



MAIN MOSQUITO VECTORS IN EURO-MEDITERRANEAN AREA

Factsheets





SUMMARY

Aedes aegypti

Aedes albopictus

Aedes geniculatus

Aedes japonicus

Aedes vexans

Anopheles claviger s.s.

Anopheles sacharovi

Culex modestus

Culex pipiens s.s.

Culiseta annulata

Aedes aegypti

Family **Culicidae**

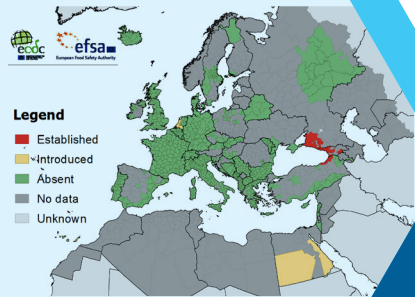
Subfamily **Culicinae**



Aedes aegypti is an invasive mosquito recently re-established in Madeira and around the Black Sea. It is nowadays one of the most widespread mosquito species globally. The spread of *Ae. aegypti* needs to be monitored as this species is the primary vector of dengue, chikungunya, yellow fever and Zika viruses. Unlike *Ae. albopictus*, the ability for *Ae. aegypti* to establish in more temperate regions is currently restricted due to its intolerance to temperate winters, and in particular the high mortality of eggs when exposed to frost, but there is no reason why it should not become widely established again in the Mediterranean basin. *Ae. aegypti* thrives in densely populated areas which lack reliable water supplies, waste management and sanitation.

Distribution around the Mediterranean Basin

Ae. aegypti is currently limited to some areas along the northeastern Black Sea coast (Georgia, the Russian Federation, northeast Turkey) Egypt and Madeira. However, because the species was widely established in the Mediterranean basin from the 18th until the mid-20th century, many are concerned about its possible re-establishment in southern Europe.



Current known distribution of *Aedes aegypti*
January 2019 / VectorNet

Vector surveillance

European map available by ECDC/VectorNet.

Vector control

- Source reduction: elimination of stagnant water that is propitious for larvae
- Spraying of chemical or organic pesticides
- Use of repellents to reduce bites

Transmission

Proved vector of:

Yellow fever virus

Dengue virus

Chikungunya virus

Zika virus

References, tools

ECDC Factsheet *Aedes aegypti*:

<http://ecdc.europa.eu/en/healthtopics/vectors/mosquitoes/Pages/aedes-aegypti.aspx>



Aedes (Stegomyia) aegypti

Common name: Yellow fever mosquito



MORPHOLOGICAL DESCRIPTION



© IRD

Mainly black; white bands/stripes on legs and dorsal abdomen.
A lyre-shaped pattern on the thorax.



© IRD

Existence of morphological « dark » form (*formosus*) and « clear » (*aegypti*) form.



Body length: 7 mm



Biting behaviour: Strong human feeding preference. Their activity is mainly diurnal and crepuscular.



Immature habitats: Historically, found in Africa in tree-holes in forest lands. As they have adapted to more urban domestic habitats, they have exploited a wide range of artificial containers such as vases, water tanks and tyres that are often associated with human habitations.



Host preference: *Aedes aegypti* prefer mammalian hosts and feed preferentially on humans.



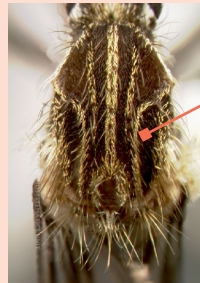
EASILY CONFUSED SPECIES

Aedes albopictus



© IRD

Aedes japonicus



© WRBU

Presence of several lines of yellowish scales on a black background on the scutum.

Aedes albopictus

Family **Culicidae**

Subfamily **Culicinae**



Aedes albopictus is currently the most invasive mosquito in the world. This mosquito can adapt to wide-ranging circumstances and is associated with human-made habitats, allowing it to spread in populated, urban areas. Its eggs are transported via the global trade of goods, particularly used tyres (cars, trucks, heavy vehicles, etc.) and 'lucky bamboo' plants. *Aedes albopictus* is already widespread and abundant in the Mediterranean basin where it is causing biting nuisance and has been implicated as a vector in the local transmission of dengue and chikungunya. In temperate populations, exposure to short-day lengths causes the female to produce diapausing eggs.

