SHILAP Revista de Lepidopterología
ISSN: 0300-5267
avives@eresmas.net
Sociedad Hispano-Luso-Americana de Lepidopterología
España

Wiemers, M.; Acosta-Fernández, B.; Larsen, T. B.
On the recent invasion of the Canary Islands by two butterfly species, with the first record of Leptotes pirithous (Linnaeus, 1767) from Gran Canaria, Spain (Lepidoptera: Lycaenidae)
SHILAP Revista de Lepidopterología, vol. 41, núm. 161, marzo, 2013, pp. 95-104
Sociedad Hispano-Luso-Americana de Lepidopterología
Madrid, España

SHILAP Revta. lepid., 41 (161), marzo 2013: 95-104 CODEN: SRLPEF ISSN: 0300-5267

On the recent invasion of the Canary Islands by two butterfly species, with the first record of *Leptotes pirithous* (Linnaeus, 1767) from Gran Canaria, Spain (Lepidoptera: Lycaenidae)

M. Wiemers, B. Acosta-Fernández & T. B. Larsen

Summary

Leptotes pirithous is reported from Gran Canaria for the first time, the recent spreading of this species and of *Cacyreus marshalli* in the Macaronesian Islands is discussed, and distribution maps of both species are presented for the Canary Islands.
KEY WORDS: Lepidoptera, Lycaenidae, *Leptotes pirithous*, Gran Canaria, Spain.

Sobre la reciente invasion de dos mariposas en las Islas Canarias con el primer registro de *Leptotes pirithous* (Linnaeus, 1767) de Gran Canaria, España (Lepidoptera: Lycaenidae)

Resumen

Se registra por primera vez para Gran Canaria a *Leptotes pirithous*, se discute la reciente expansión de esta especie y de *Cacyreus marshalli* en Macaronesia y se dan mapas de distribución de ambas especies presentes en las Islas Canarias.
PALABRAS CLAVE: Lepidoptera, Lycaenidae, *Leptotes pirithous*, Gran Canaria, España.

On a visit to Gran Canaria from 18-25 August 2011 butterflies were observed at different locations by the first author (MW), partly in company with the second author (BA), see table 1. On the afternoon of 24 August, 2011, two blues were observed in a tourist apartment complex in Maspalomas, flying in the canopy of a Flamboyant tree (*Delonix regia*, Fabaceae) which was just starting to flower. The blues were observed for more than an hour until one could be captured for identification. The first suspicion that it might represent *Azanus ubaldus*, a species which – in the Canary Islands – is only known from Maspalomas was unfounded and it turned out to be none of the species already known from the island of Gran Canaria (ACOSTA-FERNÁNDEZ 2005; WIEMERS 1995). Instead, the butterfly appeared to be a male of *Leptotes pirithous* (Linnaeus, 1767).

Leptotes pirithous is a widespread Pan-African species whose distribution extends north into most Mediterranean countries (KUDRNA *et al.,* 2011). North of the Alps it is occasionally encountered as a rare immigrant. In the Macaronesian Islands, however, the species had so far been known only from the Cape Verde Islands for more than a century (LIBERT *et al.,* 2011) but not from the Azores, Madeira and the Canary Islands until the 1990s (WIEMERS, 1995; MEYER, 1993). It was first reported from the Canary Islands by HALL (1998) on Fuerteventura, but the earliest record from the same location dates back to September 1994 (KISTNER & BECK, 2000). Since 2000, it has

