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Description of Common House Mosquito, Culex Pipiens Linnaeus, 1758 (Diptera:Culicidae) From Erbil Governorate, Kurdistan Region –Iraq

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Abstract: Commom house mosquito, Culex pipiens Linnaeus, 1758 had been described for the first time from Erbil Governorate, Kurdistan Region Iraq. The distinctive characters of the female are; Proboscis completely covered by dark scales. Maxillary palps short about 1/3 of labium long. Antenna long, pilose, 2.0 – 2.5 mm long, each segment of flagellum bears six setae. Subcosta vein reach to the costa at the same level or a little before the R2 + 3 furcation. Tergum X narrow in middle and widened at posterolateral margin where there are 10 or a little more seta on each side. The distinctive characters of the male are, Antenna strongly plumose. Maxillary palps long slightly shorter than the labium. The habitus of adults with important parts were photographed. Localities and date of collecting were mentioned.

Keywords: Description, Diptera, Culex pipiens Linnaeus, Kurdistan Region, Iraq

1. INTRODUCTION

Mosquitoes, family Culicidae, comprise a monophyletic taxon belonging to order Diptera (Harbach and Kitching, 1998). The family is a large and abundant group that occurs throughout temperate and tropical regions of the world, and well beyond the Arctic Circle. Mosquitoes are most diverse and least known in tropical forest environments. Some 3.490 species are currently formally recognized (Harbach and Howard, 2007). According to the newest checklist, the family comprises at least 3531 species representing 112 genera divided into two subfamilies, Culicinae and Anophelinae (Harbach, 2013). Thousands of species of the family feed on the blood of various kinds of hosts, mainly vertebrates, including mammals, birds, reptiles, amphibians, and even some kinds of fish (Service, 2012). Some mosquitoes also attack invertebrates, mainly other arthropods. Though the loss of blood is seldom of any importance to the victim, the saliva of the mosquito often causes an irritating rash that can be a serious nuisance (Abul-Hab, 1979; Service, 1980). In passing from host to host, some transmit extremely harmful infections such as malaria, yellow fever, Chikungunya, West Nile virus, dengue fever, filariasis, Zika virus and other arboviruses, rendering it the deadliest animal family in the world (Abul-Hap, 1979; Service, 1980). Mosquitoes are responsible for the biological transmission of a wide

diversity of arboviruses (arthropod-borne viruses) that cause diseases in humans, companion animals and livestock (Gratz, 2006). The pathogens transmitted by mosquitoes include viruses (arboviruses), filarial worms (helminths) and protozoa. Mosquitoes are the indirect cause of more morbidity and mortality among humans than any other group of organisms (Service, 1990; Judd, 1996). Some pathogens transmitted by culicinae mosquitoes such as West Nile and Sindbis viruses, *Dirofilaria immitis* (dog heartworm) and *D. repens* (dirofilariasis), and have been reported in Iran (Saidi et al., 1976). The genus *Culex* Linnaeus, 1758 is one of the important and largest groups of the family Culicidae, containing 768 species subdivided into 26 subgenera (Harbach, 2011), and the largest subgenera are further divided into hierarchical systems of informal taxonomic categories. The genus diagnosed by, Proboscis which in more flexible, usually of uniform thickness, but sometimes swollen at tip, not hooked; no V-shaped thickening in hind margin of wing between branches of fifth vein. Pulvilli present (Lee and Thomas, 1987; Molan et al., 2012). Several species of genus which serve as vectors of one or more important diseases of birds, humans, and other animals (Abul-Hab, 1979; Service, 1990). Some species of *Culex* is transmitted nematode worm, *Dirofilaria immitis* that causes heartworm disease in dogs (Simon, 2009). There are an estimated 751 million people at risk of lymphatic filariasis in 76 countries, and some 79 million people actually infected (Lane and Crosskey, 1993). According of Fontes et al. (2005) the subgenus *Culex* includes 198 species, some potentially involved in the transmission of lymphatic filariasis nematodes (*Wuchereria bancrofti, Brugia malayi* and *Brugia timori*) and several arboviruses (Komar, 2003). *Culex pipiens* complex belongs to the *Pipiens* group, divided to several subgroups and subtypes (Harbach, 2011). *C. pipiens* including form *molestus* and *Cx. quinquefasciatus* have been reported in Iran (Azari-Hamidian and Harbach, 2009). *Culex pipiens* Linnaeus, is widely distributed across Eurasia, and these are excellent enzootic vectors of West Nile virus, circulating the virus among birds, whereas others bite mainly humans and other mammal (Fonseca et al., 2004). *C. pipiens* complex species have been known as important vectors of medical and veterinary arthropod - borne diseases, Some vector borne diseases such as Filariasis, West Nile fever, Western and Eastern Equine encephalitis, Japanese encephalitis and St Louis encephalitis are transmitted by these species complex (Kasai and Komagata, 2008). In Iraq, 37 species of Culicidae have been identified in different surveys over several decades (Hantosh et al., 2012). So *Culex pipiens* complex is poorly studied except few published reports (Abul-Hab,1967,1968; Zaini et al., 1983). The aims of this work are a details description of this species with mention the geographical distribution.