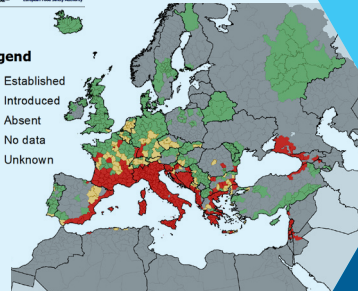
Distribution around the Mediterranean Basin

Originated from Asia, *Ae. albopictus* has succeeded in colonizing most continents in the past 30-40 years. The species was recorded for the first time in Europe in Albania in 1979, then in Italy in 1990 and is now present in some 20 European countries. Today, it is established in most countries of the Mediterranean Sea, including Lebanon, Syria, Jordan and Israel. Also recently observed in few localities in Morocco, Algeria and Tunisia.



Legend

- Established
- Introduced
- Absent
- No data
- Unknown



Current known distribution of *Aedes albopictus*
January 2019 / VectorNet



Vector surveillance

European map available by ECDC/VectorNet.

Vector control

- Source reduction: elimination of stagnant water that is propitious for larvae
- Spraying of chemical or organic pesticides
- Use of repellents to reduce bites

Transmission

Proved vector of:

Dengue virus

Chikungunya virus

Dirofilaria

Potential vector of:

Zika virus

Yellow fever virus



References, tools

ECDC Factsheet *Aedes albopictus*:

<http://ecdc.europa.eu/en/healthtopics/vectors/mosquitoes/Pages/aedes-albopictus.aspx>



Aedes (Stegomyia) albopictus

Common name: Asian Tiger mosquito

Synonyms: *Stegomyia albopicta*



MORPHOLOGICAL DESCRIPTION



© IRD

Mainly black; white stripes on legs and dorsal abdomen.



© IRD

Silvery median white line on the scutum



Body length: 5 mm



Biting behaviour: Adult females bite aggressively, usually during the day and preferably outdoors.



Immature habitats: Natural and artificial habitats, some of which include tyres, barrels, rainwater gully catch basins and drinking troughs. Preference for suburban habitats with gardens ; also in urban habitats.



Host preference: Opportunistic feeder. Hosts include humans, domestic and wild animals, reptiles, birds and amphibians.



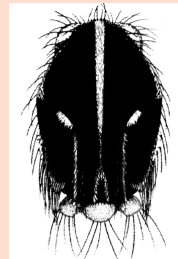
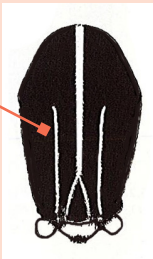
EASILY CONFUSED SPECIES

Aedes cretinus

Aedes albopictus

Aedes unilineatus

White stripes reaching to the middle of scutum.



Aedes geniculatus

Family **Culicidae**

Subfamily **Culicinae**



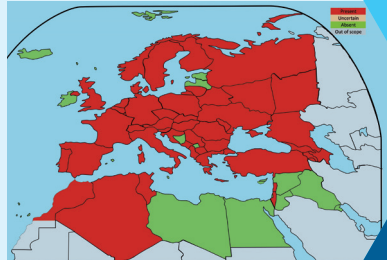
Aedes geniculatus (Olivier, 1791) hibernates in the larval stage in southern areas, and in the egg stage in northern areas.

Eggs are resistant to both frost and desiccation. Hatching occurs asynchronously during the 2 or 3 months after egg laying sites are flooded with water.



Distribution around the Mediterranean Basin

Aedes geniculatus is a Palaearctic species which is wide spread in Europe. The species is also reported in Maghreb, South Caucasus and Middle-East.



Distribution of *Aedes geniculatus*
2018 / MosKeyTool



Vector surveillance

The species is not considered as an important vector and thus is not targeted by surveillance. However, the species is regularly found when surveillance of invasive species (*Ae. albopictus*, *Ae. japonicus*) is implemented with ovitraps and can be confused with these species.

Transmission

Potential vector of:

Ae. geniculatus is not considered as a mosquito of medical importance.

In experimental studies, the species was susceptible to infection by West Nile virus, *Dirofilaria immitis* and *D. repens*.



References, tools

The mosquitoes of Europe. An identification and training programme. Schaffner F, Angel G, Geoffroy B, Hervy JP, Rhaïem A, Brunhes J. Montpellier: IRD Éditions. 2001.

Mosquitoes and Their Control, 2nd ed. Norbert Becker, Dusan Petric, Marija Zgomba, Clive Boase, Madon Minoo, Christine Dahl, Achim Kaiser, Springer, 2010.

Aedes (Dahliaea) geniculatus

Synonyms: *Ochlerotatus (Finlaya) geniculatus*
Dahliaea geniculata



MORPHOLOGICAL DESCRIPTION

Tergites with basal pale band.

