

allelic forms (electrophoretic variants) start appearing in about one hour of incubation at room temperature. In this study, we have been able to observe two distinct polymorphic gene loci for this enzyme, *i.e.*, *Xdh1* and *Xdh2*. Each locus is further represented by two electrophoretic variants (Fast and Slow). Figure 1 depicts the electrophoretic variants of xanthine dehydrogenase in *D. malerkotliana*. Frequency of these variants in natural populations of this species is being observed and a detailed description in this regard will be documented soon.

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***Drosophila mercatorum* (Diptera: Drosophilidae) in Sakhalin Island of Russian Far East.**

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During three years, from 2014 to 2016, in the summer, we have performed collections of *Drosophila melanogaster* for population genetic studies on the Sakhalin Island. In 2014 (1-9 August) and 2015 (July 27 - August 8) collections were performed on the west coast of the island, in the city of Tomari (47°40'N; 142°04'00"E); in 2016 (July 27 - August 5) in the city of Yuzhno-Sakhalinsk, - the administrative center of the island (46°57'00"N; 142°44'00"E). Since the main object of our interest was a synanthropic and cosmopolitan *D. melanogaster*, we performed collections in residential areas of the cities.

The synanthropic Drosophilidae collected in the course of these measures are represented by five species:

- 1) *Drosophila (Dorsilopha) busckii* Coquillett, 1901;
- 2) *Drosophila (Drosophila) mercatorum* Patterson & Wheeler, 1942;
- 3) *Drosophila (Sophophora) melanogaster* Mg., 1830;
- 4) *Drosophila (Sophophora) simulans* Sturtevant, 1919;
- 5) *Lordiphosa magnipectinata* Okada, 1956.

Among these five species an autochthon is only *L. magnipectinata*. This species inhabits the native habitats and is widespread on the islands and mainland of the Russian Far East, in Japan (Hokkaido and Honshu), in Korea, and northeast China (Sidorenko, 2001). Three species, *D. busckii*, *D. melanogaster*, and *D. simulans* are cosmopolitan and their presence may be expected at any point of a Globe populated by people. According to the data presented in the Table, two species, *D. melanogaster* and *D. mercatorum*, are most common and numerous, and the first is clearly dominant in numbers.

D. mercatorum in Sakhalin Island, in 2014, was recorded for the first time, and to this date it is the extreme eastern point of registration of this species in Russia. This fact is the final accord in the history of the installation of the species in the territory of Northern Eurasia.

For the first time in the Old World neotropical species *D. mercatorum* was recorded in 1953, in Spain, in Barcelona (Prevosti, 1953). In the next two decades, the individuals of the species were present in small

amounts in *Drosophilidae* collections in Spain and the Canary Islands (Monclús, 1964, 1976). In the early 80s, according to several authors, the distribution of the species in the Old World remained within the boundaries of the Western Mediterranean (David and Tsacas, 1980; Bächli and Rocha Pite, 1981; Wheeler, 1981; Monclús, 1984).

Table 1. The distribution of species on the collection sites.

Species	Tomari 2014 N (%)	Yuzhno- Sakhalinsk 2015 N (%)	Tomari 2016 N (%)	Total N (%)
<i>D. busckii</i>	0	0	52 (8.5)	52 (4.2)
<i>D. mercatorum</i>	19 (9.1)	86 (20.4)	44 (7.2)	149 (12)
<i>D. simulans</i>	1 (0.5)	3 (0.7)	0	4 (0.3)
<i>D. melanogaster</i>	188 (89.5)	324 (77)	515 (84.3)	1027 (82.7)
<i>L. magnipectinata</i>	2 (0.9)	8 (1.9)	0	10 (0.8)
Total	210	421	611	1242

Since the beginning of the 90s, according to our data and publications, began the spread of the species from the Western Mediterranean to the east and north. In 1990 *D. mercatorum* was first recorded by us in the Soviet Union, in two widely separated locations: in Eastern Europe, in Ukraine, in the city of Uman (Ivannikov *et al.*, 1993); and in Western Siberia in Novosibirsk (Ivannikov *et al.*, 1998; Ivannikov and Zakharov, 1995). In 1992, *D. mercatorum* was first found in the north of Western Europe, in the Netherlands (Kraaijeveld, 1992). In October 1994, *D. mercatorum* was first found in England (Bennett *et al.*, 1995). In November 1994, *D. mercatorum* was first recorded by us in Central Asia - Tajikistan, in Dushanbe (Ivannikov and Zakharov, 1995).

