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Physiological Studies on the Marketability of Williams Banana Fruits

M.N. Tourky, M.E. Tarabih and E.E. El-Eryan

Abstract: The effect of postharvest treatments with hot water (HW), gibberellic acid (GA_3), salicylic acid (SA) and potassium permanganate ($KMnO_4$) on enhancing or delaying the ripening quality aspect of mature Williams banana fruits were investigated. Untreated and treated fruit had a normal ripening process and similar good freshness at the ripening time (45 days at ambient temperature). This clearly that the used these materials were relatively in delaying ripening and as, can be arrange the appearance of banana fruits in the market with good quality. Such, color development, peeling condition, loss of firmness, increase of pulp/peel ratio, soluble solids content, titratable acidity, pH, total sugar and total starch were used as a good criterion of assessment the banana fruit ripening.

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Low Cost Material Enhanced the *in vitro* Regeneration and Micro Propagation of Medicinal Sand Dune Plant Species *Ipomoea Pes-caprae* (L.) R. Br.

P. Thirunavukkarasu, T. Ramanathan, G. Umamaheshwari, V. Manigandan and P. Dinesh

Abstract: *Ipomoea pes-caprae* is a sand dune plant commonly used as folklore medicine for fisherman communities based on the traditional knowledge. Little information is available on the feasibility of applying micropropagation techniques for production of dune and marsh species. The main aim of this study is to increase the callus induction and shoot generation of sand dune plant *Ipomoea pes-caprae* with easily available low cost natural materials. Coconut water is the rich source of carbohydrate and other nutrients which enhance callus and plant regeneration. In our present study, we tried different type of MS medium (Full and half strength) with coconut water at three different percentage (10, 15, 20%) and different concentration of plant growth regulators for callus induction and shoot regeneration. Well-developed callus inoculated in full and half strength MS medium with different concentration of CW and plant growth regulators. The best results were accomplished with half strength MS medium with 15% coconut water and with 2, 4-D and IAA 0.7 mg L⁻¹ concentration which shows better callus induction and shoot regeneration. Young shoot and root developed plants transferred to green house and then followed to soil.

How to cite this article:

P. Thirunavukkarasu, T. Ramanathan, G. Umamaheshwari, V. Manigandan and P. Dinesh, 2014. Low Cost Material Enhanced the *in vitro* Regeneration and Micro Propagation of Medicinal Sand Dune Plant Species *Ipomoea Pes-caprae* (L.) R. Br. American Journal of Plant Physiology 9 (1): 16-23, 2014. (DOI: 10.3923/ajpp.2014.16.23)

Antioxidant Activities and Biochemical Changes in Different Cultivars of Brinjal (*Solanum melongena* L.)

Mritunjay Tripathi, Pratibha Singh, Praveen Pandey, Vankat R. Pandey and Harendra Singh

Abstract: This experiment has been conducted to study antioxidant activities and biochemical changes in round as well as long cultivars of brinjal. Results showed that maximum protein content, amino acids, important minerals (Ca, P, K) and crude fibres were recorded in Pusa Purple Round Pusa Purple Long. Maximum phenolic content of brinjal fruit in round varieties was obtained in Pusa Purple Round followed by Pant Rituraj and NDBH-1 (86.13 mg/100 g). Phenolic content was maximum in Pusa Purple Long followed by Pusa Kranti and NB-2 in long varieties and Pusa Purple Round in round varieties. A linear relation between

the total phenolic content and DPPH activities of the extracts was observed. Antioxidant activity of brinjal fruit was noticed between (182.01-234.13 µg) in round varieties and (172.11-219.92 µg) in long varieties. Maximum antioxidant activity of brinjal fruit in round varieties was obtained in Punjab Bahar followed by Pusa Purple Round and NB-1. However in long varieties of brinjal fruit it was maximum in NDBH-2 followed by Pusa Purple Long and NB-1. While, lowest activity was recorded in round variety NDBH-1 and Pant Samrat in long variety. On the basis of biochemical investigation, it can be concluded that brinjal is very nutritive and useful vegetable because it is rich source of protein, minerals, crude fibre, phenolic content, antioxidant activity and important essential amino acids.