The pale basal band of tergite IV can be either medianly thinned or broken.

A thinned pale band is a characteristic criterion of the species.



© IRD

Femurs with a distal white spot. This is a characteristic criterion of the species. Tibias and tarsomeres are entirely black.



© WRBU



© WRBU

Scutum with continuous bands with silvery and dark scales is also quite characteristic.



Body length: 7 mm



Biting behaviour: Females are crepuscular and day biters. In some areas, especially in southeastern Europe, the species can constitute a nuisance for human in forested areas.



Immature habitats: The larva grows mainly in tree holes and open tree stumps but it can also colonize small collections of water like rock holes or ground pools. Breeding sites are usually rich in organic matters and tannins.



Host preference: Feed on various mammals, including man and cattle, but also birds and reptiles.



EASILY CONFUSED SPECIES

The subgenus *Dahliaea* is only represented by 3 species, morphologically very close. Female is morphologically impossible to differentiate from *Ae. gilcolladoi*. However, *Ae. gilcolladoi* is only reported in Spain. Adults are easily confused with *Ae. echinus* and differs from this latter species by the absence of the pale scale patch on the metameron.

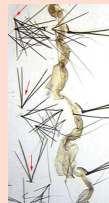
It is possible to distinguish both species at the larval stage thanks to the branching of most setae present on abdominal segments IV to VII. Indeed, *Ae. echinus* (as does *Ae. gilcolladoi*), presents rigid setae usually with 7 branches or more whereas *Ae. geniculatus* has rigid setae with less than 6 branches.



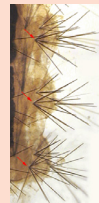
© WRBU

Ae. echinus.
Scale patch absent

Ae. geniculatus.
Abdominal setae on segments III to V with less than 6 branches



© IRD




© IRD

Ae. echinus.
Most of the setae with 7 branches or more

Aedes japonicus

Family **Culicidae**


Subfamily **Culicinae**



Aedes japonicus has become the third invasive mosquito species to be reported in Europe after *Aedes albopictus* and *Aedes aegypti*. Its geographical expansion has been facilitated by human activities, such as the international trade in used tyres and a high overwintering survival (diapause). Its distribution in central Europe is also expanding.

Ae. japonicus colonises urbanised environments and females are active during the day, increasing the potential contact this species could have with humans. This species has shown vector competence for dengue and chikungunya viruses, both of which have been recently reported in Europe.

Distribution around the Mediterranean Basin

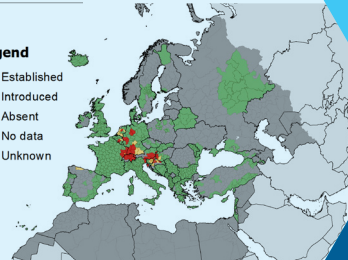


Originated from Asia, *Aedes japonicus japonicus* has spread throughout North America and later into central Europe. He was first reported in France in 2000 where it was eliminated, and has since been reported in several Europe countries (Belgium, Switzerland, Germany, France, Austria, Croatia, the Netherlands, Spain, etc.), showing evidence of its establishment and continuing expansion.



Legend

- Established
- Introduced
- Absent
- No data
- Unknown




Current known distribution of *Aedes japonicus*
January 2019 / VectorNet

Vector surveillance

European map available by ECDC/ VectorNet.

Vector control

- 
- Source reduction: elimination of stagnant water, especially in big containers, that is propitious for larvae
 - Spraying of chemical or organic pesticides
 - Use of repellent to reduce bites

Transmission

Proved vector of:

West Nile virus (in field)

Japanese encephalitis virus (in field)

Chikungunya virus (in lab)

Dengue virus (in lab)

Rift Valley virus (in lab)

Yellow fever virus (in lab)

References, tools

ECDC Factsheet *Aedes japonicus*:

<https://ecdc.europa.eu/en/disease-vectors/facts/mosquito-factsheets/aedes-japonicus>



Aedes (Hulecoeteomyia) japonicus

Common name: Asian bush, rock pool mosquito

Synonyms: *Ochlerotatus japonicus*
Hulecoeteomyia japonica



MORPHOLOGICAL DESCRIPTION

Adults are relatively large and show a dark and light pattern due to the presence of white scale patches on a black background on the legs and other parts of the body.



© WRBU

Abdominal terga with lateral and median pale basal patches, that do not form complete basal bands.



© WRBU



© WRBU

Lines of yellowish scales on a dark/brown background on the scutum.



