

INSECTS INCLUDED IN THE RED BOOK OF MOLDOVA: LIMITATION FACTORS AND PROTECTION MEASURES

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Abstract

This paper presents the analysis of insect species in Moldova with a rarity status: vulnerable, critically endangered and endangered, officially included in the "Red Book of the Republic of Moldova", in two editions: 37 species in the 2nd edition (2001) and 80 species in the 3rd edition (2015). The 80 insects of the 3rd edition of the "Red Book of the Republic of Moldova" belong to 8 orders (Odonoptera, Mantodea, Orthoptera, Coleoptera, Neuroptera, Lepidoptera, Hymenoptera, Diptera). These species are classified according to the rarity status: vulnerable (VU) – 33 species, critically endangered (CR) – 39 species and endangered (EN) – 8 species. The third edition also contains 35 species not included in the previous editions, which for the first time obtained a rarity status: VU – 16 species, CR – 17 and EN – 2 (2 species of the order Odonoptera, 1 of Mantodea, 1 of Orthoptera, 10 of Coleoptera, 18 of Lepidoptera, and 3 of Hymenoptera).

Keywords: insects, the Red Book, Republic of Moldova.

1. INTRODUCTION

The rational evaluation and valorisation of biological diversity is one of the main concerns in the contemporary age, and its preservation is an essential condition for maintaining the ecological balance in nature and for the sustainable development of socio-economic systems. The technical-scientific development of society, in addition to its obvious advantages, leads to the continuous diminishing of the diversity of the vegetal and animal world, especially under the conditions of socio-economic and political transition, resulting in the appearance of a whole series of species that have considerably diminished their herds and areas.

The Red Book of the Republic of Moldova serves as a scientific support both for establishing the measures and the regime of protection of all plant and animal species, and the elaboration of proposals and amendments to legislative and normative acts in the field of biodiversity, in order to improve the environmental legislation and its harmonization with European Community rules. The Red Book contributes to the strictly delimitation of responsibilities between the Government, the national institutions and organizations in order to implement the provisions of international conventions, to which Moldova is a party, as well as those stipulated in the National Strategy and the Action Plan in the field of Biodiversity Conservation. The Red Book is also of great help in achieving the ecological education of the young generation and society as a whole.

In the paper are presented the species of rare insects and those threatened with extinction in the territory of the Republic of Moldova, with a rarity status, according to IUCN: vulnerable, critically threatened, and endangered, as of 1984 in the USSR (Gilyarov et al., 1984), and as of 1992 in Moldova (Neculiseanu et al., 1992) and in the two official editions of the "Red Book of the Republic of Moldova" as of 2001 and 2015 (Table 1).

II. Insects from Moldova mentioned in the "Red Book of the USSR"

In the "Red Book of the USSR", the second edition, there were characterized 191 species of 16 orders, of which the following are dominant: Lepidoptera – 104 species, Coleoptera – 33, Hymenoptera – 13, and Orthoptera – 8 (Ghiliarov et al. 1984), and it is mentioned that 36 of these species are spread on the territory of Moldavian SSR, they are part of 8 orders, namely: Odonoptera – a species, Mantodea – 1, Orthoptera – 2, Coleoptera – 7, Neuroptera – Lepidoptera – 12, Hymenoptera – 11, Diptera – 1 species.

Among those who mentioned species spreading in Moldova are the following authors: Haritonova A.I. (1 odonopter), Pravdin F.H. (1 mantodea, 2 ortopters), Kryjanovskii O.L. (2 Carabide Coleopters), Kocetova N.I. (2 coleopters – 1 lucanide, 1 stafilinide, 1 neuropter, 1 dipter), Lopatin I.K. (2 cerambic coleopters), Mirzoian S.A. (1 ceramicide coleopter), Şciotkin I.L. (2 Lepidoptera sphingidae), Antonova E.M. (10 lepidopters - 1 saturniid, 2 arthiodes, 4 papillonides, 1 nimphalid, 2 licenides), Panfilov D.V. et al. (5 bumble-bees), Ermolenko V.M. (5 wasps - 3 xilocopes, 2 scols), Kozlov M.A. (1 formicide).