Table 1.– Butterflies recorded on Gran Canaria from 19/8 to 24/08/2011

Family	Species	Locality	UTM (1x1 km)	Altitude	Specimens	Larval foodplant	Date
Lycaenidae	*Aricia cramera*	Roque Nublo	28 RDR 4193	1600 m	1 adult		21/08/2011
Lycaenidae	*Aricia cramera*	Pozo de las Nieves	28 RDR 4494	1850 m	3 adults		21/08/2011
Lycaenidae	*Cacyreus marshalli*	Cruz de Tejeda	28 RDR 4198	1490 m	1 adult and > 20 eggs	*Pelargonium*	21/08/2011
Lycaenidae	*Cacyreus marshalli*	Moya	28 RDS 4209	500 m	1 egg	*Pelargonium*	23/08/2011
Lycaenidae	*Cyclyrius webbianus*	Roque Nublo	28 RDR 4193	1600 m	1 ♀		21/08/2011
Lycaenidae	*Cyclyrius webbianus*	Jardin Canario	28 RDS 5505	240 m	1 adult		23/08/2011
Lycaenidae	*Cyclyrius webbianus*	Los Tiles	28 RDS 4108	500 m	1 ♂		23/08/2011
Lycaenidae	*Leptotes pirithous*	Maspalomas	28 RDR 4372	20 m	2 adults		24/08/2011
Lycaenidae	*Lycaena phlaeas*	Ayacata	28 RDR 4092	1300 m	1 adult		21/08/2011
Lycaenidae	*Lycaena phlaeas*	Pozo de las Nieves	28 RDR 4494	1850 m	5 adults		21/08/2011
Lycaenidae	*Lycaena phlaeas*	Los Tiles	28 RDS 4108	500 m	2 adults		23/08/2011
Lycaenidae	*Zizeeria knysna*	Arguineguin	28 RDR 3371	5 m	> 40 adults		22/08/2011
Lycaenidae	*Zizeeria knysna*	Playa del Inglés	28 RDR 4470	30 m	2 adults		24/08/2011
Nymphalidae	*Danaus plexippus*	Arguineguin	28 RDR 3371	5 m	5 adults and > 10 eggs	*Asclepias curassavica*	22/08/2011
Nymphalidae	*Danaus plexippus*	Playa del Inglés	28 RDR 4470	30 m	1 adult		24/08/2011
Nymphalidae	*Hipparchia tamadabae*	Mogán	28 RDR 2987	400 m	1 adult		19/08/2011
Nymphalidae	*Hipparchia tamadabae*	Roque Nublo	28 RDR 4193	1600 m	1 adult		21/08/2011
Nymphalidae	*Hipparchia tamadabae*	Pozo de las Nieves	28 RDR 4494	1850 m	> 15 adults and 1 egg		21/08/2011
Nymphalidae	*Hipparchia tamadabae*	südl. El Baranquillo Andrés	28 RDR 3385	540 m	6 adults		22/08/2011
Nymphalidae	*Hipparchia tamadabae*	Embalse de Soria	28 RDR 3588	650 m	4 adults		22/08/2011
Nymphalidae	*Maniola jurtina*	Embalse de Soria	28 RDR 3588	650 m	1 ♂ and 1 ♀		22/08/2011
Nymphalidae	*Maniola jurtina*	Jardin Canario	28 RDS 5505	240 m	2 adults		23/08/2011
Nymphalidae	*Maniola jurtina*	Los Tiles	28 RDS 4108	500 m	1 ♀		23/08/2011
Nymphalidae	*Pararge xiphioides*	Los Tiles	28 RDS 4108	500 m	6 adults		23/08/2011
Pieridae	*Catopsilia florella*	Jardin Canario	28 RDS 5505	240 m	1 egg	*Senna didymobotrya*	23/08/2011
Pieridae	*Pieris rapae*	Arguineguin	28 RDR 3371	5 m	1 adult		22/08/2011
Pieridae	*Pieris rapae*	El Baranquillo Andrés	28 RDR 3386	650 m	1 adult		22/08/2011
Pieridae	*Pieris rapae*	Jardin Canario	28 RDS 5505	240 m	5 adults		23/08/2011
Pieridae	*Pieris rapae*	Firgas	28 RDS 4410	500 m	> 20 adults, 1 egg and 1 larva	*Sisymbrium & Tropaeolum majus*	23/08/2011
Pieridae	*Pieris rapae*	Moya	28 RDS 4209	500 m	2 adults		23/08/2011
Pieridae	*Pieris rapae*	Los Tiles	28 RDS 4108	500 m	2 adults		23/08/2011
Pieridae	*Pontia daplidice*	Aldea de San Nicolas	28 RDR 2591	430 m	2 adults		19/08/2011
Pieridae	*Pontia daplidice*	Los Tiles	28 RDS 4108	500 m	1 ♀		23/08/2011

been found also on the neighbouring island of Lanzarote (GASCOIGNE-PEES & RUSSELL, 2002). Only one year later, the species was recorded from Madeira for the first time (HALL & RUSSELL, 2001) and the following year also from neighbouring Porto Santo Island (WAKEHAM-DAWSON *et al.,* 2002). In 2003, several specimens were observed on La Gomera (HORNEMANN, 2004b). It appears that *L. pirithous* is now well established on all five islands. On Fuerteventura, the species was still present in 2004 (TENNENT *et al.,* 2004) and one of us (BA) found the species on Lanzarote and Madeira at their former localities in 2005 as well as on La Gomera at two additional localities near Hermigua in 2010 (table 2). Most recently, *L. pirithous* has also been reported from several localities in Tenerife (HENSLE, 2011). The new record from Gran Canaria therefore fits into the colonization picture, and it only seems to be a matter of time until the species reaches the remaining two large Canary Islands of La Palma and El Hierro. The current distribution of *L. pirithous* in the Canary Islands is shown in fig. 1.

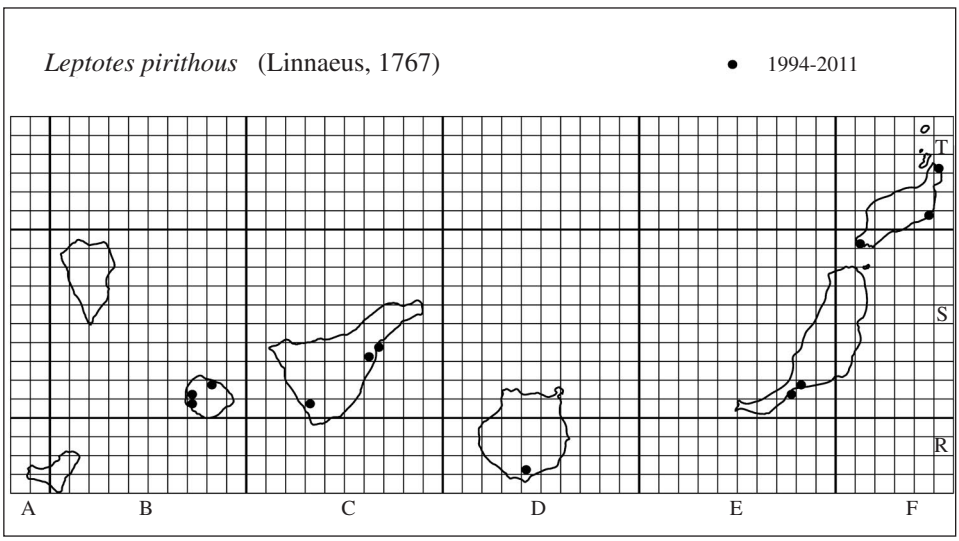

Fig. 1. Distribution map of *Leptotes pirithous* in the Canary Islands.