Body length: 6 mm



Biting behaviour: Adults are often found in forested areas. Active during daytime and crepuscular hours. This species is an aggressive biter and will readily bite humans outside and occasionally inside houses.



Immature habitats: *Ae. japonicus* larvae prefer shady rock holes but can develop in a large range of both natural and artificial aquatic container habitats including tree holes, tyres, bird baths, and all breeding sites rich in organic matter.



Host preference: This species preferentially feeds on mammalian hosts, including humans.

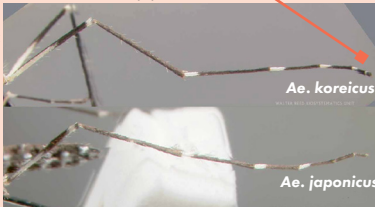


EASILY CONFUSED SPECIES

Aedes koreicus

Presence of a complete basal band on hindtarsomeres 4 & 5, unlike *Ae. japonicus*

Lines of silver-white scales on a blackish/brown background on the scutum



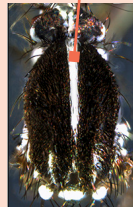
Subgenus *Stegomyia*

Aedes albopictus

Aedes cretinus

Aedes aegypti

Specific patterns of black and white scales on the scutum



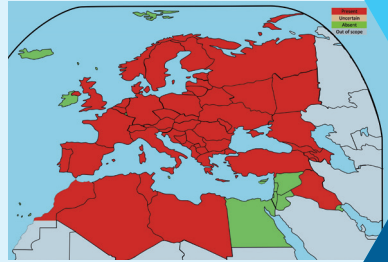


Aedes vexans is a cosmopolitan species, present on every continent especially throughout Holoartic and Oriental regions. It is a multivoltine species breeding preferentially in temporary water bodies after flooding events. Its development cycle is fast. Adult activity occurs during spring and summer and can constitute an important nuisance due to a periodic extreme abundance and aggressive human biting behaviour. Adults can migrate long distances and create nuisance up to 40 to 50 km away from their breeding sites. Overwintering occurs at the egg stage.



Distribution around the Mediterranean Basin

Aedes vexans consists of 3 subspecies in East Asia (*Ae. vexans niponii*), in Africa (*Ae. vexans arabiensis*) and in Europe (*Ae. vexans vexans*). The latter taxon is widely distributed in Central Europe, Scandinavia and throughout the Mediterranean basin.



Distribution of *Aedes vexans*
2018 / MosKeyTool



Vector surveillance

Surveillance of larvae in productive breeding sites can be implemented as this mosquito can generate strong nuisance.

Vector control

- Environmental management (draining, planting trees, filling,...)
- Use chemical or biological insecticides, including *Bacillus thuringiensis israelensis*.
- Personal protection against mosquito bites.

Transmission

Proved vector of:

- Tahyna virus
 - *Dirofilaria immitis* (dog heartworm)
- In Africa, *Ae. vexans arabiensis* has been involved in Rift Valley fever virus transmission

Potential vector of:

- West Nile virus
- Eastern equine encephalitis virus
- American *Aedes vexans* mosquitoes are also competent for Zika virus



References, tools

The mosquitoes of Europe. An identification and training programme. Schaffner F, Angel G, Geoffroy B, Hervy JP, Rhaïem A, Brunhes J. Montpellier: IRD Éditions. 2001.

Mosquitoes and Their Control, 2nd ed. Norbert Becker, Dusan Petric, Marija Zgomba, Clive Boase, Madon Minoo, Christine Dahl, Achim Kaiser, Springer, 2010.

Aedes (Aedimorphus) vexans

Common name: (inland) Floodwater Mosquito



MORPHOLOGICAL DESCRIPTION

Easily recognized by terga IV-V with pale bilobed basal bands

However, among the *Ae. vexans* population of Mediterranean Africa, ornamentation of abdominal tergites can be formed of continuous white bands



Tarsi with pale basal rings



Scutum with an indefinite pattern of yellow only or yellow and cream scales



Body length: 7 mm



Biting behaviour: This species is one of the most fierce day biters of humans. Females bites throughout the nyctemeral cycle, particularly at dusk.



Immature habitats: Immatures are found in inundated areas such as floodplain of river or lakes with fluctuating water levels, with or without vegetation. In Europe, the species is commonly found with *Ae. sticticus*.

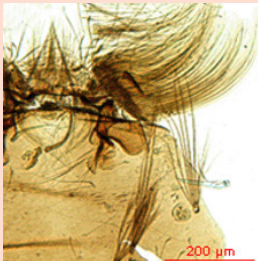


Host preference: Feed on man and cattle.

