

Notes about some species of *Holoarctia* FERGUSON, 1984

(Lepidoptera, Arctiidae)

by

AIDAS SALDAITIS & POVILAS IVINSKIS

received 9.VII.2005

Abstract: Morphological peculiarities and illustrations of three species, related to the genus *Holoarctia* FERGUSON are presented. They are: *H. dubatolovi* SALDAITIS & IVINSKIS, 2005, *H. cervini* (FALLOU, 1864) and *H. marinae* DUBATOLOV, 1985. The ♀ genital structures of *H. marinae* DUBATOLOV, 1985 are presented for the first time. Caterpillars, pupae and biology of *H. marinae* DUBATOLOV, 1985 are described.

Zusammenfassung: In dieser Arbeit wird über die morphologischen Besonderheiten von drei Arten der Gattung *Holoarctia* FERGUSON berichtet; die Falter und deren Genitalien werden abgebildet. Es handelt sich um die Arten *H. dubatolovi* SALDAITIS & IVINSKIS, 2005, *H. cervini* (FALLOU, 1864) und *H. marinae* DUBATOLOV, 1985. Raupe, Puppe und Biologie werden von *H. marinae* DUBATOLOV, 1985 beschrieben.

Introduction: *Holoarctia*-species are living in extreme habitats, situated in the alpine tundra in hardly accessible places. Therefore they are always rare species in all collections, with the exception of *H. cervini* (FALL.) inhabiting the Alps. On the other hand, all species of *Holoarctia* FERG. are morphologically related. For this reason its systematics are highly confused. New data of three species are present from Altay and Tuva expecting thus to clarify the complicated system of that genus.

Material examined:

Holoarctia dubatolovi SALDAITIS & IVINSKIS, 2005: Holotype ♂, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.11.2003, R. MISHUSTIN (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Paratypes 3 ♂♂, 1 ♀, same data as holotype; 1 ♀ Russia, SW Tuva, West Tanuola Mts., southern slopes, Sagly v., 2700 m, MISHUSTIN leg.

Holoarctia marinae DUBATOLOV, 1985: 8 ♂♂, 6 ♀♀, Russia, Altai Mts., Aktash vill., 10.07.2003

Holoarctia cervini (FALLOU, 1864): 1 ♂ Schweiz, Wallis, Gomergrant, 2900 m, 12.05.1996, leg. H. GERBER, FORSTER ex l.; 1 ♂, Schweiz, Wallis, Gomergrant, 2900 m, 24.01.1997, leg. H. GERBER, FORSTER ex ovo.; 1 ♀, Augstbord, Wallis, 2800 m, ex ovo 22.07.[19]80, coll. R. DUSS.

Results and discussion: *Holoarctia dubatolovi* SALDAITIS & IVINSKIS, 2005 was described from Altay and Tuva. This species phenotypically resembles *Holoarctia marinae* DUB. Both species occupy the same ecological niches in the same regions, but they are distinctly different in some morphological peculiarities.

H. dubatolovi SALDAITIS & IVINSKIS in its genital structure is closely related to European *H. cer-*

vini (FALL.), though distinctly differs externally. The authors assume that after the last glacial period *H. cervini* (FALL.) occupied a wide range embracing present habitats of *H. dubatolovi* SALDAITIS & IVINSKIS. Most likely they were one species then. Later, with fragmentation of the territory, individuals that appeared isolated in separate parts of the range, acquired new morphological features, which led to formation of a complicated species complex of *Holoarctia*. Sympatric *H. dubatolovi* SALDAITIS & IVINSKIS and *H. marinae* DUB. are very similar outwardly, but differ in their genital structures. *H. dubatolovi* SALDAITIS & IVINSKIS is close to *H. cervini* (FALL.) in its genital structure, but is geographically isolated from the latter.

Holoarctia puengleri perunovi DUBATOLOV, 1990 is also described from Altay and is only known from the holotype so far. For the lack of material, the systematic dependency of this taxon is controversial. A comparative review of these three species of *Holoarctia* is presented.