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Effect of Short Term Salt Stress on Chlorophyll Content, Protein and Activities of Catalase and Ascorbate Peroxidase Enzymes in Pearl Millet

Sonam Sneha, Anirudha Rishi and Subhash Chandra

Abstract: In this study the 21 days old seedlings of *Pennisetum glaucum* were subjected to short term salt stress in order to observe the effect on chlorophyll content, protein and antioxidative enzyme activity (CAT and APX) responses. The aim of the experiment was to evaluate the changes in chlorophyll content and antioxidant enzymes (Catalase and Ascorbate peroxidase). The 21 days old seedlings were subjected to salt stress by supplementing Hoagland's solution with different concentrations of Sodium chloride (50, 100, 150 and 200 mM). Measurement of chlorophyll content and antioxidant enzyme activity were taken at different time intervals of salt treatment (12, 24, 48, 72, 96 and 120 h). The results showed statistically significant differences in traits for the salt treatment. A significant increase in Catalase activity was observed under all the salt concentrations while no significant activity of Ascorbate peroxidase activity was observed. The protein content and chlorophyll content decreased with increasing salt concentration. This result shows salt stress affects the photosynthesis rate by decreasing chlorophyll content. Catalase enzyme plays an important role in scavenging reactive oxygen species generated due to salt stress in the plant cell.

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Sonam Sneha, Anirudha Rishi and Subhash Chandra, 2014. Effect of Short Term Salt Stress on Chlorophyll Content, Protein and Activities of Catalase and Ascorbate Peroxidase Enzymes in Pearl Millet. American Journal of Plant Physiology 9 (1): 32-37, 2014. (DOI: 10.3923/ajpp.2014.32.37)

Germination and Seedling Emergence of Primed Okra (*Abelmoschus esculentus* L.) Seeds under Salt Stress and Low Temperature

Besma Ben Dkhil, Amani Issa and Mounir Denden

Abstract: This experiment was conducted to evaluate the effects of priming on the germination, emergence and seedling growth of *Abelmoschus esculentus* (cultivar Marsaouia) under low temperature and salinity conditions. Seeds were primed for 24 h at 20°C in three priming media (KCl 4%, mannitol 0.75M, CaCl₂ 10 mM) and control (non-primed seeds) and were examined at different salinity levels (0, 40 and 100 mM NaCl). Results indicated that KCl priming increased final germination percentage, radicle length and seedlings dry weight 100%, 40.94 mm and 0.03 g, respectively, as compared with non-primed seeds. Mannitol and CaCl₂ have been found to be better treatments for improving final emergence percentage. Overall increased NaCl level, led to the reductions in final germination and emergence percentage but these reductions were higher for non-primed compared to primed seeds. The increase in NaCl concentrations didn't show any significantly effect on cotyledons fresh weight of primed or non-primed seeds. Besides, our results proved that priming alleviated the adverse effects of salinity for seedlings biomass as compared to non-primed seeds.

How to cite this article:

Besma Ben Dkhil, Amani Issa and Mounir Denden, 2014. Germination and Seedling Emergence of Primed Okra (*Abelmoschus esculentus* L.) Seeds under Salt Stress and Low Temperature. American Journal of Plant Physiology 9 (2): 38-45, 2014. (DOI: 10.3923/ajpp.2014.38.45)

Study of Effect of Waterlogging on Root Anatomy of Ragi and Rice

S.S. Kulkarni and P.D. Chavan

Abstract: In present study, effect of waterlogging (4, 8 and 12 days) on root anatomy of ragi and rice was studied. It was noticed that the formation of aerenchyma tissue in the ragi roots was induced due to increasing waterlogging treatment. On the other hand, rice roots grown under normal conditions had well developed aerenchyma tissue and treatment of waterlogging did not cause any noticeable change in root anatomy. Thus development of aerenchyma in response to waterlogging in ragi roots would certainly help to supply O₂ to the root metabolism. Activity of acid phosphatase was declined in both the species during waterlogging, indicating that its involvement in aerenchyma formation was no any significance. There was decline in calcium content in ragi roots due to waterlogging whereas in rice root an increase was noticeable. Thus a decreased calcium level in ragi roots may limit the availability of calcium for the formation of new cell wall material.

