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Experiments to evaluate the ability of *A. antarcticus* to tolerate increasing temperatures (from 8°C to 41°C) have shown that its capability to withstand high temperatures (33°C = 100% of survivorship; 37°C = 35% of survivorship), even though for a short time. This species is more thermo-tolerant than the true freshwater *Borealibius zetlandicus*, a boreal-alpine tardigrade species very common at high altitudes of temperate regions and in Greenland (Rebecchi *et al*. 2009, J. Limnol. 68:64-70), but less tolerant than *P. richtersi*. Both hydrated and desiccated of *A. antarcticus* specimens showed a good tolerance to UV. The hydrated specimens survived up to a UV dose of 61.9 kJ m-2 (5% of survivorship), while the desiccated specimens tolerated up to a dose of 74.8 kJ m-2 (7.5% of survivorship). The exposition of active specimens to a LD50 UV dose (28.6 kJ m-2), showed that the negative effects of UV on *A. antarcticus* survival increase in combination with the increase of temperature values (8°C = 42.6% of survivorship; 15°C = 1.7% of survivorship). These data suggest that *A. antarcticus* has the potential to overcome the environmental changes due to increasing temperature and UV radiation.

A genetic engineering approach to study the adaptation of the grapevine moth *Lobesia botrana* from its wild hosts to *Vitis*

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The grapevine moth *Lobesia botrana* is an extremely polyphagous insect, endemic of the Palearctic region and known across all the Mediterranean area as an economically important pest in the vineyards. Since the chemical ecology of the moth has been a major topic of research for decades, much is known about its behavior. Larvae of the moth can feed up to 40 plant species belonging to 27 different families and the major targets of feeding, if available, are always the reproductive tissues (flowers, fruits). A crucial role in host finding and egg-laying behaviors is played by specific volatile compounds, released by the plant and perceived by the insect olfactory system. Since the adaptation to *Vitis* is recent (the first intense damages were recorded only from the early 20th century), experiments were carried out in the last years comparing the emission of volatiles between grapevine and *Daphne gnidium*, considered the first host of *L. botrana* in the wild: as expected, the volatiles profile partially overlapped. Recent wind-tunnel studies have also shown that a blend of the 3 specific terpenoids (E)-ß-caryophyllene, (E)-ß-farnesene and (E)-4,8-dimethyl-1,3,7-nonatriene (DMNT) elicits in laboratory assays the same *L. botrana* attraction than the complete grapevine headspace collection. Of these terpenoids, only one (ß-caryophyllene) is common between the two plants, while the others are present only in *Vitis* and were thus the target of the recent adaptation. To better understand the evolution of the plant-insect interaction, we decided to take a non host plant - the model *Arabidopsis thaliana* - and by means of genetic engineering to insert the genes responsible for the production of the three terpenoids, in order to mimic the volatile profile of the known hosts. Recently we also undertook experiments aimed at the genetic engineering manipulation of the pathway of the three terpenoids in *Vitis*: the alteration of the volatile profile will be studied as a possible starting point for the creation of a new pest control strategy.

Sperm-seminal fluid interaction in a scenario of sperm competition

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Sperm competition, occurring whenever the ejaculate of rival males compete to fertilize the same group of eggs (1) is a powerful evolutionary force, shaping male behaviour, morphology and physiology (2-3). To date theoreatical and empirical studies on the effects of sperm competition have primarily focused on how sperm characteristics affect the fertilization success of competing males (3). However, seminal fluid, often making up a large part of an ejaculate, influences own sperm performance and may potentially influence the outcome of sperm competition, by also affecting that of rivals (4-6). Recent theoretical analyses predict that selection should favour phenotypic plasticity in male expenditure on the ejaculate components that affect its competitive weight. In particular, variability in seminal fluid investment, in relation to sperm competition risk, is expected where mating modalities allow ejaculates to incapacitate other males'