



## Contribution to the Lepidoptera Fauna of Hatay (Turkey)

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ARTICLE INFO	ABSTRACT
<p><i>Research Article</i></p> <p>Received : 05/11/2018 Accepted : 16/04/2019</p> <p><b>Keywords:</b> <i>Papilio demoleus</i> <i>Cornifrons ulceratalis</i> <i>Macaria alternata</i> <i>Camptogramma bilineatum</i> Hatay Citrus</p>	<p>Field studies were carried out in the localities of different altitudes and vegetation covers in the Hatay province in March-October 2018. <i>Papilio demoleus</i> was caught with insect net in the citrus orchards at Antakya and Reyhanlı. <i>Cornifrons ulceratalis</i>, <i>Macaria alternata</i> and <i>Camptogramma bilineatum</i> were caught mercury vapour light trap and white screen in different localities, at different elevations, in different climatic conditions, plant cover and surface features in Erzin. <i>Papilio demoleus</i> was caught in the citrus gardens in the province of Hatay Reyhanlı district as a male and a female on 05.09.2018 and in Antakya district on 15.10.2018 as two male and three female individuals. This invasive species is widespread all over the world and has the potential to create substantial threat for citrus orchards in the Mediterranean region and in the eastern Mediterranean region of Turkey in next years. As a result, <i>Papilio demoleus</i> (Papilionidae), <i>Cornifrons ulceratalis</i> (Crambidae), <i>Macaria alternata</i> and <i>Camptogramma bilineatum</i> (Geometridae) are new records for the lepidoptera fauna of Hatay.</p>

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## Hatay'ın (Türkiye) Lepidoptera Faunasına Katkıları

MAKALE BİLGİSİ	ÖZ
<p><i>Araştırma Makalesi</i></p> <p>Geliş : 05/11/2018 Kabul : 16/04/2019</p> <p><b>Anahtar Kelimeler:</b> <i>Papilio demoleus</i> <i>Cornifrons ulceratalis</i> <i>Macaria alternata</i> <i>Camptogramma bilineatum</i> Hatay Turunçgil</p>	<p>Mart-Ekim 2018 tarihleri arasında Hatay ilinde yapılan bu çalışma farklı yüksekliklerde ve farklı bitki örtüsüne sahip lokalitelerde gerçekleştirilmiştir. <i>Papilio demoleus</i> Antakya ve Reyhanlı ilçelerindeki narenciye bahçelerinde atrap yardımıyla yakalanmıştır. <i>Cornifrons ulceratalis</i>, <i>Macaria alternata</i> ve <i>Camptogramma bilineatum</i> Erzin ilçesinde farklı iklim koşullarında ve farklı yüksekliklerdeki bitki örtüsüne sahip lokalitelerden ışık tuzağı ve beyaz perde yardımıyla yakalanmıştır. <i>Papilio demoleus</i> Reyhanlı ilçesindeki narenciye bahçelerinden 05.09.2018 tarihinde bir erkek ve bir dişi birey ve Antakya ilçesindeki narenciye bahçelerinden ise 15.10.2018 tarihinde iki erkek ve üç dişi birey yakalanmıştır. Bu istilacı tür birçok ülkede yaygındır ve gelecek yıllarda da Akdeniz ve Doğu Akdeniz Bölgelerindeki turunçgiller için önemli bir tehdit potansiyeline sahiptir. Sonuç olarak, <i>Papilio demoleus</i> (Papilionidae), <i>Cornifrons ulceratalis</i> (Crambidae), <i>Macaria alternata</i> ve <i>Camptogramma bilineatum</i> (Geometridae) Hatay'ın Lepidoptera faunası için yeni kayıt türlerdir.</p>

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## Introduction

The first attempt on the checklist of the Turkish moths was listed by Koçak and Kemal (2006, 2007). Totally 4604 moth species were listed together with their synonymous named and updated provincial distributions. Later, the authors (Koçak and Kemal, 2018), reported that the Turkey Lepidoptera fauna was 5577 species (5158 moths and 412 butterfly) belonging to 76 families (9 butterfly, 67 moth families). In addition, a total of 508 lepidoptera species, 377 Heterocera and 131 Rhopalocera, belonging to the province of Hatay were listed by the same authors.