Table 1. Insects from the Red Book of the Republic of Moldova and other reference works

Nr. crt.	Family	Species	USSR	u/e	Republic of Moldova		Status
			1984	1992	2001	2015	
Order ODONATOPTERA							
1.	Coenagrinidae	<i>Coenagrion mercuriale</i> (Charpentier 1840)	-	-	+	-	-
2.		<i>Erythromma (Coenagrion) lindenii</i> (Selys, 1840)	+	-	+	+	CR
3.	Libellulidae	<i>Anax imperator</i> (Leach, 1815)	-	-	-	+	VU
4.		<i>Leucorrhinia pectoralis</i> (Charpentier, 1825)	-	-	-	+	CR
Order MANTODEA							
5.	Mantidae	<i>Mantis religiosa</i> (Linnaeus, 1758)	-	+	+	-	-
6.		<i>Ameles decolor</i> (Charpentier, 1825)	-	-	-	+	VU
7.		<i>Bolivaria brachyptera</i> (Pallas, 1773)	+	-	-	+	CR
Order ORTHOPTERA							
8.	Tettigoniidae	<i>Saga pedo</i> (Pallas, 1771)	+	+	+	+	CR
9.		<i>Onconotus servillei</i> (Fisher-Waldheim, 1846)	-	-	-	+	CR
10.	Phaneropteridae	<i>Poecilimon ucrainicus</i> (B.-Bienko, 1951)	-	-	-	+	CR
11.	Bradyporidae	<i>Bradyporus multituberculatus</i> (Fish.-Wald., 1833)	+	-	-	-	-
Order COLEOPTERA							
12.	Carabidae	<i>Calosoma sycophanta</i> (Linnaeus, 1761)	+	+	+	+	VU
13.		<i>Carabus clathratus</i> (Linnaeus, 1761)	-	+	+	+	EN
14.		<i>C. variolosus</i> (Fabricius, 1787)	-	+	-	+	CR
15.		<i>C. hungaricus</i> (Fabricius, 1787)	+	+	-	+	CR
16.		<i>C. bessarabicus</i> (Fisher-Waldheim, 1823)	-	+	-	+	CR
17.		<i>C. intricatus</i> (Linnaeus, 1761)	-	-	-	+	VU
18.		<i>C. ullrichii</i> (Germar, 1824)	-	-	-	+	VU
19.		<i>C. violaceus</i> (Linnaeus, 1758)	-	-	-	+	VU
20.		Cerophytidae	<i>Cerophitium elateroides</i> (Latreille, 1809)	-	+	+	+
21.	Elateridae	<i>Elater ferrugineus</i> (Linnaeus, 1758)	-	+	+	+	EN

