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## **FIRST RECORDS OF *ORTHOPODOMYIA PULCRIPALPIS* (RONDANI, 1872) (DIPTERA, CULICIDAE) IN NORTHERN ITALY**

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**Abstract** – We report the first records for northern Italy of the tree-hole breeding mosquito *Orthopodomyia pulcripalpis* (Diptera Culicidae). Larvae were found in two sites of a wooded area in the Karst Plateau of the province of Trieste (Friuli Venezia Giulia region). The larval habitat was shared with other two mosquito species, *Aedes geniculatus* and *Anopheles plumbeus*. The species overwinters at the stage of larva in various instars.

**Keywords:** *Orthopodomyia pulcripalpis*, Diptera Culicidae, Italy, Friuli Venezia Giulia, Karst.

**Riassunto** – Si segnala il primo ritrovamento per il Friuli Venezia Giulia e per l'Italia settentrionale del Culicide *Orthopodomyia pulcripalpis*. L'habitat larvale era costituito da raccolte idriche contenute in tronchi cavi in due siti di un'area boschiva del Carso triestino. Specie di Culicidi associate erano *Aedes geniculatus* e *Anopheles plumbeus*. La specie sverna allo stadio di larva in varie età.

**Parole chiave:** *Orthopodomyia pulcripalpis*, Diptera Culicidae, Italia, Friuli Venezia Giulia, Carso.

### **1. – Introduction**

During a survey on the tree hole breeding mosquitoes of Trieste's Karst area [Friuli Venezia Giulia region (FVG); north-eastern Italy], some larvae of the species *Orthopodomyia pulcripalpis* (Rondani, 1872) were detected.

*Or. pulcripalpis* is widely distributed in the Palearctic region where it represents the only species, out of about 36, of its genus (Harbach, 2007). In Europe, its range of distribution extends mainly in the central-southern regions with the northern limit represented by Belgium and England (Robert *et al.*, 2019).

The available data on the Italian distribution of *Or. pulcripalpis* are rather scarce. In Italy the species was initially identified and classified, as *Culex pulcripalpis*, by Rondani (1872), who however omitted to report the type locality. Even Ficalbi (1899), who left a more detailed description of the Rondani's culicids collection, did not specify the geographical origin of the specimens examined, referring their provenance generically to "middle Italy".

Subsequently, in Italy the presence of the species was documented both in the Sardinia region (Aitken, 1954) and the Lazio region (Zavortink, 1968; Rivosecchi 2011). There are no reports either from northern Italy, or, thus, from FVG region (Zamburlini *et al.*, 2019), but the species is recorded in the nearby Croatian Istria where, however, only a single adult specimen was sampled (Merdić *et al.*, 2008).

As for all the congeneric species, its pre-imaginal habitat consists typically in small rain water collections in tree holes. In FVG, other common tree hole

mosquitoes are *Anopheles plumbeus* Stephens, 1828 and *Aedes geniculatus* (Olivier, 1791), sometimes together with the opportunistic *Ae. albopictus* (Skuse, 1894) in urban areas (Zamburlini *et al.*, 2019).

The knowledge of the biology of *Or. pulcripalpis* is somewhat incomplete. It appears to be mostly polyvoltine, also probably in relation to the availability of water collections in dry periods (Encinas Grandes, 1982), and to overwinter as a larva in all instars (Zavortnik, 1968) or in fourth instar (Gutsevich *et al.*, 1974). The adult female is a night biter and mainly ornithophagic and for this reason the species is considered of little health or economic interest (Zavortnik, 1968).

## 2. – Materials and methods

### 2.1. – Study area

The Trieste's Karst is a calcareous plateau situated in the proximity of northern Adriatic Sea coast at 200-400 m a.s.l. (fig. 1).

The climate of the area is classified as mesotemperate: the annual average temperature is 12.7 °C, the annual average precipitation is about 1000 mm with most rainfall occurring in late spring and autumn (ARPA FVG-OSMER, 2014). An important climatic factor is the Bora wind which blows in all seasons often making



Fig. 1 - Study area. Friuli Venezia Giulia region, province of Trieste, Karst Plateau.

the air and the soils dry. Besides, because of the nature of the calcareous rocks, rich in cracks, the availability of superficial rain water bodies is quite scarce.

The karstic woodlands are mainly composed of trees such as *Quercus pubescens*, well adapted to dry soils, together with *Ostrya carpinifolia* and *Fraxinus* spp.