*Papilio demoleus* Linnaeus, 1758 (Lepidoptera, Papilionidae) (Figure 1, 2) is a common pest of all citrus plants (Koçak et al., 2008; Suwarno, 2012; Wiemers, 2012; Yazdani et al., 2014; Lewis, 2018). The lime swallowtail, *P. demoleus*, is sometimes called the chequered or citrus swallowtail. This butterfly ranges widely and an extremely successful invader. Its proliferation appears to be aided by agricultural land use and urbanization that create new, suitable, open habitat and enhanced availability of resources (Lewis, 2018). The most striking character of this species among the other papilionid species is the absence of tail at the hindwing (Koçak et al., 2006). There are six subspecies of the butterfly in the world: these are; *Papilio demoleus demoleus* Linnaeus, 1758 (Across Asia from China to the Arabian Peninsula, and in some islands in the West Indies, including Jamaica), *P. d. libanius* Fruhstorfer, 1908 (Taiwan, Philippines, Sula, Talaud), *P. d. malayanus* Wallace, 1865, (Sumatra and the Malaysian peninsula), *P. d. novoguineensis* Rothschild, 1908 (Papua New Guinea),

*P. d. sthenelus* Macleay, 1826 (Australia), *P. d. stenelinus* Rothschild, 1895 (Sumba, Flores and Alor) (Wiemers, 2012). *P. demoleus* is an economic pest on many cultivated citrus species in India, Pakistan, China, Nepal, Japan, Iraq, Arabian Peninsula, Australia, Dominican Republic, Turkey, Syria and the Middle East (Benyamini et al., 2007; Tshikolovets, 2011; Wiemers, 2012; Lewis, 2018). Due to its capability for rapid population growth under favourable circumstances and its having been recorded to have five generations in a year in temperate regions of China, it is considered a serious potential threat (Homziak and Homziak, 2006).

According to Wiemers (2012), until recently, *Papilio demoleus* was thought to be a species confined to warm climates, and that a climatic barrier was limiting its further north westward expansion from the Arabian Peninsula into the Mediterranean Region. The recent records indicate that *P. demoleus* might be a more adaptive species which can acclimatize in regions with slightly different conditions and colonize the citrus plantations there. Some authors associate the *P. demoleus* range extension with recent climatic warming in the Northern Hemisphere that move the climatic borders previously limiting the species distribution.

In this study is aimed to give systematic information about *Papilio demoleus* (Papilionidae), *Cornifrons ulceratalis* (Crambidae), *Macaria alternata* and *Camptogramma bilineatum* (Geometridae) species which are new records for Hatay province.



Figure 1 Dorsal and ventral views of adults, *Papilio demoleus*

## Material and Methods

### Field Studies

Field studies were carried out in the localities of different altitudes and vegetation covers in the Hatay province in March-October 2018. All the field works were done under suitable weather conditions (without precipitation and strong winds) and started early in the morning and continued until sunset. *Papilio demoleus* Linnaeus was caught with insect net in the citrus orchards at Antakya and Reyhanlı. *Cornifrons ulceratalis* Lederer, *Macaria alternata* [Denis&Schifferrmüller] and *Campptogramma bilineatum* (Linnaeus) were caught mercury vapour light trap and white screen in different localities, at different elevations, in different climatic conditions, plant cover and surface features in Erzin.

### Laboratory Studies

Before losing body water, the collected specimens were sorted according to body sizes, and were needed with number 0 and 2 insect needles that matched the size of the custom sized boards, strain and inhibition couples were strained in laboratory work. For the drying of the stretched specimens, they were kept at room temperature for two weeks in a dark and dry place. Male and female genital organs of species (*Cornifrons ulceratalis*, *Macaria alternata* and *Campptogramma bilineatum*) were prepared for the identification. The needling of the butterflies, stretching of the wings and genital organ preparations were done accordingly the methods that defined in Atay's work (2006). The specimens stored at the Biology Department of Mustafa Kemal University in Hatay.

## Results

### *Papilio demoleus* Linnaeus, 1758 Papilionidae (Figs. 1, 2)

Syn: *demoleus* L., 1758; *erithonius* Cramer, [1782]; *epius* Fabricius, 1793; *sthenelus* Macleay, 1826; *demoleinus* Oberthür, 1879; *pictus* Fruhstorfer, 1898; *chryseis* Boulet & Le Cerf, 1912; *flavosignatus* Heydemann (Koçak et al, 2006).

