A new subspecies of *Erebia cassioides* (Reiner & Hohenwarth, 1792) from Bulgaria): *Erebia cassioides kinoshitai* ssp. n. (Lepidoptera: Nymphalidae: Satyrinae)

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Abstract. *Erebia cassioides kinoshitai* **ssp. n.** is described from Bulgaria, Central Stara Planina Mts at an altitude of 1740-2100 m. The new subspecies forms a isolated population and shows external and internal differences from the other known subspecies. The new subspecies can easily be distinguished from the other known subspecies of *E. cassioides* by its external appearance and genitalia. The egg surface is described and illustrated on SEM-micrography photos. Relevant specimens are shown on a colour plate.

Samenvatting. Een nieuwe ondersoort van *Erebia cassioides* (Reiner & Hohenwarth, 1792) uit Bulgarije: *E. cassioides kinoshitai* **ssp. n.** (Lepidoptera: Nymphalidae: Satyrinae)
De geïsoleerde populaties van *Erebia cassioides* uit de centrale Stara Planina (Bulgarije), 1740-2100 m, worden beschreven als *E. cassioides kinoshitai* **ssp. n.** Ze vertonen zowel uiterlijke als innerlijke verschillen met de overige bekende ondersoorten en kunnen daardoor gemakkelijk onderscheiden worden. Het oppervlak van het ei wordt beschreven en met een SEM-foto afgebeeld. Relevante exemplaren worden op de kleurenplaat afgebeeld.

Résumé. Une nouvelle sous-espèce d'*Erebia cassioides* (Reiner & Hohenwarth, 1792) de Bulgarie: *E. cassioides kinoshitai* **ssp. n.** (Lepidoptera: Nymphalidae: Satyrinae)
Les populations isolées d'*Erebia cassioides* du Stara Planina (Bulgarie), 1740-2100 m, sont décrites comme *E. cassioides kinoshitai* **ssp. n.** Cette sous-espèce se distingue des autres du complèxe par des caractères intérieurs et extérieurs et peut être séparée sans difficulté. La surface de l'oeuf est décrite et figurée sur une photo SEM. Des papillons dans ce groupe difficile sont figurées sur une planche en couleurs.

Key words: *Erebia cassioides kinoshitai* ssp. n. - Bulgaria.

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During a collecting trip in Central Stara Planina Mts (Troyanska and Kaloferska Stara Planina Mts) in July 1993 a few specimens of *Erebia cassioides* (Reiner & Hohenwarth, 1792) were collected that looked different from *E. cassioides macedonica* (Buresch, 1918) from Rila and Pirin Mts. Until this capture there was only a single confirmed record of *E. cassioides* from Stara Planina Mts (Lorković 1957) and all Bulgarian *E. cassioides* specimens were considered to belong to *E. cassioides macedonica* (Buresch, 1918). The previous reports for *E. cassioides* from Stara Planina Mts dating from the beginning of the 20th century are doubtful because at that time both *E. ottomana* Herrich-Schäffer, 1847 and *E. cassioides* (Reiner & Hohenwarth, 1792) were reported as *E. tyndarus* (Esper, 1781) in Bulgaria. In July 1994 the region was revisited and some more specimens were collected between the tops Levski and Botev (Beshkov 1995). An attempt to establish the chromosome number following another visit in August 1995 unfortunately failed. However, some more specimens were collected, including females for the first time, some of which oviposited. The population of *E. cassioides* from Stara Planina Mts is isolated from other *E. cassioides* populations. The external appearance does not correspond well with the illustrations in Higgins & Riley (1984) and the male genitalia show differences with the genitalia illustrations in Higgins (1975). The specimens can be easily distinguished from the other known subspecies by their ground colour, wing shape and pattern, genitalia and range. For these reasons the population of the Stara Planina Mts is described as *E. cassioides kinoshitai* **ssp. n.**

***Erebia cassioides kinoshitai* ssp. nov.** (Plate 1, figs. 1-4; 8-9; 14-21)

Male:

Upperside (Pl. 1, figs 1-4): Forewing length 18.5 (min. 16.5, max. 20.5). Forewings pointed, ground colour extremely dark brown, near rusty-black. In strong sunlight wings with a bright metallic violet-greenish reflection. Postdiscal fascia and especially subterminal fascia with smaller bright scales, giving a slightly lighter colouration subterminally. Apically between veins R5-M1, M1-M2, M2-M3, M3-Cu1 elongate rusty spots. All these spots are separated from each other by the dark colouration of the veins. These spots form an oval mark which never extends beyond Cu1. The larger spots are those between M1-M2 and M2-M3, but they end 1-3 mm before the cell, never reaching it. Terminally the rusty spots end long before the margin. In most specimens, e.g. in the holotype, spots between R5-M1 and M3-Cu1 are reduced. Both apical ocelli are situated in the rusty spots between veins M1-M2 and M2-M3. The second one is situated more distally. If an imaginary line is drawn through the centre of the ocelli it will end on the outer margin before the tornus. Both ocelli are formed by a black, somewhat elliptic ring with a white dot in the centre. Sometimes, like in the holotype, the ocelli are separated by vein M2, sometime they are merged.

Hindwings are of the same colouration as the forewings. Postdiscally 3-4 oval rusty spots well separated each other. Every one of them bears an ocellus composed of a black ring and a small white dot in the centre. As usual there are three ocelli of which the apical one is the biggest. In the rarer case of four ocelli, the apical one is smaller, sometimes without a black dot in the centre. Sometimes specimens occur, e. g. the holotype, with a fourth ocellus developed only on one of the hindwings.

Underside (Pl. 1, figs 8-9): Ground colour of the forewings reddish-brown to orange. Submarginally to the fringes a wide greyish fascia continuing from the apex on the costal margin and from the tornus on the inner margin. Veins conspicuous. Distal end of the cell and the first third of vein M3 dark coloured, continuing with a dark transversal arch to the costal margin and forming a dark ring, inside slightly paler than the proximal part of the wings. Distally, between the ring, vein M3 and the wide greyish fascia is the lighter part of the wing, light-orange coloured, bearing the ocelli. After M3 the fascia continues near to the inner margin, but becoming slightly darker coloured. Ocelli as on upperside. In a single specimen, the biggest one, a small white centred black dot, is present only in one of the wings, like in *Erebia ottomana* submarginally between veins Cu1-Cu2, just before the fascia.

