

Atelier 5/ Workshop 5

➤ Alternatives à la lutte chimique/Alternatives to chemical control

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EARLY EVENTS IN THE HOST-PATHOGEN-INTERACTIONS AND THE EXPRESSION OF PR-PROTEINS IN GRAPEVINE

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In biotrophic pathogens of grapevine such as *Plasmopara viticola*, the infection process is the first step of the infection cycle. During this step the first interaction of the pathogen with its host takes place. In cytological and molecular studies the developmental steps of the pathogen and the reaction of the host cells have been characterized. The infection process of *P. viticola* commences with the attachment of the sporangia on the host surface and the release of zoospores. Studies on the time course of the release of zoospores indicated this to be process already host specific. The released zoospores accumulated specifically around the stomata and encysted by forming a cell wall. A penetration peg was formed which penetrated the host tissue via the porus of the stomata. Cytological investigations revealed the role of the cytoskeleton in the pathogen as well as in the host cells during encystation and penetration. After this a substomatal vesicle was formed of which a primary hypha emerged. Primary hyphae grew into the intercellular space and came into contact with the mesophyll cells. An haustorium was formed as soon as the hyphae tip reached a host cell. Whereas the infection process up to the formation of the first haustorium took place within a few hours the establishment of *P. viticola* in the host tissue was delayed up to 24 h after infection. Thereafter, in susceptible interactions *P. viticola* colonized the intercellular space of the host tissue very rapidly, whereas in resistant interactions the development was furthermore slowed. In order to investigate the response of the plant to the infection by *P. viticola* different approaches were made. One approach was the characterization of PR-gene expression. For this purposes PR-genes and their promoters of different *Vitis* species have been characterized. First results on the kinetic of transcript accumulations showed a maximum of transcripts of a *Vitis Chitinase class III* and a *Vitis Glucanase* within 48 h after infection. Another defense response which has been studied is the induction of the phenylpropanoid pathway and the apposition of phenolics and callose around penetration sites. Already during the attachment of sporangia around the stomata callose accumulation in the guard cells and the surrounding epidermic cells could be observed. In incompatible interactions, however, a papilla formation around the penetrating haustorium occurred.