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HOLARCTIC LEPIDOPTERA, 3(2): 37-41

A BUTTERFLY EXPEDITION TO ARMENIA

THOMAS C. EMMEL[1], ANDREI SOURAKOV[2], AND ALEXANDER DANTCHENKO[3]

[1]Dept. of Zoology, University of Florida, Gainesville, Florida 32611; and
[2]Dept. of Entomology and Nematology, University of Florida, Gainesville, Florida 32611, USA;
[3]Avangardnaia St. 11-160, ROS-125493, Moscow, Russia

ABSTRACT.– The results of a June-July 1996 expedition to central Armenia are described. Immature stages of *Limenitis reducta* (Nymphalidae), *Tomares romanovi* (Lycaenidae) and *Libythea celtis* (Libytheidae) are illustrated, and a new food plant record is provided for *Thaleropis jonia* (Nymphalidae). A list of butterfly species (except skippers) found at Khosrov Nature Reserve is given.

KEY WORDS: Apaturinae, Ascalaphidae, Azerbaijan, biodiversity, biogeography, Buprestidae, Caprifoliaceae, Caucasus, Central Asia, Cerambycidae, Coleoptera, Georgia, Hesperiidae, Leguminosae, Libytheidae, life history, Lycaenidae, Myrmeleontidae, Nemopteridae, Neuroptera, Noctuidae, Nymphalidae, Palearctic, Papilionidae, Pieridae, Russsia, Satyrinae, Soviet Union, Turkey, Ulmaceae, Umbelliferae.

The Republic of Armenia is the smallest of the original 15 republics of the Soviet Union. Its area of 11,500 square miles (29,800 sq. km) covers the southern flanks of the Caucasus Mountains. Armenia is bounded to the east and north by Azerbaijan and Georgia, and to the west and southeast by Turkey and Iran. The country is quite mountainous, with a wide range of habitats. While the average altitude is 5900 ft (1800m) above sea level, there are no lowlands and at least half the region lies at altitudes of 3300-6600 ft (1000-2010m).

The history of the country and the nation is one of the most dramatic stories of mankind. The people of Armenia arrived in the region in the 7th century B.C. Since then, Armenia constantly has changed hands between the strong empires of the East: Assyria, Persia, the Roman Empire, Byzantium, the Osman Empire, and Russia. In the 13-14th centuries, Armenia was occupied by Mongols, and from the 16th to 19th centuries, was a part of either Turkey or Persia. In 1878 Russia acquired part of Armenia after a war with Turkey. The cultural and religious differences (Armenians became Christians in the 4th Century) with peoples in the surrounding Armenia territories (such as Kurds in Turkey) caused constant antagonism, which resulted in frequent cases of genocide of Armenians, often inspired by the Turkish government. From the 1920's until the recent break up of the Soviet Union, Armenia remained part of the Soviet state. In 1991 Armenia became independent, and practically lost all economic support from Russia. The long suppressed national tension between Armenia and neighboring Azerbaijan developed into exhausting military conflict over the disputed territory of Nagorniy Karabah. At present the fighting has practically stopped, due, supposedly, to exhaustion of resources on both sides. Peace brought great improvement of the economic situation, so that life in Armenia went almost back to normal. Problems with electricity and fuel, when they occur, are usually temporary. Intensive economic trade with Iran and Russia saturated markets with imported goods. For example, the purchasing of all supplies for the first two weeks of our 1996 expedition did not take more than two hours in the central market area of Yerevan, the capital.

During June and July of 1996, we visited some of the more interesting wild areas of Armenia. Yerevan can be reached by air either through Moscow, or directly from Los Angeles. We chose the first route, arriving on June 16. From there we travelled to the Khosrov Nature Reserve, where we concentrated our field work. The reserve, largest (30 X 100km) in the country, lies to the southeast of Yerevan and it took us about two hours by a hired car to reach it. The reserve is closed for vehicles, unless one has a permission from the director, whose office is in the town of Vedi outside the reserve. The office can be reached by regular taxi from Yerevan for about $40. However, the roads of the reserve require 4-wheel-drive. The arrangement to use jeeps could be made with the director, who is both a great host and a financial manager, able to keep the reserve afloat in this difficult time for the Armenian economy.

