phylla. The waters of the breeding sites have usually a neutral to alkaline pH-value. In central Europe the larvae pupate in April and the first adults occur at the end of April or early May. They prefer shaded areas where they may bite humans and mammals even during daytime; however, the biting activity is usually highest at dusk. The adults do not migrate much and prefer to stay close to their breeding sites in shaded areas.

Distribution: In Scandinavia, *Oc. refiki* has been reported from Sweden (Dahl 1975). It is widely distributed in the other parts of Europe, *e.g.* France, Spain, Italy, Switzerland, Germany, Czech Republic, former Yugoslavia, Slovakia, Hungary, and Romania. Outside Europe the species can be found in Asia Minor.

Ochlerotatus (*Rusticoidus*) *rusticus* (Rossi 1790)

Female: A large mosquito, with a dark scaled proboscis and palps, and a few scattered pale scales at the base of the proboscis. The vertex and occiput have narrow yellowish white scales, and the eyes are bordered with narrow white scales. The pedicel is dark brown with a circle of whitish scales, and the clypeus is blackish brown. The integument of the scutum is blackish brown, covered with golden bronze scales and a median stripe of dark scales, usually divided by a narrow acrostichal stripe, but sometimes there are two more dark stripes in the posterior submedian areas. The lateral parts of the scutum have cream coloured scales. The scutellum is dark brown with narrow yellowish white scales and pale setae on the lobes. The postprocoxal membrane has pale scales. The pleurites are extensively covered with yellowish or white scales. The postpronotum has broad flattened scales, blackish brown in the upper part and whitish in the lower part. The hypostigmal and spiracular scale patches are fused. The mesepisternum has scales extending to the anterior angle and lower margin, the scales of the mesepimeron extend more or less to the lower margin, and lower mesepimeral setae are present. The femora have pale yellowish scales on the ventral surface and dark scales on the dorsal surface, the tibiae and tarsomeres I have pale and dark scales intermixed, and tarsomeres II–V are almost entirely dark scaled. The wing veins are predominantly covered with dark scales, with scattered pale scales at the base of the costa (C) and on the subcosta (Sc), and are most numerous at the apex of the subcosta. Abdominal tergum I has 2 patches of yellowish white scales and pale setae, the other terga are dark scaled with pale basal bands which are usually widened middorsally and show a tendency to form a longitudinal stripe in the middle, at least on the apical terga (Fig. 6.40a). Dark parts of the terga often have scattered pale scales. The sterna are predominantly whitish scaled.

Male: The apical margin of tergum VIII is densely covered with long, inwardly curved setae. The lobe of tergum IX has 5–7 short spine-like setae. The gonocoxite has dense long setation on the entire inner surface (Fig. 10.87). The basal lobe of the gonocoxite has a constricted stem-like base and a group of lanceolate, flattened setae arranged more or less in a row. The apical lobe is well developed, protruding beyond the level of the insertion point of the gonostylus, with numerous short setae. The gonostylus is slightly curved at the apex with several small subapical setae, and the apical spine of the gonostylus is twisted and distinctly S-shaped. The paraproct is strongly sclerotized, and inwardly curved at the apex. The claspette stem is long, distinctly curved in the middle, and slightly swollen at the apex. The claspette filament is short, more or less onion-like, without a plate shaped widening, and is transversely striated. The aedeagus is moderately rounded at the apex with small lateral denticles.

Larva: The head is wider than long. The antennae are approximately half as long as the head, slightly curved, and adorned with numerous spicules

