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The identities of some subspecies, forms and individual specimens in museums previously classified as *Melitaea phoebe* ([Denis & Schiffermüller], 1775) (Lepidoptera: Nymphalidae)

Peter J. C. Russell & Antonio Vives Moreno

Abstract

The identities of further taxa associated previously with *Melitaea phoebe*: *pseudosibina* Alberti, 1969, *allophylus* Rüttimeyer, 1942 and *rubialesi* Gómez Bustillo, 1973 are identified as *M. phoebe*, and *M. ornata*, respectively. Further specimens from the Gómez Bustillo collection housed in the Universidad Politécnica, E. T. S. Ingeniería de Montes, Forestal y del Medio Natural, Unidad de Entomología y Zoología, Madrid, Spain (UPM) and from the entomological reference collection of *M. phoebe* housed in the Museo Nacional de Ciencias Naturales, Madrid, Spain (MNCN), Universidad Autónoma de Madrid, Facultad de Ciencias, Departamento de Biología, Madrid, Spain (UAM) are reclassified as *M. ornata*. The distribution of *M. ornata* has been expanded to include locations in the Spanish Provinces of Cuenca, Guadalajara, Madrid, Palencia, Toledo, and Zaragoza.

Keywords: Lepidoptera, Nymphalidae, *Melitaea phoebe*, *Melitaea ornata*, Europe.

Sobre la identidad de otros taxones previamente asociados con *Melitaea phoebe* ([Denis & Schiffermüller], 1775) (Lepidoptera: Nymphalidae)

Resumen

Las identidades de otros taxones asociados previamente con *Melitaea phoebe*: *pseudosibina* Alberti, 1969, *allophylus* Rüttimeyer, 1942 y *rubialesi* Gómez Bustillo, 1973 se identifican como *M. phoebe* y *M. ornata*, respectivamente. Otros especímenes de la colección Gómez Bustillo conservada en la Universidad Politécnica, E. T. S. Ingeniería de Montes, Forestal y del Medio Natural, Unidad de Entomología y Zoología, Madrid, España (UPM) y de la colección entomológica de referencia de *M. phoebe* conservada en el Museo Nacional de Ciencias Naturales, Madrid, España (MNCN), Universidad Autónoma de Madrid, Facultad de Ciencias, Departamento de Biología, Madrid, España (UAM) se reclasifican como *M. ornata*. La distribución de *M. ornata* se ha ampliado para incluir localidades de las provincias españolas de Cuenca, Guadalajara, Madrid, Palencia y Zaragoza.

Palabras clave: Lepidoptera, Nymphalidae, *Melitaea phoebe*, *Melitaea ornata*, Europa.

Introduction

Russell & Tennent (2016) allocated a number of taxa associated with *Melitaea phoebe* ([Denis & Schiffermüller], 1775) to their presumed correct species, recognizing the three species: *M. phoebe* [Type Locality (TL): environs of Vienna, Austria], *M. ornata* Christoph, 1893 [TL: Circa “Guberli”, promontorium uralensium austrarium (Guberlya, Orenburg Province, Russian Federation)] and *M. punica* Oberthür, 1876 [TL: Tazoult-Lambèze (Lambessa), Algeria]. Further, Russell et al. (2020)

sorted out some syntypic series of western European taxa supposedly of *M. phoebe*, some of which contained two different species, and designated lectotypes, type localities and synonymising some names where necessary; this was continued by Russell et al. (2022) with those taxa from Eastern Europe and Asia, again designating lectotypes where appropriate and synonymising some names where applicable.

The distinguishing morphological features of the adult butterflies of *M. phoebe* and *M. ornata*, from sympatric populations in the Massif de la St. Baume, France (Figures 1-2), can be seen from their undersides and summarized as follows: in *M. phoebe* the forewing apices are slightly more pointed than those of *M. ornata*; the submarginal black arches on the wings underside tend not to be thickened centrally and touch the intervening veins in *M. phoebe*, whereas those of *M. ornata* tend to be thickened centrally and do not touch the intervening veins; the antennae of *M. phoebe* are club shaped but spatulate in *M. ornata*. Meanwhile, Hinojosa et al. (2022) have elevated the “tentatively named” taxon *pseudornata* Muñoz-Sariot & Sánchez-Mesa, 2019 [TL: Quéntar, Sierra Nevada, Granada, 1300 m, emerged 29-V-2018, from larva collected on 15-IV-2018] to specific status. This name has been already sunk in synonymy with *M. ornata bethunebakeri* Sagarra, 1926 by Russell et al. (2020, p. 455). The present authors do not recognise the specific status of the taxon *pseudornata* until such time as specimens of this taxon have been shown to be reproductively isolated from *M. ornata*; hence our continued use of *M. ornata* for those Spanish specimens which are distinct from *M. phoebe* sensu stricto. Some museum specimens associated with *M. phoebe* as subspecies or forms, not examined in detail previously, are identified here as *M. ornata*; others are confirmed as *M. phoebe*.

Observations on some forms, varieties and subspecies associated previously with *M. phoebe*

M. phoebe pseudosibina Alberti, 1969 [TL: Elbrus Region, Itkol, Kabardino-Balkaria, Russian Federation, 2100 m] was figured by the author (Taf. 1, figs 1c and 2c, paratypes). These monochrome Figures of the uppersides are not particularly informative but indicate this form to be lightly marked in the discal area compared with the specimens of *M. phoebe* from Kislovodsk (♂) and Pjatigorsk (♀) from circa 800 m and 550 m, respectively. The figure of a paratype of subsp. *pseudosibina* by Van Oorschot & Coutsis (2014, pl. 12, fig. 24) does somewhat support this detail but indicates lighter markings in the post-discal area only of the forewings but not on the hindwings. More detailed photographs (provided by John Tennent, see acknowledgements) of the holotype male (Figures 3-5) show it to be lightly marked in the discal and post-discal areas of the forewing upperside and the discal area of the hindwing upperside with the orange spots barely visible. The undersides of the hindwings are, however, well-marked with the orange spots clearly visible but the forewing undersides have the typical markings very thin or absent. The antennae are club shaped and the pre-marginal black arches are thin and touch the intervening veins, characters typical of *M. phoebe*. A paratype female captured at the same elevation a day previously is not so lightly marked on the upperside (Figures 6-8), also identifiable as *M. phoebe*.