Table 2.– Unpublished records of *Leptotes pirithous* in the Macaronesian Islands.

Island	Locality	UTM (1x1 km)	Altitude	Specimens	Date	Recorder
Gran Canaria	Maspalomas	28 RDR 4372	20 m	2 adults (1 ♂)	24/08/2011	Martin Wiemers
La Gomera	Las Hoyetas	28 RBS 8416	135 m	2 ♂♂, 1 ♀	25/07/2010	Benedicto Acosta
La Gomera	Agulo	28 RBS 8419	30 m	several ♂♂ and ♀♀	27/07/2010	Benedicto Acosta
La Gomera	Las Hoyetas	28 RBS 8416	135 m	1 ♀	28/07/2010	Benedicto Acosta
La Gomera	Las Hoyetas	28 RBS 8416	135 m	1 ♀	29/07/2010	Benedicto Acosta
La Gomera	Valle Gran Rey	28 RBS 7010	0 m	1 adult	01/09/2011	Paul Puhlmann
La Gomera	Valle Gran Rey, Playa	28 RBS 7010	0 m	1 adult	02/09/2011	Walter Schön
Lanzarote	Costa Teguise	28 RFT 4709	20 m	4 ♂♂, 1 ♀	18/09/2005	Benedicto Acosta
Madeira	Jardim Botánico de Funchal	28 SCB 2215	150-300 m	several ♂♂ and ♀♀	09/07/2005	Benedicto Acosta

Although *Leptotes pirithous* is the only *Leptotes* species known from Europe, four further *Leptotes* species occur in West Africa (LARSEN, 2005). Three of these (*L. babaulti* Stempffer, 1935, *L. jeanneli* Stempffer, 1935, and *L. brevidentatus* Tite, 1958) are identical to *L. pirithous* in phenotype and can only be identified using genitalia characters (LARSEN, 2005; LIBERT, 2011). It appears that no previous author has checked the genitalia of *Leptotes* specimens from the Canary Islands or Madeira to exclude the possibility that they might belong to one of the other species. Therefore the specimen was sent to the third author (TL) for verification. The dissection clearly confirmed its identity as belonging to *L. pirithous*. Because of the close sequence of records which suggest a step-by-step colonization of the islands and the fact that *Leptotes pirithous* is the commonest and only well-known migrant among *Leptotes* in the Old World, we think that all records from the Canary Islands and Madeira can be attributed to this species.

In addition to genitalia examination, a DNA barcode (GenBank accession number JQ080283) was also obtained from the specimen using standard laboratory methods (see WIEMERS & FIEDLER, 2007) using the primers LepF and LepR (HAJIBABAEI *et al.,* 2006). This 658pb fragment of cytochrome c oxidase I was compared with available GenBank sequences using BLAST®. The sequence turned out to be identical to three other sequences of *Leptotes pirithous* from Spain, and only differed in 1-2 nucleotides from other sequences of this species originating from Spain, Portugal and Romania (table 3). This result confirms the identification of our specimen, but does not solve its origin, because no sequences of African populations are currently available from GenBank.

Table 3.– Closest BLAST matches to DNA barcode of *Leptotes pirithous.*

Accession number	Species	Voucher code	Country	Locality	Source	Identity
JQ080283	*Leptotes pirithous*	MW11005	Spain	Gran Canaria	This paper	Reference
AY556948	*Leptotes pirithous*	MW01023	Spain	Burgos	(WIEMERS & FIEDLER, 2007)	100%
GU676307	*Leptotes pirithous*	RVcoll.08-L684	Spain	La Garganta	iBOL unpublished	100%
GU676332	*Leptotes pirithous*	RVcoll.08-L626	Spain	Cadiz	iBOL unpublished	100%
GU676285	*Leptotes pirithous*	RVcoll.08-L762	Spain	Segovia	iBOL unpublished	99%
GU676715	*Leptotes pirithous*	RVcoll.08-H183	Spain	Minorca	iBOL unpublished	99%
GU676835	*Leptotes pirithous*	RVcoll.06-A022	Spain	Granada	iBOL unpublished	99%
GU677005	*Leptotes pirithous*	RVcoll.07-F072	Spain	Castellon	iBOL unpublished	99%
HQ004615	*Leptotes pirithous*	RVcoll.08-M581	Romania	Constanta	(DINCA *et al.,* 2011)	98%
HQ004616	*Leptotes pirithous*	RV-07-E448	Romania	Tulcea	(DINCA *et al.,* 2011)	98%
GU676554	*Leptotes pirithous*	RVcoll.08-J149	Portugal	Boticas	iBOL unpublished	98%
GQ129025	*Leptotes marina*	MCZ:AS92Z272	USA	Santa Barbara	(VILA *et al.,* 2011)	96%

All available records from Madeira and the Canary Islands indicate that *L. pirithous* is currently restricted to parks, gardens and nurseries in coastal areas where it appears to fly throughout the year (recorded II-III and VI-IX). In the Madeira Botanical Gardens oviposition was observed on *Phaseolus* and *Teline maderensis* (both Fabaceae) as well as on *Plumbago capensis* (Plumbaginaceae) by HALL & RUSSELL (2001), and near Funchal larvae were found on *Tipuana tipu* (Fabaceae), an urban ornamental tree originating from South America (AGUIAR *et al*. 2002). It can be assumed that the species uses many additional hostplants since it is one of the most polyphagous butterfly species. It is known to utilize many different hostplants from at least 10 plant families – mainly Fabaceae, but also Mimosaceae, Caesalpiniaceae, Plumbaginaceae, Rosaceae, Verbenaceae, Bignoniaceae, Lythraceae, Caprifoliaceae and Oleaceae (FIEDLER, 1991; TOLMAN & LEWINGTON, 2009). Therefore it is to be expected that *L. pirithous* will eventually also colonize more natural habitats, e.g. in the laurel and pine forests of the Canary Islands. The species might then become a competitor of the closely related endemic *Cyclyrius webbianus* (Brullé, 1839) which occurs on Gran Canaria, Tenerife, La Gomera and La Palma, and feeds on different genera of Fabaceae.

