

DISTRIBUTIONAL CHECKLIST OF LAPPET MOTHS (LEPIDOPTERA: LASIOCAMPIDAE) OF CROATIA

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The first checklist of lappet moths (Lepidoptera: Lasiocampidae) of Croatia, containing 20 species is presented. For each species, a distribution map is given containing literature records and some new records. Only one species, *Cosmotriche lobulina* (Denis & Schiffermüller, 1775), is represented with a single record, and all other species have 3 or more records. No significant increase in the number of species is expected in the future, but the known distribution of almost all species will probably be expanded. For each species, historical and new vernacular names are also presented.

Lasiocampidae, moths, diversity, checklist

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U ovom radu predstavljen je prvi popis kvočki (Lepidoptera: Lasiocampidae) Hrvatske, a u njemu se nalazi 20 vrsta. Za svaku od njih dani su svi dostupni poznati podatci iz literature kao i neki do sada neobjavljeni. Za svaku vrstu izrađena je karta rasprostranjenosti koja sadrži sve podatke iz literature i neke koji do sada nisu objavljeni. Novi podatci svakako će pridonijeti povećanju znanja o rasprostranjenosti većine vrsta. Najrjeđa kvočka u Hrvatskoj jest *Cosmotriche lobulina* (Denis & Schiffermüller, 1775) sa samo jednim nalazom, dok sve ostale vrste imaju 3 ili više nalaza. Za svaku vrstu dana su povijesna kao i nova hrvatska imena.

Lasiocampidae, noćni leptiri, raznolikost, popis

Introduction

Knowledge of the presence and distribution of animal and plant of species is the important for all biological researches. Nowadays, although we have many different professional and amateur books and identification guides that cover dif-

ferent families of Lepidoptera, they can only provide a general distribution view, for example for the area of Europe (Leurat, 2006). Data about regional species distributions are of great importance in the regional protection of endangered or rare species. That is the reason why regional distribution atlases are necessary for each country or region.

During the last 250 years, more than 300 papers were published dealing with the moths and butterflies of Croatia (e.g. Mann, 1857, 1867, 1869; Kranjčev, 1985; Kučinić et al., 1997; Lorković, 2009; Šašić & Mihoci, 2011). They were written in many different languages (including Latin, German, Italian, English, and Croatian) and some of the papers are hard to find. The majority of these papers contain information about one or a few families of butterflies and moths and in most cases deal with only a small or limited part of Croatia (e.g. Mladinov, 1958; Kranjčev, 1985). The only series of papers containing more comprehensive data about the butterflies and moths of Croatia were published by Stauder (1923) but even in this case, only the Adriatic shore and islands were considered. For those and probably many other different reasons, only a few checklists of butterflies and moths of Croatia have been published (Sessidae - Kučinić et al, 1997; Rhopalocera - Šašić & Mihoci, 2011) however, even these have lacked distribution maps. It is the same with the family Lasiocampidae, for which no systematic checklist containing all the published data for Croatia has ever been created.

The cosmopolite family Lasiocampidae comprises 1500 species classified into 150 genera (Leurat, 2006). The members of this family are active during the night, with few exceptions of daytime wandering males during the breeding season (Thompson & Nelson, 2003). The main distribution of this family is in the tropical area, but they live worldwide (Regier et al., 2000). The number of species occurring in Europe is somewhat different depending on the authors; 38 species are known to occur according to Leraut (2006) and 45 according to Karsholt & van Nieukerken (2011).

The goal of this paper is to present the first checklist of Lasiocampidae of Croatia, along with the maps covering their distribution in Croatia. In addition to data from the literature, some newly collected data by the author are also presented.

Materials and Methods

To create the checklist of Lasiocampidae of Croatia all available papers were consulted and a database was created containing all the available literature recor-

ds of this family in Croatia. Each literature record was georeferenced, using ArcGIS software, as precisely as possible, which in turn depended on the precision of the locality description. For some localities from the old literature, it was impossible to determine where they are located, mostly because some older authors used foreign names for Croatian cities and islets, sometimes deriving them from the original Croatian name, but with incorrect spelling (less than 1% of all the collected literature data) (Stauder, 1923). The systematics used here corresponds to that from the Fauna Europaea Website (Karsholt & van Nieukerken, 2011).

During the last few years, lappet moths were collected using light traps across Croatia. Newly collected Lasiocampidae were identified using Leurat (2006). Some material donated by Franjo Perović from his private collection to Ljiljana Ladavac, was also included in this paper. The newly collected species and the above-mentioned donated specimens are now held in the private collection of T. Koren (in Pazin, Croatia).

For each species, all the literature records along with the localities are presented. In addition, a distribution map containing all known records was created for each species (Appendix I). Along with the checklist, a list of all known vernacular names is given (Appendix II).

Results

After consultation of the literature containing records of Lasiocampidae in Croatia collected, 571 records were found, belonging to 20 different species (Tab. 1). For each species, all the references are given in historical order, ranging from the oldest to the newest record. Each reference is marked with a number, which is a species specific, and corresponds to the chronological order of the published papers. The localities are presented in alphabetical order for easier use. Some remarks on the distribution of each species in Croatia are also given.

1. Eriogaster catax (Linnaeus, 1758)

References: Mann, 1857 (1); Vukotinović, 1879 (2); Koča, 1900 (3); Koča, 1901 (4); Abafi-Aigner, 1910 (5); Grund, 1918 (6); Stauder, 1923 (7); Mladinov, 1958 (8); Mladinov, 1976 (9); Kranjčev, 1985 (10)

Localities in Croatia: Drniš (7), Đelekovec (10), Knin (7), Krapina (5, 6), Kupa (9), Papuk (3), Pleternica (4), Rijeka (1, 7), Sigetec (10), Vinkovci (4), Zagreb (2), Zagreb, Tuškanac (8).

New records: Motovun, 31.7.2009, Koren obs, Vela Traba, 15.9.1999, 23.9.2008, leg. Koren & Ladavac.

Remarks: Present in Europe and Asia, from Spain to the Middle East (Leraut, 2006). This species can be considered rare in Croatia, with only two records in the last 20 years. This is the only species of the family Lasiocampidae listed in both Annex II and Annex IV of the EU Habitats Directive (European Commission, 1992). It is also listed in the IUCN Red List, with a Data Deficient status (IUCN, 2011).

