T17.210
Application of Biostimulators on *Prunus* Stockplants and Their Cuttings

Szabó, V.; Sárvári, A.; Németh, Z.; Hrotkó, K.
Department of Floriculture and Dendrology, Faculty of Horticultural Science, Corvinus University of Budapest, Villányi Str. 29-43., P.O. 53, 1518, H-1118, Budapest, Hungary

Three biostimulators are applied on stockplants (named *Prunus mahaleb* 'GF 8-1', *Prunus mahaleb* 'Egervár' and *Prunus mahaleb* 'Bogdány') three times before taking cuttings. Kelpak® (brown kelp extract) contains auxin-like and cytokinin-like substances. Wuxal Ascofol® is a leaf fertilizer with seaweed extract. There is 5-aminolevulic-acid in Pentakeep®-V, which increases chlorophyll-content in leaves. Control stockplants remained untreated. Five growth regulators are applied on cuttings. Except for the above three biostimulators Yeald Plus®, and benzyladenine was sprayed onto the leaves of cuttings, one week after cuttings were inserted into the cell trays. Control and stockplants were not treated when biostimulators were applied on cuttings. The treatments were applied once a week during four weeks. The cuttings of 'GF 8-1' were soaked at first treatment in solution of given growth regulator. On each treatment IBA was used in rate 0.2% in 50% ethanol solution for 5 seconds except for control. The cuttings of 'Egervár' were treated without soaking only spraying; and the cuttings of 'Bogdány' were treated both methods separately. The rooting period has been taking for six weeks. On stockplants number and weight of shoots and cuttings, the leaf chlorophyll content and the number of rooted cuttings are measured. Number of rooted cuttings, the roots' and shoots' fresh and dry weight are measured. The number of new shoot under rooting period was counted. Kelpak® and Wuxal Ascofol® increase the shoots' number and weight, cuttings' weight. This means that the shoots of treated stockplants reach earlier the optimum size and quality for cutting. Kelpak® on stockplants resulted at both cultivars the highest rooting rate and cutting quality. Kelpak® by soaking at treated cuttings was the most effective at 'GF 8-1' and 'Bogdány'. Kelpak®, Pentakeep®-V and Yeald Plus® by spraying had given the best results at 'Egervár'. Pentakeep®-V treatment by spraying was better comparing control.

T17.211
Improvement of Light Environment in Micropropagation Using Reflector Sheet

Ibaraki, Y.; Fujiwara, T.; Yamashita, M.
Yamaguchi University, 1677-1 Yoshida, 753-8515, Yamaguchi, Japan

A reflector sheet (aluminium foil) was set on shelf board to improve light environment in micropropagation. The effect of setting the reflector sheet on light intensity distribution inside culture vessels and potato plantlet growth were investigated. A glass tube (25 mm × 150 mm) with a transparent plastic cap was used as a culture vessel. Potato plantlets were cultured from nodal cuttings with MS medium supplemented with 30 g/L sucrose and 8 g/L agar in a temperature-controlled growth chamber at 24 °C. Culture vessels were illuminated by 18-W cool white fluorescent tubes from above with the light/dark cycle of 18h/6h. Potato plantlets cultured for 4 to 6 weeks with or without the reflector sheet and their growth was compared. The Photosynthetic Photon Flux Density (PPFD) distribution inside the culture vessels was determined by using sensor films for measuring the integrated radiation. The plantlet model whose leaves were constructed from the sensor films was put into the culture vessel. PPFD was estimated for each individual model leaf based on the degree of fading of the sensor film. The PPFD inside the culture vessel was increased by setting the reflector, especially at the lower region of the vessel. As the results, uniform distribution of PPFD could be obtained in the culture vessel. The number of leaves of potato plantlets was not affected by setting the reflector sheet, while significant differences were observed in shoot and internode lengths between with and without the reflector sheet. Setting the reflector sheet on the shelf caused decreases in shoot and internode lengths, showing a similar effect as that of higher light. The obtained results showed that setting reflector sheet could affect potato plantlet growth and was promising for cost-effective improvement of light environment inside the culture vessels.

