

Spiders (Arachnida: Araneae) of the floodplains of the Vjosa river, South Albania

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This study presents the first results of research of the spider fauna of the Vjosa River in the vicinity of the village of Kutë, Albania, conducted in the period of 24–28.04.2017. A total of 50 species from 11 families were recorded: Araneidae (2), Gnaphosidae (7), Linyphiidae (8), Liocranidae (1), Lycosidae (15), Phrurolithidae (3), Salticidae (5), Tetragnathidae (2), Theridiidae (5), Thomisidae (1) and Titanoeidae (1). One new species is described and illustrated: *Liocranoeca vjosensis* n. sp. (♂). Two species were recorded for the first time in the Balkan Peninsula: *Janetschekia monodon* (O. Pickard-Cambridge, 1873) and *Trachyzelotes huberti* Platnick & Murphy, 1984. Fifteen species are new records for the spider fauna of Albania: *Arctosa perita* (Latreille, 1799), *Arctosa stigmata* (Thorell, 1875), *Ballus rufipes* (Simon, 1868), *Berlandina plumalis* (O. Pickard-Cambridge, 1872), *Erigonoplus spinifemoralis* Dimitrov, 2003, *Gnaphosa dolosa* Herman, 1879, *Gnaphosa rhenana* Müller & Schenkel, 1895, *Gnathonarium dentatum* (Wider, 1834), *Neaetha absheronica* Logunov & Guseinov, 2002, *Pachygnatha clerckoides* Wunderlich, 1985, *Phrurolithus nigrinus* (Simon, 1878), *Pirata tenuitarsis* Simon, 1876, *Pocadicnemis juncea* Locket & Millidge, 1953, *Robertus arundineti* (O. Pickard-Cambridge, 1871) and *Titanoeca flavicoma* L. Koch, 1872. According to the present distribution, the recorded species are classified into 16 zoogeographical categories and grouped into 4 chorological complexes: widely distributed species, European, Mediterranean and endemics. Widely distributed species (48%) were dominant, followed by European (26%), Mediterranean (20%) and endemic species (6%). The results of the present study emphasize the importance of protection and conservation of the newly described species, which would be seriously threatened by the proposed hydroelectric power dam on the Vjosa River.

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Diese Studie präsentiert die ersten Ergebnisse der Erforschung der Spinnenfauna des Flusses Vjosa in der Umgebung des Dorfes Kutë, Albanien, die in der Zeit vom 24.-28.04.2017 durchgeführt wurde. Insgesamt wurden 50 Arten aus 11 Familien registriert: Araneidae (2), Gnaphosidae (7), Linyphiidae (8), Liocranidae (1), Lycosidae (15), Phrurolithidae (3), Salticidae (5), Tetragnathidae (2), Theridiidae (5), Thomisidae (1) und Titanoeidae (1). Eine neue Art wird beschrieben und illustriert: *Liocranoeca vjosensis* n. sp. (♂). Zwei Arten wurden zum ersten Mal auf der Balkanhalbinsel gefunden: *Janetschekia monodon* (O. Pickard-Cambridge, 1873) und *Trachyzelotes huberti* Platnick & Murphy, 1984. Fünfzehn Arten sind Neufunde für die Spinnenfauna Albanien: *Arctosa perita* (Latreille, 1799), *Arctosa stigmata* (Thorell, 1875), *Ballus rufipes* (Simon, 1868), *Berlandina plumalis* (O. Pickard-Cambridge, 1872), *Erigonoplus spinifemoralis* Dimitrov, 2003, *Gnaphosa dolosa* Herman, 1879, *Gnaphosa rhenana* Müller & Schenkel, 1895, *Gnathonarium dentatum* (Wider, 1834), *Neaetha absheronica* Logunov & Guseinov, 2002, *Pachygnatha clerckoides* Wunderlich, 1985, *Phrurolithus nigrinus* (Simon, 1878), *Pirata tenuitarsis* Simon, 1876, *Pocadicnemis juncea* Locket & Millidge, 1953, *Robertus arundineti* (O. Pickard-Cambridge, 1871) und *Titanoeca flavicoma* L. Koch, 1872. Entsprechend der vorliegenden Verbreitung werden die erfassten Arten in 16 zoogeographische Kategorien eingeteilt und in 4 chorologische Komplexe eingeteilt: weit verbreitete Arten, europäische Arten, mediterrane Arten und Endemiten. Weit verbreitete Arten (48%) waren dominant, gefolgt von europäischen (26%), mediterranen (20%) und endemischen Arten (6%). Die Ergebnisse der vorliegenden Studie unterstreichen die Bedeutung des Schutzes und der Erhaltung der neu beschriebenen Arten, die durch das geplante Wasserkraftwerk im Vjosa-Fluss ernsthaft bedroht würden.

Keywords: Spiders, Liocranidae, Araneae, Albania, Vjosa River, new species, first record, conservation.

Introduction

Although the European spider fauna is quite well known, some countries, such as Albania, remain poorly studied and greatly undervalued. This may, in part, be attributed to the political, cultural and scientific isolation of Albania from the rest of Europe during the communist regime. This isolation has left the spider fauna of Albania among the least studied not only in the Balkan Peninsula, but also across the whole of Europe. To date, 468 species of spiders have been recorded from Albania (HELSDINGEN 2017).

As a result of the uneven spatial distribution of the available data on spiders and their diversity in Albania, many areas of the country remain completely unexplored. Such an area is the section of the Vjosa River in the region of Poçëm. Due to the controversial project to construct a hydropower plant at Kalivaç and Poçëm, this area has only just recently received scientific attention from biologists.

The aim of this study is (i) to present the first evaluation of the spider fauna of the Vjosa River in the region of Poçëm, (ii) to describe the newly discovered species *Liocranoeca vjosensis* n. sp. and (iii) to discuss the importance of its description. Furthermore, this paper points out the need for additional studies along the Vjosa River that would most likely result in further discoveries of new species, which could provide solid ground for the future establishment of protected areas in the region.

