

DISTRIBUTION AND ECOSOLOGICAL PROBLEMS OF THE SPECIES OF THE FAMILY TETRATOMIDAE (COLEOPTERA) IN SLOVAKIA AND EUROPE

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Abstract: The paper deals with the distribution and ecosozological problems of a little-known beetle family Tetratomidae (Coleoptera) in Slovakia and Europe. Taxonomic status of this family (in the relation to Melandryidae s. lat.) is also discussed below. Tetratomidae are apparently tied to tree 'bracket' fungi and they are mostly indicators of well-preserved habitats throughout their range.

Key words: Tetratomidae, Coleoptera, Slovakia, Europe, distribution, ecosozological status, biomonitoring

INTRODUCTION

Tetratomidae rank among little-known families of beetles; these mostly rare beetles are mentioned in accessible faunistic papers only sporadically. Generally they are xylomycetophilous beetles of well-preserved forest habitats. On the other hand, they are often mentioned in accessible Red Lists of European countries to be more-or-less threatened by human activity especially in forestry. I would like to improve this data sufficiency in this paper.

MATERIAL AND METHODS

Taxonomic status of Tetratomidae and related genera may be different in the past and nowadays as well. In older publications they are almost always included in the family Melandryidae (= Serropalpidae) as a subfamily. Later two genera (*Tetratoma* and *Mycetoma*) are usually divided to the separate family Tetratomidae, while another two genera (*Eustrophus* and *Hallomenus*) remained to be in the family Melandryidae (JELÍNEK, 1993), despite the last two genera of a "boundary position" belonged in the former subfamily Tetratominae (KASZAB, 1969). Each of four genera mentioned above recently belong in the family Tetratomidae (AUDISIO, 2004; MAJKA, POLLOCK, 2006). It is noticeable, that Melandryidae (s. str.) are living in decaying timber, nevertheless infected by mycelium, while Tetratomidae are "rather mycetophagous" ones, living directly in the fungi flesh (partially with an exception of *Tetratoma ancora*, living in fungi-infected branches of deciduous trees).

The beetles were obtained by current methods, especially individual collecting under the bark and in hollows of old trees, examination of bracket fungi, etc. The material was determined according to the key by KASZAB (1969), the nomenclature is based on the Check-list edited by JELÍNEK (1993).

Tetratomidae are often mentioned in Red Lists of separate European countries (regions); it concerns the Red List of Slovakia (HOLECOVÁ, FRANC, 2001), Czech republic [FARKAČ, KRÁL, ŠKORPÍK (Eds.), 2005]; Austria – A₁ General Red List (FRANZ, 1983), A₂ Red List of Xylophilous Beetles (GEISER, 1983); Germany (GEISER et al., 1998), Bavaria [SCHMIDL, BUSSLER, LORENZ (Eds.), 2003], Great Britain (HYMAN, PARSONS, 1992, 1994), Sweden [GÄRDENFORS (Ed.), 2000], Finland [RASSI, ALANEN, KANERVA, MANNERKOKSI (Eds.) 2001] and Denmark (GØNGET, 1998). Their ecosozological status (ESS) in separate countries is also discussed in the table 1. The occurrence of separate species throughout Europe (AUDISIO, 2004) is analyzed in the table 2 below.

Tab. 1. Ecosozological status of Tetratomidae in accessible Red Lists of European countries

Species	Ecosozological status (ESS)									
	Sk	Cz	A ₁ *	A ₂ *	G*	B*	GB	Sw	F	Dk
<i>Tetratoma ancora</i> Fabricius, 1790	-	-	-	G	G	G	N	-	-	-
<i>Tetratoma desmaresti</i> Latreille, 1807	EN	-	-	-	VAb	Aov	N	CR	-	EN
<i>Tetratoma fungorum</i> Fabricius, 1790	-	-	-	G	-	-	-	NT	VU	-
<i>Mycetoma suturale</i> (Panzer, 1797)	+ VU	CR	Sg	VAb	Sg	Sg	-	-	-	-
<i>Hallomenus axillaris</i> (Illiger, 1807)	VU	-	-	Sg	Sg	Sg	-	NT	-	-
<i>Hallomenus binotatus</i> (Quensel, 1790)	-	-	-	G	-	-	N	-	-	-
<i>Eustrophus dermestoides</i> (Fabricius, 1792)	-	-	-	G	G	Sg	-	-	CR	-