According to the structure of its wing pattern, *Holoarctia dubatolovi* SALDAITIS & IVINSKIS is close to *H. marinae* DUB. known from Altay (DUBATOLOV, 1985a, b, 1990, 1996; MURZIN, 2003), but related to European *H. cervini* (FALL.) (FREINA & WITT) 1987 in its genital structure. *H. dubatolovi* SALDAITIS & IVINSKIS is significantly different from the above two species in external and genitalic features (colour plate 16: plate I, II).

Holoarctia dubatolovi SALDAITIS & IVINSKIS is smaller than *H. marinae* DUB. (Plate II). The average wing length for *H. dubatolovi* is 32 mm, whereas for *H. marinae* DUB. 34 mm. Wings of *H. dubatolovi* SALDAITIS & IVINSKIS are apparently transparent black, whereas those of *H. marinae* DUB. are transparent grey yellow (colour plate 16: plate III).

Prominent differences between *H. dubatolovi* SALDAITIS & IVINSKIS and *H. marinae* DUB. are observed in ♂ and ♀ genital structures. Valves in *H. dubatolovi* SALDAITIS & IVINSKIS ♂♂ are shorter and wider, with a more rounded apex than in *H. marinae* DUB. (Fig. 1,2) Vinculum in *H. dubatolovi* SALDAITIS & IVINSKIS is spade-shaped, straight-angled, whereas that in *H. marinae* DUB. is wide and devoid of angles (Fig. 4, 5). In contrast to *H. marinae* DUB., juxta in *H. dubatolovi* SALDAITIS & IVINSKIS has large medial isthmuses. Vesica in *H. marinae* DUB. is narrow and long, which is different from a wide vesica in *H. dubatolovi* SALDAITIS & IVINSKIS.

H. dubatolovi SALDAITIS & IVINSKIS (Fig. 3) is also noticeably distinguishable from *H. marinae* DUB. (Fig. 6) by its ♀ genitalia. Its bursa has two signa and a well-developed cestum and bulla, whereas that of *H. marinae* DUB. has three signa (two of the same size as in *H. dubatolovi* SALDAITIS & IVINSKIS, the third being markedly smaller) and is made of two parts laterally reduced in the middle (SALDAITIS & IVINSKIS 2005).

Holoarctia dubatolovi SALDAITIS & IVINSKIS differs from *H. cervini* (FALL.) in its wing pattern and colour (PÖYRY & KULLBERG, 1997). The wings in *H. dubatolovi* SALDAITIS & IVINSKIS are transparent with intensely yellow pattern-forming lines; in *H. cervini* (FALL.) the wings are non-transparent and the pattern-forming lines are wider, greyish yellow, nearly white.

Distinct differences between *H. dubatolovi* SALDAITIS & IVINSKIS and *H. cervini* (FALL.) are observed in ♂ genitalia. Valves in *H. cervini* (FALL.) are narrower, with external highly oblique edges and a pointed apex. Juxta with smaller indents from both sides. Vinculum is pointed. A posterior part of vesicus is narrow, whereas that of *H. dubatolovi* SALDAITIS & IVINSKIS is very wide (Fig. 7, 8) In comparison with *H. cervini* (FALL.) (Fig. 9), signa of the bursa in *H. dubatolovi* SALDAITIS & IVINSKIS ♀♀ are twice larger, ductus bursae is longer and narrower.

Notes on the early stages, biology and ♀ genitalia of *Holarctia marinae* (DUBATOLOV, 1985)
H. marinae DUB. was described after two ♂♂. MURZIN (2003) provided extensive biological data. The authors received comprehensive data on the biology of *H. marinae* DUB. from M. SHEVCHENKO.

Eggs are comparatively big, 1-2 mm in size, glossy and pale brown, laid in irregular, oval batches of 50 to 150 units per day at a 1-day interval. The number of eggs decreases with each oviposition, eventually 1-2 eggs make up a clutch. In 7 to 12 days, eggs turn darker and in 2 to 3 days very light-coloured caterpillars hatch. In 10 hours, they become darker and finish eating their chorion. Adult caterpillars are black, covered with long black bristles. Dorsally, a narrow stripe of white bristles extends along the body. Laterally, segmental bunches of bristles are white with an admixture of black bristles. The first instar caterpillar has the same appearance as the last instar caterpillar except for their length (colour plate 16: plate IV; fig. 1, 2).