2. *Eriogaster lanestris* (Linnaeus, 1758)

References: Vukotinović, 1879 (1); Koča, 1901 (2); Grund, 1918 (3); Mladinov, 1958 (4); Kranjčev, 1985 (5).

Localities in Croatia: Đelekovac (5), Zagreb (1, 3, 4), Karlovac, Skakavac (3), (6), Vinkovci (2).

New records: Vela Traba, 15.3.2008, 15.3.2009, leg. Koren & Ladavac.

Remarks: Distributed in almost all of Europe and Asia (Leraut, 2006). This winter-flying moth was recorded in Croatia only a few times. The lack of monitoring during winter is probably the reason for the low number of records.

3. *Eriogaster rimicola* (Denis & Schiffermüller, 1775)

References: Geiger, 1873 (1), Abafy-Aigner, 1910 (2), Rebel, 1912 (3), Rebel, 1913a (4), Stauder, 1923 (5), Koča, 1925 (6), Mladinov, 1958 (7), Witt, 1987 (8), Hafner, 1994 (9), Habeler, 2003 (10).

Localities in Croatia: Bale (8), Dalmacija (1), Knin (9), Krk, Almweg (10), Krk, Jagdahausen (10), Krk, Jurnadvor (10), Krk, Konobe (10), Krk, Picik (10), Krk, Punat (10), Krk, Stara Baška (10), Krk, Treskavac (10), Krk, Zarimon (10), Matulji (3, 4, 5), Opatija (3, 4, 5), Rijeka (2), Rovinjsko Selo (8), Vinkovci (6), Zagreb (7), Zagreb, Cmrok (7), Zagreb, Tuškanac (7).

Remarks: Eurasian species, missing from southern and eastern Europe (Leraut, 2006). It was recorded in Croatia only a few times and most records originate from the island of Krk (Habeler, 2003). It is known from the Mediterranean and continental parts of the country, with no records from the mountain part.

4. *Lasiocampa quercus* (Linnaeus, 1758)

References: Mann, 1867 (1), Mann, 1869 (2), Vukotinović, 1879 (3), Bohatsch, 1892 (4), Koča, 1900 (5), Koča, 1901 (6), Galvagni, 1909, (7), Abafy-Aigner, 1910 (8), Rebel, 1912 (9), Grund, 1918 (10), Galvagni, 1921 (11), Stauder, 1923 (12), Schwingenschuss & Wagner, 1925-1927 (13), Novak, 1940 (14), Mladinov, 1958 (15), Bartol et al., 1964 (16), Birkett, 1964 (17), Mladinov, 1967 (18), Mladinov, 1978 (19), Kranjčev, 1985 (20), Witt, 1987 (21), Hafner, 1994 (22), Habeler, 2003 (23), Vignjević et al., 2010 (24).

Localities in Croatia: Botovo (20), Brač (12), Braunova Pustara, Borovik (20), Bua (12), Buzet (12), Crna Gora, Dalmacija (2), Crni Jarci (20), Čepelovac (20), Domaji (20), Drniš (12), Đakovo (10), Đelekovec (20), Jegeniš Jezero, Đelekovec (20), Gabajeva Greda (20), Glogovac (20), Gruž (13), Hrvatsko (19), Jospidol (1), Kalnik (20), Klek (10), Knin (12, 22), Kopački Rit (24), Koprivnica (20), Korčula (14), Krapina (8, 10), Krk, Buka (23), Krk, Dobrinj (16), Krk, Hrusta (23), Krk, Jurnadvor (23), Krk, Konobe (23), Krk, Krk (23), Krk, Njivice (23), Kk, Ponikve (16), Krk, Punat (16, 23), Krk, Stara Baška (23), Krk, Šilo (16), Legrad (20), Linski Kanal (12), Lipik (10), Lošinj (12), Lošinj, Tovarić (11), Lošinj, Veli Lošinj (7), Lošinj, Mali Lošinj, Covčania (11), Matulji (9, 12), Medveja (17), Opatija (9, 12), Palacol (7, 12), Papuk (5), Pesek (20), Peskara Rezervat (20), Pleternica (6), Poreč (12), Rab (8, 12), Repaš (20), Rijeka (8, 7, 12), Ris (20), Rovinj (21), Rovinjsko Selo (12), Samobor (10), Sigetec (20), Slavonija (4), Split (12), Šolta (12), Učka, Planik (12), Unije (18), Velebit, Alan (10), Velika (6), Vinkovci (6), Zadar (12), Zagreb (3, 10, 15), Zagreb, Cmrok (15), Zagreb, Kraljičin Zdenac (15), Zagreb, Podsused (10, 15), Zagreb, Sljeme (15).

New records: Pazin, 20.8.1983, leg. Ladavac; Vela Traba, 15.8.2002, 30.7.2008, leg. Koren; Limska Draga, Istra, 20.8.2010, leg. Koren; Vugrovec, Zagreb, 29.3.2008, leg. Koren & Zadavec.

Remarks: This species is distributed from Europe to Altai (Leraut, 2006). Probably the most common species of Lasiocampidae in Croatia, present in the whole of the country, including many islands.

5. *Lasiocampa trifolii* (Denis & Schiffermüller, 1775)

References: Mann, 1857 (1), Mann, 1867 (2), Vukotinić, 1879 (3), Koča, 1900 (4), Koča, 1901 (5), Galvagni, 1909 (6), Abafy-Aigner, 1910 (7), Rebel, 1912 (8), Rebel, 1913a (9), Rebel, 1913b (10), Galvagni, 1916 (11), Grund, 1918 (12), Galvagni, 1921 (13), Stauder, 1923 (14), Schwingenschuss & Wagner, 1925-1927 (15), Hafner, 1930 (16), Mladinov, 1958 (17), Bartol et al., 1964 (18), Mladinov, 1967 (19), Habeler, 1976 (20), Mladinov, 1976 (21), Kranjčev, 1985 (22), Witt, 1987 (23), Hafner, 1994 (24), Habeler, 2003 (25), Saga, 2007 (26),

