Survey study on mosquito (Diptera: Culicidae) in Amant Al-Asimah (Sana'a city) - Yemen.

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Abstract

This study was conducted to know the common mosquito species in Amant Al-Asimah (Sana'a city) – Yemen, during the period from August 2018 to April 2019. Larvae mosquito were collected and identified to presence of two species in two genera. *Culisetalongiareolata* was more prevalence (98.1%) and well distributed in most districts of Amant Al-Asimah, while *Culexpipiens* was found with less prevalence (1.9%) and distributed in only four districts.Vectors of viruses and nematodes which caused different diseases were recorded in this study.

Keyword: Yemen, Mosquito, *Culisetalongiareolata, Culexpipiens* and Vectors.

Introduction

Mosquitoes belong to Phylum Arthropoda, Class Insecta, Order Diptera and Family Culicidae, This family has a large and copious cluster that occurs throughout temperate and tropical regions of the world. Mosquitoes are most different and least known in tropical forest environments (1). Mosquitoes are the most medically important group of insects and worldwide distributed in most eco-systems. Some mosquitoes are responsible for the transmission of many important pathogens and parasites, such as viruses, bacteria, protozoans and nematodes which cause serious diseases to human and domestic animals. The most important genera of mosquitoes borne diseases pathogens are *Aedes, Anopheles, Culex,Mansonie* and *Culiceta*(11; 12and 13).

Worldwide, there are over 4500 known species of mosquitoes belonging to113genera of Anophelinae (3 genera) and Culicinae (110 genera). The important genera are *Aedes, Anopheles, Culex, Ma*nso*nie, Psorophora, Haemagogus, Sabethes*and *Culiseta* (7; 8;9and19).The environments such as temperatures and high mountain areas, has resulted in altering factors affecting the vector fauna of the state.

There are a few studies in Yemen for identifying mosquitos' species such as Al-Maktariand Bassiouny. (3). Malaria vector, *An. arabiensis,* has been incriminated in Tihama region of Yemen and in Taiz region (2 and10). *An. arabiensis* has been identified by PCR as the only member of the *An. gambiaecomplex* from the collected specimens in Tihama and Taiz region (2 and 12). Al-Azab et al. (1) recorded six species of mosquitoes that were *cx. pipecas, cx. laticincitus, cx. tigripes, cx. mattinglyi, Ae. aegypti and Cs. longiareolata* in Sana'a governorate, during 2015-2016.

The aim of this work is to Identify the common mosquito species in Amanat Al-Asimah (Sana'a city) by using the traditional taxonomic key.

Materials and Methods:

Study sites

This study was carried out in different districts of Amanat Al-Asimah (Sana'a city) - Yemen, geographically considered as High Mountains area. Sana'a is the capital city of Yemen, located at 2150 meter above sea level, located 15°70' - 16°66' N, 33° 00' – 48° 50' E. The weather is cold in winter and moderate during summer. Mosquitoes larvae were collected from 21 sites belonging to nine districts of Amanat Al-Asimah(Sana'a city), Maeen(1), Al-Tahreer (1), Al-Thawrah (1), Shu'ub (6), Al-Wehdah (2), Al-Sabe'ein(1), old Sana'a (1), Bani Al-Hareth (5) and Al-Safyah (3) that were after rainfall season from August 2018 to April 2019, (Fig: 1 and 2).

Preparing larvae for identification:

Collected mosquitoes larvae were placed in glass tubes containing 80% ethanol. Mosquitoes larvae were dehydrated in a series of ascending ethanol (80%, 90% and 100%), cleared with xylene and mounted in D.P.X. Mosquitoes are reliably and usually identified as the 4th instar larvae (15and 18). Identification was based on their morphology characters by using different insect keys (5; 6; 14;16 and 17). This work was performed in the Department of Biology, Faculty of Science, Sana'a University.

Fig. 1: Yemen Map showing Sana'a city.(Google earth).