Leptotes pirithous is the third butterfly species to colonize the Canary Islands during the past century. The first was the African Migrant *Catopsilia florella* (Fabricius, 1775), a Pierid from the

Afrotropical and Oriental Region, which was first recorded from the two central islands of Tenerife and Gran Canaria (in 1965 and 1966, respectively), then spread to Gomera, Fuerteventura and Lanzarote (all in 1976), to La Palma (1986), El Hierro (1997), and in 1999 finally also to Madeira (AGUIAR & KARSHOLT, 2006; BAEZ, 1998; WIEMERS, 1995). It is still found on all islands, but remains restricted to parks and gardens where its only hostplant, ornamental *Senna* (synonym: *Cassia*) species grow. On the visit to Gran Canaria, the species was found near Tafira (in a nursery next to the Botanical Gardens an egg on *Senna didymobotrya*, which was bred until half grown larva), but no butterflies or signs of early stages were seen in Playa del Inglés, where its foodplant is commonly planted along road sides.

The second species was *Azanus ubaldus* (Stoll, 1782), another Palaeotropical element which is always associated with *Acacia* trees, its larval foodplant. This blue was first found in Maspalomas in 1982 (OLIVIER & VAN DER POORTEN, 1992) and still seems to occur in this area (SCHURIAN & HORNEMANN, 1992; SCHURIAN, 2008; WIEMERS, 1995).

The latest addition to the butterfly fauna of the Canary Islands is *Cacyreus marshalli* (Butler, 1898). This South African blue probably originates from Cape Peninsula (WOODHALL, 2005), but has increased its range considerably in recent decades using ornamental *Pelargonium* species and their hybrids as larval food plants. In Africa it is now widespread in South Africa and the neighbouring countries of Botswana, Zimbabwe and Mozambique, with northernmost populations in Zambia (HEATH *et al.,* 2002). While the species was already known from Zimbabwe by STEVENSON (1937), it was unknown from Botswana until one of us (TL) discovered it in a garden in Tlokweng near Gaborone, in 1989. Later on, it was also observed further north (e.g. in Serowe and Kasane), always associated with cultivated *Pelargonium* species.

In Europe, *Cacyreus marshalli* was first introduced to the Balearic Islands, probably accidentally with its foodplant, ornamental *Pelargonium* species. The first specimens were recorded from Mallorca in 1988 (EITSCHBERGER & STAMER, 1990), from where it spread across the Mediterranean Region. The Iberian Peninsula was reached in 1992 (PAGOLA-CARTE, 1998), spreading eastwards to South France & Italy (1996: TREMATERRA *et al.,* 1997), Switzerland (2002: AISTLEITNER 2003), Slovenia & Croatia (2008: MARKO & VEROVNIK, 2009; VEROVNIK *et al.,* 2011), Greece (2008: ANASTASSIU *et al.,* 2010; PARKER, 2010), and Turkey (SOYAN *et al*., 2013). The species also spread southwards to North Africa (Morocco: TARRIER 1997) and colonized most Western Mediterranean Islands (Sardinia: CONTINI *et al.,* 2005; Malta: SAMMUT, 2007; Corsica: SHAW, 2001; Sicily: CERNIGLIARO *et al.,* 2003). *Cacyreus marshalli* was also found in Northwest Europe (e.g. in the UK, Belgium, the Netherlands, and Germany: TROUKENS, 1991; BAAIJENS, 2000; GRIES, 2000) but no permanent colonies were established in these countries. Apparently, the species appears unable to survive the winter north of the Alps. In the Mediterranean countries, the species overwinters as larva. One of us (MW) found overwintered larvae in the Botanical Gardens of Lisbon on 1 February, 2011. The largest one pupated 2 days later and gave rise to the butterfly after 17 days in captivity.

In the Canary Islands, *Cacyreus marshalli* was first recorded in 1999. At that time the species was already widespread in the Iberian Peninsula and in Morocco. Apparently, the easternmost island of Lanzarote was colonized first (MARK, 1999), and from there it spread westwards. In 2003, it was found on Fuerteventura (HORNEMANN, 2004a), 2 years later on Gran Canaria (ACOSTA-FERNÁNDEZ, 2005) and another 3 years later on Tenerife (ACOSTA-FERNÁNDEZ, 2009). To date, no records have been made from the westernmost islands of La Gomera, La Palma, and El Hierro, whereas the species appears well established on Lanzarote and Fuerteventura (ACOSTA-FERNÁNDEZ, 2003, 2004; TENNENT *et al.,* 2004; ACOSTA-FERNÁNDEZ, 2005; HENSLE, 2006, 2008, 2009, 2011; FOSTER, 2000; TORRALBA-BURRIAL, 2008), see fig. 2 and table 4.

On Madeira, a single larva was found in 2002 (WAKEHAM-DAWSON & AGUIAR, 2003), but it is unclear whether the species managed to establish itself on this island (AGUIAR & KARSHOLT, 2006).

