suggestions of the energy "lost" in inducing the defense. We have shown that penetration resistance or hypersensitive response (HR) provoke stomatal and photosynthetic dysfunctions, which could be important components of the disease resistance cost. More importantly, the stomatal dysfunctions (lock-up) are genotype, but not response-type, dependent, since genotypes with similar resistance responses show very different locking patterns when assessed histologically. We have assessed the content of several photosynthetic pigments including chlorophyll *a*, and *b*, several metabolites of the xanthophyll cycle, and metabolites of the chlorophyll degradation pathway in healthy and powdery mildew (*Blumeria graminis* f. sp. *avenae*) inoculated oat seedlings. Resistant genotypes associated with stomatal and photosynthetic dysfunctions activate the chlorophyll degradation pathway early after pathogen inoculation, increasing the level of pheophytin *a* content. These genotypes also showed a reduction in chlorophyll *a* and *b* contents, whereas the resistant genotypes lacking physiological dysfunctions showed no variation in the level of these compounds.

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Early signalling during *mlo*-based papilla resistance involve a subtle crosstalk between jasmonate, salicylic acid and abcisic acid pathways. F. CANALES-CASTILLA[1], G. MONTILLA-BASCÓN[1], N. RISPAIL[1], A. GÓMEZ-CADENAS[2], V. ARBONA[2], PRATS E[1]. [1]*Department of Plant breeding, Institute for Sustainable Agriculture (IAS), Spanish National Research Council (CSIC), Alameda del Obispo s/n, P.O. Box 4084, 14004 Córdoba, Spain.* [2]*Ecofisiologia i Biotecnologia. Dpt. Ciències Agràries i del Medi Natural. Universitat Jaume I - Campus Riu Sec. E-12071 Castelló de la Plana, Spain.*

Powdery mildew is one of the most widespread and damaging crop diseases. One of the most efficient and durable powdery mildew resistance mechanisms was originally found in barley lines carrying homozygous recessive alleles at the Mlo locus. These lines show efficient resistance to pathogen penetration based on formation of papillae, which are localised cell wall appositions at attack sites. The *Mlo* gene encodes a protein considered a negative regulator of the defence response so that its loss leads to more rapid and/or enhanced papilla formation. Although it is known that host plants sense powdery mildew fungi and start to activate defenses as early as 30 min following pathogen challenge, very little is known of the signaling that leads to the efficient papillae formation of *mlo* genotypes. We have explored the profile of several signaling molecules in two sets of *mlo*-isogenic lines with different genetic background, over a time course ranging from 30 min to 24 h. Abcisic acid decreased following inoculation in all susceptible and resistant genotypes whereas salicylic acid increased only in the resistant *mlo* genotypes from 2 h post inoculation, with a maximum at 24 h. Jasmonic acid and its derivative, Ile-jasmonic increased in resistant genotypes at 10-12 h after inoculation, whereas its biosynthetic intermediate 12-OPDA accumulated in resistant genotypes as early as 4 h and following. These data, showing a subtle and very early regulation of these signaling pathways, will shed light on the mechanisms of papilla formation.

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Biocontrol, natural compounds and plant defense stimulants

Characteristics of the biocontrol rhizobacterium *Pseudomonas chlororaphis* PCL1606. S. TIENDA, C. VIDA, A. DE VICENTE, F.M. CAZORLA. *Instituto de Hortofruticultura Subtropical y Mediterránea "La Mayora" (IHSM-UMA-CSIC), Departamento de Microbiología, Facultad de Ciencias, Universidad de Málaga, Spain. E-mail: sandratienda@uma.es*

The major disease affecting avocado crops in the Mediterranean area is avocado white root rot, caused by *Rosellinia necatrix*. The biocontrol rhizobacterium *Pseudomonas chlororaphis* PCL1606 has been isolated from rhizosphere of healthy avocado trees, growing in an area affected by white root rot. As a main characteristic, PCL1606 showed strong *in vitro* antagonism against *R. necatrix* and other important soil-borne pathogens. This is mainly due to produc-