

# New Data on the Expansion of the Geranium Bronze, *Cacyreus marshalli* Butler, 1898 (Lepidoptera, Lycaenidae) in the Eastern Part of the Balkan Peninsula, with Some Biological Notes

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**Abstract:** The present paper reports some new records of the species Geranium Bronze (*Cacyreus marshalli*) from certain localities in the Mediterranean part of the South-East Balkan Peninsula, along with data regarding its biology. The collection of the data was done as a part of field work across Bulgaria, Greece and the Republic of Macedonia, as well as from other different sources (literature data, personal communications and the Internet). The first finding of the Geranium Bronze in the R. of Macedonia is also reported here.

**Key words:** *Cacyreus marshalli*, alien pest, distribution, biology, the Balkan Peninsula

## Introduction

The butterfly Geranium Bronze, *Cacyreus marshalli* Butler, 1898 (Lepidoptera, Lycaenidae), is native to South Africa. The identification of the species is very easy – the only European brownish Lycaenid with a tail and chequered fringes of the fore wing. It was introduced in the European Mediterranean (initially in Majorca on the Balearic Islands) in 1988, and in 1993 reached European mainland, where it further spread as a pest of cultivated *Pelargonium*. During the past 25 years, the butterfly has colonised much of North Africa and southern Europe, where it has become established. Till now its known range in the Mediterranean comprises: Spain, Portugal, France, Italy, Malta, Slovenia, Croatia, Greece, Morocco, and Turkey (EITSCHBERGER & STAMER 1990, RAYNOR 1990, SARTO I MONTEYS & MASÓ 1991, TARRIER 1998, TREMATERRA et al. 1997, SAMMUT 2007, POLAK 2009, KOSMAČ & VEROVNIK 2009, ANASTASSIU et al. 2010, SOYHAN et al. 2013), and there are isolated reports of the species from the UK, Switzerland, Austria, Germany, Belgium, The Netherlands, and Sweden (LUY 1996, LUY 2002, GROS 2010).

The first records for the Balkan Peninsula are from 2008 and 2009 – Slovenia (POLAK 2009), Croatia (KOSMAČ & VEROVNIK 2009) and Greece (PAMPERIS 2009). Since then many new localities have been discovered, especially in the Mediterranean zone (in Albania: SACHANOWICZ et al. 2016; Croatia: KUČINIĆ et al. 2014; Greece: COUTSIS et al. 2011, MARTINOŪ et al. 2011; Slovenia: VEROVNIK et al. 2011). In Bulgaria the species was recorded for the first time in 2014 from two localities in the southern Struma River Valley (LANGOUROV & SIMOV 2014). At present, the Geranium Bronze has spreads in almost all the coastal regions of the Balkan Peninsula, becoming a serious problem for the cultivated plants of *Pelargonium* in urban areas.

The main aim of our study was to collect data on the distribution of the alien pest species Geranium Bronze, *C. marshalli*, on the Balkan Peninsula based on field work and available data. Furthermore, some biological traits were studied under laboratory conditions.