22.		<i>Isnoides sanguinicollis</i> (Panzer, 1793)	-	+	+	+	CR
23.		<i>Porthmidius austriacus</i> (Schrank, 1781)	-	+	+	+	CR
24.		<i>Drapetes biguttatus</i> (Piller & Mitterpacher, 1783)	-	+	-	-	-
25.		<i>Calambus bipustulatus</i> (Linnaeus, 1767)	-	+	-	-	-
26.	Scarabaeidae	<i>Oryctes nasicornis</i> (Linnaeus, 1758)	-	+	+	+	VU
27.		<i>Gnorimus octopunctatus</i> (Fabricius, 1775)	-	-	-	+	CR
28.		<i>Osmoderma barnabita</i> (Motschulsky, 1845)	-	-	-	+	VU
29.		<i>Protaetia aeruginosa</i> (Linnaeus, 1767)	-	-	-	+	VU
30.	Lucanidae	<i>Lucanus cervus</i> (Linnaeus, 1858)	+	+	+	+	VU
31.	Cerambycidae	<i>Cerambyx cerdo</i> (Linnaeus, 1758)	+	+	+	+	CR
32.		<i>Morimus asper funereus</i> (Mulsant, 1862)	+	+	+	+	EN
33.		<i>Rosalia alpina</i> (Linnaeus, 1758)	+	+	+	+	CR
34.		<i>Aromia moschata</i> (Linnaeus, 1758)	-	-	-	+	VU
35.		<i>Dorcadion equestre</i> (Laxmann, 1770)	-	-	-	+	CR
36.		<i>Purpuricenus kaehleri</i> (Linnaeus, 1758)	-	-	-	+	CR
37.	Staphylinidae	<i>Ocypus olens</i> (O. Muller, 1764)	+	-	-	+	VU
38.	Cucujidae	<i>Cucujus cinnaberinus</i> (Scopoli, 1736)	-	-	-	+	CR
Order NEUROPTERA							
39.	Ascalafidae	<i>Ascalaphus macaronius</i> (Scopoli, 1736)	+	+	+	+	CR
Order LEPIDOPTERA							
40.	Saturnidae	<i>Agria tau</i> (Linnaeus, 1758)	-	+	+	+	CR
41.		<i>Eudia (Saturnia) pavonia</i> (Linnaeus, 1858)	+	+	+	+	CR
42.		<i>Saturnia (Eudia) spini</i> (Denis & Schiffermüller, 1775)	-	-	-	+	CR
43.		<i>S. pyri</i> (Denis & Schiffermüller, 1775)	-	+	+	+	VU
44.		Sphingidae	<i>Dolbina elegans</i> (A. Bang-Haas, 1912)	-	+	+	+
45.	<i>Marumba quercus</i> (Denis & Schiffermüller, 1775)		-	+	+	+	VU
46.	<i>Acherontia (Manduca) antropos</i> (Linnaeus, 1858)		+	+	+	+	VU
47.	<i>Proserpinus proserpina</i> (Pallas, 1772)		-	-	-	+	CR
48.	<i>Daphnis (Deilephila) nerii</i> (Linnaeus, 1758)		+	+	-	-	-
49.	Erebidae (Arctiidae)		<i>Callimorpha dominula</i> (Linnaeus, 1758)	+	-	-	+
50.		<i>C. (Euplagia) quadripunctaria</i> (Poda, 1761)	+	+	+	+	VU
51.		<i>Pericallia matronula</i> (Linnaeus, 1758)	-	-	-	+	CR
52.	Papilionidae	<i>Iphiclides podalirius</i> (Linnaeus, 1758)	+	+	+	-	-
53.		<i>Papilio machaon</i> (Linnaeus, 1758)	+	+	+	+	VU
54.		<i>Parnassius mnemosyne</i> (Linnaeus, 1758)	+	+	+	+	VU
55.		<i>Zerynthia polyxena</i> (Denis & Schiffermüller, 1775)	+	+	+	+	VU
56.	Lycaenidae	<i>Polyommatus daphnis</i> (Denis & Schiffermüller, 1775)	+	+	+	+	VU
57.		<i>Lycaena virgaureae</i> (Linnaeus, 1758)	-	-	-	+	CR
58.		<i>Maculinea arion</i> (Linnaeus, 1857)	-	-	-	+	VU
59.		<i>Plebejus argyrognomon</i> (Bergstrasser, 1779)	-	-	-	+	VU
60.		<i>Tomares nogelli</i> (Herrich-Schaffer, 1851)	+	+	+	+	CR
61.	Hesperiidae	<i>Carcharodus flocciferus</i> (Zeller, 1847)	-	-	-	+	CR
62.		<i>C. lavatherae</i> (Esper, 1783)	-	-	-	+	CR
63.	Pieridae	<i>Colias chrysotheme</i> (Esper, 1780)	-	-	-	+	VU
64.		<i>Leptidea morsei</i> (Fenton, 1881)	-	-	-	+	VU
65.	Riodinidae	<i>Hamearis lucina</i> (Linnaeus, 1758)	-	-	-	+	CR
66.	Nymphalidae	<i>Apatura iris</i> (Linnaeus, 1758)	+	-	-	+	VU
67.		<i>Apatura metis</i> (Freyer, 1829)	-	-	-	+	VU
68.		<i>Coenonympha hero</i> (Linnaeus, 1761)	-	-	-	+	CR
69.		<i>Euphydryas maturna</i> (Linnaeus, 1758)	-	-	-	+	EN
70.		<i>Limenitis populi</i> (Linnaeus, 1758)	-	-	-	+	EN

