

SOME BIOLOGICAL AND ECOLOGICAL FEATURES OF ANOPHELES MALARIA COMMITS IN THE CONDITIONS OF THE SURKHANDARYA REGION OF UZBEKISTAN

Mardanova Gavhar Dobilovna

Lecturer, Department of Zoology, Termez Staty University, Termez, UZBEKISTAN

e-mail. Mardonovag@gmail.com

ABSTRACT:

The article presents the results of studies carried out with blood-sucking mosquitoes of the genus *Anopheles*, indicates the places of their distribution and characteristic features on the example of the Surkhandarya region. The research results show that in our collections *An. superpictus* is rarely found with *An. pulcherrimus*, and *An. hurcanus* did not come across at all. Larvae of *An. pulcherrimus* and *An. hurcanus*. The number of mosquitoes at daytime in nature and in settlements depends on the size of the mosquito population, on the location of the daytime and larval biotope, as well as on the relative humidity and air temperature in places of the daytime.

KEYWORDS: blood-sucking mosquitoes, collection, distribution, species, *An. hurcanus*, *An. pulcherrimus*, *An. superpictus*, *An. claviger*, habitats, Amu Darya and Surkhandarya rivers, research points.

INTRODUCTION:

WHO is concerned that about 3.3 billion people half of the world's population are at risk of malaria. From 300 to 500 million cases of malaria occur annually and from 1.5 to 3 million people die from this disease (15 times more than from AIDS [3]. Over the past decade, from the third place in the number of deaths per year (after pneumonia and tuberculosis,

malaria became the first among infectious diseases. 90% of cases are registered in Africa, of the remaining 10% of cases are in India, Brazil, Sri Lanka, Vietnam, Colombia and Solomon Islands The most vulnerable are those living in low-income countries [4].

In 2010, there were 216 million cases of malaria, which resulted in an estimated one million deaths, mostly in African children [2].

According to WHO, the number of mosquitoes of the genus *Anopheles* worldwide is more than 500 species (the most widely known are 483 species), of which about 100 species are good carriers of malaria. There are 8 such species in Uzbekistan, and in the Surkhandarya region there are only 4 species (types of malaria mosquitoes: *Anopheles* common *An. pulcherrimus*, *An. Superpictus*, *An. hyrcanus*, *An. claviger* [4,6].

MATERIALS AND METODS:

The study of the ecology and phenology of blood-sucking mosquitoes was carried out year-round by observing natural biotopes and the floodplain of the Surkhandarya River. To clarify the species composition and distribution of insects, route surveys covered various types of water bodies. The larvae of their reservoirs were caught using a haze net with a diameter of 20 cm. To collect mosquitoes in rooms and caves, test tubes and special gauze traps were used (a cage measuring 10x10x10 cm, connected to a glass tube). They were collected from grassy vegetation by covering the grass with a canopy. Larvae of III-IV instars and

winged mosquitoes were identified by their species [1].

RESULTS:

The main focus may arise as a result of the importation of malaria from the border areas of Tajikistan and Afghanistan, as well as the natural and climatic conditions and fauna of the region.

Comparisons of data indicate that the main water sources for the region are the Amu Darya and Surkhandarya rivers with their multiple tributaries (like Sangardak, Tupalang, Karatag, Sherabad, Karatag). The existing majority of the region's waterways are mainly fed by snow, glacial and seasonal groundwater.

Spring and summer floods begin in the rivers (from May to mid-July, depending on the climatic and geographical location), with the temperature warming of the weather, the rivers begin to quickly and strongly become shallow, and a lot of water is lost as it flows through the pebbles. The floodplains of mountain rivers with many springs turn into swamps in places, the banks are covered with grassy cover, in places with reeds.

And shallow reservoirs, beds of dried rivers, overgrown with green filamentous algae, were the breeding grounds for a huge number of mosquitoes. The irrigation network of the region also plays a significant role, many canals are in a neglected state, in some places a breakthrough in filtration and seepage from the water canal, as well as an unsettled irrigation regime contributed to the arbitrary formation of small temporary reservoirs, which, as a result, were breeding grounds for blood-sucking mosquitoes. These included the mountain villages of Sairob and Derbent, Baysun region, Oyborik and Sina, Denau region. In the pre-adyr part of *An. superpictus*, *An. claviger*, *An. hurcanus* hatch in springs. Other types of mosquitoes are typical for the

infiltration bogs of the mountainous part. Thus, studies in the Baysun district proved that the main places for mosquitoes to spend their days were cracks in rocks and sheer walls of river valleys, burrows of rodents, nests of birds, earthen and rocky caves and vegetation in swamps of the river floodplain. In residential buildings from May to September inclusive, we were able to find only a single specimen of *An. superpictus*.