Similar lightly marked forms of *M. phoebe* have been found in the south of France (www.butterfliesoffrance.com/html/Melitaea%20phoebe.htm), figured examples: female from Var, 10-V-2012, Alpes-de-Haute-Provence, 02-V-2011, also at www.gdoremi.altavista.org/Nymphalidae/Melitaea_phoebe_en.html figured example, male but with no data. Lightly marked specimens have also been found in North Macedonia, Skopje, Grupčin (♀) (Figure 9). Alberti (1969, p. 193) considered this form to be distinct from *caucasica* Staudinger 1870, to which he referred the name *sextilis* Jachontov 1909, the small second generation form of *M. phoebe* in the Caucasus. Tshikolovets (2011, p. 497) placed it as a synonym of *Melitaea phoebe ottonis* Fruhstorfer, 1917 (replacement name for *caucasica* Staudinger) as did Tshikolovets & Nekrutenko (2012, p. 293).

However, Butterfly Conservation Armenia, www.butterfly-conservation-armenia.org/melitaea-

pseudosibina.html, considered this to be an endemic species of Caucasus and Transcaucasia. Tóth & Varga (2011) and Tóth et al. (2014) were unable to separate taxon *sibina* Alphéraky, 1881 (see Russell et al. 2022, p. 29, fig. 7) from *M. phoebe*, using morphometric measurements of male genitalia or molecular procedures, respectively. The only similarity between the taxa *pseudosibina* and *sibina* is the weak macular pattern in the post discal area of the forewings of *pseudosibina*, whilst *sibina* has both fore- and hindwings almost completely lacking in the black macular markings typical of *M. phoebe*. The present authors considers that the taxon *pseudosibina* is synonymous with *M. phoebe ottonis* and thus is a form of *M. phoebe* rather than of *M. ornata*. Without knowledge of the post L4 larvae it is not possible to be conclusive. It is highly possible that the difference in altitude at which the specimens figured by Alberti (1969, Tafel 1, figs 1c-4c) of the taxa *phoebe* and *pseudosibina* were taken (5-800 m and 2100 m, respectively) could well account for the differences in their forewing upperside markings.

Melitaea phoebe Knoch, var. nova *allophylus* Rüttimeyer, 1942 [TL: Porté, Pyrénées Orientales, France]. The male holotype and four male syntypes (labelled as allotype and three as cotypes), all taken between 9 and 15-July-1939 are present in the Naturhistorisches Museum Bern, Switzerland. From high resolution photographs of the undersides of the type series (Figures 10-12), kindly provided by Hans-Peter Wymann (see Acknowledgements), it was noted that their wing morphology and antennal shape indicated that they were more similar to *M. ornata* rather than to *M. phoebe* but the time of capture was more akin to that of *M. phoebe*, which tend to emerge later than *M. ornata* (Verovnik et al. 2010; Russell & Tennent, 2022, p. 203). However, at high elevations in mountainous areas, the emergence of *M. ornata* has been seen to be delayed at times of deep long-lasting snowfall, which remains on the ground well into late spring. This prevents the larvae from waking from their diapause until much later than normal, in doing so the emergence of the adult butterflies may occur very much later. This scenario was observed by John Coutsis (Pers Comm.) in the Greek mountains (considerably further south than the Pyrénées); its fact it was first thought that these butterflies were of a second brood, until it was observed that the first brood of other species were also in flight (e. g. *Coenonympha pamphilus* (Linnaeus, 1758)). This record widens the distribution of *M. ornata* in France to the southwest and provides more of a continuity of distribution between France and Spain, where *M. ornata* has been present for many years. Identification labels have been placed on the pins of the five specimens: “Misident. *Melitaea ornata* Christoph, 1893, Russell 2022”.

Russell et al. (2020) stated that some of the specimens of *M. phoebe nimbula* Higgins, 1941 from the Picos de Europa at c. 1225 m showed wing morphological characters of *M. ornata*; these look very similar to var. *allophylus*. It is noted that Hinojosa et al. (2022, p. 3, fig. 1) indicated that the mountains of north central Spain were populated by “*M. pseudornata*” (= *M. ornata bethunebakeri* Sagarra, 1926, [see above]) rather than by *M. phoebe*, which appeared to occupy the Pyrenees. Thus, it is possible that Russell et al. (2020, p. 456) were in error in classifying the *M. phoebe nimbula* as a subspecies of *M. phoebe*. This adequately demonstrates the difficulties in correctly classifying museum specimens exemplifying a mixture of specific characters associated with the two species under consideration in this case.

Melitaea phoebe f. *rubialesi* Gómez Bustillo, 1973 [TL: Loeches (750 m), Province of Madrid, Spain, captured 15-May-1973]. Prior to the recognition that *M. ornata* occurs in Spain (see Russell et al. 2020), Russell & Tennent (2016) placed this name as a form of *Melitaea phoebe occitanica*. At this time the type material, which consists solely of a single female (Gómez-Bustillo, 1973, p. 36), was not examined. This specimen (the holotype by monotypy) is housed in the Universidad Politécnica de Madrid [UPM] in Madrid (E). High resolution photographs of the holotype (Figure 13) were compared with examples of *M. phoebe* and *M. ornata* females (Figures 14-15). It was concluded that this was a “form” of *M. ornata* and not of *M. phoebe*. Although the names of varieties and forms are not recognized by the ICZN, it was thought important to identify this specimen; as it extends the

distribution of *M. ornata* to the Province of Madrid, from where it has not previously been reported. A label has been placed on the specimen's pin: "Misident. *Melitaea ornata* Christoph, 1893, Russell & Vives, 2023".

