CONTRIBUTIONS TO THE KNOWLEDGE OF THE RARE OR LOCALIZED SPECIES DISTRIBUTION FROM THE *CARABUS* GENRE IN ROMANIA

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Abstract: *In Romania several species of the genre Carabus are considered rare or localized. Using old references which are confronted with recent observations this paper work sets the researches history for the rare or geographically localised species inciting to the new checks in the field to achieve the targeted species management programs. Their distribution rests partially on ancient data not systematically confirmed by recent collections. The notion of rarity can also result from an insufficiency of entomological prospecting. These must be encouraged by the recent results having allowed the discovery of new species (example of Carabus (Pachystus) cavernosus Frivaldsky, 1837 in Rimetea, by Kutasi 2000) or of new stations Carabus (Tomocarabus) marginalis Fabricius, 1794 in Cefa by Dehelean et al. 2012, Carabus (Morphocarabus) scheidleri zawadskii seriatissimus Reitter, 1896 by Barloy et al. 2010. Among the rare or localized species represent species: doubtless relicts, such Carabus (Pachystus) cavernosus Frivaldsky, 1837, (single station Rimetea), Carabus (Tomocarabus) marginalis Fabricius, 1794, (two confirmed sites); of refuge zones in mountainous regions Carabus (Megodontus) planicollis* Kuster*, 1827, (endemic of the Romanian Carpathians); Carabus (Platycarabus) fabricii malachiticus C.G.Thomson, 1875, from Rodnei and Calimani Mountains, at high height; occupant of the reduced zones: Carabus (Pachystus) hungaricus Fabricius, 1792, (a single confirmed station), Carabus (Morphocarabus) rothi alutensis Sãvulescu, 1972, endemic Romania occupying a bounded area (National Park Cozia, Calimanesti, Ramnicu Valcea), Carabus (Procerus) gigas Creutzer, 1799 (species has a diffuse distribution in Banat); being situated on the verge of the area of distribution of the species Carabus (Mesocarabus) problematicus holdhausi Born, 1911 (several mountain summits) Carabus (Trachycarabus) besseri Fischer, 1822 (sporadic in romanian Moldavia). The joined study makes an assessment of knowledge on their localization distinguishing the ancient references of the recent confirmations. The ancient data can seem outdated but being established by renowned entomologists, they incite to new researches in quoted stations (for example, the rediscovered of Carabus (Tomocarabus) marginalis Fabricius, 1794, by Mathé 2000 in Varghis Valley stations, previously reported by Deubel).*

Key words: *carabus, problematicus, marginalis, planicollis, cavernosus, gigas, rothi alutensis fabricii malachiticus, marginalis, hungaricus, besseri, distribution, habitats, inventory mapping.*

INTRODUCTION

This paper aims to draw attention on the *Carabus* species vulnerable, rare or which requiring attention from competent organisations due to: either the small distribution area, either the endemic character, either the negative direction of the populations development status in Europe. Current species protection programs in Romania are generally adapted to European programs like Natura 2000, IUCN Red List etc., which are mainly interested in species of European Community interest and less on the regional or national interest, whose status is not always known.

MATERIAL AND METHODS

We conducted a data inventory of distribution for the rare or localized species on the

base of existing literature till the present, recent verifications of these data respectively, field observations of the authors.

RESULTS AND DISCUSSIONS

1. *Carabus (Mesocarabus) problematicus holdhausi* Born 1911.

Species briefly described by Born after the specimens from Mount Hăşmaş and provided by Holdhaus and Deubel. The southern limit of the type species *C. (Mesocarabus) problematicus problematicus* Herbst 1786 is situated:

- for Hungary in the NW until Lake Balaton (RETEZAR 1997)
- for the Czech Republic in Bohemia and Moravia (TARKAC 2005).

Beyond to the east can be found the taxon *holdhausi*, located in the mountains, often at altitude:

-Hongrie :

- Monts Bukk (939 m) (RETEZAR 1997, SZEL 1996)

-Romania :

