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Biotechnology for Apple Improvement disease resistance

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Apple worldwide production requires intensive operations of spraying to control many damaging diseases (e.g. apple scab, powdery mildew, fire blight) and insects (e.g. apple maggot, codling moth) in apple orchards. Chemical control has been an important means to keeping these pests at bay. The rising chemical costs not only squeeze the industry's profit margin, but also threaten the industry's sustainability. In theory, this is possible to reduce cost of disease control through both conventional breeding and biotechnology, but the technical challenges make the task nearly impossible with conventional breeding. In contrast, there are fewer technical difficulties to take on the task using genetic engineering, and it has been proven durable in apple. However, some of the undesirable points associated with existing biotechnology have resulted in public concern and opposition by several groups. Having the apple genome available, and thanks to joint efforts of several institutions, many of resistance or susceptible genes have become available to implement different approaches (transgenesis, cisgenesis or new breeding technology) to improve resistance to these disease in apple. In this talk we will present an overview of what we are doing to improve disease resistance (fire blight, apple scab and powdery mildew) in apple via GM technology.