

New records of the Lime Swallowtail *Papilio demoleus* Linnaeus, 1758 (Lepidoptera: Papilionidae) in Azerbaijan

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Summary: *Papilio demoleus* LINNAEUS, 1758 has been recorded for the first time in Azerbaijan. The larvae of the butterfly, are an important pest of citruses (*Rutaceae*).

Keywords: Lime Swallowtail, *Papilio demoleus*, Azerbaijan

Introduction

E. MÉNÉTRIÉS, collaborator of the Zoological Museum of Zoological Institute of the Russian Academy of Sciences (formerly Emperor's Museum), was the first entomologist engaged in studying butterflies in Azerbaijan (MÉNÉTRIÉS 1859). Later in the XIX century, J. LEDERER (1870a), O. STAUDINGER (1861), and N.M. ROMANOFF (1884) carried out their investigations on butterflies in many districts of Azerbaijan, but especially in Talysh and Ordubad. During the Soviet period, the famous lepidopterologist M.A. RJABOV was engaged in studying lepidopterans of the Caucasus, including Azerbaijan (RJABOV 1958).

R.M. EFFENDI was among the first native entomologists who studied the butterfly fauna of Azerbaijan. EFFENDI reports on 223 butterfly species of Azerbaijan on the basis of his own field research and museum data (EFFENDI 1971). It is particularly worth mentioning Y.P. NEKRUTENKO (NEKRUTENKO 1990) and E. DYDMANIDZE's contributions (DYDMANIDZE 2004) in the research of butterflies of the Caucasus, including Azerbaijan.

According to the results of recent research, 248 species belonging to this group (i.e. Lepidoptera: Rhopalocera) are known to Azerbaijan (TSHIKOLOVETS and NEKRUTENKO 2012).

Based on these species numbers and distribution information, it can be summarized that the butterfly fauna from Azerbaijan is insufficiently researched.

This article reports for the the first record of the Lime Swallowtail *Papilio demoleus* LINNAEUS, 1758 in Azerbaijan (Fig. 1).

Geographical description of the investigated area in Azerbaijan

Field work was carried out focusing on the Talysh area. It is located in the extreme south-eastern part of

Azerbaijan at the Caspian Sea, and to the west and south is bordered by the Republic of Iran . It stretches from the point where the sea shore region meets the steep ridge at 21 m b.s.l. up into the mountains at 2500 m a.s.l. The climate is damp and subtropical (SAFAROV 2013).

The region differs from the rest of the country by its numerous endemic species often representing relicts dating back to the Tertiary Period. By not having been affected by glaciation during the Pleistocene ice ages, these having been preserved here in the refuge of the tertiary forests under continuously favorable climatic conditions. Therefore, a State Reserve was established in 1936 in order to protect this highly relevant biodiversity and the unique landscape. In 2004, the State Reserve was transformed into Hirkan National Park with a total area of 21.435 ha (SAFAROV 2013). A part of the Hirkan National Park stretches in the Lankaran region (MAMMADOV *et al.* 2012).

However, thanks to its climatic and pedological conditions, the Talysh area is also highly suitable for fruit production. Mostly lemon (*Citrus limon*), feijoa (*Acca sellowiana*) and orange (*Citrus aurantium*) are grown in this territory.

Results

In the summer of 2018, the first author collected 5 male specimens of *P. demoleus* in the Lankaran district, Burjali village (N 38°39'0", E 48°47'0") located in the south region of the Azerbaijan Republic (Fig. 2). The butterflies were flying in feijoa gardens (*Acca sellowiana*). Apart from 5 collected specimens, other specimens were observed flying or sucking nectar. The first specimen was observed and collected at 18.VII.2018 while sucking nectar on a flower of the bindweed *Calystegia sepium* (*Convolvulaceae*). The second specimen was observed and collected in feijoa gardens on 2.VIII.2018 (Fig. 3).



Fig. 1. Male specimen of *Papilio demoleus* LINNAEUS, 1758 from Azerbaijan: dorsal (left), ventral (right).

