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Contributions of A.S. Lelej to the study of velvet-ants (Hymenoptera: Mutillidae)

Вклад А.С. Лелея в изучение ос-немок (Hymenoptera: Mutillidae)

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Key words: Mutillidae, systematic, described taxa, contributions.

Ключевые слова: Mutillidae, систематика, описанные таксоны, вклад.

Abstract. The contributions of Arkady S. Lelej to our knowledge of the diversity of mutillid wasps, with an emphasis on the new taxa described from 1971 to 2016, are surveyed.

Резюме. Приводятся сведения о вкладе А.С. Лелея в изучение ос-немок, включающие анализ описанных им новых таксонов в период с 1971 по 2016 гг.

Arkady Lelej (the usual form he has used for papers using the Roman alphabet, but otherwise sometimes transliterated as Arkadiy Leley) has concentrated mainly on studies of the taxonomy and systematics of velvet-ants (Hymenoptera: Mutillidae) during his long career, spanning about 45 years so far. The taxonomy of mutillids is very difficult, specially because the females and males of the same species are morphologically very different: females are completely wingless with the mesosoma forming a fused box, but the males are mostly fully winged with the mesosoma comprising several articulating sclerites; the colour patterns of the females and males are also generally quite different. Sex associations are usually only possible if both are collected while mating or perhaps having been reared from the same host nest, so that most species of Mutillidae have been described from one sex only, and there are even several genera for which only one sex has been identified. In addition, as a result of developing on host specimens of different sizes, the specimens of a particular species of mutillid may vary very considerably in size [Brothers, 1989], and there is even sometimes great variation in their coloration, even for specimens collected at the same time and place [e.g. Bergamaschi et al., 2012: Figs 15–22].

Until now, Arkady has published 85 papers (including monographs and book chapters) which deal with or mention Mutillidae (see Appendix); in addition to these, he has also produced two extensive thesis abstracts, and 10 conference abstracts. His contributions toward improving our understanding of the diversity within the Mutillidae, including sex associations (some resulting from his own field work), have been the most important parts of his work on the group. Thus far, he has described 244 new taxa across all subfamilies of Mutillidae (Table 1; the higher classification shown being that which he proposed in Lelej, Nemkov, 1997), and from all Old World zoogeographic regions (Table 2). His initial interests (Fig. 1), understandably (given his domiciles), were in the Palaearctic fauna, for

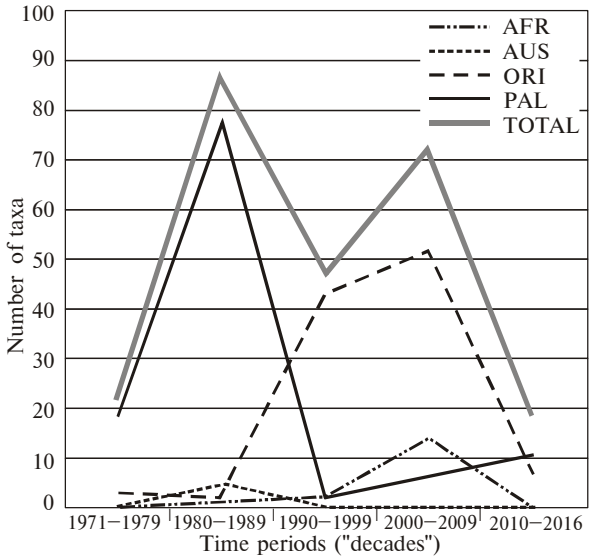

Fig. 1. Numbers of new taxa of Mutillidae described by A.S. Lelej from different regions over time (1971–2016). AFR — Afrotropical; AUS — Australian; ORI — Oriental; PAL — Palaearctic.

Рис. 1. Число новых таксонов Mutillidae, описанных А.С. Лелеем из различных регионов в период с 1971 по 2016 гг. AFR — Афротропическая область; AUS — Австралийская область; ORI — Ориентальная область; PAL — Палеарктическая область.

