Land snails from 'The Catacombs of Paris':
Original insight from an unexplored subterranean fauna

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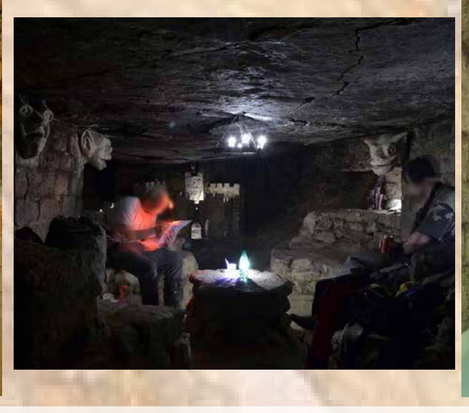
Molluscan Forum, London 2019
The Malacological Society of London

♦ Introduction ♦

At a10 to 30 meters-depth beneath Paris, miles-long galleries result from the former exploitation of limestone used for building the city. These ancient quarries have been commonly called 'catacombs' because a small part of them have been used to store human bones. In 1896, one of the pioneers of biospeleology in France, Armand Viré, created his own underground laboratory in one of the ancient quarries under the M.N.H.N. Since the nineteenth century, biospeleologists have focused on many invertebrate groups living in the subterranean ecosystem of Paris (*e.g.* Viré 1896; Jeannel 1926; Demange 1946; Balazuc *et al.* 1951; Balazuc 1962; Dresco 1983; Geoffroy 1991). Although these artificial cavities (i.e. quarries) are suitable habitats for land snails, there is not much data concerning them.

In the underground environment, physical conditions commonly fluctuate. However, the obscurity is complete. The temperature varies between 12°C and 19°C (average ~14°C~) and the constant humidity reaches 80%. Water is present in form of puddles and basins, and in some galleries water can reach 1m50. The level of flooded galleries depends on phreatic water variation. The exploitation of the tertiary bedrock provides numerous calcareous environments. Most of the organic material is brought by human activities (*e.g.* wood consolidation, underground explorer waste …). For centuries, the whole underground network has indeed been frequented and the 'cataphile' (*i.e.* underground explorers) transform this peculiar environment.

Our preliminary research provides the first inventory of ancient quarry land snails under Paris and nearby. This work aims to understand and discuss the distribution and colonisation strategies of recorded species.



♦ Method ♦

Land snails have been collected by hand-picking in the most suitable places considering the moisture and the presence of organic material. Furthermore, random collect and collaboration with cataphiles have also been conducted.

♦ Result ♦

Zonitoides excavatus

Context

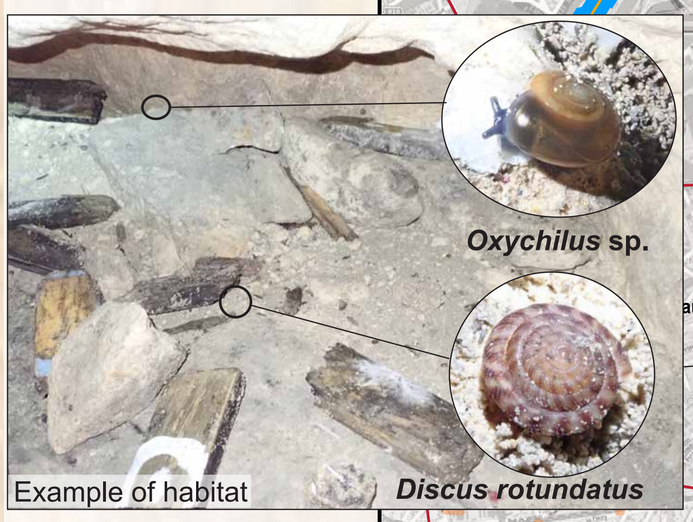
- Hydrography
- Town limit
- Paris distric limit
- Quarry
- Uninvestigated quarry

Malacological Result

- *Cecilioides acicula*
- *Discus rotundatus*
- *Oxychilus draparnaudi*
- *Oxychilus alliarus*
- *Oxychilus* sp.
- *Zonitoides arboreus*
- *Zonitoides excavatus*
- *Limax maximus*
- *Deroceras reticulatum*
- *Cornu aspersum*

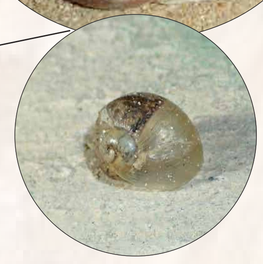
Oxychilus sp.

Deroceras reticulatum



Oxychilus sp.

Discus rotundatus



Cornu aspersum

Oxychilus draparnaudi

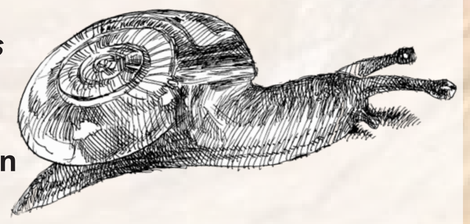
Limax maximus

♦ Conclusion ♦

A total of 11 taxa

- 1 trogloxene
- 1 endogean
- 9 troglophiles

- Difficulties to find land snails in this **peculiar environment**
- Original record of ***Zonitoides arboreus*** & ***Zonitoides excavatus***
- *Z.excavatus* found **on limestone**: explanation ??
- Only tolerant species except both Zonitids
- Land snails mainly live in **habitats transformed by frequentation** (comprising organic material = determining ecological factor)
- '**Opportunistic**' fauna : introduction & development is **dependent on human activity**



♦ Perspectives ♦

- Pursue inventories
- Compare land snail distribution with other invertebrate groups
- Investigations on freshwater molluscs

♦ References ♦

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♦ACKNOWLEDGEMENT♦

-Thanks to BDK, Luciole, Pinck, Onir, Swan, Suri, Charles R.

-Many thanks to the Malacological Society of London who provided fund trip to the Molluscan Forum