Comparative study on the fauna composition of dragonflies (Insecta: Odonata) in the Armenian, Iranian and Asia Minor Highlands as part of the Asiatic Mediterranean (Mediterranean faunal subregion, Paleosubtropical region, Boreal kingdom)

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Abstract. The paper presents the results of a comparative analysis of the taxonomic composition of the dragonfly faunas in the Armenian, Iranian and Asia Minor Highlands. Among all the regional faunas of the Mediterranean, the odonatofauna of the Iranian and Asia Minor Highlands is the richest, with 97 species each. The odonatofauna of the Armenian Highlands includes 77 species. A specific feature of the Asia Minor odonatofauna is the richness of rheophilic species. Among the representatives of the rheophilic fauna, the Gomphidae family in the Iranian Highlands includes 12 species, the genus Anormogomphus includes 1 species – A. kiritschenkoi Bartenev. There are 7 species in the Gomphidae family in the Armenian Highlands, and 10 species in the Asia Minor Highlands. In the suborder Zygoptera in the Iranian Highlands, the largest family is Coenagrionidae, in which the genus Ischnura is the richest in species. Specific species characteristic of the compared highlands are given. The odonatofaunas of the uplands contain European and Eurasian boreal as well as endemic taxa, which gives the dragonfly fauna a distinctive appearance. Analysis of the odonatofauna of the Asia Minor Highlands shows its eclecticity and species richness. Unlike the dragonfly fauna of the Armenian Highlands, the presence of European species is noticeable in the fauna of the Asia Minor.

1. Introduction
The high morphological specialization of dragonflies made it possible to classify them as a special infraclass of insects. Odonata is one of the ancient groups of terrestrial arthropods, which is provided with many features of biological progress: almost universal distribution in various landscape zones, taxonomic diversity, abundance in aquatic and near-aquatic ecosystems of all latitudinal zones, with a sufficiently high biomass [1]. This is the only group of invertebrates that completely occupies the niche of aerial predators and plays an important role in nature – the circulation and transformation of matter, energy in terrestrial, near-water and aquatic ecosystems [2].

The above explains the high interest in the group of many specialists in various biological fields.
Despite the significant flow of literary information on dragonflies, many problems remain that receive little or no attention. Such a problem is the lack of studies devoted to the odonatofaunas of large and distinctively developed regions. One of these regions is the Mediterranean – a territory with the richest fauna and flora, the formation of which is due to the interaction of subtropical warm and south-temperate climates; moisture supply for the development of the imaginal and preimaginal phases due to the proximity of the Mediterranean Sea; mountainous relief, creating highly differentiated ecological niches [3]. All this taken together creates a rich difference in local ecological conditions, due to which complexes of species of different origin and habitat are created.

Based on the most important relevance of the knowledge of the odonatofauna of the Mediterranean region, which includes the Near Asian (Iranian, Armenian and Asia Minor) highlands, we set a goal for the study: to generalize and analyze in a comparative aspect information on the taxonomic composition and geographical distribution, as well as the taxonomic composition of the dragonfly fauna of the Near Asian which are the key territory of faunogenesis of the Mediterranean faunistic subregion of the Paleosubtropical region of the Boreal kingdom.

2. Materials and Methods
This work is based on factual materials obtained in previous years (1990–2020) [1, 3-5] and additionally processed, office data, with the specification of original materials and literature sources [6-11]. The main expeditionary research was carried out in the North Caucasus, Central Caucasus, Transcaucasia, Turkey and Jordan. A total of 3.5 thousand specimens of dragonflies of 118 taxa were collected and studied. To clarify the original materials, dragonfly larvae and their exuvia were collected (about 2 thousand specimens in total), which were additionally processed [12]. The collection of material and office processing were carried out according to generally accepted methods of entomological research [13-15]. In accordance with these agreements on cooperation with foreign universities and institutes, material was received from Germany, Turkey, Bulgaria, Slovenia, Italy, France and a number of other countries. Collectible materials were also received as a result of exchange from a number of foreign colleagues, in the amount of 1.5 thousand copies of 98 species. All this made it possible to study 5 thousand specimens of dragonflies of 129 species inhabiting the highlands.