We based our expedition at the Nature Reserve house, located in a beautiful wooded canyon (Fig. 3h), and hiked out daily in all directions from this base. Typically, alpine habitats could be reached in a day's round-trip with anywhere from 10-18km of hiking, ascending from 4500-8000 ft (1370-2440m). The Reserve contains a rich variety of landscapes with many soil types and plant species distributed through at least four altitudinal vegetation zones: semi-desert, mountain steppe, forest, and alpine meadows. In the lower portions, drought-resistant plants such as juniper and sagebrush cover a rolling plain. In the higher elevations, from 4700 ft (1435m) upward, moist mountains covered with rich grass growth are dominant. The forest area begins above 5300 ft (1615m) elevation and is comprised of oaks, beech, hackberry, dogwood, and pistachio. Here, the Syrian bear,

Fig. 1. Some butterflies and moths of the Khosrov Nature Reserve: a) *Parnassius mnemosyne* (L.); b) *Nordmannia w-album* Knoch; c) *Muschampia* sp.; d) *Melanargia larissa astanda* Staudinger, as crab spider prey; e) *Pseudochazara pelopea caucasica* Lederer; f) *Plebicula amandus* Schneider; g) *Satyrus amasinus* Staudinger; h) *Zygaena* sp.; i) *Thymelicus* sp.; j) *Agrodiaetus* sp.; k) *Pyrrhia victoriana* Sodof. (Noctuidae) (Photographs by A. Sourakov, except 1a by A. Dantchenko).

Fig. 2. Some butterflies and larvae of the Khosrov Nature Reserve: a-b) *Limenitis reducta* Staudinger; c) *Libythea celtis* Laicharting; d-h) Immatures of *Limenitis reducta* (d. Last instar larva; e. Prepupa; f. Pupa, lateral view; g. Pupa, ventral view; h. Pupa, dorsal view); i-n) Immatures of *Libythea celtis* on *Celtis glabrata* (i-j. Fourth instar larva; k-l. Last instar larva; m. pupa, lateral view; n. Pupa, dorsal view); o) *Tomares romanovi* Christoph; p) *Astragalus ponticus* Pall. host plant of *T. romanovi;* q-r) Larvae of *T. romanovi* in flowerhead of *Astragalus ponticus* (Photographs by A. Sourakov).