Table 1. New taxa of Mutillidae described by A.S. Lelej, solely and in co-authorship, tabulated according to subfamily (using the system of higher classification he has promoted, Lelej, Nemkov, 1997)

Таблица 1. Новые таксоны Mutillidae, описанные А.С. Лелеем самостоятельно и в соавторстве и расположенные по подсемействам (использована классификация высших таксонов по: Lelej, Nemkov, 1997)

Subfamily	Tribes	Genera & subgenera	Species	Totals
Myrmosinae	0	3	4	**7**
Kudakrumiinae	0	0	4	**4**
Pseudophotopsidinae	0	0	4	**4**
Ticoplinae	0	3	7	**10**
Rhopalomutillinae	0	0	1	**1**
Myrmillinae	0	3	17	**20**
Mutillinae	1	35	118	**154**
Sphaeropthalminae	0	5	8	**13**
Dasylabrinae	0	5	21	**26**
Ephutinae	1	2	2	**5**
Totals	**2**	**56**	**186**	**244**

which he described many new species and a few new genera; this period culminated in his major and comprehensive treatment of the Mutillidae of the USSR and surrounding countries [Lelej, 1985], and later, building on this, his catalogue of the Palaearctic Mutillidae [Lelej, 2002]. Also during this period he serendipitously encountered a small collection of mutillids from Australia, and described some as new taxa, his only contribution for that region thus far. Thereafter he concentrated on the Oriental fauna, which was very poorly known, and again described many new taxa and compiled a comprehensive catalogue of the Oriental Mutillidae [Lelej, 2005]. Having successfully dealt with that group, he was then able to work on a greater variety of mutillids, and most recently has again dealt mainly with species from the Palaearctic, but also a few Afrotropical ones and several Oriental ones. These trends are clearly shown in Figs 1 and 2, both as absolute numbers of new taxa and also as the proportions for each region at each time interval (but note that the last period comprises fewer years than the others). Fig. 1 also shows that there was a dip in numbers at about halfway through, probably the result of his concentration on compiling the two catalogues at that time. Those catalogues are extremely valuable listings of the known taxa in those regions,

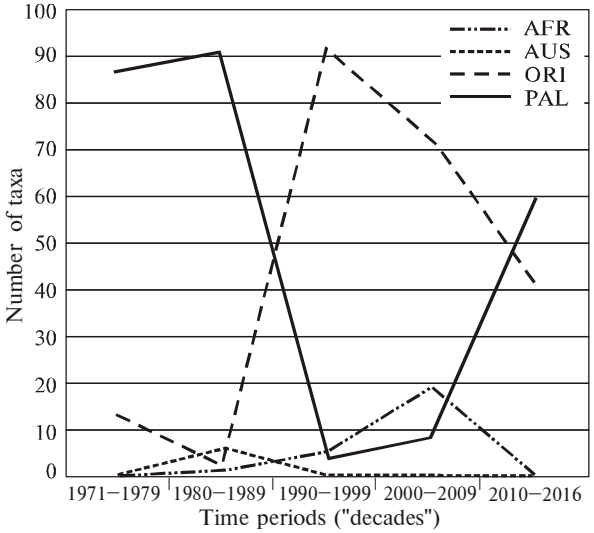

Fig. 2. Proportions of new taxa of Mutillidae described by A.S. Lelej from different regions over time (1971–2016). AFR — Afrotropical; AUS — Australian; ORI — Oriental; PAL — Palaearctic.

Рис. 2. Соотношение новых таксонов Mutillidae, описанных А.С. Лелеем из различных регионов в период с 1971 по 2016 гг. AFR — Афротропическая область; AUS — Австралийская область; ORI — Ориентальная область; PAL — Палеарктическая область.

