The mollusc fauna of the Vjosa river and its floodplains at Poçemi, South Albania

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During a survey from 24.–26.04.2017, 36 species of molluscs were found in the river-floodplain system of the Vjosa at Poçemi (see Schiemer et al. 2018 this volume). Regarding the terrestrial snails, a total of 28 species was found. Living specimens were mainly recorded at higher areas of slopes adjacent to the floodplain, which are neither affected by the changing water levels nor by burning of meadows for pastureland recovery. Most of the recorded species were species of open grassland, rock dwellers or generalists. In the Vjosa river itself and in adjacent waterbodies, a total of 8 freshwater mollusc species was found. Half of the species recorded are adapted to quick water changes and to changing water qualities. Future research should be focussed on subterranean Hydrobiidae snails, which perhaps live in the groundwater system of the Vjosa river.

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Die Erhebung der Molluskenfauna im Flussbett der Vjosa bei Poçemi wurde von 24.-26.04.2017 durchgeführt. Insgesamt wurden 36 Arten gefunden. Von diesen waren 28 Landgastropoden, bei welchen Lebendnachweise vor allem in höher gelegenen Bereichen der angrenzenden Hänge gelangen, welche weder von wechselnden Wasserständen der Vjosa noch durch Brandrodung zur Weidelandgewinnung betroffen sind. Im Wesentlichen handelte es sich dabei um Arten des Offenlandes, Fels-assoziierte Arten sowie Generalisten. An Süßwassermollsuken wurden insgesamt 8 Arten gefunden. Die Hälfte dieser Arten ist an rasche Wechsel bezüglich Wasserstände und Wasserqualität angepasst. Zukünftige Untersuchungen sollten ihr Hauptaugenmerk auf unterirdisch lebende Quellschnecken (Hydrobiidae) legen, welche möglicherweise im Grundwassersystem der Vjosa leben.

Keywords: Vjosa, Mollusca, Gastropoda.

Introduction

Research into the Albanian mollusc fauna has increased since the 1990s and, therefore, the general inventory of Albanian land snails is more or less well known (Dhora & Welter Schultes 1996, Fehér & Erőss 2007). Nevertheless, there are only few reports (e.g. Dhora & Welter-Schultes 1999a u. b, Welter-Schultes 2012) concerning ecology and habitat of Albanian terrestrial molluscs.

Material and Methods

Molluscs and their empty shells were sampled by three techniques: Manual sampling (approx. 30 min at each locality) was applied for larger species (>1 cm) and empty shells. Dry sieving was applied to river deposits and is a good method to detect small species and to survey malacologically unexplored landscapes (Ciliak & Steffek 2011). For this task, 20 litres of soil were gathered, sieved with 3.0 mm and 0.5 mm mesh width, and examined for mollusc shells. Wet sieving (Horsák 2003) was used to extract wet empty shells and living snails from moist substrate. For this task, detritus and plants from wet places and water bodies were washed in a sieve with 0.5 mm mesh width. Using this technique, living animals and water-filled empty shells stay at the bottom of the sieve, while other par-

ticles float to the top. Habitat characterisation for the species recorded was mostly taken from Dhora & Welter-Schultes (1999a) and Welter-Schultes (2012), where some general habitat requirements of European non-marine molluscs are given.

Results

A total of 36 species of mollusc was recorded.

Regarding terrestrial gastropods, 28 species were recorded. Of these, 10 were also recorded as living specimens, while the remaining 18 species were only recorded as empty shells. The number of recorded species per site ranged from 1 to 16. The highest number of species (16) was found at sampling site 4, a large river deposit, but all specimens were empty shells. The highest number of species of living specimens (5) was found at sampling site 9 (Tab. 9). Nearly half of the recorded taxa were representatives of three families (Clausilidae, Hygromiidae, Helicidae). Regarding higher taxonomic levels, almost all species belonged to the clade Eupulmonata and only one species, *Pomatias elegans*, belonged to the clade Caenogastropoda.

Tab. 1: Sampling sites. – Tab. 1: Sammelstellen.