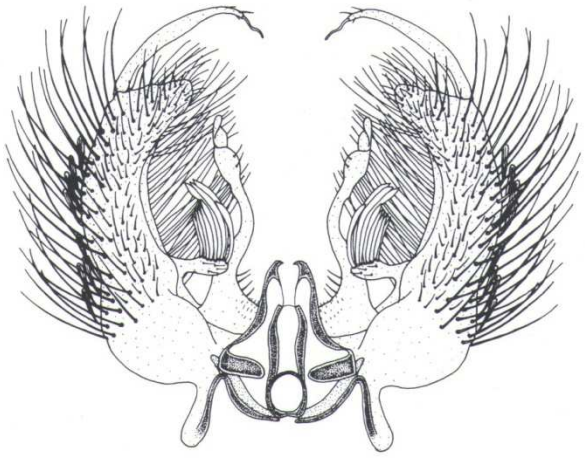

Fig. 10.87 Hypopygium of *Oc. rusticus*

(Fig. 8.24a). The antennal seta (1-A) is located at about the middle of the antennal shaft or slightly below it, with 5–6 branches. The median frontal seta (6-C) has 2, occasionally 3, branches situated before the inner frontal seta (5-C), which has 3, sometimes 2, branches, and the outer frontal seta (7-C) usually has 8 branches. The number of comb scales is 10–18, arranged in two irregular rows, each individual scale with a strong median spine, 1–2 shorter lateral spines and small spines at the base. The siphon is straight, tapering in the apical half, and the siphonal index is approximately 3.0–3.5 (Fig. 10.88). The dorsal surface of the siphon has 3, occassionally 4, pairs of additional setae; another seta with 1–2 thin branches is located on the lateral side of the siphon beyond the median pecten teeth. The pecten has 15–25 teeth not extending to the apical third of the siphon, the basal and median teeth have 2–3 lateral denticles, 1–3 distal pecten teeth are detached and spine-like. The siphonal tuft (1-S) is located at about the middle of the siphon within the distal pecten teeth, with 6–8 branches. The saddle extends about 3/4 of the way down the sides of the anal segment, and the saddle seta (1-X) is single, and nearly as long as the saddle.

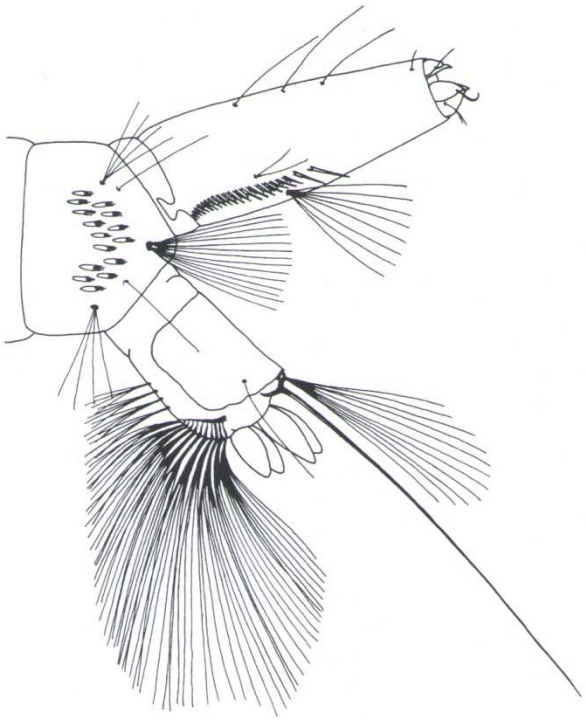

Fig. 10.88 Larva of *Oc. rusticus*

The upper anal seta (2-X) has more than 6 branches, and is half as long as the lower anal seta (3-X) which is single and longer than the siphon. The ventral brush has 11–16 tufts of cratal setae (4-X) and 3–4 precratal setae. The anal papillae are about half as long as the saddle, and the dorsal pair is longer than the ventral pair.

Biology: *Oc. rusticus* is a monocyclic snow-melt mosquito which predominantly occurs in swampy woodlands with a high level of ground water; occassionally it can be found in floodplains. Larvae are able to hatch during heavy rainfall in autumn when the water level rises. The diapause of these larvae is terminated by the decreasing temperatures in autumn. Usually the larvae which hatch in autumn hibernate in the second and third larval instar; they can even survive under a closed coverage of ice. The high content of dissolved oxygen in cold water or bubbles of oxygen under the ice which are produced by assimilating plants enable the larvae to cover their demand of oxygen and to survive; they are usually attached to these oxygen bubbles. However, during a severe winter the mortality rate can be very high. For this reason *Oc. rusticus* usually does not occur in areas where the isotherm of January is less than −1°C (Kirchberg and Petri 1955). Often the larvae of *Oc. rusticus* are associated with those of *Cs. morsitans* or with overwintering larvae of *An. claviger*. A second larval population of *Oc. rusticus* and *Cs. morsitans* hatches from hibernating eggs in early spring shortly after the snow-melt. Thus, first and fourth-instars of these two species can be found together with numerous first-instar larvae of *Oc. communis* and *Oc. punctor* which usually hatch in early spring from hibernating eggs. Typical breeding sites are ditches or deeper depressions with vegetation, *e.g. Carex* sp. or *Phragmites* sp. The larvae of *Oc. rusticus* are seldom found in shallow water bodies because of the high risk that the entire water body may freeze. Larvae are found preferably in breeding sites with a pH-value of 5.0–8.0; they are rare or absent in water bodies with pH values less than 5.0. The optimum temperature for the larval development in the laboratory is 15–20°C. The time of development is about 66 days at a constant temperature of 10°C, 28–29 days at 15°C and 23–25 days at 20°C. Although the larvae of *Oc. rusticus* belong to the first occurring species of snow-melt mosquitoes, they pupate and emerge after the species which hatch in early spring from hibernating eggs such as *Oc. communis* and *Oc. punctor*. In central Europe adults usually emerge at the end of

April. Females are vicious biters in shaded situations. The adults prefer to stay in forested areas and do not migrate long distances, usually not more than 2 km (Schäfer et al. 1997).

