

The *Berberia abdelkader* (Pierret 1837) enigma ; a review of named forms ; comments ; a solution offered (Lepidoptera : Satyridae)

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Summary

The names of all taxa relating to the endemic North West African butterfly *Berberia abdelkader* (Pierret 1837) are examined. As a result *Berberia abdelkader abdelkader*, *B. a. nelyai* (Seitz 1911) and *B. a. taghzefti* Wyatt 1952 are recognised, whilst *Berberia lambessanus* (Staudinger 1901) is accorded specific status. The taxa *romeii* Rothschild 1933, *marteni* Chnéour 1935, *alexander* Chnéour 1937, *alfae* Slaby 1981, *saharae* Slaby 1981 and *arvorum* Slaby 1981 are formally synonymised. Maps indicating the type locality of all named forms and distribution patterns of recognised taxa are provided. Recognised taxa are illustrated in black and white. Evidence is provided to show that, despite a mass of published information to the contrary, all taxa are univoltine with an extended and often flexible flight period.

Résumé

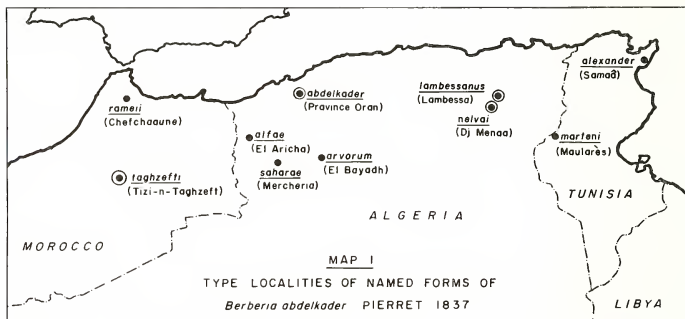
L'ensemble des taxa du Rhopalocère endémique d'Afrique du Nord-Ouest *Berberia abdelkader* (Pierret 1837) est étudié. *Berberia abdelkader abdelkader*, *B. a. nelyai* (Seitz 1911) et *B. a. taghzefti* Wyatt 1952 sont reconnus valides, tandis que l'auteur assigne un statut spécifique à *Berberia lambessanus* (Staudinger 1901). Les taxa *romeii* Rothschild 1933, *marteni* Chnéour 1935, *alexander* Chnéour 1937, *alfae* Slaby 1981, *saharae* Slaby 1981 et *arvorum* Slaby 1981 sont mis en synonymie. Des cartes indiquent les localités typiques de toutes les formes nommées et montrent la répartition des taxa retenus. Les taxa reconnus sont illustrés en noir et blanc. Une démonstration suivie d'une discussion établit que, en dépit de la publication d'une quantité d'informations contraires, ces taxa sont univoltins, avec une période de vol étendue et souvent variable.

Introduction

In 1837, Alexandre Pierret named a new satyrid butterfly from the Algerian Province of Oran in honour of the Algerian leader Abd-El-Kader. The species is now known from many localities in Morocco,

Algeria and Tunisia and since its discovery more has been written about this flagship of the North West African lepidopteran fauna than about any other butterfly of the region. It is surprising therefore, that published data available on the biology and taxonomic status of *abdelkader* and its forms, is so misleading.

The author spent more than 8 months in Morocco, Algeria and Tunisia in 1992 and visited the type localities (TL) of all described taxa (Map 1); in addition the collections of Lepidoptera in the British Museum (Natural History) (BM(NH)), including those amassed by Oberthür and Rothschild, have been scrutinised. In all, 1350 set specimens have been examined, together with photographic slides of many more. This paper sets out to revue relevant published data, suggest a taxonomic solution and correct certain long-held misconceptions. Almost inevitably new synonymy is introduced.



Named forms and their type localities

All known named forms follow in date order of publication together with their TL. At this stage no comment is made on the validity of individual taxa.

abdelkader Pierret 1837

Satyrus Abd-el-Kader, Anns Soc. ent. Fr., 6: 19-21, Plate 1, Fig. 5 (male upperside), Fig. 6 (male underside).

Described from a single male from the Province of Oran in Algeria. The female was not known to Pierret. The precise TL has never been firmly established.

serrata Rühl 1895

Satyrus abdelkader ab. *serrata* Aust., Die Palaearktischen Grossschmetterlinge und ihre Naturgeschichte 1 : 822.

Confusion arises over authorship of this name. It has been given by all authors to date as Austaut 1895 with a reference to the journal *Le Naturaliste* of that date. This is incorrect ; there are only three papers by Austaut in that journal of 1895, all referring to Tibetan *Parnassius* ! The first reference the present author was able to find is that of Rühl 1895 who gives Austaut as the author. If this is indeed the original description, Rühl must stand as the author. The position is further complicated by the fact that Rühl's death precedes his description by 2 years ! (Kudrna 1990 : 67).

The name was given to an aberrant specimen ; the TL is Magenta in Algeria.

lambessanus Staudinger 1901

Satyrus abdelkader var *lambessanus*, in Staudinger & Rebel, Catalog des Lepidopteren der Palaearctischen Faunengebietes., 1 : 58.

A brief latin description. TL : Lambessa, Algeria.

nelvai Seitz 1911

Satyrus abdelkader nelvai subsp. nov., Soc. ent., 26 (14) : 49-50, Figs (male and female upperside).

Named after Monsieur Adrien Nelva, the principal pharmaceutical chemist of the day in Batna, the TL of *nelvai* was given by Seitz as the Aurès Mountains in eastern Algeria. Specimens were apparently brought to Nelva by local collectors and Seitz was unable to say precisely from where they originated.

However, Rothschild (1917 : 108) said "...Mr Nelva, who furnished me with the four specimens I have, informs me that his Arab 'Chasseurs' captured them on the Djebel Menaa. Mr Harold Powell, who sent to Mr Oberthür several hundreds of this fine insect, states that it is comparatively rare on Menaa, and that its principal stronghold is the Djebel Metlili and the adjacent peaks to the west of El Kantara".

Djebel Menaa, part of the Aurès Massif, is to the east of El Kantara.

romeii Rothschild 1933

Satyrus (Cercyonis) abdelkader romeii subsp. nov., Novit. zool., 38 : 319.

Described from a single male, taken at 'Cuernos de Xauen' [Chefchaoune in the western Rif mountains of Morocco] on 21 vii 1932 by the Spanish collector Dr. E. Romei, after whom it was named.

marteni Chnéour 1935

Satyrus abdelkader marteni n. ab., Ent. Z. Frankf. a. M., 48 : 190-191, Fig. 2 (male upperside)

Described from the area of Moularès Mines and Gafsa in western Tunisia, flying in October.

alexander Chnéour 1937

Satyrus abdelkader alexander n. ab., Ent. Z. Frankf. a. M., 51 : 339, figured p. 340, Fig. 2 (underside), Fig. 3 (upperside).

Described from the mountains in the region of Nabeul, Cap Bon, in northern Tunisia ; the location was subsequently (Chnéour 1954 : 227) given as 'Somâa', about 10 km to the north east of Nabeul.

Berberia de Lesse 1951

Berberia n. gen., Revue fr. Lépidopt., 13 (3/4) : 41

A new genus raised by de Lesse specifically for *abdelkader* ; based on genitalic differences from *Satyrus*.

taghzefti Wyatt 1952

Satyrus abdelkader taghzefti ssp. nov., Z. wien. ent. Ges., 37 : 174, plate 1, Figs 1-7 ; plate 2, Figs A1-D7.

Described from the southern side of the Taghzeft Pass in the Middle Atlas mountains of Morocco, between 1900 and 2300 m.

alfae Slaby 1981

Berberia abdelkader alfae n. subsp., Ent. Z. Frankf. a. M., 91 : 110-112, page 112, Fig. 5 (male), Fig. 6 (female)

The large Type Series was taken at El Aricha and Bedeau, (both ca. 1200 m), Western Algeria.

saharae Slaby 1981

Berberia abdelkader saharae n. subsp., Ent. Z. Frankf. a. M., 91 : 113-116, page 115, Fig. 7 (holotype male), Fig. 8 (female)

Also from western Algeria, this form was described from ca. 30 km west of Mercheria at 1200 m, about 100 km in a direct line south east from the TL of *alfae*.