Material and Methods

The field work was conducted along the Vjosa River, in the vicinity of the village Kutë, in the period of 24–28.04.2017. The spiders were collected mainly by pitfall traps, using the cylindrical plastic bottles filled with a solution of vinegar. In only a few cases was hand collection performed. Several different habitats were investigated, mainly sandy and gravel banks along the river, wet meadows, scattered vegetation and open stands dominated by *Imperata cylindrica*, *Salix alba*, *Typha*, *Elocharis* and *Mentha*. More information about the habitat description can be found in SCHIEMER et al. (2018 this volume).

Altogether, 1001 specimens of spiders were studied (642 males and 359 females). Specimens were examined, measured and illustrated using a Nikon SMZ 25 stereomicroscope equipped with Nikon DS-Ri2 camera driven by NIS-Elements 5.2 Software. Left palp was illustrated. Lengths of leg segments were measured on the lateral side. Descriptions of the male palp refer to the left one. All morphological measurements are in millimeters. The taxonomy follows WORLD SPIDER CATALOG (2018) and NENTWIG et al. (2018). All material including the holotype are deposited in the Natural History Museum of Vienna.

The following abbreviations are used in the paper: Ta – tarsus, Mt – metatarsus, Ti – tibia, Pa – patella, Fe – femur, d – dorsal, pd – prodorsal, rd – retrodorsal, pl – prolateral, rl – retrolateral, v – ventral, pv – proventral, rv – retroventral, NHMW – Natural History Museum of Vienna, OUMNH – Oxford University Museum of Natural History, NHMB – Natural History Museum of Basel, Zoog. cat. – Zoogeographical categorization.

List of localities where spiders were collected (Map 1)

1. Floodplain; gravel bar with sandy silt cover; colonization stage with low to medium disturbance intensity; moist; scattered vegetation, 40°27.500' 19°44.503', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK

2. Floodplain; gravel bar with sandy silt cover; colonization stage with low to medium disturbance intensity; moist; scattered vegetation, 40°27.500' 19°44.503', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
3. Floodplain; gravel bar with sandy silt cover; colonization stage with low to medium disturbance intensity; moist; scattered vegetation, 40°27.522' 19°44.493', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
4. Floodplain; gravel bar with sandy cover; colonization stage with low to medium disturbance intensity; moist to wet; partly scattered vegetation, 40°27.500' 19°44.530', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
5. Floodplain; gravel bar with sand cover; colonization stage with low to medium disturbance intensity; moist to wet; partly scattered vegetation, 40°27.526' 19°44.481', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
6. Floodplain; gravel bar with sandy silt cover; early colonization stage with low to medium disturbance intensity; moist; almost bare vegetation, 40°27.555' 19°44.454', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
7. Floodplain; gravel bar with sandy silt cover; early colonization stage with low to medium disturbance intensity; moist; almost bare vegetation, 40°27.555' 19°44.454', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
8. Floodplain; gravel bar with sandy silt cover; colonization stage with low to medium disturbance intensity; moist; scattered vegetation, 40°27.518' 19°44.549', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
9. Floodplain; gravel bar with sandy cover; advanced colonization stage with low to medium disturbance intensity; moist; vegetation dominated by *Imperata cylindrica*, 40°27.529' 19°44.584', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
10. Floodplain; gravel bar with sandy cover; advanced colonization stage with low to medium disturbance intensity; moist; vegetation dominated by *Imperata cylindrica*, 40°27.538' 19°44.619', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
11. Floodplain; gravel bar with sandy cover; advanced colonization stage with low to medium disturbance intensity; moderately moist; vegetation dominated by *Imperata cylindrica*, 40°27.548' 19°44.615', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
12. Floodplain; disconnected side arm of the main channel; gravel with silty cover; colonization stage with low to medium disturbance intensity; moderately moist to wet; scattered vegetation, 40°27.672' 19°44.604', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
13. Floodplain; disconnected side arm of the main channel; gravel with silty cover; colonization stage with low to medium disturbance intensity; moist to wet; scattered vegetation, 40°27.672' 19°44.604', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
14. Floodplain; disconnected side arm of the main channel; gravel with clayey silt or silty cover; colonization stage with low to medium disturbance intensity; moist to wet; scattered vegetation, 40°27.697' 19°44.634', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
15. Floodplain; disconnected side arm of the main channel; gravel with clayey silt or silty cover; colonization stage with low to medium disturbance intensity; moist to wet; scattered vegetation, 40°27.697' 19°44.634', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
16. Floodplain; disconnected side arm of the main channel; gravel with clayey silt or silty cover; colonization stage with low to medium disturbance intensity; moist to wet; scattered vegetation, 40°27.719' 19°44.647', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK

17. Floodplain; gravel with cover of fine-grained sediments; due to pasturing retarded transition stage with medium disturbance intensity; moderately moist; open stands dominated by *Imperata cylindrica*, 40°27.548' 19°44.670', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
18. Floodplain; gravel with cover of fine-grained sediments; due to pasturing retarded transition stage with medium disturbance intensity; moderately moist; open stands dominated by *Imperata cylindrica*, 40°27.548' 19°44.704', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
19. Floodplain; gravel with cover of fine-grained sediments; due to pasturing retarded transition stage with medium disturbance intensity; moderately moist; open stands dominated by *Imperata cylindrica*, 40°27.568' 19°44.757', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
20. Floodplain; foot of eroding river bank; gravel with silty sand cover; high disturbance intensity; moist; scattered vegetation, 40°27.579' 19°44.861', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
21. Floodplain; gravel with cover of fine-grained sediments; due to pasturing retarded transition stage with medium disturbance intensity; moderately moist; open stands dominated by *Imperata cylindrica*, 40°27.577' 19°44.876', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
22. Floodplain; gravel with cover of fine-grained sediments; due to pasturing retarded transition stage with medium disturbance intensity; moderately moist; open stands dominated by *Imperata cylindrica* and *Vitex agnus castis*, 40°27.592' 19°44.936', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
23. Outside the floodplain; fallow land; sand or silty sand; moderately moist to dry, 40°27.677' 19°45.251', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
24. Higher level of floodplain; ditch channel with soft-wood; silt or clayey silt; moist to wet; vegetation dominated by *Salix alba* and *Typha*, 40°27.802' 19°45.218', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
25. Higher level of floodplain; ditch channel with softwood; silt or clayey silt; moist to wet; vegetation dominated by *Mentha* and *Typha*, 40°27.820' 19°45.251', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
26. Higher level of floodplain; disconnected side arm; silt or clayey silt; moist to wet; vegetation dominated by *Typha*, 40°27.835' 19°45.267', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
27. Higher level of floodplain; disconnected side arm; silt or clayey silt; moist to wet; vegetation dominated by *Elocharis* and *Typha*, 40°27.770' 19°45.363', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
28. Higher level of floodplain; disconnected side arm; pasture; silt or clayey silt; moderately moist to dry, 40°27.770' 19°45.363', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
29. Floodplain; foot of eroding river bank; gravel with silty sand cover; high disturbance intensity; moist; scattered vegetation, 40°27.830' 19°44.959', 48–52 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK
30. 40° 27.789' 19° 44.903', hand collecting, 28.04.2017, leg. J. GUNCZY & G. KUNZ
31. Gravel riverbank with sandy silt cover; inactive side arm, hand collecting, 48–52 m a.s.l., 25.04.2017, leg. W. PAILL
32. Ditch with softwood and *Typha*; silt or clayey silt, hand collecting, 48–52 m a.s.l., 25.04.2017, leg. W. PAILL

33. Gravel riverbank with sandy silt cover; cut bank with slip rock and silt, hand collecting, 48–52 m a.s.l., 27.04.2017, leg. W. PAILL



Map 1: Geographical distribution of the investigated localities in the region of Poçëm in Albania. The Vjosa River is shown to the left. The following sites are with same GPS coordinates presented in the map: 1=2, 6=7, 12=13, 14=15. Sites 31–33 are not presented in the map due lack of GPS coordinates in the original labels. – Karte 1: Geographische Verteilung der untersuchten Orte in der Region Poçëm in Albanien. Der Vjosa Fluss ist auf der linken Seite zu sehen. Die folgenden Standorte sind mit den gleichen GPS-Koordinaten in der Karte dargestellt: 1 = 2, 6 = 7, 12 = 13, 14 = 15. Die Seiten 31 bis 33 sind aufgrund fehlender GPS-Koordinaten in den ursprünglichen Etiketten nicht in der Karte dargestellt.

Results and Discussion

Faunistic part

Altogether 50 species from 11 families were recorded: Araneidae (2), Gnaphosidae (7), Linyphiidae (8), Liocranidae (1), Lycosidae (15), Phrurolithidae (3), Salticidae (5), Tetragnathidae (2), Theridiidae (5), Thomisidae (1) and Titanoeidae (1).

The most significant result is the discovery of a new species from the family Liocranidae: *Liocranoeca vjosensis* n. sp. (♂).

Two species are registered for the first time in the Balkan Peninsula: *Janetschekia monodon* (O. Pickard-Cambridge, 1873) and *Trachyzelotes huberti* Platnick & Murphy, 1984.

Fifteen species are new records for the spider fauna of Albania: *Arctosa perita* (Latreille, 1799), *Arctosa stigmata* (Thorell, 1875), *Ballus rufipes* (Simon, 1868), *Berlandina plumalis* (O. Pickard-Cambridge, 1872), *Erigonoplus spinifemoralis* Dimitrov, 2003, *Gnaphosa dolosa* Herman, 1879, *Gnaphosa rhenana* Müller & Schenkel, 1895, *Gnathonarium dentatum* (Wider, 1834), *Neaetha absheronica* Logunov & Guseinov, 2002, *Pachygnatha clerckoides* Wunderlich, 1985, *Phrurolithus nigrinus* (Simon, 1878), *Pirata tenuitarsis* Simon, 1876, *Pocadicnemis juncea* Locket & Millidge, 1953, *Robertus arundineti* (O. Pickard-Cambridge,

1871) and *Titanoeca flavicoma* L. Koch, 1872. The results indicate the dominance of representatives of the families Lycosidae (15), Linyphiidae (8), Gnaphosidae (7) and Salticidae (5).

Despite the fact that this study reflects only a snapshot of the existing spider diversity, 32 % (16 species) of the recorded species are new to the fauna of Albania. Bearing this fact in mind and taking into account that such significant results were achieved in just 4 days of collection, it follows that the spider fauna of Albania still remains largely unexplored.

Tab. 1: Species list of spiders collected at Vjosa River near the village of Kutë. New records are marked with an asterisk: * = new record for Albanian fauna, ** = new record for the fauna of the Balkan Peninsula. – Tab. 1: Artenliste der Spinnen, die am Fluss Vjosa in der Nähe des Dorfes Kutë gesammelt wurden. Neue Einträge sind mit einem Stern markiert: * = neuer Rekord für die albanische Fauna, ** = neuer Rekord für die Fauna der Balkanhalbinsel.

