

## THREATENING OF RE-ESTABLISHMENT OF MALARIA IN AMPARA DISTRICT OF SRI LANKA

V. Sujarajini<sup>232</sup>, Lavapirathan<sup>233</sup>, Gunsekara<sup>234</sup>, Pushpakumara<sup>235</sup> & Wikramasinghe<sup>236</sup>

Correspondence: sujaraji@seu.ac.lk

### ABSTRACT

Malaria is one of the tropical diseases which is caused by *Plasmodium* species. There has been no local transmission of malaria in Ampara for eight years following elimination of the disease in 2011. In order to avoid the risk of malaria being re-established, species prevalence and vector density variations should continue to be monitored and diligently recorded. The objectives of the study are to find the species of mosquitoes prevalent in the district. Using the following techniques of entomological surveillance were done different MOH areas in Ampara District during January to August 2019: larval surveys, human landing catches, indoor hand collections, cattle baited hut collections, cattle baited trap collections, outdoor collections, window trap collections, larval surveys and susceptibility test. Among the techniques, total output was highest for larval surveys (23705 dips) Least was done for susceptibility test (2). In, *Anopheles culicifacies*, *A. subpictus*, *A. annularis* and *A. varuna* were collected in different densities during larval survey. *Anopheles culicifacies* was the highest density of the vector larva (8,3 larvae per 100 dips) but the least obtained larvae was *A. annularis* (0,3 larvae per 100 dips) As the index malaria case was available at the boundaries of the Moneragala district (adjacent to Ampara) and the availability of the larvae and adult of the vectors in the Ampara district and the laborers from the endemic areas in the adjacent district consist of the possibilities to re-establish the malaria disease again in our country.

**Keywords:** *Plasmodium* sp, Entomological surveillance, *Anopheles culicifacies*, *A. annularis*, *A. varuna*, *A. subpictus*

### INTRODUCTION:

Over three billion people live at the risk of acquiring malaria (WHO, 2013), which mostly affects poor and vulnerable groups in tropical and subtropical areas, where the temperature and rainfall are suitable for the development and spread of the causative parasites (Carter *et. al.*, 2002). But in Sri Lanka, Malaria was controlled in 2012 (National report, 2016) and malaria free status certificate was obtained from the World Health Organization in 2016 (Seneratna *et. al.*, 2016).

From 2008 onwards when the Anti-Malaria Campaign began classifying cases as indigenous and imported, the number of imported malaria cases increased relative to indigenous cases were reported in the country (WHO,

<sup>232</sup> Department of Biological sciences, South Eastern University of Sri Lanka.

<sup>233</sup> Department of Health, Ampara, Sri Lanka.

<sup>234</sup> Health Entomology Officer, Ampara, Sri Lanka.

<sup>235</sup> Health Entomology Officer, Ampara, Sri Lanka.

<sup>236</sup> Health Entomology Officer, Ampara, Sri Lanka.

2013) and one member of a group of 31 foreign laborers (Indian Nationals), employed at a construction site in Moneragala District in the Uva Province, developed clinical malaria with *Plasmodium vivax* infection on 13 December, 2018 (Karunasena, 2019). In 1880 that Charles Laveran discovered the true causative agent of the malaria is *Plasmodium* spp.

Contribution of the vector in the completion of the parasites, *Plasmodium* spp. is immense. Anopheles injects the sporozoites into the host's dermis. These are carried with the blood stream to the liver where they mature in the hepatocytes to tissue schizonts that release their merozoites into the hepatic sinusoids from where they enter into the red blood cells where the parasites get nutrients, are ruptured (Rasad, 2000). The destruction of erythrocytes is a major consequence of infection with *Plasmodium* that can produce acute anemia (William *et. al.*, 2003). A few merozoites differentiated into male and female gametocytes which are essential for completion of the sexual cycle in the vector (Rasad, 2000).

The main aim of this research is monitoring for prevention of reintroduction phase of the determination of malaria receptivity in Ampara. This includes the identification of geographical distribution and relative density and bionomics of vector species.