Localities in Croatia: Botovo (22), Brač (14), Braunova Pustara, Borovik (22), Crna Gora, Kalnik (22), Čelepovac (22), Domaji (22), Đelekovec (22), Jegeniš Jezero, Đelekovec (22), Jospidol (2), Gabajeva Greda (22), Jospidol (1), Kanfanar (14), Karlovac (7, 12), Knin, Strana (24), Koprivnica (22), Kornat (16), Kozjak (11), Krapina (7, 12), Krk, Buka (25), Krk, Kampelje (25), Krk, Punat (25), Krk, Pygraben (25), Krk, Stara Baška (25), Krk, Šilo (18), Krk, Treskavac (25), Kupa (21), Legrad (22), Lošinj, Tovarić (13), Lošinj, Veli Lošinj (6), Male Orjule (11), Matulji (8, 10), Osijek (7, 12), Pag, Velo Blato (26), Papuk (4), Pazin (14), Pesek (22), Peskara Rezervat (22), Požega (5), Pula (14), Raljevac, Knin (24), Repaš (22), Rijeka (1, 6, 7), Rovinj (23), Sigetec (22), Spas, Knin (24), Susak

(6, 14), Unije (19), Vele Orjule (11), Veliki Brijun (10, 14), Veprinac (9), Vinkovci (5), Vis (6, 14), Vransko Jezero (26), Zadar (15), Zagreb (3, 12, 17), Zagreb, Cmrok (17), Zagreb, Podsused (12), Zagreb, Tuškanac (17), Zagreb, Zelengaj (17).

New records: Pazin, 24.8.1984, leg. Ladavac; Vela Traba, 12.8.2002, leg. Koren & Ladavac.

Remarks: Distribution of this species includes almost all of Europe, North Africa and western Asia (Leraut, 2006). Like the previous species, it is one of the most common species in Croatia with the largest number of records. However, some decrease in numbers has been observed in the last few years in central Istria (Koren, pers. obs.).

6. *Macrothylacia rubi* (Linnaeus, 1758)

References: Mann, 1857 (1), Mann, 1867 (2), Vukotinović, 1879 (3), Rebel, 1895 (4), Koča, 1900 (5), Koča, 1901 (6), Abafy-Aigner, 1910 (7), Rebel, 1912 (8), Grund, 1918 (9), Stauder, 1923 (10), Mladinov, 1958 (11), Mladinov, 1976 (12), Cribb 1976 (13), Kranjčev, 1985 (14).

Localities in Croatia: Botovo (14), Braunova Pustara, Borovik (14), Buzet (10), Crni Jarci (14), Domaji (14), Đelekovec (14), Đakovo (9), Gabajeva Greda (14), Josipdol (2), Crna Gora: Kalnik (14), Koprivnica (14), Krapina (7, 9), Kupa (12), Lipik (9), Matulji (7, 10), Papuk (4, 5), Peskara Rezervat (14), Plitvice (8), Požega (6), Ris (14), Repaš (14), Rijeka (1, 6, 10), Slunj, Korana (13), Sigetec (14), Vinkovci (5), Zagreb (3, 9, 11), Zagreb, Cmrok (11), Zagreb, Podsused (9).

New records: Pazin, 21.6.1984, leg. Ladavac; Vela Traba, 21.4.2007, 20.4.2009, leg. Koren & Ladavac.

Remarks: Distributed across Europe and central Asia (Leraut, 2006). This is a common species in northern Croatia, but is missing from Dalmatia and islands. Females of this species are easily attracted to all kinds of public light, while males are usually active during the day.

7. *Malacosoma castrensis* (Linnaeus, 1758)

References: Mann, 1857 (1), Mann, 1867 (2), Vukotinović, 1879 (3), Galvagni, 1909 (4), Stauder, 1923 (5), Rebel, 1924 (6), Habeler, 1976 (7), Hafner, 1994 (8), Saga, 2007 (9).

Localities in Croatia: Čepić Polje (6), Josipdol (2), Knin, Strana (8), Pag, Velo Blato (9), Rijeka (1, 4, 5), Starigrad (7), Zagreb (3).

New records: Vozilići, 24.7.1975, leg. Perović F.; Vela Traba, 16.6.2008; 12.7.2008, leg. Koren & Ladavac.

Remarks: Present in Europe, North Africa and Asia (Leraut, 2006). Only few records exist for Croatia. If present in a particular locality, it is easily detectable, i.e. usually collected using light traps (e.g. Vela Traba). It has not been recorded in the most southern parts of Croatia.

8. *Malacosoma neustria* (Linnaeus, 1758)

References: Mann, 1857 (1), Mann, 1867 (2), Mann, 1869 (3), Vukotinić, 1879 (4), Šloser, 1890 (5), Bohatsch, 1892 (6), Koča, 1900 (7), Koča, 1901 (8), Abafy-Aigner, 1910 (9), Faborsky, 1910 (10), Rebel, 1912 (11), Grund, 1918 (12), Stauder, 1923 (13), Mladinov, 1958 (14), Mladinov, 1976 (15), Kranjčev, 1985 (16), Witt, 1987 (17), Habeler, 2003 (18).

Localities in Croatia: Crna gora, Kalnik (16), Đelekovec (16), Josipdol (2), Kalnik (5), Karlovac (9, 10, 12), Koprivnica (16), Krapina (9, 12), Krk, Stara Baška (18), Kupa (15), Lipik (12), Matulji (11, 13), Middle Dalmatia (3), Papuk (7), Repaš (14), Rijeka (1, 9, 13), Rovinj (17), Samobor (12), Senjska Cesta, Karlovac (10), Slavonija (6), Vinkovci (8), Zagreb (4, 12, 14), Zagreb, Cmrok (14), Zagreb, Podsused (12, 14), Zagreb, Sava (14).

New records: Brestovik, Žumberak, 26.6.2010, leg. Ladavac.

Remarks: Palearctic species (Leraut, 2006). No records from Dalmatia exist in the literature. The only island record originates from Krk (Habeler, 2003).

9. *Malacosoma franconica* (Esper, 1784)

References: Witt, 1987 (1), Habeler, 2003 (2),

Localities in Croatia: Krk, Almweg (2), Krk, Čičići (2), Krk, Grashalm (2), Krk, Krk (2), Krk, Konobe (2), Krk, Krk, Paradiestal (2), Krk, Punat (2), Krk, Treskavac (Malmašuta) (2), Rovinj (1).

New records: Vela Traba, 20.6.2002, leg. Koren & Ladavac; Plovanija, Istra, 8.6.2011, leg. Koren, Sveta Marija na Krasu, Istra, 4.6.2011, leg. Koren.

