07
11:00-11:30	30.0	32	137	420	5.50	8.25	4.81	15.63	22.90	15.88
11:30-12:00	31.0	42	138	405	7.22	8.31	4.64	22.85	30.60	20.52
12:00-12:30	31.0	46	136	391	7.90	8.19	4.48	30.75	38.79	25.00
12:30-13:00	32.0	41	107	429	7.04	6.45	4.91	37.79	45.24	29.91
13:00-13:30	32.0	37	81	409	6.36	4.88	4.68	44.15	50.12	34.59
13:30-14:00	33.0	28	77	461	4.81	4.64	5.28	48.96	54.76	39.87
14:00:14:30	33.0	19	68	388	3.26	4.10	4.44	52.22	58.86	44.31
14:30-15:00	34.0	39	93	387	6.70	5.60	4.43	58.92	64.46	48.74
15:00-15:30	34.0	37	96	402	6.36	5.78	4.60	65.28	70.24	53.34
15:30-16:00	33.0	25	74	355	4.30	4.46	4.07	69.58	74.70	57.41
16:00-16:30	34.0	34	67	287	5.84	4.04	3.29	75.42	78.74	60.70
16:30-17:00	33.0	29	66	376	4.98	3.98	4.31	80.40	82.72	65.01
17:00-17:30	33.0	30	44	357	5.15	2.65	4.09	85.55	85.37	69.10

Table 7 (cont'd).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
17:30-18:00	33.0	11	44	269	1.89	2.65	3.08	87.44	88.02	72.18
18:00-18:30	32.0	18	29	208	3.09	1.75	2.38	90.53	89.77	74.56
18:30-19:00	31.0	15	33	175	2.58	1.99	2.00	93.11	91.76	76.56
19:00-19:30	30.0	2	15	133	.34	.90	1.52	93.45	92.66	78.08
19:30-20:00	29.0	11	25	125	1.89	1.51	1.43	93.34	94.17	79.51
20:00-20:30	27.0	8	22	213	1.37	1.33	2.44	96.71	95.50	81.95
20:30-21:00	26.0	1	14	108	.17	.84	1.24	96.88	96.34	83.19
21:00-21:30	26.0	3	3	92	.52	.18	1.05	97.40	96.52	84.24
21:30-22:00	25.0	1	8	72	.17	.48	.82	97.57	97.00	85.06
22:00-22:30	25.0	3	4	98	.52	.24	1.12	98.09	97.24	86.18
22:30-23:00	24.0	1	3	93	.17	.18	1.07	98.26	97.42	87.25
23:00-23:30	24.0	1	5	63	.17	.30	.72	98.43	97.72	87.97
23:30-24:00	24.0	1	6	62	.17	.36	.71	98.60	98.08	88.68
00:00-00:30	23.0	0	3	80	0	.18	.92	98.60	98.26	89.60
00:30-01:00	23.0	3	2	89	.52	.12	1.02	99.12	98.38	90.62
01:00-01:30	23.0	1	1	78	.17	.06	.89	99.29	98.44	91.51
01:30-02:00	22.0	0	3	63	0	.18	.72	99.29	98.62	92.23
02:00-02:30	22.0	1	3	87	.17	.18	1.00	99.46	98.80	93.23
02:30-03:00	22.0	0	1	74	0	.06	.85	99.46	98.86	94.08
03:00-03:30	22.0	1	3	73	.17	.18	.84	99.63	99.04	94.92

Table 7 (concluded).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
03:30-04:00	22.0	0	4	44	0	.24	.50	99.63	99.28	95.42
04:00-04:30	21.0	0	1	57	0	.06	.65	99.63	99.34	96.07
04:30-05:00	21.0	0	2	43	0	.12	.49	99.63	99.46	96.56
05:00-05:30	21.0	0	1	46	0	.06	.53	99.63	99.52	97.09
05:30-06:00	21.0	0	2	49	0	.12	.56	99.63	99.64	97.65
06:00-06:30	20.0	0	2	46	.17	.12	.53	99.80	99.76	98.18
06:30-07:00	20.0	0	3	70	0	.18	.80	99.80	99.94	98.98
07:00-07:30	20.0	1	0	36	.17	0	.41	100.00	99.94	99.39
07:30-08:00	20.0	0	1	50	0	.06	.57	100.00	100.00	100.00
Total		582	1,660	8,730						

Table 8. Collections of S. calcitrans and M. domestica related to time and monthly average temperature at 30-minute intervals from September 1 to September 30, 1970.

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
08:00-08:30	16.0	3	6	107	.42	.54	2.23	.42	.54	2.23
08:30-09:00	16.0	5	8	54	.70	.73	1.12	1.12	1.27	3.35
09:00-09:30	18.0	7	13	92	.98	1.19	1.91	2.10	2.46	5.26
09:30-10:00	20.0	9	19	86	1.27	1.74	1.79	3.37	4.20	7.05
10:00-10:30	20.0	18	26	70	2.53	2.38	1.46	5.90	6.58	8.51
10:30-11:00	21.0	40	45	107	5.63	4.12	2.23	11.53	10.70	10.74
11:00-11:30	22.0	31	78	147	4.36	7.14	3.06	15.89	17.84	13.80
11:30-12:00	23.0	55	82	173	7.74	7.51	3.60	23.63	25.35	17.40
12:00-12:30	24.0	39	69	194	5.49	6.32	4.04	29.12	31.67	21.44
12:30-13:00	24.0	34	64	213	4.78	5.86	4.43	33.90	37.53	25.87
13:00-13:30	24.0	33	61	246	4.68	5.59	5.12	38.54	43.12	30.99
13:30-14:00	25.0	43	61	255	6.05	5.59	5.31	44.59	48.71	36.30
14:00-14:30	25.0	41	77	242	5.77	7.05	5.04	50.36	55.76	41.34
14:30-15:00	25.0	40	72	249	5.63	6.59	5.18	55.99	62.35	46.52
15:00-15:30	25.0	46	52	232	6.47	4.76	4.83	62.46	67.11	51.35
15:30-16:00	25.0	42	45	255	5.91	4.12	5.31	68.37	71.23	56.66
16:00-16:30	25.0	50	51	195	7.03	4.67	4.06	75.40	75.90	60.72
16:30-17:00	25.0	29	30	179	4.08	2.75	3.72	79.48	78.65	64.44
17:00-17:30	24.0	34	37	179	4.78	3.39	3.72	84.26	82.04	68.16
17:30-18:00	24.0	26	44	168	3.66	4.03	3.50	87.92	86.07	71.66

Table 8 (cont'd).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
18:00-18:30	23.0	23	34	187	3.23	3.11	3.89	91.15	89.18	75.55
18:30-19:00	22.0	21	28	170	2.95	2.56	3.54	94.10	91.74	79.09
19:00-19:30	21.0	17	20	143	2.39	1.83	2.98	96.49	93.57	82.07
19:30-20:00	20.0	9	22	94	1.27	2.01	1.96	97.76	95.58	84.03
20:00-20:30	19.0	2	5	118	.28	.46	2.46	98.04	96.04	86.49
20:30-21:00	19.0	0	5	49	0	.46	1.02	98.04	96.50	87.51
21:00-21:30	18.0	1	5	30	.14	.46	.62	98.18	96.96	88.13
21:30-22:00	18.0	1	2	25	.14	.18	.52	98.32	97.14	88.65
22:00-22:30	17.0	0	1	12	0	.09	.25	98.32	97.23	88.90
22:30-23:00	17.0	0	4	20	0	.37	.42	98.32	97.60	89.32
23:00-23:30	17.0	1	1	22	.14	.09	.46	98.46	97.69	89.78
23:30-24:00	17.0	0	1	20	0	.09	.42	98.46	97.78	90.20
00:00-00:30	17.0	1	3	22	.14	.27	.46	98.60	98.05	90.66
00:30-01:00	16.0	0	1	14	0	.09	.29	98.60	98.14	90.95
01:00-01:30	16.0	0	0	17	0	0	.35	98.60	98.14	91.30
01:30-02:00	16.0	0	0	20	0	0	.42	98.60	98.14	91.72
02:00-02:30	16.0	0	1	13	0	.09	.27	98.60	98.23	91.99
02:30-03:00	16.0	0	0	18	0	0	.37	98.60	98.23	92.36
03:00-03:30	16.0	1	1	20	.14	.09	.42	98.74	98.32	92.78

