

Brief/Short Communication: New Record of *Culex Poicilipes* from Saudi Arabia (Jazan Region)

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Abstract

This record represents the first report for adult *Culex poicilipes* from Saudi Arabia (a farm near Albahir village of Sabya Governate, Jazan region southwest of Saudi Arabia, N: 42.58810, E:17.121738) was noted. This was occurred during a routine surveillance for adult mosquitoes in February 2021 carried out by Sabya vector control station and the laboratory of vector-borne diseases, Saudi Public Health Authority. With this new record, the number of *Culex* mosquito species known to occur in Jazan region increases to 19 while for Saudi Arabia to 20. Similarly, the total number of mosquito species known to occur in Saudi Arabia increases to 50. This record necessitates conducting more researches on the biology and bionomics of *Culex poicilipes* under local conditions, as well as complementing the morphological identification with molecular characterizations and gene diversity. The possible role of the species in pathogens transmission, especially West Nile and Rift Valley fever viruses, should also be investigated.

Keywords: *Culex poicilipes*, New record, Saudi Arabia, Jazan region

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1. Introduction

Mosquito fauna of Saudi Arabia have been widely studied by many authors. These studies were summarized and updated in a list published by Alahmad *et al.*, (2019) containing forty-nine mosquito species definitely known to occur in the country (18 Anophelines and 31 Culicines).

Mosquito-borne diseases in Saudi Arabia including dengue fever, malaria, Rift Valley fever and microfilariæ, cause diseases in the KSA (Alhaeli *et al.*, 2016; Samy *et al.*, 2017; Hotez *et al.*, 2012). Correct identification of vector species and knowledge of their distributions and biology in a specific geographical area are crucial requirements for disease epidemiology and control.

It is highly required to have adequate information about mosquito species and their geographical distribution in a certain area to determine the risk of relevant disease transmission.

In general, *Culex* mosquitoes are proven or suspected vectors of variety of Encephalitis, West Nile, and Rift Valley fever viruses, and Microfilariæ (Michael, 2012; Irish *et al.*, 2018). Similarly, *Culex poicilipes* is a known vector of West Nile and Rift Valley fever viruses in west Africa especially Senegal and Mauritania (Diallo *et al.*, 2005). The aim of this brief communication is to record *Culex poicilipes* from Saudi Arabia for the time.

2. Materials and Methods

2.1 Study Area:

Jazan area is about 11670 km², lies between 16°-12, and 18°-25, latitude north, and located in the subtropical zone, south-western of Saudi Arabia, with a coastal boundary of 250 km along the Red Sea and a 120 km border with the Republic of Yemen (Figure. 1). This region includes over 3000 villages scattered along the area, and about 100 islands located in the Red Sea, including the Farasan islands. It is surrounded by the Red Sea from the west and by Arabic Republic of Yemen from the south and east and Asir region from the north, with a total area of about 22,000 km² and 1.6 million population [Alsheikh (2011); GASTAT 2017: <https://www.stats.gov.sa/en/5655>].