Remarks: This species is locally distributed in Europe and Asia. According to Leraut (2006) it is considered to be local and rare. Only few records are known from Croatia, two from the Istrian peninsula and a few from the island Krk.

10. *Cosmotriche lobulina* (Denis & Schiffermüller, 1775)

References: Mladinov, 1971 (1).

Localities in Croatia: Risnjak, Biješe Vodice (1).

Remarks: This species is distributed in Europe and western Asia (Leraut, 2006). Only a single record exists from Croatia.

11. *Dendrolimus pini* (Linnaeus, 1758)

References: Šloser, 1890 (1), Koča, 1900 (2), Koča, 1901 (3), Galvagni, 1909 (4), Grund, 1918 (5), Stauder, 1923 (6), Schwingenschuss & Wagner, 1925-1927 (7), Neustetter, 1956 (8), Mladinov, 1958 (9), Bartol et al, 1964 (10), Burgermeister, 1964 (11), Mladinov, 1965 (12), Habeler, 1976 (13), Mladinov, 1978 (14), Kranjčev, 1985 (15), Witt, 1987 (16), Hafner, 1994 (17), Habeler, 2003 (18), Koren & Bjelić, 2010 (19).

Localities in Croatia: Braunova Pustara, Borovik (15), Dubrovnik (11), Dugi Otok, Božava (13), Gruž (7), Hvar (4, 6), Kalnik (1), Knin (17), Korčula (8), Krk, Buka (18), Krk, Hrasta (18), Krk, Konobe (18), Krk, Krk (18), Krk, Punat (10, 18), Krk, Pyrigraben (18), Krk, Treskavac (18), Legrad (15), Osilnica (14), Pag, Stara Novalja (12), Peskara Rezervat (15), Repaš (15), Rovinj (16), Starigrad (13), Tijesno (13), Velika (2, 3), Zadar (4, 6), Zagreb (5, 9), Zagreb, Ilica (9), Žut, Pristanišće (19).

New records: Lumbarda, 21.7.1976, leg. Ladavac Lj., Vozilići, 21.7.1975, leg. Perović F.

Remarks: Present in Europe and North Africa (Leraut, 2006). This species is sporadically present in the whole country, but is certainly more common in the Mediterranean area.

12. *Euthrix potatoria* (Linnaeus, 1758)

References: Mladinov, 1952 (1), Kranjčev, 1985 (1), Vignjević et al, 2010 (2).

Localities in Croatia: Botovo (2), Braunova Pustara (2), Crna gora, Kalnik (2), Crni Jarci (2), Čepelovac (2), Domaji (2), Đelekovec (2), Đelekovec, Jegeniš Jezero (2), Gabajeva Greda (2), Glogovac (2), Kopački Rit (3), Koprivnica (2), Legrad (2), Pesek (2), Repaš (2), Ris (2), Sigetec (2), Zagreb (1).

New records: Grdanjci, 15.8.2009, leg. Koren; Pregrada, 9.7.2011, leg. Koren.

Remarks: Present from Europe to Japan (Leraut, 2006). Only few records are known for Croatia, originating from the northern continental and Pannonian region.

13. *Gastropacha populifolia* (Denis & Schiffermüller, 1775)

References: Grund, 1918 (1), Mladinov, 1958 (2), Kranjčev, 1985 (3), Habeler, 2003 (4), Vignjević et al, 2010 (5)

Localities in Croatia: Kopački Rit (5), Koprivnica (3), Krk, Baška (4), Legrad (3), Repaš (3), Zagreb (1, 2).

Remarks: This species is present in most parts of Europe and Asia, but missing from the northern parts (Leraut, 2006). Five records are known from Croatia, four originating from the northern part of the country and a single record originating from the island of Krk (Habeler, 2003).

14. *Gastropacha quercifolia* (Linnaeus, 1758)

References: Mann, 1857 (1), Mann, 1867 (2), Mann, 1869 (3), Vukotinović, 1879 (4), Bohatsch, 1892 (5), Koča, 1900 (6), Koča, 1901 (7), Galvagni, 1909 (8), Abafy-Aigner, 1910 (9), Rebel, 1912 (10), Rebel, 1913a (11), Rebel, 1913b (12), Grund, 1918 (13), Schawerda, 1920 (14), Galvagni, 1921 (15), Schawerda, 1921 (16), Stauder, 1923 (17), Schwingenschuss & Wagner, 1925-1927 (18), Hafner, 1930 (19), Novak, 1940 (20), Neustetter, 1956 (21), Mladinov, 1958 (22), Bartol et al, 1964 (23), Mladinov, 1965 (24),

Mladinov, 1967 (25), Habeler, 1976 (26), Mladinov, 1978 (27), Kranjčev, 1985 (28), Witt, 1987 (29), Hafner, 1994 (30), Habeler, 2003 (31), Vignjević et al, 2010 (32)

Localities in Croatia: Brač (16), Crna gora, Kalnik (28), Crni Jarci (28), Čepelovac (28), Domaji (28), Draga (13), Dugi Otok, Sali (19), Đelekovec (28), Jegeniš Jezero (28), Gabajeva Greda (28), Hvar (20), Josipdol (2), Knin, Strana (30), Koludarc, near Lošinj (15), Kopački Rit (32), Koprivnica (28), Korčula (21), Krk, Almweg (31), Krk, Čižići (31), Krk, Hrusta (31), Krk, Konobe (31), Krk, Punat (23, 31), Legrad (28), Lošinj (17), Lošinj, Veli Lošinj (8), Lovran (14), Matulji (10, 11, 17), Osilnica (27), Pag, Caska (24), Papuk (6), Pesek (28), Peskara Rezervat (28), Pleternica (7), Pula (8, 17), Rab (8, 9, 17), Repaš (28), Rijeka (1, 9, 17), Ris (28), Rovinj (29), Sigetec (28), Slavonija (5), Split (20), Middle Dalmacija (3), Starigrad (26), Tijesno (26), Unije (25), Veli Brijun (12, 17), Vinkovci (7), Zadar (18), Zagreb (4, 13, 22), Zagreb, Cmrok (22), Zagreb, Podsused (13, 22), Zagreb, Tuškanac (22).

