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EFFECT OF EXOGENOUS GROWTH REGULATORS ON QUALITY AND LONGEVITY OF CUT TULIP FLOWERS

ABSTRACT. Effects of pulse treatments with calcium nitrate, gibberellic acid, benzyladenine, sucrose (S) and ethephon on postharvest longevity and stem length of cut tulips 'Fantasy' and 'Aladdin' were investigated. The vase life of flowers was improved by using 0.1 mM GA3, 0.1 mM BA and 2 mM $Ca(NO_3)2$. Pulse treatment with ethephon at five concentrations from 2.5 to 50 mg . l^{-1} significantly reduced the length of the last internode of Fantasy cv., when compared to water control. The addition of 10 mg . l^{-1} ethephon to the preservative solution completely inhibited, caused by GA3 and S, undesirable stem elongation without any negative effect on flower longevity. Ethylene production was higher in tulips pulsed with ethephon (10 mg . l^{-1}) than in those untreated. For a short 24-h pulsing both $Ca(NO_3)2$ + BA + S + ethephon and $Ca(NO_3)2$ + GA3 + S + ethephon solutions were effective, resulting in a longer vase life of either freshly cut or dry-stored flowers. To protect tulips against an excessive stem elongation after harvest, the addition of ethephon to the pulse treatment with a preservative solution is preferable.

Key words: growth regulators, quality, stem length, storage, tulip, vase life

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EFFICIENCY OF A DOUBLE-PHASE MEDIUM IN MICROPROPAGATION OF SEMI-DWARF APPLE ROOTSTOCKS M.26, MM.106 and P 14

ABSTRACT. The efficiency of a double-phase medium (2F) in micropropagation of semi-dwarf apple rootstocks (Malus sp.) M.26, MM.106 and P 14 was evaluated. The medium was obtained by pouring the liquid MS solution (10 ml) onto the medium solidified with agar (50 ml) at the beginning of subculture. The 2F medium favoured the ingestion of its components by cultures. The fresh weights of cultures grown on 2F medium were significantly greater than the control (obtained on solid media). The 2F media clearly improved the shoot proliferation and elongation in the case of MM.106 and P 14 but did not influence M.26 cultures in such a way. The continuous use of 2F medium at the proliferation stage did not change the health status of cultures during of 3 successive passages. The residual effect of this medium used at the proliferation stage on shoot rooting both in vitro and in vivo was not proved.

Key words: micropropagation, Malus sp., double-phase medium, apple rootstocks

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EFFECT OF DNA QUALITY ON RANDOMLY AMPLIFIED POLYMORPHIC DNA-BASED IDENTIFICATION OF STRAWBERRY (*Fragaria x ananassa*) GENOTYPES

ABSTRACT. Genomic DNA from strawberry callus was obtained using five extraction methods. DNA yield ranged from 70 to 220 ľg g^{-1} of the fresh tissue, depending on procedure used. Results of randomly amplified polymorphic DNA - polymerase chain reaction (RAPD-PCR) assays showed that completed DNA-pattern, enabling to analyse polymorphism, was observed only for DNA derived from CTAB/mercaptoethanol - based method. Simultaneously, the spectrophoto-metrically determined contamination level was the lowest in this preparation. RAPD patterns were uncompleted or even the lack of amplification was noted for DNA preparations obtained with the other methods.

Key words: strawberry, DNA isolation techniques, identification

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EFFECT OF CADMIUM SOIL CONTAMINATION ON ITS UPTAKE AND PRODUCTION OF LOW-MOLECULAR-WEIGHT ORGANIC ACIDS BY STRAWBERRY ROOTS

ABSTRACT. Experiments were conducted on strawberry (Fragaria x ananassa Duch.), cvs Senga Sengana and Elsanta. Two types of soil were used: A - light and B - heavy. Both soils were contaminated with 1 or 2 mg Cd kg^{-1}(using $3CdSO_4$ x 8H2O) while those with no Cd added served as the controls. After 12 weeks of plant growth concentrations of low molecular weight organic acids (LMWOAs) in the rhizosphere soil and cadmium in roots were determined.

Oxalic, malonic, fumaric, succinic and maleic acids were found in the rhizospheric soil of both cultivars. Oxalic acid was the most abundant. There were no apparent differences in the amounts of acids in the rhizosphere of Senga Sengana and Elsanta strawberries. In both cases concentrations of oxalic and malonic acids were higher in the control of soil B as compared to soil A. After Cd treatment the content of individual acids in the rhizosphere rose above their levels in the control. Roots of strawberries grown in cadmium - treated soils were significantly richer in this heavy metal than those from the control. Soil contamination with 2 mg Cd kg^{-1} resulted in the highest rise of this element in strawberry roots. It was also found that cadmium content in roots of Elsanta cultivar was higher when grown after Cd treatment in soil B as compered to soil A. Results obtained suggest that soil contamination with cadmium stimulates the production of LMWOAs and increases Cd content in strawberry roots.

