

Seasonal Incidence of Plasmodium in Anopheles Minimus, a Predominant Vector of Malaria in Manipur

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ABSTRACT

Anopheles sp. is a primary vector of malaria in Manipur. Since no definite information was available regarding the status of vector of malaria in Manipur, the present study was undertaken to determine the prevalence of part of life cycle stage of Plasmodium in vector a species and their possible role in transmission of malaria. The communication records of the seasonal incidence of the three years 2001, 2002 and 2003 of Plasmodium in the host Anopheles minimus at Leingangpokpi village, Jiribam.

Keywords: Anopheles sp.. Seasonal incidence. Plasmodium. Leingangpokpi village.

INTRODUCTION

The genus Plasmodium included in the class-Sporozoa of Phylum-Apicomplexa, was first discovered by Laveran, (1880), who was a doctor in the French Army stationed at Algiers. He observed Plasmodium in the blood of Malaria patient. In 1883, King reported that Plasmodium were transmitted through bite by the mosquitoes. In 1886, Golgi confirmed the observation of Laveran. And the genus Plasmodium was named by Macchiafava and Celli, in 1885. In 1894, Manson suggested that the malarial parasite i.e Plasmodium enter the blood of man after the bite of mosquitoes. Ross in 1895 proved that Plasmodium are sucked up by female Anopheles mosquitoes and are later injected into the human blood stream. Later, the life cycle of Plasmodium was described by Grassi (1899) which occurred inside the stomach of Female Anopheles. Granham, Bird and Baker (1962) studied the ultrastructure of sporozoite in birds. In 1961, 1963 Granham et.al., studied ultrastructure of sporozoites in human.

MATERIALS AND METHODS

Anopheline mosquitoes were collected from human dwellings of different areas of Leingangpokpi (Jiribam) and its periphery with the help of suction tube in the morning and in the daytime during peak transmission season (August to October 2011, 2012, 2013). Mosquitoes were anaesthetized with ether and identified with the help of regional pictorial keys of Wattal and Kalra (1961). Identified mosquitoes were dissected to look for salivary

gland infection. Sporozoites positive slides were stained with Leishman's, stain as described by Choudhary and Ghosh (1982).

RESULTS AND OBSERVATION

The results are summarized in Table 1, 2 and 3. Of the three years (August 2011 to October 2011), (August 2012 to October 2012) and (August 2013 to October 2013), the highest sporozoites positivity rate was in the year 2012.

The year 2011, 2012 and 2013 show sporozoite positivity rate as 4.1, 5.3 and 4 respectively. The above positivity rate is high which indicates that the region is a high transmission area. Though the vector Anopheles minimus was found in good numbers only 50 - 71% of the glands were dissected, of these 2.2% to 6.2% show sporozoite positivity rate.

At an average the positivity rate was 4.5% in all the three years of survey. Among these, the year 2012 show the highest sporozoite positivity rate (5.3%). This is in conformity with the higher number of malarial cases in Jiribam (September, in 2012). [Source: A manual Book of State Malaria Department 2012].

In the year 2011 and 2013 malarial cases were 5.5%, 5.9% and 6.2% respectively at Jiribam and adjoining areas.

In a similar way were by Wajihullah and Saifi (2001) on Anopheles culicifacies in Aligarh sporozoite positivity rate was 0.396%, which is a low count for malaria transmission. But in a place like Aligarh which is not a high transmission region this is normal.

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Ansari et al., (1986) also reported positivity rate of 0.490% from Meerut, whereas Ansari et al., (1986) reported higher sporozoite positivity rate of 0.823%, 1.005% and 2.89%. Prasad and Sharma (1990), reported similar observation from Bareilly and Shahjahanpur. Nagpal and Sharma (1986) reported positivity of 1.33% from Orissa for *An. culifacies*.

The role of other vectors of malaria such as *Anopheles annularis*, *Anopheles dirus* and *Anopheles stephensi* could not be established in the present study as only a small number of these mosquitoes were dissected. It can however be added that these mosquitoes could have sporozoite positive glands during their ideal breeding seasons which could be the high dry months of summer or their breeding sites may be different from the present surveyed place.

Month	Number of Host Collected	Dissected Gland	Positive Gland	Sporozoite Positivity rate (%)
Sep-11	54	34	3	5.5
Oct-11	39	22	1	2.5
Total	143	89	6	4.1

Table -1. Results of dissection of the anophelines collected from human dwellings (August 2011 to October 2011).