- Monts Fagaras- Negoi (PANIN 1955)
- Monts Hasmas : many authors whose HOLDAUS et *al*., CSIKI 1946. Prairie with *Festuca ovina* on the skeletal soil 1600-1700 m. (MATHÉ 2007) ; Piatra Singuratica, Hăşmaşu Mare 1608 m. , under stones (BARLOY et *al*. 2008).
- Top Gombas (BC) 1198 m. (M. Ciucului) HMNH Budapest.
- Piatra Craiului (AG) 1900 under stones HOLDAUS et *al*. (1910).
- Ceahlău (NT) subalpine and alpine zone (1700-1900 m), HOLDHAUS et *al*. (1910)
- Bucegi (BV) PANIN 1955, LIE (1966) capture in numbers nombre Cota 1500 (Tourist Hotel) in the forest (*Picea excelsa*) under stones in meadow unto the Vârful cu Dor (2006 m) and Piatra Arsă (2007 m).
- Mont Retezat (HD) Holdhaus et *al.* (1910) Csiki (PANIN 1955) HMHM Budapest. From 1700 m. under *Pinus mugo*.
- Dobrogea (TL) Mount Greci 456 m. the northernmost Romanian localization Biodiversitatea Dobrogei 2007; SKOLKA 2007.

Republic of Moldova: not cited by NECULISEANU et *al.* (2000).

Romania seems to be the northernmost region of Europe where this species remains (relict species). The fragmentation of this distribution area and the location in the mountainous area raises two major questions:

- causes and anteriority of this residual localisation in the refuges zones,
- genetic links with the type species, after isolation, with no doubt old.

2. *Carabus (Tomocarabus) marginalis* Fabricius 1794.

Probably relict of "Ice Age" (ARNDT 1989), this species disappeared from Germany, rare or in sharp regression in Poland, is found in some localities in Ukraine, Russia, Belarus. This location is based on data often old.

- Hungary: presence in some localities, west of the Danube and with a vertical distribution, in the zone of the Lake Balaton (Names of locations Retezar 1997; LIE and MATHÉ 2000).
- Republic of Moldova: one station in Codrii Reserve (NECULISEANU et *al.* 2000).
- Romania: Several old data: Răstolniţa (BIRTHLES 1886, SEIDLITZ 1881), Monts Călimani (SEIDLITZ 1881), Valea Vârghişului (DEUBEL dans PETRI

1910). Sibiu Cristian, Munții Gherghiului, Călimani (Pietrosul) (PANIN 1955). Pornesti Turda (MATHÉ et *al* 2002).

Current presence confirmed in two locations:

- Vârghiş Valley (HR) rediscovered station by Mathé in the Harghita Mountains. Different biotopes degraded pasture. various forest cover. The most important sites are located in the Selters (850 m) area mainly in forest clear (beech, hazel), sometimes in the forest of spruce. In these stations, the captures correspond to an autumnal activity (September October).
- Natural Park Cefa (BH) Station recently discovered (DEHELEAN *et al* 2012) in the forest of PN Cefa, near of the lake Cefa. Captures in May 2009 and April 2010. KUTASI (2004) signals the outputs spring (June) and autumnal (October) for *C. marginalis* from Mounts Barkony (HR).

Hungary: presence in some localities, west of the Danube and with a vertical distribution, in the zone of the Lake Balaton (Names of locations Retezar 1997; LIE and MATHÉ 2000).

Republic of Moldova: one station in Codrii Reserve (NECULISEANU et *al*. 2000).

3. *Carabus (Megodontus) planicollis* Kuster 1846.

Endemic species of the Southern Carpathians cited many mountain sites:

- Bucegi (BV) Montandon 1902, HOLDHAUS et *al* 1910, LIE 1996 …) and the upper part of the wooded area (1400-1500 m) under the trunks till to the peaks, in the scree, under the stones and the snow patch (2000-2400 m).
- Piatra Craiului (AG, BV) (HOLDLHAUS et *al*. 1910), subalpine near the refuge Curmătura (1470 m) and alpine, rather rare (Moara Dracului).
- Făgăraş (HOLDHAUS et *al.* 1910, PETRI 1912, HOFFMANN 1915 …). Quoted for various altitudes: Surul (1700 a 2281 m), Negoi (1540-2100 m), Lac Avrig 2011 m. Valea Sambetei 1600 m.
- Road Transfăgărăşan from 1500 m till the Bâlea Lake 2034 m.. in the *Pinus mugo* zone*,* afternoon when the rocks are hot (BARLOY et *al*. 2008).
- Parâng (GJ) (HOLHAUS et *al.* 1910, PETRI 1912) at various locations Parângu Mare 2518 m., Chalet Straja 1880 m. Quite rare.
- Retezat (GELHARDT von 1932, LIE 1997), Lapusnicu Mare Valley, Râu Mare Valley, Corciova Valley, Saua Iepii 1700 m. In the litter of *Picea excelsa* (TEODOREANU 1984)
- Mehedinti Mont Domogled rarely a single exemplar near the top Serban Cave 1000 m.