Family/ Species	Localities	Zoog. cat.
THERIDIIDAE		
<i>Asagena phalerata</i> (Panzer, 1801)	23 (1 ♂); 25 (2 ♂♂); 26 (2 ♂♂); 27 (1 ♂); 28 (2 ♂♂)	PAL
<i>Episus truncatus</i> Latreille, 1809	21 (1 ♀)	PAL
<i>Euryopis episinoides</i> (Walckenaer, 1847)	11 (1 ♂)	MED
* <i>Robertus arundineti</i> (O. Pickard-Cambridge, 1871)	2 (1 ♀); 6 (1 ♂); 12 (1 ♂); 14 (1 ♀); 23 (1 ♂)	EMMA
<i>Theridion varians</i> Hahn, 1833	24 (1 ♂)	EUS
LINYPHIIDAE		
<i>Erigone dentipalpis</i> (Wider, 1834)	5 (1 ♂)	PAL
* <i>Erigonoplus spinifemoralis</i> Dimitrov, 2003	27 (1 ♀); 28 (1 ♂)	PEM
* <i>Gnathonarium dentatum</i> (Wider, 1834)	24 (2 ♂♂ 21 ♀♀); 25 (1 ♂ 1 ♀); 26 (1 ♂ 1 ♀)	PAL
** <i>Janetschekia monodon</i> (O. Pickard-Cambridge, 1873)	6 (1 ♂)	ABA
<i>Oedothorax apicatus</i> (Blackwall, 1850)	24 (2 ♀♀); 26 (3 ♀♀)	EMA
* <i>Pocadicnemis juncea</i> Locket & Millidge, 1953	2 (1 ♂); 17 (1 ♂); 24 (1 ♂)	EUR
<i>Prinerigone vagans</i> (Audouin, 1826)	1 (20 ♂♂ 12 ♀♀); 2 (4 ♂♂ 1 ♀); 3 (6 ♂♂ 3 ♀♀); 5 (7 ♂♂); 6 (10 ♂♂ 1 ♀); 7 (5 ♂♂ 2 ♀♀); 12 (19 ♂♂ 10 ♀♀); 13 (2 ♂♂ 6 ♀♀); 14 (11 ♂♂ 7 ♀♀); 15 (7 ♂♂ 13 ♀♀); 16 (15 ♂♂ 3 ♀♀); 19 (3 ♂♂); 20 (2 ♂♂); 26 (1 ♂); 29 (2 ♂♂); 30 (1 ♂); 31 (1 ♂ 1 ♀)	EMMA
<i>Tenuiphantes tenuis</i> (Blackwall, 1852)	17 (1 ♀)	EMMA
TETRAGNATHIDAE		
* <i>Pachygnatha clerckoides</i> Wunderlich, 1985	25 (1 ♂); 26 (1 ♀)	PEM
<i>Pachygnatha degeeri</i> Sundevall, 1830	27 (1 ♂ 1 ♀)	PAL
ARANEIDAE		
<i>Hypsosinga sanguinea</i> (C. L. Koch, 1844)	17 (1 ♂)	PAL
<i>Mangora acalypha</i> (Walckenaer, 1802)	31 (1 ♀)	EMMA

Tab. 1 continued – Fortsetzung

Family/ Species	Localities	Zoog. cat.
LYCOSIDAE		
<i>Arctosa cinerea</i> (Fabricius, 1777)	1 (1 ♂); 2 (1 ♂ 1 ♀); 3 (1 ♂); 5 (2 ♂♂); 13 (1 ♂ 1 ♀); 15 (1 ♂); 16 (1 ♂); 33 (1 ♀)	EKA
<i>Arctosa leopardus</i> (Sundevall, 1833)	18 (7 ♂♂ 1 ♀); 24 (11 ♂♂ 1 ♀); 25 (2 ♂♂ 1 ♀); 26 (25 ♂♂ 3 ♀♀); 27 (7 ♂♂ 2 ♀♀)	EMMA
* <i>Arctosa perita</i> (Latreille, 1799)	2 (1 ♂); 13 (1 ♂)	EUR
* <i>Arctosa stigmosa</i> (Thorell, 1875)	12 (1 ♂ 1 ♀); 13 (3 ♂♂ 1 ♀); 14 (2 ♂♂); 15 (1 ♂ 2 ♀♀); 16 (1 ♂ 3 ♀♀)	EUS
<i>Arctosa variana</i> C. L. Koch, 1847	29 (4 ♂♂)	SEU
<i>Aulonia albimana</i> (Walckenaer, 1805)	10 (1 ♂); 19 (2 ♂♂); 22 (1 ♀)	PAL
<i>Pardosa atomaria</i> (C. L. Koch, 1847)	1 (2 ♀♀); 2 (1 ♀); 4 (1 ♀); 5 (3 ♂♂); 6 (1 ♂); 8 (1 ♀); 13 (3 ♂♂ 2 ♀♀); 14 (4 ♂♂ 2 ♀♀); 15 (2 ♂♂ 2 ♀♀); 16 (1 ♀); 20 (6 ♂♂ 2 ♀♀); 29 (8 ♂♂ 2 ♀♀)	EME
<i>Pardosa cribrata</i> Simon, 1876	5 (3 ♂♂); 12 (1 ♀); 14 (1 ♂); 26 (3 ♀♀); 27 (1 ♂ 14 ♀♀); 28 (1 ♂ 1 ♀)	SEU
<i>Pardosa hortensis</i> (Thorell, 1872)	4 (2 ♀♀); 8 (2 ♀♀); 9 (1 ♂ 10 ♀♀); 10 (2 ♂♂ 9 ♀♀); 11 (1 ♂ 5 ♀♀); 12 (3 ♂♂ 3 ♀♀); 13 (1 ♀); 14 (2 ♀♀); 17 (1 ♀); 18 (2 ♂♂); 20 (1 ♂ 3 ♀♀); 24 (1 ♂ 1 ♀); 25 (8 ♂♂ 21 ♀♀); 26 (2 ♂♂ 3 ♀♀); 29 (1 ♂)	EKA
<i>Pardosa proxima</i> (C. L. Koch, 1847)	11 (1 ♂ 1 ♀); 23 (1 ♂ 5 ♀♀); 25 (1 ♂ 2 ♀♀); 26 (1 ♀); 27 (3 ♂♂)	SEU
<i>Pirata piraticus</i> (Clerck, 1757)	18 (2 ♂♂); 25 (1 ♂)	HOL
* <i>Pirata tenuitarsis</i> Simon, 1876	13 (1 ♂); 24 (17 ♂♂ 5 ♀♀); 25 (8 ♂♂ 6 ♀♀); 26 (22 ♂♂ 16 ♀♀)	EMA
<i>Piratula latitans</i> (Blackwall, 1841)	2 (1 ♂); 11 (1 ♂); 12 (1 ♂); 13 (2 ♂♂); 18 (6 ♂♂ 4 ♀♀); 24 (54 ♂♂ 15 ♀♀); 25 (70 ♂♂ 17 ♀♀); 26 (114 ♂♂ 47 ♀♀); 27 (25 ♂♂ 12 ♀♀); 28 (3 ♂♂ 1 ♀); 29 (2 ♂♂); 32 (1 ♀)	EKA
<i>Trochosa hispanica</i> Simon, 1870	24 (2 ♂♂); 25 (2 ♂♂); 26 (3 ♂♂); 27 (1 ♂ 1 ♀)	SEK
<i>Trochosa ruricola</i> (De Geer, 1778)	9 (1 ♀); 10 (1 ♀); 13 (1 ♀); 14 (1 ♀); 24 (1 ♂); 25 (2 ♀♀); 26 (1 ♂ 3 ♀♀); 30 (1 ♀)	EUA
TITANOECIDAE		
* <i>Titanoeca flavicoma</i> L. Koch, 1872	22 (1 ♂)	SEU
LIOCRANIDAE		
<i>Liocranoeca vjosensis</i> n. sp.	27 (1 ♂)	ALB
PHRULOLITHIDAE		
<i>Phrurolithus festivus</i> (C. L. Koch, 1835)	13 (1 ♂); 25 (1 ♂)	PAL
* <i>Phrurolithus nigrinus</i> (Simon, 1878)	21 (2 ♀♀)	SEU