Table 8 (concluded).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
03:30-04:00	16.0	0	3	27	0	.27	.56	98.74	98.59	93.34
04:00-04:30	16.0	1	2	26	.14	.18	.54	98.88	98.77	93.88
04:30-05:00	15.0	1	2	31	.14	.18	.65	99.02	98.95	94.53
05:00-05:30	15.0	0	3	31	0	.27	.65	99.02	99.22	95.18
05:30-06:00	15.0	0	2	39	0	.18	.81	99.02	99.40	95.99
06:00-06:30	15.0	1	0	35	.14	0	.73	99.16	99.40	96.72
06:30-07:00	15.0	2	1	71	.28	.09	1.48	99.44	99.49	98.20
07:00-07:30	15.0	1	1	50	.14	.09	1.04	99.58	99.58	99.24
07:30-08:00	15.0	3	4	39	.42	.37	.81	100.00	100.00	100.00
Total		711	1,092	4,806						

Table 9. Collections of S. calcitrans and M. domestica related to time and monthly average temperature at 30-minute intervals from October 1 to October 31, 1970.

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
08:00-08:30	9.0	0	3	7	0	3.70	1.87	0	3.70	1.87
08:30-09:00	10.0	1	0	10	3.03	0	2.67	3.03	3.70	4.54
09:00-09:30	11.0	1	1	7	3.03	1.23	1.87	6.06	4.93	6.41
09:30-10:00	12.0	2	0	9	6.06	0	2.40	12.12	4.93	8.81
10:00-10:30	13.0	1	1	4	3.03	1.23	1.07	15.15	6.16	9.88
10:30-11:00	14.0	0	3	7	0	3.70	1.87	15.15	9.86	11.75
11:00-11:30	15.0	0	2	14	0	2.47	3.73	15.15	12.33	15.50
11:30-12:00	16.0	0	1	6	0	1.23	1.60	15.15	13.56	17.10
12:00-12:30	17.0	1	2	18	3.03	2.47	4.80	18.18	16.03	21.90
12:30-13:00	17.0	1	3	20	3.03	3.70	5.33	21.21	19.73	27.23
13:00-13:30	18.0	0	7	13	0	8.64	3.47	21.21	28.37	30.70
13:30-14:00	18.0	0	5	18	0	6.17	4.80	21.21	34.54	35.50
14:00-14:30	18.0	3	6	25	9.09	7.41	6.67	30.30	41.95	42.17
14:30-15:00	18.0	2	7	22	6.06	8.64	5.87	36.36	50.59	48.04
15:00-15:30	18.0	3	5	20	9.09	6.17	5.33	45.45	56.76	53.37
15:30-16:00	17.0	2	1	20	6.06	1.23	5.33	51.51	57.99	58.70
16:00-16:30	17.0	2	1	22	6.06	1.23	5.87	57.57	59.22	64.57
16:30-17:00	17.0	1	2	16	3.03	2.47	4.27	60.60	61.69	68.84
17:00-17:30	16.0	2	6	24	6.06	7.41	6.40	66.66	69.10	75.24

Table 9 (cont'd).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
17:30-18:00	15.0	6	3	23	18.18	3.70	6.13	84.84	72.80	81.37
18:00-18:30	14.0	1	7	18	3.03	8.64	4.80	87.87	81.44	86.17
18:30-19:00	13.0	1	2	21	3.03	2.47	5.60	90.90	83.91	91.77
19:00-19:30	12.0	1	1	9	3.03	1.23	2.40	93.93	85.14	94.17
19:30-20:00	11.0	1	7	16	3.03	8.64	4.27	96.96	93.78	98.46
20:00-20:30	11.0	0	0	0	0	0	0	96.96	93.78	98.46
20:30-21:00	11.0	0	0	3	0	0	.80	96.96	93.78	99.26
21:00-21:30	10.0	0	4	0	0	4.94	0	96.96	98.72	99.26
21:30-22:00	10.0	0	0	0	0	0	0	96.96	98.72	99.26
22:00-22:30	10.0	0	0	0	0	0	0	96.96	98.72	99.26
22:30-23:00	9.0	0	0	0	0	0	0	96.96	98.72	99.26
23:00-23:30	9.0	0	0	0	0	0	0	96.96	98.72	99.26
23:30-24:00	9.0	1	0	0	3.03	0	0	100.00	98.72	99.26
00:00-00:30	9.0	0	0	0	0	0	0	100.00	98.72	99.26
00:30-01:00	9.0	0	0	0	0	0	0	100.00	98.72	99.26
01:00-01:30	8.0	0	0	1	0	0	.27	100.00	98.72	99.53
01:30-02:00	8.0	0	0	0	0	0	0	100.00	98.72	99.53
02:00-02:30	8.0	0	0	0	0	0	0	100.00	98.72	99.53
02:30-03:00	8.0	0	0	0	0	0	0	100.00	98.72	99.53
03:00-03:30	8.0	0	1	0	0	1.23	0	100.00	100.00	99.53

Table 9 (concluded).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
03:30-04:00	8.0	0	0	0	0	0	0	100.00	100.00	99.53
04:00-04:30	7.0	0	0	0	0	0	0	100.00	100.00	99.53
04:30-05:00	7.0	0	0	0	0	0	0	100.00	100.00	99.53
05:00-05:30	7.0	0	0	0	0	0	0	100.00	100.00	99.53
05:30-06:00	7.0	0	0	0	0	0	0	100.00	100.00	99.53
06:00-06:30	7.0	0	0	0	0	0	0	100.00	100.00	99.53
06:30-07:00	7.0	0	0	0	0	0	0	100.00	100.00	99.53
07:00-07:30	7.0	0	0	1	0	0	.27	100.00	100.00	99.80
07:30-08:00	8.00	0	0	1	0	0	.27	100.00	100.00	100.00
Total		33	81	375						

Table 10. Collections of S. calcitrans and M. domestica related to time and monthly average temperature at 30-minute intervals from November 1 to November 23, 1970.

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
08:00-08:30	4.0	0	0	1	0	0	2.44	0	0	2.44
08:30-09:00	5.0	0	0	0	0	0	0	0	0	2.44
09:00-09:30	5.0	0	0	0	0	0	0	0	0	2.44
09:30-10:00	6.0	0	0	1	0	0	2.44	0	0	4.88
10:00-10:30	7.0	0	0	3	0	0	7.32	0	0	12.20
10:30-11:00	7.0	0	1	1	0	10.00	2.44	0	10.00	14.64
11:00-11:30	8.0	0	0	2	0	0	4.88	0	10.00	19.52
11:30-12:00	9.0	0	1	3	0	10.00	7.32	0	20.00	26.84
12:00-12:30	9.0	0	0	4	0	0	9.76	0	20.00	36.60
12:30-13:00	9.0	0	0	1	0	0	2.44	0	20.00	39.04
13:00-13:30	10.0	1	0	1	.25	0	2.44	.25	20.00	41.48
13:30-14:00	10.00	0	1	6	0	10.00	14.63	.25	30.00	56.11
14:00-14:30	10.00	0	2	1	0	20.00	2.44	.25	50.00	58.55
14:30-15:00	10.0	0	0	5	0	0	12.20	.25	50.00	70.75
15:00-15:30	10.0	1	0	3	.25	0	7.32	.50	50.00	78.07
15:30-16:00	9.0	0	1	2	0	10.00	4.88	.50	60.00	82.95
16:00-16:30	9.0	0	2	1	0	20.00	2.44	.50	80.00	85.39
16:30-17:00	8.0	0	1	0	0	10.00	0	.50	90.00	85.39
17:00-17:30	7.0	0	0	1	0	0	2.44	.50	90.00	87.83

Table 10 (cont'd).