3. Results and Discussion
The Mediterranean is a single region in faunogenesis, however, differences in features in landscapes and natural and climatic conditions have their own specific and original features in the faunistic complex of dragonflies in the Mediterranean territories. Their location in the Mediterranean Sea region, the intersection of the European and Asian parts of Eurasia, as well as the African continent leads to the differentiation of the Mediterranean region into European, Asian and African parts, which is convenient for analyzing the odonatofauna.

The Asian Mediterranean, which includes the Armenian, Iranian and Asia Minor Highlands, is a heterogeneous territory defined into a single region based on proximity to the Mediterranean Sea, the dominance of mountainous terrain and the prevalence of an arid climate. The Armenian, Iranian and Asia Minor Highlands constitute the core of the Asian Mediterranean, which are characterized by an arid Mediterranean landscape. As we move to the east, the Mediterranean elements proper in the landscapes decrease, and the mountain-desert Asian ones increase.

The climate of the highlands is dry and continental, except for the extreme west and the south of the Asia Minor Highlands. Typically subtropical Mediterranean landscapes are well expressed here.

On the territory of the highlands, real deserts are developed in the plain and mountainous parts, and the distribution of precipitation is interconnected with the orography and the impact of the seas (Mediterranean, Black, Caspian) [5].

The distribution of desert, semi-desert and steppe landscapes, the transitions between them and the saturation with Mediterranean elements is determined by the distance from the Mediterranean Sea, the height of the terrain and the exposure of mountain slopes.
In accordance with the structure of the Asian Mediterranean and the general geographical division of the region, we differentiated analyze the odonatofauna of the Armenian, Iranian and Asia Minor Highlands.

The taxonomic composition of the uplands is, to a certain extent, different. So in the Iranian Highlands, as in all the other analyzed highlands, there are three suborders of dragonflies (Anisoptera, Zygoptera, Caloptera), while out of 10 families representatives of 9 live here, and 10 families live here in all other highlands. Despite this species, the composition of this upland is the richest in taxa of species and subspecies rank [4].

**Suborder Anisoptera**

The rheophilic fauna of the Gomphidae family in the Iranian Highlands includes 12 species.

The genus Anormogomphus includes 1 species A. kiritschenkoi Bartenef, endemic to the Iranian highlands.

The genus Onychogomphus is the richest in species: in the Iranian Highlands it includes 4 species: O. flexuosus Schneider, O. lefebvrei Rambur and O. assimilis Schneider, O. lefebvrei Rambur, the first two are endemic to the region. The species O. forcipatus L. has two subspecies within the highlands: O. f. unguiculatus Van der Linden and O. f. lucidostriatus Schmidt, and the second is endemic to the Iranian Highlands.

The genus Gomphus is represented by two species – endemic to the highlands G. amseli Schmidt and the Asian subspecies of G. vulgatissimus L. – G. v. schneideri Selys & Hagen.

The other four genera are represented by a single species each (Stylurus flavipes Charpentier, which has here the geographical form S. f. lineatus Bartenef, Ophiogomphus reductus Calver, Paragomphus lineatus Selys, Lindenia tetraphylla Van der Linden).

The Gomphidae family comprises 7 species in the Armenian Highlands [3, 5]. The species Gomphus vulgatissimus L. is represented by the southern Asian subspecies G. v. schneideri Selys & Hagen. The other, Stylurus flavipes Charpentier, is represented by the subspecies S. f. lineatus Bartenef, and Onychogomphus forcipatus L. – O. f. unguiculatus Van der Linden.

The genus Onychogomphus in the Armenian Highlands is represented by three species – O. flexuosus Schneider, O. lefebvrei Rambur, and O. assimilis Schneider. The species O. flexuosus Schneider and O. assimilis Schneider are endemic to the Asian Mediterranean.

The rheophilic fauna of the Asia Minor Highlands is quite diverse. The Gomphidae family in the Asia Minor Highlands is represented by 10 species (Gomphus davidi Selys, G. vulgatissimus L., Stylurus flavipes Charpentier is represented by the geographical forms G. v. Schneideri Selys & Hagen and S. f. lineatus Bartenef). In the species Onychogomphus forcipatus L., two subspecies are known in the highlands: O. f. unguiculatus Van der Linden and O. f. albotribialis Schmidt. In addition, three more species of this genus are known on the peninsula: O. flexuosus Schneider, O. lefebvrei Rambur, and O. assimilis Schneider. Paragomphus lineatus Selys and Lindenia tetraphylla Van der Linden are also typical Mediterranean species.