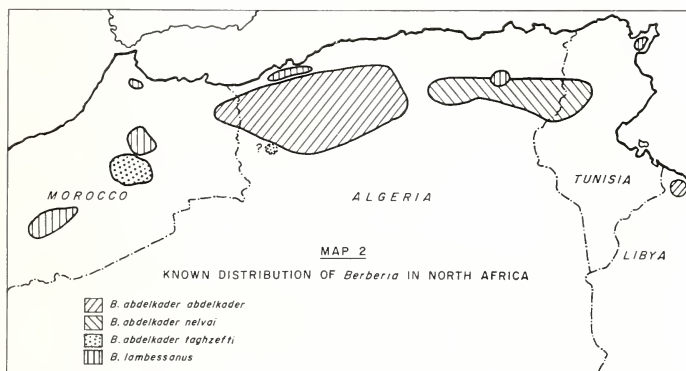
arvorum Slaby 1981

Berberia abdelkader arvorum n. subsp., Ent. Z. Frankf. a. M., 91 : 116-117, page 115, Fig. 9 (male), Fig. 10 (female)

The Type Series is from El-Bayadh, (1300 m), and on the road between El-Biod and Bou-Ktoub, (ca. 1100 m). El Bayadh is ca. 140 km in a direct line east of the TL of *saharae*. A large series was obtained.

Systematic part — A solution ?

In this part, three subspecies of *Berberia abdelkader* are recognised and *Berberia lambessanus* is accorded specific status. Reasons are given for this and for new synonymy introduced. Details are given of distribution patterns and these are summarised on Map 2.



Berberia abdelkader abdelkader Pierret 1837 (Pl. 1, Figs 1-8, Pl. 2, Figs 1-8 [males], Pl. 6, Fig. 1 [female])

Satyrus Abd-el-Kader Pierret 1837, loc. cit.

Satyrus abdelkader ab. *serrata* Rühl 1895, loc. cit.

Berberia abdelkader alfae Slaby 1981, loc. cit., syn. n. [see note (1)]

Berberia abdelkader arvorum Slaby 1981, loc. cit., syn. n. [see note (1)]

MATERIAL EXAMINED : 433 males, 184 females

3 ♂♂ 1 ♀, Tripolitania, Garian [Gharyan ?] Hills, 26 × 1952, KM Guichard, ca. 2000 ft. ; 1 ♀, Tripolitania : Corradini, ca 500 ft., 4 xi 62, KM Guichard ; 1 ♂, Sidi Djillali, Prov. Oran, 28 ix 18, P Rotrou ; 3 ♂♂ 1 ♀, ditto, 26 Sep 1908 ; 1 ♂, Sidi Djillali ; 3 ♂♂ 1 ♀, Crowley bequest/Algeria ; 1 ♂, Elwes coll., 1902-85, Mesopotamia ; 1 ♂, Leech coll., Heyne, Algiers ; 1 ♀, Elwes coll., Sebdu (Oran), 1880-82 ; 1 ♀, GTB Baker coll., Sebdu, Algeria, Pech

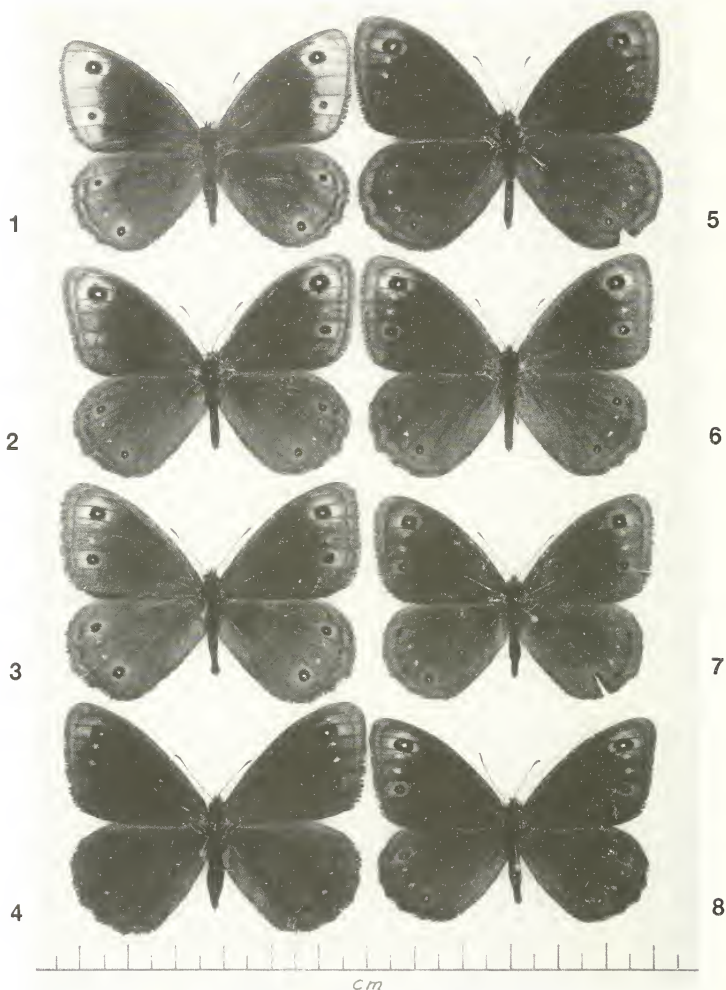


Plate One. *Berberia abdelkader abdelkader*.

1-4 — Males, Col de Jerada, eastern Rif mountains, MOROCCO, 1100-1150 m, 17.ix.1992 ; **5-8** — Males, Sebdou, western ALGERIA, 1000 m, 19.ix.1992.

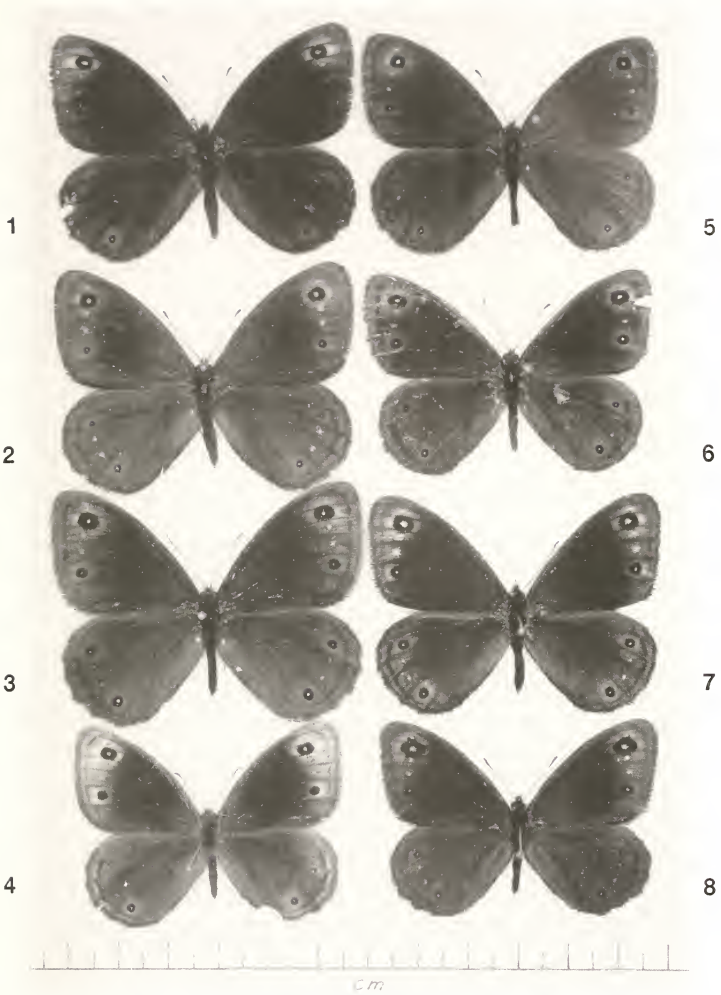


Plate Two. *Berberia abdelkader abdelkader*.
1-4 — Males, El Bayadh, western ALGERIA, 1500 m, 23.ix.1992 ; 5-8 — Male, Djebel Mekaidou (El Aricha), western ALGERIA, 1400 m, 21.ix.1992.