T17.212
Improvement of Graft Union in Plum by Studying Graft Anatomy

Gradinariu, G.; Zlati, C.; Istrate, M.
University of Agricultural Sciences and Veterinary Medicine Iasi, 3Mihail Sadoveanu Alley, 700490, Iasi, Romania

During grafting, phenolic compounds from the cut surface cells oxidize and produce necrotic layer isolating the surfaces. Callus cells formed from the xylem medullar ray and secondary shell cells destroy the necrotic layers on the cut surfaces. Then, the cavity between the rootstock and scion is filled and reestablish the connection between them. After this stage, the transport of water and nutrients through the grafting area occurs. For a successful grafting it is important to pursue the anatomical development between tissue of scion and rootstock after grafting. The anatomical structure of graft unions was investigated in plum varieties Stanley, Centenar, Tuleu gras and Pescarus grafted on cherry plum (*Prunus cerasifera* Ehrh) seedlings. This research was aimed to determine the anatomical structure of graft union in some graft combinations of plum using chip-budding grafting technique. The study was carried out in 2007-2009 in University of Agricultural Sciences and Veterinary Medicine Iasi Experimental orchard. Tissue samples from graft unions were taken one year after grafting and fixed in formalin/glacial acetic acid/ethanol solution. Scattered brown necrotic layers were identified, as a result of enzymatic reactions in the junctional tissue. By analyzing the pattern of the development of vascular tissues we can estimate the compatibility of the graft combination and control the grafting process. The results are beneficial in nursery plant production for new rootstocks selections.

T17.213
Histological Investigation on Graft Formation in Pear/Quince Combinations (*Pyrus communis*/*Cydonia oblonga*)

Zlati, C.; Gradinariu, G.; Istrate, M.; Dascalu, M.
University of Agricultural Sciences and Veterinary Medicine Iasi, 3Mihail Sadoveanu Alley, 700490, Iasi, Romania

It is known that success of grafting in higher plants depends on two essential factors: the physiological compatibility between the two graft partners, scion and rootstock and the proper alignment of like tissues. Vascular tissue formation is the last stage of the successful grafting. Formation of a strong union depends on differentiation and amount of new vascular elements formed after grafting. Histological evaluation on graft sections gives us first information about compatibility or incompatibility of combination in short time. This research was aimed to determine the anatomical structure of graft union in some heterograft combinations of pear/quince. The study was carried out in the University of Agricultural Sciences and Veterinary Medicine Iasi Experimental Farm during 2007-2009. In the study there were used four scion varieties and quince as rootstock. Tissue samples were taken from graft unions one year after grafting and fixed in formalin/glacial acetic acid/alcohol solution. Cambium differentiating, necrotic layers, cambial continuity and vascular tissues formation were analyzed. It was observed from the anatomical structure of graft union area that new cambium, xylem and phloem tissues were formed and there was needed longer time for continuous cambial merging. Some abnormalities were seen at graft union area at some combinations and it was suggested that there could be a not very good compatibility for these graft combinations. The applicability of this study could be the possibility to apply an early selection method that could predict the future of a determinate combination long before the external symptoms can be observed.

T17.214
Spineless "Mandacaru" Plants Multiplication

Correia, D.[1]; Nascimento, E. H. S.[2]; Santos, R. J. C.[2]; Silva Júnior, J. M. T.[1]; Coelho, P. J. D. A.[1]; Morais, J. P. S.[3]
[1]Brazilian Agricultural Research Corporation -Tropical Agroindustry ,Dra. Sara Mesquita St. 2270, 60.511-110, Fortaleza, Ceará ,Brazil
[2]Universidade Federal do Ceará, Av. Mister Hull, Zip Code 60021-970, Brazil
[3]Brazilian Agricultural Research Corporation -Cotton, Osvaldo Cruz St. 1143, Brazil