Tab. 1 continued – Fortsetzung

Family/ Species	Localities	Zoog- cat.
<i>Phrurolithus szilyi</i> Herman, 1879	23 (1 ♂)	SEU
GNAPHOSIDAE		
<i>Aphantaulax cincta</i> (L. Koch, 1866)	30 (1 ♂)	MED
* <i>Berlandina plumalis</i> (O. Pickard-Cambridge, 1872)	4 (1 ♂); 11 (4 ♂♂)	MED
* <i>Gnaphosa dolosa</i> Herman, 1879	5 (1 ♂); 33 (1 ♀)	SEM
* <i>Gnaphosa rhenana</i> Müller & Schenkel, 1895	11 (1 ♂)	ABA
<i>Haplodrassus dalmatensis</i> (L. Koch, 1866)	22 (1 ♂)	EMMA
<i>Haplodrassus signifer</i> (C. L. Koch, 1839)	24 (1 ♂)	HOL
** <i>Trachyzelotes huberti</i> Platnick & Murphy, 1984	22 (1 ♂); 26 (2 ♂♂); 28 (1 ♂)	MED
THOMISIDAE		
<i>Xysticus kochi</i> Thorell, 1872	23 (1 ♂)	PAL
SALTICIDAE		
* <i>Ballus rufipes</i> (Simon, 1868)	30 (1 ♂)	MED
<i>Mendoza canestrinii</i> (Ninni, 1868)	24 (1 ♂)	EUA
* <i>Neaetha absheronica</i> Logunov & Guseinov, 2002	4 (1 ♂)	EME
<i>Pellenes arciger</i> (Walckenaer, 1837)	22 (1 ♂)	SEU
<i>Phlegra bresnieri</i> (Lucas, 1846)	4 (1 ♂)	MED

Taxonomic part

Liocranidae

Liocranoeca vjosensis Komnenov n. sp. (Figs. 2–7)

Material examined. **Holotype** 1 ♂ (NHMW 28671): ALBANIA, Fier County, Mallakastër Municipality, Vjosa River near the village of Kutë, higher level of flood-plain, disconnected side arm, silt or clayey silt, moist to wet vegetation dominated by *Elocharis* and *Typha*, 40°27.770' 19°45.363', 51 m a.s.l., 24–28.04.2017, pitfall traps, leg. W. PAILL, J. GUNCZY & T. FRANK.

Etymology. The specific name refers to the type locality; adjective.

Diagnosis. *Liocranoeca vjosensis* n. sp. is a distinctive species easily recognized from other three species by the straight embolus (Fig. 5) (curved in *L. emertoni* (Kaston, 1938), *L. spasskyi* Ponomarev, 2007 and *L. striata* Kulczyński, 1882). By the length of the embolus, the new species is close related to *L. emertoni* and *L. spasskyi* but can be separated from them by the smaller and narrower embolar base (larger and broader in *L. emertoni* and *L. spasskyi*). From *L. striata*, the new species can be easily distinguished by the very short and linear embolus (long and semicircular in *L. striata*).

Description. Male (holotype). Carapace 1.64 long, 1.24 wide. Abdomen 1.96 long, 1.16 wide. Total length 3.6. Carapace brown with broad greyish lateral bands and unclear strips diverging from the medial groove. Chelicerae orange, 3 promarginal (middle one being the largest) and 2 retromarginal teeth. Maxillae, labium and sternum orange, longer than wide. Legs orange. Leg formula 4123. Leg measurements and leg spination are given in Table 2 and Table 3.