The current presence of the species in the various sites mentioned is confirmed except at Mount Domogled where she seems extremely rare.

The distinction between the two taxa described (*planicollis* type and *verae* Csiki 1906 fact the subject of controversy (LIE 1996).

The species is considered rare due to captures by direct searches at view on a low number (few specimens). This rareness is probably due to the low population density (high dispersion) and the brief period of activity of the surface, depending on the maintenance of the dampness of the biotope (short-lived under stones and rocks on the soil).

For example, in the Bâlea Valley (BARLOY et *al.* 2010), the captures spacing aut from the end of May (1400-1500 m) to early July (2000 m. near Bâlea Lake) depending on the speed of snowmelt; the activity being about two weeks in the rocky scree (except the snow patch). In the most favorable biotopes (area with *Pinus mugo* 1400-1700 m.), the activity may

persist for one month (in 2009 from late May to early July).

4. Carabus (Pachystus) cavernosus Frivaldsky 1837.

This species occurs in various countries of the Balkan Peninsula: Albania, Serbia, Montenegro, Bosnia Herzegovina, Macedonia, Bulgaria (many localities in GORJIEB et *al*. 1995), often at altitude: 800 to 2300 m. She can be found in a single station in Romania. Discovery in July 1998 by KUTASI et *al* 2000 on the plateau of Piatra Secuiului (1129 m.), this species is new for the Carpathians.

5. Carabus (Procerus) gigas Creutzer 1799

Romanian Banat:

This large species, rare and located has long been known from Banat (WINGELMULLER, GANGLENBAUER 1901). Breuning 1932 quote her from several localities, partly adopted by Panin (1955): Nemet Bogsan (Bocşa), Mehadia, Mount Godeanu, Băile Herculane Mount Domogled.

The latest captures (Lie 1987, 1991, 1998), Barloy et *al*. (2004) are:

- Cerna Valley : around Baile Herculane, Mehadia (Izvoare, power plant, peak Ciorici, Mohornic, Secemin, Siminnicea), Plateau Domogled 1000 m., Suscu Pucinisca-Klamm, rare, in 30 years, 30 catches (LIE 1997).
- Area Bazias: Divici- Ribis Valley (confirmation H. LE MAO 2006).
- Nerei Gorges National Park–Beusnita: Cheile Nerei and Susara (ERHAN DINCA et *al.* 1982), Cheile Nerei and Valea Bei: 5 exemplars in 2012, PRUNAR F. (confirmation ARDELEAN A. 2012).
- National Park Portile de Fier : Vodita Valley (Ruicanescu 1992)
- Area Pojoga-Mures old captures (1920-1940) E. von Teleki along the Mures river. Capture of a larva (LIE 1991, between Pojoga and Căprioara).

Other regions

- Cibin Mountains (BREUNING 1932). Comana Forest (BORN 1902, MONTANDON 1906)
- Turnu Rosu (GANGLENBAUER in FUSS 1864)
- Dobrogea Iortmac Esechioi (NEGRU et *al.* 1967, PANIN 1955), rare
- Vrancea Mountains: Eastern Carpathians (SZEKELY 2005)

Despite a certain rarity, the current presence of the species in the southern part of the Romanian Banat is amply confirmed; its existence in Dobrogea remains to be verified.

6. Carabus (Morphocarabus) rothi alutensis Savulescu 1972.

This endemic species of enigmatic origin, identified and described by SĂVULESCU (1972) is highly localized on both banks of the Olt River. To the right bank stations she has been found from Cozia Monastery until south of Ramnicu Valcea in parks, gardens and forest edges close to housing (LIE 1999). Various sites have recently been identified on the left bank (BARLOY et *al*. 2011) woods and gardens along the Olt River (Pausa to Daesti-Sambotin), in the National Park Cozia in the forest (Stanisoara Monastery 709 m., Dangesti 700 m., Poiana Bobolea 1400 m.).

7. Carabus (Platycarabus) fabricii malachiticus C G. Thomson 1875.

C. Platycarabus fabricii is located in the alpine stage of the northern Alps and Carpathians with five major distributions: Switzerland, Italy-Austria, Czech Republic, Slovakia

and Poland, Romania, Ukraine. In these areas, the isolated populations form the local races whose taxon *malachiticus* present in the Ukrainian Carpathians: Massive Hoverla, Chornagora (Mount Petros 2010 m.) and in Romania. This species is distinguished to the type by the shape, the density, the depth of elytra dimples and by the presence in the population of specimens with metallic green or bluish green among brown individuals.

