Propagation improvement of some apple rootstocks and passion fruits by using tissue culture techniques

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This investigation was carried out at the tissue culture laboratory. Horticulture Department, Faculty of Agriculture. Moshtohor, Zagazig University during the period 2000 to 2003.Explant shoot tip from different apple rootstocks (MM-106 & 111 and Balady) and passion fruit were taken at April and subjected to running water for 15 minutes then sterilized by 10% Clorox (commercial bleach) with two DROPs of tween-20 for 15 minutes and washed 3 times with sterilized distilled water for 5 minutes each. The explant was cultured on different medium types, states. Also, testing of different anti-oxident treatments were evaluated .However, different additives were tested in passion fruit explant only during the establishment stage. In addition different cytokinin types and different concentrations of BAP were studied during proliferation stage.Moreover, medium strength, different concentrations of GA3 , auxintype and auxin concentrations were evaluated during rooting stage .Beside , studying the range drought tolerance by using differentconcentrations of agar as solidifying agent as well as manitole andpolyethylene glycol as osmotism inducers. Physical observations andchemical analysis (chlorophyll A& B , indoles, phenoles , reducing,non-reducing ,and total sugars) were recorded .The obtained results canbe summarized as follow : V-I-Establisment stage : 1- Lepoiver Medium proved to be the best medium type, for all apple rootstocks used as it decreased necrosis and maximized explantresponse , greening and growth while Murashige and Skoog medium enhanced the best parameters concerning passion fruit explant.2-MM106 rootstock surpassed the two other apple rootstocks usedin all parameters under study (necrosis, explant response, callusproduction, growth and greening.3-The accumulated phenolic compounds in apple rootstocks and passion fruit caused oxidation and finally the death of the established explant which were greatly reduced when P.V.P was used then followed by anti-oxident solution.4- Solid medium state of either leporive medium for apple rootstocks or Murashige and Skoog for passion fruit were the most effective medium state for enhancing explant development and growth parameters.5-Supplementation Murashige and Skoog medium with additives either adenine sulphate, coconut milk or trptophane encouraged maximum explant development . However, adenine sulphate and coconut milk were superior in increasing explant development and greening of passion fruit explant than other additives .V-II- proliferation stage:-1 -MM 106 rootstock explant surpassed other apple rootstock explants in maximizing proliferation and growth with less necrosis.2-Kinetin surpassed BAP in improving growth, greening as well as reducing necrosis while BAP maximized proliferation in either apple rootstocks or passion fruit shoots.3-Supplementation the culture medium with 2.0mg/L BAP induced low necrosis and increased proliferation while 1.0 mg/L of BAP encouraged growth and greening in both apple rootstocks and passion fruit shoots .SUMMARY 113V-III- Rooting stage:-V411.1.Shoot elongation:-1-Shoot elongation of all apple rootstocks was increased by usingeither full or one half medium strength. However in passion fruitone-half medium strength was preferred.2-Adding 4.0 mg/L GA3 to the culture medium enhanced a noticeableincrease in shoot elongation and greening while using of 2.0 mg/I, GA3 was preferred for passion fruit explants.V-III.2. Rooting formation:-1-Indo1-3-butyric acid was the most effective auxin as it enhancedrooting in apple rootstocks. However, IBA and NAA succeeded

inincreasing all parameters of passion fruit shoots studied. 2-Supplementation of the medium with 1.0 mg/L auxin encouragedgrowth and rooting while reduced necrosis in either applerootstocks or passion fruit shoots.V.IV. Drought tolerance :-1-Balady apple rootstock proved to be more tolerant than either MM-106 or MM- 111 to available water deficient occurred by addingmanitole with different concentrations to the culture medium.2-Increasing manitole concentrations had an adverse effect on growth , number of shoots, and number of leaves while gave the best results with shoot thickness, root length ,and roots number.SUMMARY 1143- Chlorophyll-B, reducing sugars, Total indoles and Total phenoles were maximized by increasing manitole concentrations up to 60 g/L and using Balady apple rootstock .4 —Balady apple rootstock surpassed other rootstocks under study in tolerating higher concentrations of polyethylene glycol as most superior.5-Most of growth parameters i.e. growth , number of shoots and number of leaves responds positively with the lowest PEG concentration while , callus, shoot thickness, root length and number of roots were tolerated with higher concentration of PEG.6-Balady apple rootstock in combination with higher PEG concentration (8000 ppm) increased chlorophyll-B , reducing sugars, Total sugars, Total indoles and Total phenoles.7-Drought resulted from different concentrations of agar was greatlytolerated as appeared to improve all tissue cultural parameters andsome chemical analysis parameters concrning Balady applerootstock.8-The lowest agar concentration induced the best growth, shoot length, number of leaves and root length while number of shoots, shoot thickness and number of roots increased by increasing agar concentration to 8.0 g/L.9-Culturing Balady apple rootstock on medium supplemented with 12 g/L enhanced chlorophyll-B , Total indoles and Total phenoles accumulate while the same combination but with 4.0 g/L maximized non-reducing sugars. Moreover, combination of MM-106 as rootstock and adding 12 g/L agar encouraged the highest accumulation of reducing sugars and Total sugars.