1886; 61 ♂♂, Guelt-es-Stel, Algeria, 3-7 Sep and 8-12 Sep 1912, Dr Nissen; 79 ♂♂ various September dates 1912, V Faroult; 3 ♂♂, Guelt-es-Stel, 26 Aug 1913, V Faroult; 7 ♂♂ Oct 1913, V Faroult; 29 ♂♂ 62 ♀♀, Guelt-es-Stel, Sep/Oct, 1912/1913, Nissen/Faroult; 16 ♂♂ 28 ♀♀, El Mizab, Prov. Oran, 14-22 Sep 1918, P Rotrou; 2 ♂♂ 1 ♀, Algérie, El Aouedja, pr. Sebdu, 27-28 Aug 1907, H Powell; 13 ♂♂ 2 ♀♀, mtns. north of Sebdu, Prov. Oran, 6 Sep 1918, P Rotrou; 4 ♂♂, Gérgv., 19.9.10, collection Captain Holl; 1 ♀, ditto 1.9.10; 1 ♀, ditto 10.9.10; 2 ♂♂ 2 ♀♀, Sidi bel Abbes; 2 ♂♂, Mercheria, 12 Aug 1918, V Faroult; 1 ♂, Ain Boukzouf, 11.8.11, collection of Captain Holl; 9 ♂♂ 4 ♀♀, Les Pins, Prov. Oran, dates from 30 Aug to 22 Sep 1915, P Rotrou; 20 ♂♂ 7 ♀♀, Aflou, Oran, dates from 15 Aug to 11 Sep 1920, V Faroult; 1 ♂, Titen Yaya, SW of Tabia, Jun 21-30 1915, Rotrou; 1 ♂ 2 ♀♀, collection Captain Holl; 2 ♂♂, no data; 1 ♂, Merchich, Prov. Oran, 25 Sep 1918, P Rotrou; 49 ♂♂ 8 ♀♀, Province d'Oran, Aflou, Août 1911, Harold Powell; 3 ♂♂ Algérie, El-Aouedje pr. Sebdu, 27-28 Août 1907, H Powell; 6 ♂♂, Géryville, Harold Powell, Septembre 1910; 1 ♂ Dj. Metlili, El Kantara, 2-12 Sep 1914, pris par Sari Aman [in same drawer as *a. abdelkader* with different data and 11 ♂♂ 15 ♀♀ *a. nelyai* with identical labels — wrongly labelled?]; 32 ♂♂ 21 ♀♀, Prov. d'Oran, Geryville, Harold Powell, Septembre 1910; 1 ♂, Algérie, environs de Geryville (Sud Oranais), Harold Powell & Ch. David, Août 1910 [all in coll. BM(NH)]; 12 ♂♂, 4 ♀♀, Col de Jerada, eastern Rif mountains, Morocco, 11-1150 m, 17 September 1992 [coll. Tennent]; 1 ♂, Tlemcen, W Algeria, 1100 m, 18 September 1992 [coll. Tennent]; 10 ♂♂, 8 ♀♀, Sebdu, W Algeria, 1000 m, 19 September 1992 [coll. Tennent]; 16 ♂♂, 7 ♀♀, Djebel Mekaidou (El Aricha), Algeria, 1350-1400 m, 20-21 September 1992 [coll. Tennent]; 3 ♂♂, Djebel Amour (Brida), Algeria, 1350 m, 2 October 1992 [coll. Tennent]; 33 ♂♂, 20 ♀♀, El Bayadh, Algeria, 1500 m, 23 September 1992 [coll. Tennent].

DESCRIPTION: All races of this butterfly are very variable both in size and markings. In the male, the ground colour varies from a warm mid-brown to dark brown, though seldom as dark as in *abdelkader nelyai*. It is usually much darker in fresh specimens than in individuals which have been on the wing for some time. On the forewing there is a large bluish-white pupilled subapical ocellus in s. 5 and another smaller ocellus in s. 2; the latter is often reduced, occasionally vestigial but never absent. Small bluish spots are almost constant in s. 3 and s. 4 between the ocelli and occasional in s. 6. The subapical ocellus is ringed pale brown or whitish; the ocellus in s. 2 less so. Pale suffusion sometimes spreads to encompass the area between the ocelli. This last characteristic is more frequent in some populations than in others; for example in the population from the Col de Jerada in eastern Morocco, individuals with fairly wide white marginal bands enclosing the outer quarter of the forewing, indistinguishable from *taghzefti* or *nelyai*, sometimes occur (Pl. 1, Fig. 1). On the hindwing there are two

rather smaller pupilled ocelli in s. 2 and s. 5 with that in s. 5 often reduced and occasionally absent.

On the underside hindwing a discal band is defined by thick dark lines, strongly angled at vein 4. In f. *serrata* Rühl, this band is more rounded than angulate ; it probably occurs in all races.

The female is often slightly larger and with all markings larger and more prominent, sometimes with a pale golden-brown marginal border on the forewing. On the underside the female differs from the male in the paler ground colour and in having all hindwing veins heavily lined with white.

HABITAT : Rough open areas and mountain slopes with large stands of the larval host plant, *Stipa tenacissima* (l'Alfa). Although other host plants may be utilised, there is no doubt that this is the primary one, since most, if not all, populations occupy a biotope where there is little or no other vegetation. In northern Saharan localities in Algeria, the biotope is often quite sandy. Found from 200 m (Slaby 1981 : 106, 112) to at least 1500 m on the Algerian 'Hauts Plateau'.

TIME OF APPEARANCE : June to October, depending on altitude, biotope and probably local (variable) conditions.

DISTRIBUTION : The stronghold of the nominate form is western Algeria from the relatively low levels of the coastal regions to the High plateaux from Mercheria to Aflou. To the west it is found as far as the Col de Jerada in eastern Morocco. To the east the distribution is less well known ; there are three males and one female from the Garian [Gharyan] Hills in Western Libya in the BM(NH) collection, which in appearance accord well with *abdelkader abdelkader*. It is quite likely that the nominate race also flies in Tunisia.

Note :

(1) the taxa *alfae* and *arvorum* fall within the known variation of *abdelkader abdelkader* and are unworthy of subspecific status. The butterfly is not new to El Aricha or to El-Bayadh. Regrettably, the type series of these forms and of *saharae* were sold to a commercial dealer and dispersed. They were traced to the private collection of Dr. W. Eckweiler of Frankfurt who very kindly supplied colour slides. A short series from the TL of both 'forms' taken by the present author in 1992 have been deposited at the BM(NH) in London.

***Berberia abdelkader nelvai* Seitz 1911** (Pl. 3, Figs 1-8 [males], Pl. 6, Fig. 5 [female])

Satyrus abdelkader nelvai subsp. nov., Seitz 1911, loc. cit.

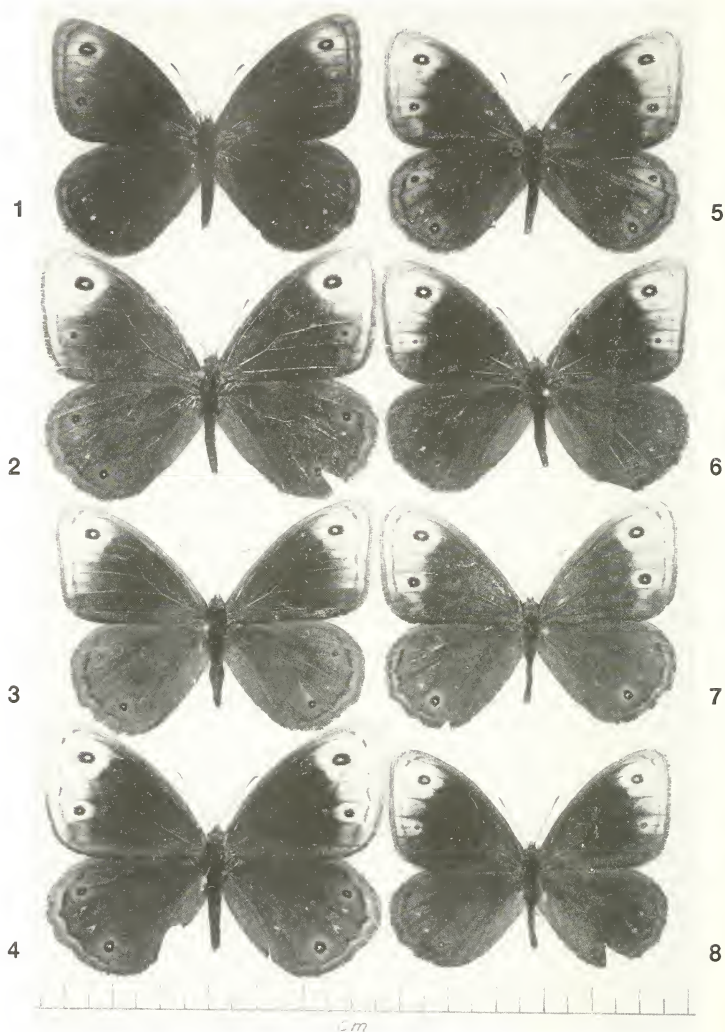


Plate Three. *Berberia abdelkader nelvai*.

