

Fig. 10.16 Hypopygium of *Oc. echinus*

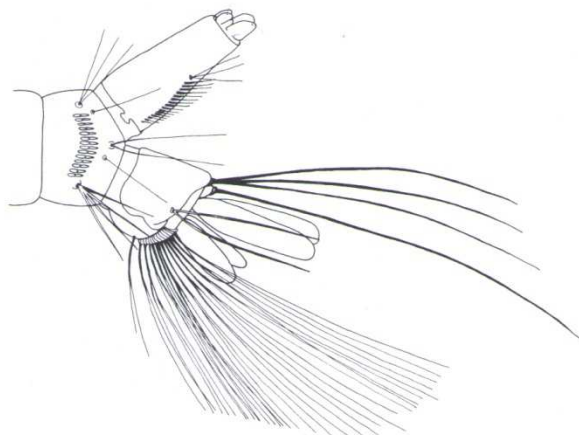


Fig. 10.17 Larva of *Oc. echinus*

developed (Fig. 10.17). The pecten has 15–27 teeth and occupies at least the basal half of the siphon, each tooth is very long and spine-like. The siphonal tuft (1-S) is inserted beyond the middle of the siphon, with 2–4 branches. The anal segment is not entirely encircled by the saddle, and 1–2 precratal tufts (4-X) are present. The anal papillae are broad and long, and the dorsal pair is twice as long as the ventral pair.

Biology: Larvae have been found in the same habitats as *Oc. geniculatus*. In Anatolia and Bulgaria they may also occur in root holes of olive trees. Not much is known of the biology of the larvae, they are supposed to feed on microorganisms in the tree-holes in the same way as the larvae of *Oc. geniculatus* do. In Portugal, larvae and adults were found in August and September (Ribeiro et al. 1988).

Distribution: In Europe this species is confined to the Mediterranean region and has been reported in Portugal, Italy, Greece, and Bulgaria where it has been found in abundance along the Black Sea coast.

Note on systematics: Edwards (1920) originally placed this species in the subgenus *Ochlerotatus* and transferred it to *Finlaya* later (Edwards 1932). The same considerations regarding the subgenus affiliation

of *Oc. geniculatus* also apply to *Oc. echinus*. As the types of most of the synonymous species of *Oc. geniculatus* are lost, apparent synonymy to *Oc. echinus* is not resolved. From Madeira and the Canary Islands another species within the subgenus *Finlaya*, *Oc. eatoni* Edwards, has been reported (Knight and Stone 1977).

***Ochlerotatus (Finlaya) geniculatus* (Olivier 1791)
[*Dahlia geniculata*]**

Female: Dark scales with a violet tinge especially on the abdomen, the white and blackish pattern of the scutum, the conspicuous white knee spots and the blunt cerci immediately distinguish the females from all other females of the genus *Ochlerotatus* except the closely related *Oc. echinus*. The proboscis and palps are black scaled, and the vertex is dark with a median light stripe and a narrow band of whitish scales around the eyes. The scutum has two dorsocentral black stripes which sometimes fuse into one anteriorly, or are otherwise completely separated by a pale acrostichal stripe. The submedian and lateral areas of the scutum have creamy or silvery grey scales. Dark anterior and posterior submedian stripes are present, and the scutellum has narrow yellowish scales. The pleurites have patches of broad, whitish scales. The legs are dark, the femora have a white knee spot, and the tibiae and tarsomeres are entirely black scaled. The fore and mid claws have a subbasal tooth. The wing veins are covered with dark brownish scales. The abdominal terga are black scaled with conspicuous white triangular lateral patches on

segments II–VII. Sternum VIII is unusually broad, and the cerci are broad and rounded (Fig. 6.37a).

Male: Tergum IX has somewhat elongated lobes and 4–5 spine-like setae on each lobe. The hypopygium superficially resembles that of the species of the *Ochlerotatus* Excrucians Complex by lacking a basal lobe, but is distinguished from it by the absence of an apical lobe (Fig. 10.18). The long and evenly tapered gonocoxite has two areas of dense setation, a basal one with shorter setae, and an apical one with long setae. The claspette stem is short with several setae, and the filament is narrow and somewhat shorter than the stem. The paraproct is heavily sclerotized and bent at the tip, and the aedeagus is pear shaped.