Underside of hindwings silver-greyish to brown-greyish with some blue-greenish basal hairs. Submarginal fascia not well defined. Postdiscal fascia with 2-4 very small ocelli (three in the holotype) some of them without a white centre (in the holotype white centre present). Discal band darker, greyish or brown-greyish indicated by darker sinuate transversal lines. Inner transversal line not always well defined.

Female:

Upperside (Pl. 1, figs 14, 16-17, 19-21): Forewing length 19.5 (min. 17.0, max. 21.0). Forewings as in males but less pointed and not so dark. Sometimes slight orange-reddish colouration postdiscally near to the inner margin and the cell. Spots between the veins orange-reddish, in some specimens a little elongated proximally but never reaching the cell. Ocelli as usual bigger than in males and merged together.

Hindwings as in the males but paler. Orange-reddish spots separated by the veins, in some specimens continued to near the costa. Fringes whitish.

Underside (Pl. 1, figs 15, 18) forewings as in the males but paler. Inner margin of the submarginal fascia sinuate.

Hindwings underside silvery bright, lighter than in males and without basal hairs. In most specimens one-three extremely small, inconspicuous ocelli. Discal band only a little darker than the ground colour, silvery-greyish, limited by darker sinuate transversal lines. Inner transversal line, like in males, not always well defined.

The closely related taxon *E. cassioides macedonica* (Buresch, 1918) (Pl. 1, Figs 5-7, 10-13) is a little smaller with a forewing length of 17-18.5 mm, average 17.5 mm (Buresch 1918, 1921). Male forewing not as pointed as in *E. cassioides kinoshitai* **ssp. n.** Forewing ground colour lighter than in *E. cassioides kinoshitai* **ssp. n.** Rusty band with the ocelli lighter, somewhat larger, not well defined, in colour near the ground ones, merged with it, spots composing the band more joined. Hindwings upperside of the same colour as the forewings, rusty spots with the ocelli not always well separated, forming a band merged with the ground colour. Three ocelli, rarely four. Females of *macedonica* upperside (Pl. 1, Fig. 10) show the same differences as the males. In comparison with females *E. cassioides kinoshitai* **ssp. nov.**, females *E. cassioides macedonica* are smaller and lighter, rusty band on the forewings is extended, ocelli on both wings are much smaller. Underside males of *E. cassioides macedonica* (Pl. 1, Fig. 7) are darker and more contrasted. Underside of hindwings brown-greyish with inner transversal line and submarginal fascia always well defined, brown. Discal band dark brown. Ocelli fewer and smaller than in *E. cassioides kinoshitai* **ssp. nov**. Underside of female *macedonica* (Pl. 1, Fig. 12) not as light and bright as *E. cassioides kinoshitai* **ssp. n.**, with hindwings silvery brownish, discal band brownish.

In the nominate subspecies *E. cassioides cassioides* the rusty spots of submarginal band often are with a strong inclination to the discoidal cell, sometimes even reaching it, submarginal band elongated to the inner margin. A monochrome faximile from the original illustration of *Papilio cassioides* from J. Reiner & S. Hohenwarth, 1792 is given in Lorković (1975, Pl. VI).

Another closely related taxon *E. (cassioides) aquitania* Fruhstorfer, 1909 is lighter and has less pointed wings, underside of hindwings uniform, less variegated, greyish-brown. In the other closely related taxon *E. (cassioides) neleus* (Freyer, 1833), according to Popescu-Gorj (1962) from Romanian Carpathes, submarginal band larger, dark reddish-rusty, sometimes interrupted on the veins. Apical ocelli sometimes completely separated. On the hindwings submarginal band usually larger, slightly angular, well distinguished, traversed by dark veins. Hindwings underside grey or grey-violet without well coloured submarginal fascia. Discal band marbled brown with brown borders. One to four ocelli. Monochrome illustrations of both taxa - *aquitania* and *neleus* and a comparison between them can be found in von Mentzer (1960). According to this author (von Mentzer 1960) *E. aquitania* and *E. neleus* are two species which represented the former name *E. cassioides*. Externally *E. cassioides kinoshitai* **ssp. n.** is most similar to the holotype of *E. neleus noricana* von Mentzer, 1961.

In the Balkan Peninsula, except for *E. cassioides macedonica* and *E. cassioides kinoshitai* **ssp. n.**, two other taxa of this group have been described: *illyrica* Lorković, 1953 and *illyromacedonica* Lorković, 1953. The first one is known from Bosnia and Hercegovina, Montenegro and the North Albanian Alps. The second is mentioned from Macedonia - Shar, Korab, Yakupica and Pelister mountains (Sijaric, Lorković, Carnelutti & Jaksić 1984). The original descriptions of both these taxa have not been examined by

the present author, but the specimens on the monochrome illustrations in Lorković (1957) show some differences with *E. cassioides kinoshitai* **ssp. n**. Many other subspecies and forms have been described in this difficult group, some of them without any taxonomic value. The relationship between the species of the group (*E. tyndarus* group) have been investigated by means of enzyme electrophoresis by Lattes, Mensi, Cassulo & Balletto (1994), but this study is focussed on the Western European members of the group only.

Legend of plate 1:

1-4, 8-9, 14-21: *Erebia cassioides kinoshitai* ssp. n.

1. Holotype ♂ - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.
2. Paratype ♂ - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.
3. Paratype ♂ - Bulgaria, Central Stara Planina Mts, under Levski Top, 1780 m alt., 07.VIII.1995, S. Beshkov & V. Gashtarov leg.
4. Paratype ♂ - Bulgaria, Central Stara Planina Mts, between Levski and Botev Tops, 1800-2100 m alt., 19-21.VII.1994, S. Beshkov leg.

8-9. Paratype ♂ underside - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.

14. Paratype ♀ - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.
15. Paratype ♀ underside - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.
16-17. Paratype ♀ - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.
18. Paratype ♀ underside - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.
19-21. Paratype ♀ - Bulgaria, Central Stara Planina Mts, under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gashtarov leg.