Explanations: Ecosozological status, **countries:** **Sk** – Slovakia, **Cz** – Czech republic, **A₁ A₂** – Austria, **G** – Germany, **B** – Bavaria, **GB** – Great Britain, **Sw** – Sweden, **F** – Finland, **Dk** – Denmark

Categories of ESS: **CR** – critically endangered, **EN** – endangered, **VU** – vulnerable, **N** – notable, **NT** – near threatened

* although different ecosozological categories are used in Germanic-speaking countries, they are convertible to IUCN ones: **Aov** – Ausgestorben oder verschollen (it corresponds **RE** – regionally extinct according to IUCN criteria), **VAb** – Vom Aussterben bedroht (\approx **CR**), **Sg** – stark gefährdet (\approx **EN**), **G** – gefährdet (\approx **VU**)

RESULTS (SYSTEMATIC REVIEW OF SPECIES)

Subfamily: Tetratominae

Tetratoma ancora – a relatively wide-spread and sometimes not rare Palaearctic species, ranking among the most frequent species of this family. It especially lives in dying branches of deciduous trees, infected by mycelium. Chronological preview of newer and recent records:

Malé Karpaty Mts – Pezinská Baba (7769a), 1978 (MAJZLAN, 1990), Banská Bystrica – Urpín (7280d), September 8, 1981, V. Kubinec lgt. et coll.; Veľká Fatra Mts – Majerova skala Mt (7180b), on beech branches June 22, 1985, V. Franc lgt. et coll. (below only “VF”); Zvolen – Zálužná (7481a/c), beech branches October 19, 1986 (VF); Nízke Tatry Mts – Korytnica (7181b), beech branches May 18, 1989 (VF); Slovenský kras Mts – Zádiel (7390d), 80s (MAJZLAN, RYCHLÍK, 1993a); Veporské vrchy Mts – Tlstý javor (7383b), pheromone trap for bark beetles May 30, 1991, D. Brutovský lgt. et coll.; Dobrá Niva (7580a), on drying oak branches May 22, 1992 (VF); Vtáčnik Mts – Gepniarova dolina valley (7377a-b), June 27-28, 1992 (ČERNÝ, ŠAFANDA, 1997); Veporské vrchy Mts – Vrchdobroč (7483d), pheromone trap July 1, 1992, D. Brutovský lgt. et coll.; Kremnické vrchy Mts – Nature reserve (below only “NR”) Špicatá (7279b), beech branches July 20, 1992 (VF); Kremnické vrchy Mts – Kordíky (7280a), July 19, 1993, J. Šuška lgt., coll. Andrej Kmeť Museum, Martin (later only “AKMM”); Poľana Mts – Žiarec Mt (7382a), beech branches August 14, 1993 (VF); Tribeč Mts – the Hunták brook valley (7674b), May and July 1994 (CUNEV, 1997); Zvolen – Stráže (7480b), pheromone trap May 1, 1997, D. Brutovský lgt. et coll.; Strážovské vrchy Mts – NR Kňazi vrch Mt (7373a), June 2000 (MAJZLAN, FEDOR, 2001); Strážovské vrchy Mts – NR Vápeč (7075d/7076c) knocked down from dying beech branches May 27, 2003 (VF); NR Devínska Kobyla (7867b/7868a), dateless (MAJZLAN, RYCHLÍK, KORBEL, 2005); Muránska planina Mts – NR Hradová (7385b), May 12, 2004, S. Benedikt lgt. et coll.; Muránska planina Mts – NR Poludnica (7286a), July 3, 2005, M. Mantič lgt. et coll.; Muránska planina Mts – NR Malá Stožka (7285d) approx. 1200 m a. s. l., July 31, 2005, S. Benedikt lgt. et coll. (a remarkable record from mountain altitudes!).

Tetratoma desmaresti – a very rare West-Palaearctic (Atlanto-Mediterranean) species, living in a relatively large, but apparently discontinuous range. It occurs sporadically in open deciduous, often pasture forests on the stems of old trees occupied by various bracket fungi. Only two records from Slovakia are accessible:

Zvolen (7480), July 1955, A. Olexa lgt. et coll. (NOHEL, 1975); Zvolen – surroundings, on the stem of old oak, occupied by bark fungi (*Stereum* sp.) October 29, 1994, 4 individuals – below only “ind.” – (VF). Accurate site of this very local species would be risky to publish.