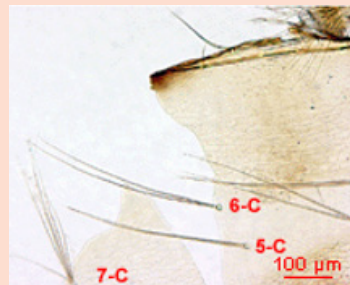


EASILY CONFUSED SPECIES

Adults are easily identified based on the above-mentioned criteria. However, larvae are close to the species of *Cinereus* group and can be distinguished by the frontal cephalic setae inserted on a zig-zag line, and with 2-3 branches.



Aedes vexans
F. Schaffner Coll.



Aedes cinereus
F. Schaffner Coll.

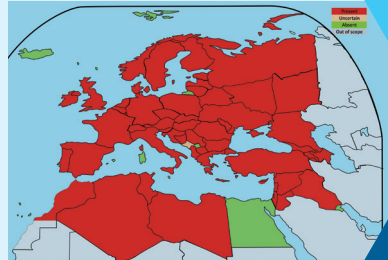


Anopheles claviger s.s., as well as its sibling species *Anopheles petragrani*, are members of the *Claviger* complex. These two species differ in their morphology (egg, larval and pupal), behaviour (larval and adult) and in their distribution. *An. claviger s.s.* occurs across most of Europe, up to the Middle East and North Africa, whereas *An. petragrani* is so far restricted to the western Mediterranean region. Although its epidemiological importance is not significant due to its small population, *An. claviger* was known in the twentieth century as a malaria vector in the eastern Mediterranean region.



Distribution around the Mediterranean Basin

Anopheles claviger s.s. is a Palaearctic species that is distributed all over Europe, the Middle East and North Africa.



Distribution of *Anopheles claviger*
2018 / MosKeyTool



Vector surveillance

No surveillance at European level.

Vector control

- Source reduction: elimination of stagnant water that is propitious for larvae
- Spraying of chemical or organic pesticides
- Use of repellents to reduce bites

Transmission

Potential vector of:

Human malaria parasites

(*Plasmodium vivax* and experimentally for *Plasmodium falciparum*)



References, tools

Mosquitoes and Their Control, 2nd ed. Norbert Becker, Dusan Petric, Marija Zgomba, Clive Boase, Madon Mino, Christine Dahl, Achim Kaiser, Springer, 2010.

Anopheles (Anopheles) claviger



MORPHOLOGICAL DESCRIPTION

A brownish
colour mosquito



© WRBU

Uniformly
dark legs



© WRBU

Uniformly dark brown
maxillary palps.



© WRBU

The scales on the wings
are dark, evenly distributed
without any dark spot.



Body length: 7 mm



Biting behaviour: Exophilic species ; the adult females do not readily enter houses, but bite in the open, outside villages.



Immature habitats: Wide variety of breeding sites, but show a preference for unpolluted, semipermanent and permanent water bodies. In the Mediterranean region, they are frequently found in wells and water containers.



Host preference: Zoophilic species ; its preferred hosts are domestic mammals but humans may constitute a second choice.



EASILY CONFUSED SPECIES

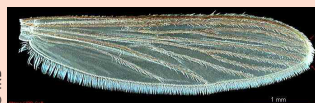
Anopheles plumbeus



© WRBU

An. plumbeus could be distinguished from *An. claviger* by its smaller size, darker coloration, lightly whorled antenna and more densely scaled wings.

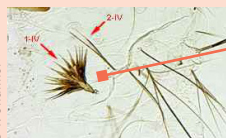
Anopheles marteri



© IRD

Pale patch
on the apical end.

Anopheles petragrani



© F. Shaffner

Antepalpal setae 2-IV and 2-V on abdominal segments with 2-3 branches, with one of the middle branch shorter (3-5 branches of the same length with *An. claviger*).

Anopheles sacharovi

Family **Culicidae**

Subfamily **Anophelinae**

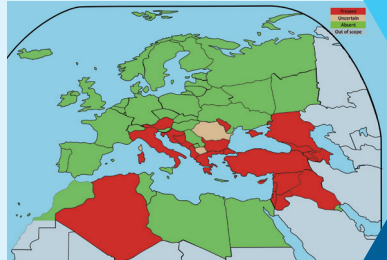


Anopheles sacharovi is an important malaria vector of the *Maculipennis* complex across Europe, and remains principal vector in Turkey. It has been the target of a number of focused anti-vector campaigns across its range including Israel, Greece, Armenia and Turkey. Yet this species still persists in all areas. *Anopheles sacharovi* is highly plastic in both adult behaviour and its use of larval habitats.