Of the Cordulegasteridae family, the Iranian Highlands inhabits Cordulegaster insignis Schneider, which has two subspecies here, C. i. nobilis Morton and almost endemic to the Iranian Highlands C. i. coronatus Morton.

Cordulegaster insignis Schneider is known from the Cordulegasteridae family in the Armenian Highlands, represented by the geographical form C. i. nobilis Morton.

Of the family Cordulegasteridae, only the species Cordulegaster insignis Schneider lives in the Asia Minor Highlands, but it has three subspecies here: nominative C. i. insignis Schneider, C. i. charpentieri Kolenati and C. i. nobilis Morton.

10 species are known in the Aeshnidae family in the Iranian Highlands. The genus Cephaloheschna, represented by C. klapperichi Schmidt. The Iranian Highlands are the only place in the Mediterranean where a representative of this genus is found.

Of the genus Aeshna, 3 species inhabit the highlands (Ae. mixta Latreille, Ae. affinis Van der Linden, Ae. juncea L. The latter species is represented here by the geographical form Ae. j. mongolica Bartenef).
For the genus *Brachytron* (*B. pratensis* Müller), this is the eastern limit of the range. Representatives of the genus *Anax*: *A. imperator* Leach and especially *A. parthenope* Selys are numerous and distributed throughout the highlands. The species *Anaciaeschna isoeceles* Müller is represented by the eastern geographic form *A. i. antehumeralis* Schmidt. Finally, *Caliaeschna microstigma* Schneider and *Hemianax ephippiger* Burmeister are common in most of the highlands.

The composition of the *Aeshnidae* family from the Armenian Highlands is represented by 11 species, five of which belong to the genus *Aeshna* (*Ae. serrata* Hagen, *Ae. juncea* L., *Ae. cyanea* Müller, *Ae. mixta* Latreille, and *Ae. affinis* Van der Linden). The territory is also inhabited by dragonflies of the genus *Anax* – *A. imperator* Leach and *A. parthenope* Selys. And the species *Anaciaeschna isoeceles* Müller is represented by the subspecies *A. i. antehumeralis* Schmidt. *Caliaeschna microstigma* Schneider, *Brachytron pratensis* Müller, *Hemianax ephippiger* Burmeister are widespread (but not numerous everywhere) in the highlands.

The *Aeshnidae* family in Asia Minor is also represented by 11 species, among which *Ae. serrata* Hagen, *Ae. mixta* Latreille and *Ae. affinis* Van der Linden. In general, the fauna of the genus *Aeshna* in the Asia Minor Highlands is depleted, since most of its species have more northern ranges [3].

The genus *Anax* is common in Asia Minor, especially *A. parthenope* Selys, which is numerous throughout the territory and has two subspecies here: nominative and *A. p. major* Goetz. The species *A. imperator* Leach and *A. immaculifrons* Rambur are not so numerous. Four genera of the *Aeshnidae* family are represented by one species each: *Anaciaeschna isoeceles antehumeralis* Schmidt, *Caliaeschna microstigma* Schneider, *Brachytron pratensis* Müller and *Hemianax ephippiger* Burmeister.

The family *Corduliidae* is completely absent in the Iranian Highlands. Of the representatives of the *Corduliidae* family in the Armenian Highlands, there is only one species of dragonflies – *Cordulia aenea* Leach. The *Corduliidae* family in the Asia Minor Highlands is represented by 2 species: *Cordulia aenea* Leach, *Somatochlora metallica* Van der Linden. The latter species is represented by the geographical form *S. m. meridionalis* Neielsen.

The *Libellulidae* family of the Iranian Highlands has 35 species. The genus *Sympetrum* is rich in species: 11 taxa have been recorded in the Iranian Highlands: *S. depressiuculum* Selys, *S. harionovii* Borisov, *S. sanguineum* Müller, *S. decoloratum* Selys, *S. tibiale* Ris, *S. flaveolum australinum* Akramowski, *S. meridionale* Selys, *S. vulgarum flavum* Barteneff, *S. striolatum pallidum* Selys, *S. pedemontanum* Allioni, *S. fonscolombii* Selys, which are widespread species and are common throughout the entire Iranian Highlands.