Time hrs	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
17:30-18:00	6.0	0	0	0	0	0	0	.50	90.00	87.83
18:00-18:30	6.0	0	0	1	0	0	2.44	.50	90.00	90.27
18:30-19:00	5.0	1	0	0	.25	0	0	.75	90.00	90.27
19:00-19:30	5.0	0	1	0	0	10.00	0	.75	100.00	90.27
19:30-20:00	5.0	0	0	2	0	0	4.88	.75	-	95.15
20:00-20:30	4.0	0	0	2	0	0	4.88	.75	-	100.00
20:30-21:00	4.0	1	0	0	.25	0	0	100.00	-	-
21:00-21:30	4.0	0	0	0	0	0	0	-	-	-
21:30-22:00	4.0	0	0	0	0	0	0	-	-	-
22:00-22:30	3.0	0	0	0	0	0	0	-	-	-
22:30-23:00	3.0	0	0	0	0	0	0	-	-	-
23:00-23:30	3.0	0	0	0	0	0	0	-	-	-
23:30-24:00	3.0	0	0	0	0	0	0	-	-	-
00:00-00:30	3.0	0	0	0	0	0	0	-	-	-
00:30-01:00	3.0	0	0	0	0	0	0	-	-	-
01:00-01:30	3.0	0	0	0	0	0	0	-	-	-
01:30-02:00	2.0	0	0	0	0	0	0	-	-	-
02:00-02:30	2.0	0	0	0	0	0	0	-	-	-
02:30-03:00	2.0	0	0	0	0	0	0	-	-	-
03:00-03:30	2.0	0	0	0	0	0	0	-	-	-

Table 10 (concluded).

Time hrs.	Avg. temp. occurrence	No. collected			% Catch			% Cumulative catch		
		Stomoxys		Musca	Stomoxys		Musca	Stomoxys		Musca
		Male	Female	Total	Male	Female	Total	Male	Female	Total
03:30-04:00	2.0	0	0	0	0	0	0	-	-	-
04:00-04:30	2.0	0	0	0	0	0	0	-	-	-
04:30-05:00	2.0	0	0	0	0	0	0	-	-	-
05:00-05:30	2.0	0	0	0	0	0	0	-	-	-
05:30-06:00	2.0	0	0	0	0	0	0	-	-	-
06:00-06:30	2.0	0	0	0	0	0	0	-	-	-
06:30-07:00	2.0	0	0	0	0	0	0	-	-	-
07:00-07:30	2.0	0	0	0	0	0	0	-	-	-
07:30-08:00	2.0	0	0	0	0	0	0	-	-	-
Total		4	10	41						

Table 11. Collections of male S. calcitrans (median temperatures) at 30-minute intervals for 24-hour periods (8:00 A.M.-8:00 A.M.), June 14 to June 30, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
<11.5	0	0	0	0	0	0	0
11.5-12.4	3	2	2	.67	2.95	2.95	66.67
12.5-13.4	7	3	3	.43	1.89	4.84	42.86
13.5-14.4	3	0	0	0	0	4.84	0
14.5-15.4	7	1	1	.14	.62	5.46	14.20
15.5-16.4	10	0	0	0	0	5.46	0
16.5-17.4	16	0	0	0	0	5.46	0
17.5-18.4	22	3	2	.14	.62	6.08	9.09
18.5-19.4	30	7	7	.23	1.01	7.09	23.33
19.5-20.4	30	5	5	.17	.75	7.84	16.67
20.5-21.4	42	5	4	.12	.53	8.37	9.52
21.5-22.4	40	11	5	.28	1.23	9.60	12.50
22.5-23.4	47	16	9	.34	1.50	11.10	19.15
23.5-24.4	39	22	9	.56	2.46	13.56	23.08
24.5-25.4	46	16	7	.35	1.54	15.10	15.22
25.5-26.4	45	42	12	.93	4.09	19.19	26.67
26.5-27.4	46	14	8	.30	1.32	20.51	17.39
27.5-28.4	45	50	16	1.11	4.89	25.40	35.56
28.5-29.4	73	52	13	.71	3.13	28.53	17.81

Table 11 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
29.5-30.4	67	173	35	2.58	11.36	39.89	52.24
30.5-31.4	33	95	13	2.88	12.68	52.57	39.39
31.5-32.4	28	35	10	1.25	5.50	58.07	35.71
32.5-33.4	21	38	6	1.81	7.97	66.04	28.57
33.5-34.4	17	42	11	2.47	10.87	76.91	64.71
34.5-35.4	4	21	4	5.25	23.11	100.00	100.00
Total		653		22.72			

Table 12. Collections of female S. calcitrans (median temperatures) at 30-minute intervals for 24-hour periods (8:00 A.M.-8:00 A.M.), June 14 to June 30, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
<11.5	0	0	0	0	0	0	0
11.5-12.4	3	0	0	0	0	0	0
12.5-13.4	7	2	2	.29	1.17	1.17	28.57
13.5-14.4	3	0	0	0	0	1.17	0
14.5-15.4	7	2	2	.29	1.17	2.34	28.57
15.5-16.4	10	5	5	.50	2.02	4.36	50.00
16.5-17.4	16	1	1	.06	.24	4.60	6.25
17.5-18.4	22	4	3	.18	.73	5.33	13.64
18.5-19.4	30	12	6	.40	1.61	6.94	20.00
19.5-20.4	30	6	6	.20	.81	7.75	20.00
20.5-21.4	42	7	6	.17	.69	8.44	14.29
21.5-22.4	40	22	13	.55	2.22	10.66	32.50
22.5-23.4	47	14	10	.30	1.21	11.87	21.28
23.5-24.4	39	24	14	.62	2.50	14.37	35.90
24.5-25.4	46	30	14	.65	2.62	16.99	30.43
25.5-26.4	45	48	18	1.07	4.32	21.31	40.00
26.5-27.4	46	23	13	.50	2.02	23.33	28.26
27.5-28.4	45	88	23	1.96	7.91	31.24	51.11
28.5-29.4	73	85	25	1.16	4.68	35.92	34.25

Table 12 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
29.5-30.4	67	209	50	3.12	12.60	48.52	74.63
30.5-31.4	33	90	16	2.73	11.02	59.54	48.48
31.5-32.4	28	40	17	1.43	5.77	65.31	60.71
32.5-33.4	21	40	8	1.90	7.67	72.98	38.10
33.5-34.4	17	67	13	3.94	15.91	88.89	76.47
34.5-35.4	4	11	3	2.75	11.10	100.0	75.00
Total		830		24.77			

Table 13. Collections of male S. calcitrans (median temperatures) at 30-minute intervals for 24-hour periods (8:00 A.M.-8:00 A.M.), July 1 to July 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
< 7.5	0	0	0	0	0	0	0
7.5- 8.4	7	0	0	0	0	0	0
8.5- 9.4	4	0	0	0	0	0	0
9.5-10.4	6	0	0	0	0	0	0
10.5-11.4	12	0	0	0	0	0	0
11.5-12.4	13	2	1	.15	.54	.54	7.69
12.5-13.4	24	2	2	.08	.29	.83	8.33
13.5-14.4	21	2	2	1.00	3.59	4.42	9.52
14.5-15.4	27	2	2	.07	.25	4.67	7.41
15.5-16.4	20	1	1	.05	.18	4.85	5.00
16.5-17.4	30	4	4	.13	.47	5.32	13.33
17.5-18.4	41	19	5	.46	1.65	6.97	12.20
18.5-19.4	54	1	1	.02	.07	7.04	1.85
19.5-20.4	64	2	2	.03	.11	7.15	3.13
20.5-21.4	93	11	9	.12	.43	7.58	9.68
21.5-22.4	96	12	9	.13	.47	8.05	9.38
22.5-23.4	98	7	4	.07	.25	8.30	4.08
23.5-24.4	85	17	10	.20	.72	9.02	11.76
24.5-25.4	76	35	20	.46	1.65	10.67	26.32

