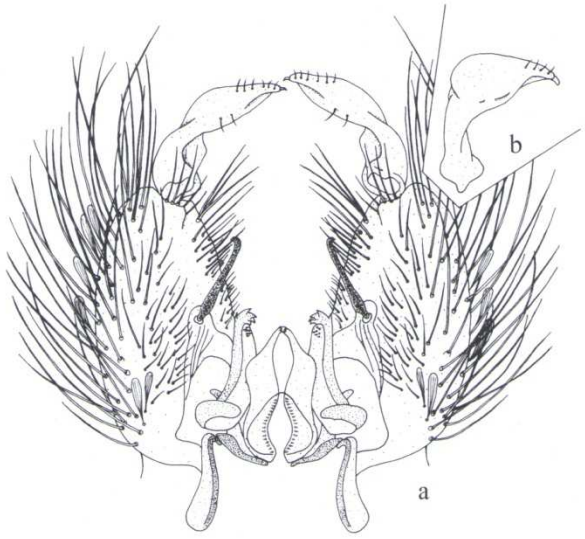

Fig. 10.136 Hypopygium of (**a**) *Cq. richiardii* and gonostylus of (**b**) *Cq. buxtoni*

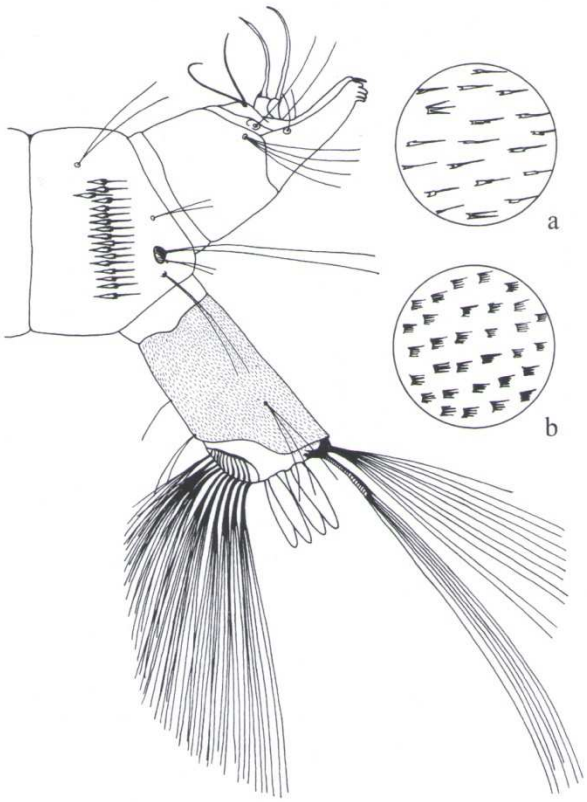

Fig. 10.137 Larva of *Cq. richiardii* and spicules on the saddle of (**a**) *Cq. richiardii*; (**b**) *Cq. buxtoni*

Male: The palps are longer than the proboscis. The hypopygium is quite similar to that of *Cq. richiardii*. The lobes of tergum IX possess 4–5 thin setae. The main difference between the two species is found in the shape of the gonostylus. In *Cq. buxtoni* the basal half of the gonostylus is stem-like, not constricted in the middle. The apical half is considerably bulky and then gradually narrows towards the apex. The outer margin of the gonostylus bears four small and tiny setae apically (Fig. 10.136b).

Larva: Closely resembles that of *Cq. richiardii*. The head is about 1.5 times wider than long. The postclypeal seta (4-C) is multiple-branched. The inner frontal seta (5-C) is short and 8-branched. The median frontal seta (6-C) has 5–7 branches and the outer frontal seta (7-C) has 9 branches. The comb consists of 16–22 scales arranged in an irregular row, dorsally in a partly doubled row. The individual scales have a pointed terminal spine. Seta 1-VIII has 5–7, usually 6 branches (Fig. 8.87b), setae 2-VIII and 3-VIII are 2-branched, and 4-VIII and 5-VIII are usually 3–4 branched. Setae 2-VIII, 4-VIII and 5-VIII are at most half as long as seta 3-VIII. The abdominal segment X resembles that of *Cq. richiardii* but the saddle is covered with numbers of rows containing 2–8 spicules on a common base (Fig. 10.137b). The saddle seta (1-X) is 4-branched.

Biology: Because of its limited distributional range and rarity, the data on the biology of the species are scanty. The larvae were found attached to the roots of *Acorus* sp. and *Typha* sp. (Coluzzi and Contini 1962). Eggs are laid in boat-shaped rafts (Guille 1975). The females bite humans in open areas (Gutsevich et al. 1974).