Apart from the holotype, AVM discovered, among the specimens in the Gómez Bustillo collection headed *M. phoebe*, two male specimens from Campo Real only some 6.5 Km to the south-southeast of Loeches, across a dry area of earthworks dating from the Spanish Civil War (1936-1939). One specimen was captured 6-VI-1971 (Figures 16-17), the other specimen is very ragged (Figures 18-19), its date of capture unknown but presumably later in the month. Both specimens resemble the form *rubialesi* and thus we classify them as *M. ornata*.

Another male specimen, also resembling *rubialesi*, was found by AVM in the same collection (Figures 20-21). It was captured also on 6-VI-1971 at Montarco (a well-known collecting site 15 km southeast of central Madrid, now in the suburb of Rivas-Vaciamadrid (Fidalgo & Paris, 2023, p. 8); this location is only some 13 km west of Loeches. Again, we classify this specimen as *M. ornata*. All three specimens have had an extra label placed on their pin: "Misident. *Melitaea ornata* Christoph, 1893, Russell & Vives, 2023".

E. García-Barros photographed two specimens originating from the Madrid University campus (a male is figured - Figure 22), which are undoubtedly also *M. ornata*, as the larvae found in this location have red-brown heads (J. Martín pers. comm. to E. García-Barros). This locality is to the northwest of the city rather than to the southeast as are the locations mentioned above.

Papilio tremulae Pillar & Mitterpacher, 1775, was synonymised with nominotypical *M. phoebe* by Russell & Tennent (2016, note 93) on the basis that there had been no reports of *M. ornata* from Croatia, the Type Locality of this taxon. *M. ornata* has since been confirmed from Croatia (Russell & Pateman, 2019); however, the specimen figured by the authorities (Tab. IV, figs 1-2) is considered still to be representative of *M. phoebe*, with the submarginal black markings touching the intervening veins.

Further Spanish specimens in the Gómez Bustillo collection in UPM previously identified as *Melitaea phoebe*

1). A male specimen originating from Sanabria, Province of Zamora (NW Spain) (Figures 23-24). The wing morphology of the specimen and the shape of its antenna suggest that it is *M. ornata*. The capture date of 4-VI-1926, however, is reminiscent of capture times of *M. phoebe*, but there are mountainous areas within the Parque Natural del Lago Sanabria y Sierras in excess of 1700 m above sea level. Thus, it is possible that the larva of this specimen suffered an elongation of diapause or, as a result of wet conditions, skipped diapause and continued feeding, producing an adult *M. ornata* in the summer of the same year (see Russell et al. 2007, p. 145; Benyamini, 2021, p. 190 [taxon *klili*] and Russell et al. 2023, pp. 187-195). Interestingly, Hinojosa et al. (2022, p. 3, fig. 1) indicated that specimens of "*M. pseudornata*" (= *M. ornata* [Russell et al. 2020, p. 455]) had been found in mountainous regions further north in the provinces of León and Asturias and further south in the province of Ávila, with no reports of *M. phoebe* from the area surrounding the National Park. They also considered that some specimens of their taxon *pseudornata* were "double brooded" with adults present at very low altitude in September possibly originating from the west coast of the province of La Coruña, NW Spain (Hinojosa et al. 2022, pp. 5-6). However, it was not stated whether this was simply some larvae skipping diapause and continuing to feed, with a proportion of adults emerging the same year (see Benyamini, 2021, p. 190), or a "complete 2nd brood". We consider that the specimen under consideration is most probably *M. ornata*, and a label indicating such has been placed on the pin: "Misident. *Melitaea ornata* Christoph, 1893, Vives, 2023".

2). A male specimen in rather poor condition and without a complete antenna (Figures 25-26), taken on an unspecified date in July 1967 at Puerto de la Ragua, Sierra Nevada, Granada at 1990 m. Russell et al. (2020, pp. 450-451) reported 5 specimens of *M. ornata* from the Sierra Nevada at 1600 m (1 in MZB, 3 in MCZHU, Harvard, U.S.A. and a pair of specimens in NHM, London). Muñoz-Sariot &

Sánchez-Mesa (2019, p. 9) reported 2 specimens of *M. ornata* from the Sierra Nevada (♂ Quéntar at 1300 m and ♀, Beas de Granada at 1350 m, Figures 2a-2b respectively [not Figures 1a-b, as indicated in their text]). The only precise reports of *M. phoebe* from the Sierra Nevada are by Muñoz-Sariot & Sánchez-Mesa (2019, p. 7): a pair of specimens from Beas de Grenada at 1460 m (indicating a mixed population?); Hinojosa et al. (2022, p. 3, fig. 1) indicated a preponderance of *M. phoebe* in the Sierra Nevada. Although worn and lightly marked, this specimen bears a resemblance to *M. ornata* with respect to the forewing underside black submarginal markings being more triangular than smooth arches in shape. However, these markings clearly touch the intervening veins, thus we consider this specimen to be *M. phoebe* rather than *M. ornata*.

A selection of specimens here classified as *M. ornata* from the entomological reference collection of the Universidad Autónoma de Madrid, Departamento de Biología (UAM)

1). A male specimen taken on 28-V-1986 at Navalguijo, Sierra de Gredos, Ávila, leg. J. L. Viejo and J. Martín Cano (Figures 27-28), showing the typical morphology of *M. ornata*: black submarginal markings on the hindwing underside not touching the intervening veins and the antennae spatulate rather than elongated club shaped. No specimen of either taxa was mentioned from this locality in the supplement of Hinojosa et al. (2022).

