FUSARIUM WILT OF CARNATION: PRESENT SITUATION, PROBLEMS AND PERSPECTIVES

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Vascular wilt, incited by *Fusarium oxysporum* f.sp. *dianthi*, continues to cause serious losses in all the carnation growing areas leading to a strong reduction in the acreage devoted to the carnation industry in some countries of Southern Europe. Over the past 10 years, innovative control measures have been reported and traditional strategies have been improved: this review will focus on the progress in *Fusarium* wilt management.

Development and detection of resistant varieties has for a long time been considered a time consuming and expensive operation, complicated by the presence of several pathotypes of *F. dianthi* and by the rapid development of new ones. At present, the need of using resistance as a wilt control strategy is becoming more important: some cultivars recently selected are resistant to several pathotypes of *F. dianthi* and commercially acceptable.

Proper floriculture practices, such as cultivation in isolated or raised benches, use of high pH and ammonia nitrogen fertilization, may help to reduce the incidence of wilt attacks.

Steam disinfection and chemical fumigation are not completely satisfactory under greenhouse conditions since eradication is often incomplete. Moreover, these practices may create a biological vacuum favorable to quick establishment of other pathogens and may reduce natural soil suppressiveness by decreasing the total amount of antagonistic populations.

Benzimidazole and phthalimide fungicides, applied during the cultivation, insufficiently control *Fusarium* wilt on highly susceptible cultivars and show improved activity in the case of partially resistant cultivars. The difficulties encountered in controlling *F. dianthi* wilt strongly stimulated, over the last decade, the search for biocontrol strategies. Suppressiveness of several soils to *F. dianthi*, reported in USA, France and Italy, has been widely investigated. In all cases suppressiveness has a microbiological origin: it is attributed to bacteria *(Pseudomonas, alcaligenes)* in USA soils, to fungi *(Fusaria)* in French and Italian soils. The isolation and identification of the microbiological entities responsible for soil suppressiveness represented a significant step: recolonization of steamed and/or conductive soil with these microorganisms resulted in a significant reduction of the spread of *F. dianthi*. The efforts of researchers are by now oriented to try to apply under practical conditions biocontrol measures: this seems to present a challenging perspective for the near future. At present only the integration of different control measures, such as soil disinfection, partially resistant cultivars, fungicides during the cultivation, permits management of *F. dianthi*.