How to cite this article:

S.S. Kulkarni and P.D. Chavan, 2014. Study of Effect of Waterlogging on Root Anatomy of Ragi and Rice. American Journal of Plant Physiology 9 (2): 46-51, 2014. (DOI: 10.3923/ajpp.2014.46.51)

Physiological and Pathological Impacts of Potassium Silicate on Storability of Anna Apple Fruits

M.E. Tarabih, E.E. EL-Eryan and M.A. EL-Metwally

Abstract: Exogenous application of silicon (Si) in the form of potassium silicate at different concentrations (0.1, 0.2 and 0.3%) were investigated for maintaining quality and control disease development caused by *Penicillium expansum* on Anna apple fruits stored 60 days at 0°C±1 with 90-95% R.H (Experiment 1) and held for 6 days at room temperature conditions at 28°C±2 with 65-70% R.H (Experiment 2). It was noticed that the reduction in linear growth and dry weight were positively correlated to the increase in potassium silicate concentrations. So, potassium silicate at 0.3% treatment indicated complete inhibition of the linear growth and dry weight of *P. expansum*. The disease infection decreased as storage period advanced at cold storage and under marketing conditions. The lowest significant values of disease infection percentage of *P. expansum* were recorded by dipping fruit at potassium silicate at 0.3% after 60 days of cold storage and 6 days at marketing in the two seasons. Generally, significant changes were observed in potassium silicate at 0.3% which reduced the loss of weight, decay, total loss, respiration rate and PPO activity with respect to the other treatments or the control. Meanwhile, potassium silicate at 0.2% gave a higher fruit firmness. In addition, all silicon treatments reduced SSC, acidity, SSC/acid ratio and total sugar compare to the untreated fruits. The values of hue angle increased with the progress of potassium silicate concentration. These results show that potassium silicate can be used to delay ripening, keep quality and control disease development caused by *P. expansum* on apple fruits.

How to cite this article:

M.E. Tarabih, E.E. EL-Eryan and M.A. EL-Metwally, 2014. Physiological and Pathological Impacts of Potassium Silicate on Storability of Anna Apple Fruits. American Journal of Plant Physiology 9 (2): 52-67, 2014. (DOI: 10.3923/ajpp.2014.52.67)

Effect of Bio and Chemical Fertilizers on Growth and Flowering of *Petunia hybrida* Plants

E. El-Mokadem Hoda and Sorour Mona

Abstract: Two field experiments were carried out during two successive seasons of 2011 and 2012 to study the effect of bio- and chemical fertilizers on growth, flowering and some chemical analysis of *Petunia hybrida* (cv. Bravo White). *Petunia* plants were sprayed with *Azospirillum lipoferum* (nitrogen fixing bacteria, N.F.B.) and *Bacillus polymyxa* (phosphate dissolving bacteria, P.D.B.) and their mixture in presence or absence of a complete fertilizer of 19N: 19P₂O₅: 19K₂O. Both bacterial inoculants and their mixture showed significantly increases in the studied vegetative growth (i.e., plant height, branches number, leaf area, dry weights of shoots and roots) and flower parameters (i.e. flowering date, number of flower/branch and flowering period) when compared with the control (full dose of NPK chemical fertilizer = 5 g plant⁻¹ twice). Also the results revealed that using *Azospirillum* sp. + *Bacillus* sp. plus 5 g plant⁻¹ of the chemical fertilizer produced the highest significant values of all growth, flowering parameters and chemical analysis (chlorophyll, total carbohydrates, N and P percentages) compared with the control. It was clear that biofertilizers beside its ability to improve the nutrient supply in the soil, they also increased the efficiency of added chemical fertilizer. From the obtained results it can be used the half dose of the recommended chemical fertilizer (2.5 g plant⁻¹ twice) combined with each of nitrogen fixing bacteria (at 2 mL L⁻¹ twice) and phosphate dissolving bacteria (at 2 mL L⁻¹ twice) to grow *Petunia hybrid* cv. Bravo White with high quality, reducing the environmental from pollution and surpassed the recommended dose of the chemical fertilizer.