Tetratoma fungorum – a rare West-Palaeartic species living in the Near East as well. It occurs quite sporadically on the stems of older trees occupied by softer-fleshed bracket fungi (often Agaricales). It is noticeable that its appearance and colouration are similar than in the case of erotylid-beetles from the genus *Triplax* Herbst, 1793, despite they are not closely related. It may be showed as a classical example of convergence. Recent records:

Badín (7380b), December 8, 1979, V. Kubinec lgt. et coll.; Starohorské vrchy Mts – NR Baranovo (7280c), on the beech stump infected by *Pholiota* sp. October 6, 1985, 3 ind. and October 26, 1985, 2 ind. (VF); Banská Bystrica – Urpín (7280d), February 5, 1986, V. Kubinec lgt. et coll.; Zvolen – Zálužná (7481a/c), on the broken beech infected by *Pholiota adiposa* October 19, 1986, 2 ind. (VF); Kremnické vrchy – NR Boky (7480a), under the bark of an oak stem February 1, 1992 (VF); Oravská Magura Mts – NR Javorinka (6680d/6780b), on the spruce stem occupied by *Armillaria mellea* October 22, 1992, 2 ind. (VF); Dobrá Niva (7580a), November 12, 1994, V. Kubinec lgt. et coll., and October 12, 1996, M. Kupec lgt., coll. AKMM; Malé Karpaty Mts – Chtelnická dolina valley (7471b), October 28, 1997, Ľ. Jurga lgt., coll. Natural History Museum, Hlohovec (later only “NHMH”); Muránska planina Mts – NR Šance (7286a/b), October 9, 2006, M. Mantič lgt. et coll.; Štiavnické vrchy Mts – Chlm (7578c), on the dying stem of an old beech, infected by *Pleurotus ostreatus* January 10, 2007, 3 ind. (VF); Ostrôžky Mts – Lysec (7682b/d), on older fungi (*Stereum* sp.) under the bark of a solitary oak October 10, 2007, 3 individuals (VF).

Subfamily: Hallomeninae

Mycetoma suturale – a rare West-Palaeartic species also appearing in the Near East, which nevertheless may be surprisingly abundant. It is actual only in specific conditions: well-preserved up to ancient deciduous forests, of course; it is considered to be an ‘Urwaldrelikt’ – ancient forest relict (e. g. KIRBY, DRAKE, 1993). It is highly noticeable due to its ecology, exclusively tied to two similar bracket fungi *Ischnoderma benzoinum*, especially growing on old conifer (mainly fir) timber and *I. resinosum*, highly preferring old beech timber – tropical specialists appear as a rare exception among mycetophagous insects. A relatively large number of post-war records is available, because the occurrence of this species has been examined particularly:

Busov Mts – NR Magura (6693a/b) December 1-4, 1975, 4 ind. J. Jelínek lgt., coll. National Museum Prague; Kremnické vrchy Mts – NR Badínsky prales (7380a/b), on broken fir infected by *I. benzoinum* October 20, 1985, 3→* ind. and October 25, 1989, 3→ ind. together with an extremely rare species *Derodontus macularis* (Fuss, 1850) [Coleoptera: Derodontidae] (VF); Zvolen – Zálužná (7481a/c), on broken beech infected by *I. resinosum* October 19, 1986, 3→ ind. (VF); Poľana Mts – Žiarec (7382a), November 6, 1994, 2→ ind. on *I. resinosum* (VF); Malá Fatra Mts – NR Šrámková (6880b), remains of imago (elytrae) under the bark of an old fir together with *Lacon lepidopterus* (Panzer, 1801) (Coleoptera: Elateridae), May 1999, H. Poláček lgt. et coll.; Kremnické vrchy Mts – NR Boky (7480a), remains of imago (elytrae) under the bark of a beech log May 12, 2002 (VF); Veľká Fatra Mts: Krížna – Ramžiná (7180a/b), October 13, 2001, 4→ ind. on *I. resinosum* (VF); Starohorské vrchy Mts – Baranovo (7280b), October 28, 2001, 3→ ind. on *I. resinosum* (VF); Malá Fatra Mts – Trebostovská dolina valley (6978d), September 23, 1999, M. Wieszik lgt. et coll. and November 2002, H. Poláček lgt. et coll.; Brusno (7282a), June 16, 2005, 1 ind. in Malaise trap, O. Majzlan lgt. et coll.; Banská Bystrica – Urpín (7280d), September 26, 2005, 3→ ind. on *I. resinosum* (VF); Strážovské vrchy Mts – NR Ľutovský Drieňovec (7175d/7275b), June 10, 2006, O. Majzlan lgt. et coll.; Vtáčnik Mts: Gupňa – Háj (7577d), approx. 650 m a. s. l., on the fallen beech stem infected by *I. benzoinum* December 9, 2006, 2 ind. and a lot of remains – elytrae (VF); Štiavnické vrchy Mts – Chlm (7578c), on the dying stem of an old oak, infected by *I. resinosum* January 10, 2007, 2 running individuals during a sunny day! (VF).