	Description	Date	Coordinates
1	River deposit on gravel bank, pioneer vegetation near river	24.04.2017	N40°26.466′ E19°45.458′
2	River deposit on sand bank near river	24.04.2017	N40°26.445′ E19°45.456′
3	Loosely structured reed, shrubs and moist soil, remains of desiccated bayou	24.04.2017	N40°26.431′ E19°45.238′
4	Loosely structured reed, garbage pile and river deposits in shrubbery	24.04.2017	N40°26.343′ E19°45.171′
5	Meadow, particularly with moist soil	25.04.2017	N40°27.803′ E19°45.302′
6	Meadow near creek with reed (also sampling site for freshwater molluscs)	25.04.2017	N40°27.813′ E19°45.230′
7	Sediments of eroding bank	25.04.2017	N40°28.290′ E19°45.015′
8	Slope to higher part of the river plain, residual water of a bayou (also sampling site for freshwater molluscs)	26.04.2017	N40°28.558′ E19°45.179′
9	Rocks at the slope to higher part of the river plain.	26.04.2017	N40°28.710′ E19°45.199′
10	Maquis and single rocks at the slope (also sampling site for freshwater molluscs)	26.04.2017	N40°26.662′ E19°45.380′

Three species – *Vallonia enniensis*, *Succinella oblonga* and *Vertigo pygmaea* – can be considered typical species of wetlands. Inhabitants of various predominantly open, meadow-like habitats are *Cecilioides tumulorum*, *Chondrula microtragus*, *Mastus grandis, Allaegopis skanderbegianus, Monacha claustralis*, *Monacha frequens*, *Xeromunda vulgarissima*, *Trochoidea pyramidata*, *Cochlicella acuta* and *Cernuella virgata*. Species which can be considered predominantly rock-dwelling or rock-associated are *Granopupa granum*, *Chondrina arcadia clienta*, *Morlina glabra striaria*, *Albinaria scopulosa*, *Strigilodelima conspersa* and *Josephinella byshekensis*. The remaining nine species can be considered to be generalists inhabiting different types of habitats.

Tab. 2: Land snail species recorded on sampling sites 1-10. E: empty shells; L: living specimens. – Tab. 2: Landschnecken, die an den Sammelstellen 1-10 festgestellt warden konnten. E: leere Schalen, L: lebende Individuen.

Family	Species	1	2	3	4	5	6	7	8	9	10
Succinaeidae	*Succinella oblonga* (Draparnaud, 1801)			L							
Pomatiidae	*Pomatias elegans* (O.F.Müller, 1774)									L	E
Valloniidae	*Vallonia enniensis* (Gredler, 1856)				E						
Enidae	*Mastus grandis* (Mouson, 1859)									E	
Enidae	*Chondrula microtragus* (Rossmässler, 1838)						E				
Chondrinidae	*Granopupa granum* (Draparnaud, 1801)				E					L	
Chondrinidae	*Chondrina arcadica clienta* (Westerlund, 1883)				E						
Vertingidae	*Vertigo pygmaea* (Draparnaud, 1801)					L					
Ferrusaciidae	*Cecilioides tumulorum* Bourguignat, 1856		E								
Clauslilidae	*Charpentiera stigmatica sturmii* (L. Pfeiffer, 1848)				L					E	
Clauslilidae	*Albinaria scopulosa* (Charpentier, 1852)									L	
Clausilidae	*Strigilodelima conspersa* (L. Pfeiffer, 1848)									E	
Pristliomatidae	*Vitrea* sp.		E		E						
Spiraxidae	*Poiretia delesserti* (Bourguignat 1852)									L	
Oxychilidae	*Morlina glabra striaria* (Westerlund, 1881)				E						
Zonitidae	*Allaegopis skanderbegianus* (Polinski, 1924)				E						
Helicodontidae	*Lindholmiola corcyrensis* (Rossmässler, 1838)		E	L	E			L	L	L	
Cochlicellidae	*Cochlicella acuta* (O. F. Müller, 1774)		E		E						E
Hygromiidae	*Monacha claustralis* (Menke, 1828)			E	E	E				E	
Hygromiidae	*Monacha frequens* (Mousson, 1859)				E	E		L	L		
Hygromiidae	*Trochoidea pyramidata* (Bourguignat, 1856)		E	E	E					E	E
Hygromiidae	*Xeromunda vulgarissima* (Mousson, 1859)				E					E	E
Helicidae	*Josephinella byshekensis* (Knipper, 1941)									E	
Hygromiidae	*Cernuella virgata* (Da Costa, 1778)			E	E						
Helicidae	*Eobania vermiculata* (O. F. Müller, 1774)	E									
Helicidae	*Cornu aspersum* (O. F. Müller, 1774)				E						
Helicidae	*Helix lucorum* Linnaeus, 1758			E							
Helicidae	*Helix secernenda* Rossmässler, 1837				E	E					L
Total number of species		1	5	5	16	3	1	2	2	2	5
Number of species recorded living		0	0	2	1	1	0	2	2	5	1

Regarding freshwater molluscs, a total of 8 species could be detected (Tab. 3). More than half of the species detected – *Radix auricularia*, *Radix labiata*, *Physella acuta*, *Pisidium casertanum* and *Musculium lacustre* – is known for being adapted to rapid changes in water levels and water quality (Albrecht et al. 2008, Dhora & Welter-Schultes 1999a, Welter-Schultes 2012, Kileen 1992, Kerney 1993, Zettler & Glöer 2006). *Theo-*

doxus fluviatilis and *Ancylus fluviatilis* are typical species of permanent water bodies like rivers and lakes (Dhora & Welter-Schultes 1999). The Hydrobiidae snail *Radomaniola curta* inhabits springs (Glöer et al. 2015).