Key words: cadmium, uptake, low molecular weight organic acids, straw- berry, rhizosphere, roots

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CADMIUM UPTAKE AND DISTRIBUTION IN STRAWBERRY PLANTS AS AFFECTED BY ITS CONCENTRATION IN SOIL

ABSTRACT. Strawberry plants cv. Senga Sengana were grown in a green-house in sandy soil collected from the surface layer of agricultural land. Its mineral content was low: P - 2.1 mg, K - 4.6 mg and Mg - 3.8 mg per 100 g and pHKCl 4.2. Five different Cd levels in soil were used: (i) control (with background Cd concentration of 0.1 mg kg^{-1}); (ii) 0.5 mg kg^{-1}; (iii) 1.0 mg kg^{-1}; (iv) 1.5 mg kg^{-1}; (v) 2.0 mg kg^{-1}. Cd concentration in roots, crowns, leaves and fruit was measured after fruit harvest. Increased soil Cd content significantly enhanced its concentration in all plant tissues, but especially in roots and crowns, while the highest Cd accumulation was found in leaves. Fruit Cd distribution was the lowest of all tested plant parts (6.7% of total Cd taken up by a plant).

Key words: cadmium, strawberry

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SUPPLEMENTARY NITROGEN FERTILISATION OF APPLE MAIDENS

ABSTRACT. The experiment was performed during 1996-1998 on apple maidens cvs Elise, Jonagold Decosta, Elstar and Golden Delicious grafted on M.9 (VF) and M.26 rootstocks. The supplementary nitrogen was applied to the soil as 35% ammonium nitrate in six variants with regard to timing and rates applied; the control trees received only basic fertilisation. The best results were obtained with Elise cv. supplemented with 50 kg N ha^{-1} in the middle of June. Maidens on M.9 responded better to N supplementation that those on M.26. Application of nitrogen in split rates or latter in the season gave results comparable with the control. Precipitation, especially spring rains, significantly affected the effect of N supplementation.

Key words: apple maidens, nitrogen fertilisation

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EFFECTS OF STRAW-MULCHING OF TREE ROWS ON SOME SOIL CHARACTERISTICS, MINERAL NUTRIENT UPTAKE AND CROPPING OF SOUR CHERRY TREES

ABSTRACT. Two systems of soil management were permanently establis-blished in tree rows in the second year after planting sour cherry cv. English Morello grafted on Prunus mahaleb. These systems were either rape (or wheat) straw mulching (SM) or herbicide strips (HS) maintained with glyphosate + MCPA. In 1998, three years after this experiment was set up, the content of available P, K and organic C in the arable layer was similar in SM- and HS-soils. In May mulched soil contained more water in the layer of 0-10 cm than that treated with herbicides. The P, Ca and Mg contents in leaves, determined at the end of May, June and July, were similar for SM and HS, but in July the foliage of trees grown in mulched soil was richer in N and K than that of trees from herbicide strips. There was no significant influence of soil treatments on the cumulative fruit yield in the first three years. No rodent damage was observed in trees grown both in straw-mulched and herbicide-treated soil.

Key words: sour cherry, straw mulch, soil water content, soil and leaf analysis

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EFFECTIVENESS OF SOME INSECTICIDES IN THE CONTROL OF Macrosteles laevis (Rib.) AND PROTECTION OF ANNUAL ORNAMENTAL PLANTS AGAINST ASTER YELLOWS (AY) PHYTOPLASMA

ABSTRACT. Observations carried out in 1998-1999 on Callistephus chinensis, Tagetes erecta and T. patula L., revealed that Macrosteles laevis (Rib.) produced on these plants only a summer generation. First adults of this species appeared in mid June. They were most numerous in August and at the beginning of September. First larvae were recorded in the middle of July, reaching a peak at the end of the month. In the control of adult leafhoppers the best results were obtained with biphenthrin applied as 4 spray-treatments at two week intervals, starting at the beginning of the growing season. No relation was found between the density of M. laevis and numbers of Callistephus chinensis and Tagetes spp. plants showing aster yellows (AY) phytoplasma symptoms.

Key words: Macrosteles laevis, Tagetes patula, chemical control, aster yellows phytoplasma

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INFLUENCE OF METEOROLOGICAL FACTORS DURING BLOOMING ON SOUR CHERRY

YIELD IN OLSZTYN REGION

ABSTRACT. The effect of meteorological factors during sour cherry blooming on fruit yield was examined during 1983-1999 in an orchard at Pozorty near Olsztyn (N.E. Poland). From all the studied factors (spring frosts, precipitation and a number of days with rain, temperature at noon) spring frosts caused the highest yield loses. A single frost at blooming reduced sour cherry yield by 2.71 t ha^{-1}. Annual yields in the studied period showed a declining trend by 0.17 t ha^{-1}. This may be explained by the age of the trees, since the maximum productivity of sour cherry orchard falls on the 5th or 6th year after planting.

Key words: cherry, meteorological factors, yield