How to cite this article:

E. El-Mokadem Hoda and Sorour Mona, 2014. Effect of Bio and Chemical Fertilizers on Growth and Flowering of *Petunia hybrida* Plants. American Journal of Plant Physiology 9 (2): 68-77, 2014. (DOI: 10.3923/ajpp.2014.68.77)

Waterlogging Effects on Growth and Physiological Characteristics of *Azadirachta excelsa* Seedlings

Nurul-Nasyitah Shukor, Hazandy Abdul-Hamid, Arifin Abdu and Mohd-Kamil Ismail

Abstract: In this study the effects of waterlogging were examined on growth and physiological characteristics of *Azadirachta excelsa*, one of the famous indigenous tree species used for urban landscape. Forty eight seedlings about 3 year-old subjected to waterlogged for three time durations, i.e., 1, 2 and 3 weeks and at its recovery. The results had shown the highest survival percentage in two weeks of waterlogged seedlings, decreased rate in diameter, leaf area and chlorophyll content in waterlogged seedlings. In spite of all these, there was an increased in height for waterlogged treatment as compared to control. High biomass of stem was found in waterlogged treatment. There were no differences among treatments for the ratio maximum quantum efficiency of the photosystem II (Fv/Fm) and gas exchange parameters except vapour pressure deficit (VpdL). The disturbed water relation also occurred in waterlogged seedlings. *Azadirachta excelsa* seedlings were found to only tolerate with stress of being waterlogged up to two weeks of treatment. However, the recovery seedling leaves can still perform well in its physiological performance.

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Macro and Micro-Nutrients Concentrations and Uptake by Maize Seedlings Irrigated with Fresh or Saline Water as Affected by K-Silicate Foliar Fertilization

Mahmoud M. Shaaban and El-Zanaty A.A. Abou El-Nour

Abstract: Silicon was reported to play a role in increasing plant resistance to biotic and abiotic stress. Pot experiment was conducted in the greenhouse of the "Micronutrient Project", Fertilization Technology Department, National Research Centre, Dokki, Cairo, Egypt with (*Zea mays* L. var. Pioneer) grown on silty loam soil to study effect of K-silicate foliar fertilization on concentrations and uptake of nutrients by plant seedlings. The plants were sown on mid May, 2012 in Mitscherlich pots contained 7.0 kg sandy soil. The experiment followed the Randomized Complete Block Design (RCBD) with nine treatments, in three replicates. The K-silicate was foliar sprayed two times in the concentrations of 300, 600 and 900 mg L⁻¹. The first spray was 21 days after sowing and the second was 10 days after the first one. One third of the experimental pots was irrigated with tap water, the second third was irrigated with water contains 4134 mg L⁻¹ saline ions and the last third of pots was irrigated with water contains 5594 mg L⁻¹ saline ions. Data revealed that despite the increase of sodium concentrations in the seedling tissues due to irrigation with saline water, other nutrient concentrations were slightly affected ($p = 0.05$). The K-silicate foliar fertilization found also to significantly affect concentrations and uptake of the determined micronutrients iron (Fe), zinc (Zn), manganese (Mn) and copper (Cu). Iron concentration was increased as K-silicate was added in the tissues of both plants irrigated with fresh or saline water. The best dose was 600-900 mg L⁻¹. The same trend was almost found with Zn and Mn while Cu showed no trend, however, its concentrations were higher than that determined for control plants. The best dry weight accumulation (4.1 g per plant) was achieved by the treatment 600 mg L⁻¹ K-silicate on the plants irrigated with fresh water. The best dose gave the highest dry matter accumulation with the plants irrigated with saline water was also 600 mg L⁻¹ K-silicate with low level salinity (2.8 g per plant) and 300 mg L⁻¹ K-silicate with the higher level salinity in irrigation water (2.13 g per plant). Despite K-silicate could keep the concentrations of nutrients in the normal ranges, however, salinity of irrigation water found to interfere with dry matter synthesis and negatively affect dry matter accumulation. Thus, silicon treatment can be only partially alleviating salinity stress on maize plants.