The second genus in terms of species richness in the analyzed region is *Orthetrum*. It includes 10 species (*O. triangulare* Selys, *O. prainosum neglectum* Rambur, *O. cancellatum kraepelini* Ris, *O. anceps* Schneider, *O. ransotnneti* Brauer, *O. chrysostigma* Burmeister, *O. taeniolatum* Schunider, *O. sabina* Drury, *O. brunneum* Fonscolombe, *O. albistylum* Selys and the nominative form of the species *O. cancellatum* L.). Most of the species are locally distributed in the highlands and occur sporadically. The tropical genus *Trithemis* is represented by three species: *T. arteriosa* Burmeister, *T. annulata* Palisol de Beauvois, and *T. festiva* Rambur.

The genus *Libellula* is represented by three typical species (*L. fulva* Müller is represented here by the subspecies *L. f. pontica* Selys, *L. quadrimalcata* L. is represented by both the typical form and the more widespread here subspecies *L. q. grigorievi* Schmidt, endemic to the highlands).

The genus *Crocothemis* includes here the oriental species *C. cervilia* Drury and the eastern subspecies of the widespread dragonfly species *C. erythraea* Brulle – *C. e. chaldaeorum* Morton.

The rest of the genera of the *Libellulidae* family are represented in the Iranian Highlands, one species each. These are *Acisoma panorpoides* Rambur, *Brachythemis fuscopalliata* Selys, *Diplacodes lefebvrei* Rambur, *Paloopleura sexmaculata* Fabricius, *Pantala flavescens* Fabricius, *Tholymis tillargai* Fabricius, *Selysiothemis nigra* Van der Linden.

The *Libellulidae* family in the Armenian Highlands has 25 representatives [4]. There are numerous species of the genus *Crocothemis* – *C. cervilia* Drury, *C. erythraea* Brulle (represented by the subspecies *C. e. chaldaeorum* Morton). The genus *Sympetrum* is also rich in species: *S. danae* Sulzer, *S. pedemontanum* Allioni, *S. flaveolum* L. (subspecies *S. f. australinum* Akramowski), *S. vulgarum* L.
(geographic form *S. v. flavum* Bartenev), *S. sanguineum* Müller (with the southern subspecies *S. s. armeniacum* Selys), *S. striolatum* Charpentier (the southern subspecies *S. striolatum pallidum* Selys is absent).

On the territory of the Armenian Highland, species of southern biological appearance are widespread. The genus *Sympetrum* with typical taxa: *S. meridionale* Selys, *S. decoloratum* Selys, *S. tibiale* Ris, *S. fonscolombii* Selys, and *S. depressissimum* Selys. The genera *Libellula*, *Pantala*, *Selysiothemis*, *Orthetrum* are represented by a complex of taxa common for the Asian Mediterranean. Representatives of the genus *Leucorhinia*, as well as on all the Near Asian highlands, are absent.

The *Libellulidae* family is the most diverse and includes 34 species in Asia Minor. Of the sympatric species of the genus *Brachythemis*, *B. leucosticta* Burmeester, is characteristic of the Pyrenees and Africa, and *B. fuscopalliata* Selys is characteristic of the Asian Mediterranean. The genus *Crocothemis* has two species (*C. cervilia* Drury and *C. erythrea* Brulle, represented by the subspecies *C. e. chaldaeorum* Morton). Both species are numerous and occur sympathetically. The species *Diplocodes lefebrevi* Rambur and *Pantala flavescens* Fabricius are found sporadically and locally.

The genus *Sympetrum* in Asia Minor is represented by nominative taxa: *S. striolatum* Charpentier, *S. fonscolombii* Selys, *S. decoloratum* Selys, *S. meridionale* Selys, *S. pedemontanum* Allioni, *S. flaveolum* L., *S. haritonovii* Borisov, *S. depressissimum* Selys, *S. sanguineum* Müller, as well as subspecies: *S. vulgaris flavum* Bartenev and *S. s. armeniacum* Selys.

The genus *Trithemis* is richly represented in the Asia Minor Highlands. Three taxa of this genus are recorded here: *T. arteriosa* Burmeister, *T. annulata* Palisot de Beauvois, and *T. festiva* Rambur. The genus *Libellula* includes 3 species. All of them are few in number and live only near mountain reservoirs. The subspecies *L. f. pontica* Selys is characteristic of the species *L. fulva* Müller.