Table 13 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
25.5-26.4	73	31	12	.42	1.51	12.18	16.44
26.5-27.4	63	48	22	.76	2.73	14.91	34.92
27.5-28.4	61	110	25	1.80	6.46	21.37	40.98
28.5-29.4	66	103	34	1.56	5.60	26.97	51.52
29.5-30.4	72	142	46	1.97	7.07	34.04	63.89
30.5-31.4	63	151	37	2.40	8.62	42.66	58.73
31.5-32.4	76	273	44	3.59	12.89	55.55	57.89
32.5-33.4	63	278	46	4.41	15.83	71.38	73.02
33.5-34.4	50	168	34	3.36	12.06	83.44	68.00
34.5-35.4	45	114	28	2.53	9.08	92.52	62.22
35.5-36.4	22	31	14	1.41	5.06	97.58	63.64
36.5-37.4	32	11	10	.34	1.22	98.80	31.25
37.5-38.4	20	4	4	.20	.72	99.52	20.00
38.5-39.4	8	1	1	.13	.47	100.00	12.50
39.5-40.4	8	0	0	0	0	100.00	0
Total		1,582		27.85			

Table 14. Collections of female S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), July 1 to July 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
< 7.5	0	0	0	0	0	0	0
7.5- 8.4	7	0	0	0	0	0	0
8.5- 9.4	4	0	0	0	0	0	0
9.5-10.4	6	0	0	0	0	0	0
10.5-11.4	12	2	2	.17	.36	.36	16.67
11.5-12.4	13	0	0	0	0	.36	0
12.5-13.4	24	3	3	.13	.27	.63	12.50
13.5-14.4	21	1	1	.05	.11	.74	4.76
14.5-15.4	27	2	2	.07	.15	.89	7.41
15.5-16.4	20	5	5	.25	.53	1.42	25.00
16.5-17.4	30	12	10	.40	.84	2.26	33.33
17.5-18.4	41	34	8	.83	1.75	4.01	19.51
18.5-19.4	54	11	7	.20	.42	4.43	12.96
19.5-20.4	64	12	8	.19	.40	4.83	12.50
20.5-21.4	93	29	20	.31	.65	5.48	21.51
21.5-22.4	96	25	18	.26	.55	6.03	18.75
22.5-23.4	98	36	28	.37	.78	6.81	28.57
23.5-24.4	85	43	25	.51	1.08	7.89	29.41
24.5-25.4	76	39	12	.51	1.08	8.97	15.79

Table 14 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
25.5-26.4	73	65	25	.89	1.88	10.85	34.25
26.5-27.4	63	92	32	1.46	3.08	13.93	50.79
27.5-28.4	61	162	36	2.66	5.61	19.54	59.02
28.5-29.4	66	153	44	2.32	4.89	24.43	66.67
29.5-30.4	72	303	55	4.21	8.88	33.31	76.39
30.5-31.4	63	301	53	4.78	10.08	43.39	84.13
31.5-32.4	76	417	62	5.49	11.57	54.96	81.58
32.5-33.4	63	370	59	5.87	12.38	67.34	93.65
33.5-34.4	50	267	41	5.34	11.26	78.60	82.00
34.5-35.4	45	222	38	4.93	10.39	88.99	84.44
35.5-36.4	22	35	11	1.59	3.35	92.34	50.00
36.5-37.4	32	34	13	1.06	2.23	94.57	40.63
37.5-38.4	20	14	9	.70	1.48	96.05	45.00
38.5-39.4	8	13	6	1.63	3.44	99.49	75.00
39.5-40.4	8	2	2	.25	.53	100.00	25.00
Total		2,704		47.43			

Table 15. Collections of M. domestica (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), July 1 to July 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
< 7.5	0	0	0	0	0	0	0
7.5- 8.4	7	1	1	.14	.23	.23	14.28
8.5- 9.4	4	0	0	0	0	.23	0
9.5-10.4	6	0	0	0	0	.23	0
10.5-11.4	12	10	3	.83	1.37	1.60	25.00
11.5-12.4	13	5	4	.38	.63	2.23	30.77
12.5-13.4	24	4	4	.17	.28	2.51	16.67
13.5-14.4	21	1	1	.05	.08	2.59	4.76
14.5-15.4	27	4	1	.15	.25	2.84	3.70
15.5-16.4	20	11	7	.55	.91	3.75	35.00
16.5-17.4	30	7	5	.23	.38	4.13	16.67
17.5-18.4	41	33	15	.80	1.32	5.45	36.59
18.5-19.4	54	31	20	.57	.94	6.39	37.04
19.5-20.4	64	40	21	.63	1.04	7.43	33.81
20.5-21.4	93	42	26	.45	.74	8.17	27.96
21.5-22.4	96	98	49	1.02	1.68	9.85	51.04
22.5-23.4	98	115	46	1.17	1.93	11.78	46.94
23.5-24.4	85	55	38	.65	1.07	12.85	44.71
24.5-25.4	76	69	37	.91	1.50	14.35	48.68
25.5-26.4	73	105	38	1.44	2.38	16.73	52.05

Table 15 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
26.5-27.4	63	62	31	.98	1.62	18.35	49.21
27.5-28.4	61	119	35	1.95	3.22	21.57	57.38
28.5-29.4	66	126	46	1.91	3.15	24.72	69.70
29.5-30.4	72	173	52	2.40	4.00	28.72	72.22
30.5-31.4	63	212	55	3.37	5.56	34.28	87.30
31.5-32.4	76	274	64	3.61	5.95	40.23	84.21
32.5-33.4	63	263	58	4.17	6.88	47.11	92.06
33.5-34.4	50	218	42	4.36	7.19	54.30	84.00
34.5-35.4	45	230	45	5.11	8.43	62.73	100.00
35.5-36.4	22	90	17	4.09	6.75	69.48	77.27
36.5-37.4	32	150	29	4.69	7.74	77.22	90.63
37.5-38.4	20	87	19	4.35	7.17	84.39	95.00
38.5-39.4	8	34	7	4.25	7.00	91.39	87.50
39.5-40.4	8	42	8	5.25	8.66	100.0	100.00
Total		2,711		60.63			

Table 16. Collections of male S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), August 1 to August 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
<14.5	42	0	0	0	0	0	0
14.5-15.4	18	0	0	0	0	0	0
15.5-16.4	21	0	0	0	0	0	0
16.5-17.4	44	1	1	.02	.18	.18	2.27
17.5-18.4	26	1	1	.04	.37	.55	3.85
18.5-19.4	46	1	1	.02	.18	.73	2.17
19.5-20.4	69	2	2	.03	.28	1.01	2.90
20.5-21.4	83	4	4	.05	.46	1.47	4.82
21.5-22.4	98	3	3	.03	.28	1.75	3.06
22.5-23.4	105	5	5	.05	.46	2.21	4.76
23.5-24.4	76	4	4	.05	.46	2.67	5.26
24.5-25.4	82	5	3	.06	.55	3.22	3.66
25.5-26.4	99	11	7	.11	1.02	4.24	7.07
26.5-27.4	99	14	10	.14	1.29	5.53	10.10
27.5-28.4	67	22	12	.33	3.05	8.58	17.91
28.5-29.4	67	44	18	.66	6.09	14.67	26.87
29.5-30.4	55	55	18	1.00	9.23	23.90	32.73
30.5-31.4	64	132	35	2.06	19.02	42.92	54.69
31.5-32.4	39	75	19	1.92	17.73	60.65	48.72

Table 16 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
32.5-33.4	45	67	19	1.49	13.76	74.41	42.22
33.5-34.4	53	69	28	1.30	12.00	86.41	52.83
34.5-35.4	54	45	20	.83	7.66	94.07	37.04
35.5-36.4	44	10	8	.23	2.12	96.19	18.18
36.5-37.4	41	7	5	.17	1.57	97.76	12.20
37.5-38.4	29	3	3	.10	.92	98.68	10.34
38.5-39.4	22	0	0	0	0	98.68	0
39.5-40.4	14	2	2	.14	1.29	100.00	14.29
40.5-41.4	14	0	0	0	0	100.00	0
41.5-42.4	4	0	0	0	0	100.00	0
Total		582		10.83			