2). A female specimen taken on 16-VI-2001 at Camino Valdosillos, Cuenca, leg. S. Jiménez & J. I. Arce (Figures 29-30) has the black submarginal markings on the underside more triangular in shape and not touching the intervening veins, suggesting it is *M. ornata*. There is no record of this location for either taxa in the supplement of Hinojosa et al. (2022).

3). A pair of specimens from Guadalajara: male captured on 15-VI-1980 at Masegozo de Taguña at *circa* 1000 m (Figures 31-32) and the female, rather worn and taken on 7-VI-1980 only a few km. away at Auñón (Figures 33-34) at the lower altitude of *circa* 700 m, both leg. E. García-Barros, are clearly *M. ornata*.

4). A female (?), judging by its rounded forewing shape taken in 2018 [date not given] at San Felices de Castillaria, Palencia (Figures 35-36) leg. M. L. Munguira has the black submarginal markings swollen centrally, tending to triangular in the forewing, and not touching the intervening veins and spatulate antenna, identifying this specimen as *M. ornata*.

5). A male specimen taken on 28-VI-2018 by M. L. Munguira at El Vallecillo, Albarracín, Teruel (Figures 37-38) has centrally thickened submarginal markings not touching the intervening veins but rather pointed, club-shaped antenna; however, we classify this as *M. ornata*. Interestingly, Hinojosa et al. (2020, supplement p. 4) list this as a location for the taxon *pseudornata*.

6). Another male specimen taken on 18-IV-1998 at Montes de Torrero, Zaragoza at 230 m a.b.s.l. (Figures 39-40) by G. E. King has the black submarginal markings not extending to the intervening veins. This specimen is classified as *M. ornata*. Hinojosa et al. (2022) do not mention this location for either taxa.

7). A male from Yepes, Toledo taken on 13-V-2007, by J. Martín & L. Ureña (Figures 41-42), has the spatulate antennae and submarginal black arches not touching the intervening veins and thus we classify this specimen as *M. ornata*.

The locations of these specimens provide further information on the distribution of *M. ornata* apparently adding the provinces of Cuenca, Guadalajara, Palencia, Toledo and Zaragoza to its Spanish distribution.

Some comments on the observations made by Hinojosa et al. (2022)

1). PHENOLOGY AND VOLTINITY: some confusion were present concerning the voltinity of *M. ornata*. They suggested that the taxon *pseudornata* Muñoz-Sariot & Sánchez-Mesa, 2019 was double brooded (bivoltine) because it had two flight periods and that *M. ornata* was bivoltine only in

captivity under laboratory conditions quoting Russell & Pateman (2013) and Russell et al. (2014) (Hinojosa et al. 2022, p. 6). Neither of these articles suggested that *M. ornata* was truly bivoltine, i. e. had two completed generations in a single year, only partially bivoltine; confusion arises from the use of the word “generation” by the former authors. What occurred during the rearing of *M. ornata* from Chios (2013) and Slovenia (2014) open to the English showery spring weather was that the larvae split into two groups: the first group instead of entering diapause at stage L4, as would have been expected, continued to feed, pupated and adults emerged in the summer of the same year; whereas the second group entered diapause with the larvae only resuming feeding in the early spring of the following year. This was merely a larval diversification due to prevailing weather conditions; those larvae reared in a greenhouse protected from the prevailing wet weather conditions all entered diapause and followed the “normal” growth pattern of *M. ornata* associated with their natural dry environments. This scenario of bypassing diapause by some larvae occurs naturally in the taxon *klili* Benyamini, 2021 (synonymised with *M. telona* (part of the super-species *M. ornata*) by Russell et al. (2023). The populations of *klili* occupy just two permanently low-lying wet areas in stream valleys in Central Galilee (© Nahal Shezor, 206 m) [TL.] and Lower Galilee (© Nahal Zippori, 90 m), Israel (Benyamini, 2021). Under these circumstances, due to the hotter temperatures experienced by the larvae in Israel, complete bivoltinity can occur because of the much shorter development time of the larvae, which allows time for the group which bypassed diapause to complete a true 2nd generation in the same year; although the larvae which enter diapause do not begin feeding again until the following spring.

Thus, the situation in Europe can be expressed as follows:

Year 1: L4 larvae emerge from diapause, feed up, pupate and produce adults (spring brood) which mate, the female lays an egg batch, larvae hatch and feed up to stage L4; some larvae then continue feeding to final instar, pupate and adult butterflies emerge (partial summer brood), the remaining larvae enter diapause and remain in that stage throughout the summer and winter to exit their web in year 2 and begin feeding to final instar, pupate and adults emerge (spring brood) but these butterflies are the same “generation” as the previous summer brood, or possibly a combination of both the Year 1 broods, if the offspring of the summer brood have been able to survive the winter, which is probably unlikely in Europe.

It is strongly suspected that the apparent bivoltinity in the taxon *pseudornata* is in reality only partial with some larvae bypassing diapause and continuing to feed to produce adults in August. The observations of adults in August detailed in the supplementary material provided by Hinojosa et al. (2022, suppl. 4) indicate observations on 26, 27 and 28-VIII (no year[s] given) at Praia de Rostro, A Grixia and N. of Cuño, respectively. These locations, at or below 200 m above sea level, are all to be found in the west of the province of La Coruña, the most northwesterly in Spain and consequently open to the humidity of the Atlantic Ocean air flow from the prevailing south-westerly winds. Thus, it is considered most likely that the apparent bivoltinity is in fact the result of a pre-diapause division of the larvae, with one group bypassing diapause, continuing to feed, pupating and producing adult butterflies in August, thus reflecting the larval behaviour when subjected to humid conditions. The lower summer temperatures experienced by the larvae in north-western Spain compared with those in Israel would preclude a complete second generation, the offspring of which would be most likely to enter diapause; any which did not reach that stage would be unlikely to survive.