## 2.2. – Collection and identification

Larvae of Culicidae were collected by means of a small dipper in about 30 rain filled tree holes in various sites of the Trieste's Karst. Some larvae were stored in 70 % ethanol and others were reared in laboratory up to the adult stage. The male hypopygia were mounted on slides for microscopic observation.

The identification was undertaken according to the keys of Gutsevich *et al.* (1974), Encinas Grandes (1982), Severini *et al.* (2007) and Becker *et al.* (2010).

## 3. – Results and Discussion

*Or. pulcripalpis* larvae were found in two different sites a few hundred meters apart. The site n. 1 (fig. 2) was a deep cavity in a *Quercus pubescens* tree (45.736 N, 13.724 E, altitude 220 m a.s.l., 2710 m from the Adriatic Sea coast line) situated in the locality of Gabrovizza, municipality of Sgonico. The first collection dates back to May 2<sup>nd</sup>, 2019 when five fourth instar larvae of Culicidae were sampled and from which five adults emerged: two *Or. pulcripalpis*, one male and one female, two *Ae. geniculatus* and one *An. plumbeus*. The second collection occurred on March 7<sup>th</sup>, 2020 when one 4<sup>th</sup> instar larva of *Or. pulcripalpis* was sampled and from which one adult male emerged. In this second sampling the water was dark, rich in tannin, but clear, the conductivity was



Fig. 2 - Larval habitat of *Orthopodomyia pulcripalpis* in site n. 1

520  $\mu\text{S}/\text{cm}$  and the water temperature was of 8.0 °C.; the pH was 7.6, much lower than the pH (= 9-10) observed for the same species and habitat in southern France (Rioux, 1958). Three more collections were carried out on September 2<sup>nd</sup>, on September 16<sup>th</sup> and on November 18<sup>th</sup>, 2020 (on this latest sampling: water temperature = 9.2 °C, conductivity = 2164  $\mu\text{S}/\text{cm}$  and pH = 7.5), when four II instar, one IV instar and five (four II instar and one III instar) larvae of *Or. pulcripalpis* were sampled, respectively, all times in associations with larvae of *Ae. geniculatus* and *An. plumbeus*.

The site of sampling n. 2 (fig. 3) was a hole in an *Ailanthus altissima* tree (45.724 N; 13.719 E, altitude 240 m a.s.l., 1490 m from the coast line) situated near the locality Campo sacro; the water conductivity was 146  $\mu\text{S}/\text{cm}$ , the temperature was 19.2 °C and the pH was 7.4. In this site one IV instar larva was sampled on May 7<sup>th</sup>.



Fig. 3 - Larval habitat of *Orthopodomyia pulcripalpis* in site n. 2



The sampling results confirm that *Or. pulcripalpis* is a polycyclic species and that it overwinters as a larva in various instars.

The identification of *Or. pulcripalpis* is relatively easy at all stages. The larva is of a pink colour and has a siphon without the pecten (fig. 4). The thorax (scutum and scutellum) of the adult has a characteristic design of narrow longitudinal white lines on a black background (fig. 5). It should be noted that these stripes appeared yellowish (fig. 6) in the adult male specimen collected in March 2020, in accordance with what was described by Ficalbi (1899) on the Rondani's holotype which had a "back with a yellow-brass fleece".



Fig. 4 - *Orthopodomys pulcripalpis* larva. Terminal segments



Fig. 5 - *Orthopodomys pulcripalpis* adult. Dorsal view of thorax

The male hypopygium (fig. 7) has the gonostyle with a characteristic digitiform end (“nail”) and the gonocoxite is covered by 4-5 large setae.

In the same survey other small container breeder mosquitoes were observed. *Culiseta longiareolata* (Macquart, 1838) was found in a rock hole (45°38'58.90"N, 13°51'22.30"E) and *Cx. pipiens* Linnaeus 1758 in co-occurrence with *Ae. koreicus* (Edwards, 1917) were detected in an animal small drinking trough (45°41'36.17"N, 13°45'6.39"E).

The present records of *Or. pulcripalpis* are the first for Northern Italy and represent an addition of a new genus and a new species to the FVG Culicids checklist (Zamburlini *et al.*, 2019), which is now composed of a total of 38 species.

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**Fig. 6** - *Orthopodomyia pulcripalpis* adult. Dorsal view of thorax of the specimen with yellowish stripes



**Fig. 7** - *Orthopodomyia pulcripalpis* adult. Male hypopygium

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