Table 17. Collections of female S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), August 1 to August 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
<14.5	42	0	0	0	.00	0	0
14.5-15.4	18	1	2	.06	.20	.20	11.11
15.5-16.4	21	3	3	.14	.46	.66	14.29
16.5-17.4	44	2	2	.05	.16	.82	4.55
17.5-18.4	26	5	3	.19	.62	1.44	11.54
18.5-19.4	46	9	7	.20	.65	2.09	15.22
19.5-20.4	69	9	4	.13	.42	2.51	5.80
20.5-21.4	83	13	12	.16	.52	3.03	14.46
21.5-22.4	98	11	7	.11	.36	3.39	7.14
22.5-23.4	105	21	13	.20	.65	4.04	12.38
23.5-24.4	76	16	11	.21	.68	4.72	14.47
24.5-25.4	82	20	11	.24	.78	5.50	13.41
25.5-26.4	99	26	12	.26	.85	6.35	12.12
26.5-27.4	99	51	33	.52	1.69	8.04	33.33
27.5-28.4	67	59	30	.88	2.86	10.90	44.78
28.5-29.4	67	131	43	1.96	6.38	17.28	64.18
29.5-30.4	55	169	41	3.07	9.99	27.27	74.55
30.5-31.4	64	339	48	5.30	17.24	44.51	75.00
31.5-32.4	39	174	32	4.46	14.51	59.02	82.05
32.5-33.4	45	207	34	4.60	14.96	73.98	75.56

Table 17 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
33.5-34.4	53	197	38	3.72	12.10	86.08	71.70
34.5-35.4	54	116	34	2.15	6.99	93.07	62.96
35.5-36.4	44	49	22	1.11	3.61	96.68	50.00
36.5-37.4	41	19	12	.46	1.50	98.18	29.27
37.5-38.4	29	7	4	.24	.78	98.96	13.79
38.5-39.4	22	4	4	.18	.59	99.55	18.18
39.5-40.4	14	1	1	.07	.23	99.78	7.14
40.5-41.4	14	1	1	.07	.23	100.00	7.14
41.5-42.4	4	0	0	0	0	100.00	0
Total		1,660		30.74			

Table 18. Collections of M. domestica (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M), August 1 to August 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
<11.5	0	0	0	0	0	0	0
11.5-12.4	8	1	1	.13	.07	.07	12.5
12.5-13.4	15	7	5	.47	.27	.34	33.33
13.5-14.4	19	11	7	.58	.33	.67	36.84
14.5-15.4	18	8	6	.44	.25	.92	33.33
15.5-16.4	21	10	7	.48	.28	1.20	33.33
16.5-17.4	44	35	19	.80	.46	1.66	43.18
17.5-18.4	26	25	15	.96	.55	2.21	57.69
18.5-19.4	46	49	24	1.07	.61	2.82	52.17
19.5-20.4	69	245	55	3.55	2.04	4.86	79.71
20.5-21.4	83	298	69	3.59	2.06	6.92	83.13
21.5-22.4	98	163	63	1.66	.95	7.87	64.29
22.5-23.4	105	223	73	2.12	1.22	9.09	69.52
23.5-24.4	76	195	49	2.57	1.47	10.56	64.47
24.5-25.4	82	171	59	2.09	1.20	11.76	71.95
25.5-26.4	99	357	85	3.61	2.07	13.83	85.86
26.5-27.4	99	377	84	3.81	2.19	16.02	84.85
27.5-28.4	67	271	53	4.04	2.32	18.34	79.10

Table 18 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
28.5-29.4	67	445	60	6.64	3.81	22.15	89.55
29.5-30.4	55	438	51	7.96	4.57	26.72	92.73
30.5-31.4	64	759	59	11.86	6.80	33.52	92.18
31.5-32.4	39	536	35	13.74	7.88	41.40	89.74
32.5-33.4	45	881	43	19.58	11.23	52.63	95.56
33.5-34.4	53	1,060	49	20.00	11.47	64.10	92.45
34.5-35.4	54	821	53	15.20	8.72	72.82	98.15
35.5-36.4	44	532	42	12.09	6.94	79.76	95.45
36.5-37.4	41	335	41	8.17	4.69	84.45	100.00
37.5-38.4	29	213	29	7.34	4.21	88.66	100.00
38.4-39.4	22	110	17	5.00	2.87	91.53	77.27
39.5-40.4	14	65	14	4.64	2.66	94.19	100.00
40.5-41.4	14	68	13	4.86	2.79	96.98	92.86
41.5-42.4	4	21	4	5.25	3.01	100.00	100.00
Total		8,730		174.30			

Table 19. Collections of male S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), September 1 to September 30, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
4.5- 5.4	4	0	0	0	0	0	0
5.5- 6.4	12	0	0	0	0	0	0
6.5- 7.4	22	0	0	0	0	0	0
7.5- 8.4	19	0	0	0	0	0	0
8.5- 9.4	52	1	1	.02	.07	.07	1.92
9.5-10.4	69	2	2	.03	.11	.18	2.90
10.5-11.4	40	0	0	0	0	.18	0
11.5-12.4	73	2	1	.03	.11	.29	1.37
12.5-13.4	115	4	3	.03	.11	.40	2.61
13.5-14.4	83	1	1	.01	.04	.44	1.20
14.5-15.4	61	2	2	.03	.11	.55	3.28
15.5-16.4	97	4	4	.04	.14	.69	4.12
16.5-17.4	51	1	1	.02	.07	.76	1.96
17.5-18.4	59	2	2	.03	.11	.87	3.39
18.5-19.4	40	2	1	.05	.18	1.05	2.50
19.5-20.4	37	3	2	.08	.30	1.35	5.41
20.5-21.4	42	2	2	.05	.18	1.53	4.76
21.5-22.4	75	6	7	.08	.30	1.83	9.33
22.5-23.4	77	6	4	.08	.30	2.13	5.19

Table 19 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
23.5-24.4	50	12	4	.24	.87	3.00	8.00
24.5-25.4	46	7	6	.15	.54	3.54	13.04
25.5-26.4	47	3	3	.06	.22	3.76	6.38
26.5-27.4	45	22	11	.49	1.77	5.53	24.44
27.5-28.4	59	27	13	.46	1.67	7.20	22.03
28.5-29.4	46	31	16	.67	2.43	9.63	34.78
29.5-30.4	31	58	20	1.87	6.77	16.40	64.52
30.5-31.4	19	69	12	3.63	13.15	29.55	63.16
31.5-32.4	32	146	25	4.56	16.52	46.07	78.13
32.5-33.4	34	181	34	5.32	19.27	65.34	100.00
33.5-34.4	14	66	12	4.71	17.06	82.40	85.71
34.5-35.4	10	37	8	3.70	13.40	95.80	80.00
35.5-36.4	12	14	8	1.17	4.24	100.0	66.67
36.5-37.4	1	0	0	0	0	100.00	0
Total		711		27.61			

Table 20. Collections of female S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), September 1 to September 30, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
4.5- 5.4	4	0	0	0	0	0	0
5.5- 6.4	12	0	0	0	0	0	0
6.5- 7.4	22	0	0	0	0	0	0
7.5- 8.4	19	0	0	0	0	0	0
8.5- 9.4	52	0	0	0	0	0	0
9.5-10.4	69	1	1	.01	.02	.02	1.45
10.5-11.4	40	2	2	.05	.12	.14	5.00
11.5-12.4	73	2	2	.03	.07	.21	2.74
12.5-13.4	115	8	7	.07	.17	.38	6.09
13.5-14.4	83	7	7	.08	.20	.58	8.43
14.5-15.4	61	7	6	.11	.27	.85	9.84
15.5-16.4	97	5	5	.05	.12	.97	5.15
16.5-17.4	51	11	8	.22	.54	1.51	15.67
17.5-18.4	59	3	3	.05	.12	1.63	5.08
18.5-19.4	40	5	5	.12	.30	1.93	12.50
19.5-20.4	37	5	4	.14	.35	2.28	10.81
20.5-21.4	42	8	4	.19	.47	2.75	9.52
21.5-22.4	75	12	11	.16	.40	3.15	14.67