Like in the Mediterranean countries, *Cacyreus marshalli* in the Canary Islands has mainly been found in gardens and parks of urban settlements, where its foodplant is grown as an ornamental. At low altitudes, the species seems to fly throughout the year (recorded I-IV and VI-IX). Although most records are from coastal areas, the species has also been observed at slightly higher altitudes (e.g. near

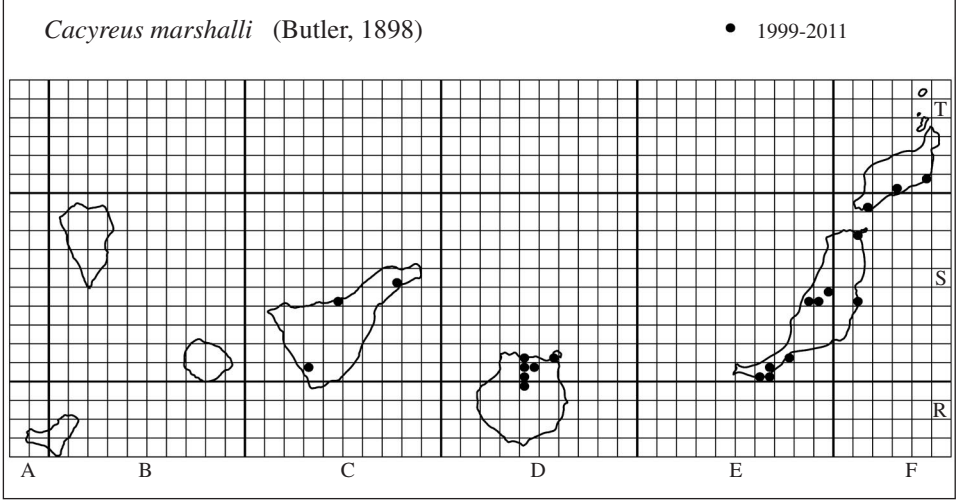

Fig. 2. Distribution map of *Cacyreus marshalli* in the Canary Islands.

Table 4.– Unpublished records of *Cacyreus marshalli* in the Canary Islands.

Island	Locality	UTM (1x1 km)	Altitude	Specimens	Date	Recorder
Fuerteventura	Betancuria, Vega de Río Palmas	28 RES 8941	215 m	several ♂♂ and ♂♂	28/02/2009	Benedicto Acosta
Gran Canaria	Teror, El Palmar	28 RDS 4605	510 m	2 ♂♂	08/09/2005	Benedicto Acosta
Gran Canaria	Las Palmas de Gran Canaria, Urb. La Minilla	28 RDS 5711	80 m	2 ♂♂	12/08/2007	Benedicto Acosta
Gran Canaria	Las Palmas de Gran Canaria, Urb. La Minilla	28 RDS 5711	80 m	3 ♂♂	30/09/2007	Benedicto Acosta
Gran Canaria	Moya, Los Tiles	28 RDS 4208	470 m	adult	15/02/2008	Heiner Ziegler
Gran Canaria	Firgas, Barranco de Azuaje	28 RDS 4409	240 m	adult	15/02/2008	Heiner Ziegler
Gran Canaria	Teror, El Palmar	28 RDS 4605	510 m	1 ♀	24/06/2008	Benedicto Acosta
Gran Canaria	Moya, Fontanales	28 RDS 4004	950 m	several ♂♂ and ♀♀	30/07/2008	Benedicto Acosta
Gran Canaria	Moya, Trujillo	28 RDS 4310	400 m	several ♂♂ and ♀♀	14/09/2008	Benedicto Acosta
Gran Canaria	Cruz de Tejeda	28 RDR 4198	1490 m	1 adult and > 20 eggs	21/08/2011	Martin Wiemers
Gran Canaria	Moya	28 RDS 4209	500 m	1 egg	23/08/2011	Martin Wiemers

Moya on Gran Canaria at about 500 m; ACOSTA-FERNÁNDEZ, 2005). During the visit to Gran Canaria, an adult butterfly and many eggs were found on an ornamental *Pelargonium* at Cruz Tejeda in the centre of the island at almost 1500 m altitude. However, it is unclear, whether the species can survive the winter at these altitudes. According to our observations (MW & BA), *C. marshalli* is now widespread in the north of Gran Canaria, but appears absent from the south of the island. E.g. a visit to the village of El Baranquillo Andrés, where *Pelargonium* is cultivated in large numbers, did not produce any records of either adult butterflies or early stages.

Concerns have been raised that *Cacyreus marshalli* might switch to native *Geranium* species and thus could become a competitor to native *Geranium*-feeding butterflies of the genus *Aricia* (Lycaenidae). In the lab, females of *C. marshalli* also lay their eggs on various *Geranium* species and larvae can successfully complete their development on those plants (QUACCHIA *et al.,* 2008). However, in the wild, females seem to lay their eggs only on *Pelargonium*, which is mostly restricted to urban settlements. In the north of Gran Canaria, e.g. near Firgas and Moya, *Pelargonium* has become

naturalized in scrubland, which is a degenerated stadium of the former laurel forest. *Cacyreus marshalli* is therefore not restricted to urban settlements here, but also occurs in semi-natural habitats, even at Los Tiles, one of the last (although severely degenerated) laurel forests on the island. This might facilitate a shift to native *Geranium* species, some of which are endemic to the Canary Islands.

Acknowledgements

We thank Walter Schön, Paul Puhlmann, Heiner Ziegler and Klaus G. Schurian for contributing unpublished data, and Oliver Brauner for contributing his observation and photograph of *Leptotes pirithous* while this paper was already in press.