## METHODOLOGY

### Study area:

The country is divided into nine provinces and twenty five districts. Ampara is one of the districts in Eastern Province, about 360 km from the capital city of Colombo and its coordinates are 7° 17'0" North and 81° 40'0". And the health care is governed by Eastern provincial council of Sri Lanka. (Figure: 1)

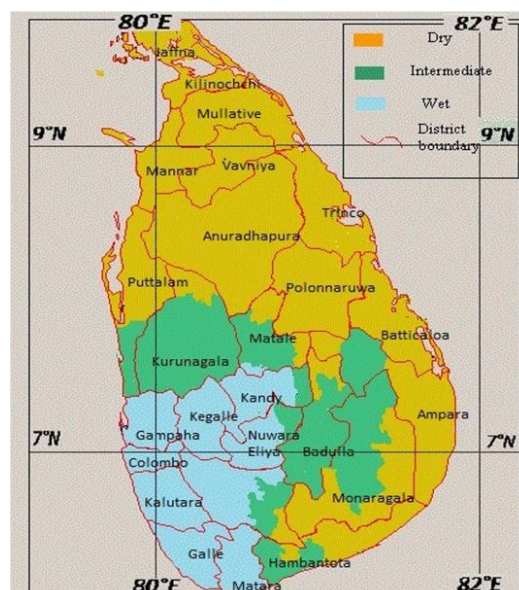


Figure 1: Map of Sri Lanka showing study area

## Entomological surveillance:

Sri Lanka has a strong entomological surveillance system since 1930s. Larval and adult survey were done using the following techniques in MOH areas of Ampara (Table 1) from January 2019 to August 2019: larval surveys, human landing catches, indoor hand collections,

## DISCUSSION AND RESULTS

Monitoring generally refers to the set of processes established, punctual or routine, in a defined perimeter, to observe a phenomenon. It involves compilation of data, without including analysis, interpretation, dissemination and use of the information produced for the action, which is under surveillance (Tabbai *et. al.*, 2017).

Malaria has been endemic in Sri Lanka for centuries past, and transmission was typically unstable, with seasonal causing epidemics every 10- 15 years. Although landing catches were various types (figure 3) the principle vector of malaria was *Anopheles culicifacies* in the endemic areas (Karunasena *et al* , 2019). This was further confirmed by the current study (Figure 2). These presence or absence data are particularly relevant in the invasive species which, by their presence constitute a necessary factor for the emergence of the disease (Tabbai *et. al.*, 2017). In Ampara, the availability of the vector of different species has the threat for the transmission of the parasites as the border of the Ampara Moneragala district where recently found the indexed case.

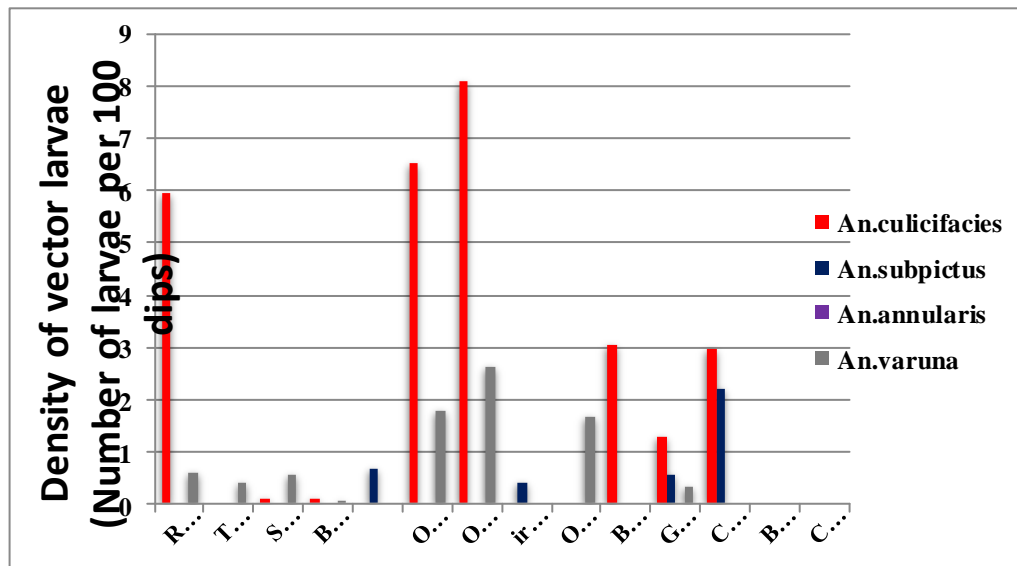
Total output were different in different methods. Highest amount was obtained during the larval survey. The bioassay test for IRS was not done because of the unavailability of the cases.