Distribution around the Mediterranean Basin

Historically it is a known vector of malaria in Armenia and a proven vector in Turkey, Syria, northern Iraq and Iran but also Greece. It is also regarded as the principal potential vector in regions of southern Europe. *Anopheles sacharovi* was responsible for malaria transmission in Greece in 2011.



Distribution of *Anopheles sacharovi*
2018 / MosKeyTool



Vector surveillance

Anopheles sacharovi is a target species for surveillance in Armenia and Turkey.

Vector control

The large-scale decline of malaria vectors in Italy in the 1920s and 30s employed a variety of strategies, including land reclamation (involving digging drainage channels to drain swamps), larviciding (including aerial treatments), and huts to trap overwintering females.

Larvae are difficult to control due to numerous aquatic habitats.

Transmission

Proved vector of:

Human malaria parasites

(*Plasmodium falciparum* and *P. vivax*)



References, tools

ECDC Factsheet *Anopheles sacharovi*:

<http://ecdc.europa.eu/en/healthtopics/vectors/mosquitoes/pages/anopheles-sacharovi-factsheet.aspx>

Anopheles (*Anopheles*) *sacharovi*



MORPHOLOGICAL DESCRIPTION

The only member of the *Maculipennis* morphologically identifiable



© WRBU



© WRBU

Lack of a large pale median band on the scutum



© WRBU

Absence of a patch of clear scales on the wing fringe



Body length: 7 mm



Biting behaviour: Adult females bite humans indoors and outside. Majority feed in the evening.



Immature habitats: In the Mediterranean area it breeds typically in large brackish marshes though larvae may at times be found in a wide variety of habitats.



Host preference: Highly anthropophilic but also feed on a wide range of hosts including sheep, goats, cattle, horses, birds, rabbits, rodents, and domestic pets.



EASILY CONFUSED SPECIES

Anopheles maculipennis s.l.



The species belonging to the *Maculipennis* complex -except *An. sacharovi*- have a patch of clear scales on the extremity of the wing fringe, and a large pale median band on the scutum.



© WRBU

Culex modestus

Family **Culicidae**

Subfamily **Culicinae**



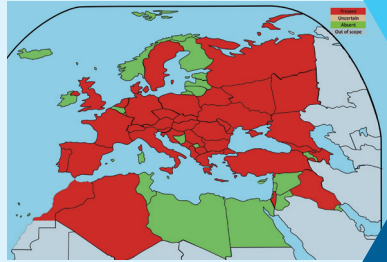
Culex modestus is a widespread mosquito throughout the Palaearctic region. This mosquito is considered in some parts of Europe as the main bridge vector of West Nile virus between birds and humans (southern France, Danube delta, Caspian and Asov sea deltas, and the Volga region).

Culex modestus belongs to the small subgenus *Barraudius* which includes only one other species in the Palaearctic region: *Cx. pusillus*.

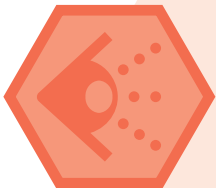


Distribution around the Mediterranean Basin

Culex modestus is widely distributed in the Palaearctic region from England to southern Siberia. It is considered as a common species in southern and central Europe. *Culex modestus* has been reported throughout the Maghreb but its presence is always limited.



Distribution of *Culex modestus*
2018 / MosKeyTool



Vector surveillance

Cx. modestus is an exophagous and exophilic species. The species can represent locally a nuisance. Adults appear in July and can be abundant until the end of August; they disappear in late September.

Vector control

- Environmental management
- Personal protection against mosquito bites

Transmission

Vector of:

West Nile Virus

Tahyna virus

Myxomatosis virus

Lednice virus

Found naturally infected with:

Tularemia



References, tools

The mosquitoes of Europe. An identification and training programme. Schaffner F, Angel G, Geoffroy B, Hervy JP, Rhaïem A, Brunhes J. Montpellier: IRD Éditions. 2001.

Les Culicidae d'Afrique Méditerranéenne. Brunhes J, Rhaïem A, Geoffroy B, Angel G, Hervy JP. IRD éditions. 2000.

Mosquitoes and Their Control, 2nd ed. Norbert Becker, Dusan Petric, Marija Zgomba, Clive Boase, Madon Minoo, Christine Dahl, Achim Kaiser, Springer, 2010.