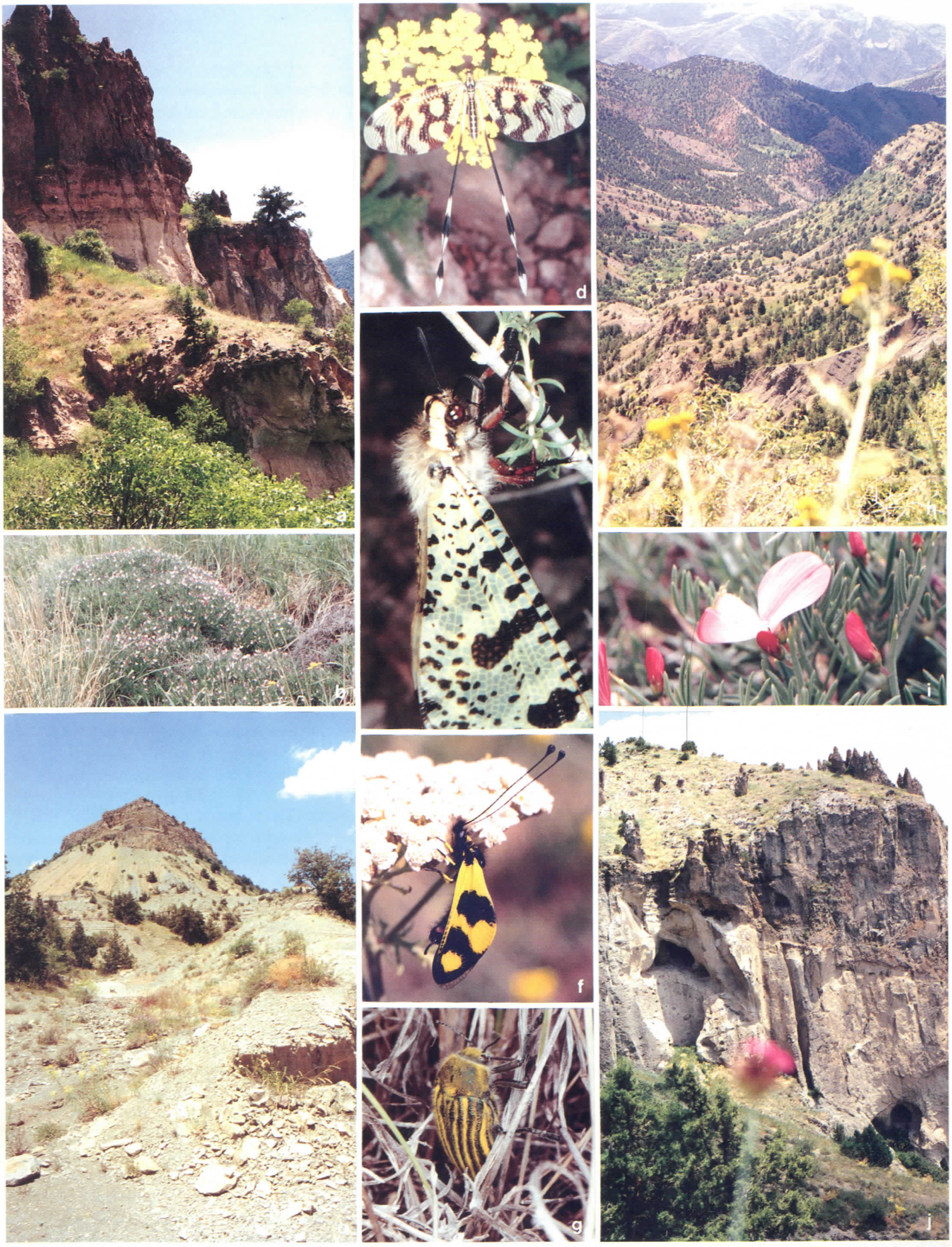

Fig. 3. Khosrov Nature Reserve and some of its insect fauna: a) Rocks above the house; b) *Onobrychis cornuta*, foodplant of *Colias chlorocoma* and many species of blues; c) Arid mountain slopes, habitat of *Pseudochazara pelopea* and *Tomares romanovi*; d) *Nemoptera sinuata* Olivier (Neuroptera: Nemopteridae); e) *Acanthaclisis occitanica* Vill. (Neuroptera: Myrmeleontidae); f) *Ascalaphus coccajus* (Schneider) (Neuroptera: Ascalaphidae); g) *Julodis onopordi* Fabricius (Coleoptera: Buprestidae); h) Overview of the canyon; i) Close-up of the flower and the spine of *Onobrychis cornuta*; j) The caves in the mountain ridge surrounding the base (Photographs by A. Sourakov, except 3a and 3c by A. Dantchenko).

wild sheep, wild boar, lynx, squirrels, and birds are numerous. Bear signs, along with deer droppings, could be noted on many trails. Above approximately 6600 ft (2010m), the trees break up into smaller groves and subalpine mountain meadows begin, often covered with lush flower growth. The moister meadows gradually increase as the tops of the closest mountain ridges, at 7300-7500 ft (2225-2285m), are reached. Water erosion has formed vertical multicolored cliffs, ridges and spectacular "fins" of rock by the exposure of different minerals on many of the mountains. Some vertical ridge faces had large caves (Fig. 3j), in which we discovered evidence of an overwintering site for several bears.

Walking down in elevation from the house allows one to reach arid mountain slopes (Fig. 3c), rich with grass-feeding butterflies like *Pseudochazara* (Fig. 1e) and *Chazara* satyrids (Nymphalidae) and skippers (Hesperiidae), as well as a number of species associated with *Onobrychis cornuta* L. (Leguminosae), a semi-spherical plant usually a yard across (Fig. 3b). It is well protected by sharp spines which stick out of the thin layer of leaves (Fig. 3i). This plant is characteristic of the open mountain slopes in the area and serves as a host plant for *Agrodiaetus* and other blues (Lycaenidae), as well as *Colias chlorocoma* Christoph (Pieridae). In this habitat we found a few individuals of the lycaenid *Tomares romanovi* Christoph (Fig. 2o), which is associated with *Astragalus ponticus* Pall. ssp. (Fig. 2p). Its larvae practically infested flower heads of the few scarce plants of the food plant (Fig. 2q, r). The arid slopes integrated into the mountain steppe at the hilltops, where several *Satyrus amasinus* Staudinger (Fig. 1g) and *Melanargia larissa astanda* Staudinger (Fig. 1d) (Nymphalidae) were always in sight.