The first instar lasts for 8 days, after which caterpillars molt at a 1-day interval. Caterpillar development consists of five instars, with time length between different body lengths extending up to 14 days. These days include 2 to 3 days of caterpillar acclimatisation, 7 to 8 days of active feeding and 3 to 5 days of a pre-molting period. The development from egg to adult moth takes about 65 days. It is likely that only third instar caterpillars hibernate. They are probably polyphagous and are found on Taraxacum and Berberis as well as on stones near different *Salix* species in the natural environment.

Pupae: Length is 17-18 mm, width is 6 mm. Cremaster is a bunch of hook-like processes, two processes in the center being longer than the rest (colour plate 16: plate IV, fig. 3, 4).

After caterpillars reach the fifth instar, they undergo a short diapause and later actively look for a place to pupate under stones of a particular form. In 2 to 3 days, caterpillars spin a light transparent cocoon, which is finished in 2 days. Later in 1.5 to 2 days, they turn into a light-brown pupa, which changes its colour into dark and in 2 more days becomes bluish. The pupal diapause lasts for 7 to 15 days and its duration depends on temperature and sex. An emerged adult moth dries its wings in about 6 hours, a ♀ remains flightless, whereas a ♂ starts searching for a ♀ partner.

Acknowledgements: The authors thank Mr. THOMAS WITT, Dr. V. DUBATOLOV, Mr. S. CHURKIN, Mr. R. MISHUSTIN, and Mr. G. GRIGORJEV for their assistance. Special thanks are extended to Mr. M. SHEVCHENKO for comprehensive data on the biology of *H. marinae* DUB., Mrs. SIGITA DAUGIARDIENE for translating this article into English and Ms. LINA JASIUKONYTE for correct figures.

References

- DUBATOLOV, V. V. (1985 a): Vysshye medveditsy (Lepidoptera, Arctiidae: Arctiinae) gor Yuzhnoi Sibiri. Soobstshenie 1. [Arctiinae (Lepidoptera, Arctiidae) of the South Siberian mountains. Part 1]. In: Chlenistonogie i gelminty [Arthropoda and helminths]. Nauka, Sib. Department: 150-152, Novosibirsk (in Russian).
- DUBATOLOV, V. V. (1985 b): Notes on the *Holarctia cervini* complex (Lepidoptera, Arctiidae). 1. *Holarctia marinae* sp. n. from Altai. - Ann. Ent. Fenn. 51: 57-58, Helsinki.
- DUBATOLOV, V. V. (1990 a): Novye taksony vysshikh medvedits (Lepidoptera, Arctiidae: Arctiinae) Palearktiki [New taxa of Arctiinae (Lepidoptera, Arctiidae) from the Palearctic]. In:

Redkie gelminty, klestshi i nasekomye [Rare helminths, mites and insects]. – Nauka, Sib. Department: 79-86, Novosibirsk: (in Russian).

DUBATOLOV, V. V. (1996): A list of the Arctiinae of the territory of former U.S.S.R. (Lepidoptera, Arctiidae). - Neue Entomologische Nachrichten **37**: 54-55, Markt-leuthen.

FREINA, J. J. DE & T. J. WITT (1987): Die Bombyces und Sphinges der Westpalaearctis 1: 144-146, Taf. 8. Map. 86. - Edition Forschung & Wissenschaft, München.

MURZIN, V. (2003): The tiger moths of the former Soviet Union (Insecta: Lepidoptera: Arctiidae): 80-82; Plate XII, fig. 5- 8, Plate 26, fig 5. - Pensoft, Moscow.

PÖYRY, J. & J. KULLBERG (1997): A taxonomic revision of the genus *Holoarctia* FERGUSON, 1984 (Arctiidae). - Nota lepid. **20** (1/2): 45-65, Werrel, Belgium.