How to cite this article:

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Gamma Irradiation Effects on Some Physiological Traits of Wheat (*Triticum aestivum* L.) under Control and Water Stress Conditions

H. Bachiri, R. Djebbar and C. Djenadi

Abstract: This study assessed the physiological changes in wheat plants exposed to gamma radiation and then subjected to water stress for 10 days. Seeds of wheat cultivar Hidhab and M4 mutant populations obtained previously by gamma rays treatment of cultivar Hidhab with 150 and 200 Gy were carried out in the green house at University of Bab-Ezzour (North Algeria) in 2012-2013. In water stress conditions, the 150 Gy dose caused a significant increase of total chlorophyll (30.13%) and proline content (31.48%) compared to non irradiated plants. Also the data show both treatments had a significant effect on Relative Water Content (RWC), where the high values of water content (48.57 and 54.10%) were recorded at 150 and 200 Gy, respectively under water stress. Overall, most of the physiological traits showed an improvement under gamma effect, now it is clear that the physical agents such as gamma rays can be used to enhance wheat cultivars in harsh conditions.

How to cite this article:

H. Bachiri, R. Djebbar and C. Djenadi, 2014. Gamma Irradiation Effects on Some Physiological Traits of Wheat (*Triticum aestivum* L.) under Control and Water Stress Conditions. American Journal of Plant Physiology 9 (3): 103-109, 2014. (DOI: 10.3923/ajpp.2014.103.109)

Thermal Response of Seedling Growth in Tropical Grasses in Controlled and Field Environments of Northern Kyushu, Japan

Satoru Fukagawa, Yasuyuki Ishii, Kenzi Sato, Ryoji Kobayashi and Ikuo Hattori

Abstract: Most tropical grasses in the warm southwestern region of Japan are cultivated as annuals and can be sown from May to July, after the harvest of an alternating crop of Italian ryegrass. However, suboptimal thermal conditions in the region may affect the germination and growth of seedlings. The objective of this study was to compare the growth of seedlings of promising tropical grasses in a Controlled Environment Facility (CEF) and in a Field Data (FD) trial. Temperatures in the CEF averaged 17.9, 22.9 and 27.9°C for the low (LT), middle (MT) and high temperature (HT) regimes, respectively, while the temperature in the FD trial was higher in the June-sowing (average 23.7°C, with a range between MT and HT in the CEF) than in the May sowing (average 21.2°C, between LT and MT). Favorable plant growth attributes tended to increase with the increase in air temperature in both trials. The growth rates in Guinea grass and Sudan grass exhibited a linear response to the increase in temperature from LT to HT, whereas the growth rate of Rhodes grass and colored Guinea grass showed saturation between MT and HT. Thus, for early sowing in mid-May, the prominent species judged in terms of high seedling potential were Sudan grass and Rhodes grass and for the late-sowing in early July, Sudan grass and Guinea grass.

How to cite this article:

Satoru Fukagawa, Yasuyuki Ishii, Kenzi Sato, Ryoji Kobayashi and Ikuo Hattori, 2014. Thermal Response of Seedling Growth in Tropical Grasses in Controlled and Field Environments of Northern Kyushu, Japan. American Journal of Plant Physiology 9 (3): 110-116, 2014. (DOI: 10.3923/ajpp.2014.110.116)

Growth and Physiological Response of *Azadirachta excelsa* (Jack) Jacobs Seedlings to Over-Top-Filling Treatment

Nurul-Nasyitah Shukor, Hazandy Abdul-Hamid, Arifin Abdu and Mohd-Kamil Ismail

Abstract: Over-top-filling is one of common stresses experienced by urban landscape trees. Flexibility of morphological and physiological is needed by trees to survive in over-top-filling. This study was conducted to determine the effect of over-top-filling on *Azadirachta excelsa* seedlings by imposing different levels of soil over-top-filling, i.e, 10, 20 and 30 cm. Soil was mounted above the normal collar and covered. Growth and physiological characteristics were assessed, and repeated measures analysis was used to analyze the differences among times and treatments. The repeated measures results showed various patterns of morphological growth throughout the experiment. In general, treated *A. excelsa* seedlings showed positive growth due to the extra availability of nutrients in the soil. Leaf mass ratio was high in the 30-cm over-top-filling treatment, indicating a large amount of chlorophyll. In addition, new development of root area showed a persistent relation to root sensitivity of the system architecture by increasing root volume. Chlorophyll fluorescence was found to be higher in the treated seedlings compared to the controls. Gas exchange attributes were also found to vary among treatments, but not other water-related parameters such as predawn and midday water potential, hydraulic conductance, and water use efficiency. It was decisively found that this species is partially tolerant of over-top-filling due to its ability to resist permanent damage and due to its stress avoidance.

