

SUMMARY

GENE EXPRESSION IN FLOWERS AND FRUITS OF *Vanilla planifolia* AND RESPONSE TO *Fusarium oxysporum* f.sp. *radicis-vanillae*

Vanilla is one of the few orchid species that is grown for its fruit, as it has a great commercial importance because its content of vanillin. Mexico has lost its importance in volume production; even when, vanilla grown in the country has qualities that continue placing it in high demand in the international market. Nowadays, the premature fall of fruits is a factor that significantly affects the yields obtained in vanilla production in Mexico. On the other hand, the most important fungal disease for vanilla worldwide is the root and stem rot caused by *Fusarium oxysporum* f. sp. *radicis-vanillae* (Forv). Among the genetic studies carried out in vanilla, those that focus on the study of the expression of genes involved in the synthesis of vanillin stand out, while there are few evaluations on the expression of genes in flowers and fruits during their senescence and abscission, as well as during the response of the plant to Forv. The present work evaluated the expression of seven genes related to abscission and senescence in flowers and fruits, as well as the expression of three genes related to the synthesis of lignin during root infection by Forv. The expression of endo-1,4-beta glucanase was present in all the tissues analyzed, whereas in the pedicel of the non-set fruit, a clearly absence of the expression of glucan 1,3-beta glucosidase and phosphoprotein phosphatase 2A, and lower expression of aquaporin were observed; the dominant class transcription factor AP2. Also the low temperature and salinity response protein had a tissue-dependent differential expression. Nine new accessions with high levels of resistance to Forv were found. The evaluation of the expression of genes related to lignin synthesis showed that the early expression of phenylalanine ammonia lyase contributes to the resistance of vanilla against Forv, which indicates the importance of lignin as a defense mechanism during the beginning of root and stem rot.

Key words: *Vanilla planifolia*, flowers, fruits, lignin, *Fusarium oxysporum* f. sp. *radicis-vanillae*, PCR y qPCR