Larva: The larvae are distinguished from those of all other subgenera of *Aedes* and *Ochlerotatus* (except *Oc. echinus*) by the numerous stellate setae on the thorax and abdomen, the broad and unequally long anal papillae and the single row of large comb scales. The antenna is half as long as the head, smooth, and not covered with spicules (Fig. 8.24b). The antennal seta (1-A) is usually single. The inner frontal seta (5-C) is usually single, the median frontal seta (6-C) has 1–2 branches and the outer frontal seta (7-C) has 2–4 branches. All setae on the prothorax are 2-branched, except for 2-P. Most of the setae on the rest of the thorax and abdomen are of the stellate

type. The branches of the stellate setae on abdominal segment I are about the same length as the segment (Fig. 8.59c). The number of comb scales is 8–15 arranged in a single row. Each individual scale is elongated with a swollen base, a strong median spine, and small lateral spines at the base. The siphonal index is 2.3–3.2 (Fig. 10.19). The number of pecten teeth is 15–19, and each tooth is long, spine-like, with a few indistinct denticles at the base. The pecten usually occupies less than the basal half of the siphon. The siphonal tuft (1-S) is situated at about the middle of the siphon or slightly below it, with 4–5 branches. The anal segment X is not completely encircled by the saddle, and the latter has a row of long microtrichiae at the distal part. The ventral brush is made up of 7–10 cratal tufts (4-X) and 1–2 precratal tufts. The anal papillae are broad and longer than the saddle, with the ventral pair being shorter.

Biology: The larvae live in tree-holes at various heights and in open tree stumps of different deciduous trees as *Quercus* sp., *Fagus* sp., *Alnus* sp., *Betula* sp., and *Juglans* sp. They also occur in mixed forests in old trees and can occasionally be found in ground pools together with *Or. pulcripalpis*, *An. plumbeus*, and *Oc. pulcirtarsis*, but very rarely in coniferous forests. The species hibernates in the egg stage in northern areas, and in the larval stage in more southern regions. The

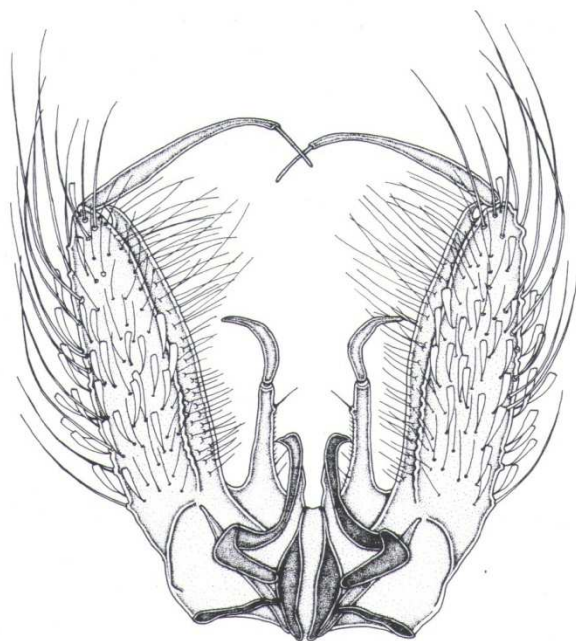


Fig. 10.18 Hypopygium of *Oc. geniculatus*

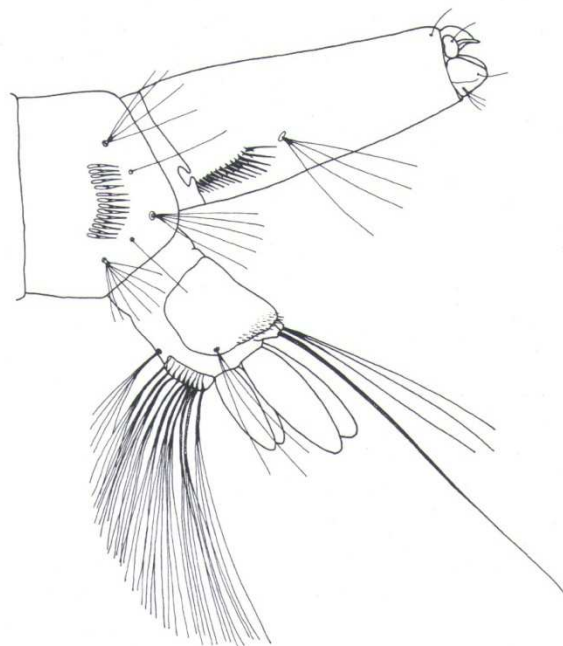


Fig. 10.19 Larva of *Oc. geniculatus*

adults appear during the summer as the development depends on spring and summer rains collected in the tree-holes. Females are day and crepuscular biters and readily feed on humans. In southeastern Europe they occur in masses, viciously attack humans in the open, but rarely enter urban areas.