Address of authors

AIDAS SALDAITIS & POVILAS IVINSKIS
Institute of Ecology of Vilnius University, Akademijos 2
LT-08412 Vilnius21, Lithuania
E-mail: saldrasa@gmx.lt, entlab@centras.lt

Colour plate 16 (p. 609)

Plate I:

Holoarctia dubatolovi SALDAITIS & IVINSKIS, 2005

Fig. 1, 3: Paratypes ♂♂, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.XI.2003, R. Mishustin (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Fig. 2: Holotypus ♂, the same data as paratypes. In coll. Museum WITT, Munich.

Fig. 4: Paratypus ♀, the same data.

Plate II

Fig. 1: *Holoarctia marinae* DUBATOLOV, 1985 ♂, Russia Altai Mts. Aktash vill. 10.VII.2003.

Fig. 2: *Holoarctia marinae* DUBATOLOV, 1985 ♀, Russia Altai Mts. Aktash vill. 10.VII. 2003.

Fig. 3: *Holoarctia dubatolovi* SALDAITIS & IVINSKIS, 2005, paratypus ♂, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.XI.2003, R. MISHUSTIN (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Fig. 4: *Holoarctia dubatolovi* SALDAITIS & IVINSKIS, 2005, paratypus, ♀, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.XI.2003, R. MISHUSTIN (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Plate III

Fig. 1: *Holoarctia marinae* DUBATOLOV, 1985, Russia Altai Mts. Aktash vill., 10.VII.2003, fig. 1, 3: ♂♂; fig. 2, 4: ♀♀

Plate IV

Fig. 1, 2: *Holoarctia marinae* DUBATOLOV, 1985, larvae.

Fig. 3, 4: *Holoarctia marinae* DUBATOLOV, 1985, pupa, exuviae.