Immediately around the house at 5300 ft (1615m) elevation, a large number of species could be collected in the drier grassland, junipers and oaks. *Limenitis reducta* Staudinger (Fig. 2a, b) (Nymphalidae), whose larva (Fig. 2d, e) and pupa (Fig. 2f, g, h) were found on the local species of the honeysuckle (*Lonicera* sp.) (Caprifoliaceae), came to streams together with numerous *Iphiclides podalirius* (Linnaeus) (Papilionidae), plus Lycaenidae and Hesperidae. Rarely, *Thaleropis jonia* (Eversmann) (Nymphalidae) individuals could be seen around *Celtis australis* L. shrubs (Ulmaceae), on which the species was noted to oviposit. Searching for its eggs and larvae yielded a few obviously Apaturinae eggs laid on the upper surface of the leaf. We also found several larvae (Fig. 2i-l) and a pupa (Fig. 2m, n) of *Libythea celtis* Laicharting (Libytheidae), adults of which were sometimes quite abundant on flowers (Fig. 2c). A number of day-flying moths, as well as members of other insect orders, attracted attention. Thus, Zygaenidae moths of several different species were numerous, especially in the alpine zone (Fig. 1h). A spectacular species of long-tailed yellow-and-black *Nemoptera sinuata* Olivier (Neuroptera: Nemopteridae) (Fig. 3d) was very common both during the day and at the light at night. Similarly colored *Ascalaphus coccajus* Sciff (Ascalaphidae) were numerous as well (Fig. 3f). Giant ant lions *Acantaclisis occitanica* Vill. (Myrmeleontidae) (Fig. 3e) occasionally could be chased out of the grass in the arid habitat. There were many species of beetles: beautiful golden *Julodis onopordi* Fabricius (Buprestidae) (Fig. 3g) on flowers, and *Agapantia* and *Malosia* (Cerambycidae) on the leaves of Umbelliferae plants were among most common ones.

Walking up from the house area soon led into the moister forest, which, according to the local legend, was planted here by the Persian Tzar Khosrov in the 4th Century. Though the latter is not a fact, we found several "cross stones:" large, waist-high, four-sided slabs with an engraved cross; those could easily date back to the times of Khosrov. The composition of the butterfly fauna in the forest was different from the fauna around the transition zone of the area: *Parnassius mnemosina caucasia* Verity (Fig. 1a) (Papilionidae), *Melitaea* and *Argynnis* (Nymphalidae) became abundant. Forest satyrids, such as *Hipparchia pellucida* Stauder *Hyponephele*, *Aphantopus*, *Lasiommata*, *Erebia medusa* (Denis & Schiffermüller) and several *Coenonympha* species were also more common here than in the open areas.

In the subalpine zone above the forest, *Onobrychis cornuta* was a dominant plant again, together with *Prangos* (Umbelliferae), whose leaves made the slopes look yellow from a distance, and caused strong skin irritation on contact. Here, besides *Papilio machaon syriacus* Eller and, later in the season, *P. alexanor orientalis* Romanoff (Papilionidae), *Melanargia russiae* Esper (Nymphalidae), *Colias chlorocoma* (Pieridae), and *Brenthis hecate transcaucasica* Wnukowsky (Nymphalidae) were found. From this zone, the surrounding panorama was spread out before us, with a gorgeous view of massive Mt. Ararat, at 16,946 ft (5123m), dominating the Armenian plateau from the Turkish side of the border.

With the remoteness of the Reserve, contact with Armenians on the trip was minimal: our host, a professional entomologist from Yerevan, Mark Kalashan, was able to spend a couple of days with us. The director of the Reserve and his rangers visited us several times during our stay, expressing the famous Caucasian hospitality with food and cognac which they brought and shared with us. Otherwise, we were left entirely to ourselves, and the peacefulness of the canyon and its beauty, unspoiled by human presence, made the two weeks in Khosrov Nature Reserve a most pleasant experience. The accomodations, though not oriented for tourists, had everything one needed for productive scientific work: three large rooms with several beds, a kitchen with a gas stove, outhouse, and a stream a few yards away with water good for drinking and bathing. The accomodations cost $5 a day per person, and visitors or scientists are also asked to pay a $15 per day fee for the use of the Reserve.