Table 20 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
22.5-23.4	77	16	12	.21	.52	3.67	15.58
23.5-24.4	50	17	8	.34	.84	4.51	16.00
24.5-25.4	46	27	10	.59	1.46	5.97	21.74
25.5-26.4	47	23	14	.49	1.21	7.18	29.79
26.5-27.4	45	37	14	.82	2.03	9.21	31.11
27.5-28.4	59	77	22	1.31	3.24	12.45	37.29
28.5-29.4	46	92	24	2.00	4.95	17.40	52.17
29.5-30.4	31	102	22	3.29	8.14	25.54	70.97
30.5-31.4	19	86	13	4.53	11.20	36.74	68.42
31.5-32.4	32	156	26	4.88	12.07	48.81	81.25
32.5-33.4	34	220	32	6.47	16.00	64.81	94.12
33.5-34.4	14	88	12	6.29	15.56	80.37	85.71
34.5-35.4	10	46	10	4.60	11.38	91.75	100.00
35.5-36.4	12	28	8	2.33	5.76	97.51	66.67
36.5-37.4	1	1	1	1.00	2.47	100.00	100.00
Total		1,092		40.43			

Table 21. Collections of M. domestica (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), September 1 to September 30, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
4.5- 5.4	4	0	0	0	0	0	0
5.5- 6.4	12	0	0	0	0	0	0
6.5-7.4	22	3	2	.14	.08	.08	9.09
7.5-8.4	19	2	2	.11	.06	.14	10.53
8.5-9.4	52	12	8	.23	.13	.27	15.38
9.5-10.4	69	18	11	.26	.15	.42	15.94
10.5-11.4	40	7	5	.18	.10	.52	12.50
11.5-12.4	73	17	12	.23	.13	.65	16.44
12.5-13.4	115	96	32	.83	.47	1.12	27.83
13.5-14.4	83	110	36	1.33	.75	1.87	43.37
14.5-15.4	61	127	28	2.08	1.17	3.04	45.90
15.5-16.4	97	129	41	1.33	.75	3.79	42.27
16.5-17.4	51	97	31	1.90	1.07	4.86	60.78
17.5-18.4	59	106	28	1.80	1.01	5.87	47.46
18.5-19.4	40	107	23	2.68	1.51	7.38	57.50
19.5-20.4	37	96	25	2.59	1.46	8.84	67.57
20.5-21.4	42	94	32	2.24	1.26	10.10	76.19
21.5-22.4	75	210	46	2.80	1.58	11.68	61.33

Table 21 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
22.5-23.4	77	162	46	2.10	1.18	12.86	59.74
23.5-24.4	50	65	27	1.30	.73	13.59	54.00
24.5-25.4	46	140	29	3.04	1.71	15.30	63.04
25.5-26.4	47	98	31	2.09	1.18	16.48	65.96
26.5-27.4	45	197	34	4.38	2.46	18.94	75.56
27.5-28.4	59	216	46	3.66	2.06	21.00	77.97
28.5-29.4	46	298	44	6.48	3.65	24.65	95.65
29.5-30.4	31	262	28	8.45	4.75	29.40	90.32
30.5-31.4	19	312	19	16.42	9.24	38.64	100.00
31.5-32.4	32	560	30	17.50	9.84	48.48	93.75
32.5-33.4	34	446	34	13.12	7.38	55.86	100.00
33.5-34.4	14	325	14	23.21	13.06	68.92	100.00
34.5-35.4	10	297	10	29.70	16.71	85.63	100.00
35.5-36.4	12	187	11	15.58	8.76	94.39	91.67
36.5-37.4	1	10	1	10.00	5.63	100.00	100.00
Total		4,806		177.76			

Table 22. Collectios of male S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), October 1 to October 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
-2.5- -1.6	7	0	0	0	0	0	0
-1.5- -0.6	22	0	0	0	0	0	0
-0.5- 0.4	30	0	0	0	0	0	0
0.5- 1.4	51	0	0	0	0	0	0
1.5- 2.4	51	0	0	0	0	0	0
2.5- 3.4	45	0	0	0	0	0	0
3.5- 4.4	76	0	0	0	0	0	0
4.5- 5.4	56	0	0	0	0	0	0
5.5- 6.4	68	0	0	0	0	0	0
6.5- 7.4	72	0	0	0	0	0	0
7.5- 8.4	101	0	0	0	0	0	0
8.5- 9.4	88	3	3	.03	2.48	2.48	3.41
9.5- 10.4	92	0	0	0	0	2.48	0
10.5- 11.4	83	2	2	.02	1.65	4.13	2.41
11.5- 12.4	62	3	3	.05	4.13	8.26	4.84
12.5- 13.4	48	0	0	0	0	8.26	0
13.5- 14.4	63	0	0	0	0	8.26	0
14.5- 15.4	47	2	2	.04	3.31	11.57	4.26
15.5- 16.4	60	1	1	.02	1.65	13.22	1.67
16.5- 17.4	53	1	1	.02	1.65	14.87	1.89
17.5- 18.4	37	2	2	.05	4.13	19.00	5.41

Table 22 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
18.5-19.4	39	1	1	.03	2.48	21.48	2.56
19.5-20.4	39	2	1	.05	4.13	25.61	2.56
20.5-21.4	56	5	4	.08	5.79	31.40	7.14
21.5-22.4	31	0	0	0	0	31.40	0
22.5-23.4	21	1	1	.05	4.13	35.53	4.76
23.5-24.4	14	1	1	.07	5.79	41.32	7.14
24.5-25.4	9	1	1	.11	9.09	50.41	11.11
25.5-26.4	11	0	0	0	0	50.41	0
26.5-27.4	14	0	0	0	0	50.41	0
27.5-28.4	10	2	2	.20	16.53	66.94	20.00
28.5-29.4	25	5	5	.20	16.53	83.47	20.00
29.5-30.4	5	1	1	.20	16.53	100.00	20.00
Total		33		1.22			

Table 23. Collections of female S. calcitrans (median temperature) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), October 1 to October 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
-2.5- -1.6	7	0	0	0	0	0	0
-1.5- -0.6	22	0	0	0	0	0	0
-0.5- 0.4	30	0	0	0	0	0	0
0.5- 1.4	51	0	0	0	0	0	0
1.5- 2.4	51	0	0	0	0	0	0
2.5- 3.4	45	0	0	0	0	0	0
3.5- 4.4	76	0	0	0	0	0	0
4.5- 5.4	56	2	2	.04	1.34	1.34	3.57
5.5- 6.4	68	1	1	.02	.67	2.01	1.47
6.5- 7.4	72	1	1	.01	.33	2.34	1.39
7.5- 8.4	101	1	1	.01	.33	2.67	.99
8.5- 9.4	88	2	2	.02	.67	3.34	2.27
9.5- 10.4	92	3	3	.03	1.00	4.34	3.26
10.5- 11.4	83	9	8	.11	3.68	8.02	9.64
11.5- 12.4	62	4	4	.06	2.00	10.02	6.45
12.5- 13.4	48	5	5	.10	3.35	13.37	10.42
13.5- 14.4	63	3	3	.05	1.67	15.04	4.76
14.5- 15.4	47	1	1	.02	.67	15.71	2.13
15.5- 16.4	60	5	4	.08	2.68	18.39	6.67
16.5- 17.4	53	4	3	.08	2.68	21.07	5.66

Table 23 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
17.5-18.4	37	5	4	.14	4.68	25.75	10.81
18.5-19.4	39	4	4	.10	3.34	29.09	10.26
19.5-20.4	39	1	1	.03	1.00	30.09	2.56
20.5-21.4	56	4	3	.07	2.34	32.43	5.36
21.5-22.4	31	2	2	.06	2.00	34.43	6.45
22.5-23.4	21	0	0	0	0	34.43	0
23.5-24.4	14	3	2	.21	7.02	41.45	14.29
24.5-25.4	9	0	0	0	0	41.45	0
25.5-26.4	11	2	2	.18	6.02	47.47	18.18
26.5-27.4	14	1	1	.07	2.34	49.81	7.14
27.5-28.4	10	5	4	.50	16.72	66.53	40.00
28.5-29.4	25	10	8	.40	13.38	79.91	32.00
29.5-30.4	5	3	3	.60	20.00	100.00	60.00
Total		81		2.99			