The genus *Orthetrum* is the second most abundant genus in the *Libellulidae* family, after *Sympetrum*, in the Asia Minor Highlands. It includes nine species (*O. sabina* Drury, *O. taeniolatum* Schneider, *O. ransonneti* Brauer, *O. anceps* Schneider, *O. chrysostigma* Burmeister, *O. trinacria* Selys, *O. brunneum* Fonscolombe, *O. cancellatum* L., *O. albistylum* Selys). The species *Selysiothemis nigra* Van der Linden is typical for most of the highlands.

Suborder Zygoptera

In the suborder *Zygoptera* in the Iranian Highlands, the largest family is *Coenagrionidae*. In this family, the genus *Ischnura* is the richest in species (*I. aralensis* Haritonov, *I. forcipata* Morton, *I. aurora* Brauer, in the Mediterranean are known only for the Iranian Highlands, *I. forcipata* Morton, *I. aurora* Brauer, *I. senegalensis* Rambur, *I. fountainei* Morton, *I. evansi* Morton and *I. intermedia* Dumont). The species *I. elegans* Van der Linden, widespread over most of the Mediterranean, is represented in the Iranian Highlands by two subspecies: the eastern Mediterranean *I. elegans pontica* Schmidt and the highland endemic *I. e. marquardti* Schmidt. The species *I. pumilio* Charpentier is common here, as well as throughout the Mediterranean.

The species *Agriocnemis pygmaea* Rambur and *Ischnura aurora* Brauer, are widespread in the tropical and subtropical parts of the Old World, finding the northern limit of distribution in the Iranian Highlands [3].

Of the genus *Coenagrion*, 4 species are known for the highlands: *C. scitulum* Rambur, *C. puella* syriacum Morton, *C. australocaspicum* Dumont & Heidari, and *C. ornatum* Selys & Hagen. Of the genus *Enallagma*, in addition to the ubiquitous taxon *E. cyathigerum* Charpentier, the species *E. risi* Schmidt is characteristic of the highlands. The genus *Erythromma* is represented by *E. najas* Hansemann and *E. viridulum orientale* Schmidt. For the Iranian Highlands, the distribution limit of the species *Pyrrhosoma nymphula* Suzler (and the entire genus) to the east is characteristic.

The suborder *Zygoptera* in the Armenian Highlands is characterized by 27 species [4]. Most of the taxa belong to the *Coenagrionidae* family. The genus *Coenagrion* has 6 species here: *C. armatum* Charpentier, *C. vernale* Hagen, *C. pulchellum* Van der Linden, *C. puella* L. (geographical form *C. p. syriacum* Morton), *C. scitulum* Rambur and *C. ornatum* Selys & Hagen. The genus *Ischnura* is also represented in the highlands by six species: *I. evansi* Morton, *I. senegalensis* Rambur, *I. fountainei*
Morton, and *I. intermedia* Dumont. Two taxa, *I. elegans* Van der Linden and *I. punilio* Charpentier, are widespread. A species such as *I. elegans* Van der Linden is represented by the subspecies *I. e. pontica* Schmidt.

The genera *Cercion*, *Enallagma*, *Erythromma* are represented by a single species (*Cercion lindeni* Selys, *Enallagma cyathigerum* Charpentier and *Erythromma viridulum orientale* Schmidt, the latter species is represented by the Asian subspecies).

The fauna of dragonflies of the suborder *Zygoptera* of the Asia Minor Highlands is very close to that of the Armenian Highlands [4]. Differences can be traced only in isolated taxa. Thus, the *Platycnemididae* family in the Asia Minor Highlands contains the species *Platycnemis kervillei* Martin, which is absent in the Armenian Highlands. The situation is similar in the genus *Ceriagrion*. *C. tenellum* Villers lives in the Asia Minor Highlands, where it is represented by the endemic subspecies *C. t. georgifreyi* Schmidt, while it does not exist on the territory of the Armenian Highlands. In the genus *Coenagrion*, on the contrary, in the Asia Minor Highlands there are no species *C. armatum* Charpentier and *C. vernale* Hagen, locally found in the Armenian Highlands. This accounts for the small differences in the fauna of the dragonflies of the two neighboring highlands [3].

