CONTROL OF THE GRAPEVINE MOTH *LOBESIA BOTRANA* THROUGH THE MANIPULATION OF THE PLANT TERPENOID PROFILE

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The grapevine moth *Lobesia botrana* is one of the key pests of grape. Damages of the vineyard are achieved both by direct larval feeding on reproductive tissue of the plant (flowers, berries) and by secondary infections of microorganisms. Current control systems are either based on pesticides (many of which are currently being phased out) and mating disruption. Mating disruption stops the male moth from finding the female, by saturation of the treated area with sex pheromone. However, this method does not work well in non-delimited areas, or areas where pest population is high. We therefore suggest a method that instead works on the female by modifying the host-finding and the egg-laying behaviors, which in herbivore insects are mostly mediated by host plant volatiles (kairomones). Recent wind-tunnel studies have shown that a blend of 10 synthetic grape volatiles attracts as many moth females as a bunch of green grapes or the entire headspace collection from the same grape bunch. Further investigations demonstrated that even a subset of 3 specific terpenoids (E)-β-caryophyllene, (E)-β-farnesene and (E)-4,8-dimethyl-1,3,7-nonatriene (DMNT) elicits attraction comparable to that of the complete lure in laboratory essays, and gave also promising result when tested in field conditions. In addition, it was shown that the specific ratio among compounds is crucial, since both the subtraction and the percentage variation of any of the three chemicals resulted into an almost complete loss of activity of the blend. In the present work, we previously studied morphology and distribution of the antennal sensilla of *L. botrana* males and females, using Scanning Electron Microscopy (SEM). Afterwards, Single-Cell Recordings (SCR) from receptor neurons housed in sensilla thricodea and auricillica were performed. The neuronal activity induced by various grape volatiles, including the 3 kairomones mentioned above, was recorded and compared to responses to the female main pheromone compound E7,Z9-12:Ac. SCR responses to kairomones were strongly female-specific and s. auricillica-specific, and in the same range of neuron activation as those elicited in males by E7,Z9-12:Ac. Sensilla auricillica play hence a key role in the perception of host plant compounds. Recently we also undertook experiments aimed at the genetic engineering manipulation of the pathway of the three kairomonal terpenoids in *Vitis vinifera* cv. Chardonnay. In the creation of stable transgenic lines, two strategies are being used: the silencing of the genes responsible for the production of the three compounds (lack of the compounds) and their overexpression (alteration of the ratio between the compounds). The plant obtained will be a potential useful tool to investigate further the plant-insect interactions, and are a likely starting point of new insect control strategies based on kairomones manipulation in planta.