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Do species interactions prevent *Limoniscus violaceus* from living in suitable basal hollow trees?

The violet click beetle *Limoniscus violaceus* (Elateridae) © Nicolas Gouix

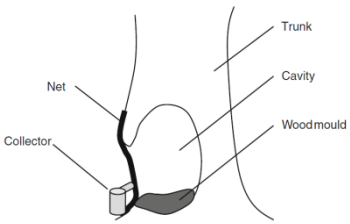
Introduction

Recent study has revealed that the probability of occurrence of *L. violaceus* in basal hollows increases with increasing tree diameter at 30 cm above ground and with increasing hollow decay stage (Gouix et al., *in prep*). The model also showed that a considerable part of the trees assessed as "suitable" for *L. violaceus* were not occupied by the beetle.

Is it because of interspecific interactions with other species (competition or predation) ?

Methods

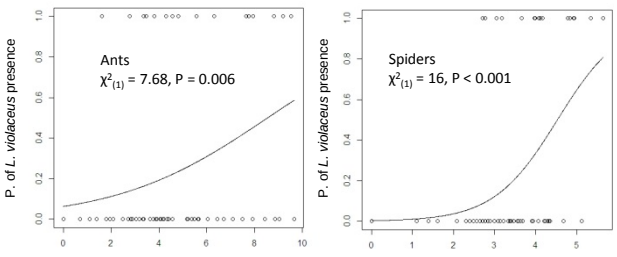
By use of emergence traps, we studied beetle and spider assemblages emerging from 73 basal hollow trees located within a single forest site of 3500 ha (in France). All trees were considered as "suitable" for *L. violaceus* (i.e. circonference at 30 cm height > 235 cm and at least in advanced decay stage). We used the probabilistic approach (Veech 2013) to test for significant pairwise patterns of species co-occurrence. We also analysed the effect of spider and ant abundance on the probability of occurrence of *L. violaceus* in the hollow by logistic regression.



Above: Emergence trap improved for collecting invertebrates from basal hollows (Gouix and Brustel 2012).

Results

From the total of 308 pair combinations of *L. violaceus* with other species, there was no significantly negative association. On the other hand, we found 25 species significantly positively associated with the presence of *L. violaceus* (three of them with spiders).



The probability of presence of *L. violaceus* in the hollows increased with the abundance of ants and spiders (above).

Below: Species positively associated with *L. violaceus* according to the probabilistic model of species co-occurrence.

Family	Species	Saproxylic	Predator	Hollow dwelling
Agelenidae	*Malthonica silvestris*	indet	yes	indet
Nemesiidae	*Nemesia simoni*	indet	yes	indet
Segestriidae	*Segestria senoculata*	indet	yes	indet
Aderidae	*Euglenes oculatus*	yes	no	facultative
Carabidae	*Carabus auratus*	no	yes	no
Curculionidae	*Phloeophagus lignarius*	yes	no	no
Dermestidae	*Trinodes hirtus*	yes	no	obligatory
Elateridae	*Ischnodes sanguinicollis*	yes	no	obligatory
Elateridae	*Melanotus villosus*	yes	yes	facultative
Elateridae	*Procraerus tibialis*	yes	yes	facultative
Leiodidae	*Ptomaphagus sericatus*	no	no	no
Leiodidae	*Sciodrepoides watsoni*	no	no	no
Mycetophagidae	*Mycetophagus quadriguttatus*	yes	no	obligatory
Oedemeridae	*Ischnomera caerulea*	yes	no	facultative
Oedemeridae	*Ischnomera sanguinicollis*	yes	no	facultative
Scarabaeidae	*Cetonia aurata*	yes	no	facultative
Scolytidae	*Xyleborus dryographus*	yes	no	no
Scolytidae	*Xyleborus monographus*	yes	no	no
Scraptiidae	*Scraptia fuscula*	yes	no	no
Staphylinidae	*Hesperus rufipennis*	yes	no	no
Staphylinidae	*Homoeusa acuminata*	yes	no	no
Staphylinidae	*Hypnogyra angularis*	yes	no	no
Staphylinidae	*Quedius cruentus*	no	no	no
Tenebrionidae	*Allecula morio*	yes	no	obligatory
Tenebrionidae	*Allecula rhenana*	yes	no	obligatory

Conclusions

We did not find any signs of competition or predation. If such effects were present they did not lead to exclusion of *L. violaceus* from the trees. Other potential reasons of the beetle's absence, like abiotic factors or population fluctuations, remain to be investigated. The spectrum of positively associated species covers a wide range of life strategies. This strengthens a potential role of *L. violaceus* as an umbrella species for assemblages of basal hollows.

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References:
Gouix and Brustel (2012) Biological Conservation 21.
Veech (2013) Global Ecology and Biogeography 22.

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