BIBLIOGRAPHY

ACOSTA-FERNÁNDEZ, B., 2003.– Confirmación de la presencia de *Cacyreus marshalli* Butler, [1898] en Lanzarote (Lepidoptera: Lycaenidae) y comentarios sobre otros ropalóceros de interés.– *Butlletí de la Societat Catalana de Lepidopterologia,* **91**: 55-58.

ACOSTA-FERNÁNDEZ, B., 2004.– Geranium Bronze *Cacyreus marshalli* (Butler, 1898) (Lep.: Lycaenidae) and other interesting butterflies on Fuerteventura, Canary Islands.– *Entomologist's Record and Journal of Variation,* **116**: 258.

ACOSTA-FERNÁNDEZ, B., 2005.– *Cacyreus marshalli* Butler, [1898] en Fuerteventura y Gran Canaria (Islas Canarias, España) (Lepidoptera: Lycaenidae).– *SHILAP Revista de lepidopterología,* **33** (131): 245-246.

ACOSTA-FERNÁNDEZ, B., 2009.– Presencia de *Cacyreus marshalli* Butler, [1898] en la isla de Tenerife, Islas Canarias, España y otros registros de interés sobre Rhopalocera endémicos de la isla (Lepidoptera: Papilionoidea).– *SHILAP Revista de lepidopterología,* **37** (146): 155-159.

AGUIAR, A. M. F. & KARSHOLT, O., 2006.– Systematic catalogue of the Entomofauna of the Madeira archipelago and Selvagens islands. Lepidoptera. Vol. I.– *Boletim do Museu Municipal do Funchal,* **Sup. 9**: 5-139.

AGUIAR, A. M. F., WAKEHAM-DAWSON, A. & BRAZÃO, C., 2002.– Additional data on the presence of *Leptotes pirithous* (Linnaeus, 1767) (Lepidoptera: Lycaenidae) in Madeira Island, Portugal, with a record of the first confirmed host plant.– *Entomologist's Record and Journal of Variation*, **114**: 118-120.

AISTLEITNER, U., 2003.– Erste Nachweise des Geranien-Bläulings *Cacyreus marshalli* Butler, 1898, in der Schweiz (Lepidoptera: Lycaenidae).– *Entomologische Berichte (Luzern),* **49**: 151-154.

ANASTASSIU, H. T., GHAVALAS, N. & COUTSIS, J. G., 2010.– First record of *Cacyreus marshalli* in Greece, and comments on the potential occurrence of *Zizeeria karsandra* on the Greek island of Crete (Lepidoptera: Lycaenidae).– *Phegea,* **38**(3): 85-92.

BAAIJENS, A., 2000.– Het geraniumblauwtje in Nederland!– *Vlinders,* **15**: 32.

BAEZ, M., 1998.– Nuevos datos sobre la distribución de *Catopsilia florella* (Lepidoptera: Pieridae) en Canarias.– *Boletín de la Asociación Española de Entomología,* **22**(3-4): 241.

CERNIGLIARO, A., DIBENEDETTO, R. & LEOTTA, R., 2003.– New data about Macrolepidoptera of Sicily (Lepidoptera).– *Bolletino della Società Entomologica Italiana,* **135**(3): 181-187.

CONTINI, C., MUDU, C., PIRODDA, E. & SENIS, G., 2005.– Sulla presenza in Sardegna del Lepidottero Lycaenidae Sudafricano *Cacyreus marshalli* Butler, 1898.– *Rendiconti del Seminario della Facoltà di Scienze dell'Università di Cagliari,* **75**(1-2): 99-104.

DINCA, V., ZAKHAROV, E., HEBERT, P. D. & VILA, R., 2011.– Complete DNA barcode reference library for a country's butterfly fauna reveals high performance for temperate Europe.– *Proceeding of the Royal Society of London. Series B,* **278**(1704): 347-355.

EITSCHBERGER, U. & STAMER, P., 1990.– *Cacyreus marshalli* Butler, 1898, eine neue Tagfalterart für die europäische Fauna? (Lepidoptera, Lycaenidae).– *Atalanta,* **21**(1/2): 101-108.

FIEDLER, K., 1991.– Systematic, evolutionary, and ecological implications of myrmecophily within the Lycaenidae (Insecta: Lepidoptera: Papilionoidea).– *Bonner Zoologische Monographien,* **31**: 1-210.

FOSTER, A. P., 2000.– Lepidoptera observed in Lanzarote during February 2000.– *Entomologist's Record and Journal of Variation,* **112**: 271.

GASCOIGNE-PEES, M. & RUSSELL, P. J. C., 2002.– Lang's Short-tailed Blue *Leptotes pirithous* (L.) (Lep.: Lycaenidae) and other butterflies on Lanzarote.– *Entomologist's Record and Journal of Variation,* **114**: 113-115.

GRIES, N., 2000.– Weitere Informationen zum Erstfund von *Cacyreus marshalli* Butler, 1898 in Deutschland (Lep., Lycaenidae).– *Melanargia,* **12** (1): 15-16.

HAJIBABAEI, M., JANZEN, D. H., BURNS, J. M., HALLWACHS, W. & HEBERT, P. D., 2006.– DNA barcodes distinguish species of tropical Lepidoptera.– *Proceedings of the National Academy of Sciences, USA,* **103** (4): 968-971.

HALL, D., 1998.– Lang's short-tailed Blue *Leptotes pirithous* (L.) (Lep.: Lycaenidae) and other butterflies on Fuerteventura, Canary Islands.– *Entomologist's Record and Journal of Variation,* **110**: 289-290.