Novosibirsk population of *D. mercatorum*, we found in 1990, in the geographical center of Russia, during the decade of the 90s remained viable, numerous, and stable. However, to find individuals of the species in other cities of Russia we could not until 1998. In 1998, Dr. Yu. Novikov found *D. mercatorum* in Tomsk (200 km north of Novosibirsk). In the summer and autumn of 1999 the species was found in two places in the territory of Russia, - in the Altai Republic (south of Western Siberia, 500 km south of Novosibirsk) and in the Republic of Udmurtia (eastern European part of Russia, 2000 km west of Novosibirsk) (Ivannikov and Zakharov, 2000).

In 2000 *D. mercatorum* was first discovered in the Far East of Russia, in the city of Vladivostok by dipterologist Vasily Sidorenko and was included in the "Key to the Insects of Russian Far East" (Sidorenko, 2001).

In our collections synanthropic fruit flies in the Central Asian republics of the former Soviet Union since the early 2000s to the present time, *D. mercatorum* was found in the big cities: Almaty (Kazakhstan); Bishkek (Kyrgyz Republic); Tashkent (Uzbekistan) (our unpublished data).

Thus, now we can state with confidence that over the past approximately thirty years, *D. mercatorum* fully colonized the Eurasian Continent from Western Europe, including the British Isles, up to the Far East of Russia, including Sakhalin Island.

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Parasitoids of Drosophilidae with potential for parasitism on *Drosophila suzukii* in Brazil.

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Abstract

The spotted wing drosophila is an invading polyphagous species, which causes damage on small stone fruits. In Brazil, the species was detected in 2013. This study registers the occurrence of parasitoids *Leptopilina boulardi* (Barbotin, Carton & Kelner-Pillault) (Hymenoptera: Figitidae) and *Trichopria anastrephae* Lima (Hymenoptera: Diapriidae) on blackberry and strawberry fruits attacked by *Drosophila suzukii*.

Introduction

The spotted wing drosophila, *suzukii* (Matsumura, 1931) (Diptera, Drosophilidae), is a species endemic to Asia, first registered as an invading species in Hawaii in 1980 (Kaneshiro, 1983). It has rapidly spread worldwide in the last few years, arising as one of the main pests of small stone fruits (Asplen *et al.*, 2015). In 2008, it was recorded simultaneously in California, in the United States (Bolda *et al.*, 2010), and several other localities in Europe (Calabria *et al.*, 2012). For South America, records include Brazil (Deprá *et al.*, 2014; Schlesener *et al.*, 2014; Geisler *et al.*, 2015), Uruguay (González *et al.*, 2015), and Chile (Medina-Muñoz *et al.*, 2015).

This species presents a short life cycle and high biotic potential (Emiljanowicz *et al.*, 2014; Tochen *et al.*, 2014), which may lead to a rapid increase in population when environmental conditions are favorable (Wiman *et al.*, 2014) possibly resulting in considerable economic losses to commercial crops (Beers *et al.*, 2011; Walsh *et al.*, 2011). Currently, the main control method applied is chemical (Cancino *et al.*, 2015), wherein several insecticide classes – such as pyrethroids, spinosyns and organophosphates – have been proven effective over *D. suzukii* (Bruck *et al.*, 2011). Nevertheless, the fly's rapid life cycle, which allows for the occurrence of many generations during a single production cycle, and its occurrence in the fruit's ripening phase, require frequent applications endangering human health and the environment via residue in the fruits, insecticide resistance in insects, as well as the negative effects to pollinators and biological control agents (Cini *et al.*, 2012).

Therefore, alternative strategies for the control of *D. suzukii* are demanded. Biological control, particularly by use of parasitoids, may help suppress regional *D. suzukii* population even in crop adjacent habitats (Wang *et al.*, 2016). A great diversity of parasitoids associated with the *drosophila* genus has been recorded (Fleury *et al.*, 2009). Larvae parasitoids are the most recurring ones, especially those from the