Distribution: *Ae rusticus* is widely distributed throughout Europe and can also be found in North Africa and Asia Minor.

Ochlerotatus (*Rusticoidus*) *subdiversus* (Martini 1926)

Female: The proboscis and palps are dark scaled, often with some scattered pale scales. The vertex has whitish narrow scales, and the occiput has pale and dark scales. The integument of the scutum is blackish brown, the scutum has a median stripe of yellowish bronze scales, lighter in the median and darker in the lateral part, but sometimes the stripe is indistinct. The scutellum has narrow whitish scales and pale setae on the lobes. The postnotum is blackish brown without a group of scales. The pleurites have dense patches of silvery to yellowish scales, and the upper part of the postpronotum has straight or slightly curved bronze scales. Postprocoxal and hypostigmal patches are present. The femora and tibiae have light and dark scales intermixed, and the tarsi are dark scaled with numerous pale scales on tarsomeres I and the basal part of tarsomeres II. The wing veins are predominantly covered with narrow dark scales, and pale scales are present mainly at the base and the anterior part of the wing. The abdominal terga have greyish white scales and a varying number of dark scales, forming indistinct spots, and pale transverse bands are absent. There is great variation in the colouration of the species. Gutsevich et al. (1974) described a light form with numerous pale scales on the abdominal terga, proboscis, and palps of females. Transitional forms have also been found.

Male: The apical margin of tergum VIII is densely covered with long, thin setae. The lobes of tergum IX are situated close together, with 7–10 short, thick setae. The base of the gonocoxite has two or more lobes, but only one lobe bears a group of lanceolate, flattened setae, the other smaller lobes have long hair-like setae (Fig. 10.89). The apical lobe is weakly developed with short, slightly curved setae. The gonostylus is curved, with several small setae near the apex, and the apical spine of the gonostylus is more or less straight. The paraproct is well sclerotized, and inwardly curved at the apex. The claspette stem is long and slightly curved in the basal part. The claspette filament is short, and more or less triangular shaped with a pointed apex. The aedeagus is not as broadly rounded at the apex as in *Oc. lepidonotus*, and has small lateral denticles.

Larva: The head is wider than long. The antenna is about half as long as the head, and densely covered with spicules. The antennal seta (1-A) is located at about the middle of the antennal shaft, with 3 branches. The postclypeal seta (4-C) is short, with 2 branches. The inner frontal seta (5-C) has 2 branches, the median frontal seta (6-C) has 2–3 branches and the outer frontal seta (7-C) has 5 branches. The number of comb scales is usually 14–15 arranged in two irregular rows, and each scale is large with a prominent median spine and small spines at the base. The siphon is straight, tapering in the apical third, and the siphonal index is 3.0–3.3 (Fig. 10.90). The dorsal surface of the siphon has 3–4 pairs of additional long setae, and another thin seta with 2 branches is located on the lateral side of the siphon close to the median pecten teeth. The pecten has the 3–4 distalmost teeth atypical, spine-like, widely spaced, almost reaching the apex of the siphon. The siphonal tuft (1-S) is single, and nearly twice as long as the width of the siphon at the point of its origin. It is attached at about the middle of the siphon within the pecten. The saddle extends down 3/4 of the sides of the anal segment, and the saddle seta (1-X) is single and as long as the saddle. The upper anal seta (2-X) usually has 11 branches, and the lower anal seta (3-X) is single and about as long as the siphon. The ventral brush has 13–15 tufts of cratal

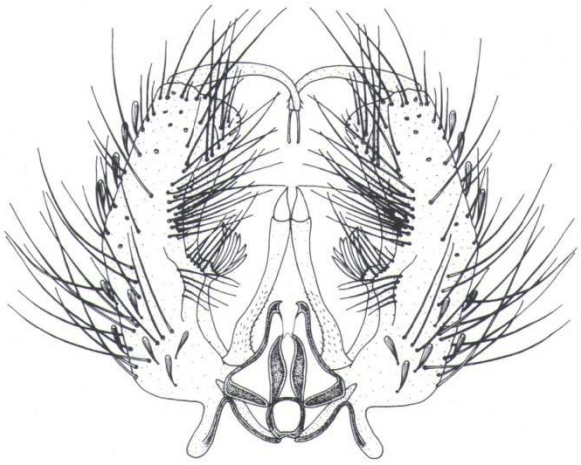

Fig. 10.89 Hypopygium of *Oc. subdiversus*