HALL, D. & RUSSELL, P. J. C., 2001.– Lang's Short-tailed Blue *Leptotes pirithous* (L.) (Lep.: Lycaenidae) and other butterflies on Madeira Island.– *Entomologist's Record and Journal of Variation,* **113**: 261.

HEATH, A., NEWPORT, M. A. & HANCOCK, D., 2002.– *The butterflies of Zambia*: 17+137 pp. African Butterfly Research Institute and The Lepidopterists' Society of Africa, Nairobi

HENSLE, J., 2006.– Papilionidae, Pieridae, Nymphalidae und Lycaenidae 2005.– *Atalanta,* **37**(1/2): 41-129.

HENSLE, J., 2008.– Papilionidae, Pieridae, Nymphalidae und Lycaenidae 2007.– *Atalanta,* **39**(1-4): 13-154.

HENSLE, J., 2009.– Papilionidae, Pieridae, Nymphalidae, Lycaenidae und Hesperiidae 2008.– *Atalanta,* **40**(1/2): 13-134.

HENSLE, J., 2011.– Papilionidae, Pieridae, Nymphalidae, Lycaenidae und Hesperiidae 2010 (Lepidoptera, Rhopalocera).– *Atalanta,* **42**(1-4): 21-82.

HORNEMANN, A., 2004a.– Erstnachweis von *Cacyreus marshalli* (Butler, 1898) für die Kanareninsel Fuerteventura (Lepidoptera: Lycaenidae) und weitere Beobachtungen.– *Nachrichten des Entomologischen Vereins Apollo, N. F.,* **25**(1/2): 21-23.

HORNEMANN, A., 2004b.– *Leptotes pirithous* (Linnaeus, 1767) auf La Gomera - ein Erstnachweis für die Westkanaren (Lepidoptera: Lycaenidae).– *Nachrichten des Entomologischen Vereins Apollo, N. F.,* **25**(1/2): 78.

KISTNER, F. & BECK, A., 2000.– Falterbeobachtungen auf Fuerteventura: Erstnachweis von *Leptotes pirithous* (Linnaeus, 1767) für die Kanarischen Inseln (Lepidoptera: Lycaenidae).– *Nachrichten des Entomologischen Vereins Apollo, N. F.,* **21**(2): 99-102.

KUDRNA, O., HARPKE, A., LUX, K., PENNERSTORFER, J., SCHWEIGER, O., SETTELE, J. & WIEMERS, M., 2011.– *Distribution Atlas of Butterflies in Europe*: 576 pp. Gesellschaft für Schmetterlingsschutz, Halle (Saale)

LARSEN, T. B., 2005.– *Butterflies of West Africa*: 595 pp. Apollo Books, Stenstrup.

LIBERT, M., 2011.– Note sur le genre *Leptotes* Scudder, 1876 (Lepidoptera, Lycaenidae).– *Lambillionea,* **51**: 53-66.

LIBERT, M., BALITEAU, L. & BALITEAU, S., 2011.– Deux nouveaux Lycaenidae du Cap-Vert (Lepidoptera).– *Bulletin de la Société Entomologique de France,* **116**(1): 63-67.

MARK, H.-G., 1999.– *Cacyreus marshalli* (Butler, 1898), eine neue Lycaenidenart für Lanzarote (Spanien, Kanarische Inseln) (Lepidoptera: Lycaenidae).– *Nachrichten des Entomologischen Vereins Apollo, N. F.,* **20**(1): 105-106.

MARKO, K. & VEROVNIK, R., 2009.– First record of *Cacyreus marshalli* (Lycaenidae) from the Balkan Peninsula.– *Nota lepidopterologica,* **32**(1): 81-82.

MEYER, M., 1993.– Die Lepidoptera der makaronesischen Region III. Die Tagfalter des nördlichen Makaronesiens (Madeira, Azoren) aus biogeographischer Sicht (Papilionoidea).– *Atalanta,* **24**: 121-162, pl. VI-XIII.

OLIVIER, A. & VAN DER POORTEN, D., 1992.– *Azanus ubaldus* (Cramer, 1782) on Gran Canaria (Canary Islands, Spain) (Lepidoptera: Lycaenidae).– *Phegea,* **20**: 151-154.

PAGOLA CARTE, S., 1998.– *Cacyreus marshalli* zure geranioak jan(go) dituen tximeleta.– *Oitsaila,* **128**: 26-31.

PARKER, R., 2010.– *Cacyreus mashalli* Butler, 1898 (Lepidoptera, Lycaenidae) newly recorded for Corfu, with notes on other butterflies on the island in September 2008.– *Entomologist's Gazette,* **61**: 40-42.

QUACCHIA, A., FERRACINI, C., BONELLI, S., BALLETTO, E. & ALMA, A., 2008.– Can the Geranium Bronze, *Cacyreus marshalli*, become a threat for European biodiversity?– *Biodiversity and Conservation,* **17** (6): 1429-1437.

SAMMUT, P., 2007.– *Cacyreus marshalli* Butler, [1898] reaches the Maltese Islands (Lepidoptera: Lycaenidae).– *SHILAP Revista de lepidopterología,* **35**(139): 317-319.

SCHURIAN, K. G., 2008.– Wiederfund von *Azanus ubaldus* (Cramer, 1782) auf Gran Canaria (Lepidoptera: Lycaenidae).– *Nachrichten des Entomologischen Vereins Apollo, N. F.,* **28**(3/4): 187-188.

SCHURIAN, K. G. & HORNEMANN, A., 1992.– Eine neue Bläulingsart für die Kanarischen Inseln: *Azanus ubaldus* (Cramer, 1782) (Lepidoptera: Lycaenidae).– *Nachrichten des Entomologischen Vereins Apollo, N. F.,* **16**(1): 63-74.