Distribution: Mediterranean subregion of the Palaearctic. In Europe the species is present in Spain, France, and Italy, and also reported from Romania and Ukraine (Snow and Ramsdale 1999).

Coquillettidia (*Coquillettidia*) *richiardii* (Ficalbi 1889)

Female: The scales on the wing veins are much broader than those of any other European species (Fig. 6.6b). The apex of the proboscis is slightly broader and distinctly darker than the preceding portion, and sometimes the pale scales form a median ring. The base of the proboscis has intermixed

yellowish and brown scales, sometimes with the dark scales predominating. A pale ring is present in the middle of tarsomere I of all the legs, a pattern similar to that of *Cs. annulata* and *Cs. subochrea*. The palps are short, not exceeding 1/4 the length of the proboscis, and are covered with mixed yellowish and brown scales. The vertex has yellowish golden narrow, curved, decumbent scales and dark erect forked scales. The scutum is brown coloured, with narrow, curved brown and golden scales. The mesepisternal and mesepimeral patches have broad, whitish scales. The femora and tibiae are basally sprinkled with yellowish and brown scales, and apically pale scaled. Tarsomere I of all the legs has a pale ring in the middle, which is sometimes indistinct or absent. If so, the legs are mainly covered with pale scales. Broad pale basal rings are usually present at tarsomeres I–III of the fore legs and all tarsomeres of the mid and hind legs. Pale rings are particularly distinct on the hind tarsomeres. The wing veins are covered with broad, intermixed yellowish and brown scales. The terga are brown scaled, with scattered pale scales more numerous at their bases. Basolateral triangular patches of yellowish scales are present, and the scales may form inconspicuous basal bands which are constricted in the middle similar to those of *Oc. punctor*. The sterna are pale scaled.

Male: The palps are nearly as long as the proboscis. The lobes of tergum IX have 8–10 setae. The gonocoxite is short and stout. The basal lobe is heavily sclerotized with a strong rod-like spine. The gonostylus is widened basally just above the articulation to the gonocoxite, distinctly constricted and flexed in the middle, enlarged again at the beginning of the distal third and then tapered apically (Fig. 10.136a). The outer side of the gonostylus has 6–7 tiny setae and two more setae on its inner side, just beyond the middle. The apical spine of the gonostylus is short. The apex of the paraproct is strongly sclerotized and denticulated.

Larva: The head is wider than long. The antennae are very long, 1.5–2.0 times longer than the head. The long-terminal filament is hardly visible on a white background. The antennal seta (1-A) has 15–20 branches. The postclypeal seta (4-C) usually has 5–6 branches, situated anterior to the frontal setae. The inner frontal seta (5-C) is short, matching the postclypeal seta. The median frontal seta (6-C) is long, with 4–5 branches. The outer frontal seta (7-C) has 9 branches. The comb consists of an irregular row of 10–25 scales, each individual scale has a well developed terminal spine (Fig. 10.137). Seta 1-VIII is inserted into the dorsal half of abdominal segment VIII, with 2–4 branches. Setae 2-VIII, 3-VIII, 4-VIII and 5-VIII are articulated medioventrally and have 2–4 branches. The siphon is very short and conical, and forms a piercing apparatus. The siphonal tuft (1-S) is inserted ventrolaterally near the middle of the siphon, and pecten teeth are absent. In addition to 1-S, two pairs of single setae and two pairs of curved spine-like setae with hooked ends are present which support the penetration of the siphon into the plant tissue. Abdominal segment X is elongated, longer than wide, and is completely encircled by the saddle. The saddle is covered with short and stout, usually single spicules, rarely 2 or 3 on a common base (Fig. 10.137a). The saddle seta (1-X) is 2–3 branched, inserted quite apart from the posterior margin. The upper (2-X) and lower (3-X) anal setae are multiple-branched, 2-X is half as long as 3-X. The cratal setae (4-X) have 10–14 tufts and 2 precratal setae (4-X) are widely separated. The anal papillae are lanceolate, subequal in length, and shorter than the saddle.