71.		<i>Neptis sappho</i> (Pallas, 1771)	-	-	-	+	VU	
72.		<i>Nymphalis xanthomelas</i> (Esper, 1781)	-	-	-	+	VU	
Order HYMENOPTERA								
73.	Apidae	<i>Andrena bulgariensis</i> (Warncke, 1965)	-	-	-	+	CR	
74.		<i>Anoplius samariensis</i> (Pallas, 1771)	-	-	-	+	CR	
75.		<i>Bombus argillaceus</i> (Scopoli, 1763)	+	-	+	+	VU	
76.		<i>B. fragrans</i> (Pallas, 1763)	-	-	+	+	CR	
77.		<i>B. muscorum</i> (Fabricius, 1775)	+	-	-	+	VU	
78.		<i>B. pomorum</i> (Panzer, 1805)	+	-	-	+	CR	
79.		<i>B. ruderans</i> (Fabricius, 1775)	+	-	-	+	VU	
80.		<i>B. zonatus</i> (Smith, 1854)	-	-	-	+	CR	
81.		<i>B. paradoxus (confusus)</i> (Dalla Tore, 1885)	+	+	+	-	-	
82.		<i>Rophites canus</i> (Eversmann, 1852)	-	+	-	+	EN	
83.		<i>Xylocopa valga</i> (Linnaeus, 1857)	+	+	+	-	-	
84.		<i>X. violacea</i> (Linnaeus, 1857)	+	-	-	+	EN	
85.		Megachilidae	<i>Megachile rotundata</i> (Fabricius, 1787)	+	+	+	+	CR
86.		Scoliidae	<i>Megascolia (Scolia) maculata</i> (Drury, 1773)	+	+	+	+	VU
87.	<i>Scolia hirta</i> (Schrank, 1781)		+	-	-	+	VU	
88.	Formicidae	<i>Liometapum microcephalum</i> (Panzer, 1798)	+	+	+	+	CR	
Order DIPTERA								
89.	Asilidae	<i>Satanas gigas</i> (Eversmann, 1855)	+	+	+	+	CR	
Total	8 orders	73 genres	36	40	37	80	VR-33	
	31 families						CR-39	
							EN-8	

Legend: u/e – unofficial edition; VU – Vulnerable; CR – Critically endangered; EN – Endangered (according to the statuses of the "Red Book of the Republic of Moldova", 3rd edition).

The dominant insects belong to the Lepidoptera order - 12 species, Hymenoptera order – 11 species, and Coleoptera order – 7 species. Authors from the Moldovan SSR did not participate in the preparation of articles for the respective species, because the subject of rare insects was not approached in Moldova (Gyliarov et al., 1984).

III. Rare and endangered insects in Moldova

As mentioned in the previous article, the "Red Book of the USSR and Moldovan SSR" (1978) was widely publicized in the research and educational institutions of Moldova. The second edition of the Red Book of the USSR followed in 1984, which again professionally sensitized scientists from the Institute of Zoology of the Academy of Sciences of Moldova. Thus, a team of four entomologists: Neculiseanu Zaharia, coleopterologist, Stratan Veniamin, himenopterologist, Vereşciaghin Boris, apidologist and lepidopterologist, and Ostaficiuc Vasile, coleopterologist, have elaborated and published in 1992 the first entomological monograph in Romanian (Editor-in-chief Petru Chişchin), which characterizes 40 species of rare and endangered insects in Moldova (Neculiseanu et al., 1992). Of the total number of species, 20 coincide with those in the "Red Book of the USSR", and 20 are characterized separately because they are of national interest.

The species presented in the monograph belong to 6 orders: Mantodea – 1 species, Orthoptera – 1 species, Coleoptera - 16 species (6 families), Neuroptera – 1, Lepidoptera – 14 species (5 families), Hymenoptera – 6 species (4 families), and Diptera – 1 species. These were described methodologically and didactically: the characteristic of the order, the family and the species – morphologically and bioecologically. The insect species are accompanied by 42 colorful suggestive and educative images, namely: the habitat for coleopteran adults; the larva stage (caterpillar) and

their favorite host plants are presented for 12 lepidoptera; for 25 species, the leaves or flowers are presented, which allow determination of preferred plant species for nutrition in the imago or larva stage.