2). HYBRIDISATION between *M. phoebe* and taxon *pseudornata*: this has been suggested to have occurred on a number of occasions previously by Hinojosa et al. (2022, p. 7) and more recently between *M. phoebe* and *M. ornata* by Bálint & Ilonczai (2001, p. 217) and Russell et al. (2014). There are several localities in Spain where both taxa are sympatric and at least partially synchronic - Beas 1200 m, and Monachil, 1600 m, in the province of Granada (Sánchez-Mesa & Muñoz-Sariot, 2017, pp. 315-316); La Sagra 19, 23-V taxon *pseudornata*, 21-V *M. phoebe* and Güejar Sierra, 11-V taxon

pseudornata, 23-IV *M. phoebe* (Hinojosa et al. 2022, suppl. pp. 3-4). Thus, it is highly possible that this scenario would continue and in such cases their presence would make for difficulties in taxon determination and could well account for some larvae having black heads and the adult being determined as *pseudornata*. It could well be the cause of difficulties in the determination of adults from their wing and antenna morphology, as has been experienced by the first author.

3). LARVAL COLOUR has been shown to be variable in different Spanish locations in *M. phoebe* and the taxon *pseudornata* (Hinojosa et al. 2022, p. 6, fig. 4). Variation of larval colouring is well known and documented; in fact, the two very different larval forms of *M. phoebe* account for the subspeciation of *M. phoebe occitanica* Staudinger, 1871, which has larvae with an orange lateral stripe (Figure 43) and that of the nominate *M. phoebe phoebe*, which has no orange lateral stripe but is well covered in white spots (Figure 44). The larvae of *M. ornata* can vary also even in those larvae from the same egg batch, as was the case with an egg batch from Mamousia, Ahaia, Greece (Russell et al. 2007, p. 159, figs 16-17).

Comments on the overall distribution of *M. ornata*

Melitaea ornata adversaria Korb, Stradomsky & Kuznetsov, 2015 [TL: Kyrgyzia (= Kyrgyzstan), Kyrgyz Mts., Ala-Too settlement vicinity, 1100-1200 m]; at approximately 74.5° east, this is very much further east than previous records; i. e. the western side of the Southern Ural Mountains (Guberli [the Type Locality] and Kysylkaya [Van Oorschot & Coutsis, 2014, plate 12, figs 20-21]) are at approximately 58° East. Also the reports by Tshikolovets et al. (2016) of a number of locations in southeastern Kazakhstan, which are even further east, around 85 ° East; thus this species is apparently well established in Asia. Unfortunately, Korb (2011, p. 158) had reported *M. phoebe saturate* from the Kungey Ala-Too Mountains; however, later Korb, Stradomsky & Kuznetsov (2015, p. 140) considered that *M. phoebe* did not occur in North Tian-Shan. The presence of this species very close to the border with northwest China, one must expect reports from China to be imminent.

The presence of *M. ornata allophylus* Rütimeyer, 1942 [TL: Porté, Pyrénées Orientales, France] in the eastern Pyrénées links the populations in Var (southeastern France) with the Spanish populations of *M. ornata* in the Spanish Cantabrian and Asturian mountains. It also raises the possibility of finding *M. ornata* in the intervening French departments of Aude and Hérault, particularly in xerothermic habitats.