1-4 — Males, El Kantara, eastern ALGERIA, 8-900 m, 30.ix.1992 — 1.x.1992; 5-6 — Males, Djebel Selloum, TUNISIA, 9-1100 m, 8.x.1992; 7 — Male, Djebel Semmama, TUNISIA, 1100 m, 9.x.1992; 8 — Male, Sbeitla, TUNISIA, 700 m, 9.x.1992.

Satyrus abdelkader marteni n. ab. Chnéour 1935, loc. cit., syn. n. [see note (2)]
Berberia abdelkader marteni Chnéour, in Higgins & Riley (1983 : 273) ;
 Higgins & Hargreaves (1983 : 158,159) ; D'Abrera (199 : 217[text]) (misidentifications) [see note (3)]

MATERIAL EXAMINED : 252 males, 66 females

2 ♂♂ El Kantara, 2-12 Sep 1914, V Faroult ; 46 ♂♂ 15 ♀♀, Dj. Metlili, El Kantara, 2-12 September 1914, pris par Sari Aman ; 98 ♂♂ 13 ♀♀, Djebel Metlili, 4-6 Sep 1917, V Faroult ; 1 ♂, Menaâ, Aures Mts., Nelva coll., 3 ♂♂, environs de Batna, 1913-14, A Nelva ; 2 ♂♂, Algeria, Faroult ; 14 ♂♂, Prov. Constantine, El Kantara, Août 1913, Harold Powell ; 1 ♂ ditto but Lambese [all Coll. BM(NH)] ; 51 ♂♂, 20 ♀♀, El Kantara, Algeria, 8-900 m, 30 September/1 October 1992 [coll. Tennent] ; 27 ♂♂, 17 ♀♀, Djebel Selloum, Tunisia, 9-1100 m, 8 October 1992 [coll. Tennent] ; 2 ♂♂, Djebel Semmamma, Tunisia, 1100 m, 9 October 1992 [coll. Tennent] ; 5 ♂♂, 1 ♀, Sbeitla, Tunisia, 700 m, 9 October 1992 [coll. Tennent]

DESCRIPTION : Differs from the nominate form in that the apex of the upperside forewing is broadly creamy white, usually completely encompassing the subapical ocellus and often also encompassing the ocellus in s. 2 when present. This white area is sometimes lightly broken by the veins but it more usually obscures the other markings. Hindwing ocelli in s. 2 and s. 5, if present, often surrounded by pale or golden scales which may spread to encompass the outer margin. All ocelli, in particular that in s. 2, are prone to small size or absence. The underside is similar to *abdelkader abdelkader* but with a 'halo' of pale scales surrounding the forewing apical ocellus ; often extended to the ocellus in s. 2 and marginal areas.

On examination of a large number of specimens in collections and in the field, no individuals in which the white areas are completely lacking were encountered (the most lightly marked individual was that illustrated on Pl. 3, Fig. 1). The ground colour, particularly of the male, is very dark brown, almost black and in flight the contrast between the dark ground colour and creamy white is most striking.

HABITAT : As for *abdelkader abdelkader*. Specimens seen have been taken at 700-1100 m.

TIME OF APPEARANCE : mid-August to October, probably into November.

DISTRIBUTION : In a fairly well defined area from Bou-Saada to Djebel Metlili and the Aures Massif in eastern Algeria, to mountain areas of western Tunisia [but see note (6)]

Notes :

(2) The taxon *marteni* Chnéour is clearly synonymous with *nelvai*, despite being treated as a valid subspecies by a number of recent authors who regarded *nelvai* as merely a seasonal form of the nominate race. The original author illustrated (1935 : 191, Fig. 2), a male which, although lightly marked, falls well within the normal variation of *nelvai*. He seemed unaware of *nelvai* at the time of his original description of *marteni*, since he compared it only with the nominate form. Subsequently he referred on a number of occasions to *nelvai* (variously spelled in his papers as *nelvai*, *nelvia* (1936b : 190), *nelwai* (1939 : 17), *nelway* (1942 : 54, 1947-48 : 23) and *nelwai* (1954 : 228, 239)) and although he referred (1954 : 227) to *marteni* being found at Moularès Mines and on the following page referred to *nelvai* from Djebels Selloum and Semmama, some 75 km north East of Moularès and 65 km north of Gafsa, he illustrated (1954 : 239, pl. 33, Fig. 1) *marteni* from Djebel Semmama and (1954 : 239, pl. 33, Fig. 2) *nelvai* from Djebel Selloum. This *marteni* has, like that illustrated in his original description, the distinctive white suffusion confined to the forewing apex ; a form which is common throughout the known range of *nelvai*.

The present author visited the TL of *marteni* in 1992 but, despite a thorough search, was unable to find any examples, although the biotope looked promising. However, *nelvai* was common on Djebel Selloum and sporadic on Djebel Semmama, in October 1992. All specimens taken by the present author on the two mountains and the ground between, are *nelvai*.

There were no specimens of *abdelkader* from Tunisia in the BM(NH) and a short series have now been deposited there. The only Tunisian specimens of *abdelkader nelvai* in the Muséum National d'Histoire Naturelle, Paris, are 17 males from Maknassy, taken in September 1929 (coll. E. Dumont).

Whilst not perhaps directly related to the validity of *marteni*, attention is further drawn to the taxonomic inconsistencies produced by the same author in his treatment of *alexander* [see note (11)]

(3) The source of the reference to *marteni* by Higgins and Riley (1983 : 273) and copied with some variation by Higgins and Hargreaves (1983 : 158-159) and D'Abrera (1992 : 217) is not certain. Although Chnéour (1935 : 190) stated that his *marteni* was the same size as *abdelkader*, Higgins & Riley stated that *marteni* is "smaller and that it has the upf apical suffusion reduced to a wide ring around the sub-apical ocellus, with vestigial extension into s. 4 and s. 3...". This description does not concur with any of Chnéour's illustrations of his own taxon. Higgins & Riley also said that late brood males only were available for description ; a curious statement since there are no individuals of any *Berberia* species or races from Tunisia in the Higgins, Oberthür, Rothschild or Main Collections in the BM(NH), from where it is believed the authors gleaned the bulk, if not all, of the information for their book.

Higgins & Hargreaves described *marteni* as an insect which, judging from their brief description, was more probably *abdelkader abdelkader* (their '*abdelkader*' was actually *lambessanus* [see note (12)]) and went on to say (1983 : 159) "... probably locally variable [!]. Flies in hilly country near the Mediterranean coast and probably here and there in the Libyan desert". One wonders whether the three males and one female of *abdelkader* in the BM (NH) collection from the Gharyan Hills in Libya might account for this comment.

(4) The TL of *marteni* is, as has already been established, Moularès mines and Gafsa. The village of Moularès is a mining centre and the original published TL obviously refers to the mines surrounding Moularès. The TL of "Mines, Tunisia" given by Higgins & Riley (1983 : 273), also found in the German edition (1970 (1978) : 136), is inaccurate. In the more recent French edition of Higgins & Riley (1988 : 397), it has been corrected.

(5) The great majority of the specimens of *nelvai* contained in the Oberthür and Rothschild collections are from Djebel Metlili where it is probably still common. Unfortunately, the present author cannot confirm this because, shortly after arriving on the mountain on 28 September 1992 he was arrested by soldiers of the Algerian Army before being handed over to the police and held for several hours. Prospective visitors, entomological or other, are warned that the whole of Djebel Metlili has recently been declared a sensitive military area. There are no warning signs !

(6) Victor Faroult (1917 : 322), a professional collector employed by Lord Rothschild, found *nelvai* ? [the question mark is Faroult's] at Oasis des Aouïnettes, 15 km west of Gabès on the east coast of Tunisia, in October and November 1902, noting it to be common in the 'plaines d'Alfa' bordering the Gulf of Gabès. On the same page there is a footnote by Rothschild to the effect that "... The Gabès [*abdelkader*] mentioned by him ... have never been recorded before, nor is any record for Tunis[ia] extant, and I do not know where the specimens are. These notes are the mere skeleton of what they ought to have been, as the bulk of Faroult's papers were burnt by accident, as he informs me". The present author spent some time in the area in October 1992 (Aouïnette is actually north west of Gabès) but was unable to find either the butterfly or a suitable biotope ; this does not mean of course that the biotope was not suitable 90 years previously or that *nelvai* is not found there now.