The monograph does not have the status of "Red Book", but it deals with the species on the territory of the Republic of Moldova, whose populations are extremely rare and endangered. This paper was the basis of the "Insects" chapter in the "Red Book of the Republic of Moldova", 2nd edition with official status, and it was also cited in the subsequent editions of 2001 and 2015 (Munteanu, 2001; Toderaş, 2015). There are 27 bibliographic sources, including one of authors (3.7%) ("Animal world/Insects", 1983) and 5 sources (18.1%) from neighboring countries (Romania – 3 and Ukraine – 2).

IV. Insects from the "Red Book of the Republic of Moldova", 2nd edition (2001)

In this edition, 37 insects were characterized in two languages - Romanian and English (under each paragraph). The species presented in the second edition belong to 8 orders: Odonoptera – 2 species, Mantodea – 1, Orthoptera – 1, Coleoptera – 11 species (6 families), Neuroptera – 1, Lepidoptera – 13 species (5 families), Hymenoptera – 7 species (4 families), Diptera – one species. The description includes: species identity (scientific and folk name), systematic classification (order and family), color image of the adult insect, status (VU, CR, EN), geographic spread accompanied by the map of Moldova (with the distribution sites indicated for each species), habitat, quantitative aspect, limiting factors, biological features, captive breeding potential, protection status (legislation), protection measures, sources of information (author's name and year of publication). Of the insects included in the second edition, 24 insects coincide with the ones from the Soviet edition and 31 with those in the unofficial edition of the Republic of Moldova.

Six authors contributed to this edition: Vereşciaghin Boris (14 species: 1 mantoptera, 1 formicide himenoptera, 12 lepidoptera - 3 atacides, 3 sphinids, 4 papillions, 2 licenides); Ostaficiuc Vasile (14 species: 1 orthoptera, 9 coleoptera - cerofitide, elateride, scarabeid, lucanide, cerambicide, 1 scoliidae himenoptera, 1 diptera, 1 neuroptera, 1 lepidoptera); Andreev Alexei (3 himenoptera aphids); Derjanschi Valeriu (2 odonatoptera); Neculiseanu Zaharia (2 carabide coleoptera); Stratan Veniamin (2 hymenoptera). (Munteanu, 2001).

The **Editorial Board** of this edition consisted of: President - Cor. M., Dr. habil. Ion Dediu, and Members: Dr. Arcadie Capcelea, Acad. Dr. habil. Alexandru Ciobotaru, Cor. M., Dr. habil. Ion Toderaş, Prof. Dr. habil. Mina Lozan, Dr. Alexandru Teleuţă, and Alecu Reniţa, President of the Moldovan Ecological Movement.

The **Coordination group** of the Ministry of Ecology, Constructions and Territorial Development for elaborating the Red Book of the Republic of Moldova included: Dr. Nicolae Stratan, Dr. habil. Valentin Bobeică, Dr. Ion Bejenaru, Dr. Pantelei Vladimir, Mihail Coca, Ala Rotaru, and Ion Coteaşi.

In the chapter "Insects" there are 47 bibliographic sources, including 5 (10.6%) of the authors: Andreev A., Stratan V., Neculiseanu Z., Vereşciaghin B., Ostaficiuc V.; 3 (6.4%) indigenous sources: Plugaru S., Miller E., Zubovsky N., and 7 (14.8%) sources from the countries in the immediate vicinity: Ukraine – 6 and Romania – 1 (Munteanu, 2001).

V. Insects included in the "Red Book of the Republic of Moldova", 3rd edition (2015)

In the recent edition of the Red Book (2015), 80 insects were characterized in two languages (Romanian and English, both separately). The species presented in the 3rd edition belong to IUCN

rarity categories: vulnerable (VU), critically endangered (CR) and endangered (EN), and belong to 8 orders: Odonatoptera – 3 species, Mantodea – 2, Orthoptera – 3, Coleoptera – 25 species (8 families), Neuroptera – 1, Lepidoptera – 31 species (10 families), Hymenoptera – 14 species (4 families), and Diptera – 1 species.