5-7, 10-13: *Erebia cassioides macedonica* (Buresch, 1918)

5. Syntype ♂ - Bulgaria, "Pirin Pl. 2400 m. Papas Giol 16.VII.915. Dr Iw. Buresch." (coll. Nat. Hist. Mus. Sofia).
6. ♂ - Bulgaria, Rila Mts, under Kanarata Top, 2500 m alt., 30.VIII.1987, S. Beshkov leg.
7. Syntype ♂ underside - Bulgaria, "Pirin Pl. 2350 m. Papas Giol 16.VII.915. Dr Iw. Buresch." (coll. Nat. Hist. Mus. Sofia).
10. Syntype ♀ - Bulgaria, "Pirin Pl. 2500 m. Papas Giol 16.VII.915. Dr Iw. Buresch." (coll. Nat. Hist. Mus. Sofia).
11. ♀ - Bulgaria, Rila Mts, under Angelov Vrah Top, 2600 m alt., 31.VIII.1987, S. Beshkov leg.
12. Syntype ♀ underside - Bulgaria, "Pirin Pl. 2400 m. Papas Giol 16.VII.915. Dr Iw. Buresch." (coll. Nat. Hist. Mus. Sofia).
13. Syntype ♀ - Bulgaria, "Pirin Pl. 2500 m. Papas Giol 16.VII.915. Dr Iw. Buresch." (coll. Nat. Hist. Mus. Sofia). (Photo S. Beshkov).

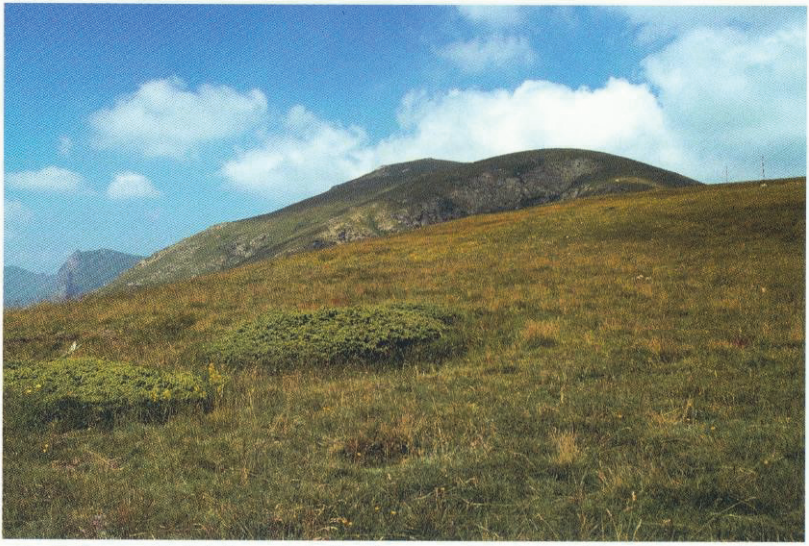


Fig. 22: Type locality of *Erebia cassioides kinoshitai* **ssp. n.** - Bulgaria, Central Stara Planina Mts (Kaloferska Planina), under Ravnetz Top, 08.VIII.1995 (Photo S. Beshkov).

Fig. 23: Central Stara Planina Mts (Kaloferska Planina), under Zhaltetz Top, 08.VIII.1995 (Photo S. Beshkov).

Male genitalia:

Genitalia (Figs 24-29, 34-36) very variable, teratologic anomalies sometimes present. Uncus slightly shorter than tegumen. Brachia slender, curved. Apex angularly prominent, strong, not pointed. Saccus elongated, vinculum curved, distended near saccus. Fultura extensive, penis short, curved, slender in the coecum and enlarged distally, stronger sclerotized in the middle part. Valvae usually asymmetric (Figs 27, 29). On the third part of the costal part of the valvae a big tooth with a large base is present. This tooth is very variable (compare figs 24-29). Proximally on the basis in some specimens there is another very small tooth (Figs 26-27) sometimes double. Apically valva slender, usually with a small costal tooth just before the valval tip (Figs 28-29, 34), sometimes with an additional tooth between the apical and the big costal teeth. There are specimens in which all the elements mentioned above are present - small tooth on the basis of the large tooth, large strong sclerotized tooth, another big tooth after the large tooth, apical tooth and two small teeth on the valval tip (Figs 26-27).

One specimen shows teratomic anomalies, which can be considered as an atavism (Fig. 36). The uncus is completely reduced and replaced by short structures looking like sub-unci. Brachia are short and wide, leaf-like. Valvae are strongly asymmetric, all teeth are missing except for the biggest proximal tooth on one of the valvae. The valval end is angular, pointed. The other valva in shape reminds one in *Hipparchia*. It is without any teeth, the biggest proximal tooth is replaced with a fin-like structure.

Male genitalia of the closely related taxon *E. cassioides macedonica* (Figs 30-33) are very similar and also variable, the saccus is shorter (Fig. 30-31), the biggest proximal tooth of the valvae is always simple without a large basis, usually shorter and thinner than in *E. cassioides kinoshitai* **ssp. n**. The distance between the biggest proximal tooth and apical teeth is shorter in *macedonica*. In the nominal taxon *E. cassioides cassioides* praeapical tooth is large, sometimes with two praeapical teeth. In *E.* (*cassioides*) *aquitania* and *E.* (*cassioides*) *neleus* the praeapical and apical teeth are more proximally situated. The genitalia illustrated in Popescu-Gorj (1962) from Romanian Carpathes do not correspond well with *E. cassioides kinoshitai* **ssp. n**. Illustrations and morphometrical data of the male genitalia of both taxa - *aquitania* and *neleus* - can be found in von Mentzer (1960). The externally very similar *E. neleus noricana* von Mentzer, 1961 has completely different genitalia (von Mentzer 1961). A morphometrical study on the male genitalia of the new subspecies (as *E. cassioides macedonica* Buresch, 1918 auct.) from Jumrukcal (=Botev Top), as well as on the genitalia of many other taxa of this group, can be found in Lorković (1957). Most of them are illustrated there.

Female genitalia (Figs 37-40):

Sterigma complicated, with an Y-shaped clape of the lamella antevaginalis, covered by large ventral lamella (Figs 37-40). The basis of the Y-shaped clape of the lamella antevaginalis is warped once ventrally and symmetrically laterally, the part before the furcation is large. Apex of the Y-shaped clape bifid, both parts of the furcation are long, finger-shaped, forming a more (Figs 39-40) or less extended (Figs 37-38) U-shaped structure. Between and under both branches of the U-shaped structure small elongate arched sclerotization as long as the distance between branches. It could be the rest of the postvaginal lamella. In a single specimen (Fig. 40) the connection of this structure with the postvaginal lamella can be seen. Lamella antevaginalis with two lateral lobes, strongly sclerotized, warped near ostium bursae and with a radial ribs distally. Dorsal lamella less sclerotized. Posterior apophyses short. Ductus bursae slightly sclerotized, short, ostium bursae more intensively sclerotized. Corpus bursae with two longitudinal signa, each one composed by about 50-60 radial sclerotizations (Figs 37-39).