In the family *Platycnemididae* (Iran), two species are known (*Calicnemia exima* Selys and *Platycnemis dealbata* Selys – ubiquitous in flowing water bodies). The family *Platycnemididae* in the Armenian Highlands has two species: *Platycnemis dealbata* Selys and *P. pennipes* Pallas. The *Platycnemididae* family in the Asia Minor Highlands contains the species *Platycnemis kervillei* Martin, *P. dealbata* Selys, *P. pennipes pennipes* Pallas.

A similar situation in the genus *Ceriagrion*: *C. tenellum* Villers inhabits the Asia Minor Highlands (where it is represented by the subspecies *C. t. Georgigreyi* Schmidt, endemic to the coastal regions of the Asian Mediterranean), while it is absent in the Armenian.

The family *Lestidae* is richly represented in the Iranian Highlands. The genus *Lestes* contains *L. dryas* Kirby, *L. sponsa* Hansemann, *L. barbarus* Fabricius, *L. virens* virens Charpentier, *L. v. parvidens* Artobolevski, *L. macrostigma* Eversmann, *L. umbnnaus* Selys.

The genus *Sympecma* is represented throughout the Mediterranean by a full set of its species (*S. fusca* Van der Linden, *S. paedisca* Brauer, and *S. gobica* Foerster) only in the Iranian Highlands, and the abundance of all three of its species in many places of the highlands is very high. Dragonflies of the family *Lestidae* have 9 species in the Armenian Highlands represented by the genera *Lestes* and *Sympecma* (*L. dryas* Kirby, *L. sponsa* Hansemann, *L. barbarus* Fabricius, *L. virens* virens Charpentier, *L. v. parvidens* Artobolevski, *L. macrostigma* Eversmann, *Sympecma fusca* Van der Linden, *S. paedisca* Brauer, *S. gobica* Foerster).

Within the Asia Minor Highlands, the Lestidae family includes 8 species (*Lestes dryas* Kirby, *L. sponsa* Hansemann, *L. barbarus* Fabricius, *L. virens* virens Charpentier, *L. v. parvidens* Artobolevski, *L. macrostigma* Eversmann, *Sympecma fusca* Van der Linden, *S. paedisca* Brauer).

**Suborder Caloptera**

From the suborder *Caloptera*, 4 species have been identified in the Iranian Highlands. The only representative of the *Euphaeidae* family, *Epallage fatime* Charpentier, is found here.

The genus *Calopteryx* is represented by three species, two of which, *C. orientalis* Selys and *C. samarcandica* Bartenef, are practically endemic to the Iranian Highlands, and the third, *C. intermedia* Selys, is distributed throughout the Asian Mediterranean.

In the Armenian Highlands, as in Iran, the only representative of the *Euphaeidae* family, *Epallage fatime* Charpentier, is found. The family *Calopterygidae* in the highlands is characterized by the presence of two species of the genus *Calopteryx* (*C. intermedia* Selys and *C. samarcandica* Bartenef).

In the Asia Minor Highlands, as well as in two other regions from the *Euphaeidae* family, one species occurs – *Epallage fatime* Charpentier. As for the family *Calopterygidae*, there are species of the genus *Calopteryx* – *C. virgo festiva* Brulle, *C. splendens erevanense* Akramowski, *C. syriaca* Rambur, *C. intermedia* Selys, *C. samarcandica* Bartenef, *C. waterstoni* Schneider.

More specifically, the comparative analysis of the odonatofauna of the highlands was carried out on the basis of 4 background families, representatives of which inhabit these geographical areas.
Among the representatives of the family Gomphidae, only in the Iranian Highlands are species *Anormogomphus kiritschenkoi* Bartenev, *Gomphus ainseli* Schmidt, *Ophiogomphus reductus* Calvert, *Onychogomphus forcipatus* L. and the Armenian Highlands. Of the 14 species inhabiting the highlands, seven are common.

The vast family Aeshnidae includes 15 species. Typical for all uplands are: *Ae. mixta* mixta Latreille, *Ae. affinis* Van der Linden, *Anaciaeschna isoceles antehumeralis* Schmidt, *Caliaesclina microstigma* Schneider, *Brachytron pratensis* Müller, *Anax imperator* imperator Leach, *A. parthenope* parthenope Selys, *Hemianax ephippiger* Bunneister. Only in the Iranian Highlands are *Ae. j. mongolica* Bartenev, *Cephalaeaencha klappechi* Schmidt; in the Armenian Highlands – *Ae. cyanea* Müller, and there are no specific taxa in the Asia Minor Highlands.