Table 2. New taxa of Mutillidae described by A.S. Lelej from different zoogeographical regions of the world (taxa occurring in more than one region are apportioned according to their estimated representation in each)

Таблица 2. Новые таксоны Mutillidae, описанные А.С. Лелеем из различных зоогеографических областей мира (таксоны распространенные в нескольких регионах включены в долях в каждый из них)

Zoogeographical regions	Genera and Subgenera	Species	Totals
Afrotropical	3.3	11.0	**14.3**
Australasian	2.0	3.0	**5.0**
Nearctic	0.0	0.0	**0.0**
Neotropical	0.0	0.0	**0.0**
Oriental	34.4	72.9	**107.3**
Palaearctic	16.3	99.1	**115.4**
Totals	**56**	**186**	**242**

including synonymies, and in addition including keys to the genera; the Oriental catalogue also includes the descriptions of many new genera and species, an unusual and useful feature. Lelej [2002, 2005] has thus provided recent keys to the mutillid genera of two of the major regions; Manley and Pitts [2002] did so for the Nearctic region and Brothers [2006] for the Neotropics, leaving only the Afrotropical and Australasian regions to be done, both with many as-yet undescribed genera (a task which I have been trying to contribute to for many years).

So far, Arkady has contributed to describing taxa from four zoogeographic regions, although more than 90 % were Palaearctic and Oriental, and those in almost equal proportions (Fig. 3, Table 2). Although he started out publishing alone and in Russian, he soon gained recognition for his expertise on Palaearctic, and then Oriental, Mutillidae, so that he was consulted more frequently, resulting in increasing numbers of co-authored papers (although the many new taxa described in those papers were often attributed to him alone), these increasingly being in English and thus reaching a wider readership. This trend in authorship is illustrated in Fig. 4, reflecting the numbers of papers (based on those listed below, including several in which new taxa were not described) published in each "decade". Looking at the proportions of new taxa from each zoogeographic region, described solely or in co-authored papers, provides a slightly different perspective, though (Fig. 5). The few Australian taxa were all solely described, early in his career (Lelej 1983a), and the Afrotropical taxa were almost all described in collaboration with the collector of extensive samples of mutillids from Yemen [Lelej, Harten 2006]. For both the Palaearctic and

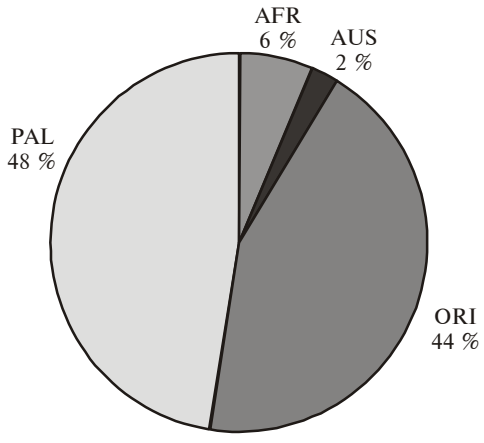

Fig. 3. Proportions of all new taxa of Mutillidae described by A.S. Lelej from different regions (1971–2016). AFR — Afrotropical; AUS — Australian; ORI — Oriental; PAL — Palaearctic.

Рис. 3. Соотношение всех новых таксонов Mutillidae, описанных А.С. Лелеем из различных регионов в период с 1971 по 2016 гг. AFR — Афротропическая область; AUS — Австралийская область; ORI — Ориентальная область; PAL — Палеарктическая область.

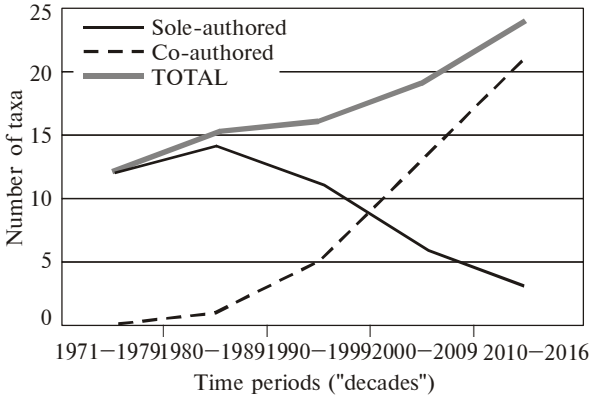

Fig. 4. Numbers of published papers (including monographs), sole- and co-authored, treating Mutillidae by A.S. Lelej over time (1971–2016).