Female genitalia of *E. cassioides macedonica* (Figs 41-42.) similar to *E. cassioides kinoshitai* **ssp. n.**, but can easily be distinguished by the following characters: Y-shaped clape of the lamella antevaginalis has a shorter and more slender part before the furcation. Apex of the Y-shaped clape bifid, both parts of the furcation are longer than in *E. cassioides kinoshitai* **ssp. n.**, finger-shaped, forming less extended U-shaped structure (Figs 41-42). Between and under both branches of the U-shaped structure smaller elongate arched sclerotization. In corpus bursae both longitudinal signa, each composed of about 40-50 radial sclerotizations. The sterigma of the nominate taxon *E. cassioides cassioides* is illustrated in Lorković (1957). It has an intermediate form between *E. cassioides kinoshitai* **ssp. n.** and *E. cassioides macedonica*. In it Y-shaped clape of the lamella antevaginalis is with short and slender part before the furcation as in *E. cassioides macedonica* and with short branches of the furcation like in *E. cassioides kinoshitai* **ssp. n.** The part before the furcation is not as large as in *E. cassioides kinoshitai* **ssp. n.**, and the U-shaped structure, formed by the branches of the furcation is less extended than in *E. cassioides kinoshitai* **ssp. n.**

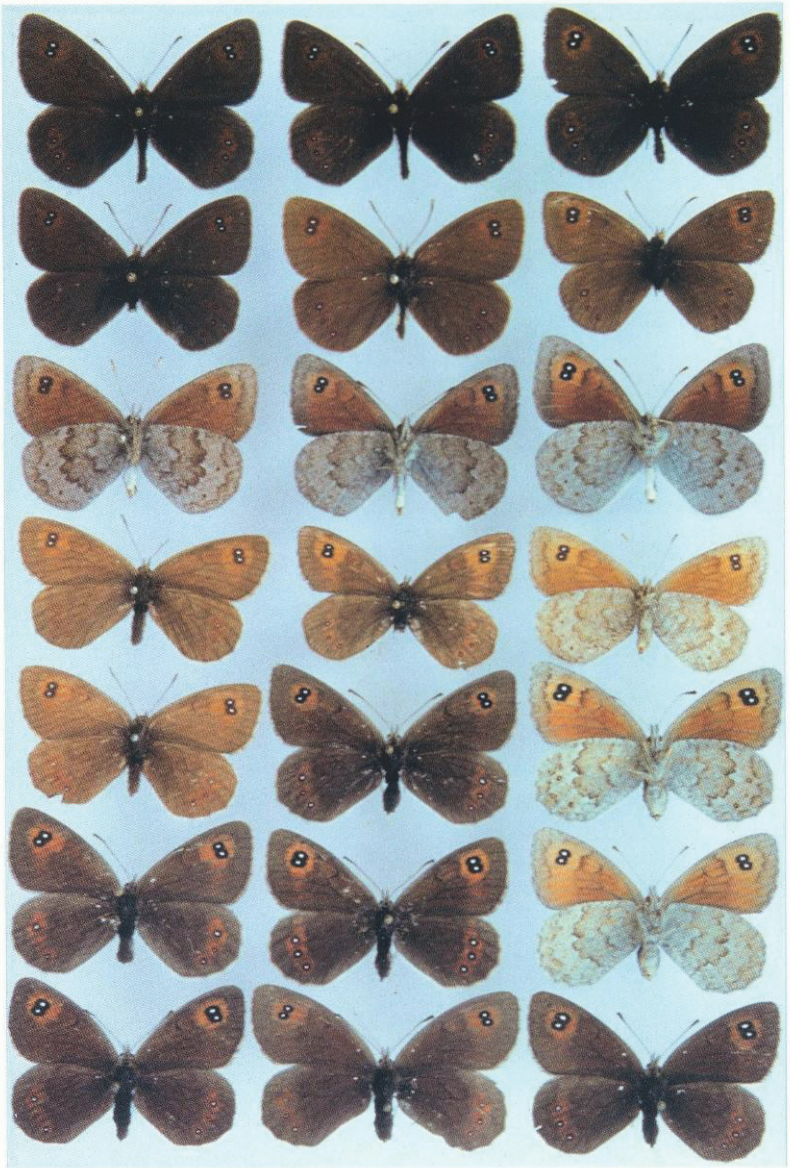
The egg surface

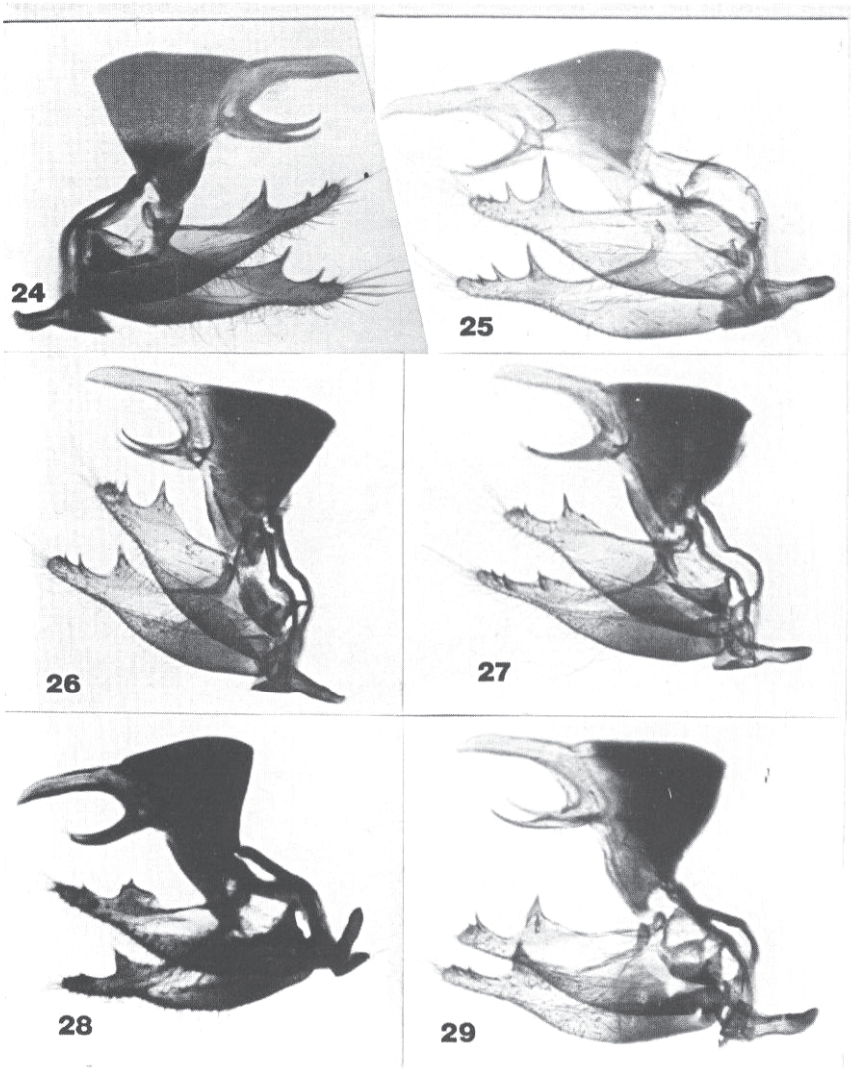
19 eggs from Central Stara Planina Mts, under Ravnetz Top, 1920 m, 08.VIII.1995 have been examined, six of them with SEM micrographs. All the eggs the author had for examination were laid in the paper envelopes singly or in clusters of 3-5. Ovipositing butterflies have not been observed in nature, but the author thinks that eggs are laid singly. Probably one female lays 14-20 eggs. The fresh laid egg is light green. A few days later its colour changes to dark green with a yellowish tinge. The sizes of the eggs are as follows:

Sizes in mm	minimum	maximum	average
length:	1.05	1.12	1.086
width:	0.938	1.022	0.973

There are 17 vertical ribs on the egg's surface, each rib bifid at each end (Fig. 43). The number of the horizontal ribs is approximately 30 on the central part of the egg, where the vertical ribs are not forked, and approximately 10 from the beginning of the furcation to the micropylar area. The micropylar rosette (Fig. 44) is asymmetric, consisting of 4-5 irregular concentric cell rings. The outer ring is composed by 12 cells, the inner by 6. The micropylar canals are surrounded by 4 cells, forming a four-clover rosette. The shape and the structure of the egg of the new subspecies is like the one pictured in Drenowski (1923: 194) for eggs of *E. ottomana balcanica*, but according to Drenowski (1923: 195) the number of the vertical ribs in *E. ottomana balcanica* is about 21. Illustrations of the caterpillar of both *E. cassioides* and *E. ottomana* can be found in Chinery (1989).

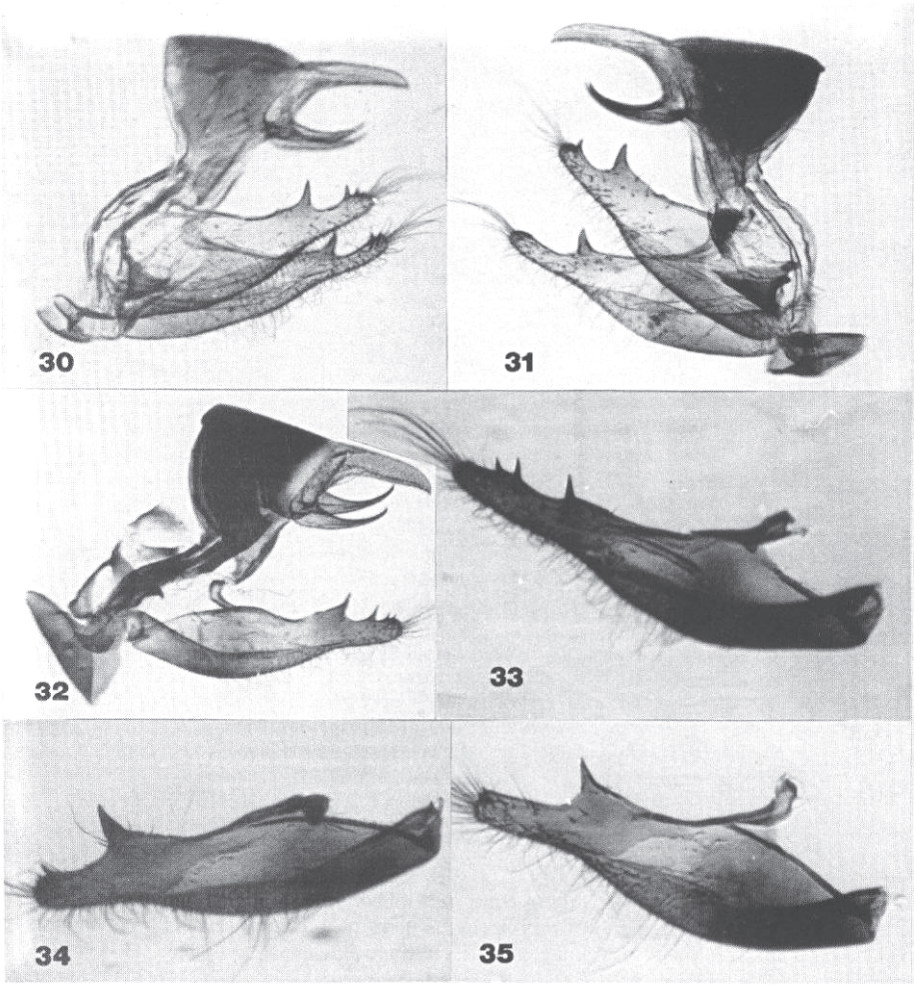
Plate 1





Figs 24-29: *Erebia cassioides kinoshitai* **sp.n.**, male genitalia

24. Holotype. Bulgaria, Central Stara Planina Mt, under Ravnetz Top, 1920 m alt. 08.VIII.1995, S. Beshkov & V. Gastarov leg., Gen. prep. 9./29.II.1996, Beshkov.
25. Paratype. Bulgaria, Central Stara Planina Mt, under Levski Top, 1780 m, 07.VIII.1995, S. Beshkov leg., Gen. prep. 1./29.II.1996, Beshkov.
26-27. Paratypes. Bulgaria, Central Stara Planina Mt, under Ravnetz Top, 1920 m, 08.VIII.1995, S. Beshkov & V. Gashtarov leg., Gen. prep. 8./29.II.1996, Beshkov.
28. Paratype. Bulgaria, Central Stara Planina Mt, under Krastzite Top, 1820 m, 07.VIII.1995, S. Beshkov & V. Gashtarov leg., Gen. prep. 4./29.II.1996, Beshkov.
29. Paratype. Bulgaria, Central Stara Planina Mt, under Ravnetz Top, 1920 m, 08.VIII.1995, S. Beshkov & V. Gashtarov leg., Gen. prep. 7./29.II.1996, Beshkov.