Table 24. Collections of M. domestica (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), October 1 to October 31, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
-2.5- -1.6	7	0	0	0	0	0	0
-1.5- -0.6	22	0	0	0	0	0	0
-0.5- 0.4	30	0	0	0	0	0	0
0.5- 1.4	51	3	3	.06	.32	.32	5.88
1.5- 2.4	51	0	0	0	0	.32	0
2.5- 3.4	45	0	0	0	0	.32	0
3.5- 4.4	76	0	0	0	0	.32	0
4.5- 5.4	56	1	1	.02	.11	.43	1.79
5.5- 6.4	68	3	3	.04	.22	.65	4.41
6.5- 7.4	72	1	1	.01	.05	.70	1.39
7.5- 8.4	101	3	3	.03	.16	.86	2.97
8.5- 9.4	88	6	4	.07	.38	1.24	4.55
9.5- 10.4	92	4	4	.04	.22	1.46	4.35
10.5- 11.4	83	13	10	.16	.86	2.32	12.05
11.5- 12.4	62	16	9	.26	1.40	3.72	14.52
12.5- 13.4	48	8	7	.17	.91	4.63	14.58
13.5- 14.4	63	7	6	.11	.59	5.22	9.52
14.5- 15.4	47	7	5	.15	.81	6.03	10.64
15.5- 16.4	60	19	17	.32	1.72	7.75	28.33

Table 24 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
16.5-17.4	53	18	11	.34	1.83	9.58	20.75
17.5-18.4	37	20	11	.54	2.91	12.49	29.73
18.5-19.4	39	19	9	.49	2.64	15.13	23.08
19.5-20.4	39	15	12	.38	2.05	17.18	30.77
20.5-21.4	56	22	16	.39	2.10	19.28	26.57
21.5-22.4	31	20	10	.65	3.50	22.78	32.26
22.5-23.4	21	10	8	.48	2.58	25.36	38.10
23.5-24.4	14	17	9	1.21	6.51	31.87	64.29
24.5-25.4	9	22	6	2.44	13.13	45.00	66.67
25.5-26.4	11	18	7	1.64	8.83	53.83	63.64
26.5-27.4	14	23	11	1.64	8.83	62.66	78.57
27.5-28.4	10	25	9	2.50	13.46	76.12	90.00
28.5-29.4	25	41	22	1.64	8.83	84.95	88.00
29.5-30.4	5	14	5	2.80	15.07	100.00	100.00
Total		375		18.58			

Table 25. Collections of S. calcitrans (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), November 1 to November 23, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency		% Flight occurrence
-10.5- -9.6	15	-	-	-	-	0		-
- 9.5- -8.6	6	-	-	-	-	0		-
- 8.5- -7.6	11	-	-	-	-	0		-
- 7.5- -6.6	15	-	-	-	-	0		-
- 6.5- -5.6	14	-	-	-	-	0		-
- 5.5- -4.6	10	-	-	-	-	0		-
- 4.5- -3.6	20	-	-	-	-	0		-
- 3.5- -2.6	35	-	-	-	-	0		-
- 2.5- -1.6	22	-	-	-	-	0		-
- 1.5- -0.6	40	1♂	1♂	.03♂	9.09♂		9.09♂	2.5♂
- 0.5- 0.4	49	-	-	-	-		9.09♂	-
0.5- 1.4	46	-	-	-	-		9.09♂	-
1.5- 2.4	74	-	-	-	-		9.09♂	-
2.5- 3.4	113	-	-	-	-		9.09♂	-
3.5- 4.4	90	2 1♂	2 1♂	.02	3.03	3.03	12.12♂	2.2 1.1♂
4.5- 5.4	87	1	1	(.01♂) .01	(3.03♂) 1.52	4.55	12.12♂	1.15
5.5- 6.4	64	-	-	-	-	4.55	12.12♂	-
6.5- 7.4	41	-	-	-	-	4.55	12.12♂	-
7.5- 8.4	64	-	-	-	-	4.55	12.12♂	-

Table 25 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency		% Flight occurrence
8.5- 9.4	35	-	-	-	-	4.55	12.12♂	-
9.5-10.4	55	-	-	-	-	4.55	12.12♂	-
10.5-11.4	31	-	-	-	-	4.55	12.12♂	-
11.5-12.4	22	-	-	-	-	4.55	12.12♂	-
12.5-13.4	27	1	1	.04	6.06	10.61	12.12♂	3.70
13.5-14.4	20	1	1	.05	7.58	18.19	12.12♂	5.0
14.5-15.4	30	1	1	.03	4.55	22.74	12.12♂	3.3
15.5-16.4	22	-	-	-	-	22.74	12.12♂	-
16.5-17.4	13	1	1	.08	12.12	34.86	12.12♂	7.69
17.5-18.4	17	-	-	-	-	34.86	12.12♂	-
18.5-19.4	10	-	-	-	-	34.86	12.12♂	-
19.5-20.4	7	3 2♂	2 2♂	.43 (.29♂)	65.15 (87.88♂)	100.00	100.00♂	28.57
20.5-21.4	9	-		-		100.00	100.00♂	-
Total		10 4♂		0.66 .33♂				

Table 26. Collections of M. domestica (median temperatures) at 30-minute intervals for 24-hour period (8:00 A.M.-8:00 A.M.), November 1 to November 23, 1970.

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
-10.5- -9.6	15	0	0	0	0	0	0
- 9.5- -8.6	6	0	0	0	0	0	0
- 8.5- -7.6	11	0	0	0	0	0	0
- 7.5- -6.6	15	0	0	0	0	0	0
- 6.5- -5.6	14	0	0	0	0	0	0
- 5.5- -4.6	10	0	0	0	0	0	0
- 4.5- -3.6	20	0	0	0	0	0	0
- 3.5- -2.6	35	3	3	.09	3.36	3.36	8.57
- 2.5- -1.6	22	0	0	0	0	3.36	0
- 1.5- -0.6	40	0	0	0	0	3.36	0
- 0.5- 0.4	49	0	0	0	0	3.36	0
0.5- 1.4	46	0	0	0	0	3.36	0
1.5- 2.4	74	1	1	.01	.37	3.73	1.35
2.5- 3.4	113	1	1	.01	.37	4.10	.88
3.5- 4.4	90	4	3	.04	1.49	5.59	3.33
4.5- 5.4	87	3	3	.03	1.12	6.71	3.45
5.5- 6.4	64	0	0	0	0	6.71	0
6.5- 7.4	41	0	0	0	0	6.71	0

Table 26 (concluded).

Temperature °C	No. times temp. occurred	Size of catch	No. times flight occurred	Avg. no. collected	Avg. % collected	Cumulative avg. % frequency	% Flight occurrence
7.5- 8.4	64	0	0	0	0	6.71	0
8.5- 9.4	35	0	0	0	0	6.71	0
9.5-10.4	55	0	0	0	0	6.71	0
10.5-11.4	31	1	1	.03	1.11	7.82	3.23
11.5-12.4	22	2	2	.09	3.36	11.18	9.09
12.5-13.4	27	1	1	.04	1.49	12.67	3.70
13.5-14.4	20	0	0	0	0	12.67	0
14.5-15.4	30	0	0	0	0	12.67	0
15.5-16.4	22	3	3	.14	5.22	17.89	13.64
16.5-17.4	13	4	4	.31	11.57	29.46	30.77
17.5-18.4	17	3	2	.18	6.72	36.18	11.76
18.5-19.4	10	5	3	.50	18.66	54.84	30.00
19.5-20.4	7	3	3	.43	16.04	70.88	42.86
20.5-21.4	9	7	4	.78	29.10	100.00	44.44
Total		41		2.68			

Table 27. Means and standard deviations of dependent and independent variables.

Variable	June		July		August		September		October	
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Y_5	.92	.49	1.06	.73	.74	.62	.79	.67	.16	.22
Y_6	1.04	.47	1.35	.66	1.14	.66	.99	.65	.29	.34
Y_7	1.30	.45	1.54	.67	1.30	.63	1.21	.64	.55	.27
Y_8	-	-	3.74	.81	4.90	.81	4.20	.98	1.42	1.36
X_1	25.50	14.00	25.50	14.00	25.50	14.00	25.50	14.00	25.50	14.00
X_2	26.33	3.70	26.52	5.35	27.52	4.87	20.35	3.74	12.63	3.91
X_9	1.31	.34	1.31	.34	1.31	.34	1.31	.34	1.31	.34
X_{10}	1.42	.061	1.41	.088	1.43	.077	1.31	.079	1.08	.13

Table 28. Values of estimated parameters in the regression equation and their standard errors.