SHAW, M. R., 2001.– *Cacyreus marshall*i (BUTLER) (Lep. Lycaenidae) in Corsica.– *Entomologist's Record and Journal of Variation,***113** (6): 262.

SOYAN, T., BASER, S. & NAZARI, V., 2013.– First record of *Cacyreus marshalli* (Lycaenidae) from Turkey.– *Nota lepidopterologica (in press)*.

STEVENSON, R. H. R., 1937.– Lycaenidae of the northern and north-eastern parts of the South African subregion.– *Occasional Papers of the National Museum of Southern Rhodesia,* **1**(6): 14-48.

TARRIER, M., 1997.– *Cacyreus marshalli* Butler, 1898, espèce nouvelle pour la France, le Portugal et le Maroc (Lepidoptera Lycaenidae).– *Alexanor,* **20**(3): 143-144.

TENNENT, J., HALL, D. & RUSSELL, P. J. C., 2004.– Some notes on the butterflies of Fuerteventura (Spain, Canary Islands).– *Entomologist's Gazette,* **55**: 227-232.

TOLMAN, T. & LEWINGTON, R., 2009.– *Collins Butterfly Guide. The most complete guide to the Butterflies of Britain and Europe*: 384 pp. HarperCollins, London

TORRALBA BURRIAL, A., 2008.– Presencia de *Cacyreus marshalli* Butler, 1898 (Lepidoptera: Lycaenidae) en Fuerteventura (Islas Canarias, España).– *Boletín de la Sociedad Entomológica Aragonesa,* **42**: 429.

TREMATERRA, P., ZILLI, A., VALENTINI, V. & MAZZEI, P., 1997.– *Cacyreus marshalli* un lepidottero sudafricano dannoso ai gerani in Italia.– *Informatore fitopatologico,* **7-8**: 2-6.

TROUKENS, W., 1991.– *Cacyreus marshalli* Butler, 1898 aangetroffen in Belgie.– *Phegea,* **19**(4): 129-131.

VEROVNIK, R., POLAK, S. & SELJAK, G., 2011.– Pojav in širenje tujerodne vreste dnevnega metulja Pelargonijevega Bakrencka (*Cacyreus marshalli* (Butler 1898)) v Sloveniji.– *Acta Entomologica Slovenica,* **19**: 5-16.

VILA, R., BELL, C. D., MACNIVEN, R., GOLDMAN-HUERTAS, B., REE, R. H., MARSHALL, C. R., BALINT, Z., JOHNSON, K., BENYAMINI, D. & PIERCE, N. E., 2011.– Phylogeny and palaeoecology of *Polyommatus* blue butterflies show Beringia was a climate-regulated gateway to the New World.– *Proceedings of the Biological Sciences,* **278**(1719): 2737-2744.

WAKEHAM-DAWSON, A. & AGUIAR, A. M. F., 2003.– The arrival of a *Cacyreus marshalli* (Butler, 1898) larva, a larval host-plant for *Lycaena phlaeas phlaeoides* (Staudinger, 1901) and notes on other butterfly species in the Madeiran Archipelago, Portugal, 8-15 July 2002 (Lepidoptera: Rhopalocera).– *Entomologist's Gazette,* **54**: 227-231.

WAKEHAM-DAWSON, A., SALMON, M. A. & AGUIAR, A. M. F., 2002.– *Leptotes pirithous* (Linnaeus, 1767) (Lepidoptera: Lycaenidae) - new to Porto Santo Island, Madeira, Portugal, with notes on other butterfly species in Madeira 6-13 October 2001.– *Entomologist's Gazette,* **53**: 245-247.

WIEMERS, M., 1995.– The butterflies of the Canary Islands.– A survey on their distribution, biology and ecology (Lepidoptera: Papilionoidea and Hesperioidea).– *Linneana Belgica,* **15**: 63-84 & 87-118.

WIEMERS, M. & FIEDLER, K., 2007.– Does the DNA barcoding gap exist? - a case study in blue butterflies (Lepidoptera: Lycaenidae).– *Frontiers in Zoology,* **4**: 8.

WOODHALL, S., 2005.– *Field Guide to Butterflies of South Africa*: 440 pp. Struik Publishers, Cape Town.

*M. W.
Department of Community Ecology
UFZ, Helmholtz Centre for Environmental Research
Theodor-Lieser-Str., 4
D-06120 Halle
ALEMANIA / *GERMANY*
E-mail: martin.wiemers@ufz.de

T. B. L.
Jacobys alle, 2
DK-1806 Frederiksberg
DINAMARCA / *DENMARK*
E-mail: torbenlarsen@btinternet.com

B. A. F.
Molino de Viento, 19-3-B
E-35004 Las Palmas de Gran Canaria
ESPAÑA / *SPAIN*
E-mail: benedictoacosta@gmail.com

*Autor para la correspondencia / *Corresponding author*

(Recibido para publicación / *Received for publication* 15-I-2012)
(Revisado y aceptado / *Revised and accepted* 5-III-2012)
(Publicado / *Published* 30-III-2013)

Figs. 3-4.– 3. Male of *Leptotes pirithous* resting on the leaves of a Flamboyant tree in Maspalomas, Gran Canaria (Spain) on 24 August 2011 (Photo: Martin Wiemers). **4.** Habitat of *Leptotes pirithous* on Gran Canaria (Spain): Flamboyant tree (*Delonix regia*) in Maspalomas (Canary Garden Club) (Photo: Martin Wiemers).