It is noted that Faroult's observations were apparently sometimes suspect ; he recorded (Faroult 1917 : 319) a *Parnassius* species on the border of Algeria and Tunisia in July 1902 and also had "... the bad habit ... of dragging about with him, when travelling, odd specimens of lepidoptera captured on previous expeditions ..." (Rothschild 1917 : 69). Rothschild referred on other occasions to Faroult's collecting habits and seems to have held a low opinion of him.

***Berberia abdelkader taghzefti* Wyatt 1952** (Pl. 4, Figs 1-8 [males], Pl. 6, Figs 2-4 [females])

Satyrus abdelkader taghzefti ssp. nov., Wyatt 1952, loc. cit.

Berberia abdelkader saharae n. subsp., Slaby 1981, loc. cit., syn. n. [see notes (1) and (7)]

Berberia abdelkader abdelkader Pierret 1837 (f. *nelvai* gen. 2), in Higgins, L. G., & Hargreaves, B., 1983. The Butterflies of Britain and Europe, p. 158, female (misidentification) [see note (8)]

Berberia abdelkader abdelkader Pierret 1837 (form *nelvai* Seitz, in Higgins, L. G., & Riley, N. D., 1983. A Field Guide to the Butterflies of Britain and Europe, 5th (revised) edition, p. 273, plate 43, Fig. 5 female (misidentification) [see note (8)]

MATERIAL EXAMINED : 66 males, 22 females

1 ♂, Morocco, K Chapman & JWS Pringle, Gt. Atlas Mtns., Ari Ayachi, 6000 ft. (?); 1 ♂, Maroc, Moyen Atlas, Région de Timhadit; 1 ♂ 1 ♀, Morocco, Taghzeft Pass, Middle Atlas Mtns., 6800 ft., 28.6.50, C Wyatt, paratype, coll. : Colin Wyatt; 1 ♂ 1 ♀, Tizi-n'Taghzeft, Middle Atlas, Morocco, 65-7200 ft., 11-13 ix 1962, Colin Wyatt, (♂ also ideotype, ♂ also Field Guide Plate 42, Fig. 8) [all Coll. BM(NH)]; 55 ♂♂, 17 ♀♀, Tizi-n-Tairhemt, Middle Atlas mountains, Morocco, 1900 m, 28 July-18 August 1992, [coll. Tennent]; 6 ♂♂, 3 ♀♀, Tizi-n-Taghzeft, Middle Atlas mountains, Morocco, 1900-2200 m, 29-30 August 1991/21 August, 10-13 September 1992 [coll. Tennent]; 1 ♂, route 4656, ca. 4 km E of route 20 junction (Boulmane), Middle Atlas mountains, Morocco, 17 August 1992 [coll. Tennent].

DESCRIPTION : This taxon is intermediate between *abdelkader abdelkader* and *abdelkader nelvai*, indeed specimens are often seen which are virtually indistinguishable from the nominate form, a circumstance noted by Colin Wyatt in his original description. In the series of specimens examined by the present author, 11 males (20%) and no females fall into this category. The remainder resemble *nelvai* but differ in that the 'white' areas are more heavily suffused yellow, the pale area of the forewing is almost always broken by the veins and all ocelli are generally larger than in *nelvai*.

HABITAT : As for *abdelkader abdelkader*. Specimens from Morocco examined were taken between 1900-2200 m; those from western Algeria [note (7)] were taken at 1200 m.

TIME OF APPEARANCE : July to September.

DISTRIBUTION : Known from a relatively small area of the Middle Atlas mountains, Morocco. The population named *saharae* by Slaby flies at 1200 m in western Algeria [see note (7)]

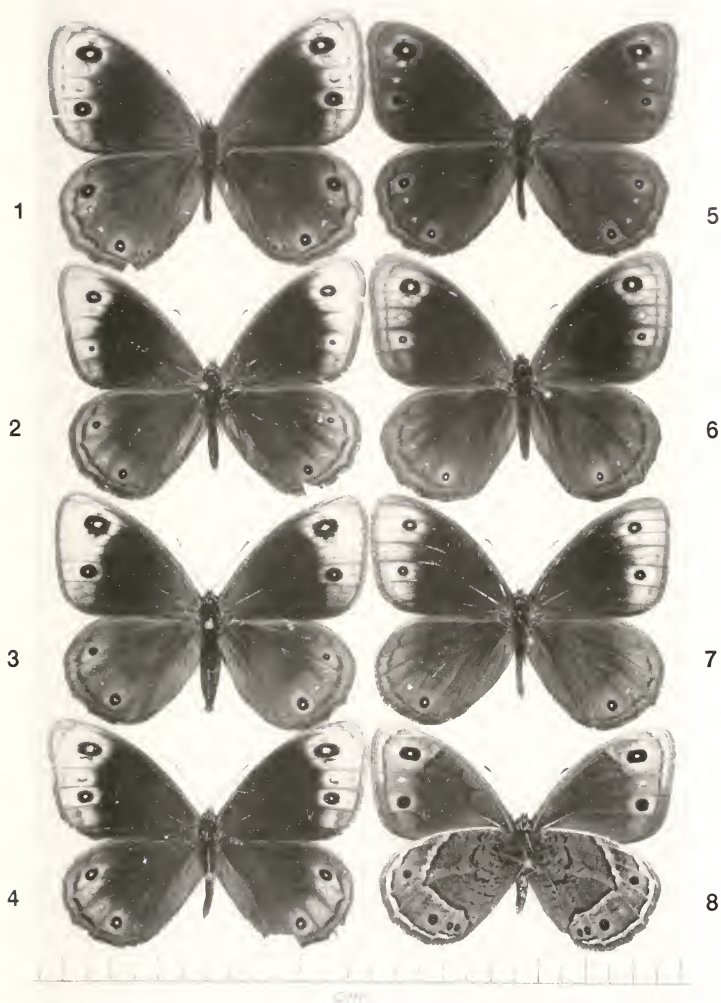


Plate Four. *Berberia abdelkader taghzefti*.

1 — Male, Tizi-n-Taghzeft, Middle Atlas mountains, MOROCCO, 21-2200 m, 21.viii.1992; **2-7** — Males, uppersides, Tizi-n-Tairhemt, Middle Atlas mountains, MOROCCO, 1900 m, 28.vii.1992-18.viii.1992; **8** — Male underside, ditto, 18.viii.1992.

Notes :

(7) *Saharae* remains to some extent an enigma. The present author searched the TL in mid-September 1992 but no butterflies were seen. Illustrations of *saharae* (Slaby 1981 : 115, Figs 7, 8) resemble *abdelkader taghzefti* in appearance and similar specimens were taken by the present author among the more usual examples of *abdelkader abdelkader* at the Col de Jerada, ca. 190 km to the north west of Mercheria. Slides of 22 male and 4 female specimens, including the Types, in the collection of Dr Eckweiler were examined ; of the males almost 60% display features transitional to, or indistinguishable from, *taghzefti* and the remainder are typical *abdelkader*. They are tentatively placed as a population of *abdelkader taghzefti*. There are two males in the BM(NH) Collection labelled 'Mercheria, 12 August 1918, V Faroult' which are similar in all significant respects to specimens of *abdelkader abdelkader* from Sebdo, El Aricha or El Bayadh.

(8) The female butterfly illustrated by Higgins & Riley (1983, plate 43, Fig. 5 [5th edition]) and identified as *abdelkader abdelkader* (form *nelvai*) has been examined in the Higgins Collection in the BM(NH). It bears the labels "Tizin Taghzeft, Middle Atlas, Morocco, 65-7200 ft ; 11-13 1x 1962, Colin Wyatt" and "Field Guide Plate 42, figure 8 [original edition]". It is from the TL of *abdelkader taghzefti*, taken by the original author of that taxon more than 800 kilometres in a direct line west from the nearest known population of *abdelkader nelvai*. The same specimen seems to have been illustrated by Higgins and Hargreaves (1983 : 158).