Tab. 3: Recorded species and their habitats. – Tab. 3: Festgestellte Arten und ihre Habitate.

Family	Species	Habitats; remarks
Neritidae	*Theodoxus fluviatilis* (Linnaeus,1758)	permanent water bodies
Hydrobiidae	*Radomaniola curta* (Küster, 1853)	Springs; no subspecies assignment possible
Lymnaeide	*Radix auricularia* (Linnaeus, 1758)	permanent and periodic water
Lymnaeide	*Radix labiata* (Rossmässler, 1835)	Periodic water bodies, springs
Lymnaeide	*Ancylus fluviatilis* Müller, 1774	Periodic water body; species group with cryptic diversity
Physidae	*Physella acuta* (Draparnaud, 1805)	Periodic water bodies
Sphaeridae	*Pisidium casertanum* (Poli, 1791)	Permanent and periodic water bodies; species group with cryptic diversity
Sphaeridae	*Musculium lacustre* (Müller, 1774)	Periodic water bodies

Discussion

It must be noted in general that, because of the season, some species of terrestrial mollusc (e.g. *Cernuella virgata*, *Xerocrassa vulgarissima*) were only obtained as empty shells or as indeterminable juveniles according to their phenology. Slugs could also not be detected for reasons of seasonality. Therefore, these results are merely a very first insight into the local terrestrial snail fauna of the Vjosa river at Poçemi. Regarding habitat preferences, it must be said that no comprehensive study concerning habitat preferences exists for the molluscs of the Balkan compared to those of Central Europe (Ložek 1964) or Northwestern Europe (Falkner et al. 2001) exists.

A first tendency that can be deduced from these results is that the floodplain directly adjacent to the river does not provide favourable living conditions for terrestrial gastropods. This can be explained on the one hand by the often rapidly changing vegetation structure and land cover caused by flood events, and on the other hand by the large-scale bushfires connected to the recovery of pasture land. Only the sampling sites 7, 8 and 9 harboured a larger number of living specimens. These three sites were not directly adjacent to the annually flooded part of the river basin, instead being slightly elevated. The relatively high number of species represented by living individuals at sampling site 9 is related to the fact that this site is dominated by well-structured calcareous rocks in different expositions, which provide favourable habitat conditions for various land snails, not only specific rock-dwellings species.

Regarding the freshwater molluscs, the results reflect the fact that the Vjosa river, with its rapidly changing water levels and lack of older bayous, is mainly suitable as habitat for species which can react quickly to changing living conditions. A variable bayou system, as originally existed in larger Central European rivers, does not exist here, because the Vjosa, as opposed to e.g. the Lower Danube or the Lower Rhine in Central Europe, is a much faster flowing river with a greater boulder load than the other two rivers. Besides species

that can react quickly to changing conditions, there are also some inhabitants of stagnant water and springs. Although only relatively few species were recorded, a power plant would destroy the living conditions of these species and also of other species possibly existing in the subterranean water body. This applies to the Hydrobiidae snail *Iglica xhuxhi* A. Reischütz, N. Reischütz & P.L. Reischütz 2014, which was described at the lower reaches of the Vjosa river near Novosele, but was not discovered in the recent study. This species is assumed to live underground in flooded gravel or sand banks beneath the river and is a suspected endemic of the Vjosa. So far, there are no reports of living specimens of this taxon. Further investigations should focus on the possible occurrence of this taxon and other potentially existing, but yet undiscovered subterranean species.

Some taxonomic insecurities must be noted regarding *A. fluviatilis*, as a cryptic diversity (see also Tab. 3) has been reported within this species (Pfenninger et al. 2003, Albrecht et al. 2006). Therefore, it seems quite clear that most *Ancylus* populations from the southern Balkans do not represent *A. fluvialtilis* sensu stricto, but a hitherto undescribed taxon provisionally named "*Ancylus* sp. B" by Albrecht et al. (2006). In their opinion, it could perhaps be *A. pileolus* Ferrusac 1822, which could be only verified, if specimens of the type locality were investigated. Further research is needed to settle this question. The same applies to *Pidisium casertanum* (see Tab. 3): some cryptic species could be hiding within this taxon (Mouthon & Abbaci 2012), which perhaps have different and more specialised habitat needs.

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