Figs 30-33: *Erebia cassioides macedonica* (Buresch, 1818), male genitalia:
30. Syntype. Bulgaria, "Pirin Pl. 2400 m, Papas Giol, 16.VII.1915 Dr. Iw. Buresch", in coll. Nat. Hist. Mus. Sofia, Gen. prep. 3./29.II.1996, Beshkov.
31. Syntype. Bulgaria, "Pirin Pl. 2350 m, Papas Giol, 16.VII.1915 Dr. Iw. Buresch", in coll. Nat. Hist. Mus. Sofia, Gen. prep. 10./29.II.1996, Beshkov.
32. Bulgaria, Rila Mt, under Angelov Vrah Top, 2600 m., 31.VIII.1987, S. Beshkov leg., Gen. prep. 6./06.III.1995, Beshkov.
33. Bulgaria, Rila Mt, under Kanarata Top, 2500 m., 30.VIII.1987, S. Beshkov leg., Gen. prep. 4./06.III.1995, Beshkov.
Figs 34-35: *Erebia cassioides kinoshitai* **ssp. n.**, male genitalia
34. Paratype. Bulgaria, Central Stara Planina Mt, between Botev and Levski Tops, 1800-2100 m., 19-21.VII.1994, S. Beshkov leg., Gen. prep. 3./06.III.1995, Beshkov.
35. Paratype. Bulgaria, Central Stara Planina Mt, under Zhaltetz Top, 2000 m., 15.VII.1993, S. Beshkov leg., Gen. prep. 7./06.III.1995, Beshkov.

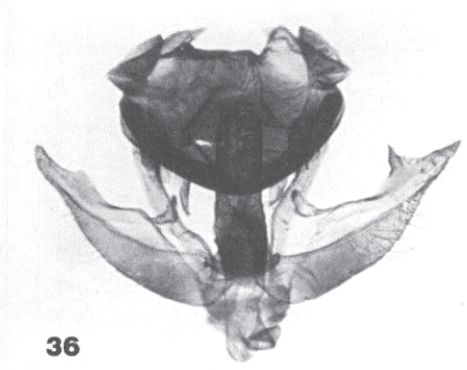


Fig. 36: *Erebia cassioides kinoshitai* **ssp. n.**, aberrant male genitalia. Paratype. Bulgaria, Central Stara Planina Mt, under Kupena Top, 1900 m., 19.VII.1994, S. Beshkov leg., Gen. prep. 2./15.III.1995, Beshkov.

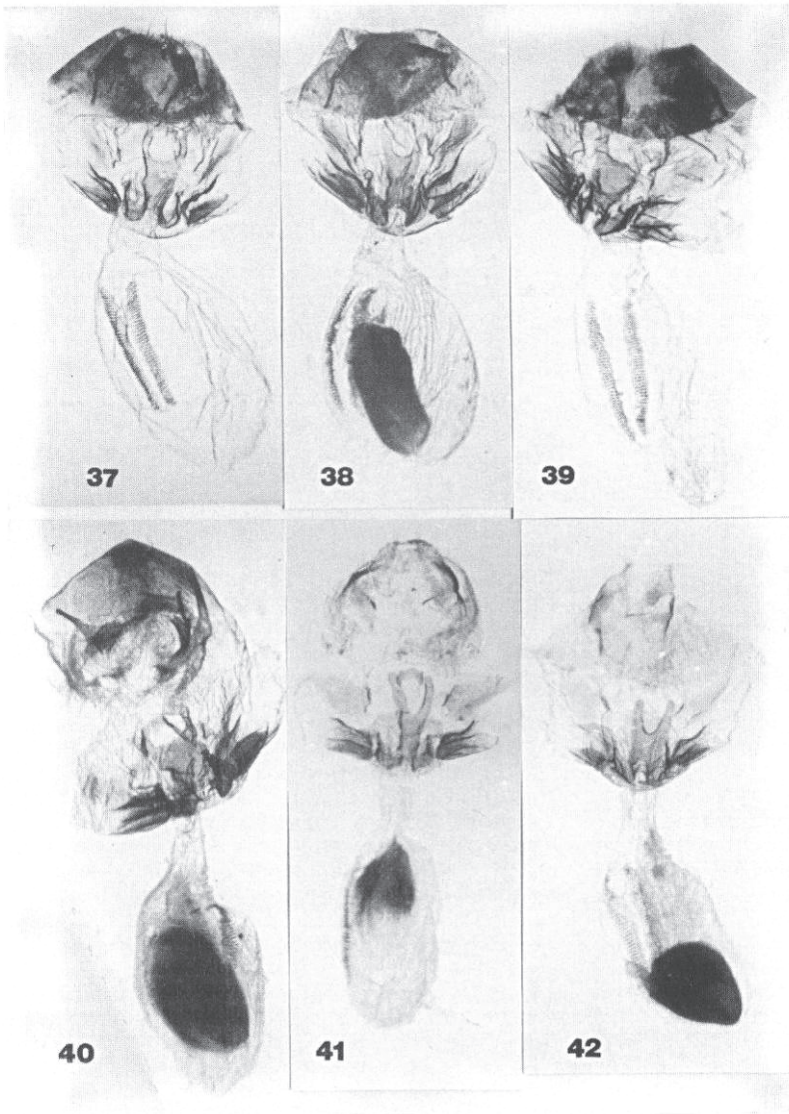
Material examined

Holotype ♂ (Plate 1, fig. 1), forewing length 19 mm, labeled "Bulgaria, Central Stara Planina Mt, under Ravnetz Top, 1920 m alt. 08.VIII.1995, S. Beshkov & V. Gastarov leg." printed on a laser writer on white paper and with another label "Holotype *Erebia cassioides kinoshitai* Beshkov" printed on red paper. Genital slide 9./29.II.1996, Beshkov, with a red hand-written label "Holotype *Erebia cassioides kinoshitai* Beshkov".