Negative publicity caused by war and economic hardship during the last few years, as well as earlier restrictions on tourism enforced by Soviet authorities, unfortunately has stimulated too little ecotourism to Armenia to make the country's conservation efforts, of which the reserve is a great example, economically viable. The future integration of Armenia into the world community hopefully will stimulate more interest to its fascinating natural history.

A list of butterflies (exclusive of skippers) known from the Khosrov Nature Reserve is appended at the end. Nomenclature is taken from the work of Hesselbarth *et al.* (1995): subgenera are added to bring the names in line with most European books on butterflies and the checklist of Russian butterflies by Tuzov (1993) (the latter used for names in the figure captions).

ACKNOWLEDGMENTS

Mr. Samvel Andronaki Shaboyan, Director of the Khosrov State Nature Reserve, extended every professional courtesy to our research group during our stay at the Reserve, providing housing, logistical support, and food supplies. Mr. S. A. Avetissian, Minister of the Environment and Natural Resources of the Republic of Armenia, kindly issued permits for collecting and export of specimens, and Mr. A. K. Hunaman, Director-General of the State Forest Service of the Republic of Armenia ("Hayantar"), granted permission for fieldwork and entomological collecting in the Khosrov State Nature Reserve and for our lodging there. Dr. Mark Kalashan of the Zoological Institute in Yerevan facilitated all arrangements in Armenia and joined us in the field work. Mr. Steven D. Schlachta of the University of Florida and Mr. Anton Dantchenko and Dr. Alexander Berstein of Moscow assisted greatly throughout the expedition. Last but not least, a local farmer, Vasgen, helped save us from occasional starvation by his generous gifts of cheese, vegetables, and fruits from his farm and orchards.

REFERENCES

Hesselbarth, G., H. van Oorschot, and S. Wagener
1995. *Die Tagfalter der Türkei, unter Berücksichtigung der Angenzenden Länder.* Bocholt: S. Wagener. 3 vol.

Tuzov, V. K.
1993. *The Synonymic List of Butterflies from the ex-USSR.* Moscow: Rosagroservice. 74pp.