In the Libellulidae family, all the highlands include 45 taxa, of which the following are common: *Cercothemis erythraea chaldaeorum* Morton, *C. cervilia* Drury, *Pantala flavescens* Fabricius, *Sympetrum pedemontanum* Allioni, *S. vulgatum flavum* Bartenev, *S. decoloratum* Selys, *S. decoloratum* Selys *S. haritonovi* Borisov, *S. tibiale* Ris, *S. sanguineum sanguineum* Müller, *S. s. armeniacum* Selys, *S. depressiusculum* Selys, *S. fonscolombii* Selys, *Libellula depressa* L., *L. fulva pontica* Selys, *L. quadrimaculata quadrimaculata* L., *Orthetrum aniceps* Schneider, *O. brunneum brunneum* Fonscolombe, *O. cancellatum cancellatum* L., *O. albistylus albistylus* Selys, *O. sabina* Drury, *Selysiothemis nigra* Van der Linden.

Only for the Iranian Highlands are *Acisoma panorpoides* panorpoides Rambur, *Palpopleura sexmaculata sexmaculata* Fabricius, *Tholymis tillarga* Fabricius, *Libellula quadrimalculata grigonevi Schmidt*, *Orthetrum cancellatum krapeleini* Ris, *O. triulinsum neglectum* Rambur, *O. triularelysum neglectum* Rambur. Only one taxon is specific for the Armenian Highlands – *Sympetrum striolatum pallidum* Selys. For the Asia Minor Highlands there are 4 taxa – *Brachythems leucosticta* Burmeister, *Sympetrum flavolatum flavolatum* L., *Orthetrum trinacria* Selys, *Rhyothemis semilyalina* Desjardins, *Rhyothemis s. syriaca* Selys [3].

An analysis of representatives of the suborder Zygoptera showed that the *Coenagrionidae* family contains 27 taxa. The richest Iranian plateau (27 species). Only here live *Agriocnemis pygmaea* Rambur, *Coenagrion australocapricum* n. sp., *Enallagma risi* Schmidt, *Erythromma najas najas* Hanseman, *Ischnura elegans marquardti* Schmidt, *I. aurora* Drury, *I. foniculata* Morton, *I. arakensis Hantonov* [16]. For the Armenian Highlands, specific taxa have not been found, and for Asia Minor, *Ceriagrion georgifreyi* Schmidt, *Ischnura elegans elegans* Van der Linden, *I. e. ebneri* Schmidt.

### 4. Conclusion

The odonatofauna of the Iranian and Asia Minor highlands turns out to be the richest among all the regional faunas of the Mediterranean, they include 97 species taxa each. At the same time, it should be noted that the qualitative nature of the odonatofauna of the uplands is different. The Armenian highlands are significantly inferior in quantitative and qualitative composition to the other two highlands and contain 77 species.

The significant influence of the eastern territories of Central Asia and the Oriental Faunal Region, from where representatives of the eastern species of widespread genera penetrate, indicates a bright specific line of the uplands. The odonatofaunas of these geographical countries contain European and Eurasian boreal faunal elements, as well as a large number of endemic taxa, which gives the dragonfly fauna a distinctive look. It should be noted that the Armenian Highland is characterized by the impoverishment of rheophilic species from the families *Cordulegasteridae* and *Calopterygidae*, as well as the presence of a significant number of endemics and the presence of a large number of boreal faunal elements. Analysis of the odonatofauna of the Asia Minor Highlands shows its eclecticity and species richness. Unlike the dragonfly fauna of the Armenian Highlands, the presence of European species is noticeable in the fauna of Asia Minor. Moreover, a specific feature of the Asia Minor odonatofauna is the relative abundance of rheophilic species.

The compared families in the Iranian Highlands include 80 species, the number of species taxa in Armenia is 61; the Asia Minor Highlands contains 74 taxa. 7 species taxa are common to the
highlands in the *Gomphidae* family, 8 taxa are specific to the *Aeshnidae* family, the *Libellulidae* family includes 22 species, and the *Coenagrionidae family* – 13.

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