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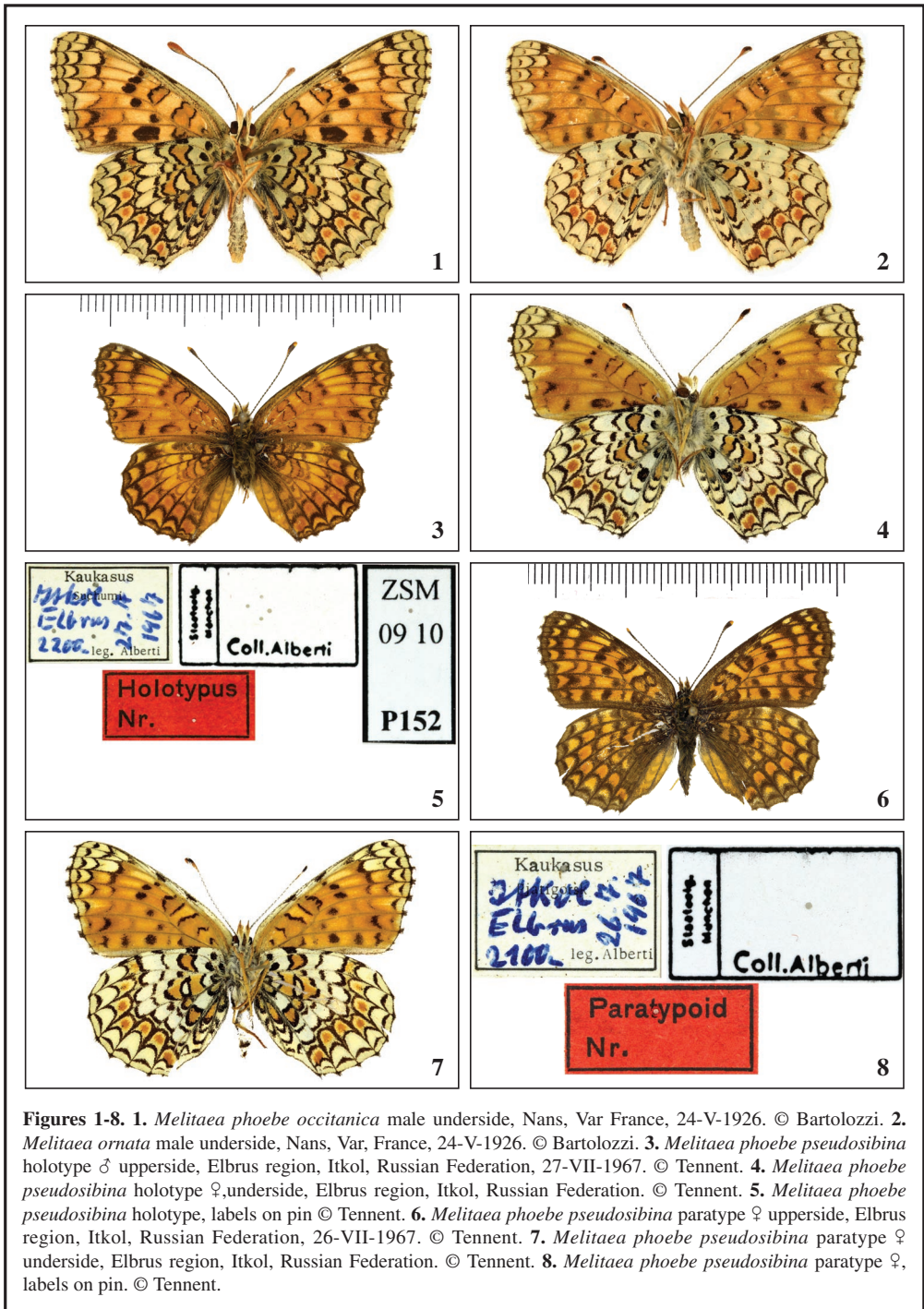
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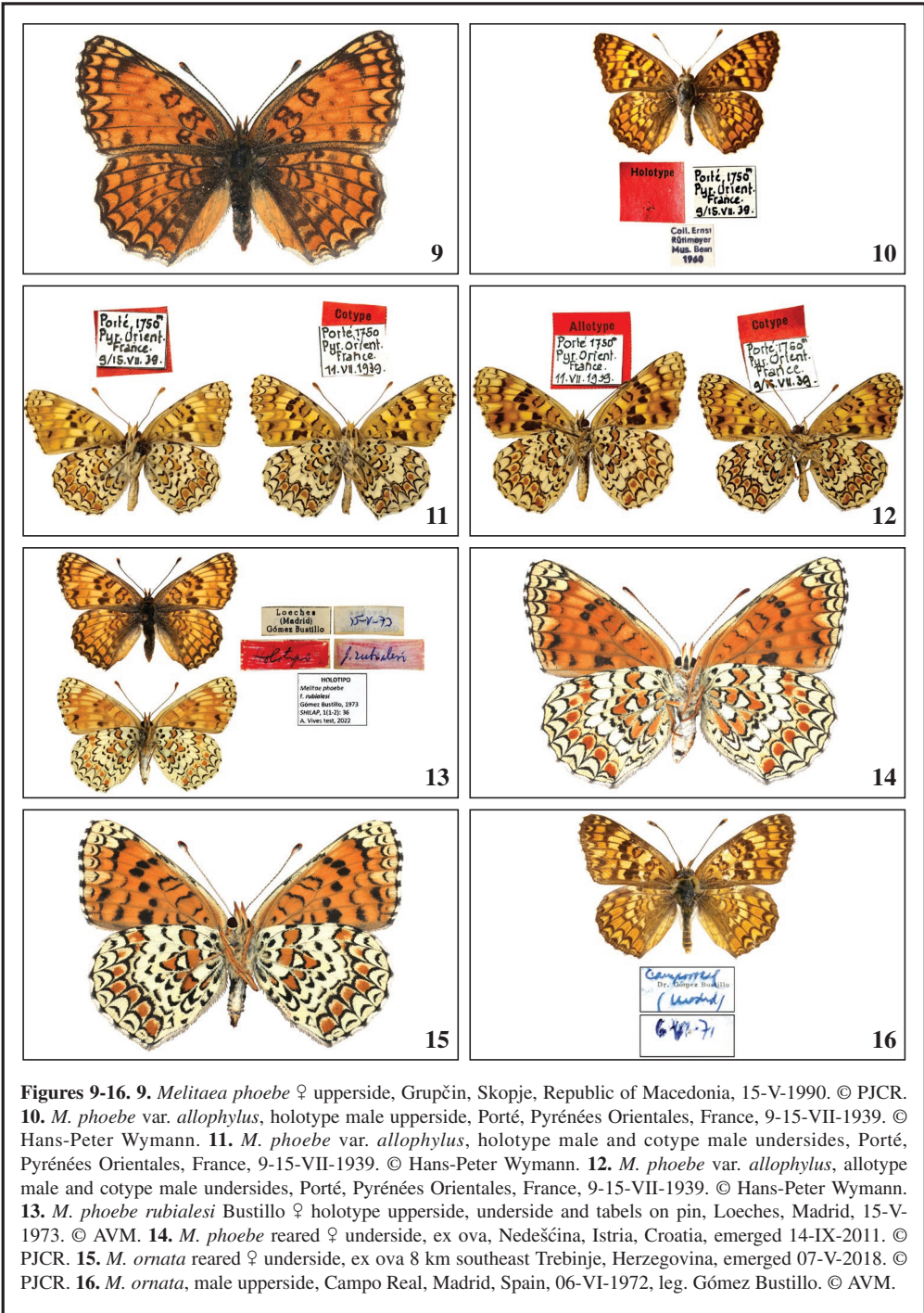
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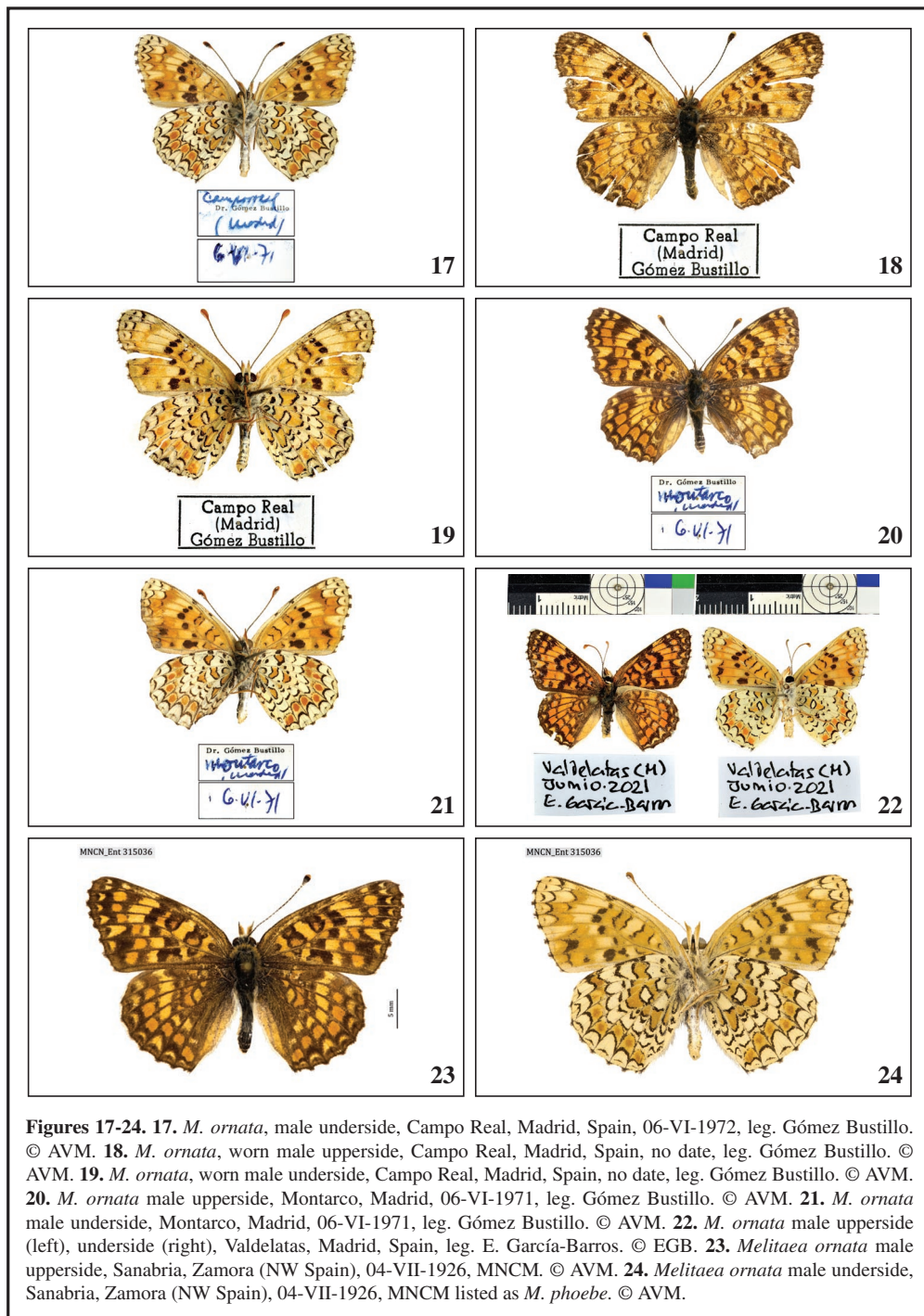
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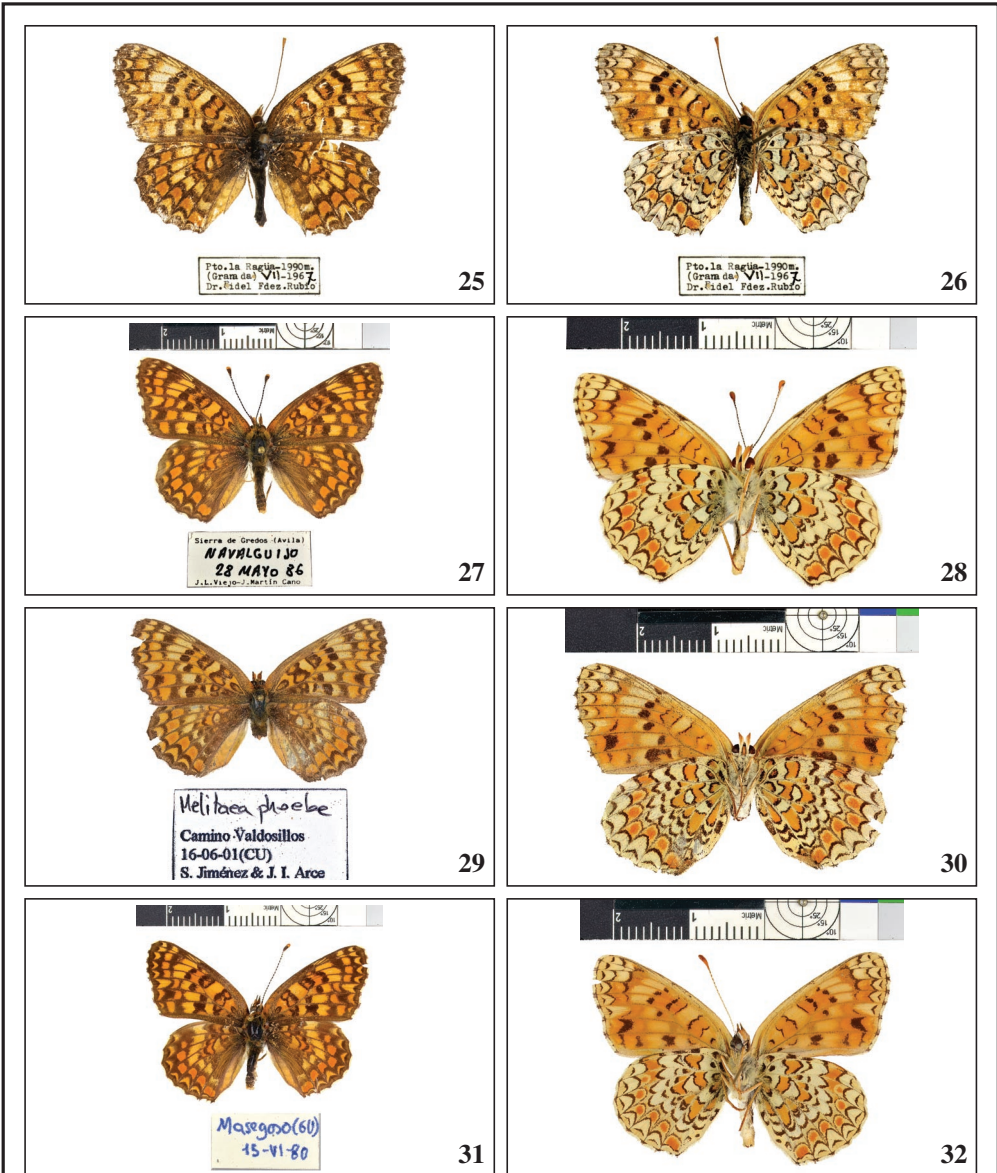
Figures 1-8. 1. *Melitaea phoebe occitanica* male underside, Nans, Var France, 24-V-1926. © Bartolozzi. 2. *Melitaea ornata* male underside, Nans, Var, France, 24-V-1926. © Bartolozzi. 3. *Melitaea phoebe pseudosibina* holotype ♂ upperside, Elbrus region, Itkol, Russian Federation, 27-VII-1967. © Tennent. 4. *Melitaea phoebe pseudosibina* holotype ♀, underside, Elbrus region, Itkol, Russian Federation. © Tennent. 5. *Melitaea phoebe pseudosibina* holotype, labels on pin © Tennent. 6. *Melitaea phoebe pseudosibina* paratype ♀ upperside, Elbrus region, Itkol, Russian Federation, 26-VII-1967. © Tennent. 7. *Melitaea phoebe pseudosibina* paratype ♀ underside, Elbrus region, Itkol, Russian Federation. © Tennent. 8. *Melitaea phoebe pseudosibina* paratype ♀, labels on pin. © Tennent.