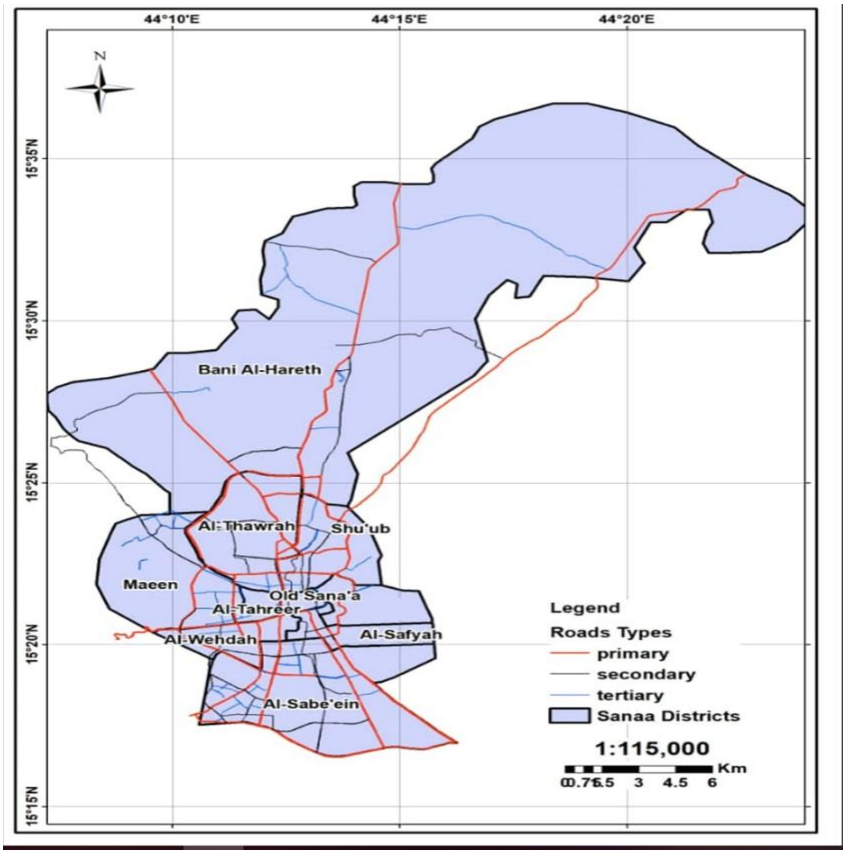

Fig2: Districts of Amanat Al-Asimah (Sana'a city).(Yemen Remote Sensing).

Result and Discussion

The present study was conducted to know the prevalence of mosquitoes species, especially the species *Ae. aegypti* , in Amanat Al-Asimah (Sana'a city). The mature larvae (4^{th} instar) were collected from different districts of Amanat Al-Asimah, after rainfall season from August 2018 to April 2019. A total of 2857 mosquitoes larvae were collected from 21 sites belonging to nine districts of Amanat Al-Asimah. Two species in two genera were identified, namely *Culisetalongiareolata* and *Culex pipiens.* Table (1) summarizes the abundance of mosquito species in different districts of Amanat Al-Asimah. The highest number of mosquito larvae was collected from Al-Sabe'ein district 1088 (38%), followed by Bani Al-Hareth544 (19.1%) and Shu'ub395 (13.8%), while the lowest collection 11 (0.4%) was recorded in Al-Thawrah district, followed by Al-Wahdah34 (1.2%) and Al-Safyah167 (5.8%).The highest collection of mosquito larvae was recorded in Al-Sabe'ein district (1088 larvae). This may be attributed to the presence of water for a long time following rain in Al-Sabe'ein damp which creates favorable and suitable conditions for mosquitoes breeding. On contrast, the total abundance of mosquito species in most districts was poor, this could be attributed to temporary pods in these districts holding water for 2 weeks or less fallowing rains, which make it unfavorable for mosquitoes breeding. *Culiseta Longiareolata* was more abundant (98.1%) and well distributed in different districts except in Al-Thawrah district, while *Cu. pipiens* was found with less abundant (1.9%) and was distributed in only four districts : Al-Sabe'ein, Al-Thawrah, Bani Al-Hareth and Old Sana'a.

Data in Table (1) indicate that Al-Sabe'ein district recorded the highest number of *Cs. Longiareolata* larvae (1077 (37.6%)), followed by Bani Al-Hareth(533 (18.7%)) and Shu'ub(395 (13.8%)), while the lowest number was recorded in Al-Wahdah district (34 (1.2%)), (Figure: 3). On the other hand, *Cu. pipiens* larvae were found with a low number in four districts. Old Sana'a recorded the highest number (21 (0.7%)), while the three rest districts had similar number of larvae (11 (0.4%)). *Culex* larvae were present in four districts with a fewer numbers sharing the other species *Cs. Longiareolata of* the same habitats in three districts. This finding is in agreement with the results 1 and4 .

It is worth to noticing that occurrence of the two species at the same district was recorded only at three districts: , Al-Sabe'ein, Bani Al-Hareth and Old Sana'a (Figure: 4).

