Fire blight in different production systems in Germany and strategies to control the disease

Der Feuerbrand in verschiedenen Anbausystemen in Deutschland und Strategien zur Bekämpfung der Krankheit

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Abstract

Fire blight, caused by the bacterium *Erwinia amylovora*, is a serious disease of pome fruits in many countries of the world. The disease was first recognized at the end of the 18th century in the USA. Its first occurence in Europe was reported in 1957 from England. Since the disease was introduced in Northern Germany in 1971 it spread over the whole country and is now endemic. Due to favourable climatic conditions the disease is of major economic importance to apple and pear in the production regions of Southern Germany. The bacterium can establish epiphytic populations on floral surfaces and infections are initiated most commonly in blossoms. Other potential invasion sites are stomata, nectarthodes, lenticels and wounds. Besides weather conditions during the critical blossom infection periods the outbreak of the disease is directly connected to cultivation of susceptible host plants. These include several ornamental plants of the family *Rosaceae* and at present almost all important apple, pear, and quince varieties. Some of the pear varieties used in scattered orchards (Streuobstanbau) such as Oberösterreicher Weinbirne, Nordhäuser Winterforelle and Gelbmöstler are highly susceptible. These plants are under thread of the disease and they contribute in providing inoculum to commercial orchards of all production systems. Although apple varieties with some degree of resistance have become available, they can only partly contribute to control the disease as they have been of minor importance for marketing due to other quality criteria. Phytosanitary measures play an important role in reducing the level of fire blight incidence. Symptomatic plant material should be removed as soon as it appears. Sanitation of cankers is also a key to reduce inoculum. However, under German conditions integrated pest management measures have not been able to control the disease in any production system. During recent years, Plantomycin (Streptomycin) was primarily used for chemical control in integrated pome fruit production on the basis of exemption permits according to § 11 Par. 2 No 2 of the German Plant Protection Act under extremely restrictive conditions. Parallel to its use publicly funded research was increased in search of alternative control measures. A range of potential products from national and international sources was investigated in laboratory, greenhouse and field experiments. Some mineral powders, plant extracts, resistance inducers, and bacterial antagonists showed promising effects. However, some of these products have failed to show repeatable effects in field experiments of the BBA and the plant protection service under definite (EPPO guideline) conditions. Some products need to be verified under orchard conditions. Other recent experiments show the usefulness of a plant growth regulator in reducing the risk of shoot infection. This product seems to have potential in a combined strategy with bacterial antagonists or yeast. Yeasts have shown some encouraging results in reducing blossom infections and are of focus in current research funded by the Federal Ministry for Consumer Protection, Food and Agriculture (BMVEL). The research is

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part of a strategy to fight fire blight in fruit crops without use of antibiotics. The strategy was initiated in 2002 and is laid out over a period of five years. The discussion process and yearly evaluation of measures includes representatives of the BMVEL and its research institutions, the German Bundesländer plant protection administration, the conventional and organic fruit production, the consumer protection, the bee keepers, and from the environment and nature protection. Some aspects of the strategy, the measures in 2003 and their evaluation will be discussed.