Distribution: Found in the Palaearctic region, known in most European countries, and its northernmost limit follows that of deciduous or mixed forests. In the Mediterranean region it is reported in northern Portugal, Sardinia, Italy mainland, Greece, and extends east to the Caucasus. Also reported from North Africa to Asia Minor.

10.2.2 Subgenus *Ochlerotatus* Lynch Arribalzaga

The flagellomeres of the female antennae are prolonged distally, the palps are only 1/3 to 1/4 the length of the proboscis, the latter being longer than the fore femur. The scale pattern on the vertex and occiput is variable, often with numerous erect forked scales on the occiput and mixed narrow and broad scales on the vertex and along the eye margin. The thorax in most species has a dark grey to dark brown or blackish integument. The scutum is covered with scales and with rows of acrostichal, dorsocentral and supraalar setae. The scutellum has three lobes and groups of setae and a few narrow scales. The pleurites are extensively scaled with patches of mostly pale to whitish scales. Prespiracular setae are absent. A postprocoxal patch of whitish scales is present in some species. The legs are mostly covered with dark scales, but pale scales may be scattered or grouped to form a knee spot or basal or apical rings, mainly on the tarsomeres. All the tarsal claws have an additional subbasal tooth, and the pulvilli are setous or inconspicuous. The wings are predominantly dark scaled, both the costa (C) and subcosta (Sc) may have patches of paler scales, and in some species the wing veins are covered with mixed dark and pale scales. The abdomen has elongated cerci and the usually narrowed last segments give the impression of being pointed. The scaling of the abdomen is extensive on both the terga and sterna. It can be rather uniform or display various patterns of banding or mixed colours. The scale patterns on the thorax, legs, wings, and abdomen are often used for species identification.

The proboscis of the males is often not longer than the fore femur, and the palps are usually longer than the proboscis, but sometimes as long as the proboscis or shorter. The tarsal claws of the front and mid legs have prolonged main and subbasal teeth. Tergum IX always has two more or less expressed lateral lobes which usually bears a group of strong or spine-like setae. The gonocoxite in most species has basal and apical lobes, sometimes one or both less expressed, indistinct, or absent. The gonostylus is simple with an apical spine. The paraproct has pointed tips, sometimes inwardly curved. Typical claspettes are present, divided into a stem and a filament. The aedeagus is pear shaped, elongated, or rounded.

The antennae of the larvae have a multiple-branched antennal seta (1-A), usually inserted at about the middle of the antennal shaft. The lateral palatal brushes are well developed for suspension feeding or brushing. The postclypeal seta (4-C) is inconspicuous, and multiple-branched. The inner frontal seta (5-C) is often situated in front of the median frontal seta (6-C), both pairs being single to multiple-branched. Prothoracic setae 1-P to 7-P are single to 3-branched. The number of comb scales is variable from a few to many, arranged in a single or irregular rows. The siphon is well developed, with siphonal seta (1-S) usually inserted at about the middle of the siphon. The pecten has more or less spaced teeth of significant shape. The saddle partly or fully encircles the anal segment, and the saddle seta (1-X) is usually single. The cratal and precratal tufts (4-X) are well developed. The anal papillae are of variable shape and size.

Of the nearly 200 species of the subgenus described worldwide, more than half are distributed in the Holarctic region and nearly a quarter in each of the Australian and the Neotropical regions. Only a few species are found in the Oriental and African regions.

In the western Palaearctic and throughout Europe, Alphavirus, Flavivirus, and three different groups of Bunyavirus were found in a few isolates from the *Ochlerotatus* species, such as *Oc. cantans*, *Oc. caspius*, *Oc. communis*, *Oc. flavescens*, *Oc. hexodontus*, *Oc. punctator*, and *Oc. sticticus* (Traavik et al. 1985; Lundström 1994; Aspöck 1996). Some other parasites have been reported from the *Ochlerotatus* species in Europe, such as the bacterium *Francisella tularensis*. In North America virus vector capacity is documented for several species of the subgenus (Reeves 1990; Beaty and Marquardt 1996).