Hallomenus axillaris – a very rare Palaeartic species occurring in Near East as well. Nevertheless, its range is obviously discontinuous. This species is little known and may be confused with *H. binotatus* that is apparently larger, having two more-or-less distinct dark spots on the pronotum. It is highly noticeable that records from Slovakia are missing in accessible publications and even in the extensive collection of J. Roubal! Only one concrete record is available:

Cerová vrchovina Mts – Bagóova skala Mt (7785b), in the bracket fungus *Daedalea quercina* growing on the broken oak stem May 24, 1996, 3 ind. (VF).

* 3 individuals were collected, but a lot of ones were registered and left

Hallomenus binotatus – a scarcer Palaearctic species occurring in Near East as well. It occurs sporadically in warmer deciduous (often alluvial) or casually mixed forests, tied to the softer-fleshed bracket fungi. A relatively large number of recent records are available:

Zvolen – old branch of the river Hron (7480b), in the sulphur fungus *Laetiporus sulphureus* growing on an old willow stem July 5, 1980 (VF), this site has been totally destroyed during the second half of 80s (new ward of the Zvolen town); Badín (7380b), under the bark of an old fir July 28, 1981 (VF) and August 21, 1994, V. Kubinec lgt. et coll.; Zvolen – Poštárka (7480a/b), under the bark of an old oak stump May 24, 1992 (VF); Závod – Borová (7467d), June 3, 1992, 3 ind. (MAJZLAN, RYCHLÍK, 1993b); Kremnické vrchy Mts – NR Špicatá (7279b), in the fungus *Hericiium flagellum* on the old fir log July 20, 1992, 4 → ind. (VF); Veľká Fatra Mts – Japeň (7180c/d), September 6, 1994, V. Kubinec lgt. et coll.; Veľká Fatra Mts – Selenecká valley (7080c), July 4, 1996, 2 ind. (VF); Kremnické vrchy Mts – NR Badínsky prales (7380a), 1997, flight window trap, 3 ind. (ZACH, HOLECOVÁ, 1998); NR Čachtický hradný vrch (7272d), June 5, 1999, 4 ind. (MAJZLAN, ŠTEPANOVIČOVÁ, FEDOR, 2000); Podhradie – Sivý kameň (7377b), June 2000 (MAJZLAN, 2004); Strážovské vrchy Mts – Hradištnica valley (7267c), under the bark of an old beech stump June 19, 2002 (VF);

Dateless records: Vtáčnik Mts – Megova valley (7377d/7477b), 80s (CUNEV, 1992); Ivanka pri Dunaji (7869a), Malaise trap (MAJZLAN, 2002); Žiar – Podhradie (7377b), Malaise trap (MAJZLAN, 2002); NR Čenkovská lesostep (8277b) (MAJZLAN, RYCHLÍK, DEVÁN, 1999); Devínska Kobyla – NR Fialková valley (7867b/7868a) (MAJZLAN, RYCHLÍK, KORBEL, 2005).

Subfamily: Eustrophinae

Eustrophus dermestoides – a quite rare West-Palaearctic (prevailing European) species, living in softer-fleshed bracket fungi, almost exclusively *Laetiporus sulphureus* in warmer open woodlands, orchards, alleys, pasture forests, etc. It occurs rather sporadically and only a few records are available:

Bučany (7572c), March 20, 1966, 12 ind., J. Oswald lgt., coll. NHMH; Hronský Beňadik (7677a/c), in the fungus *Laetiporus sulphureus* on an old, solitarily growing cherry tree along a road July 29, 1981 (VF); Krupinská planina Mts – Čabradská dolina valley (7780d), in *L. sulphureus* growing on the stem of an old oak May 30, 1989, 2 ind. (VF); Šahy (7979b), June 4, 1989, J. Šuška lgt., coll. AKMM; Vrbovka (7982a), July 1, 1989, flown towards UV light approximately at 22.30 (VF); Dobrá Niva (7580a), an ancient oak, infected by *L. sulphureus* April 19, 1988, V. Kubinec lgt. et coll., and May 8, 1992 (VF); NR Vereš (7586d), May 17, 1993, 2 → ind., V. Kubinec lgt. et coll.; Nižná Hutka (7394a/c) November 26, 1994, P. Koniar lgt., I. Rychlík coll.; Gemerské Dechtáre (7786a/c), in *L. sulphureus* on a dying solitary oak May 6, 1995, 2 ind. (VF).

CONCLUSIONS

This little known family of heterogeneously defined taxonomic status is mentioned in accessible papers only sporadically. I have tried to increase this data deficiency in this paper. Two of them (*Tetratoma desmaresti* and *Hallomenus axillaris*) obviously rank among utmost rare species because only a few concrete records from Slovakia are accessible. On the other hand, Tetratomidae are mostly living in well-preserved environments having clear potential for biological indication. They deserve more attention of entomologists and conservationists. I would like to emphasize that *Mycetoma suturale* is one of a special position. This relatively easily identifiable species of ancient forests ought to be listed in the list of especially significant insects for the nature conservancy of the European Union.

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Tab. 2. Occurrence of Tetratomidae in separate European countries

Country (region)	Presence of Species							Country (region)	Presence of Species						
	<i>Ta</i>	<i>Td</i>	<i>Tf</i>	<i>Ms</i>	<i>Ed</i>	<i>Ha</i>	<i>Hb</i>		<i>Ta</i>	<i>Td</i>	<i>Tf</i>	<i>Ms</i>	<i>Ed</i>	<i>Ha</i>	<i>Hb</i>
Austria	P	P	P	P	P	P	P	Macedonia	A?	A?	P	A?	P	A?	A?
Belarus	P	A	A	A	P	P	P	Moldova	P	A	A	A	A	P	P
Belgium	P	D	P	A	A	P	P	Netherlands	P	P	P	A	A	P	P
Bosnia + Herzegovina	P	D	A?	P	P	A?	P	Norway	P	A	P	A	A	P	P
Bulgaria	A?	A?	A?	A?	P	A?	A?	Poland	P	A	P	P	P	P	P
Corsica	A	A	P	A	A	P	P	Portuguese	A?	A?	A?	A?	A?	A	A?
Croatia	A?	A	P	P	P	P	A?	Romania	P	A	P	P	P	P	P
Czech republic	P	A?	P	P	P	P	P	Russia Central	P	A	A?	A	A?	P	P
Denmark	P	P	P	A	A	P	P	Russia East	P	A	A?	A	A?	P	P
Estonia	P	A	P	A	P	P	P	Russia North	P	A	A	A	A	P	P
Finland	P	A	P	A	P	P	P	Russia Northwest	P	A	A	A	A	P	P
France	P	P	P	P	P	P	P	Russia South	D	A?	D	A	D	P	P
Germany	P	P	P	P	P	P	P	Sardinia	A	A	P	A	P	A	A
Great Britain	P	P	P	A	A	A	P	Sicily	A	A	P	A	P	A	A
Greece	A?	P	A?	A?	P	A?	A?	Slovakia	P	P	P	P	P	P	P
Hungary	P	P	P	P	P	P	P	Slovenia	P	A	A?	P	P	A?	P
Ireland	P	A	P	A	A	A	P	Spanish	P	P	P	P	P	A	P
Italy	P	P	P	D	P	P	P	Sweden	P	P	P	A	A	P	P
Kaliningrad Region	P	A	A	A	P	P	P	Switzerland	P	A	P	P	P	P	P
Latvia	P	A	P	A	P	P	P	Turkey (European)	A?	A	P	A?	P	A?	A?
Lithuania	P	A	P	A	P	P	A	Ukraine	P	A?	P	P	P	P	P
Luxembourg	A	A	A	A	A	A	P	Yugoslavia	P	A?	P	P	A?	A?	P

Explanations: Abbreviations (*italics*) are the first letters of the species names. A – absent, A? – occurrence has not been documented, but may be expected; D – dubious, P – present. Note: Countries where neither one species of Tetratomidae is living or probable, are not listed in the table.