

Contribution to the knowledge of *Agrodiaetus violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979 sensu lato, an endemic Iberian species; new localities and first records for Sierra Nevada and Almeria Province (S. Spain)

(Lepidoptera, Lycaenidae)

by

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Abstract: New localities (within 8 new UTM 10 x 10 km grids) of the Iberian endemic *Agrodiaetus violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979 (s. l.) are recorded for Almeria, Granada and Jaen provinces (SE. Iberian Peninsula, Spain). We report the first records for the Province of Almeria, as well as for the Sierra Nevada and the Sierra de Gador: localities ascribed provisionally to the nominal subspecies (only ♂♂ are available for the study). Also in the aim for a wider comprehension of this species (sensu lato), we inform of its currently known distribution, new taxonomic data recently published, morphological comparison (adults and larvae) of the nominal subspecies and subspecies *subbaeticus* GIL-T. & GIL-UCEDA, 2005, and an ecological synthesis.

Resumen: Se registran nuevas localidades (dentro de 8 nuevas cuadrículas UTM 10 x 10 km) del endemismo ibérico *Agrodiaetus violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979 (s. l.) en las provincias de Almería, Granada y Jaén (SE. Península Ibérica, España). Se comunican los primeros registros en la provincia de Almería, así como en Sierra Nevada y Sierra de Gádor: localidades adscritas provisionalmente a la subespecie nominal (solamente machos disponibles para estudio). También, para un mejor conocimiento de esta especie (sensu lato), se informa sobre su distribución actualmente conocida, nuevos datos taxonómicos recientemente publicados, comparación morfológica (adultos y larvas) de las dos subespecies descritas: subespecie nominal y *Agrodiaetus violetae subbaeticus* GIL-T. & GIL-UCEDA, 2005, y una síntesis sobre su ecología.

Introduction: The original description of *Agrodiaetus violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979, was based on characters of its genitalia (which are regarded as unreliable for *Agrodiaetus* spp.) and adult morphology (it is clearly different from other species of Iberian *Agrodiaetus*). From then until its rediscovery 26 years later (GIL-T. & GIL-UCEDA, 2005) at its type locality at Sierra de la Almijara, in the southern Iberian peninsula (fig. 1: grid 1 -left-), considered to be the only locality for this taxon until the work of VILA et al., (2010), nothing was known about the real taxonomic status of this butterfly. Even its continued existence had been brought into doubt by some Spanish authors. Consequently, nothing was known about its biology or ecology. Even its morphology was practically unknown, although the ♀ was re-described in GIL-T. & GIL-UCEDA (2005). Despite this fact, as well as an overall lack of information and material for study, it was surprising how some authors, e.g. MUNGUIRA et al. (1995), rashly discussed its taxonomic status [they assigned it as a subspecies of *Agrodiaetus fabressei* (OBERTHÜR, 1910)], basing their opinions solely on suppositions. As a result of this, erroneous information has been perpetuated, e.g. TOLMAN & LEWINGTON (1997), with respect to its host plant, ants associated to its larvae and even on certain aspects of adult morphology.

A new taxon, *Agrodiaetus fabressei subbaeticus* GIL-T. & GIL-UCEDA, 2005 [provisionally assigned to *A. fabressei* (OBTH.), pending future molecular study], was described from Sierra de la Sagra, NE. Granada Province on the SE Iberian Peninsula (fig. 1: grid 6); this population is significantly far away from the type locality of *A. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ sensu stricto at Sierra de la Almijara.

An initial study on the karyotype of *A. f. subbaeticus* GIL-T. & GIL-UCEDA (LUKHTANOV et al., 2006) pointed in the previously mentioned direction [as belonging to *A. fabressei* (OBTH.)], with n = 90, the same as for *A. ripartii* (FREYER, 1830). Later, however, DNA studies undertaken by VILA et al. (2010) determined that *A. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ sensu lato (*violetae* and *subbaeticus*, fig. 1), is genetically (but not chromosomally) different from *A. fabressei* (OBTH.) and the phylogenetic analysis showed that both species are quite distant. *Agrodiaetus violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ (s. l.) is shown to be a polytypic species, with two subspecies: *A. violetae subbaeticus* GIL-T. & GIL-UCEDA (= *A. fabressei subbaeticus* GIL-T. & GIL-UCEDA) and the nominal subspecies. Both nuclear and mitochondrial sequences coincide in the close relationship between the two subspecies. The subspecific status of *A. violetae subbaeticus* GIL-T. & GIL-UCEDA with respect to *A. violetae violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ is based on adult and caterpillar morphological differences which will be subsequently mentioned herewith.