Note that, according to the statuses granted in the third edition, there are 33 species of VU status, 39 – CR, and 8 – EN, and in the systematic classification: Odonatoptere – 1 VU species and 2 CR species; Mantodea – 1 VU and 1 CR; Coleoptera - 10 VU, 12 CR and 3 EN; Lepidoptera – 16 VU, 13 CR and 2 EN; Hymenoptera – 5 VU, 7 CR and 2 EN; Orthoptera, Neuroptera and Diptera – CR. The description of the species corresponds to that of the 2nd edition, excepting for the the biological features that were supplemented with "ecological" ones. Of the insect species included in the third edition, 32 species coincide with those of the Soviet edition of 1984, 33 - with the unofficial edition of 1992, and 32 species – with the second edition of 2001. 35 species were included for the first time: Odonatoptera – 2 species, Mantodea – 1, Orthoptera – 1, Coleoptera – 10, Lepidoptera – 18, and Hymenoptera – 3 species (Toderas, 2015).

The main factors that reduce the density of insect populations are:

1) the Anthropogenic factor:

Destruction of forest habitats (forest deforestation and landscaping, cutting hollow secular trees and logs (saproxilic insects); destruction of aquatic habitats (swamp drying, chemical pollution), rocky habitats, meadow and steppe habitats (grazing and excessive mowing); destruction of forest protection strips (illicit cuts); burning the reed, stubble and places with weeds adjacent to the agricultural fields. Extensive agriculture and excessive use of pesticides (control of insects and rodent mammals); reducing the area planted with lucerne; soil pollution; capturing attractive insects, due to curiosity or lack of ecological education; unorganized tourism; hostile attitude towards some insects (wasps, flies, ants, bugs, butterflies); urbanization, etc.

2) the Biological factors:

The fluctuation of climatic conditions towards the aridization of steppes and meadows; limited places for development after hibernation (bumblebee); competition between species (*Bombus zonatus* Smith, 1857 with some apids); dependence on the family that has grown into inappropriate places (apid); the limited migration potential (*Liometopum microcephalum* Panzer, 1798, females *Agria tau* L., 1758, *Marumba quercus* D. et al., 1775 are aptera); reduction of spontaneous plants from the Solanaceae family (nutrition for larvae of *Acherontia atropos* L., 1758).

In Moldova, the following measures are taken to protect insects with special status: population status monitoring (for all species); protecting aquatic habitats of hibernation and reproduction (Odonatoptera, Neuroptera); conservation of natural habitats, in particular, meadows and steppes by regulating grazing in areas with vulnerable and endangered populations (for most Orthoptera, Mantopter, Lepidopter, and Himenopter); prohibiting the deforestation of secular and hollow trees (saproxil choleptera); creating artificial conditions for shelter (apid, scarab, formicide); reducing the amount of pesticides in agricultural and forestry use (phytopofage lepidoptera); cultivating lucerne on inter-land (licenides); prohibition of burning the stubble and reed (Odonatoptera, Mantodea, Lepidoptera); education of the population through the dissemination of ecological knowledge, in particular, to prevent the capture of stages of attractive insects (of large size - Lepidoptera, Orthoptera, Mantodea, Hymenoptera; of vivid color - Coleoptera, Lepidoptera; of strange appearance - Lepidoptera caterpillars, Hymenoptera adults, etc.).

Insects in the 3rd edition were presented by 8 authors: Derjanschi Valeriu (16 Lepidoptera), Baban Elena (15 Coleoptera), Andreev Alexei (12 Hymenoptera), Calestru Livia (10 Lepidoptera),

Bacal Svetlana (9 Coleoptera), Stahi Nadejda (3 Odonatoptera, 3 Orthoptera, 2 Mantodea), Timus Asea (5 Lepidoptera), Stratan Veniamin (1 Diptera, 2 Hymenoptera, 1 Neuroptera), Mihailov Irina (1 Coleoptera) (Toderaş, 2015).