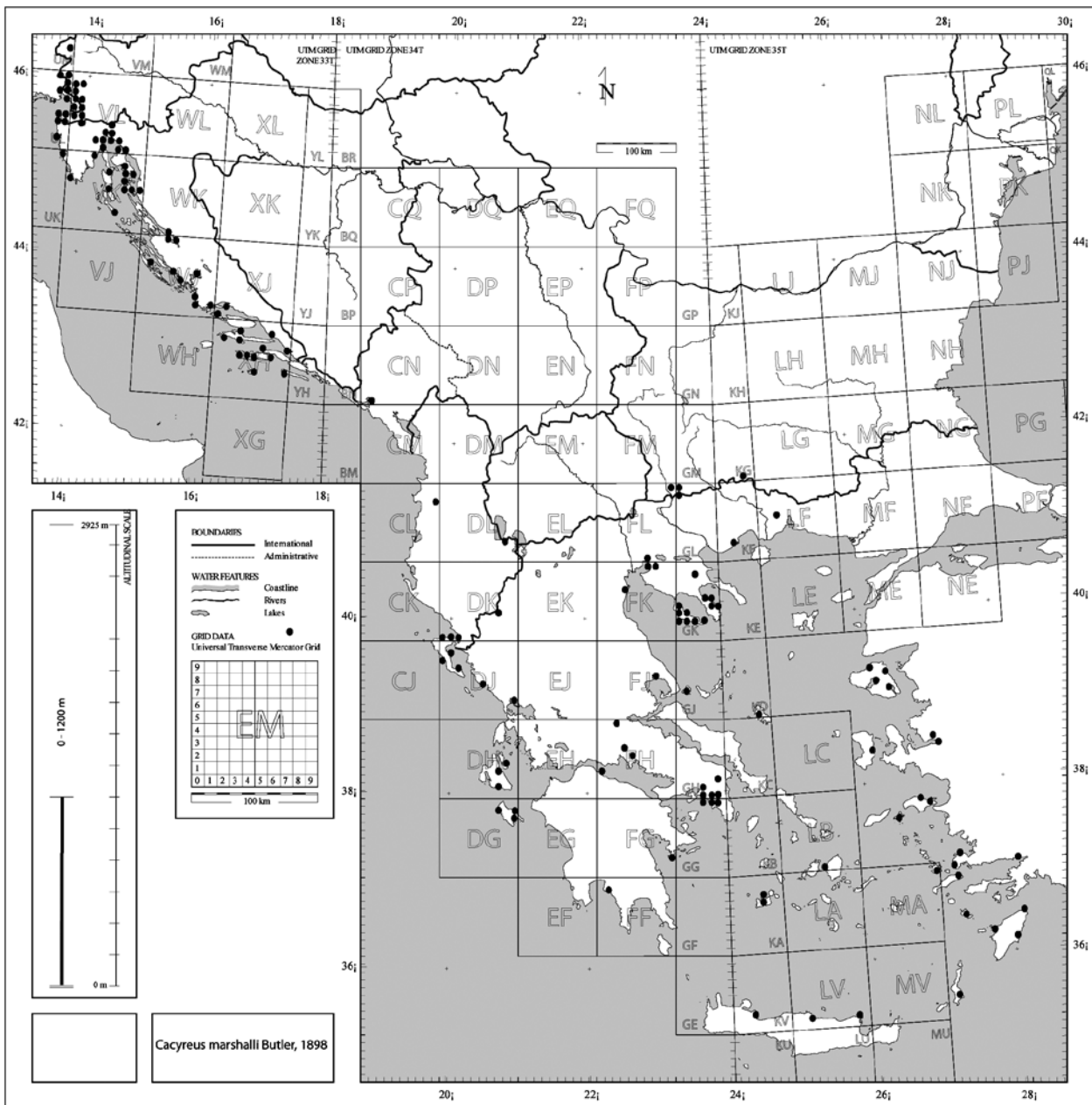


Fig. 1. Distribution of the Geranium Bronze, *Cacyreus marshalli*, on the Balkan Peninsula

## Materials and Methods

The collection of data on the distribution of the Geranium Bronze was done by field work and from other sources, such as literature data, personal communications and the Internet. The field work was conducted in Bulgaria (2015-2017), Greece (2016) and the Republic of Macedonia (2017). An UTM-grid map (10x10 km) with indicated localities of the species was prepared.

Two last instar caterpillars, collected in Ormos Panagias (Halkidiki Peninsula, Greece) on 06.08.2016 were taken to laboratory for some biological observations.

## Results and Discussion

As a result of our study three new localities of the Geranium Bronze were recorded: 1) in Bulgaria (Trigrad Village, the West Rhodope Mountains, 1200 m a.s.l., 08.2014, data from the Internet); 2) in Greece (Ormos Panagias, Halkidiki Peninsula, 06.08.2016, newly recorded data); and 3) in the R. Macedonia (St. Naum Monastery, 710 m, N 40.91362 E 020.74037, 02.08.2017, new data – one female ovipositing on *Pelargonium* sp., M. Langourov observed). The finding in the R. Macedonia is also the first record of the Geranium Bronze from this country.

Taking into account all published data about



**Fig. 2.** A female of the Geranium Bronze, *C. marshalli*, ovipositing on *Pelargonium* sp.



**Fig. 3.** A female of the Geranium Bronze, *C. marshalli*, upper side



**Fig. 4.** An egg of the Geranium Bronze, *C. marshalli*



**Fig. 6.** A chrysalis of the Geranium Bronze, *C. marshalli*



**Fig. 5.** A caterpillar of the Geranium Bronze, *C. marshalli*

this species (in the literature and the Internet), it has been recorded so far in about 150 UTM-grid zones (10x10 km) in the Balkan Peninsula and Turkey (Fig. 1). Most of the recorded localities are along the

coast (including the islands), with prevalence at the Adriatic coastal area. Very few localities are situated in the continental part of the peninsula (e.g. Trigrad, which is situated in the West Rhodope Mountains, at 1200 m a.s.l.). In recent years, a well-marked expansion of the range has been observed, with covering new territories to the east and in the interior of the Balkan Peninsula. The known boundary of the distribution area of *C. marshalli* on this peninsula

has extended between 75 (Trigrad) to 90 (Levunovo) kilometres from the sea-shore (in a straight line). All places of finding the species are located only in the Sub-Mediterranean and Eu-Mediterranean areas, which is conditioned by the biological features of the butterfly and its full life-cycle development at temperatures higher than 24°C.

The two last instar caterpillars, collected in Ormos Panagias (Halkidiki) on 06<sup>st</sup> August 2016, were observed under laboratory conditions. They fed on *Pelargonium zonale* (L.) L'Hér. ex Aiton, with preferring flowers, and then transferred to the stem

where they pupated. The first instar, which pupated on 10<sup>th</sup> August, emerged on 20<sup>th</sup> August at a temperature between 25 to 30°C, while the second developed for two weeks: between the chrysalis on 14<sup>th</sup> August and the imago on 27<sup>th</sup> August at the same temperature as above. It took about 40-45 days to complete the life cycle from egg to imago (Figs. 2-6).

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