***Berberia lambessanus* Staudinger 1901 stat. n. (Pl. 5, Figs 1-6 [males], Pl. 6, Figs 6-8 [females])**

Satyrus abdelkader var *lambessanus*, Staudinger 1901, loc. cit.

Satyrus (Cercyonis) abdelkader romeii subsp. nov., Rothschild 1933, loc. cit., syn. n. [see note (10)]

Satyrus abdelkader alexander n. ab., Chnéour 1937, loc. cit., syn. n. [see note (11)]

Berberia abdelkader abdelkader Pierret 1837, in Higgins, L. G., & Riley, N. D., 1983. A Field Guide to the Butterflies of Britain and Europe, 5th (revised) edition, p. 273, plate 44, Fig. 4 male (misidentification) [see note (12)]

Berberia abdelkader abdelkader Pierret 1837, in Higgins, L. G., & Hargreaves, B., 1983. The Butterflies of Britain and Europe, p. 158, male (misidentification) [see note (12)]

Berberia abdelkader Pierret 1837 and f. *typica*, in D'Abrera, B., 1992. Butterflies of the Holarctic Region, Part 2, (Satyridae (concl.), Nymphalidae (partim)), p. 217, male and female Recto and Verso (misidentification) [see note (13)]

MATERIAL EXAMINED : 218 males, 104 females

1 ♂, Chechaouen, Dj. Kelaa, 1500 m ; 1 ♂, Elwes coll., 1902-85, Lambessa, 15.5.82 ; 1 ♂ Hewitson coll., Lambessa ; 1 ♂ purch. from Jansen, Algeria ;

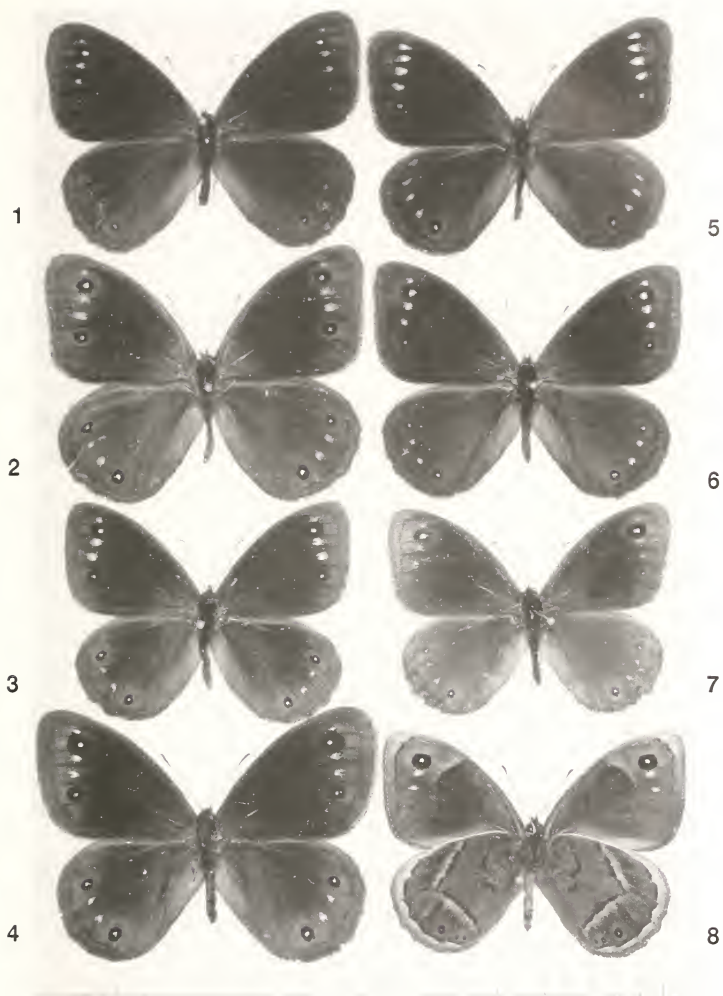


Plate Five. *Berberia lambessanus*.

1-4 — Males, Djebel Kelaa, western Rif mountains, MOROCCO, 10-1100 m, 19-21.vii.1992 ; **5-7** — Males, Oukaïmeden, High Atlas mountains, MOROCCO, 23-2400 m, 5.vi-4.ix.1992 ; **8** - Male underside, ditto, 2.viii.1992.

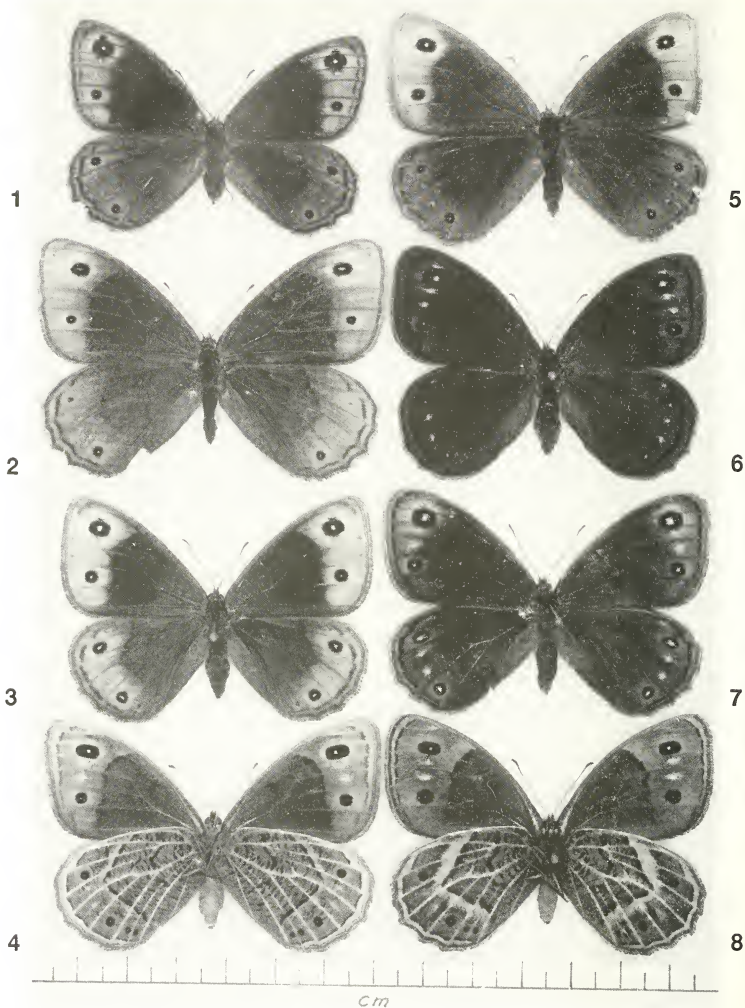


Plate Six. *Berberia* females.

1 — *B. abdelkader abdelkader*, El Bayadh, western ALGERIA, 1500 m, 23.ix.1992 ;
 2-4 — *B. abdelkader taghzefti*, Tizi-n-Tairhemt, Middle Atlas mountains, MOROCCO,
 1900 m, 18.viii.1992 ; 5 — *B. abdelkader nelvai*, Djebel Selloum, TUNISIA, 9-1100 m,
 8.x.1992 ; 6-7 — *B. lambessanus*, Oukaïmeden, High Atlas mountains, MOROCCO,
 3-10.viii.1992 ; 8 — *B. lambessanus* (underside), Djebel Kelaa, western Rif mountains,
 MOROCCO, 10-1100 m, 21.vii.1992.