Рис. 4. Число работ (включая монографии) А.С. Лелея по Mutillidae, опубликованных самостоятельно и в соавторстве в период с 1971 по 2016 гг.

Oriental faunas, about three-quarters of the new taxa were described in sole-author publications. His personal contributions to the taxonomy of the mutillids of those regions in particular have thus been very significant and of lasting value (only 1 of his 56 genera and subgenera, and 6 of his 186 species, have been synonymized so far, very small numbers, although it must be recognized that the paucity of workers on mutillids has meant that his work has generally not been subjected to in-depth review as yet).

His work has essentially involved broad surveys of the species found in different areas, rather than systematic revisions of particular groups/genera, an approach which is also reflected in his abilities in compiling those catalogues. A further example is his survey of the genera and subgenera (a paper for which he invited me to become a co-author, Lelej, Brothers, 2008). A subject facilitated by that compilation was his exploration of the biogeography of the genera and subfamilies of mutillids [Lelej, 2007 and several conference presentations]. The higher classification of the family has been an area of contention, however, so that any analyses using higher taxa (such as subfamilies, tribes, etc.) are constrained by the particular classification followed. As part of his doctorate, Arkady did a "cladistic" analysis of as many genera for which he had specimens as he could include [Lelej, Nemkov, 1997]. The results differed somewhat from my earlier analysis [Brothers, 1975], at least partly because of flaws in his coding of several characters, and his relative unfamiliarity with the New World fauna; my reanalysis [Brothers, 1999] critiqued Arkady's results, and essentially confirmed my earlier classification. However, both classifications have continued to be used by different workers, and I invited Arkady to spend some time with me in 2008 so that we could collaborate on carrying out a much more comprehensive analysis using improved methods, with the aim of producing a mutually agreed classification. We have made progress on this, and the results should

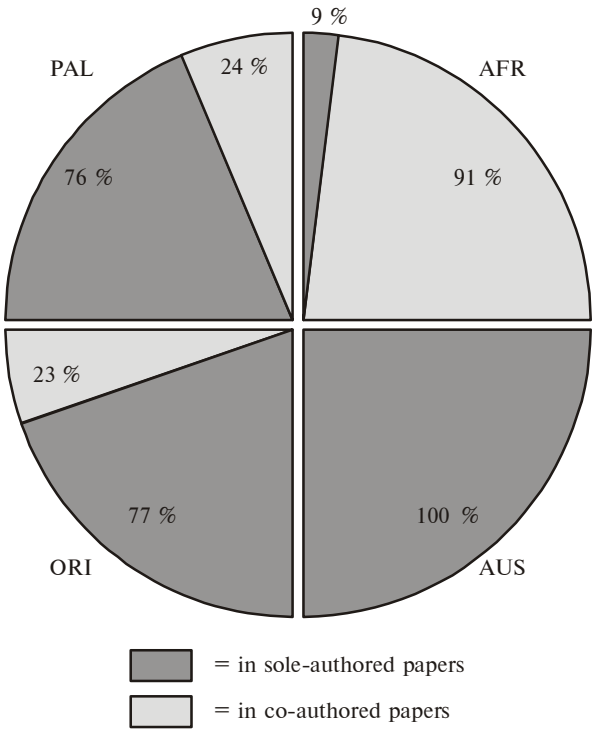

Fig. 5. Sole- and co-authorship of all papers including new taxa of Mutillidae by A.S. Lelej (1971–2016) per region. AFR — Afrotropical; AUS — Australian; ORI — Oriental; PAL — Palaearctic.

Рис. 5. Соотношение самостоятельных работ и работ в соавторстве, включающих описания новых таксонов Mutillidae по регионам. AFR — Афротропическая область; AUS — Австралийская область; ORI — Ориентальная область; PAL — Палеарктическая область.

be available later in 2016, but both of us have had many other commitments meanwhile.