List of the Butterflies Known from Khosrov Nature Reserve, Armenia

PAPILIONIDAE
Parnassius mnemosyne caucasia Verity, [1911]
Iphiclides podalirius (Linnaeus, 1758)
Papilio alexanor orientalis Romanoff, 1884
Papilio machaon syriacus Eller, 1936
PIERIDAE
Leptidea duponcheli lorcovici (Pfeiffer, 1932)
Colias crocea (Fourcroy, 1785)
Colias chlorocoma Christoph, 1888
Colias aurorina Herrich-Schäffer, [1850]
Colias alfacariensis fontainei Reissinger, 1989
Gonepterix farinosa turcirana de Freina, 1983
Anthocharis cardamines (Linnaeus, 1758)
Zegris eupheme menestho (Ménétriès, 1832)
Aporia crataegi (Linnaeus, 1758)
Pieris brassicae (Linnaeus, 1758)
P. (Artogeia) krueperi Staudinger, 1860
P. (Artogeia) rapae (Linnaeus, 1758)
P. (Artogeia) ergane detersa Verity, [1908]
P. (Artogeia) pseudorapae suffusa Verity, [1908]
Pontia daplidice (Linnaeus, 1758)
Pontia chloridice (Hübner, [1813])
LYCAENIDAE
Lycaena (Lycaena) phlaeas (Linnaeus, 1761)
L. (Heodes) tityrus (Poda, 1761)
L. (Heodes) candens (Herrich-Schäffer, [1844])
L. (Thersamonolycaena) alciphron melibaeus (Staudinger, 1758)
L. (Thersamonia) thersamon kurdistanica (Riley, 1921)
L. (Thersamonia) asabinus satraps (Staudinger, 1878)
Tomares romanovi (Christoph, 1882)
Callophrys paulae Pfeiffer, 1932
Satyrium (Nordmannia) spini melantho (Klug, 1834)
S. (Nordmannia) w-album majuscula (Jachontov, 1911)
S. (Nordmannia) ilicis (Esper, [1779])
S. (Nordmannia) acaciae (Fabricius, 1787)
S. (Armenia) ledereri (Boisduval, 1848)
S. (Armenia) hyrcanicum cyri (Nekrutenko, 1978)
Lampides boeticus (Linnaeus, 1767)
Cupido osiris (Meigen, [1829])
Everes argiades (Pallas, 1771)
Celastrina argiolus (Linnaeus, 1758)
Pseudophilotes vicrama schiffermulleri (Hemming, 1929)
Glaucopsyche alexis (Poda, 1761)
G. (Maculinea) arion (Linnaeus, 1758)
Turanana endymion (Freyer, [1850])
Plebejus argus aegidion (Meisner, 1818)
Plebejus idas baldur (Hemming, 1934)
Plebejus christophi transcaucasicus (Rebel, 1901)
P. (Plebejides) sephirus semiturcmenicus Bálint, 1991
P. (Plebejidea) loewii (Zeller, 1847)
P. (Kretania) eurypilus (Freyer, [1851])
Aricia agestis sheljuzhkoi (Obraztsov, 1935)
Aricia (Ultraaricia) anteros crassipunctus (Christoph, 1893)
Polyommatus icarus (Rottemburg, 1775)
P. (Neolysandra) alticola (Christoph, 1893)
P. (Cyaniris) semiargus bellis (Freyer, [1842])
P. (Plebicula) amandus orientalis (Staudinger, 1901)
P. (Plebicula) thersites ketshevana (Obraztsov, 1936)
P. (Meleageria) daphnis versicolor (Heyne, 1895)
P. (Lysandra) bellargus (Rottemburg, 1775)
P. (Lysandra) corydonius caucasicus (Lederer, 1870)
P. (Agrodiaetus) erivanensis (Forster, 1960)
P. (Agrodiaetus) firdussii pseudactis (Forster, 1960)
P. (Agrodiaetus) huberti (Carbonell, 1993)
P. (Agrodiaetus) carmon surakovi Dantchenko & Lukhtanov, 1994
P. (Agrodiaetus) phyllis sheljuzhkoi (Forster, 1960)
LIBYTHEIDAE
Libythea celtis (Laicharting, 1782)
NYMPHALIDAE
Satyrinae
Esperarge climene valentinae (Miller, 1923)
Lasiommata megera (Linnaeus, 1767)
Lasiommata maera (Linnaeus, 1758)
Melanargia galathea satnia Fruhstorfer, 1917
Melanargia russiae caucasica Nordmann, 1851
Melanargia larissa astanda Staudinger, 1871
Coenonympha glycerion tiphonides Staudinger, 1901
Coenonympha leander obscura Heyne, [1894]
Coenonympha saadi (Kollar, 1849)
Coenonympha pamphilus (Linnaeus, 1758)
Erebia medusa ([Denis & Schiffermüller], 1775)
Hyponephele lupina intermedia (Staudinger, 1886)
Maniola jurtina strandiana Obraztsov, 1936
Satyrus amasinus Staudinger, 1861
Hipparchia pellucida (Stauder, 1924)
Pseudochazara pelopea caucasica Lederer, 1864
Pseudochazara mamurra schahrudensis (Staudinger, 1881)
Chazara briseis meridionalis Staudinger, 1886
Chazara persephone transiens (Zerny, 1932)
Chazara bischoffii (Herrich-Schäffer, [1846])
Nymphalinae
Thaleropis jonia (Eversmann, 1851)
Argynnis paphia (Linnaeus, 1758)
Argynnis aglaja ottomana Röber, 1896
A. (Pandoriana) pandora ([Denis & Schiffermüller], 1775),
A. (Fabriciana) adippe taurica Staudinger, 1878
A. (Fabriciana) niobe orientals Alpheráky, 1881
Issoria lathonia (Linnaeus, 1758)
Euphydryas orientalis (Herrich-Schäffer, [1845])
Melitaea cinxia (Linnaeus, 1758)
Melitaea phoebe ([Denis & Schiffermüller], 1775)
Melitaea arduinna (Esper, [1783])
Melitaea didima trascaucasica Turati, 1919
Melitaea persea Kollar, 1849
Melitaea caucasogenita Verity, 1930
Brenthis hecate transcaucasica (Wnukowskiy, 1929)
Limenitis reducta mirzajani Gross & Ebert, 1975
Neptis rivularis (Scopoli, 1763)
Nymphalis xanthomelas fervescens (Stichel, [1908])
Nymphalis polychloros fervida (Standfuss, 1896)
Vanessa atalanta (Linnaeus, 1758)
Vanessa cardui (Linnaeus, 1758)
Inachis io (Linnaeus, 1758)
Aglais urticae turcica (Staudinger, 1861)