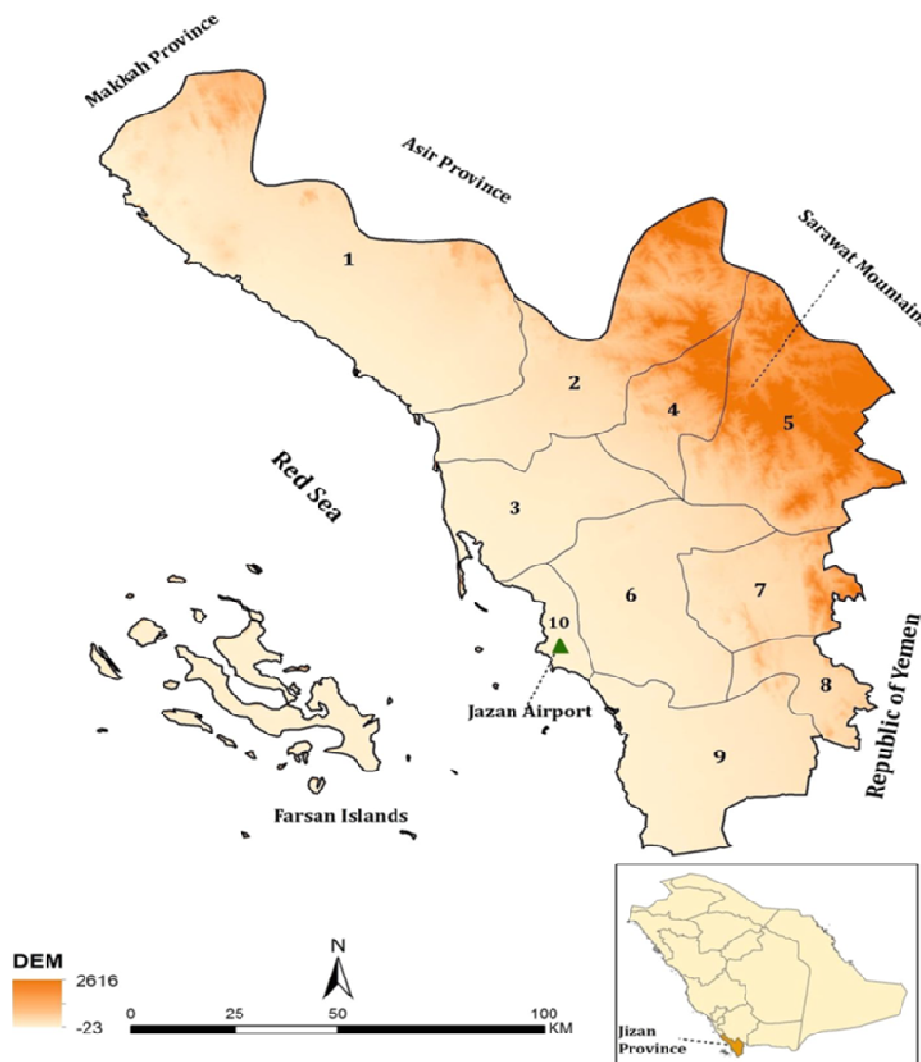


Figure 1. The topography and boundaries of study areas in Jazan Region; 1 Aldarb, 2 Baish, 3 Sabya, 4 Haroob, 5 Eleidabi (Eiban, Belgazzi), 6 Abuareesh, 7 Al-Ariddah, 8 Al-khoba, 9 Samttah, and 10 Jazan/ Farasan Islands.

2.2 Collection and Identification of Mosquitoes

Studied specimens of adult mosquito species were caught in the field using Blackhole light trap (BioTrap, Seoul, Korea, <http://www.bio-trap.com>) installed in a farm near Albahir village of Sabya Governate, Jazan region southwest of Saudi Arabia (N: 42.58810 E:17.121738,). This was done during a routine surveillance of adult mosquitoes in February 2021 carried out by Sabya vector control station. Mosquito specimens were then brought to the Public Health Authority (laboratory of vector-borne diseases) for morphological identification. Pictorial keys by (Harbach, 1985), Glick (1992), and Azari-Hamidian & Harbach (2009) were used in mosquito species identification.

3. Results

Identification of the adult mosquito species caught in the Blackhole light trap revealed the presence of 6 species belonging to 3 genera. These are: *Anopheles arabiensis*, *Aedes aegypti*, *Culex tritaeniorhynchus*, *Culex pipens*, *Culex quinquefasciatus*, and *Culex poicilipes* (Table 1). However, *Culex poicilipes* is identified for the first time from the Jazan region and the kingdom of Saudi Arabia.

Table 1. Identified mosquito species from a farm near Albahir village, Sabya – Jazan region.

