



Ecology of anopheline mosquitoes of district Vidisha, Madhya Pradesh

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ABSTRACT

This paper deal with the ecology of anopheline mosquitoes in Tehsil Sironj and Lateri of district Vidisha. Mosquito sampling took place surface water in the tah. Sironj stream were collected at 2- week intervals during August 2007 to July 2008. During the survey, it was noticed that permanent breeding ground such as ditches, cesspool, sewas, ponds and dam where same breeding ground where mosquito species laele there xqulexand aides mosquito breeds in polluted water all transmission water where they can with strand desiccation it was also noted that varies mosquito species used the same water bodies over a period of time.

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Introduction

Malaria and other mosquito borne diseases are common in Vidisha, India. More than 3,400 species of mosquito have been recorded worldwide. The abundance of these vector mosquitoes varies with the season and available habitats (Pramanik and Raut, 2002; Hati, 2001). Mobility of human hosts between different regions influence the transmission process too (Singh et. al., 2004; Pramanik and Raut, 2005). Mosquitoes exploit almost all types of lentic aquatic habitats for breeding. The immature stages of mosquitoes thrive in these aquatic bodies along with conspecifics and heterospecifics – bodies along with conspecifics and heterospecifics- forming the larval mosquito community. The resources in terms of food, predators and competitors present in the habitat determine the population status of larval mosquitoes, both qualitatively and quantitatively. Composition of organisms in these ensembles depends on size and type of aquatic bodies.

Keeping these in view, the present survey was aimed at evaluation of the ecology of anopheline mosquitoes and an association malaria parasite in commuters. The survey considered two distinct regions- one urban and one rural area that are expected to provide different larval mosquito habitats and completely different landscape. Since the migrating human population is expected to be susceptible to mosquito bites from both the regions, an estimate of malarial parasites in the commuters from this region will help to evaluate their possible role in spreading the disease vis-à-vis the abundance of anopheline mosquitoes.

Materials and Methods:

Study Area: Five Sampling site were selected of tahsil Sironj and Lateri, Distt. Vidisha for sampling water collected at 2-week intervals during August 2007 to July 2008.

The sampling site as follows:

Site-1: Village Bagroda, **Site-2:** Village Bhatoli, **Site-3:** Village Devpur, **Site-4:** Village Patan, **Site-5:** Village Chaudakhedi.

Collection of larvae: The larvae of the *Anopheles stephensi* were collected from the two breeding habitats selected for the present study from Sironj Tehsil of Vidisha district of M.P. collection of larvae the long hand dipper and plastic containers of 5 liters capacity and a filter were used. The larvae after collection brought to the laboratory and were separated in star wise and kept in different enamel trays.

Laboratory colonization of *Anopheles*: *stephensi* is one of the species amenable to very easy laboratory colonization. Laboratory colonization of *An. stephensi* established in wooden cage (30×30×30 cm). Adult were fed on water soaked raisins and female were offered blood meal on rabbit.

Observation, Result and Discussion:

In the present study all mosquitoes have four stages of development, egg, larva, pupa and adult and spend their larval and pupal stages in water.

(1) *A. culicifacies* -

Cooler months: November to March - Biting took place mostly in the first segment of the night.

Hot months: April - May and September - October - Biting shifted to 2nd and 3rd segments of the night.

Mid-summer months: June -July - August - Biting was entirely arrhythmic and occurred throughout night.

(2) *A. subpictus* -

Disappears in the cold period in the Sironj, but is common in post monsoon months. Feeds mostly prior to midnight with a predawn peak.

(3) *A. stephensi* -

Feeds mostly before midnight, being markedly crepuscular in periods of low ambient temperature. *A. stephensi* largely a nocturnal feeder but it could also bite during day time even at 9.00 hours.

(4) *A. annularis* -

Throughout the year - 1st and 2nd segments of the night, but a slight shift occurred covering a little earlier period, during cold weather.

The females of some mosquitos species deposited egg on most surfaces, such as mud or fallen leaves that may be near water but dry. Later, rain of high tides refold these surfaces and stimulate the egg to notch in to larvae. During different times of the day variations in density of resting mosquitoes have been observed as mentioned in the Table (1). In case of *A. culicifacies* it has been found that the numbers of females gradually increased from about 32 for 15 minutes at 6 hours to nearly 57 till 1200 hours and then a gradual fall to about 9 at 20 hours. Anopheline females are known to feed on the blood of a wide variety of animals including man, monkeys, cattle, horses, dogs, pigs, camels, other ruminants and birds etc. Some specimens show distinct preferences in this regards, while others are facultative and feed on any animal which comes along. Only the species which prefers to bite man, or bite man, in large numbers can be important vectors of human diseases.