Parameters:	C		X_9		X_1		X_{10}		X_2		
Dependent variables	Est.	S. D.	Est.	S. D.	Est.	S. D.	Est.	S. D.	Est.	S. D.	
Y_5	7.74	.16	.82	.62	.01	.02	- 8.62	20.67	.24	.32	
Y_6	29.17	.15	- .63	.58	-.004	.02	-29.15	19.32	.54	.30	June
Y_7	22.91	.13	- .61	.49	-.002	.02	-22.87	16.26	.44	.25	
Y_8	-	-	-	-	-	-	-	-	-	-	
Y_5	15.26	.25	-1.21	.56	.01	.02	-16.34	7.76	.38	.11	
Y_6	17.48	.25	-1.00	.56	.01	.02	-18.42	7.77	.41	.11	
Y_7	17.40	.22	- .99	.48	.01	.02	-18.04	6.69	.40	.10	July
Y_8	28.15	.40	.075	.89	-.03	.03	-26.09	12.38	.50	.18	
Y_5	7.56	.13	.17	1.40	-.02	.05	- 9.14	19.02	.23	-.27	
Y_6	5.54	.13	.25	1.38	-.03	.04	- 6.33	18.70	.18	.25	Aug.
Y_7	5.44	.11	.15	1.22	-.02	.04	- 6.19	16.58	.18	.22	
Y_8	59.83	.14	3.11	1.50	-.12	.05	-56.15	20.31	.89	.27	

Table 28 (concluded).

Parameters:	C		X_9		X_1		X_{10}		X_2		
Dependent variables	Est.	S. D.	Est.	S. D.	Est.	S. D.	Est.	S. D.	Est.	S. D.	
Y_5	-25.72	.17	-3.48	.66	.01	.02	26.16	11.80	-.27	.22	Sept.
Y_6	-27.37	.17	-2.57	.67	.07	.02	28.83	11.99	- .37	.23	
Y_7	26.66	.15	-2.93	.57	.08	.02	28.05	10.24	- .34	.19	
Y_8	-51.61	.28	-7.22	1.08	.21	.04	56.77	19.39	- .69	.37	
Y_5	- 3.12	.56	- .46	.50	.02	.02	4.09	3.37	.08	.09	Oct.
Y_6	- .85	.72	- .22	.64	.01	.02	.55	4.30	.05	.12	
Y_7	- 1.32	.52	- .31	.46	.01	.02	1.85	3.09	.004	.09	
Y_8	-17.64	1.84	-5.19	1.64	.15	.06	24.23	11.05	- .34	.30	

Table 29. Simple correlation coefficients among variables for various months.

				June				
Y_5	1.00			-				
Y_6	.85	1.00		-				
Y_7	.95	.97	1.00	-				
X_9	-.65	-.72	-.72	-	1.00			
X_1	-.78	-.81	-.83	-	.93	1.00		
X_{10}	.80	.76	.81	-	-.51	-.75	1.00	
X_2	.80	.75	.81	-	-.49	-.74	1.0	1.00
	Y_5	Y_6	Y_7	Y_8	X_9	X_1	X_{10}	X_2
				July				
Y_5	1.00							
Y_6	.96	1.00						
Y_7	.98	.99	1.00					
Y_8	-	-	.94	1.00				
X_9	-.70	-.64	-.67	-.67	1.00			
X_1	-.84	-.80	-.83	-.82	.93	1.00		
X_{10}	.91	.91	.92	.88	-.55	-.79	1.00	
X_2	.92	.92	.93	.88	-.53	-.77	1.0	1.00
	Y_5	Y_6	Y_7	Y_8	X_9	X_1	X_{10}	X_2

Table 29 (cont'd)

	August							
Y_5	1.00							
Y_6	.94	1.00						
Y_7	.97	.99	1.00					
Y_8	-	-	-	1.00				
X_9	-.51	-.59	-.57	-.56	1.00			
X_1	-.73	-.80	-.79	-.78	.93	1.00		
X_{10}	.92	.91	.93	.92	-.40	-.69	1.00	
X_2	.92	.91	.93	.93	-.39	-.67	1.0	1.00
	Y_5	Y_6	Y_7	Y_8	X_9	X_1	X_{10}	X_2

	September							
Y_5	1.00							
Y_6	.95	1.00						
Y_7	.98	.99	1.00					
Y_8	-	-	-	1.00				
X_9	-.58	-.61	-.60	-.55	1.00			
X_1	-.74	-.78	-.77	-.68	.93	1.00		
X_{10}	.91	.92	.92	.86	-.44	-.70	1.00	
X_2	.91	.91	.92	.87	-.42	-.68	1.0	1.00
	Y_5	Y_6	Y_7	Y_8	X_9	X_1	X_{10}	X_2

Table 29 (concluded).

	October							
Y_5	1.00							
Y_6	.51	1.00						
Y_7	.73	.95	1.00					
Y_8	-	-	-	1.00				
X_9	-.35	-.42	-.47	-.63	1.00			
X_1	-.49	-.59	-.65	-.77	.93	1.00		
X_{10}	.64	.76	.81	.88	-.54	-.78	1.00	
X_2	.63	.76	.81	.87	-.51	-.74	1.0	1.00
	Y_5	Y_6	Y_7	Y_8	X_9	X_1	X_{10}	X_2

Table 30. R-square values and multiple correlation coefficients with standard error.

	Y_5			Y_6			Y_7			Y_8		
	R^2	R	Standard error	R^2	R	Standard error	R^2	R	Standard error	R^2	R	Standard error
June	.74	.86	.26	.75	.86	.25	.80	.90	.21	-	-	-
July	.93	.96	.21	.91	.95	.21	.94	.97	.18	.85	.92	.33
August	.87	.93	.23	.89	.94	.23	.91	.95	.20	.91	.96	.25
Sept.	.92	.96	.19	.92	.96	.20	.94	.97	.17	.90	.95	.32
October	.42	.64	.18	.59	.77	.22	.66	.82	.16	.83	.91	.58

FACTORS AFFECTING FLIGHT OF THE STABLE FLY, *STOMOXYS CALCITRANS* (L.) AND THE HOUSE FLY, *MUSCA DOMESTICA* (L.)

by

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Fly populations were sampled in a loafing shed of a dairy barn at 30-minute intervals, using two Johnson-Taylor segregating suction traps placed level with the stalls.

Sixty-four per cent of the stable flies, Stomoxys calcitrans (L.) were females and 36% were males. House flies, Musca domestica (L.) represented 66% of the total number of flies collected from July through late November.

Similar patterns in diurnal flight activity were observed in female and male S. calcitrans. Optimal periodism occurred between 11:30 and 13:00 hours but slight differences in peak flight activity existed from 13:00 to 16:30 hours. In contrast, M. domestica exhibited the greatest activity between 13:00 and 14:30, and between 16:30 to 18:00 hours.

Population peaks were observed in S. calcitrans: (1) during the second half of June, (2) first half of July, and (3) from late August to the end of the first week of September. M. domestica was the most abundant in August with the highest peak occurring between August 19 and September 2. The population densities of both species markedly declined during September.

Temperatures below 11° C and above 40° C inhibited flight activity in S. calcitrans. There was no evidence of an upper temperature threshold at 42° C with M. domestica but temperatures below 7° C apparently inhibit flight. Optimal temperature range of S. calcitrans occurred between 30° C and 35° C and between 31° C and 38° C for M. domestica.

Regression analysis indicated an apparent strong linear relationship between log catches and time, temperature or the log transformation of these variables. Temperature was the most important factor influencing flight activity of both species. Temperature correlation coefficients of male and female S. calcitrans were comparable, which suggests similar temperature thresholds between the sexes.