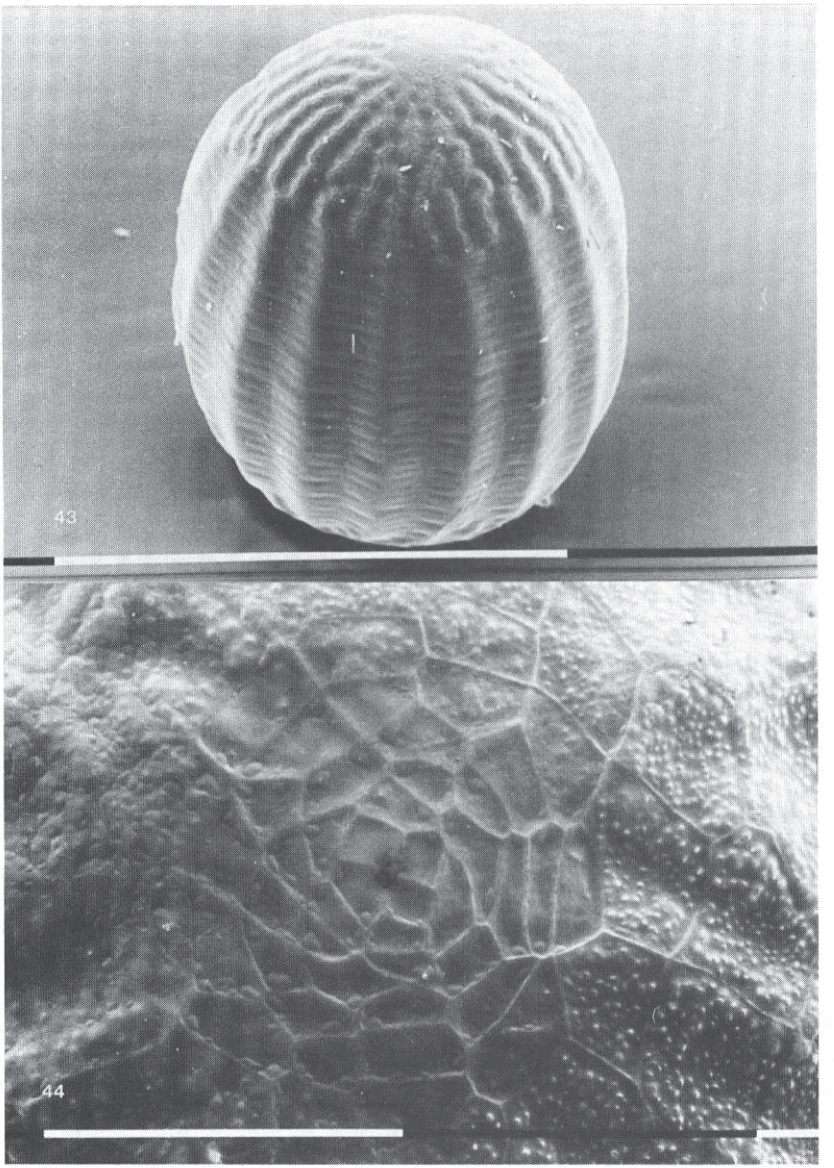
Paratypes: 19♂♂ and 22♀♀: Bulgaria, Central Stara Planina Mt (Kaloferska Planina), under Ravnetz Top, 1920 m alt. 08.VIII.1995, S. Beshkov & V. Gastarov leg.; 2♂♂ and 1♀: Bulgaria, Central Stara Planina Mts (Troyanska Planina Mts), under Levski Top, 1780 m alt., 07.VIII.1995, S. Beshkov & V. Gashtarov leg.; 3♂♂: Bulgaria, Central Stara Planina Mts, between Levski and Botev Tops, 1800-2100 m alt., 19-21.VII.1994, S. Beshkov leg.; 1♂: Bulgaria, Central Stara Planina Mts (Troyanska Planina Mts), under Kupena Top, 1900 m, 19.VII.1994, Beshkov leg.; 1♂ and 1♀: Bulgaria, Central Stara Planina Mts (Troyanska Planina Mts), under Krastzite Top, 1820 m, 07.VIII.1995, S. Beshkov & V. Gastarov leg.; 2♂♂: Bulgaria, Central Stara Planina Mts (Kaloferska Planina Mts), under Zhaltetz Top, 2000 m, 15.VII.1994, Beshkov leg.

The holoytpe is deposited in the National Natural History Museum, Sofia. Paratypes are deposited as follows: from the type locality: 3♂♂ and 1♀ in coll. Vlaamse Lepidoptera Collectie Antwerpen (VLCA, Belgium); 4♂♂ and 3♀♀ in coll. V. Gashtarov (Novo Konomladi, Bulgaria); 2♂♂ and 1♀ in coll. E. von Mentzer (Täby, Sweden); 1♂ and 1♀ in coll. K. Soichiro (Settsu, Osaka, Japan); 1♂ and 1♀ in Entomologischen Museum Dr U. Eitschberger (Marktleuthen, Germany); 1♂ and 1♀ in National Natural History Museum, Sofia; 1♂ and 1♀ in Natural History Museum (London, England). The rest of the paratypes are in the collection of the author.

14 male and 6 female genitalia fixed on slides have been examined. All paratypes and the genital preparations are labeled with a red label "Paratype *Erebia cassioides kinoshitai* Beshkov".



Figs 37-40: *Erebia cassioides kinoshitai* **ssp.n.**, female genitalia:
37. Paratype. Bulgaria, Central Stara Planina Mt, under Ravnetz Top, 1920 m, 08.VIII.1995, S. Beshkov & V. Gashtarov leg., Gen. prep. 18./29.II.1996, Beshkov.
38. Paratype. Same data, Gen. prep. 16./29.II.1996, Beshkov.
39. Paratype. Same data, Gen. prep. 17./29.II.1996, Beshkov.
40. Paratype. Same data, Gen. prep. 15./29.II.1996, Beshkov.
Figs 41-42: *Erebia cassioides macedonica* (Buresch, 1818), female genitalia:
41. Syntype. "Pirin Pl., 2500 m, Papas Giol, 16.VII.1915, Dr. Iw. Buresch", in coll. Nat. Hist. Mus. Sofia, Gen.prep. 12./29.II.1996, Beshkov.
42. Syntype. Same data, Gen. Prep. 11./29.II.1996, Beshkov.



Figs 43-44: *Erebia cassioides kinoshitai* **ssp. n.,** egg surface
43. Semilateral view. Bulgaria, Central Stara Planina Mt. under Ravnetz Top, 1920 m alt., 08.VIII.1995, S. Beshkov & V. Gastarov leg. Scale bar=1 mm
44. Micropylar area. Same locality and date. Scale bar=0.1 mm