The **National Commission of the Red Book** was composed of:

President of the Commission - Mr. Munteanu Valeriu, Minister of Environment; **Vice President** - Acad. Ion Toderaş, Director of the Institute of Zoology of the ASM; **Secretary** - Ms. Lilia Eladii, consultant at the Ministry of Environment.

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In the chapter "Insects" there are 78 bibliographical sources, including sources included by authors - 10 (13%), Andreev A., Baban Elena, Bacal Svetlana, Derjanschi V., Stahi Nadejda, Stratan V., and Timus Asea) - 13 (16.6%) and sources from the immediate neighbor countries - 15 (19.2%), including Ukraine - 9 and Romania - 6.

1) *The last edition of the "Red Book of Moldova" was one of the most publicized in Moldova and abroad. This edition was presented on TV (AgroTV, Publica TV, TV3 Craiova, Romania) and Radio, on the official website of the Ministry of Environment ("Red Book - a long-awaited editorial novelty"). Scientific and popularization articles in the republican press were published about it, for example, in: Oficial.md "The 3rd edition of the "Red Book of the Republic of Moldova" was launched"; in Akademos (Timus et al., 2016); in the Republican newspaper Moldova Suverană - "Ten curiosities about the "Red Book of the Republic of Moldova" (Xenofontov, 2016, a and b; Timuş, 2016).*

2) *At the initiative of the director of the Institute of Zoology of the ASM, acad. Ion Toderaş, a donation action was launched: "Red Book - in the native village", in which each of the authors of this edition of the Red Book donated a copy of the Book to the school in his native village.*

A recent event referring to all editions of the "Red Book of the Republic of Moldova" took place at the Scientific Symposium "Current Trends in Natural Sciences", held at the University of Pitesti (Romania) during 19-23 April 2017, at the XL Spring Exhibition of the "Tulip Symphony", organized by the Pitesti City Hall. All the Red Book editions were presented at the Exhibition: from the Soviet period (the Red Book of the Moldovan SSR edited in 1978 and the Red Book of the USSR edited in 1984) and the period after the declaration of Moldova's independence in 1991: the unofficial edition of 1992 and the official editions of 2001 and 2015 (Figures 1-3).

VI. CONCLUSIONS

In conclusion, we mention that vulnerable, critically endangered and endangered insects species from Moldova were officially included in two editions of the Red Book, namely: 37 species in the

2nd edition of 2001 and 80 species in the 3rd edition of 2015. A work that addressed rare and endangered insect species was published in 1992, in which 40 species were presented. The 80 insect species of the third edition belong to 8 orders (Odonoptera, Mantodea, Orthoptera, Coleoptera, Neuroptera, Lepidoptera, Hymenoptera, Diptera). The status of rarity attributed to these species is as follows: Vulnerable - 33 species, Critically Endangered - 39 species, and Endangered - 8 species. In the 3rd edition there were included 35 species not mentioned in other editions (2 species of the order Odonoptera, one species of Mantodea, one species of Orthoptera, 10 species of Coleoptera, 18 species of Lepidoptera and 3 species of Hymenoptera) and thus these species for the first time obtained the status: VU - 16 species, CR - 17 species and EN - 2 species.



Fig.1. The unofficial Edition of the Registry of Rare and Endangered Insects Species, 1992 (photo Elena V. Baban)

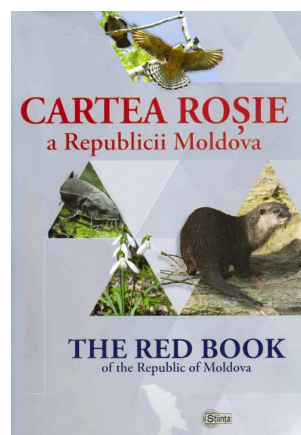


Fig. 2. The Red Book of the Republic of Moldova, 3rd edition, 2015 (photo Asea M. Timuș)



Fig. 3. Exhibition of all editions of the Red Book of the Republic of Moldova (1978-2015) at the University of Pitești, Romania, 2017 (photo Ion Iftodii)

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