**Materials examined:** Reyhanlı-Hatay (36°07'26" N; 36°08'39" E, 350 m.) 05.IX.2018 1♂, 1♀; Antakya-Hatay (36°07'26" N; 36°08'39" E, 350 m.), 15.X.2018 2♂, 3♀.

Wingspan ♂: 90 mm, ♀: 100 mm; Body Length ♂: 27 mm, ♀: 26 mm.

The distribution in Turkey: Mardin (Koçak and Kemal, 2009).

### *Cornifrons ulceratalis* Lederer, 1858 (Crambidae; Evergestinae) (Fig. 3)

Syn: *ulceratalis* Lederer, 1858; *Scoparia seriziatilis* Oberthür, 1876 (Koçak and Kemal, 2018).

**Materials examined:** Erzin-Hatay (36°07'26" N; 36°08'39" E, 350 m.) 20.VII.2018 2♂, 1♀; 12.VIII.2018 2♂.

Wingspan ♂: 16 mm, ♀: 17 mm; Body Length ♂: 8 mm, ♀: 6 mm.

The distribution in Turkey: Antalya, Gaziantep, Van (Koçak and Kemal, 2009).



Figure 2 Dorsal view of adult, *Papilio demoleus*



Figure 3 Dorsal view of *Cornifrons ulceratalis* (Male and female)

### *Macaria alternata* [Denis&Schifferrmüller, 1775] (Geometridae)

(Fig. 4)

Syn: *alternata* [Denis&Schifferrmüller, 1775]; *alternaria* Hübner, [1805]; *praenotata* Haworth, 1809 (Koçak and Kemal, 2018).

**Materials examined:** Erzin-Hatay (36°07'26" N; 36°08'39" E, 350 m.) 20.VII.2018 1♀; 12.VIII.2018 1♂.

Wingspan ♂: 30 mm, ♀: 30 mm; Body Length ♂: 11 mm, ♀: 11 mm.

The distribution in Turkey: Bursa, Kahramanmaraş (Koçak and Kemal, 2009).



Figure 4 Dorsal view of *Macaria alternata* (Male and female)



Figure 5 Dorsal view of *Camptogramma bilineatum* (Male)



Figure 6 The Larvae damages on Citrus leaves

*Camptogramma bilineatum* (Linnaeus, 1758)  
(Geometridae)

(Fig. 5)

Syn: *bilineata* L., 1758; *brocatella* Fourcroy, 1785; *dumetata* Schrank, 1802; *bilinearis* Boisduval, 1840; *musauria* Freyer, 1846; *testaceolata* Staudinger, 1871 (Koçak and Kemal, 2018).

*Materials examined:* Erzin-Hatay (36°07'26" N; 36°08'39" E, 350 m.) 12.VIII.2018 1♂.

Wingspan ♂: 23 mm; Body Length ♂: 11 mm.

The distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Balıkesir, Bitlis, Bolu, Bursa, Çanakkale, Hakkari, Kars, Ordu, Tokat, Van, Şırnak (Koçak and Kemal, 2009).

As a result, *Papilio demoleus* L. (Papilionidae), *Cornifrons ulceratalis* Lederer (Crambidae), *Macaria alternata* [Denis&Schifferrmüller] (Geometridae) and *Camptogramma bilineatum* (Linnaeus) (Geometridae) are new record for the lepidoptera fauna of Hatay.

## Discussion

*Papilio demoleus demoleus* reported a new record by Koçak et al., (2006) for the first time in Nusaybin district of Mardin in Turkey. This species was caught in the citrus gardens 13 years later for first time which in the province of Hatay Reyhanlı district as a male and a female on 05.09.2018 and in Antakya district on 15.10.2018 as two male and three female individuals.

This species, which is an important citrus pest (Fig. 6) and migrant, has probably reached to Reyhanlı district of Hatay province through Syria and from there to the Antakya where is another district of Hatay province. There are significant citrus cultivation in the city of Hatay and there are orange, lemon, mandarin and grapefruit gardens of citrus species in Antakya, Samandağ, İskenderun, Dörtöyl and Erzin districts. A total of 643.533 tons of products are received from citrus orchards, which are approximately 205.835 decares in Hatay. In Turkey where production made from Adana, Mersin, Hatay, Antalya and Mugla province is 1.277.426 decares and in total 3.681.158 tons of citrus production is made from garden. This invasive species is widespread all over the world and has the potential to create substantial threat for citrus orchards in the Mediterranean region and in the eastern Mediterranean region of Turkey in next years.

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