Known distribution of the species (sensu lato) with the new localities

In the current paper, the first records for Sierra Nevada, Sierra de Gador and Almeria Province (four colonies) in three UTM 10 x 10 km grids are reported for this endemic Iberian species. Other new localities of in the NE. Jaen Province, will also be mentioned. Fig. 1 shows the currently known distribution.

The distribution of *A. violetae subbaeticus* GIL-T. & GIL-UCEDA: a) NE. Jaen Province (JA): in the Sierra of Cazorla (with two new UTM 10 x 10 km grids for this area: fig. 1: grids 7 -below-) and Sierra de Segura (with two new UTM 10 x 10 km grids for this area: fig. 1: grids 8 -below-); b) NE. Granada Province (GR): in the Sierra de La Sagra (fig. 1: grids 6 -above-), type locality of this subspecies (with one new UTM 10 x 10 km grid, between GR and AB); c) S. Albacete Province (AB): in the Sierra de Alcaraz (three grids) and other grid on the south end of this province; d) to the west of Murcia Province (MU): in the Sierra de Moratalla (two grids).

Until now, the distribution of *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ was thought to be limited to the Sierra de la Almijara (type locality; fig. 1: grid 1 -left-) and the adjacent Sierra de Tejeda (fig. 1: grids 2 -above-), both grids in the geographical limit between the Provinces of Granada (GR) and Malaga (MA). However, we record this species for the first time in Almeria Province (AL), four new colonies in three UTM 10 x 10 km grids - three in Sierra Nevada and one in Sierra de Gador. To the north, northeast and northwest of Laujar de Andarax village (E. of Sierra Nevada) we have located three colonies (fig. 1: grids 3 & 4 -below-), each

approximately 5 km separated from each other. To the south of Laujar de Andarax (N. Sierra de Gador) we have located another colony (fig. 1: grid 5). These new colonies are situated approximately 100 km away from the type locality (Sierra de la Almirajara) of *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ and also approximately 100 km away from the type locality (Sierra de la Sagra) of *A. v. subbaeticus* GIL-T. & GIL-UCEDA.

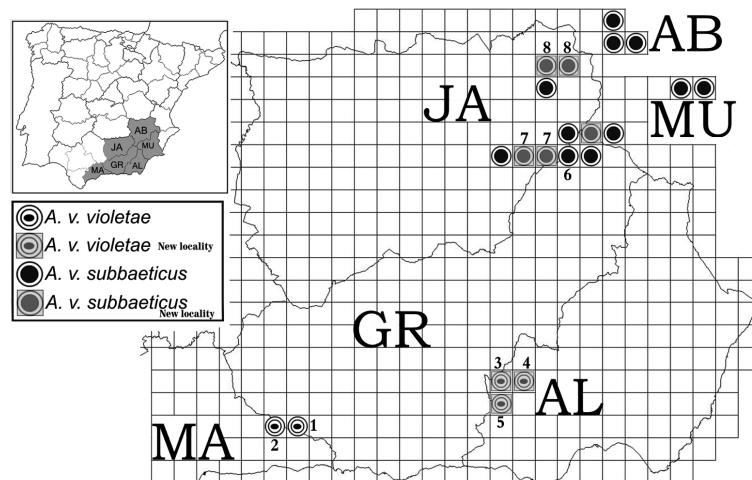


Fig. 1: Distribution of *Agrodiaetus violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979 (s. l.) in Spain.

Morphological comparison and ascription of populations to the two described subspecies

Adults: Table 1 shows the morphological differences between *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ and *A. v. subbaeticus* GIL-T. & GIL-UCEDA. The imagines (figs. 2, 3) of *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ show clear differences from *A. v. subbaeticus* GIL-T. & GIL-UCEDA: a) on the underside (mainly in hind wings) of the nominal subspecies, the black spots are very small (smaller diameter), vestigial or missing, in around 90% of specimens, mainly in ♀♀ (fig. 2: row A), by far the more distinctive sex of the two subspecies; b) a different background colour in ♀♀ (fig. 2), most prominent in fresh specimens; c) the ♂♂ adults (fig. 3: row D) and ♀♀ (fig. 2: row B) of *A. v. subbaeticus* GIL-T. & GIL-UCEDA normally show on the underside (fore and hind wings) a complete series of clearly visible black spots (larger diameter). Other differences are indicated in table 1; additional photographs of adults may be referred to in GIL-T. (2009).