It is characteristic that *An. pulcherrimus* inhabits the rice fields of the above-floodplain terraces of the Surkhandarya River; *An. superpictus*, albeit in small numbers. This mosquito lays eggs exclusively in groundwater. Spring waters, which are biotopes of this species, are distinguished by their chemical properties by high hardness (over 20 German degrees), significant chlorine content (from 40 to 600 mg / l), have a lot of sulfate salts and low oxidizability, not exceeding 4 mg oxygen for 1 liter. The data of the chemical analysis of water from the places of mass emergence of *An. superpictus* show that the water in them is soft, the total hardness does not exceed 10 it. degrees, chlorine, no more than 16 mg / l. It can be concluded that a prerequisite for breeding sites for mosquitoes of the *An. superpictus* is the absence of decomposition products of organic substances in water, as well as its complete transparency and good heating.

It should be noted that from the middle of summer, a decrease in the water level in rivers led to their partial or complete drying up, and such reservoirs quickly became places of mass hatching of *An. superpictus* and moderate amounts of *An. claviger*. In addition to floodplain rivers, swamps with poor emerging vegetation were occasionally encountered in a deep gorge in mountainous areas. In such reservoirs, larvae were also found in large numbers (more than 1000 larvae per 1 m²). In

spring bogs, only *An. claviger*. Larvae of *An. superpictus*.

In the foothill-adyr part of the region, the settlements Pashkurt and Zarabagh of the Sherabad region, Sina Denau, Khanjiza Sariasi region, Akmachit Uzun region and Khadzhaipak of the Shurchinsky region were covered by a route survey. In the village of Pashkurt, many *An. superpictus*, and in small springs - *An. claviger*. Elsewhere, *An. hurcanus* and singly *An. pulcherrimus*.

In the surveyed water bodies of the plain of the Sherabad, Angora, Muzrabad, Jarkurgan and Termez regions. The coastal parts of bogs of ground and waste origin, temporary puddles with brackish water, larvae of malaria mosquitoes were not found, and they were not found in pits near irrigation canals with poor vegetation and the smell of hydrogen sulfide. In bogs with a large debit of groundwater, overgrown with reeds, *An. hurcanus*, *An. claviger*, *An. algerinsis*, *An. algeriensis*, *An. superpictus*, *An. hurcanus*, *An. pulcherrimus*.

Also, in the floodplains of the Surkhandarya River, there are many bays with stagnant water, hollows with seeping spring water and many puddles with filtration water of the river. Inlets, overgrown with reeds and other vegetation, are gradually turning into a permanent floodplain swamp. During spring and summer floods, they communicate with the main river bed and, as the water recedes, they are colonized by the larvae of *An. hurcanus*, *An. pulcherrimus*, *An. superpictus*, *An. claviger*. The dominant species since July is the *An. pulcherrimus*, *An. superpictus*. (Table 1).

In the hollows, only *An. claviger*, but their number was extremely small. In puddles on sandy shores, only *An. superpictus*.

The larva of *An. pulcherrimus* are especially widespread in the floodplain swamps of the Amu Darya and Surkhandarya rivers, as well as in the marshes of filtration and discharge origin

under the conditions of the irrigation system of agriculture in the Nezhnesurkhan region. *An. claviger* were observed occasionally, more often in spring and autumn in swamps and in the collector-drainage network.

Table 1 Frequency of mosquito species in swamps of the Surkhandarya river floodplain (%)

№	Species	June	July	August	September
1	<i>An. hyrcanus</i>	13,0	6,8	19,8	4,4
2	<i>An. superpictus</i>	-	2,6	9,9	21,2
3	<i>An. pulcherrimus</i>	2,3	3,5	39,0	41,8
4	<i>An. claviger</i>	-	0,2	-	-

Having studied the general collection and distribution of mosquito larvae in water bodies of various types, it should be noted that river floodplains, which are places of mass emergence of *An. pulcherrimus*, *An. superpictus* and *An. hurcanus*.