Distribution

Type locality: Bulgaria. Central Stara Planina Mt (Kaloferska Planina), under Ravnetz Top, 1920 m alt. (Holotype). The type locality is situated between the tops Ravnetz and Zhaltetz on a ridge connecting both tops. In this place the new subspecies is abundant. The other localities (Paratypes) are in Troyanska and Kaloferska Stara Planina Mts between Levski and Botev tops in altitude 1780-2000 m. Drenowski (1909) reported for Central Stara Planina Mts (Kaloferska Planina) "*Erebia Tyndarus* Esp. und var. *Balcanica* Rbl. Der Typus fliegt von 1500-2200 m und die Varietät nur bis 2000 m. Die typischen Exemplare sind kleiner als die von Esper beschriebenen. Zwischen vielen Männchen entdeckte ich ein Exemplar, bei welchem die braunen Querbinden fehlen und auf den beiden Flügeln ein grauer Glanz vorhanden ist." Drenowski (1912) again reported *E. tyndarus* Esp. "from the alpine area of Central Stara Planina Mts (Kaloferska Planina) in altitude 1600-2200 m, mostly in a typical form and rare f. *balcanica* Rbl.". According to Drenowski (1928) *E. tyndarus* "flying in Central Stara Planina Mts in altitude 1500-2200 m, as in the low altitude flying together with f. *balcanica* (Rbl.). There is not a transition to f. *balcanica* (Rbl.). Some specimens are bigger, with a big ocelli as well as with wider transversal rusty-brownish connections. This find out the last as the alpine form *dromus* (H.S.) known from Pirin as well". Now, there is no doubt that specimens reported by Drenowski as typical *E. tyndarus* belong to *E. cassioides kinoshitai* **ssp. n.** In Buresch & Tuleschkow (1929) only the data of Drenowski quoted above from Kaloferski Balkan (Kaloferska Planina) are represent the "typical form" of *E. tyndarus* in Bulgaria. All other data are concerning *E. tyndarus balcanica* and *E. tyndarus macedonica*. Lorković (1957), using Drenowski's material, illustrated a specimen from Kaloferski Balkan, Botev (=Jumrukcal) Top. Also, a biometric measurement on the valvae of this group is made, e.g. on 10 specimens from Botev Top (T. T). In that work for the first time our *E. tyndarus* specimens are placed as *E. cassioides*. But in Lorković (1957) the specimens from Botev Top are recognized as *E. cassioides macedonica* (Buresch, 1918) and the specimens from Pirin Mts (type locality of *macedonica*) - as *E. cassioides macedonica* f. *pirinica* Drenowski. This is probably the reason why Lorković did not recognize the specimens from Botev Top as a distinct subspecies of *E. cassioides*. The name *E. cassioides macedonica* f. *pirinica* Drenowski (sensu Lorković, 1957) is a **nomen nudum, syn. n.** of *E. cassioides macedonica* (Buresch, 1918). A distribution map of *E. cassioides macedonica* in Bulgaria can be found in Abadjiev (1993), but Central Stara Planina Mts is missing in the text. The present author thinks, that also Ossogovo Mts can be added as inhabited by *E. cassioides* in Bulgaria. Drenowski (1930) reported from Ossogovo Mts *E. tyndarus balcanica* Rbl., as mentioned that "there is not an intermediate forms with the typical form, which is flying in the highest parts of the mountain". This "typical form" has to be *E. cassioides*, a species mentioned for Ossogovo in Thurner (1964) together with *E. ottomana balcanica* Rebel, and marked also for the Macedonian part of Ossogovo Mts in Jakšić (1988: 190). The male genitalia of *E. cassioides kinoshitai* **ssp. n.** are figured in Abadjiev (1995: 136, fig. 26).

Ecology

The biotopes of *E. cassioides kinoshitai* **ssp. n.** are in the southern slopes of the Stara Planina Mts, far above the forest limit. The butterflies prefer dry areas with low grass vegetation. In moist parts of the mountain with high lush green vegetation, they only fly on the stony erosion spots. The type locality, under Ravnetz Top, is a flat dry area with low grass vegetation and some single low *Juniperus* shrubs. Among the grass, many *Vaccinium vitis-idaea* L., *V. myrtillus* L. and *V. uliginosum* L. shrubs grow, as well as many low yellow Asteraceae and other plants, which the butterflies often visit. In the same biotopes some other interesting species are found: *Polyommatus eroides* Frivaldsky,

1835, *Lycaena candens leonhardi* (Fruhstorfer, 1917), *Erebia ottomana balcanica* Rebel, 1913, *Erebia euryale* (Esper, [1805]), *Coenonympha rhodopensis* Elwes, 1900, *Pyrgus alveus* (Hübner, [1803]). All biotopes of *E. cassioides kinoshitai* **ssp. n.** are situated below the highest tops in Troyanska and Kaloferska Stara Planina, with an altitude of more than 2000 m.

The localities at the lower altitude mentioned here always are situated under a high top, from whence the specimens come. In such a low altitude in other places of the mountain *E. cassioides kinoshitai* **ssp. n.** does not occur.

Conservation status

The area where the known localities of *E. cassioides kinoshitai* **ssp. n.** are situated forms part of the National Park "Central Balkan". In this part of the park there are two Biosphere Reserves and some other reserves. All the localities of *E. cassioides kinoshitai* **ssp. n.** are out of the Biosphere Reserves and the other reserves. In that part of the mountain the European Touristic Route E-3: Atlantic Ocean-Karpati-Stara Planina-Black Sea passes along the main crest of the mountain. Many other touristic routes go through that part of the mountain, including the localities of *E. cassioides kinoshitai* **ssp. n.** In that area many horses graze free in the mountain during the summer, as well as flocks of cows which do so illegally. The only things that can be done to conserve *E. cassioides kinoshitai* **ssp. n.** is to protect it by low in Bulgaria and to include its localities in the reserves near by. More strict control from the local authorities is urgently necessary to prevent the illegal grazing which is destroying the habitats of *E. cassioides kinoshitai* **ssp. n.** In that part of the mountain many other interesting Lepidoptera species also occur, but in rather different biotopes. Some of their localities are in the territory of the reserves. The most interesting butterflies and day flying moths are as follows: *Parnassius apollo* (Linnaeus, 1758), *Lycaena virgaureae balcanicola* Graves & Hemming, [1928], *Aricia eumedon rumeliensis* (Eitschberger & Steiniger, 1975), *Erebia orientalis* Elwes, 1900 (undescribed ssp.), *Erebia alberganus phorcys* Freyer, 1836, *Erebia rhodopensis* Nicholl, 1900, *Erebia pronoe fruhstorferi* Warren, 1933, *Erebia melas leonhardi* Fruhstorfer, 1917, *Boloria eunomia* (Esper, 1800) (undescribed ssp.), *Parasemia plantaginis interrupta* Schawerda, 1910, *Photedes captiuncula* (Treitschke, 1825) and others.

Etymology

The new subspecies *Erebia cassioides kinoshitai* **ssp. n.** is dedicated to my friend Mr Kinoshita Soichiro (Osaka, Japan) who encouraged me to do the research.

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