Spineless "mandacaru" (*Cereus* sp.) plants are some of the most sought *Cactaceae* products, as for ornamental, so for forage usages. Due to the lack of natural occurrence of these plants in the collecting spots in Brazilian Northeast, as well as to the absence of information about the natural origin of this material, it is strategically important the introduction from cultured material. With this goal, Brazilian Agricultural Research Corporation – Tropical Agroindustry (Embrapa Agroindústria Tropical) has introduced 21 accesses of spineless mandacaru, which are multiplied for germplasm conservation and utilization. The aim of this work was to evaluate the multiplication rate of some spineless mandacaru accesses from the Embrapa Agroindústria Tropical *Cactaceae* Collection, in Fortaleza, Ceará State, Brazil, in where this study is conducted. It was used 25 plants of access 59, 4 plants of access 116 and 4 plants of access 167, materials that were introduced from Fortaleza (Ceará State) and Petrolina (Pernambuco State). The plants (stem cutting 30 cm length) were cultured in pots (capacity 5 L), which were filled with fine sand, vermicompost and hydromorphic soil (5:3:2 v/v), watered when needed (300 mL per pot), supplemented with 50 mL of nutritive solution JADS at each 15 days and 50 mL of urea solution (1 g/L) at each 30 days per pot. The plants stayed at nethouse with 50% of shading for 18 months. In this time, it was evaluated shoot formation per plant and shoot surviving rate with at least three months after planting. The developed shoots were cut with at least 10 cm and they were planted in pots (capacity 1 L) with the same substrate. At 18 months, the average shoot yields were 6.60; 4.25 and 9.25, respectively, for accesses 59, 116 and 167. All the shoots survived after planting.

T17.215
The Effect of Wounding and IBA on the Rooting of Pomegranate (*Punica granatum* L.) Cuttings

Sarrou, I., Dimassi, K., Therios, I., Tsirakoglou, V.
Laboratory of Pomology, Faculty of Agriculture, Aristotle University of Thessaloniki, 54 124, Thessaloniki, Greece

Pomegranate (*Punica granatum* L.) is an important tree of the tropical and subtropical regions of the world which is valued highly for its delicious edible fruits. In this work, the effects of hormone treatment and wounding on the rooting and the proliferation of pomegranate cuttings were examined. Leafy cuttings were prepared as 15 cm in length from mature, one-year old mature shoots in September and treated with 0, 500, 1000 and 2000 ppm indole butyric acid (IBA) in the absence or presence of wounding. Following treatments the cuttings were placed in a greenhouse for 45 days and grown in perlite (100%) under mist-propagation conditions. The data indicated that 500 ppm IBA in the absence of wounding significantly improved rooting of cuttings. The highest number and fresh weight of roots per cutting was achieved with 1000 ppm IBA in the presence of wounding whereas the highest root length was obtained in the wounded cuttings. In addition, the highest shoot proliferation percentage and number of shoots per cutting were recorded in the control treatment (without IBA and wounding). Treatment with 500 ppm IBA in the absence of wounding resulted in the highest shoot length compared with other treatments tested.

T17.216
Evaluation of Effects of Cutting Source, Culture Method and Different Concentrations of IBA on Rooting of Pomegranate Cuttings

Hassanzadeh khankahdani, H.[1]; Shirzadi, M. H.[2]
[1]Minab Agricultural Research Satation, Minab Agricultural Research Satation, 0098, Minab, Hormozgan, Islamic Republic of Iran
[2]Islamic Azad Univ. of Jahrom, Islamic Republic of Iran

