mosquitoes. They do feed very heavily on the fragrant blossom of the common milkweed (*Asclepias syriaca*); 25 *Ae. vexans* were collected from one flower cluster of milkweed in 15 minutes. The age of the flower was also a factor, with fewer feeding attempts being observed on the older blossoms.

SUMMARY AND CONCLUSIONS. A total of 1,981 specimens representing 4 genera and 14 species of mosquitoes was captured in nature after imbibing nectar meals. They were taken from a large number of different plant species during the early night-time hours. Various factors, such as temperature, wind and rainfall, in addition to availability of the nectar, and the color, age and aroma of the flower, may affect the plant-feeding activity of the mosquito. The ease with which nectar-feeding mosquitoes are found and the variety of plants upon which they feed supports the belief that mosquitoes in nature may rely extensively upon nectar for satisfying their biological requirements.

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THE INFLUENCE OF FLOWER SCENTS ON AGGREGATIONS OF CAGED ADULT *AEDES AEGYPTI*

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INTRODUCTION. Female mosquitoes have been observed to visit and probe several species of flowering plants for nectar and juices (Barr, 1958). Under laboratory conditions *Aedes communis* (De Geer) males and females visit flowers and ingest plant juices and nectars as shown by their accumulation of radioactivity from flowering plants treated with P^{32} (West and Jenkins, 1951).

This behaviour is undoubtedly a factor in longevity of adult mosquitoes. In our preliminary experiments we observed that *Aedes aegypti* (Linnaeus) adults survived only 24–48 hours without water and 4 to 5 days on water without sugar whereas they can survive about 60 days in the laboratory when provided with sugar syrup or honey. Hocking (1953) has shown that nectar supply is important for

flight of mosquitoes and hence is a major factor in dispersal and migration. These considerations raise the question as to how mosquitoes orientate to flowers in their "search" for nectar. In this study we made a preliminary enquiry into the role of flower fragrance as a factor in the orientation of mosquitoes to flowers.

METHODS. Sweet clover [*Melilotus officinalis* (L.) Lam.], red clover (*Trifolium pratense* L.) and mustard plants (*Brassica kaber* (DC) L. C. Wheeler) were selected at the flowering stage and the blooms were picked for use in the tests. The fresh flowers were placed in petri dishes and covered with cotton wool in order to standardize the visual stimulus in the behavioural response. Water was used in place of flowers in the control dish. Adults were given no food for 24 hours before the trials because better results were obtained with starved than with fed insects. The test dish together with a control dish were placed simultaneousl 10 inches apart in a "Saran" plastic scree cage (2′ x 2′ x 3′). The mosquitoes th aggregated on each dish were counte every 30 seconds for a five-minute perio The positions of the dishes were inte changed after each 30-second count.

A second series of experiments was pe formed in which sweet clover honey an buckwheat honey replaced flowers in th treated dish. In a third series of exper ments, extracts of plant flowers provide by a perfume distributor (P. Roberte Inc., 221 Fourth Ave., New York 3, N. Y were tested in a similar way. Each e periment was conducted at a room ten perature of 25°–26° C. and 50–60 perce relative humidity and replicated two three times as indicated in Tables 1, 2, an 3. Student's "t" test was applied to t comparison of treatment means.

RESULTS AND DISCUSSION. The da in Table 1 show that some flower fr

TABLE 1.—Mean numbers of *Aedes aegypti* adults aggregated under olfactory influence of flower fragrance.

Number of experiments	Odour treatment	Number of mosquitoes aggregated on dishes: Treated dish	Control dish	Student "t"
3	Sweet clover	193	145	3.1 **
2	Red clover	111	94.5	3.2 *
2	Mustard	151.5	142.5	2.6 *

NOTE: Means calculated from experiments each involving 10 observations at 30 second intervals.
** Significant at the 1 percent level.
* Significant at the 5 percent level.

TABLE 2.—Mean numbers of *Aedes aegypti* adults aggregated under olfactory influence of honey or sugar solutions.

Number of experiments	Odour treatment	Number of mosquitoes aggregated on dishes: Treated Dish	Control Dish	Student "t"
3	10% Buckwheat honey	305.3	50.7	5.6**
3	10% Sweet clover honey	97.3	49	5.3**
3	10% Sucrose	57.3	57.7	0.23*
3	10% Glucose	79.7	78.3	0.65*

NOTE: Means calculated from experiments each involving 10 observations at 30 second intervals.
** Significant at the 1 percent level.
* Significant at the 5 percent level.

rances induce significantly larger mosuito aggregations than water. This ehaviour clearly implies an olfactory esponse of some kind. Our observations o not necessarily imply that the mosuitoes are actually attracted by the odours. Ve favour the interpretation that the eated and control dishes are both visally "attractive" (equally so) and that ie larger aggregations of mosquitoes uild up through an olfactory "arrestant" ifluence (Dethier, *et al.*, 1960). Observaons on the frequency of landing would e required to decide between the alternave interpretations.

Table 2 shows that sweet clover honey id especially buckwheat honey are confactor possibly accounting for the greater "attractiveness" of sweet clover honey as compared with sweet clover blossoms. However, other effects may be involved related to the processing of nectar into honey by the bee or the treatment of the honey by the beekeeper and packager. We have not been able to discover any striking olfactory effect from fresh buckwheat blossoms (*Fagopyron sagittatum* Gilib.); lilac blossoms (*Syringa vulgaris* L.) although not highly attractive, are not repellent. Nevertheless the results justify more thorough studies of the olfactory influence of flower fragrances on mosquito behaviour and such investigations are proceeding in our laboratory.

TABLE 3.—Mean numbers of *Aedes aegypti* adults aggregated under olfactory influence of flower extracts.

Number of experiments	Odour treatment	Number of mosquitoes aggregated on dishes: Treated dish (T)	Control dish (C)	T — C	Student's "t"
2	Rose moroc (1323 J) †	71.5	41.5	40	2.5*
2	Rose (3700) †	101.5	61.5	40	2.3*
2	Strawberry (3709) †	13	71.5	—59	3.6**
2	Lilac (3717) †	12	39	—27	3.2**

NOTE: Means calculated from experiments each involving 10 observations at 30 second intervals.
** Significant at the 1 percent level.
* Significant at the 5 percent level.
† Manufacturer's Number.

derably more effective than water in inucing aggregations on the treated dishes. his effect cannot be simulated by sugar lutions inasmuch as they proved equal water as olfactory influences on the ggregations.

Table 3 shows that some perfumes (e.g., se) can induce aggregations in the same ay as honey and flower fragrance and hers (strawberry and lilac) apparently pel the mosquitoes or excite locomotion mosquitoes so that aggregations develop ore slowly than they would under the inuence of water vapour.

It is admitted here that no adequate acount was taken of the concentrations of ie active principles inasmuch as these are ot yet identified. One would, of course, xpect concentration to be an important

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