1 ♀, Elwes coll., Lambessa, R Oberthür, 1875; 1 ♀, Godman-Salvin coll., 95-99, Lambessa, R Oberthür, 1875; 1 ♀, GTB Baker coll., Sebdu, Algeria, Pech, 1886; 2 ♂♂, Metlili, n of Laghouat, 4-6 Sep 1917, V Faroult (ab. *serrata* Austaut) [error? — this is the TL of *nelvai*]; 3 ♂♂ 1 ♀, Batna, Algeria, coll. Nelva; 2 ♂♂ 3 ♀♀, Batna, So. Algeria, Nelva coll.; 3 ♂♂ Batna, Algeria, Nelva; 1 ♂, environs de Batna, 1913-14, A Nelva; 47 ♂♂ 10 ♀♀, environs de Batna 1911-12, A Nelva; 18 ♂♂ 8 ♀♀, Batna, Algeria, 14 v 15, Nelva; 4 ♂♂ 3 ♀♀, Batna, Algeria, coll. Taillefer(?); 2 ♂♂, Batna, 20.5.12, collection Captain Holl; 1 ♂, ditto, 8.4.1912; 2 ♂♂ 2 ♀♀, Batna, Jun 1913, collection Captain Holl; 1 ♂, Lambessa, Juin 190?, Captain Holl; 1 ♂, M Stauder, Alg. Atlas, Batna, 17.5.1913; 2 ♀♀, ditto, 1100 m; 1 ♂, Algerie, Felder colln.; 1 ♂, Lambessa, cl. Tisset (?), May, Felder colln.; 1 ♂, Felder colln.; 1 ♂ Glaoui, Atlas, 7.05; 3 ♂♂ 1 ♀, High Atlas, Maroc, Dj. Ouchedenne, 2000-2700 m, 23 vi 1933, Schwingenschuss; 1 ♂, ditto, Tachdirt, 2300-2700 m, 25 vii 1933; 1 ♂ Cuernos de Xauen, Marruecos, m[etres] 1.300, Romei, 21.7.32, *Satyrus abdelkader romei* Type Rothsch.; 4 ♂♂ 1 ♀, Middle Atlas, Ifrane, 1964, 12-25 June, LG Higgins, 6400 ft., (1 ♂ also Field Guide, Plate 43, Fig. 4); 1 ♂, High Atlas, Ojkajmeden, Jun 27-30, 1964, 9000 ft.; 2 ♂♂, ditto, 8000 ft.; 1 ♂, Tizi-n-Test, Gr. Atlas, 2000 m, 29 vi 74, KMG [Guichard]; 1 ♂, RE Ellison, 1.6.34, Annosseur, Middle Atlas; 1 ♀, S. Atlas, Tizi n'Tichka, 20.8.33, 7000 ft., RE Ellison; 10 ♂♂ 7 ♀♀ Algerie, Lambèse, Juin 1913, Harold Powell; 3 ♂♂ 1 ♀, ditto, Mai 1916, Sari Amar; 4 ♂♂ 3 ♀♀, ditto, Mai 1914; 1 ♀, Prov. Constantine, Lambese, pris par Sari Amar, Mai 1914; 2 ♂♂ 1 ♀, Algerie, Lambèze, environs de Batna, Juin 1913, Harold Powell; 2 ♂♂ 2 ♀♀, Lambessa, R Oberthür 1875; 1 ♂, entre Beccaria et Oüre Boudries pris Tebessa, Bidillot [? — handwriting difficult to decipher]; 1 ♂, Algerie, Lambese, J Merkl, Juin 1884; 1 ♀, Kenchala, Prov. Constantine, H Powell, Juin 1908; 1 ♂, Algerie, Lambese, E Bac; 3 ♂♂ 4 ♀♀, Moyen-Atlas, Région de Timhadit, t, 1924, H Powell; 1 ♂ 2 ♀♀, no data [all in Coll. BM(NH)]; 47 ♂♂, 39 ♀♀, Oukaïmeden, High Atlas Mountains, Morocco, 2000-3160 m, September 1991/June-September 1992 [coll. Tennent]; 3 m, Boulmane, Middle Atlas mountains, Morocco, 1700 m, 15 August 1992 [coll. Tennent]; 30 ♂♂, 8 ♀♀, Djebel Kelaa, Chefchaouene, western Rif mountains, Morocco, 1000-1200 m, July 1992 [coll. Tennent].

DESCRIPTION: This species [see note (9)] differs from all races of *Berberia abdelkader* by its darker, almost black, ground colour, larger blue spots (often enlarged into wedges or smears) between the forewing ocelli and on the hindwing and in the fact that, in the male, the pale area surrounding the ocelli or suffusing the wing, is totally absent, making the ocelli obscure. It is remarkably constant throughout its range. The female often has pale brown areas marginally or enclosing the ocelli, but to a lesser degree than in races of *abdelkader*.

HABITAT: Although occasionally, as at Boulmane in the Middle Atlas mountains of Morocco, occupying a similar biotope to *abdelkader*,

the butterfly more usually inhabits rough ground and mountain slopes with a variety of vegetation, often including light woodland. The larval host plant is *Ampelodesmos tenax*, although the butterfly almost certainly uses other grasses, including *Stipa*. It flies from 1000 m or lower to more than 3000 m; both sexes were noted by the present author feeding at flowers at 3160 m, above Oukaïmeden in the Moroccan High Atlas.

TIME OF APPEARANCE : April to October. Variable and flexible depending on biotope and altitude.

DISTRIBUTION : This species has a wide distribution, occurring from the High Atlas, Middle Atlas and Rif mountains of western Morocco, through the Aurès mountains in eastern Algeria, to Cap Bon [see note (11)] in Tunisia.

Notes :

(9) That *Berberia lambessanus* is specifically distinct from its congener, *Berberia abdelkader*, is inescapable. It is here accorded specific rank because :

- a. the forms of *abdelkader* are found in fairly well defined geographical areas, with the nominate form in western and central Algeria and *taghzefti* / *nelvai* to the west/east respectively. *B. lambessanus* is found over a wide geographical area and does not vary significantly within this range.
- b. *abdelkader* and *lambessanus* usually occupy quite different biotopes.
- c. Present field observations indicate that they are unlikely to be found flying together because of their differing biological requirements although they apparently almost do so in some areas. For example, *lambessanus* flies a few kilometres north west of Boulmane in the Moroccan Middle Atlas in May, June and later; *abdelkader taghzefti* flies a few kilometres to the south east of the town from July onwards. Similarly, there are specimens of both *lambessanus* and *abdelkader nelvai* in the Rothschild and Oberthür collections in the BM(NH), bearing the labels 'Batna' or 'environs de Batna' but in different months of the year. This may account for the long held belief that *nelvai* is a second brood of *abdelkader* [*lambessanus*].
- d. *lambessanus* flies much earlier in the year than any race of *abdelkader*.

(10) Rothschild (loc. cit), described *romeii* from a single male which he considered larger and considerably darker than *abdelkader abdelkader*. He also thought the forewing ocelli and 'white dots' larger. The holotype, in the Rothschild collection at the BM(NH), bears the labels "*Satyrus abdelkader romeii* Rothschild." and "Cuernos de Xauen, Marruecos, m[etres] 1,300, Romei, 21.7.1932" and has been examined. It is quite large but both in size and markings is well within the normal variation displayed by *lambessanus*. The present author took a series of *lambessanus* at the TL of *romeii* in mid-July 1992 when many individuals were quite worn. A short series has been deposited at the BM(NH).

(11) It is clear from examination of the various papers published by Chnéour between 1937 and 1963 that he confused his *alexander* with a perfectly normal female *lambessanus* for more than 25 years ! In 1937 he described *alexander* from a series of 21 specimens, only 5 of which were 'typical *abdelkader lambessana* [sic]'. The remainder differed in a number of aspects, the most obvious of which was that the veins of the hindwing underside were lined with white (he likened the form to *Pseudotergumia fidia albovenosa* Austaut) and he went on to say that the new form was very constant.

He illustrated (1937 : 340) a male underside of *lambessanus* followed by a female underside and upperside, also apparently of *lambessanus* ; the last 2 specimens bearing the legend '*Satyrus abdelkader alexander* n. ab.'. The sex was not given for any of the specimens. Some years later (1950 : 47) he illustrated the underside of a typical male and a typical female *lambessanus* once more, in order to show the differences between *lambessanus* and *alexander*, apparently having no idea of the sexual dimorphism displayed by either species since neither specimen is given a sex. The fact that two moths on the same page are marked as males suggests that he was not sure of the sex of his *abdelkader alexander*.

Finally (1955 : 132, plate 32, Figs 5 & 6), he illustrated two undersides, one (Fig. 5) marked '*Berberia abdelkader lambessana* [sic] (Staud), mâle, Cap Bon, 6 ix 1937' and the other (Fig. 6) marked '*Berberia abdelkader alexander* (Chnéour), mâle, dj. Semama [sic], 8 ix 1941. The latter is a typical female *lambessanus*.

It must also be said that the data for Chnéour's figure is suspect ; the present author found *abdelkader nelvai* on Djebel Semmama in October 1992 and it is considered unlikely that *lambessanus* also flies there in September. It is noted that Chnéour was a most unreliable recorder who listed in his papers butterflies allegedly found in Tunisia and which almost certainly do not occur there (*Euchloe tagis pechi*, *Thersomonia phoebus* etc.). He described a number of taxa, all of dubious validity.