According to reports of local gardeners, based upon, culture of pomegranate cuttings as inverted (against polarity), are increased leaf shading on fruits and are prevented from fruit sunburn and for study of differences of plant obtained from shoot and sucker and study of effects of Indol butiric acid (IBA) on rooting of pomegranate cuttings, in this research were evaluated effects of cutting source (shoot and sucker), culture method (direct and inverted) and different concentrations of IBA (0, 500, 1000, 1500 and 2000 mg/L) on rooting of pomegranate cuttings, in RCBD as factorial. After finishing the trial were measured traits such as rooting percent, root length, number of roots, root fresh weight and number of grown buds on cutting. Results showed that in all evaluated traits shoot was better than sucker and have significant difference. Direct culture of cutting in all evaluated traits better than inverted culture and differences were significant. 1500 mg/L IBA have best results in view to rooting percent and number of grown bud on cutting; in view to number of root and root length, 500 mg/L IBA and in view to root fresh weight, 1000 mg/L IBA. In inverted culture sucker cuttings did not rooted in 0 and 2000 mg/L IBA. In view to interaction of 3 factors, direct culture of sucker by 500 mg/L IBA have highest rooting percent.

T17.217
Optimizing Seed Priming for One Local Iranian Onion Cultivar (Red Azarshahr)

Rezvani Aghdam, A.[1]; Lotfi, M.[2]; Kashi, A.[3]; Zamani, Z.[3]
[1]Islamic Azad University, Khoramshahr, Moin Street, 333, Khoramshahr, Islamic Republic of Iran
[2]Dept. of Horticulture, Abureihan Campus, University of Tehran, Pakdasht 39754, Islamic Republic of Iran
[3]Dept. of Horticulture, Agriculture and Natural Resources Campus, University of Tehran, Karaj, Islamic Republic of Iran

Seeds of an important local Iranian onion cultivar (Red Azarshahr) were primed by poly ethylene glycol 10000 at three concentrations of 273, 300, and 342 molal for 7, 10, 14 and 20 days at 15 °C. The percentage of germination, the mean germination time (index for rate of germination) and the reciprocal of standard deviation of germination time as an index for uniformity of germination were the main factors used for evaluation of germination quality. Concentration of solution and duration of priming treatment had significant effects on seed performance. Percentage of germination was more than control in all concentrations in 10 and 14 days treatment but decreased in some concentrations after 7 and 20 days soaking. All treated seeds also germinated in shorter time compared to control but the lowest mean germination time (the fastest germination) obtained from all concentrations in 14 days. The most uniform germination obtained by lower concentration in 20 days and then higher concentration in 14 days. Concentration 300 molal caused the fastest and the most uniform germination and 14 days was the most appropriate time for this cultivar.

T17.218
The Effect of Seed Extraction Methods on Seed Quality of Two Cultivar's Tomato (*Lycopersicon esculentum* Mill.)

Nazdar, T.[1]; Nemati, H.[2]; Azizi, M.[2]; Aroiee, H.[2]
[1]Ferdowsi University of Mashhad, Azadi Square, , Faculty of Agriculture, Dept. of Horticulture, 91775-1163, 0098, Mashad, Islamic Republic of Iran
[2]Ferdowsi University of Mashhad, Islamic Republic of Iran

In order to compare of different methods for tomato seed extraction, factorial experiments with 4 replications were conducted. Pulp of two tomato cultivars (Faraon, Dominator) were extracted by HCL (pH was arranged to 1, 2, 3 by adding required acid to the slurry and shaked for 10, 20, 30 minutes), H_2SO_4 (pH was arranged to 1, 2, for 15, 30 minutes), Sodium carbonate (5%, 10% for 24 and 48h) and fermentation. Germination percentage, germination rate, length of radicle and length of plumule were used for seed quality assessment. The results showed that interaction effect between pH and duration of HCL treatments was significant for germination of seeds (percentage and rate), but sulphuric acid treatments didn't show significant difference on measured traits. There was an interaction effect between concentration and duration for germination rate in alkali treatments. Different extraction methods had significant effect on germination rate (but not on germination percentage), so that natural fermentation and alkali gave lower germination rate than acid treatments. Also, acid treatments produce very bright clean seed in compare to other treatments. The best results were generally obtained with Faraon cultivar.