Culex (Barraudius) modestus



MORPHOLOGICAL DESCRIPTION



This species has only dark scales on the abdominal targa

© IRD

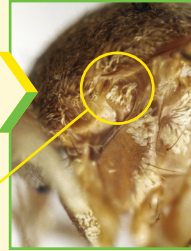


Leg III: the tibia is clearly longer than the tarsomere 1

© IRD

Prespiracular and postspiracular setae are absent

Presence of a patch of pale scales on the postspiracular area



© IRD



Body length: 6 mm



Biting behaviour: Adult do not enter buildings and feed outdoors mainly at dusk.



Immature habitats: Larvae inhabit fresh to slightly saline water and breed in irrigation channels, marshes with rich vegetation, reedbeds and rice fields. Larvae express a preference for shallow and sunlit breeding sites and are often associated with those of the *Anopheles* species.



Host preference: Feed predominantly on birds but can also feed on a wide variety of mammals including humans.



EASILY CONFUSED SPECIES

Culex modestus can be confused with *Cx. adairi*, *Cx. pusillus* and *Cx. martinii*. The four species have abdominal targa with dark scales only. However, the three latter species do not have any patch of pale scales on the postspiracular area. The tibia of leg III is clearly longer than the tarsomere 1 in *Cx. modestus*, *Cx. adairi* and *Cx. pusillus*, but not in *Cx. martinii*.

Cx. pusillus is mainly a halophilic species. It is not a very common species. In the Mediterranean area, it is reported only from Eastern Mediterranean (from eastern Algeria to Egypt) and from eastern and southern Greece.

Culex adairi is a rare species only reported from Egypt. Larvae are found in clear and non-permanent water from rock holes. Larvae can be associated with *Culiseta longiareolata* and *Cx. deserticola*.



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Culex pusillus presents a characteristic thin line of pale scales at the base of costal vein



© IRD

Leg III of *Cx. martinii* has tibia nearly as long as tarsomere 1

Culex pipiens s.s.

Family **Culicidae**

Subfamily **Culicinae**



Culex pipiens s.s., as well as its tropical vicariant *Culex quinquefasciatus*, are members of the *Culex pipiens* complex. *Cx. pipiens* s.s. is a synanthropic mosquito with a widespread distribution in temperate regions. This species occurs as two biological forms, *Cx. pipiens pipiens* and *Cx. pipiens molestus*, which exhibit important behavioural and physiological differences. The *molestus* form has a greater tendency to feed upon humans and other mammals whereas the *pipiens* form prefers avian hosts.

The adaptation of *Cx. pipiens* complex to human environments and hosts while predominantly feeding on birds increases zoonotic disease risk.

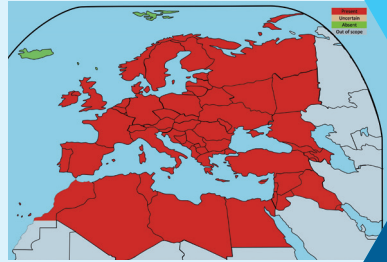
Culex pipiens is the main vector for West Nile virus, and many other pathogens.



Distribution around the Mediterranean Basin

Native to Africa, this mosquito is now the most widely distributed mosquito in temperate regions, spread mostly by humans to every continent except Antarctica.

The *pipiens* form is probably the only biological form in the most northern part of Europe, and the *molestus* form more common in the Mediterranean basin.



Distribution of *Culex pipiens*
2018 / MosKeyTool



Vector surveillance

No surveillance at European level.

Vector control

- Reduce the aquatic habitats suitable for larvae
- Use chemical or biological insecticides, including *Bacillus sphaericus*
- Protect against bites by using repellents, clothes that cover the body well and sleep under a mosquito net

Transmission

Potential vector of:

West Nile virus (WNV)

Rift Valley fever virus (RVFV)

Japanese encephalitis virus (JEV)

Bancroftian filariasis



References, tools

Dehghan H, Sadraei J, Moosa-Kazemi SH, et al. A Pictorial Key for *Culex pipiens* Complex (Diptera: Culicidae) In Iran. *Journal of Arthropod-Borne Diseases*. 2016;10(3):291-302.

Culex (Culex) pipiens

Common name: Common house mosquito

MORPHOLOGICAL DESCRIPTION



The apex of all femora with narrow spot of yellowish scales.

Tarsi are uniformly dark brown.

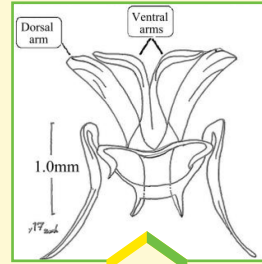


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Adults with yellowish basal bands on abdominal terga.