Area	Coordinates	Identified mosquito species					
		<i>Anopheles arabiensis</i>	<i>Aedes aegypti</i>	<i>Culex tritaeniorhynchus</i>	<i>Culex pipens</i>	<i>Culex quinquefasciatus</i>	<i>Culex poicilipes</i>
Albahir village	N: 42.58810 E: 17.121738	3	2	36	7	5	8

Using the pictorial key of Harbach (1985) and the website of Walter Reed Biosystematics Unit (WRBU) ([Culex poicilipes \(Theobald, 1903\) | Walter Reed Biosystematics Unit \(WRBU\) \(si.edu\)](http://Culex_poicilipes_(Theobald,_1903)_|_Walter_Reed_Biosystematics_Unit_(WRBU)_(.si.edu))), the following morphological features were noted for *Culex poicilipes* from Saudi Arabia:

Head: Proboscis with median pale band, and it was longer than forefemur (Fig.2).

Thorax: Mesepimeral setae absent; Lower proepisternal scales present. Scutum without well-marked patterns (Fig.3).

Wings: Dark-scaled (Fig.4).

Legs: Anterior surfaces of femora and tibiae with rows of small pale spots, tarsus with narrow basal pale rings (Fig.5).

Abdomen: tergites with basal pale bands (Fig.4).



A **B**
Figure 2. A: Proboscis of female *Culex poicilipes* with median pale band. B: Male

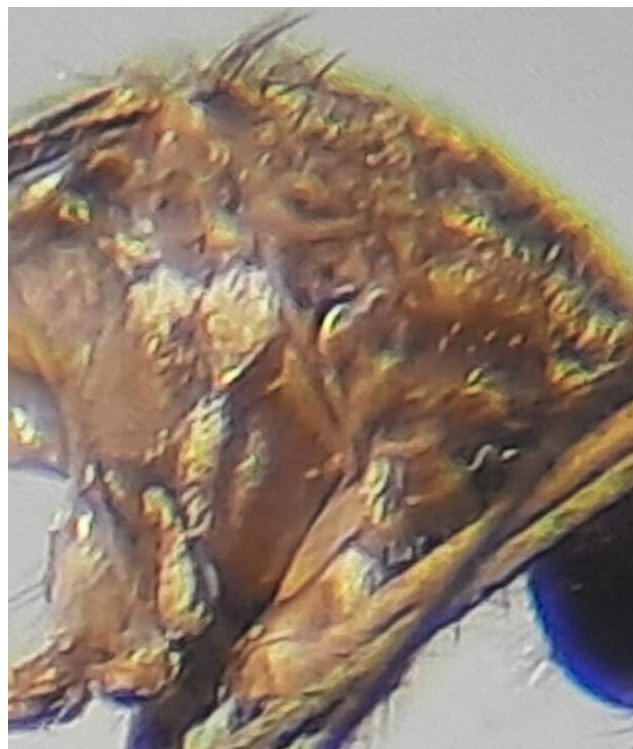


Figure 3. Mesepimeral setae absent; Lower proepisternal scales present.



Figure 4. Wing dark-scaled, tergites with basal pale bands.

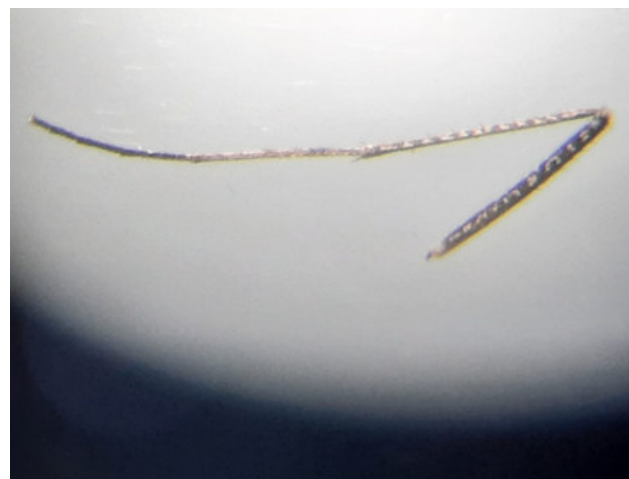


Figure 5. Anterior surfaces of femora and tibiae with rows of small pale spots, and tarsus with narrow basal pale rings.

