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Poster Abstract – G.19

A NOVEL ROOTSTOCK TOLERANT TO FLOODING STRESS USABLE FOR *PRUNUS* SPP.

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A novel somaclonal variant tolerant of prolonged soil waterlogging, was regenerated from callus derived from leaf explants of *in vitro* grown plantlets of rootstock Mr.S.2/5 originated from free pollination *Prunus cerasifera*. In vitro pressure selection conditions were induced by adding N-methyl-D-glucamine to the medium. Among regeneration events, only 4 cases of conversion into shoots were recorded. Under *in vivo* conditions, plants of line S.4 exposed to waterlogging survived for up to 15 days (*plus variant*) of hypoxic stress, plants of the line S.1 (*minus variant*) showed a lower capacity to survival at waterlogging (4 days), while Mr.S2/5 wild type and Barrier1 rootstock plants died after 7 days of continuous exposure to stress.

Physiological and morphological modifications occurred in line S.4 and line S.1 as change in stem and leaf water retention, chlorophyll stability, formation of adventitious roots and modifications in leaf tissue free hexoses. The data collected on free carbohydrates indicated that line S4 is able to maintain its metabolic activity and sugar transport during waterlogging, whereas the other lines are affected by treatment. Root and leaf mitochondrial activity, as relieved by TTC test, was retained for longer period, in line S.4 than Mr.S2/5 wild type. From histological studies was observed that after 6 days, under hypoxia stress, the roots of line S.4 plants maintained the tissue and cell integrity of their structure, while it was loosed in wild type and as early event in line S.1. The histological observations suggest that genes codifying for enzyme responsible for the cell wall architecture and for protein related to cell-cell adesion are regulated differently in the tolerant line S.4 as compared to the Mr.S2/5 wild type and minus variant line S.1. The natural ability of Mr.S2/5 wild type to generate adventitious roots was strongly increased in the line S.4, under stress conditions, forming large roots even in the deep layer of root system. This new property could indicate an acquired new strategy of adaptation to the stress by the line S.4.

Differential gene expression studies suggested that ethylene biosynthesis and signalling pathway components, ATP1 and NAD mitochondria gene expression, ADH1, and glycosil transferase like gene (ltg4) are differently expressed, by the waterlonging stress, in the plants of line S.4 respect to the plants of line S.1 and MrS2/5 wild type. The sorbitol transporter, SOT1, was differently affected in the wild type and line S.4 by the waterloging The expression pattern of lgt4 is particularly interesting, because of, after six days of waterlogging stress, was down-regulated in the tolerant plants of line S.4 while did not change in plant of wild type.