(12) The male butterfly illustrated by Higgins & Riley (loc. cit., plate 44, Fig. 4 in the 5th edition) and identified as *abdelkader abdelkader* has been examined in the Higgins Collection in the BM(NH). It bears the labels "Middle Atlas, Ifrane [Morocco], 1964, 12-25 June, L. G. Higgins, 6,400 ft" and "Field Guide Plate 43, figure 4 [original edition]". It is clearly *lambessanus* ; *abdelkader abdelkader* does not occur in western Morocco. The same specimen seems to have been illustrated by Higgins and Hargreaves (1983 : 158).

(13) Four of the five *Berberia* illustrated by D'Abrera (1992 : 217) and labelled *B. abdelkader* or *B. abdelkader* f. *typica*, are *lambessanus*. Localities given as 'Lambrea' are probably 'Lambessa'. The fifth specimen is correctly marked *B. abdelkader* f. *nelvai* but is a male, not a female as stated.

Univoltine or bivoltine ?

The present author firmly believes that, despite a plethora of published data to the contrary, all *Berberia* species and races are univoltine. Numerous authors have referred to the dark form(s) (i.e. *abdelkader/lambessanus*) as forming the 'first brood' and to the form(s) with white markings on the forewing (i.e. *nelvai/taghzefti*) as being from a second brood. It is believed that different species/races have different flight periods depending on biological requirements and factors not fully understood, but almost certainly including altitude and biotope.

Oberthür (1915 : 203-344) published an exhaustive natural history of this insect, including the comprehensive field observations of Harold Powell and Le Cerf. At that time forms *abdelkader*, *lambessanus* and *nelvai* were known, although the extent of their distribution was not clear. It is interesting that Oberthür considered *abdelkader* and *nelvai* forms of one species and regarded *lambessanus* as probably a separate taxon. Rothschild (1917 : 107) disagreed with Oberthür, believing *lambessanus* to be no more than a form of *abdelkader* because "... among my Batna/Lambessa specimens are some males indistinguishable from males from Titen Yaya in the Oranais."

Rothschild went on to say that "... It is most strange that while in the Oranais *abdelkader abdelkader* flies in June and July, this SAME FORM [present author's capitals] at Guelt-es-Stel flies in September and October. The form *lambessanus* flies in April and May while *a. nelvai* is on the wing from end of August throughout September". [see note (14)]

Most recent authors have accepted without question that *abdelkader* and its races are double brooded although others have questioned it. For example Devarenne (1981 : 174) noted the butterfly at Senalba in Algeria in May, with a second generation in September. He stated (1990 : 164) it was common at Guelt-es-Stel in May [?!], "plus in August-September" but it is not clear whether this was his personal observation. He further (1990 : 165) noted that *lambessanus* was common in the High Atlas and local in the Middle Atlas in April and June and then in July and September and accepted *marteni* and *romeii* as valid taxa. Rungs (1981 : 464) also gives two generations in May and in September/October, depending on altitude.

Conversely, Barragué (1987 : 7-9) was of the opinion that information given by Higgins & Riley and Rungs was false and misleading and stated "... my firm opinion formed as a result of repeated breeding ... is that *lambessanus* has a unique generation ... research by Monsiuer

Nelva ... on the same subject confirms my results ... it is the opinion therefore of the collectors that have resided in the place over the years ... that *lambessanus* is a Spring species which appears in May and June I confirm that I never saw *abdelkader* in the places where I saw *lambessanus* in the Spring ... concerning *abdelkader* ... depending on altitude it appears mid-July to October ...”.

These last comments are the key to the enigma — no two races/forms fly in the same locality and each population is extremely flexible in its flight period.

The present author has considerable field experience of *Berberia lambessanus* in the Moroccan High Atlas. First encountered there in 1979, it was not until 1991 that the population was visited late in the year, when the butterfly was flying well into September. This population was visited regularly throughout 1992 with a view to establishing the number of broods ; the inescapable conclusion reached was that it was univoltine but with a very long, and probably very flexible, flight period. For example, in 1987, fresh males were flying on 26 and 28 of April, but in 1992 the first males appeared in the first week of June. In 1991, females were still emerging in the first week in September and a fresh pair was seen *in cop.* on 30 August 1992, with numbers beginning to decline on 8 September, the date of the last visit that year.

It is reasonable to suppose that some individuals would be still flying in October. Fresh examples were seen throughout the intervening period in 1992 with a peak, when total numbers were high and the number of females emerging was greater than at any other time, at the end of July and early August. There was no break in emergence and from mid June there were fairly equal numbers of freshly emerged and worn individuals on the wing.

Populations of *lambessanus* in the Middle Atlas and the Rif mountains were also examined, though not so closely as the High Atlas population. At Boulmane, where *lambessanus* flies on a biotope similar to that of *abdelkader*, the first males were noted on 10 May and fresh females, flying with worn examples of both sexes, on 19 August 1992 (Michel Tarrier, pers. comm.). In the Rif mountains *lambessanus* was first seen, mainly in worn condition, on 21 July and it was present in small numbers with some individuals of both sexes still fresh, on 25 August 1992.

Berberia abdelkader taghzefti was first noted at the Tizi-n-Tairhemt on 14 June and a fresh female was seen on 10 September 1992 in company with some worn males ; (Michel Tarrier, pers. comm.). No

specimens were seen by the present author on 14 September. In the intervening period emergence was steady and obviously consisted of only a single brood. At the TL of *taghzefti*, it was seen for the first time on 30 July and last seen on 13 September. In each of these localities, visits were made (Tairhemt by Michel Tarrier) prior to first sightings and no individuals were seen.

At El Kantara *abdelkader nelvai* was common at the end of September and early in October. It was not present at the end of June/early July and it seems inconceivable that an early brood could have been overlooked over the years in such a well known and well collected entomological locality.

The great bulk of circumstantial evidence supports the view that all races and species of *Berberia* in north Africa are univoltine. There is certainly no satisfactory evidence to the contrary. It is interesting to note that all other large Satyrid species in the Mediterranean region are univoltine.

Note :

(14) It is apparent that Guelt-es-Stel was at one time a very healthy biotope ; indeed it was described by Rothschild (1914 : 299) as "a veritable entomological Eldorado" and "one of the richest collecting grounds [known to him at that time] in Algeria". Because of this, Rothschild arranged for Victor Faroult to collect for him for 15-16 months and it is inconceivable that *abdelkader*, a distinctive butterfly recognisable from a distance and usually common where it occurs, would have been overlooked if it occurred there at any time other than September/October.

Sadly, the area appears to have suffered serious degradation recently, probably through chemical spraying. The present author visited Guelt-es-Stel in late March, mid-July and late September 1992 ; only the early Pierids were about early in the year and only a few *Pontia daphidice* (Linnaeus) in July. In September, despite 5 hours spent walking the hills, only 6 butterflies were seen ; 2 *Papilio machaon saharae* Oberthür, 2 *daphidice* and 2 *Hipparchia aristaeus algerica* Oberthür. Although there was a large and healthy stand of *Stipa*, there was no sign of *abdelkader* or of *Neohipparchia powelli* Oberthür which Rothschild and others recorded in such large numbers.

Acknowledgements

Thanks are due to a number of people, acknowledged here in alphabetical order. Mr Phil Ackery of the British Museum (Natural History), London, allowed access to the unrivalled collections therein ; Madame Hnia Bencheikh, Chef de la Division de la Coopération, Ministère de l'Agriculture et de la réforme Agraire, Rabat, kindly gave authority to collect and study butterflies in Morocco ; Dr Wolfgang Eckweiler of Frankfurt provided colour slides of

taxa described by Slaby ; Mr Nguyen Thi Hong of the Muséum National d'Histoire Naturelle, Paris, provided details of *Berberia* contained in the Museum collection ; Dr Abderrahman Jerraya, l'Institut National Agronomique de Tunisie, kindly gave authority to collect and study study butterflies in Tunisia ; Mr Michel Tarrier of Malaga provided some Moroccan records and translated the résumé. Finally, my thanks to my wife Julie who drew the maps which accompany this paper.

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Zeitschrift/Journal: [Nota lepidopterologica](#)

Jahr/Year: 1993

Band/Volume: [16](#)

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Artikel/Article: [The Berberia abdelkader \(Pierret 1837\) enigma; a review of named forms ; comments; a solution offered \(Lepidoptera : Satyridae\) 295-320](#)