2. MATERIAL AND METHODS

The study is based on, 40 specimens. plastic containers were used to collect the specimens from the surface of the Water-closet (WC) in different localities of Erbil Governorate, Kurdistan Region –Iraq from January till June 2021. When the female in resting on the WC surface, by suddenly process, the insect is confined in the container and then locked. then the female mosquitoes transport into another containers contain water at the middle and long rectangular piece of wood for egg laying, the late stage of *Culex* larvae and pupae were transferred to a separate mosquito cage and reared to adults. This process important for identification the species depending on the larvae according to the key of (Lee and Thomas, 1987) and get the male samples. Adult mosquitoes were identified morphologically to the species (Harbach,1985). Some important characters of the *Culex* adult male specially the terminalia and 4th stage larvae are important for the identified. Male of

Culex were identified according to the structure of the dorsal and ventral arms of the phallosome (Ross and Horsfall, 1965) The female identified according h the key of (Lee and Egan,1985). The specimens (Adults) were placed in boiling water for 15-20 minutes to soften their parts. Then the parts (Head and Terminalia) were separated by two fine pins and put in10% potassium hydroxide (KOH), after that placed on fire (heater source) with shaking for about 15- 20 minutes for dissolving the lipids. After that these parts placed in distilled water for 3-4 minutes in order to neutralize the alkali. The parts are placed in ethyl alcohol 25% and dissected under binocular microscope. Next, the head and terminalia were placed in a series dishes of 25, 50, 70 and 100% ethanol for 2 minutes for each concentration for dehydration of water, so that placed in xylol for two minutes, finely each part placed on a slide with some drops of DPX solution then covered by cover slides to prepare slides for examination (Lane and Grosskey, 1993; Mawlood, 2016). A digital camera (Ucmas series microscope camera) was used to for photographing the habitus and important parts. The measured proportions of body parts are given in points of an eyepiece linear micrometer in a binocular microscope. The Specimens are deposited in the museum of plant protection Department-College of Agricultural Engineering Science-Salahaddin University.

3. RESULTS AND DISSECTION

***Culex Pipiens* Linnaeus, 1758**
Synonymy: *Culex consobrinus* Robineau-desvoidy, 1827 (IT IS, 2020).

Description
FEMALE
Body (Fig.1 a, b): Small, slender and pale to dark brown in color lacking distinctive markings on the proboscis. The body almost entirely covered with mainly dark brown scales. Length 4.1 – 5.6 mm.
Head: Globular shaped, dark brown and covered dorsally to a varying extent with decumbent and erect or semi-erect dark or pale scales. Vertex with narrow falcate scales; in the lateral sides of the region these scales are predominately clear, a little median area with other falcate scales predominately dark; a little lateral set of broad dingy clear scales. clypeus is thick and projects in front. Eyes black, large, holoptic, nearly triangular, ocular and interocular setae lengthy, dark or with golden sheen. Ocelli are absent. Proboscis is a straight, long tube formed by a fleshy ventral labium which has a deep groove on its upper side, then it is completely covered by dark scales and high dense of brown setae, midventral area usually pale, length 1.6- 1.8 mm. Maxillary palps (Fig.1f) short, brown, three segmented entirely coated with dark scales with high dense of yellow setae, length 0.3-0.5 mm, about one-third of proboscis long, 2nd segment nearly cup shaped 1.2 times as long as the 1st segment , 3rd segment tubular shaped, 2.8 times as long as the 2nd. Labium tubular slightly longer than the Maxillary palp. Labrum- epipharynx needle shaped. Mandibles, galeae and hypopharynx needle like, slightly shorter than labium, but the mandibles are finer than the galeae . Antenna (Fig.1d) filiform, dark, pilose consists of 13 segments, length 2.0-2.5 mm, each segment consists of a narrow basal ring, flagellum whorls normally with 6 setae arise from the bases of most segments; 1st -5th segments nearly same length.
Thorax: Dark brown, arched, consists of very large mesothorax, its tergum has three sclerites, a scutum, a trilobed scutellum and a post-scutellum. Prothorax and metathorax are very small. Scutum entirely covered by fine narrow golden reddish-brown scales with some clear ones variously disposed, in a patchy manner, on the anterior promontory, the prescutal