Discussion

Papilio demoleus is a common and wide spread swallowtail butterfly. Being a pest and invasive species, it can be observed from Asia to Australia. The *demoleus* species group includes 5 monophyletic species (SMITH and VANE-WRIGHT 2010). Apart from *P. demoleus*, the most common and wide spread species of this group in Sub-Saharan Africa is *P. demodocus*. The remaining three species are particular restricted to Madagascar (ZAKHAROV *et al.* 2004a,b).

P. demoleus was observed and collected in and around citrus plantation and gardens. Thus, the habitat belongs to the extensive orchards, which are treated chemically several times a year. In Lankaran district, citrus orchards and nature reserves do not have natural margins and partly border each other in some parts of the region (Fig. 4).

Biology and Ecology

The preimaginal stages of *P. demoleus* have been well studied and documented. The egg is described e.g. by BADAWI (1981). The larval stages and biology were described by SHARIFI (1970). The moth can develop up to 6 generations a year (HEPPNER 2006, HOMZIAK and HOMZIAK 2006). The larvae of *P. demoleus* have 5 stadia.

The Lime Swallowtail is well known to be a serious Citrus pest, especially to young Lemon and Orange trees which may be completely defoliated by its large, voracious larvae (NARAYANAMMA *et al.* 2001). The high pest potential of the species is due to quick multiplying, and a whole life cycle is possible to be completed within 30 days in summer, if conditions are favourable. This reason evoked the Florida Department of Agriculture to issue a pest alert (HEPPNER 2006) when *P. demoleus* was first observed in Puerto Rico (HOMZIAK and HOMZIAK 2006).

Despite the fact that climate change may exert an increase of temperatures in the Eastern Mediterranean, it is unlikely that *P. demoleus* will be able to survive the colder and wetter winters that normally prevail

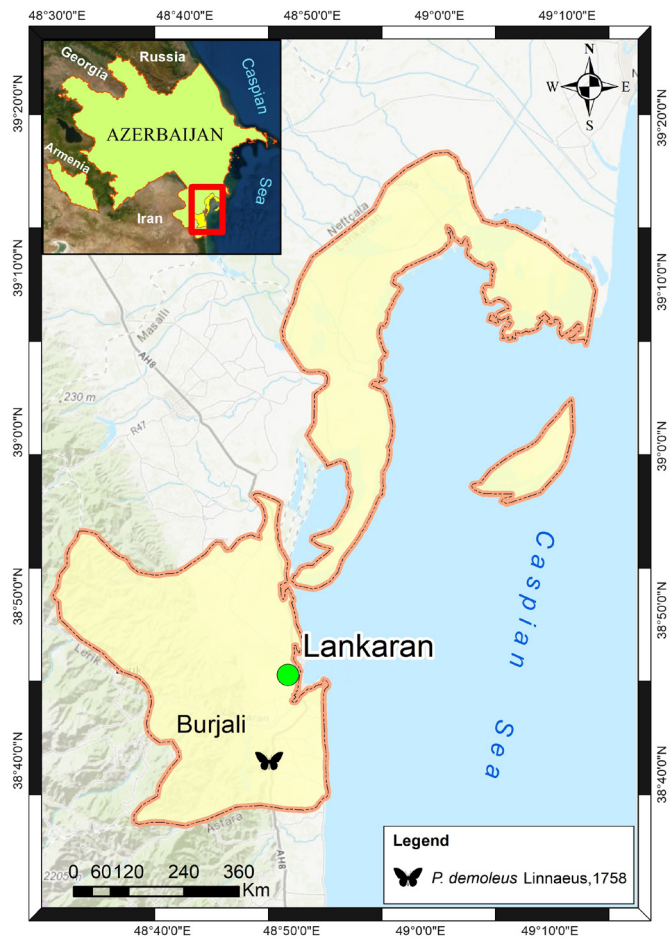


Fig. 2. First observations of *Papilio demoleus* in Azerbaijan

in the inland areas of the region. However, the more temperate coastal temperatures may allow the species to become established, and the *P. demoleus* group might even extend more to the west in forthcoming years (BENYAMINI *et al.* 2007).