© WRBU



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Males are distinguishable from *Cx. quinquefasciatus* and *Cx. torrentium* by the male genitalia characters.



Body length: 3-7 mm



Biting behaviour: Their most active time to feed is after dusk and before dawn.



Immature habitats: Usually the most common mosquito in urban settings, found breeding in fouled and polluted water; often in small containers, septic systems and ditches associated with human activity.



Host preference: Major role in human nuisance. Also bites birds.

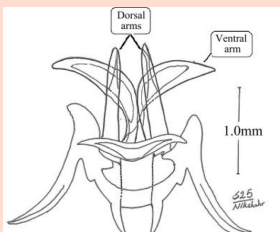


EASILY CONFUSED SPECIES

In the absence of information on the male genitalia, molecular techniques are recommended to identify *Culex pipiens* from *Culex quinquefasciatus* and *Culex torrentium* at both adult and larval stage.

Culex quinquefasciatus

Differences in the shape of the male genitalia - dorsal and ventral phallosome arms.



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Culex torrentium



The prelar scales usually permit to discriminate females of *Cx. pipiens* (absent) and *Cx. torrentium* (present).

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Culiseta annulata

Family **Culicidae**

Subfamily **Culicinae**

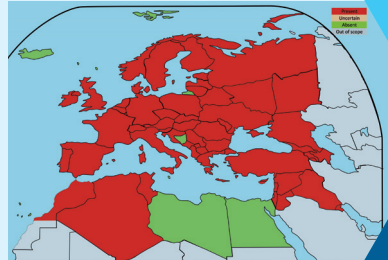


Culiseta annulata is a widespread and common mosquito in Western Europe and parts of the Middle East. This species is often responsible for nuisance biting early and late in the year. *Culiseta annulata* is a cold adapted species able to overwinter without the need for diapause.



Distribution around the Mediterranean Basin

Culiseta annulata is widely distributed throughout Europe, but it is more common in the north than in the south, where it seems to be largely replaced by *Cs. longioreolata*. The distribution range of *Cs. annulata* extends into north Africa, Asia Minor and southwest Asia.



Distribution of *Culiseta annulata*
2018 / MosKeyTool



Vector surveillance

Cs. annulata is a common nuisance species in the UK. There is no specific surveillance in Europe.

Vector control

Avoid bites by using repellents, clothes that cover the body well and sleep under a mosquito net.

Transmission

Potential vector of:

Tahyna virus

Plasmodia of birds

Equine arboviruses

Myxomatosis virus

West Nile Virus



References, tools

Mosquitoes and Their Control, 2nd ed. Norbert Becker, Dusan Petric, Marija Zgomba, Clive Boase, Madon Minoo, Christine Dahl, Achim Kaiser, Springer, 2010.

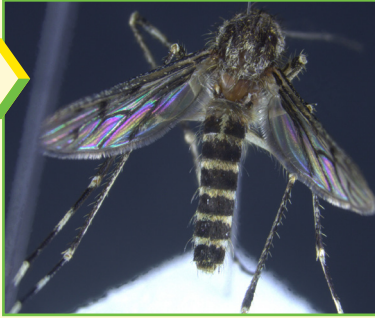
Culiseta (*Culiseta*) *annulata*

Common name: Banded house mosquito

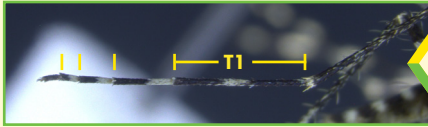


MORPHOLOGICAL DESCRIPTION

A large, dark brown mosquito with whitish basal bands on the abdominal terga and the legs. Wings with spot of dark scales.



The *Culiseta* genus can be distinguished by the presence of prespiracular setae.



One median pale band on tarsomere 1.



Body length: 7-9 mm



Biting behaviour: Adult feed both indoors and outdoors.



Immature habitats: It breeds in natural and artificial waters, sunlit or shaded areas, and fresh or brackish water.



Host preference: Feed on a wide variety of vertebrate hosts including humans. Occasionally they may take their blood meal from birds.



EASILY CONFUSED SPECIES

Cs. annulata/alaskaensis/subochrea larvae are very difficult to differentiate.

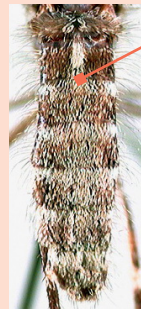
Culiseta alaskaensis

Colour of tarsomere 1 is entirely dark



Culiseta subochrea

Abdominal terga almost completely covered with pale scales





CONTACTS

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