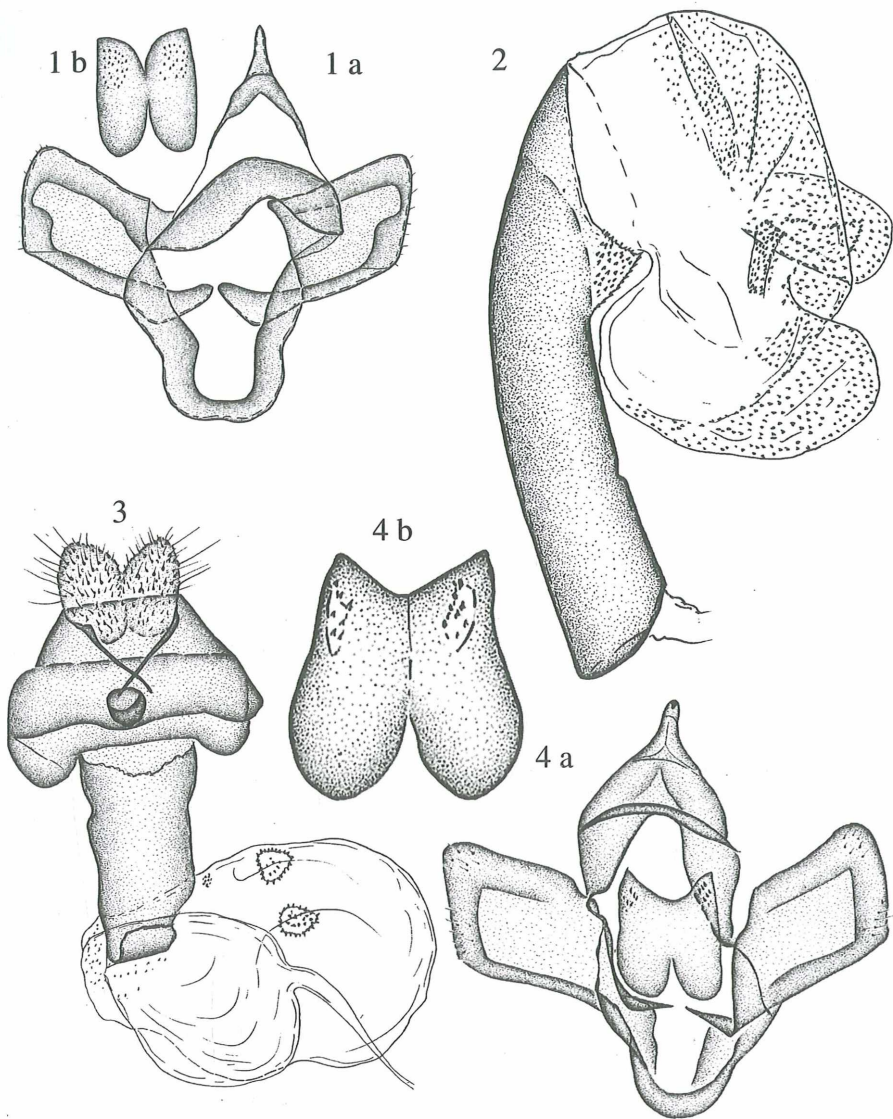


Fig. 1: *Holoartia dubatolovi* SALDAITIS & IVINSKIS, 2005, Holotypus ♂, a- genitalia, b- juxta.
 Fig. 2: *Holoartia dubatolovi* SALDAITIS & IVINSKIS, 2005, Holotypus ♂, aedeagus.
 Fig. 3: *Holoartia dubatolovi* SALDAITIS & IVINSKIS, 2005, Paratypus ♀, genitalia.
 Fig. 4: *Holoartia marinae* DUBATOLOV, 1985, ♂, genitalia, b- juxta.

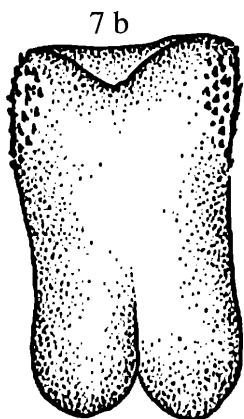
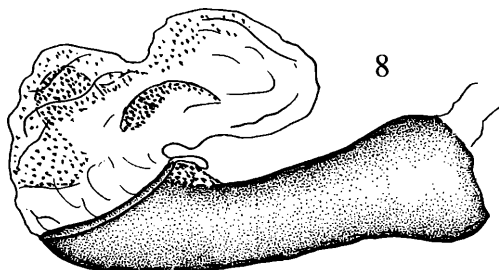
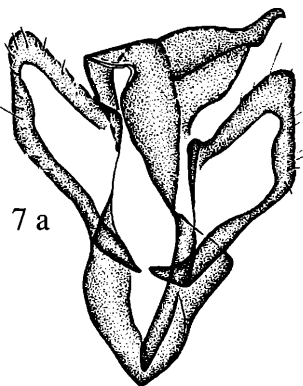
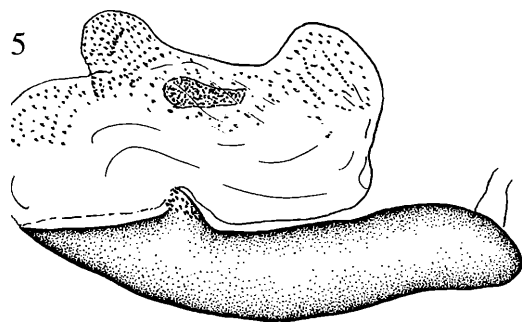


Fig. 5: *Holoarctia marinae* DUBATOLOV, 1985, aedeagus.
 Fig. 6: *Holoarctia marinae* DUBATOLOV, 1985, ♀, genitalia.
 Fig. 7: *Holoarctia cervini* (FALLOU, 1864), a-♂ genitalia, b- juxta.
 Fig. 8: *Holoarctia cervini* (FALLOU, 1864), – aedeagus.

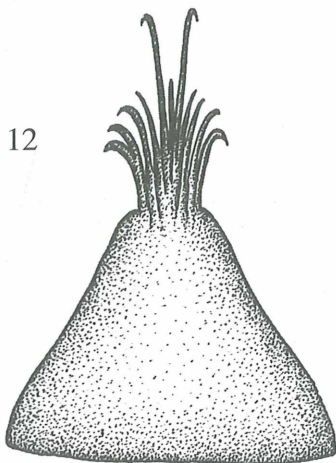
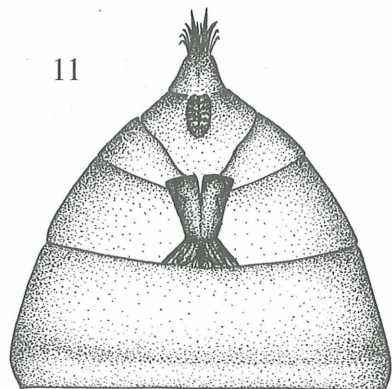
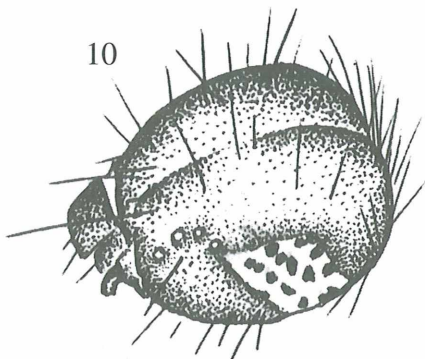