New records: Vozilići, 26.7.1975, leg. Perović F., Vela Traba, 27.6.2008, 21.7.2009, leg. Koren; Pazin, 21.7.2009, leg. Koren; Troglav, Planinarski Dom Jakov Bitelić, 25.7.2011, leg. Koren.

Remarks: Present in almost all of Europe and Asia (Leraut, 2006). Due to the numerous records from all parts of the country, this species can be considered common in Croatia.

15. *Odonestis pruni* (Linnaeus, 1758)

References: Mann, 1857 (1), Mann, 1869 (2), Vukotinović, 1879 (3), Bohatsch, 1892 (4), Koča, 1901 (5), Galvagni, 1909 (6), Abafy-Aigner, 1910 (7), Faborsky, 1910 (8), Rebel, 1912 (9), Rebel, 1913a (10), Rebel, 1913b (11), Grund, 1918 (12), Stauder, 1923 (13), Mladinov, 1958 (14), New, 1966 (15), Kranjčev, 1985 (16), Witt, 1987 (17), Hafner, 1994 (18), Habeler, 2003 (19), Vignjević et al, 2010 (20).

Localities in Croatia: Botovo (16), Braunova Pustara, Borovik (16), Brijuni (13), Crna gora, Kalnik (16), Crni Jarci (16), Čepelovac (16), Domaji (16), Đelekovec (16), Jegeniš Jezero (16), Filip (6), Gabajeva Greda (16), Glogovac (16), Kastav (13), Kastun (6), Knin (18), Kopački Rit (20), Koprivnica (16), Krapina (7, 12), Krk, Almweg (19), Krk, Čižići (19), Krk, Kampelje (19), Krk, Konobe (19), Krk, Paradiestal (19), Krk, Punat (19), Krk, Punat (19), Krk, Pyrigraben (19), Krk, Treskavac (Malmašuta) (19), Legrad (16), Lipik (12), Matulji (9, 10, 13), Middle Dalmatia (2), Opatija (13), Osijek (7, 12), Pesek (16), Repaš (16), Rijeka (1, 7, 12), Ris (16), Rovinj (17), Samobor (12), Senjska Cesta, Karlovac (8), Sigetec (16), Slavonija (4), Split (15), Varaždinske Toplice (8), Veliki Brijun (11), Vinkovci (5), Zagreb (3, 12, 14), Zagreb, Cmrok (14), Zagreb, Podsused (12), Zagreb, Tuškanac (14).

New records: Vela Traba, 15.8.2002, 11.9.2008, 21.5.2009, leg. Koren.

Remarks: Present in Europe and Asia (Leraut, 2006). This species is missing from the south of Croatia, common elsewhere.

16. *Phyllodesma tremulifolia* (Hübner, 1810)

References: Vukotinović, 1879 (1), Bohatsch, 1892 (2), Abafy-Aigner, 1910 (3), Rebel, 1912 (4), Rebel, 1913a (5), Grund, 1918 (6), Stauder, 1923 (7), Koča, 1925 (8), Schwingenschuss & Wagner, 1925-1927 (9), Mladinov, 1958 (10), Burgermeister, 1964 (11), Mladinov, 1978 (12), Kranjčev, 1985 (13), Hafner, 1994 (14), Habeler, 2003 (15).

Localities in Croatia: Đelekovec (13), Gabajeva Greda (13), Gruž (9), Josipovac (6), Knin (14), Koprivnica (13), Krapina (3, 6), Krk, Almweg (15), Krk, Jagdahausen (15), Krk, Konobe (15), Krk, Punat (15), Krk, Pyrigaben (15), Krk, Skrbčići (15), Krk, Stara Baška (15), Krk, Zarimon (15), Legrad (13), Lipik (6), Matulji (5, 7), Mlini (11), Opatija (7), Osilnica (12), Požega (6), Slavonija (2), Trnjani (8), Zagreb (1, 10), Zagreb, Cmrok (10), Zagreb, Jurjevska ulica (6).

New records: Blato, Neretva, 24.5.2011, leg. Koren, Cres, Beli, 25.5.2011, Kaštel Žegarski, 1.5.2010, Vugrovec, Zagreb, 24.5.2009.

Remarks: Distributed from Europe to Armenia (Leraut, 2006). Sporadically present in Croatia, but locally. It is usually one of the first moths to be attracted to light traps early in the evening.

17. *Phyllodesma ilicifolia* (Linnaeus, 1758)

References: Piller & Mitterbacher, 1783 (1), Vukotinović, 1879 (2), Mladinov, 1958 (3).

Localities in Croatia: Požega (1), Zagreb (2, 3).

Remarks: This species is present in Europe and Asia, but missing from the Mediterranean Basin (Leraut, 2006). Records exist only from the northern parts of Croatia, but no records were published during the last 50 years. With more intensive surveys it may be recorded in the future.

18. *Pachypasa otus* (Drury 1773)

References: Mann, 1869 (1), Galvagni, 1909 (2), Abafy-Aigner, 1910 (3), Rebel, 1912 (4), Grund, 1918 (5), Schawerda, 1921 (6), Stauder, 1923 (7), Schwingenschuss & Wagner, 1925-1927 (8), Bartol et al, 1964 (9), Burgermeister, 1964 (10), Witt, 1987 (11), Hafner, 1994 (12), Habeler, 2003 (13).

Localities in Croatia: Bibinje (Bibigno) (2, 7), Brač (6), Cale (2, 7), Dubrovnik (2, 7, 10), Gruž (8), Jablanac (5), Middle Dalmatia (1), Knin (12), Krk, Punat (9, 13), Lovran (11), Matulji (4, 7), Rijeka (3, 5, 7), Srdelaz (2), Sukošan (2, 7), Zadar (7, 8).

Remarks: This species is distributed only in the costal areas, ranging from Sicily, southern Italy, the Balkans, to Iraq and Iran (Leraut, 2006). This is a rare species in Croatia.

19. *Poecilocampa populi* (Linnaeus, 1758)

References: Mann, 1857 (1), Mann, 1867 (2), Vukotinović, 1879 (3), Koča, 1901 (4), Rebel, 1912 (5), Grund, 1918 (6), Stauder, 1923 (7), Mladinov, 1958 (8), Kranjčev, 1985 (9), Vignjević et al, 2010 (10).