suture, supraalar and prescutellar areas; infrequently specimens may show an entirely dark clothed scutum; scutal setae developed and brown shining; acrostichal setae absent. Antepronotum without scales, with bronzy setae disposed almost in a row on the anterolateral surface. Postpronotum with narrow dark scales, as the scutum ones, sometimes with a small number of clear others situated near the spiracle region; posterodorsal margin with 5-8 long dark setae. Pleural sclerites with similar tonality or a little clear than the scutum; proepisternum, postspiracular area, prealar knob, anteroinferior region of mesokatepisternum, inferior and superior regions of mesepimeron, all of them with dark areas pattern, but leaving the median mesepimeron area crossed by a clear band of varying breadth. Pleura with a characteristic patch of broad spatulate whitish scales situated on the upper corner and posteroinferior margin of the mesokatepisternum with whitish scales; pleural setae dark brown shining; upper of proepisternals consist of 6-20 setae, prealars with 6-10, upper of mesokatepisternals with 6-10 setae, lower of mesokatepisternals have 10-14, upper of mesepimerals with 16-20 setae. Legs entirely dark-scaled. Fore leg (Fig.1h) short, very week, fore femur tubular, 2.0-2.4 mm long, dorsal margin without pale band, posteroventral surface pale-scaled, Fore femora not striped on anterior or dorsal margin, fore tibia tubular, 2.1-2.7 mm long, not striped on anterior or dorsal margin fore tarsus five segmented, well developed fleshy pulvilli, 1^{st} -3^{rd} tarsus entirely dark. Middle and hind legs resemble to the fore legs but slightly shorter. Wing (Fig. 1i) membranous, yellow, length 3.0-3.6 mm; veins are often covered with scales of a uniform brown or black colour, subcosta reach costa at the same level the R2 + 3 furcation; Rs and R2+R3 veins covered with plume scales. Alula with narrow fringe scales. Halter clavate shaped, pale brown, capitellum entirely covered by clear scales.

Abdomen: In female (Fig.1j) elongated oval shaped, consists of 10 segments of which the first is vestigial and fused to the metathorox; 2^{nd} – 10^{th} segments are visible. each segment has basal pale bands which are broadly rounded medially and distinctly constricted sublaterally before joining large, lateral scale patches. The 9^{th} and 10^{th} segments are telescoped into the eighth once. Apex of the abdomen is rounded when it is viewed dorsally eighth. Tenth segment is blunt and bears a pair of retracted cerci. Abdominal 10^{th} tergite narrow at the middle and widened at posterolateral margin, each side with 8-10 setae on each side. Harbach et al., (1985) mentioned that the maxillary palpus of this species entirely black-scaled; length 0.36 mm, about 0.16 of proboscis length. subcosta intersects costa beyond furcation of R2+3. Pulvilli distinct. Terga III-VII with basal bands of yellowish scales and basolateral spots of white scales.

MALE

Like female except, the antennae are plumose. Maxillar palps long, five segmented, slightly shorter than the proboscis. 4^{th} and 5^{th} segments entirely covered by strong setae.4^{th} and 5^{th} segments equals in long. The mandibles and maxillae are very short and functionless and the hypopharynx is fused with the labium. Ninth abdominal tergite in male genitalia small, cone shaped, covered with 12 fine setae. Gonocoxite oval shaped. Gonostylus slender. Lateral plates and aedeagal sclerites of phallosome same length. parameres and basal plate triangular shaped.

Harbach et al., (1985) mentioned that the male is medium-sized mosquito. Proboscis mainly black scaled, with ventral patch of white scales 0.3 to 0.7 from base. Subcosta intersects costa before furcation of R2+3.Ninth tergal lobes small, each with 12 setae in 2 irregular rows. terga III-VIII with basal yellowish bands.

Fig. 1 Culex pipiens Linnaeus

a. Dorsal habitus (Female) b. Lateral view c. Male (Lateral view) 20X d. Head (Female) e. Head (Male) f. Mouthparts (Female) g. Mouthparts (Male) h. Fore leg i. Fore wing j. Abdomen (Scale bar = 0.1 mm)

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