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Effect of 14 peach rootstocks on the yield, fruit quality, mortality, girth expansion and resistance to frost damages of May Crest peach variety and their susceptibility on *Phytophthora citrophthora*

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Abstract

The influence of 14 peach rootstocks (GF677, AN 1/6, PR204/84, KID 1, DSS, wild peach seedling, KID 2, IDS-37, Limnou, Loadel, D.1869, MRS 2/5, A/P Procopiou, Selfrooted) on the nutrient absorption, yield, fruit quality, mortality, girth expansion and resistance to frost damages of May Crest peach variety was evaluated. The results showed that the better rootstocks were considered PR204/84, GF677, AN 1/6, KID 1 and KID 2. Trees on these rootstocks produced the highest yields and relatively good fruit quality. Trees grafted on PR204/84, GF677, KID 1 and KID 2 rootstocks were resistant to frost damage. In contrast, scion on the rootstock AN 1/6 were susceptible to frost damage. The mortality of trees grafted on AN 1/6, KID 1 and KID 2 was 0%. Trees grafted on PR204/84 and GF677 showed 40% mortality. The rootstocks GF677, AN 1/6, KID 1 and KID 2 had similar girth expansion. In contrast, the girth expansion of PR204/84 was significantly lower. Generally, rootstocks with the lowest level of P had the highest level of K and Ca. The converse was also true.

All rootstocks showed similar susceptibility to *Phytophthora citrophthora*.

Keywords: Fruit quality; Frost damage; Mortality; Nutrient absorption; Yield

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1. Introduction

Peachs are cultivated widely worldwide (FAO, 2002), the top five production regions are: Italy (1,700,000 t), United States (1,355,050 t), Spain (1,215,200 t), Greece (667,000 t), and France (483,000 t). In Greece, production base is in Naoussa county in Northern Greece. The research effort given to peach in the last few years is proportional to its commercial importance and much progress has been achieved in several aspects of peach cultivation.

May Crest, an early ripening sport of Crest peach, ripening in the third week of May, is the most widely planted peach variety in Greece. However, the continuous monocropping of peaches has resulted in various problems, including replant diseases (Magarey, 1999). The use of new peach rootstocks is useful in the control of replant diseases, consequently rootstock evaluations and their effects on fruit quality and yield is a major research topic.

Crown rot, caused by *P. citrophthora*, is a serious fungal disease of peach trees. Susceptibility of peach rootstocks on *Phytophthora* crown rots differ from rootstock to rootstock (Thomidis et al., 2002). In Greece, *P. citrophthora* has been reported as a causal agent of crown rot diseases on stone fruit trees (Thomidis, 2000a,b).

In this study, we report on the effect of 14 peach rootstocks on the yields, fruit quality, mortality, girth expansion and resistance to frost damage on the peach variety May Crest. In addition, the susceptibility of these rootstocks on *Phytophthora citrophthora* was evaluated in the laboratory.

2. Material and methods

2.1. Influence of peach rootstocks on some characteristics of the peach variety May Crest

All the experiments were carried out at the Pomology Institute, Naoussa, in Northern Greece. The orchard soil was calcareous, fairly shallow (20 cm) and poor in nitrogen and humus. Its initial pH value was high (7.8; mean of six samples before the application of any fertilizer). Calcium was abundant (17–49.47% total) and water permeability good, due to sandy rocky subsoil.

The peach variety May Crest was grafted on 14 peach rootstocks (GF677, AN 1/6, PR204/84, KID 1, DSS, wild peach seedling, KID 2, IDS-37, Limnou, Loadel, D.1869, MRS 2/5, A/P Procopiou, Selfrooted). Detailed description of most of these rootstocks are published by Stylianides et al. (1988). GF677 and a wild peach seedling rootstock were also included in this study.

The rootstocks were obtained from a commercial tissue-culture station (Vitro Hellas) and were planted in March 1988 in the field. Trees were planted at a 5 m × 5 m plant spacing.

Trees were trained to a vase shape with three to five main branches and three sub-branches each. The orchard was managed according to standard commercial practice (pruning, spraying, thinning, irrigation, etc.). The influence of rootstocks on yield, absorption of nutrients (tissue analysis), fruit quality (sample of 50 fruits per tree; mean