Localities in Croatia: Crni Jarci (9), Đelekovec (9), Josipdol (2), Kopački Rit (10), Matulji (5, 7), Repaš (9), Rijeka (1, 6), Ris (9), Sigetec (9), Vinkovci (4), Zagreb (3, 8), Zagreb, Botanički vrt (6), Zagreb, Cmrok (6, 8), Zagreb, Tuškanac (6, 8).

New records: Vela Traba, 23.3.2007, 23.9.2007, 25.10.2008, leg. Koren.

Remarks: Eurasian species (Leraut, 2006). It is sporadically present in Croatia, but missing in most parts of Dalmatia.

20. *Trichiura crataegi* (Linnaeus, 1758)

References: Mann, 1867 (1), Vukotinović, 1879 (2), Koča, 1901 (3), Rebel 1913a (4), Grund, 1918 (5), Stauder, 1923 (6), Kranjčev, 1985 (7), Witt, 1987 (8), Waring & Thomas, 1989 (9).

Localities in Croatia: Đelekovec (7), Josipdol (1), Josipovac (5), Matulji (4, 6), Mljet (9), Rovinj (8), Vinkovci (3), Zagreb (2).

New records: Vela Traba, 5.10.2008, 11.11.2008, leg. Koren.

Remarks: Distributed in Europe and Turkey (Leraut, 2006). This species is relatively common in northern Croatia. Only a single record from Mljet island (Waring & Thomas, 1989) is known from Dalmatia.

Discussion

Data on distribution and number of species of lappet moths in Croatia presented above are generally in accordance with data presented within the recent identification key (Leraut, 2006). One additional species, *Lasiocampa eversmanni* (Eversmann, 1843) was listed by Mladinov (1958) for the Zagreb area. *L. eversmanni* is distributed from the Black Sea coast in the Balkans, to the south of Altai and Afghanistan (Leraut, 2006). The record from Zagreb does not fit in the distribution area, and it probably represents a misidentified or mislabeled specimen, thus was not included in this overview.

On the map of Croatia that contains all the available records (Fig. 1), it can be seen that some parts of the country do not have any records at all. This is especially true of the middle part of Slavonia (Northern region of Croatia) and Dalmatia (especially the southeastern part). Slavonia has never been systematically surveyed and Koča (1900, 1901) was the only systematic moth collector. The mountain area (i.e. Lika and Gorski kotar regions) of Croatia has also not been sufficiently surveyed, so the records are very scarce.

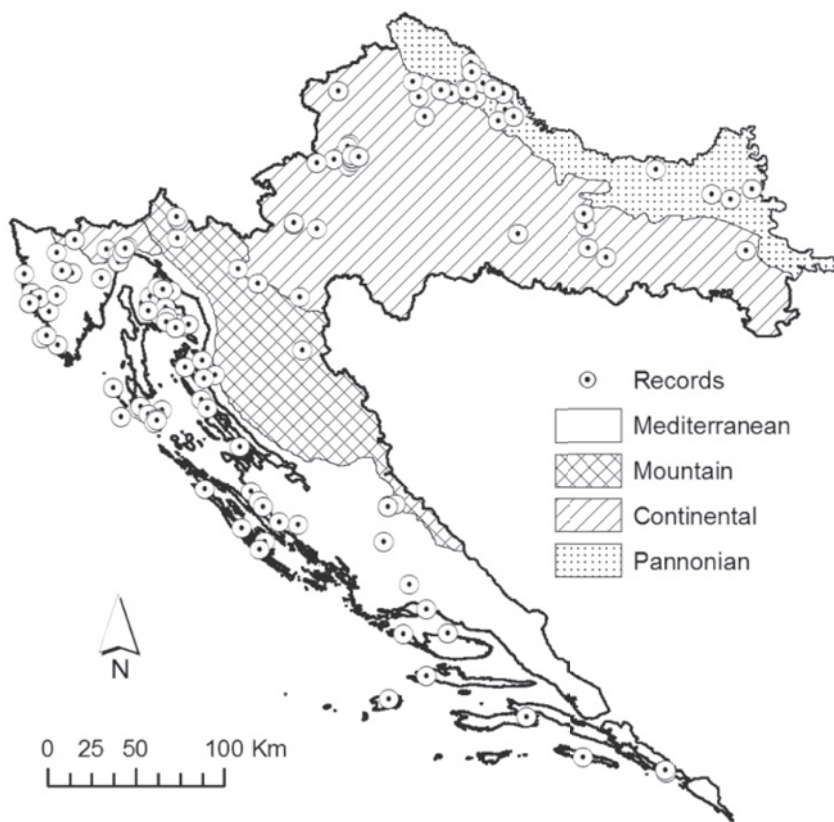


Figure 1. Records of all species belonging to the family Lasiocampidae from Croatia in different biogeographical regions (State Institute for Nature Protection, 2011).

A total of 571 records of the lappet moths of Croatia exist in the published literature and the new data represented here. These records are unevenly distributed among species (Fig. 2). The species with the highest number of records are: *L. quercus*, *G. quercifolia* and *O. pruni*, *L. trifolii*, *G. quercifolia* and *O. pruni* (Fig. 2). Most species (19) have more than 3 records, while only one species, *Cosmotriche lobulina* (Denis & Schiffermüller, 1775) is represented in Croatia with just a single record.

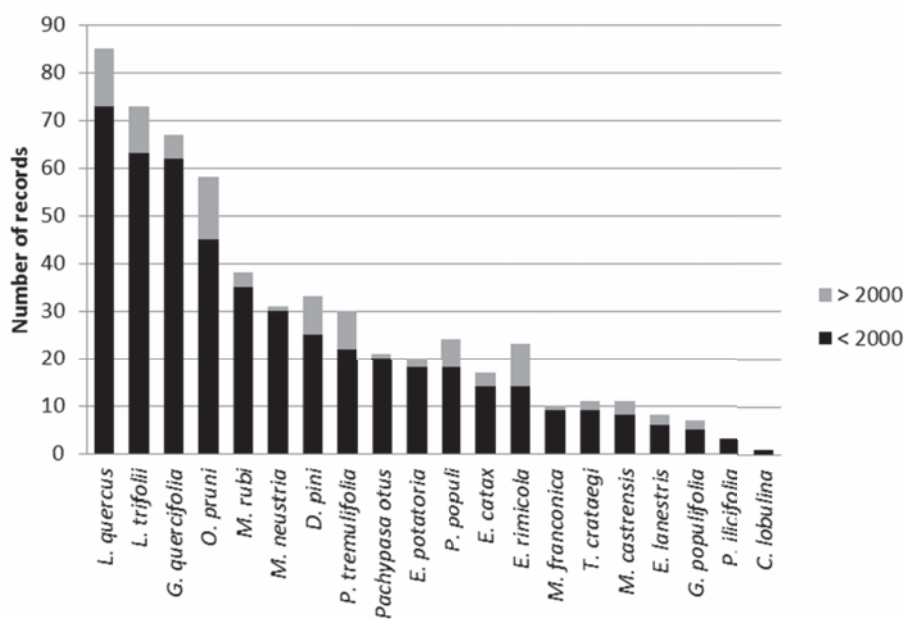


Figure 2. Number of records for each lappet moth species present in Croatia.