Tab. 2: Leg measurements of *Liocranoeca vjosensis* **n. sp.** (male holotype). – Tab. 2: Beinmaße von *Liocranoeca vjosensis* **n. sp.** (männlicher Holotypus).

	Fe	Pt	Ti	Mt	Ta
I	1.28	0.64	1.08	0.92	0.80
II	1.16	0.64	1.00	0.88	0.80
III	1.08	0.56	0.96	1.00	0.72
IV	1.56	0.64	1.48	1.68	0.96

Tab. 3: Leg spination of *Liocranoeca vjosensis* **n. sp.** (male holotype). Backslash indicates structure not present. – Tab. 3: Beinstachelung von *Liocranoeca vjosensis* **n. sp.** (männlicher Holotypus). Backslash zeigt an, dass die Struktur nicht vorhanden ist.

	Fe	Pt	Ti	Mt	Ta
I	3d 1rl	/	2 (pv rv)	2pv (2–3)rv	/
II	3d	/	2rv	2(rv pv)	/
III	3d 2rl 1pl	1d	2pv 2d 2(pd rd)	2rv 3pv 3 (rd pd)	/
IV	3d 1rl 1pl	1d 1rl	2(d pd rd) 2pv 1rv	2(rv pv) 4(rd pd)	/

Palp (Figs. 2–7): Tibial apophysis straight, bluntly pointed; median apophysis situated laterally, hooked, with broad base; embolus short, straight and pointed.

Female unknown.

Natural history. The only male was collected at the end of April by means of pitfall traps placed on wet clayey silt ground on the higher level of the floodplain, among vegetation dominated by *Elocharis* and *Typha*, at an altitude of 52 m.

Distribution. Only known from the type locality (Fig. 1).

Conservation status. Since this is first study to evaluate the spider fauna and diversity of the investigated area and since only one specimen of the new species was collected, the conservation status of *Liocranoeca vjosensis* **n. sp.** cannot be accurately determined at present. For precise categorization according IUCN Red List Categories and Criteria, more investigations are required. However, this new endemic species will be threatened by the proposed hydroelectric power dam along the Vjosa River, which will have a devastating impact on the type locality. The creation of a new hydroelectric dam would most likely drastically impact populations of this new species, and in some cases would eventually lead to the extinction of species before they become known to science. For these reasons, the discovery of new species is crucial for environmental and natural resources management and could lead to the establishment of protected areas in the future. The discovery

of a new spider species in only four days of collection, shows that new species will continue to be discovered as more and larger-scaled studies are carried out along the Vjosa River.



Fig. 1: Type locality of *Liocranoeca vjosensis* n. sp. at the Vjosa River near Kutë, Albania (Photo: Gernot KUNZ, 26.04.2017). – Abb. 1: Typenlokalität von *Liocranoeca vjosensis* n. sp. am Fluss Vjosa bei Kutë, Albanien (Foto: Gernot KUNZ, 26.04.2017).

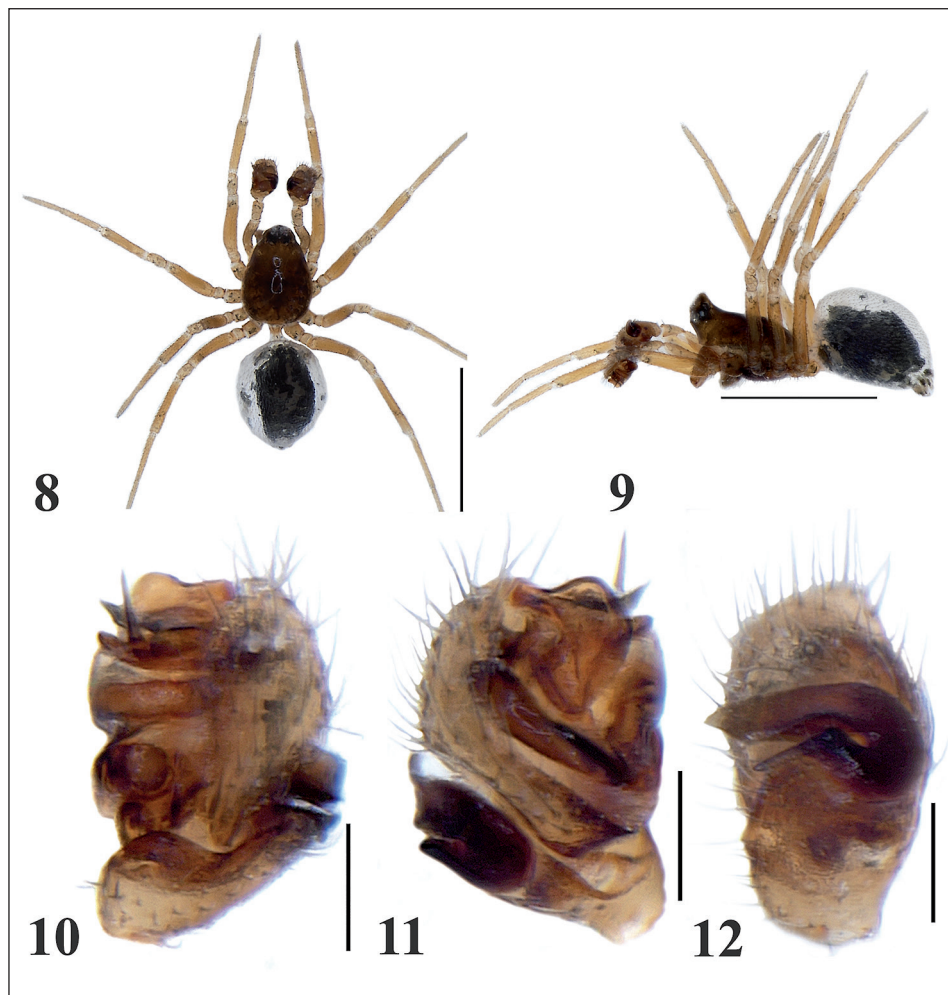
Zoogeographical analysis

Since this paper presents the first data for the spider fauna of the investigated area, the subsequent zoogeographical analysis remains incomplete and should be understood as the first attempt to summarize our present knowledge of the spider fauna in the investigated area. Based on the present distribution, the recorded species are classified into 16 zoogeographical categories and then grouped into the four following chorological complexes: Widely distributed species, European, Mediterranean and Endemics (Table 4), which are discussed below.