Figures 9-16. 9. *Melitaea phoebe* ♀ upperside, Grupčín, Skopje, Republic of Macedonia, 15-V-1990. © PJCR. 10. *M. phoebe* var. *allophylus*, holotype male upperside, Porté, Pyrénées Orientales, France, 9-15-VII-1939. © Hans-Peter Wymann. 11. *M. phoebe* var. *allophylus*, holotype male and cotype male undersides, Porté, Pyrénées Orientales, France, 9-15-VII-1939. © Hans-Peter Wymann. 12. *M. phoebe* var. *allophylus*, allotype male and cotype male undersides, Porté, Pyrénées Orientales, France, 9-15-VII-1939. © Hans-Peter Wymann. 13. *M. phoebe rubialesi* Bustillo ♀ holotype upperside, underside and tapers on pin, Loeches, Madrid, 15-V-1973. © AVM. 14. *M. phoebe* reared ♀ underside, ex ova, Nedešćina, Istria, Croatia, emerged 14-IX-2011. © PJCR. 15. *M. ornata* reared ♀ underside, ex ova 8 km southeast Trebinje, Herzegovina, emerged 07-V-2018. © PJCR. 16. *M. ornata*, male upperside, Campo Real, Madrid, Spain, 06-VI-1972, leg. Gómez Bustillo. © AVM.