In the work of VILA et al. (2010: table 1 & 2, sample code RVcoll.08-H299; COI genbank code HM210175), one specimen from of the new discovered population in Almeria province (E. Sierra Nevada) was included. This new and isolated population is genetically closer to *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ than to *A. v. subbaeticus* GIL-T. & GIL-UCEDA: only 6 differences were found in the cytochrome oxidase subunit I (COI) and in cytochrome oxidase subunit II (COII) with respect to *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ; and between 12 & 17 differences with respect to *A. v. subbaeticus* GIL-T. & GIL-UCEDA (R. VILA, pers. com.).

The new colonies previously mentioned for this species in Almeria Province are of difficult access (rugged terrain), and we were only able to examine about 35 ♂♂. These adults (fig. 4) are very similar to those of the same sex of the nominal subspecies (fig. 3, row C): compare the black spots. In the meantime, until we are able to study the morphology of the ♀♀ adults from Almeria Province, we provisionally ascribe these new populations of *Agrodiaetus* to the nominal subspecies.

It is very probable that there are other colonies in the western Sierra Nevada (Granada Province), closer to the type locality (Sierra de la Almirajara) of the nominate subspecies.

	Black spots underside hindwings	White stripe (v4) underside hindwings males	White stripe (v4) underside hindwings females	Ground color upperside females	Ground color underside females
<i>Agrodiaetus violetae violetae</i>	Smaller diameter. Several missing or are vestigial in 90% imagos	Present in 72.7% imagos. Slightly marked, discolored, less visible than in males of <i>A. v. subbaeticus</i>	Present in 80% imagos. Very visible	Brown	<i>characteristic pigmented brown color</i>
<i>Agrodiaetus violetae subbaeticus</i>	Normally in complete series. Larger diameter, clearly visible	Present in 89,1% imagos. Very marked, more visible than in males of <i>A. v. violetae</i>	Present in 90% imagos. Very visible	Dark brown	Dark brown

Table 1: Synopsis morphological comparison between *Agrodiaetus violetae violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979 and *Agrodiaetus violetae subbaeticus* GIL-T. & GIL-UCEDA, 2005.

Larvae: In GIL-T. (2008) we examined the preimaginal stages of the two subspecies described. The most significant feature of the larvae are their lateral stripes. In the nominal subspecies the lateral stripe is composed of three lines: a central white-cream line, superimposed with two pink ones, the upper one broader than the lower. In *A. v. subbaeticus* GIL-T. & GIL-UCEDA [referred to in

that work as „*Agrodiaetus fabressei subbaeticus*“] the central line is yellowish-cream and the other two lines are of red-wine colour.

Ecology: In LAFRANCHIS et al. (2007), the second author of the current article mentions, for the first time, data concerning host plants, parasitoids [*Ichneumon exilicornis* WESMAEL, Hymenoptera, Ichneumonidae] and associated ants of *A. v. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ and *A. v. subbaeticus* GIL-T. & GIL-UCEDA. These two taxa use different plant subspecies of *Onobrychis argentea*: *Onobrychis argentea argentea* and *Onobrychis argentea hispanica*, respectively. All the associated ants (with new data) currently known for *A. violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979 (s. l.), are registered in LAFRANCHIS et al. (2007) and OBREGÓN & GIL-T. (2011): *Camponotus cruentatus*, *Camponotus piceus*, *Plagiolepis pygmaea*, *Crematogaster sordidula* and *Formica subrufa*.

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Fig. 2: ♀♀ - row A = *Agrodiaetus violetae violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979; row B = *Agrodiaetus violetae subbaeticus* GIL-T. & GIL-UCEDA, 2005.



Fig. 3: ♂♂ - row C = *Agrodiaetus violetae violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979; row D = *Agrodiaetus violetae subbaeticus* GIL-T. & GIL-UCEDA, 2005.



Fig. 4: ♂♂ imagos from Almeria province (E. Sierra Nevada), population ascribed to *Agrodiaetus violetae violetae* GÓMEZ-BUSTILLO, EXPÓSITO & MARTÍNEZ, 1979.

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