Table 1: Abundance and distribution of mosquito species in different districts of Sana'a city after rainfall season from August 2018 to April 2019

No.	Districts	Number of sites	Mosquito Species	
			Culiseta longiareolata	***Culex pipiens***
1	Al-Sabe'ein	1	1077 (37.6%)	11 (0.4%)
2	Al-Safyah	3	167 (5.8%)	–
3	Al-Tahreer	1	234 (8.2%)	–
4	Al-Thawrah	1	–	11 (0.4%)
5	Al-Wahdah	2	34 (1.2%)	–
6	Bani Al-Hareth	5	533 (18.7%)	11 (0.4%)
7	Maeen	1	70 (2.5%)	–
8	Old Sana'a	1	293 (10.3%)	21 (0.7%)
9	Shu'ub	6	395 (13.8%)	–
Total	**Nine districts**	**21 sites**	**2803 (98.1%)**	**54 (1.9%)**

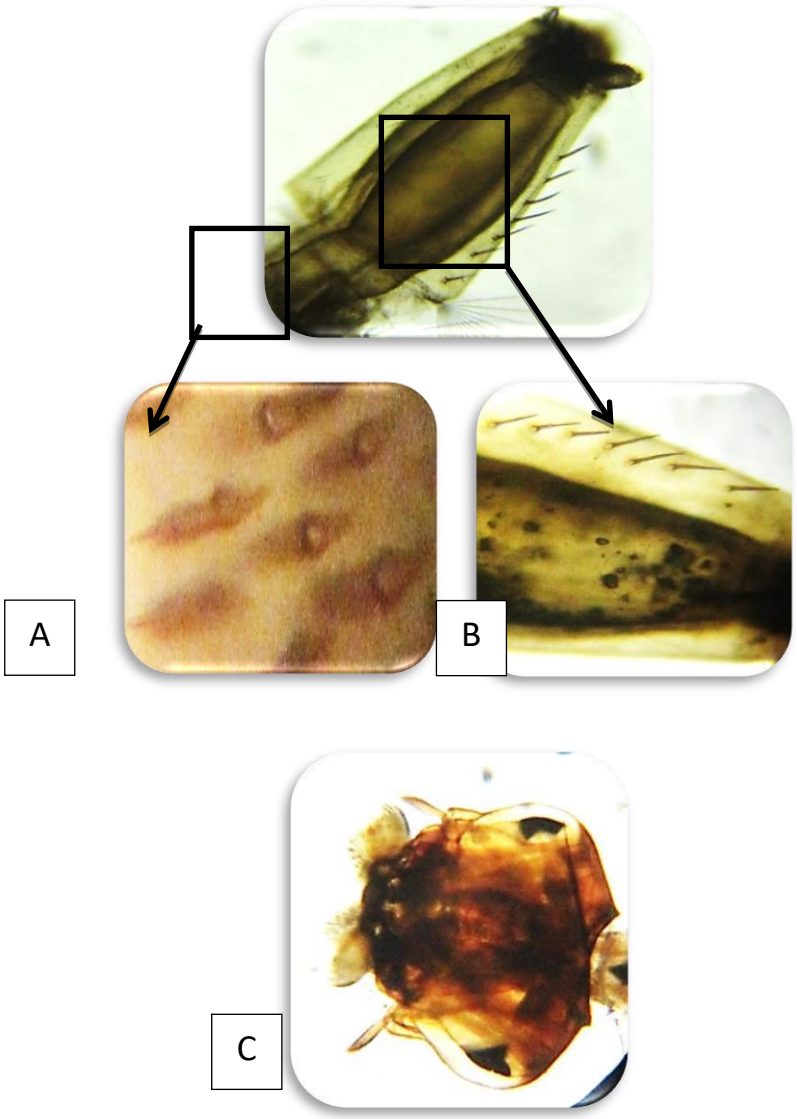

Fig. 3: *Culiseta longiareolata*larva (posterior)**,** A: Comb scale, B: Siphon with a single pair of seta and Pecten tooth, and C: head.

