First records of *Zaprionus tuberculatus* (Diptera: Drosophilidae) from the Mediterranean Region, Turkey.

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Introduction

The drosophilid genus *Zaprionus* Coquillett, 1902 is classified under two subgenera, and a total of 59 species are recognized with respect to recent phylogenetic findings using molecular and morphological characters (Yassin and David, 2010). The genus *Zaprionus* is widespread through the African continent (Tsacas *et al*., 1981), and it exhibits that the most common species of the genus are *Zaprionus indianus* Gupta, 1970 and *Zaprionus tuberculatus* Malloch, 1932 with their expanded distribution to the Afrotropical region and Palearctic (Chassagnard and Tsacas, 1993).

Zaprionus tuberculatus is assigned to the subgenus *Zaprionus*, species group *inermis* and species subgroup *tuberculatus* (Yassin, 2008). The species *Z. tuberculatus* commonly known as "Vinegar fly or Pomace fly," is an Afrotropical drosophilid native to the Afrotropical region and the islands of the Indian Ocean (Chassagnard and Tsacas, 1993). It has acquired invasive capacities after the geographical expansion to the southern boundaries of Europe. Even though it is the second most widespread species especially compared with the agricultural pest *Z. indianus*, very little is known about its biology and ecology. The present study intends to report the first record of *Zaprionus tuberculatus* from the city of Adana (37.0000° N, 35.3167° E) located on the southern coast of Turkey. Based on our observations and due to the some possible similarities between the range expansions of *Z. tuberculatus* and *Z. indianus*, it is supposed that *Z. tuberculatus* could be a potential agricultural pest for the fig cultures around the area in recent times.

Materials and Methods

The sampling was done in August 2011, from more coastal parts of Adana to inner parts of the adjacent region. The locations chosen to be sampled were different in terms of altitude, and some of them are agricultural lands that surround the urban area (Geographical locations are listed in Table 1). We set quite a number of traps which contained fermented banana and peach baits with a distance of at least a few meters between each of them, to collect wild-living adults. The flies were picked from the traps in each region at approximately the same time of the day. The collected individuals were transported to the laboratory with each of them in a separate vial to allow females to lay eggs to produce progenies. Species identification was performed using the first generation progeny of wild-caught females with respect to the identification key by Yassin and David (2010).

a. **b.**

Figure 1. Forefemur with (a) a tubercule bearing a long bristle and (b) a tuft of heavy hairs on basitarsus segment of fore-legs of males in *Zaprionus tuberculatus.*

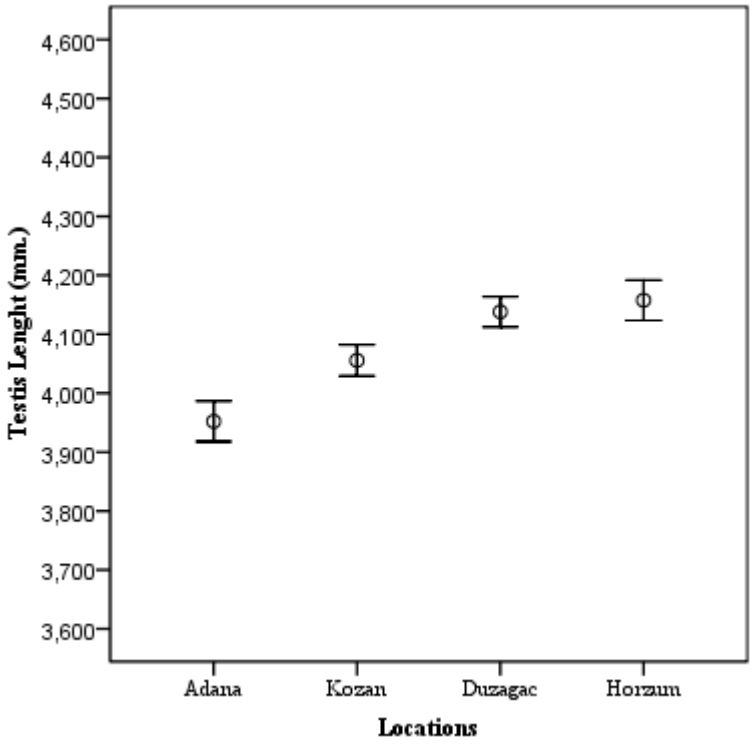

Figure 2. Testis length (mm) variation of F1 progenies in *Zaprionus tuberculatus* across the altitudinal gradient. Data are presented as mean and standart error.