The latter is the only mountain lappet moth species present in Croatia (Mladinov, 1971), and further research is needed to gain a better insight into the distribution, biology and the conservation status of this species. While the distribution seems almost well known for some species (e.g. *L. quercus*, *L. trifolii*), for most species, the known distribution is far from complete. Aside from *C. lobulina*, some especially rare species in Croatia are: *E. lanestris*, *M. franconica*, *E. potatoria*, *G. populifolia*, *P. ilicifolia* and *P. otus*. Special attention should be devoted to the search for potential new locations of these species in Croatia.

The largest number of species is present in the Continental region (17), followed by the Mediterranean region (16), Pannonian region (14) and Mountain region (12) (Tab. 1). Most species have a wider distribution and are present in 3 or 4 different geographic regions (12 species). On the other hand, 3 species are present in only two regions, while 4 species occur in a single region (*M. franconica* and *P. otus* in the Mediterranean region, *C. lobulina* in the continental region and *P. ilicifolia* in the Continental region). Most historical and recent surveys target

the Mediterranean (e.g. Stauder, 1923, Schwingenschuss & Wagner, 1925-1927) and the continental (e.g. Vukotinić, 1879) part of the country, while the studies of the Mountain region still remain very scarce (Mladinov, 1971; 1976; 1978), which is probably the reason for this region's having the lowest number of species records. If we compare the richness of other groups, for example butterflies, in the Mountain region there are the two largest recorded butterfly hotspots, the Kupa river valley (Lorković & Mladinov, 1971) and the Velebit Mountain (Mihoć et al., 2007). This indicates that the richness of moths should be quite high, and further surveys are needed.

Table 1. Presence of lappet moths in four different biogeographic regions of Croatia.

Species	Region			
	Mediterranean	Mountain	Continental	Pannonian
<i>Eriogaster catax</i>	X	X	X	X
<i>Eriogaster lanestris</i>	X		X	X
<i>Eriogaster rimicola</i>	X		X	
<i>Lasiocampa quercus</i>	X	X	X	X
<i>Lasiocampa trifolii</i>	X	X	X	X
<i>Macrothylacia rubi</i>	X	X	X	X
<i>Malacosoma castrensis</i>	X	X	X	
<i>Malacosoma neustria</i>	X	X	X	X
<i>Malacosoma franconica</i>	X			
<i>Cosmotriche lobulina</i>		X		
<i>Dendrolimus pini</i>	X	X	X	X
<i>Euthrix potatoria</i>			X	X
<i>Gastropacha populifolia</i>			X	X
<i>Gastropacha quercifolia</i>	X	X	X	X
<i>Odonestis pruni</i>	X		X	X
<i>Phyllodesma tremulifolia</i>	X	X	X	X
<i>Phyllodesma ilicifolia</i>			X	
<i>Pachypasa otus</i>	X			
<i>Poecilocampa populi</i>	X	X	X	X
<i>Trichiura crataegi</i>	X	X	X	X
Total:	16	12	17	14

The only protected species of lappet moth, *Eriogaster catax* (European Commission, 1992; IUCN, 2011), was recorded only at two localities in recent years, both in Istria. Nevertheless, the great gaps in the data make the proper assessment of this species' status very difficult. The only recent records originate from Istria (Motovun and Vela Traba) and are the result of intensive moth collecting (T. Koren, unpublished data). Preliminary monitoring activities for this species will be established during the year 2012 in Istria (Koren, pers. comm.); and it is possible that it will be recorded also in many other localities.

Vernacular names

Some vernacular names for lappet moths are present in the old literature (Vukotinović, 1879; Šloser, 1890), which is an indication that such names were once important and in use. Even in some recent textbooks (e.g. Matoničkin et al, 1999) some vernacular names are used. For 14 species vernacular names were presented in the literature, but they are not all within the present spirit of the language (for example, *Odonestis pruni* (Linnaeus, 1758) was named "riborep" by Vukotinović (1879)). For such species, old names are also present, but a more modern version of the name is suggested for use. For 6 species, new names were created. The new names consist of two words, one of which is "kvočka" meaning lappet moth, while the second word is descriptive, and refers to their geographical distribution, author, size, morphological feature or larval host plant (following the principle used by Šašić & Mihoci (2011) with butterfly names). For example, due to its size and to its being the largest member of the Lasiocampidae in Europe, a new name was assigned to *Pachypasa otus* (Drury 1773) – velika kvočka, meaning large lappet moth. Additional problem regarding names is the use of the same name "prelci" for the members of two families: Saturniidae and Lasiocampidae (e.g. *Dendrolimus pini* (Linnaeus, 1758) named "prelac bora" by Šloser, 1890). The older and more commonly used name for the family Lasiocampidae is "kvočke", so I suggest that in the future this particular name is exclusively used for the members of the family Lasiocampidae and "prelci" for the members of the family Saturniidae. Accordingly, some vernacular names, like that for *D. pini* "borov prelac", should be changed into "borova kvočka", one of the commonly used names. Both literature and new vernacular names are given in Appendix II, so that both can be used in the future, depending on the user. This list should be subjected to further discussion and improvement; however, it gives a first overview of historical and suggested new vernacular names for lappet moths in Croatian.

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Appendix I. Distribution maps of the lappet moths (Lasiocampidae) of Croatia (biogeographic regions are presented following State Institute for Nature Protection (2011)).