Fig. 9: *Holoarctia cervini* (FALLOU, 1864), - ♀ genitalia.

Fig. 10: *Holoarctia marinae* DUBATOLOV, 1985, head of caterpillar.

Fig. 11.-*Holoarctia marinae* DUBATOLOV, 1985, pupa, last segments.

Fig. 12.-*Holoarctia marinae* DUBATOLOV, 1985, cremaster.

Farbtafel 16/ Colour plate 16

AIDAS SALDAITIS, A. & P. IVINSKIS: Notes about some species of Holarctia Ferguson, 1984 (Lepidoptera, Arctiidae). -Atalanta (Dezember 2005) 36 (3/4): 543-549, Würzburg.

Plate I

Holoarctia dubatolovi SALDAITIS & IVINSKIS, 2005

Fig. 1, 3: Paratypes ♂♂, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.XI.2003, R. Mishustin (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Fig. 2: Holotypus ♂, the same data as paratypes. In coll. Museum WITT, Munich.

Fig. 4: Paratypus ♀, the same data.

Plate II

Fig. 1: *Holoarctia marinae* DUBATOLOV, 1985 ♂, Russia Altai Mts. Aktash vill. 10.VII.2003.

Fig. 2: *Holoarctia marinae* DUBATOLOV, 1985 ♀, Russia Altai Mts. Aktash vill. 10.VII. 2003.

Fig. 3: *Holoarctia dubatolovi* SALDAITIS & IVINSKIS, 2005, paratypus ♂, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.XI.2003, R. MISHUSTIN (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Fig. 4: *Holoarctia dubatolovi* SALDAITIS & IVINSKIS, 2005, paratypus, ♀, Russia, SW Altai, Katun' River (upper stream), Belukha Mnt., Chernyi [Black] glacier, 2000 m, ex ovo 24.-26.XI.2003, R. MISHUSTIN (original ♀ was collected at the beginning of August 2003 by A. SHERBINA).

Plate III

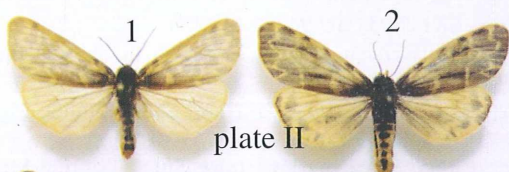
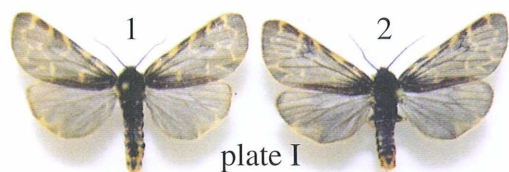
Fig. 1: *Holoarctia marinae* DUBATOLOV, 1985, Russia Altai Mts. Aktash vill., 10.VII.2003, fig. 1, 3: ♂♂; fig. 2, 4: ♀♀

Plate IV

Fig. 1, 2: *Holoarctia marinae* DUBATOLOV, 1985, larvae.

Fig. 3, 4: *Holoarctia marinae* DUBATOLOV, 1985, pupa, exuviae.

Farbtafel 16/ Colour plate 16



ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Atalanta](#)

Jahr/Year: 2005

Band/Volume: [36](#)

Autor(en)/Author(s): Saldaitis Aidias, Ivinskis Povilas

Artikel/Article: [Notes about some species of Holarctia Ferguson, 1984 543-549](#)