The above collaboration has been only one of many where Arkady has travelled and spent time working with colleagues in other countries, most recently repeatedly in China. Apart from his visit to South Africa in 2008 (Fig. 6), we both attended the Conference of hymenopterists held in Köszeg (Hungary) in 2010 (Fig. 7), and shortly thereafter both spent a few days working in the Biologiezentrum of the Oberösterreichisches Landesmuseum in Linz (Austria), a collection which has recently come to prominence in mutillidological circles as housing the personal collection of the late Guido Nonveiller (a specialist on Afrotropical mutillids) and also more recently collected specimens from around the world, where we encountered another two mutillid specialists (Fig. 8).

Arkady's contributions to the study of Mutillidae have thus been very considerable, providing excellent baseline data on the Palaearctic and Oriental faunas through description of new species and genera, reviews of the mutillids from different areas, and specially the compilation of his catalogues. The identification and description of new genera, as opposed to new species within known genera, is arguably more significant in advancing our knowledge of mutillid diversity, and Arkady's contributions in this respect are evident (Fig. 9), specially for the extensive Oriental fauna (although he described higher proportions of genera for the Afrotropical and Australian taxa, the absolute numbers of those are very low). I wish him well on his 70th birthday, and trust that he will be able to make many further important contributions to our knowledge of mutillid diversity.

Acknowledgments

I thank Maxim Proshchalykin and his colleagues for providing the initial lists of Arkady's mutillid publications (slightly modified as the Appendix to this paper) and new taxa (see paper by Storozhenko et al. in this volume), and for the invitation to contribute to this volume in this fashion. However, I'm particularly grateful to Arkady himself for his friendship and collaboration in the study of that most fascinating (and frustrating!) group of Hymenoptera — our beloved mutillids.

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Appendix. A.S. Lelej's publications treating Mutillidae

Monographs (4)

Lelej A.S. 1985. [The velvet ants (Hymenoptera, Mutillidae) of the USSR and neighbouring countries]. Leningrad: Nauka. 268 p. [In Russian].

Lelej A.S. 2002. Catalogue of the Mutillidae (Hymenoptera) of the Palaearctic Region. Vladivostok: Dalnauka. 171 p.

Lelej A.S. 2005. Catalogue of the Mutillidae (Hymenoptera) of the Oriental Region. Vladivostok: Dalnauka. 252 p.

Lelej A.S., Brothers D.J. 2008. The genus-group names of Mutillidae (Hymenoptera) and their type species, with a new genus, new name, new synonymies, new combinations and lectotypifications // Zootaxa. No.1889. P.1–79.

Figs 6–8. Photographs of Arkady Lelej: 6 — Arkady Lelej (centre), with Denis Brothers (right) and Justin Waldman (left) at Hluhluwe-Imfolozi Game Reserve in South Africa (2008); 7 — Arkady Lelej near Kőszeg (Hungary) during an excursion for the 7th International Conference of Hymenopterists (2010); 8 — four mutillid specialists in the Biologiezentrum, Oberösterreichisches Landesmuseum, Linz (Austria), left to right: Esther Ockermüller (Austria), Denis Brothers (South Africa), Aleksandar Ćetković (Serbia), Arkady Lelej (Russia) (2010) (photograph by kind favour of Fritz Gusenleitner).

Рис. 6–8. Фотографии с А.С. Лелеем: 6 — Аркадий Лелей (в центре) с Денисом Бразерсом (справа) и Джастином Валдменом (слева) в Hluhluwe-Imfolozi Game Reserve в ЮАР (2008); 7 — Аркадий Лелей в окрестностях Кёсега (Венгрия) во время экскурсии на 7-м Международном Конгрессе по перепончатокрылым насекомым (2010); 8 — четыре специалиста по Mutillidae в Биологическом центре Верхнеавстрийского земельного музея, Линц (Австрия), слева направо: Эстер Окермюллер (Австрия), Денис Бразерс (ЮАР), Александр Цеткович (Сербия), Аркадий Лелей

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Papers (81)

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