Results and Discussion

The first generation progenies of wild-caught females collected from each location were identified step by step. Accordingly, it is shown that all individuals have the fore-femur with a protruding tubercule bearing a bristle (Figure 1a), frons with a median white stripe, thorax is dark brown, mesonotum and metanotum with aligned, white, longitudinal stripes. In males there exists a structure, a tuft of heavy hairs similar to *Drosophila*-sex comb, on basitarsus segment of fore-legs (Figure 1b) and aedeagus subterminally convex in dorsoventral view. Preapical egg filaments either spatulate or simple, testis repeatedly coiled and long, included in the range of 3.2 mm and 4.9 mm based on the results measured from approximately 100 males from the first generation of each location. According to Yassin and David (2010), *Z. tuberculatus* can only be distinguished from its siblings by testicular sizes. We found that

testicular size showed individual variation among brothers from the same isolines, and significant differences were found between population pairs [$F(3,514) = 12{,}182$, $p = 0.000$]. Interestingly, it seems that the testis length increases with increasing elevation (Figure 3). But that point needs a detailed study of a much more extensive sampling.

In conclusion, we are confident that these are very recent introductions for the region, as we had been sampling *Drosophila* specimens in the area previously without detecting *Z. tuberculatus* until 2010. The locations chosen were different in terms of altitude, and we could not collect *Z. tuberculatus* above 1000 meters above sea level despite more traps being laid in higher altitudes (Table 1).

Table 1. Number of adult specimens of *Z. tuberculatus* collected from different regions of Adana, Turkey.

Geographical Locations	Habitat	Altitude	No. of traps	No. of individuals
ADANA (37.03°N, 35.82°E)	Urban	35 m.	20	100
KOZAN (37.45°N, 35.80°E)	Suburban	150 m.	10	100
DUZAGAC (37.58°N, 35.82°E)	Forested-rural area	500 m.	30	195
HORZUM (37.62°N, 35.84°E)	Forested-rural area	700 m.	20	127
TUFANBEYLİ (38.26°N, 36.22°E)	Suburban	1.430 m.	50	-
SARIZ (37.81°N, 35.70°E)	Rural area	1.612 m.	45	3
SAİMBEYLİ (37.98°N, 36.09°E)	Forested-rural area	1.000 m.	30	3

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References: Chassagnard, M.T., and L. Tsacas 1993, Annls. Soc. Ent. of France 29: 173-194; Tsacas, L., D. Lachaise, and J.R. David 1981, In: *Genetics and Biology of* Drosophila, (Ashburner, M., H.L. Carson, and J.N. Thompson, jr., eds.), Vol 3a: 197-259, Academic Press, London; Yassin, A., 2008, Annls. Ent. Soc. of America 101: 978–988; Yassin, A., and J.R. David 2010, Zookeys 51: 33-72.

Drosophilid collections at Moleques do Sul archipelago, southern Brazil.

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Moleques do Sul is an oceanic archipelago near Santa Catarina Island, Santa Catarina state, southern Brazil. It is located 14 km from the coast and made up of three small islands with a total area of 10.5 hectares. The main island, also called Moleques do Sul, has 9.86 ha, from which 6.34 is covered with grass and bush vegetations and the rest by rocky terrain. The vegetation cover of this area has had many taxonomic surveys carried out (Gomes *et al*., 2005; Rogalski and Araújo, 2005).