Biology: The species has one generation per year in the north (Service 1969) and 2–3 generations in the south (Gutsevich et al. 1974). The females deposit the eggs in rounded rafts. The larvae hatch in intervals of up to 2 weeks after oviposition (Guille 1975) and usually hibernate in the third or fourth-instar. Larvae and pupae live submerged and obtain oxygen from the aerenchyma of aquatic plants and move very little. Breeding sites may be various permanent water bodies rich in *Acorus* sp., *Typha* sp., *Phragmites* sp., *Glyceria* sp., *Sparganium* sp., *Ranunculus* sp., and *Carex* sp. (Shute 1933; Natvig 1948; Guille 1976). Pupation takes place from end of May to early June. In Serbia, blood searching females have been recorded from June to September, but usually have a seasonal peak during July (Petric 1989). Females can be very numerous and a severe nuisance to humans and domestic animals, in the surroundings of fresh waters or slightly saline marshes, lakes, old river beds, and estuaries. Also frequent indoor feeding on humans has been recorded in England (Shute 1933) and occasionally in Portugal (Ribeiro et al. 1988). Nuisance is usually restricted to the surroundings of the breeding sites but females can use ascendant air currents to invade, in considerable number, areas up to altitudes of 800–900 m (Gilot et al. 1976). Females prefer to

feed on mammals (Service 1968c; Ribeiro et al. 1988; Petric 1989) but may also take their blood meal from birds (Service 1969) and amphibians (Shute 1933). Jaenson et al. (1986b) found the species in horse stables and human bait collections. In England, the peaks of biting activity occurred after sunset and just after sunrise (Shute 1933; Service 1969), while a nocturnal biting activity was typical for a population from Serbia (Petric 1989). Biting activity was recorded at a temperature between 9 and 26°C and a relative humidity between 30 and 92%. Swarming of males could be observed one hour after sunset and at dawn (Marshall 1938). In the laboratory, copulation was observed in small cages of 40×40×120 cm. The species has been reported as autogenous, but some females may be unable to develop the first egg batch without taking a blood meal (Guille 1975).

Distribution: *Cq. richiardii* is a common species throughout Europe and widely distributed in the western Palaearctic region.

Medical importance: Females infected with WNV, and Omsk haemorrhagic fever virus (OHF) were detected in wild populations (Detinova and Smelova 1973).

Note on systematics: Guille (1975) stated that some authors consider the nearctic species *Cq. perturbans* as a geographic race of *Cq. richiardii*. Similarity in both morphological and biological characteristics of the two species should stimulate further investigation.

10.6 Genus *Orthopodomyia* Theobald

The palps of the females are 1/3 as long as the proboscis. The vertex is covered with erect forked scales. The postpronotum usually has 2 setae, and postspiracular setae are absent. Tarsomeres I on the fore and mid legs are distinctly longer than the other four tarsomeres together. The combined length of tarsomeres IV and V is shorter than tarsomere III of the fore and mid legs. The abdomen is parallel sided with a truncated end, the cerci are blunt and moderately projecting. The palps of the males are slender, and about as long as the proboscis. Palpomere V (sometimes also palpomere IV) is greatly reduced without dense, long setae. The hypopygium is similar to those of the genus *Culiseta* and subfamily Anophelinae. The general colouration of the larvae is red or pink, and violet-blue before pupation. The antennal seta (1-A) is confined to the basal half of the antennal shaft, with 4 or more branches. The inner and median frontal setae (5-C and 6-C) are long, multiple-branched. The setae of the thorax and abdomen are very long, particularly the lateral setae 6-III to 6-VI. Conspicious sclerotized plates are present on the dorsal surface of all or at least on one of the segments VI–VIII. The siphon is without a pecten but with a single pair of siphonal tufts (1-S). The siphonal index is at least 2.5, often much more. The saddle completely encircles the anal segment. The ventral brush is made up of 12 or more cratal setae (4-X). The dorsal pair of the anal papillae is longer than the ventral pair. The larvae develop in tree-holes, bamboo stumps, axils of bromeliads (arboreal or dendrolimnocolous species). All species are rare, none of them being known as a nuisance.

The small genus comprises 24 species spread throughout the Neotropical and Oriental regions, a few of them ranging northwards into the Palaearctic and Nearctic regions, some are isolated on Madagascar and Mauritius, but none are found in continental Africa. *Or. pulcripalpis* is the only member of the genus found in the Palaearctic region (Gutsevich et al. 1974; Dahl and White 1978).

Orthopodomyia pulcripalpis (Rondani 1872)

Female: It differs from most of the other Palaearctic mosquitoes by its conspicious pattern of white scales on a black background producing several easily recognised characteristics. The proboscis has black scales and a moderately broad ring of white scales within the apical half. The palps are nearly half as long as the proboscis, black, with a white ring at the base and in the middle, and the apex is white. The antennae are black, the pedicel is covered with white scales, and 3–5 basal flagellomeres may have a median line of white scales. The head is black, and covered with a mixture of black and white scales. The posterior margin of the eyes dorsally is covered with white scales. The scutum is covered with narrow black scales, distinctly ornamented with three pairs of narrow, white longitudinal stripes. A dorsocentral pair of stripes extends from the anterior margin to the posterior third of the scutum, where it is broken. It continues on over the prescutellar dorsocentral area as a wider stripe converging and ending on the scutellum. The second pair