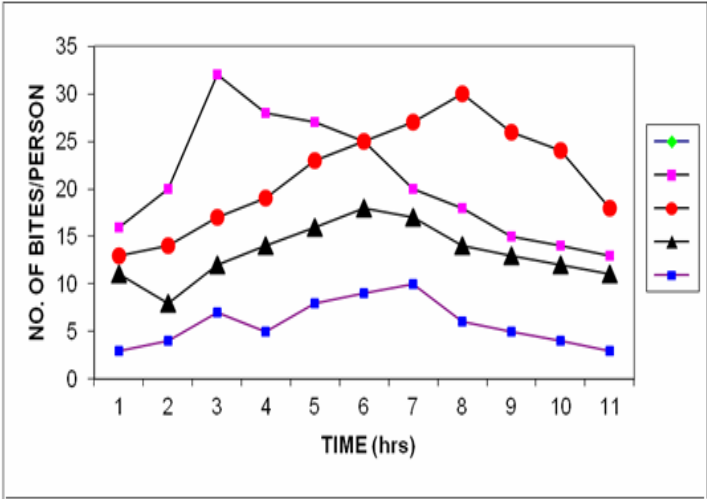
In this study *An. culicifacies* habitats were associated with light and vegetation and *An. stephensi* associated with other aquatic fauna in line with previous entomological studies in the same study area. Similar variation was observed between irrigated and non-irrigated rice-fields in Sri Lanka and Mali (Diuk-Wasser *et. al.*, 2005) and in Rural and urban areas of sub-Saharan Africa (Lindsay and Birley, 2004). In reference to the abundance of the anopheline mosquitoes and the malarial parasites in the human sample, Post-monsoon and monsoon seasons were noted to be significant. Similar pattern of seasonal variation of mosquito abundance and malaria cases were noted from Kalsi, Uttaranchal (Pemola and Jauhari, 2006), with the winter being the season for least number of malaria cases. Similarly the anopheline mosquitoes and malarial parasite in commuters in a rural and an urban area were noted from West Bengal, India (Pramanik *et. al.*, 2006).

Our survey as a model study reveals that a positive relationship exists in terms of anopheline density and the presence of malarial parasites in the commuters between the seasons. These preliminary findings can serve as the basis for further studies on the people, mosquito and malaria in the state of Madhya Pradesh as a whole and Vidisha in particular.

Table. Man hour densities in different collection sites of Tah. Sironj and Lateri District Vidisha, M.P.

onth	Cattle shads	Mixed dwelling	Human dwelling
August-07	0.0	0.0	-
September-07	0.0	0.06	-
October-07	0.06	0.08	0.5
November-07	2.25	-	-
December-07	20.95	6.68	1.6
January-08	6.33	9.0	5.5
February-08	24.14	4.0	6.72
March-08	45.75	10.5	12.12
April-08	10.0	1.6	0.79
May-08	43.46	13.29	4.57
June-08	18.43	5.77	2.06
July-08	3.0	1.5	0.5

Graph
Indoor and outdoor biting cycle of *An. gambiae* and *An. Arabiensis*



Reference

Diuk-Wasser MA, Toure MB, Dolo G, Bagayoke M, Sogoba N, Traore SF, Manoukis N, Taylor CE. Vector abundance and malaria transmission in rice-growing villages in Mali. *Am J Trop Med Hyg* 2005; 72(6): 725– 31.

Hati AK. *Medical entomology*, II ed. Kolkata: Allied Book Agency 2001; p. 1-201.

Lindsay SW, Birley M. Rural development and malaria control in sub-Saharan Africa. *Eco Hlth* 2004; 1: 129–37.

Pemola Devi N, Jauhari RK. Relationship between *Anopheles fluviatilis* and *An. stephensi* (Diptera: Culicidae) catches and the prevalence of malaria cases at Kalsi area in Dehradun district (Uttaranchal). *Indian J Med Res* 2006; 123(2): 151–8.

Pramanik MK, Raut SK. Human dwelling and cattleshed mosquitoes of Kolkata: Past and present. *J Natl Taiwan Mus* 2002; 55: 1–16.

Pramanik MK, Raut SK. *Toxorhynchites splendens*, a potential biological control agent of the pest and vector mosquitoes in boro rice fields in West Bengal, India. *Environ Ecol* 2005; 23(3): 698–704.

Pramanik MK, Gautam A, Raut SK. A survey of anopheline mosquitoes and malarial parasite in commuters in a rural and an urban area in West Bengal, India. *J Vect Borne Dis* 2006; 43: 198–202.

Singh N, Chand SK, Mishra SK, Nagpal AC. Migration malaria associated with forest economy in central India. *Curr Sci* 2004; 87(12): 1396–9.