Figures 17-24. 17. *M. ornata*, male underside, Campo Real, Madrid, Spain, 06-VI-1972, leg. Gómez Bustillo. © AVM. 18. *M. ornata*, worn male upperside, Campo Real, Madrid, Spain, no date, leg. Gómez Bustillo. © AVM. 19. *M. ornata*, worn male underside, Campo Real, Madrid, Spain, no date, leg. Gómez Bustillo. © AVM. 20. *M. ornata* male upperside, Montarco, Madrid, 06-VI-1971, leg. Gómez Bustillo. © AVM. 21. *M. ornata* male underside, Montarco, Madrid, 06-VI-1971, leg. Gómez Bustillo. © AVM. 22. *M. ornata* male upperside (left), underside (right), Valdelatas, Madrid, Spain, leg. E. García-Barros. © EGB. 23. *Melitaea ornata* male upperside, Sanabria, Zamora (NW Spain), 04-VII-1926, MNCM. © AVM. 24. *Melitaea ornata* male underside, Sanabria, Zamora (NW Spain), 04-VII-1926, MNCM listed as *M. phoebe*. © AVM.



Figures 25-32. 25. *M. ornata* male upperside, Puerto de la Ragua, Sierra Nevada, Granada, Spain, VII-1967, leg. Fernández Rubio. © AVM. 26. *M. ornata* male underside, Puerto de la Ragua, Granada, Sierra Nevada, Spain, VII-1967, leg. Fernández Rubio. © AVM. 27. *M. ornata* male upperside, Navalguijo, Sierra de Gredos, Ávila, Spain, 28-V-1986, leg. J. L. Viejo & J. M. Cano. © EGB. 28. *M. ornata* male underside, same data as Figure 27. 29. *M. ornata* female upperside, Camino Valdosillos, Cuenca, Spain, 16-VI-2001, leg. S. Jiménez & J. I. Arce. © EGB. 30. *M. ornata* female underside, same data as Figure 29. 31. *M. ornata* male upperside, Masegozo de Tagaña, Guadalajara, Spain, at circa 1000 m., 15-VI-1980, leg. García-Barros. © EGB. 32. *M. ornata* male underside, same data as Figure 31.

