

A PRELIMINARY REPORT ON THE BREEDING SITES AND INCIDENCE OF *Aedes* IN DELHI

M. K. K. PILLAI, B. V. R. MADHUKAR AND K. K. GROVER

Department of Zoology, University of Delhi, Delhi-7

THE yellow fever mosquito, *Aedes aegypti*, has been shown to be the main potential vector of hæmorrhagic fever in India.¹ In view of the recent outbreak of hæmorrhagic fever / chikungunya fever in Calcutta in 1963² and again in Madras and Pondicherry in 1964³, the control of this tropicopolitan mosquito is of paramount importance to India. A thorough study of the bionomics of the vector mosquitoes is essential for a proper assessment of the epidemic potentiality of this disease in other parts of India. On the basis of a survey undertaken in September 1964 Krishnamurthy *et al.*⁴ have reported a high incidence of *A. aegypti* in Delhi area. An unusually large increase of mosquitoes in Delhi in October–November 1967 coupled with a high incidence of a febrile illness similar to hæmorrhagic fever, presumably mosquito-borne (the exact nature of the fever and its transmission are under investigations elsewhere), has necessitated a further study on the relative abundance of the various species of *Aedes*. This preliminary report deals with the larval habitat of various species of *Aedes* in Delhi based on a survey conducted during September–October 1967 as a part of the study programme of insecticide resistance in Indian strains of this mosquito.

Fifteen different localities within the metropolitan Delhi (Table I) were chosen during the period September 8 to October 11, 1967 and a limited survey was carried out with reference to the breeding sites where mosquito larvæ could be collected. Many types of containers holding water within the precincts of waste lands, gardens, houses and shops were examined. The larvæ collected from these sites were allowed to pupate in the laboratory and the emerging adults were scored for the various species. A certain number of larvæ were used to assess their susceptibility to DDT using WHO standard test kit.

The mean atmospheric temperature in Delhi during the survey period ranged from 21.6° C. to 32.3° C. The total rainfall for the period July–September was 887.9 mm., much higher than in previous years and the mean relative humidity was as high as 80%. The climatic

factors during this period were congenial for profuse breeding of mosquitoes and the rain water accumulated in various containers proved to be good breeding ground.

TABLE I
Results of larvæ collections of *Aedes* from
fifteen areas in metropolitan Delhi

Area	No. of containers examined	No. of containers positive for <i>Aedes</i>	Total no. of <i>Aedes</i> larvæ	No. of <i>A. aegypti</i>	No. of <i>A. albopictus</i>	No. of <i>A. vittatus</i>
University campus	24	24	362	30	140	192
Kamala Nagar	16	3	44	..	38	6
Roop Nagar	6	3	345	150	173	22
Karol Bagh	67	67	350	350	..	..
Red Fort	2	..	..	..	..	..
Kingsway Camp	13	13	147	..	147	..
Model Town	14	..	..	..	..	..
Mazlis Park	14	..	..	..	..	..
Adarsh Nagar	21	..	..	..	..	..
Indra Nagar	1	..	..	..	..	..
Rajouri Garden	14	6	45	45	..	..
Ansari Nagar	23	14	525	..	525	..
Palam Contonment	49	..	..	..	..	..
Birla Mandir	11	6	50	50	..	..
Anand Parbhat	26	2	145	145	..	..
Total	301	138	2013	770	1023	220

The results of the present survey are given in Table I. Out of a total of 301 containers examined 138 were positive for *Aedes* larvæ, their gross breeding index being as high as 45.8. The remaining 163 containers showed a large number of mosquito larvæ belonging to various species of *Anopheles* and *Culex*. In few instances all the three types of larvæ were found together. Among the *Aedes* collected 50.5% constituted *A. albopictus*, 38.3% *A. aegypti* and 19.9% *A. vittatus*.

The breeding sites of these three species varied to a certain extent. *A. aegypti* was found breeding close to human habitations particularly more in densely populated areas such as Karol Bagh. It was collected mostly from containers like unused motor tyres, broken pots and drums. A few larvæ could also be collected from a blocked nullah with clear water. The other

two species are comparatively wild species and were found to breed in areas away from houses such as gardens and waste lands. All the species of *Aedes* are observed to breed in receptacles containing either rain-water or stored tap-water. *A. albopictus* was found to breed mostly in dirty water while *A. vittatus* preferred breeding in flower pots with hydrophytes and in cemented water tanks maintained in gardens. Other mosquitoes like *Culex* appeared to prefer more stagnant and polluted waters whereas *Anopheles* was observed to be breeding in dirty still waters and in temporary rain-water puddles along shallow ditches on the roadside.

The present survey, though it did not cover the entire metropolitan Delhi, indicates the prevalence of all the three species of *Aedes* due to the easy availability of breeding sites in the area surveyed. The results also show a spread in the breeding foci of *A. aegypti* and *A. albopictus* from the premises already reported in 1964 survey.⁴ This spreading was probably due to the highly favourable climatic factors prevalent during July–October 1967. The successful transmission of Calcutta strain of chikungunya virus in the laboratory through *A. aegypti* and *A. albopictus* suggest their

importance as potential vectors. The high anthropophilic index for *A. aegypti*⁴ indicates its high epidemic potential. The potential role of *A. albopictus* must also be taken into consideration because of its increased occurrence and present distribution in Delhi. The anthropophilic index of this species needs investigation. Preliminary experiment on DDT tolerance conducted on the larvae collected from various places shows their LC_{50} to DDT varied from 0.011 ppm to 0.065 ppm which shows that they are not yet tolerant to this insecticide in this area. However, *A. aegypti* is known to develop resistance to insecticides and also have the ability to change their breeding sites due to their high genetic plasticity. Thus, any control programme planned using DDT as the insecticide should be intensive and without delay.

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ARTIFICIAL AND NATURAL POLYPLOIDS IN *ANTIRRHINUM*

CHARANJEET MAHAL, MOHINDER PAL AND T. N. KHOSHOO

National Botanic Gardens, Lucknow, India

ANTIRRHINUM is well known for its lack of natural polyploidy,¹ but data obtained by us and Gunther and Rothmaler² necessitate a revision of this view. These findings have some cytogenetic, evolutionary and phyto-geographic implications which are briefly discussed here.

The genus has been divided into two sections,³ *Antirrhinum* and *Scaerorhinum*, which are distributed in the Mediterranean region of Europe and South-Western parts of North America respectively. From the European element of the genus 16 species have been worked out cytologically so far. All these are diploid ($n=8$; Fig. 1). Furthermore, there is a preponderance of self-incompatible and cross-fertilized species.⁴ However, gene flow between

species is restricted by bee specificity⁵ in relation to colour, size and structure of flower and ecological isolation.⁶ As a result of this, in a mixed population of different species, like *A. majus* and *A. glutinosum*, there is ordinarily little interspecific hybridization although the species cross readily when pollinated by hand. There appear to be no barriers to recombination once hybridization between two subspecies or species is effected. Fertile and segregating progenies^{8,9} are known to result from hybrids involving *A. majus* with *A. glutinosum*, *A. ibanyezii*, *A. latifolium*, *A. linkianum*, *A. molle* and *A. sempervirens*. The flowers in some F_1 segregants of *A. majus* \times *A. glutinosum* resemble an allied genus *Rhinanthus*.¹⁰ Such "explosive variability" is disharmonious and non-functional. The hybrids have normal meiosis but possibly