Distribution

This species was found throughout tropical and subtropical regions of southern Asia (CORBET and PENDLEBURY 1992), Saudi Arabia (BADAWI 1981), Iraq (LARSEN 1977), Iran (SHARIFI and ZAREA 1970)

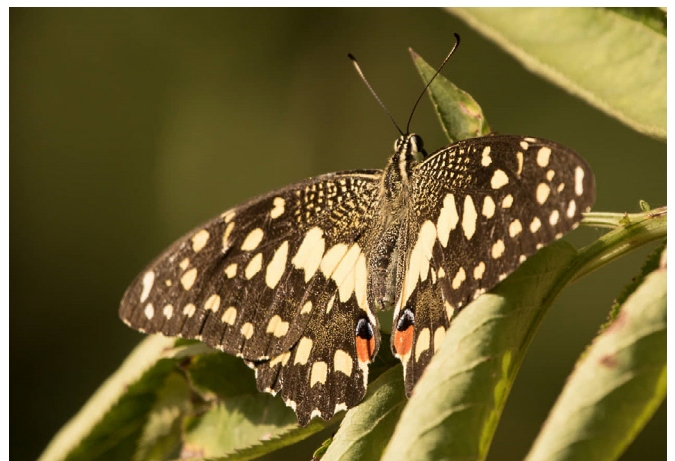
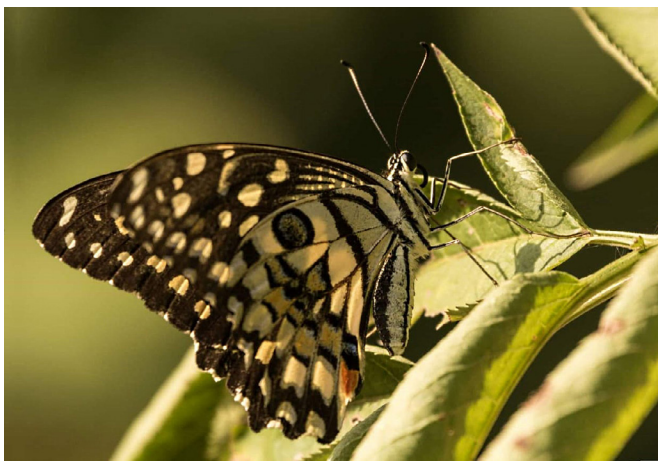


Fig. 3. *Papilio demoleus* LINNAEUS, 1758 from Lankaran district, Azerbaijan, photographed alive in nature, photos: IBRAHIMOV E.

and the Middle East to India, Nepal, southern China, Taiwan, and Japan (SARADA *et al.* 2013). In addition, it is observed in Cuba (RAYNER 2007), Malaysia, Indonesia (KATO 1989, PEGGIE *et al.* 2005), New Guinea (PARSONS 1998) and Australia (BRABY 2000).

Recently, *Papilio demoleus* has been recorded in the Dominican Republic (GUERRERO *et al.* 2004), Puerto Rico (HOMZIAK and HOMZIAK 2006), and Carribean (GARRAWAY *et al.* 2009).

In 2003 and 2004, *P. demoleus* was observed in such territories as central Syria, near Al Qaryatayn and Palmyra, and after a short period, in 2005, it was recorded in Turkey for the first time, in Nusaybin city (Mardin Province) close to the Syrian border (BENYAMINIET *et al.* 2007, KOCAK *et al.* 2006, KOCAK and AKDENIZ 2008).

Some specimens were collected from Ramsar (Iran) on 23rd of July, in 2007 (LEHMANN and ZAHIRI 2011). This Oriental butterfly species, originally restricted in Iran to the southernmost regions of the country, was first introduced by men to the Teheran area and has spread there over the last two decades (NAZARI 2003). Anthropogenic impact on the current spread of *P. demoleus* was already suspected many times (SMITH and VANE-WRIGHT 2008). Presumably the species is *P. demoleus* from Iran, in South-East Azerbaijan after the year 2000 immigrated from Iran. Due to the good flight dynamics, the species will continue to spread north in the coming years.

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Fig. 4 . Citrus orchards in the Burjali Village, August 2018

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