4. Discussion

In this study, *Cx. poicilipes* species was recorded for the first time from southwest of Saudi Arabia, Sabya Governate. The other mosquito species identified in this study, namely; *Anopheles arabiensis*, *Aedes aegypti*, *Culex tritaeniorhynchus*, *Culex pipens*, and *Culex quinquefasciatus* (Table 1) are known potential vectors of diseases in the region and the kingdom; malaria, dengue, Rift Valley Fever, and lymphatic filariasis, respectively.

The adults of *Cx. poicilipes* are dark, large mosquito species with attractive rows of speckled (pale spots) along its femora and tibiae. It has also a distinct median pale band on its proboscis (Figure 2) (WRBU, 2021).

The latest updated list of mosquito fauna and their distribution in Saudi Arabia revealed the presence of forty-nine mosquito species (18 Anophelines and 31 Culicines) belonging to seven genera. Of the 31 Culicines, 19 species were belonging to the genus *Culex* Linnaeus (1758), namely; *Culex pusillus*, *Cx. Nebulosus*, *Cx. Bitaeniorhynchus*, *Cx. Arbieeni*, *Cx. Salisburiensis*, *Cx. decens*, *Cx. duttoni*, *Cx. laticinctus*, *Cx. mattinglyi*, *Cx. mimeticus*, *Cx. perexiguus*, *Cx. pipiens*, *Cx. quinquefasciatus*, *Cx. simpsoni*, *Cx. sinaiticus*, *Cx. sitiens*, *Cx. theileri*, *Cx. tritaeniorhynchus*, and *Cx. univittatus* (Alahmed *et al.*, 2019).

Except for *Cx. Nebulosus*, the other 18 species of *Culex* have been reported from Jazan region (Alahmed *et al.*, 2010; Alsheikh *et al.*, 2013; Bakr *et al.*, 2014; Harbach, 1985; Khater *et al.*, 2013; Gaffigan *et al.*, 2019; Alahmed *et al.*, 2019).

Immature stages of *Cx. poicilipes* were found in swamps, marshy depressions near rivers, clean fresh water sites, mature rice fields, and lakes with abundant floating vegetation. In Egypt, the bionomics studies revealed that the adult female of *Cx. poicilipes* was found to be highly anthropophilic and enters houses to feed. while in

South Africa, it could feed on arboreal fauna. *Cx. poicilipes* is regarded as primarily ornithophilic in Kenya, whereas in Senegal its feeding habits are opportunistic and can feed on goats, sheep, cattle, chickens and mammals.

Furthermore, 36 strains of Rift Valley Fever virus (RVFV) were screened in *Cx. poicilipes* in Senegal, confirming its significant role in disease transmission ([Culex poicilipes \(Theobald, 1903\) | Walter Reed Biosystematics Unit \(WRBU\) \(si.edu\)](#)); (WRBU, 2021).

The record of *Cx. poicilipes* for the first time in Saudi Arabia necessitates conducting more researches on its biology and bionomics under local conditions, as well as complementing the morphological identification with molecular characterizations and gene diversity.

5. Conclusion

This study recorded *Cx. poicilipes* for the first time from Saudi Arabia, Jazan region. With this new record, the number of *Culex* mosquito species for Jazan region increases to 19 while for Saudi Arabia to 20. Similarly, the total number of mosquito species known to occur in Saudi Arabia increases to 50.

This finding should draw the attention of the vector surveillance and control programs in Jazan region to detect more adults and immature stages of *Cx. poicilipes* from the region areas and study their possible role in pathogens transmission, in particular Rift Valley and West Nile viruses.

6. Recommendations

1. To complement this morphological identification of *Cx. poicilipes* with its molecular characteristics.
2. To survey for immature stages of *Cx. poicilipes* in Jazan region, especially Sabya Governate.
3. To explore the role of this species in pathogens transmission in Saudi Arabia especially RVF and West Nile viruses, as it is the main vector of RVF in west Africa (Senegal and Mauritania).

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