Widely distributed species complex (HOL + PAL + EUA + EUS + EMA + SEM + EMMA) is the best represented, comprising almost half of all species (48 %). **Palaearctic species** predominate (*Asagena phalerata*, *Aulonia albimana*, *Episinus truncatus*, *Erigone dentipalpis*, *Gnathonarium dentatum*, *Hypsosinga sanguinea*, *Pachygnatha degeeri*, *Phrurolithus festinus* and *Xysticus kochi*) (18 %), followed by **E-Mediterranean-Middle Asiatic** (*Arctosa leopardus*, *Haplodrassus dalmatensis*, *Mangora acalypha*, *Prinerigone vagans*, *Robertus arundineti* and *Tenuiphantes tenuis*) (12 %) and **Euro-Asian** species (*Mendoza canestrii* and *Trochosa ruricola*) (4 %).



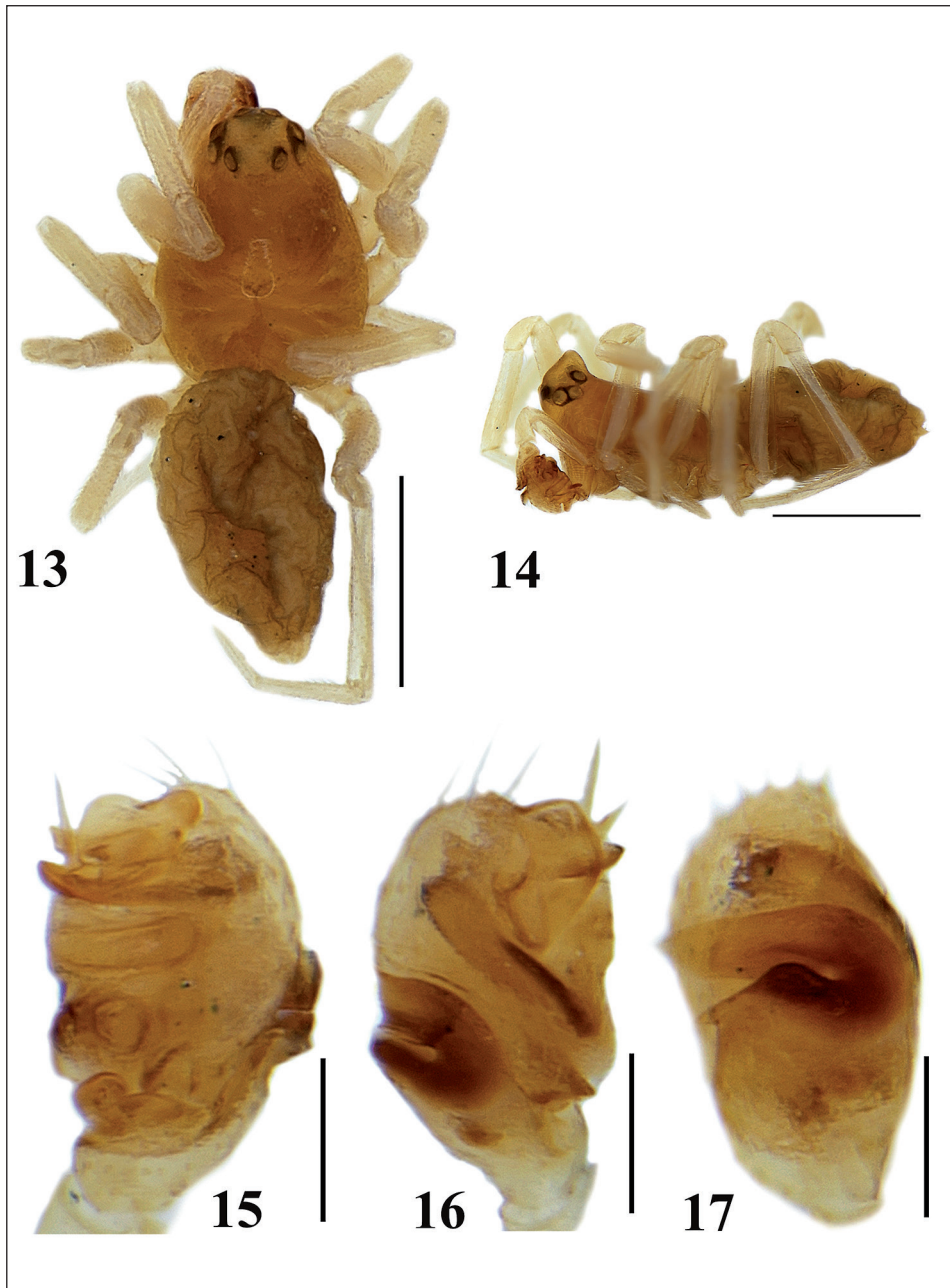
Figs. 2–7: *Liocranoeca vjosensis* n. sp. male holotype, NHMW 28671. 2 habitus, dorsal view; 3 palp, retrolateral view; 4 same, ventral-retrolaterally; 5 same, ventral view; 6 same, prolateral view; 7 same, dorsal view. Scale bars: 1 mm (2); 0.1 mm (3–7). – Abb. 2–7: *Liocranoeca vjosensis* n. sp. männlicher Holotypus, NHMW 28671. 2 Habitus, dorsale Ansicht; 3 palp, retrolaterale Ansicht; 4 gleiche, ventral-retrolateral; 5 gleiche, ventrale Ansicht; 6 gleiche, prolaterale Ansicht; 7 gleiche, dorsale Ansicht. Maßstabsbalken: 1 mm (2); 0.1 mm (3–7).