Figure 1. Distribution of *Eriogaster catax* (Linnaeus, 1758)



Figure 2. Distribution of *Eriogaster lanestrís* (Linnaeus, 1758)



Figure 3. Distribution of *Eriogaster rimicola* (Denis & Schifferrmüller, 1775)



Figure 4. Distribution of *Lasiocampa quercus* (Linnaeus, 1758)



Figure 5. Distribution of *Lasiocampa trifolii* (Denis & Schiffermüller, 1775)



Figure 6. Distribution of *Macrothylacia rubi* (Linnaeus, 1758)



Figure 7. Distribution of *Malacosoma castrensis* (Linnaeus, 1758)



Figure 8. Distribution of *Malacosoma neustria* (Linnaeus, 1758)



Figure 9. Distribution of *Malacosoma franconica* (Esper, 1784)



Figure 10. Distribution of *Cosmotriche lobulina* (Denis & Schiffermüller, 1775)

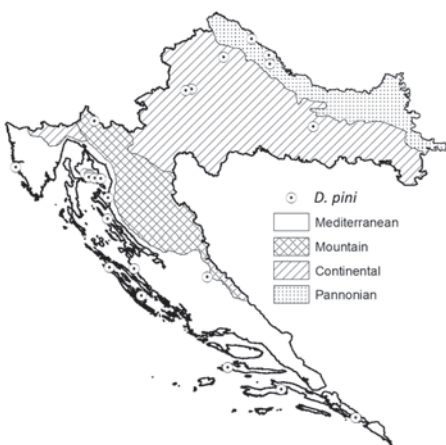


Figure 11. Distribution of *Dendrolimus pini* (Linnaeus, 1758)



Figure 12. Distribution of *Euthrix potatoria* (Linnaeus, 1758)



Figure 13. Distribution of *Gastropacha populifolia* (Denis & Schiffermüller, 1775)



Figure 14. Distribution of *Gastropacha quercifolia* (Linnaeus, 1758)



Figure 15. Distribution of *Odonestis pruni* (Linnaeus, 1758)

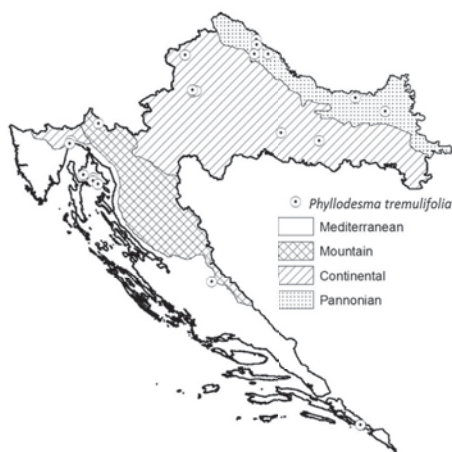


Figure 16. Distribution of *Phylodesma tremulifolia* (Hübner, 1810)



Figure 17. Distribution of *Phylodesma ilicifolia* (Linnaeus, 1758)



Figure 18. Distribution of *Pachypasa otus* (Drury, 1773)

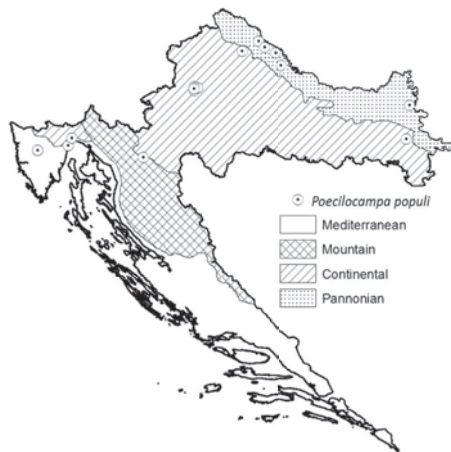


Figure 19. Distribution of *Poecilocampa populi* (Linnaeus, 1758)



Figure 20. Distribution of *Trichiura crataegi* (Linnaeus, 1758)

Appendix II. Systematic list of Lasiocampidae of Croatia with Croatian vernacular names.

	Lasiocampidae	Known vernacular names	Suggested vernacular names
	Lasiocampinae		
1.	<i>Eriogaster catax</i> (Linnaeus, 1758)	hromar, kataks	kataks kvočka
2.	<i>Eriogaster lanestris</i> (Linnaeus, 1758)	runar	brezova kvočka
3.	<i>Eriogaster rimicola</i> (Denis & Schiffermüller, 1775)	/	jesenska kvočka
4.	<i>Lasiocampa quercus</i> (Linnaeus, 1758)	briestar	hrastova kvočka
5.	<i>Lasiocampa trifolii</i> (Denis & Schiffermüller, 1775)	livadar	djetelinina kvočka
6.	<i>Macrothylacia rubi</i> (Linnaeus, 1758)	kupinar	kupinina kvočka
	Malacosominae		
7.	<i>Malacosoma castrensis</i> (Linnaeus, 1758)	taboraš	mlječikina kvočka
8.	<i>Malacosoma neustria</i> (Linnaeus, 1758)	klimar, prelac prstenjak, kukavičji suznik	kukavičja kvočka
9.	<i>Malacosoma franconica</i> (Esper, 1784)	/	frankonska kvočka
	Pinarinae:		
10.	<i>Cosmotriche lobulina</i> (Denis & Schiffermüller, 1775)	/	kvočka četinjača
11.	<i>Dendrolinus pini</i> (Linnaeus, 1758)	prelac bora, borov prelac, borova kvočka	borova kvočka
12.	<i>Euthrix potatoria</i> (Linnaeus, 1758)	/	travnička kvočka
13.	<i>Gastropacha populifolia</i> (Denis & Schiffermüller, 1775)	/	trepetljikolistar
14.	<i>Gastropacha quercifolia</i> (Linnaeus, 1758)	hrastolistar	hrastolistar
15.	<i>Odonestis pruni</i> (Linnaeus, 1758)	Riborep	šljivina kvočka
16.	<i>Phyllodesma tremulifolia</i> (Hübner, 1810)	jasenar	jasenova kvočka
17.	<i>Phyllodesma ilicifolia</i> (Linnaeus, 1758)	oskorušar	oskoruškina kvočka
18.	<i>Pachypasa otus</i> (Drury, 1773)	/	velika kvočka
	Poecilocampinae		
19.	<i>Poecilocampa populi</i> (Linnaeus, 1758)	jabučar	topolina kvočka
20.	<i>Trichiura crataegi</i> (Linnaeus, 1758)	gložar	glogova kvočka