In Romania:

- Rodna Mountains (Biosphere Reserve) in the alpine area (HURKA 1975, NITU 2008) of the main peaks: Peak Pietrosul, Peak Puzdrele, Peak Laptele, Peak Galatiului (Museum Grigore Antipa) Ineu (HOLDHAUS et *al*. 1910, BIELZ in PETRI 1912)
- Călimani Mountains (Pietrosu plateau, HOLDAUS et *al*. 1910), Muller (in PETRI 1912). Quite common under stones, in the snow beds: populations with mixed individuals blackish brown and green to bluish green

8. Carabus (Pachystus) hungaricus Fabricius 1792.

Protected species by the Council Directive 92/43/EEC, which has never be very common in Roumanie (only citations by BREUNING 1933 for the form *frivaldskyanus* at Timisoara, Remetea Mica, Masloc). In Natura 2000 several stations quoted, the first being unconfirmed: Ciuperceni-Desna, Coridorul Jiului, Silvostepa Olteniei (references: Ienistea according Nitu, personal communication). The quoted at Mlaştina Satchinez seems to us erroneous.

Currently the only known location is the valley Semita (Jamu Mare, Latunas) in xerophyte meadow. The population, fairly abundant, has two activity periods: in spring (May-June) and especially autumnal (September-October). Individuals prefer shaded areas (bushes of *Prunus spinosa*, *Crataegus monogyna*, large-sized grasses (*Calamagrostis epigeios*) in depressions of the water flow but also finds itself in the steppique zone without considerable topographic model (LIE 1994, 1996, BARLOY et *al*. 2008).

The closest station to the Serbian Banat is situated to Deliblat: Susara area (BARLOY et *al*.) at 40 km. from Jamu Mare in sandy dune, under the cover of bushes.

This species, presents formerly in the Moldavian steppes between rivers Nistru and Don (SE Republic of Moldova) is disappeared as a result of the clearing of the habitat (put in culture) (NECULISEANU et *al*. 1992). She appears on the red list of Republic of Moldova.

9. Carabus (Tomocarabus) besseri Fischer Waldheim 1823.

Species of the SE European steppes, still frequent in Ukraine and Southern Russia reaches its limit of accidental current distribution in Romanian Moldova. Described by Fischer de Bessarabia (now Republic of Moldova), she is quoted as typical station of Beuder on the right bank of Dniester Transnistria. Present in the steppes of S and SE of the Republic Moldova (in particular steppe of Bugeac); the last capture at Tighina, date of 1987. At present considered as disappeared (NECULISEANU and *al*. 2000), further to the clearing, she appears on the red list of the Republic Moldova.

- Romanian Moldova

Species captured in several cultures: wheat, sugar beet, lucerne, meadow and orchards (apple tree-cherry tree, VARVARA 2008, 2009, 2012), vineyard (TALMACIU and *al*. 2005); never in deciduous forests. The activity extends over a long period (May-September) with greater frequency in the second half of July (VARVARA 2001) or in August (vineyard, TALMACIU 1998).

Quoted from numerous localities: Sarbi (BT), Secuieni (NT), Cotnari, Letcani, Iasi, Miroslava (IS), Husi, Vaslui, Pogana, Perinei, Crang, Pogonesti (VS), Burdusaci, Căbeşti

(BC) ; Adjud (VN) ; Tecuci (GL) ; by TALMACIU et *al*. 2005. VARVARA 2008, 2009, 2010 is added of Museum Grigore Antipa: Roman (NT), Gidenti, Grozesti, Oituz, Galbeni et Rastoaca-Putna (VN); Dates captures 1966-1978.

This presence in Romanian Moldavia is not mentioned by TURIN et *al*. 2003; the status of the species is at present difficult to estimate: its relative rarity in fields cultivated using traditional methods question about zones refuges. The disappearance in the bordering countries incites to think about its registration in a red list for Romania.

CONCLUSIONS

As underlined in introduction, an update of the geographical distribution would be useful to perfect, modernize inventory and possibly take measures to ban collection for the most vulnerable (let's remind it that C. *(Platycarabus) fabricii malachiticus* C G. Thomson 1875 of Rodna Mountains is protected by the status of Reserve Biosphere under reserve to efficient surveillance).

In the scientific plan for the not endemic species of refuges zones or considered as relicts, arise two major questions:

- causes and ancientness of their genetic isolation,
- genetic relation with whether typical species (case of *C. (Mesocarabus) problematicus)* whether the same species in the diverse locations.

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