In our collections, *An. superpictus* is rarely found with *An. pulcherrimus*, and *An. hurcanus* did not come across at all. Larvae of *An. pulcherrimus* and *An. hurcanus*.

Our studies indicate the conditioned nature of the *An. superpictus*. It should be noted that its larvae freely tolerate a significant content of chlorine and sulfate salts in the water. We observed their colonization of puddles located in the floodplains of rivers, where the water was bitter-salty, and the edges of the reservoir were covered with white salt. For the development of *An. superpictus* requires soluble calcium, which is abundant in groundwater.

DISCUSSION:

In our studies, the larva of *An. superpictus* sharply predominate in collections from groundwater that protrude onto the day surface in mountain river valleys, on the periphery of river alluvial cones, at the base of river terraces, at the bottom of pits, discharges, in reserves and other relief depressions. When the larvae of *An. pulcherrimus* are especially widespread in the floodplain swamps of the Amu Darya and Surkhandarya rivers, as well as in the marshes of filtration and discharge origin under the conditions of the irrigation system of agriculture in the Nezhnesurkhan region. *An. claviger* were observed occasionally, more often in spring and autumn in swamps and in the collector-drainage network.

Having studied the distribution of mosquito larvae in water bodies of various types, we can conclude that river floodplains, which are places of mass emergence of *An. pulcherrimus*, *An. superpictus* and *An. hurcanus*. In the pre-adyr part of *An. superpictus*, *An. claviger*, *An. hurcanus* hatch in springs. Mosquito species (for example, *C. hortensis*, *C. longiareolata*) are typical for the infiltration bogs of the mountainous part.

It should be noted that *An. pulcherrimus* was found in large numbers in yurts (keppa) with domed cloth or wicker thatched roofs, under sheds for livestock, in temporary reed huts on rice plantations and melons; in a relatively small amount - in rooms for animals in more illuminated places under a slight draft. This species is also noted in vegetation and various outbuildings with an optimum moisture content of 35-45%. Males and females, having flown out of the reservoir, immediately populate caves with high humidity (Table 2). *A. pulcherrimus*, unlike other exophilic mosquito species, enters caves the more often the higher the temperature and lower the humidity.

Table 2 The degree of dominance of mosquito species, caught in caves of the Surkhandarya river floodplain (%)

No	Cpesies	June	July	August	September
1	<i>Culiseta longiareolata</i>	25,0	9,7	23,1	22,2
2	<i>An. superpictus</i>	-	-	-	5,5
3	<i>An. pulcherrimus</i>	-	9,7	11,6	22,2

CONCLUSION:

1. Research proves that *An. hurcanus* occurs only in reed-reed thickets of floodplain swamps of rivers, as well as in places where ground and spring waters dry up. The main factors determining the attraction of females to certain plant communities are relative humidity and temperature.
2. In various types of herbaceous thickets with relative humidity below 50% and temperatures above 30 ° C, *An. hurcanus* does not occur at all. A characteristic feature of this species is that it flies into residential buildings and cattle houses exclusively in search of food.
3. An insignificant part of the mosquitoes that flew in at night remain here for the day. Usually *An. hurcanus* sits on the wall closer to the floor. In nature, *An. hurcanus* is usually found in the lower layer of vegetation, closer to the surface of the water or soil, and also in depressions of the earth.
4. Depending on the air temperature, this mosquito migrates horizontally or vertically along the stems during the day. On cool days at 23-25 ° C, it crawls up the stems and stays at a considerable distance from the soil surface,

while at temperatures above 30 ° C, it goes down.

5. From the third decade of July to the second decade of August, *An. hurcanus* occasionally meets on the banks of ditches and in the coastal part of rice fields, and on hotter days it populates mainly reed-reed swamps and rice crops itself.

6. The water under the vegetation is heated by the sun's rays more slowly than the soil of the coastal part. From the third decade of August, as the temperature decreases, the female of this species is found in the coastal thickets.

7. A great influence on the distribution of mosquitoes among different types of daytime in nature is exerted by the distance from the place of daytime to the place of breeding.

8. In the summer, dwelling houses and empty sheds cannot serve as a refuge for this mosquito due to the high temperature and low relative humidity, since dead mosquitoes were found in them. The location of the daytime and larval biotope, as well as the relative humidity and temperature of the air in the place of the daytime.

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