Month	Number of Host Collected	Dissected Gland	Positive Gland	Sporozoite Positivity rate (%)
Aug-12	66	47	3	4.5
Sep-12	67	44	4	5.9
Oct-11	55	39	3	5.4
Total	188	130	10	5.3

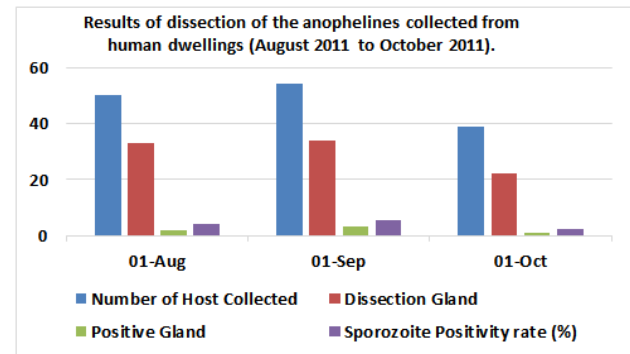
Table -2. Results of dissection of the anophelines collected from human dwellings (August 2012 to October 2012).

Month	Number of Host Collected	Dissected Gland	Positive Gland	Sporozoite Positivity rate
Aug-13	44	22	1	2.2
Sep-13	32	19	2	6.2
Oct-13	49	31	2	4

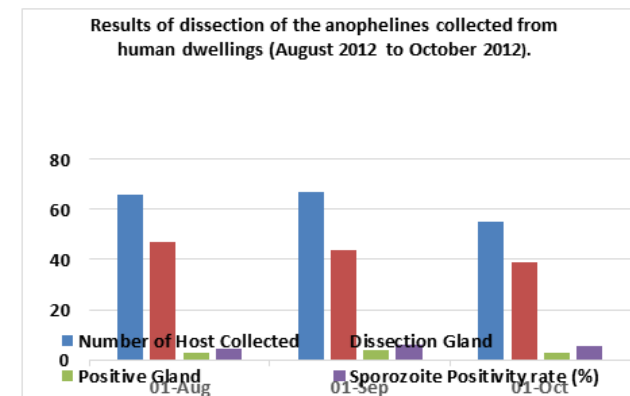
Total	125	72	5	4
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Table -3. Results of dissection of the anophelines collected from human dwellings (August 2013 to October 2013)

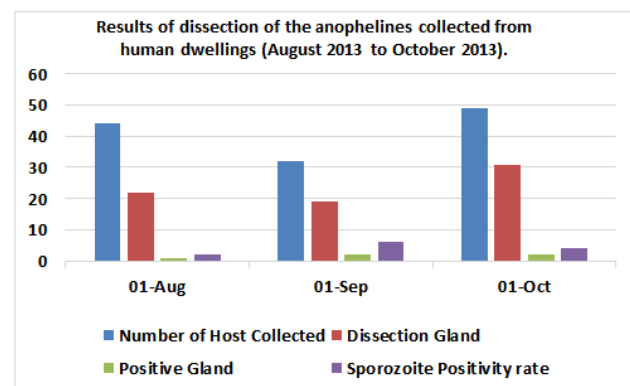
Graph of the Seasonal incidence of Plasmodium in the Host Anopheles minimus:



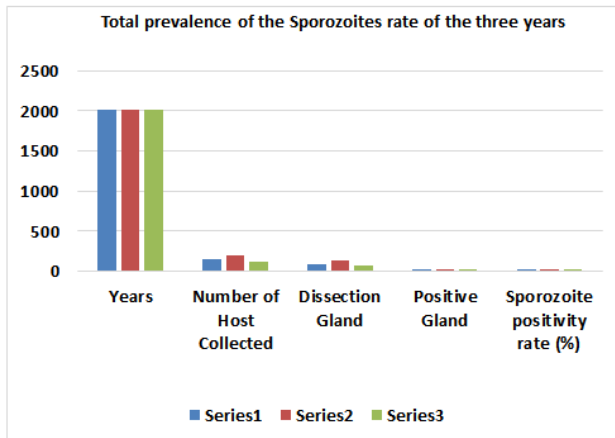
Graph-1



Graph-2



Graph-3



Graph-4

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