**Table 1:** Summary of the places of Entomological Surveillances

Month	MOH Area	Locality	Days
January	Dehiattakandiya	Nawamadagama	05
	Ufana	Senadaraduna	05
	Lahugala	Hulimbuge	03
	Demana	Monagathapellana	03
	Demana	Hingurana	05
February	Ampara	Amparatomnana	03
	Mahaboy	Unuwathurabubula	03
	Demana	Hingurana	05
	Dehiattakandiya	Nawamadagama	05
March	Ufana	Senadaraduna	03
	Dehiattakandiya	Nawamadagama	05
	Lahugala	Panama	03
	Demana	Hingurana	05
April	Demana	Hingurana	05
	Dehiattakandiya	Nawamadagama	05
May	Padiyathalawa	Kethukula	03
	Mahaboy	Unuwathurabubula	03
	Demana	Hingurana	05
	Dehiattakandiya	Nawamadagama	05
June	Dehiattakandiya	Nawamadagama	05
	Demana	Hingurana	05
	Lahugala	Panama	03
July	Demana	Hingurana	05
	Dehiattakandiya	Nawamadagama	05
	Lahugala	Panama	03
	Ufana	Senadaraduna	03
August	Demana	Hingurana	05
	Dehiattakandiya	Nawamadagama	05
	Mahaboy	Unuwathurabubula	03
	Padiyathalawa	Kethukula	03

**Table 2:** Summary of Entomological surveillance techniques

Technique	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total week output
Indoor Hand Collections	35	35	35	30	35	30	30	40	270 mh
Cattle Baited Hut Collections	03	-	02	-	-	-	02	-	07 traps
Cattle Baited trap collections	13	11	12	08	12	11	11	12	90 traps
Outdoor Collections	-	-	-	-	-	-	-	-	-
Window Trap Collections	04	05	05	05	11	05	11	10	66 traps
HLC (Indoor)	63	45	63	27	45	54	54	45	396 mh
HLC (Outdoor)	63	45	63	27	45	54	54	45	396 mh
Larval Surveys	4525	2745	4015	1400	3000	3475	2395	2155	23705 dips
Susceptibility Tests	-	-	-	-	01	01	-	-	02
Bio Assay Tests for IRS	-	-	-	-	-	-	-	-	-



**Figure1:** Larval survey the breeding sites for January 2019 to August 2019

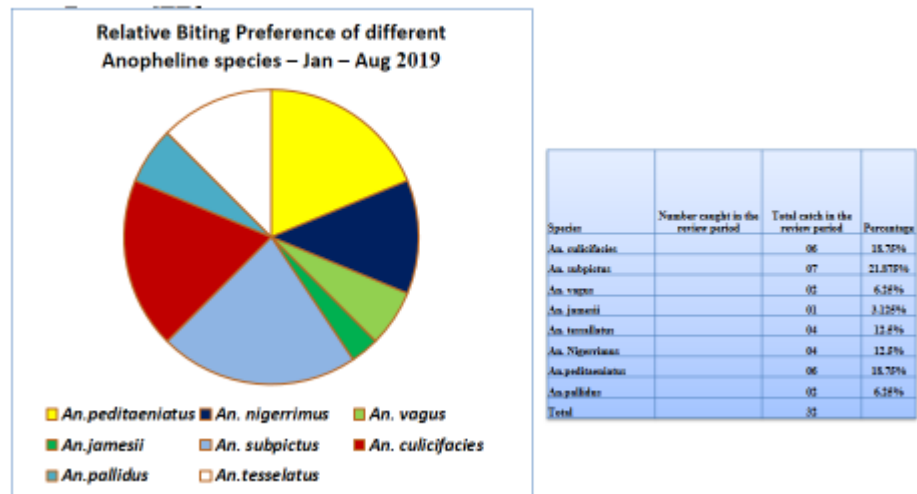


Figure2: Human Landing catches

## CONCLUSION

Entomological surveillance and vector control at the site of transmission are critically important to prevent further transmission. The risk of re-establishment of the disease in the Ampara is high. The regional elimination of malaria must be important in Ampara as well as in the country to sustain the control.

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