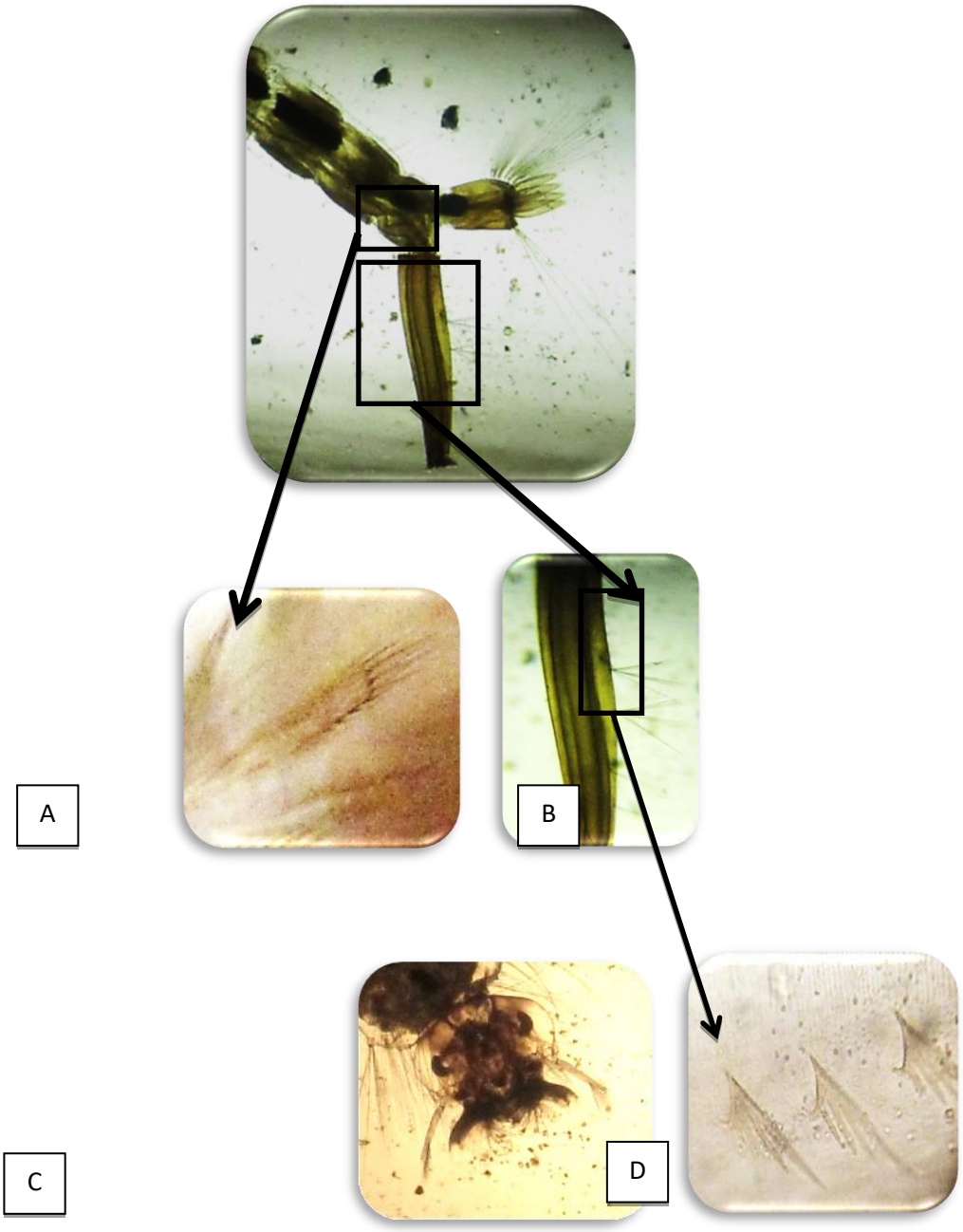

Fig 4: *Culex pipiens*larva (posterior)**,** A: Comb scale, B: Siphon with three pairs of seta, C: head and D: Pecten tooth.

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دراسة مسحية على البعوض (ثنائية الاجنحة: البعوضيات) في أمانة العاصمة (مدينة صنعاء) – اليمن

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الملخص

أجريت هذه الدراسة للتعرف على أنواع البعوض المنتشر في أمانة العاصمة (مدينة صنعاء) – اليمن وقد أجريت هذه الدراسة في الفترة من شهر أغسطس 2018 إلى أبريل 2019. بعد جمع يرقات البعوض والتعرف عليها تبين وجود نوعين لجنسين مختلفين من يرقات البعوض هما: *Culisetalongiareolata* و*Culexpipiens* . كان النوع كيوليسيتا لونقايريلاتا أكثر انتشارًا في معظم المديريات وبمعدل ظهور مرتفع (98.1%) بينما تواجد النوع كيولكسبايبينس في أربع مديريات وبمعدل ظهور منخفض (1.9%). وهذه الأنواع التي تم التعرف عليها في هذه الدراسة هي نواقل لفيروسات وديدان اسطوانية مسببة لأمراض مختلفة.

الكلمات المفتاحية : اليمن، البعوض، كيوليسيتالونقايريلاتا، كيولكسبايبينس، النواقل.