Figs. 8–12: *Janetschekia monodon* male from Albania. 8 habitus, dorsal view; 9 same, lateral view; 10 palp, retrolateral view; 11 same, prolateral view; 12 same, dorsal view. Scale bars: 1 mm (8–9); 0.1 mm (10–12). – Abb. 8–12: *Janetschekia monodon* männlich aus Albanien. 8 Habitus, dorsale Ansicht; 9 gleiche, seitliche Ansicht; 10 palp, retrolaterale Ansicht; 11 gleiche, prolaterale Ansicht; 12 gleiche, dorsale Ansicht. Maßstabsbalken: 1 mm (8–9); 0.1 mm (10–12).

European species complex (EUR + EKA + SEU + SEK) includes 13 species (26%). Within it, the **S-European** species are dominant (*Arctosa variana*, *Pardosa cribrata*, *Pardosa proxima*, *Pellenes arciger*, *Phrurolithus nigrinus*, *Phrurolithus szilyi* and *Titanoeca flavicoma*) (14%), followed by **Euro-Caucasian** (*Arctosa cinerea*, *Pardosa hortensis* and *Piratula latitans*) (6%) and **European** species (*Arctosa perita* and *Pocadicnemis juncea*) (4%).

Mediterranean species complex (MED + EME + PEM) includes 10 species (20%). This complex contains **Mediterranean** species (*Aphantaulex cincta*, *Ballus rufipes*, *Berlandina*



Figs. 13–17: *Janetschekia monodon* male holotype, OUMNH 707. 13 habitus, dorsal view; 14 same, lateral view; 15 palp mirrored, retrolateral view; 16 same, prolateral view; 17 same, dorsal view. Scale bars: 0.5 mm (15–16); 0.1 mm (17–19). – Abb. 13–17: *Janetschekia monodon* männlicher Holotypus, OUMNH 707. 13 Habitus, dorsale Ansicht; 14 gleiche, seitliche Ansicht; 15 palp gespiegelte, retrolaterale Ansicht; 16 gleiche, prolaterale Ansicht; 17 gleiche, dorsale Ansicht. Maßstabsbalken: 0.5 mm (15–16); 0.1 mm (17–19).



Figs. 18–25: Palp, retrolateral view (18, 22); same, dorsal view (19, 23); same, prolateral view (20, 24); same, dorsal view (21, 25). 18–21 *Gnaphosa rhenana* from Albania, Vjosa River near Kutë; 22–25 *Gnaphosa rhenana* lectotype, NHMB 695a. Scale bars: 0.5 mm (18–21); 0.1 mm (22–25). – Abb. 18–25: Palp, retrolaterale Ansicht (18, 22); gleiche, dorsale Ansicht (19, 23); gleiche, prolaterale Ansicht (20, 24); gleiche, dorsale Ansicht (21, 25). 18–21 *Gnaphosa rhenana* aus Albanien, Vjosa River bei Kutë; 22–25 *Gnaphosa rhenana* Lectotypus, NHMB 695a. Maßstabsbalken: 0.5 mm (18–21); 0.1 mm (22–25).

plumalis, *Euryopis episinoides*, *Phlegra bresnieri* and *Trachyzelotes huberti*) are dominant (12 %), followed by **E-Mediterranean** (*Neaetha abscheronica* and *Pardosa atomaria*) and **Ponto-E-Mediterranean** species (*Erigonoplus spinifemuralis* and *Pachygnatha clerckoides*) (4 %).

Endemic species complex (ABA + ALB) comprises 3 species (6%). Due to our limited knowledge on the distribution of *Gnaphosa rhenana* and *Janetschekia monodon* (which occurred outside their typical area of distribution – the Alps) in the unexplored Balkan Peninsula, they are temporally treated here as **Alpine-Balkan** species. It seems that both species are very rare in the investigated area, since only one specimen of each species has been collected. For a better understanding of their taxonomy, comparative material of holotype of *Janetschekia monodon* (Figs. 13–17) and lectotype of *Gnaphosa rhenana* (Figs. 22–25) were examined and described in the study. *Gnaphosa rhenana* and *Janetschekia monodon* are ripicolous species and particularly high-quality indicators for natural river banks (STEINBERGER 1996). For these reasons, we can freely consider them as flagship-species for open braided sections of dynamic alpine rivers.

Known only from the type locality, and at this state of knowledge, *Liocranoeca vjosensis* **n. sp.** is considered as **Albanian** endemic species.

Tab. 4: Zoogeographical composition of the spider fauna of Vjosa River. – Tab. 4: Zoogeographische Zusammensetzung der Spinnenfauna von Vjosa Fluss.

Complexes	Chorotypes	Species		
		Code	Number	%
Widely distributed	Holarctic	HOL	2	4
	Palearctic	PAL	9	18
	Euro-Asian	EUA	2	4
	Euro-Siberian	EUS	2	4
	Euro-Middle Asian	EMA	2	4
	S-European-Middle Asiatic	SEM	1	2
	E-Mediterranean-Middle Asiatic	EMMA	6	12
	Total		24	48
European	European	EUR	2	4
	Euro-Caucasian	EKA	3	6
	S-European	SEU	7	14
	S-Europeo-Caucasian	SEK	1	2
	Total		13	26
Mediterranean	Mediterranean	MED	6	12
	E-Mediterranean	EME	2	4
	Ponto-E-Mediterranean	PEM	2	4
	Total		10	20
Endemics	Alpine-Balkan	ABA	2	4
	Albanian	ALB	1	2
	Total		3	6

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