How to cite this article:

Nurul-Nasyitah Shukor, Hazandy Abdul-Hamid, Arifin Abdu and Mohd-Kamil Ismail, 2015. Growth and Physiological Response of *Azadirachta excelsa* (Jack) Jacobs Seedlings to Over-Top-Filling Treatment. American Journal of Plant Physiology 10 (1): 1-24, 2015. (DOI: 10.3923/ajpp.2015.1.24)

Effects of Soil Compaction on Growth and Physiological Characteristics of *Azadirachta excelsa* Seedlings

Nurul-Nasyitah Shukor, Hazandy Abdul-Hamid, Arifin Abdu and Mohd-Kamil Ismail

Abstract: Urban landscape trees have always been very much exposed to the stresses of soil compaction. Trees in such condition need high flexibility in both morphological and physiological attributes to survive well. This study was conducted to determine the effect of soil compaction on *Azadirachta excelsa* seedlings by imposing different levels of compacted medium with bulk density at 1.2, 1.4 and 1.6 g cm⁻³. Growth and physiological characteristics were assessed and repeated measures analysis was used to analyze the differences between treatments. The results showed that the seedlings were seen struggling to survive but still sprouting new shoots even after showing dying symptom. Significant decrease in leaf elongation also occurred in this experiment resulting from root damage thus initiated reducing physiology performance in leaf traits. However, biomass data showed persistent relation towards root sensitivity of the system architecture. Gas exchange attributes were also found to decrease significantly between treatments but not for other water related parameters such as predawn and midday water potential, hydraulic conductance and water use efficiency. It was decisively found that this species is partially tolerable towards soil compacted condition due to its ability to resist permanent damage and stress avoidance.

How to cite this article:

Nurul-Nasyitah Shukor, Hazandy Abdul-Hamid, Arifin Abdu and Mohd-Kamil Ismail, 2015. Effects of Soil Compaction on Growth and Physiological Characteristics of *Azadirachta excelsa* Seedlings. American Journal of Plant Physiology 10 (1): 25-42, 2015. (DOI: 10.3923/ajpp.2015.25.42)

Effect of Chitosan and Green Tea on the Quality of Washington Navel Orange During Cold Storage

Eman E. EL-Eleryan

Abstract: This study was carried out during two successive seasons 2012 and 2013 on Washington Navel orange. Fruits were dipped in 2% chitosan and/or 2% green tea either alone or in combination as a postharvest application to extend the ability of fruits to low cold stress as the optimum quarantine when exports to foreign markets. Chitosan is considered as an ideal preservative coating to enhance the storage life of fresh fruits. It acts as an antifungal agent to control the postharvest fungal disease and forms a semi-permeable coating around plant tissues. Green tea was able to reduce chilling injury and skin browning in turn to increase the shelf life and marketability period. Fruits were stored at 0±2°C, 90-95% R.H for 60 days, then analyzed for physical and chemical changes at 20 days intervals during storage period. Dipping fruits in chitosan alone was more effective in decreasing weight loss percentage. Besides, dipping with green tea alone delayed color transition compared to all treatments or untreated samples. Coating with chitosan + green tea was the best in reducing fruit decay, chilling injury, titratable acidity, losses percent of juice, activity of ascorbic acid oxidase (ASAO) and peroxidase (POX). On the other hand, the same treatment gave higher values of soluble solids content, SSC/acid ratio and ascorbic acid content.

How to cite this article:

Eman E. EL-Eleryan, 2015. Effect of Chitosan and Green Tea on the Quality of Washington Navel Orange During Cold Storage. American Journal of Plant Physiology 10 (1): 43-54, 2015. (DOI: 10.3923/ajpp.2015.43.54)

In vitro Pollen Germination of Four Olive Cultivars (*Olea europaea* L.): Effect of Boric Acid and Storage

Mehri Hechmi, Mhanna Khaled and Feleh Echarari

Abstract: This work aimed to optimize the pollen germination of four olive cultivars Koroneiki, Frantoio, Manzanille and Nabali, in order to use pollen resource in cross pollination assays. Pollen samples were subjected to 2 experiments to assess the effect of

boric acid and storage treatments on the germination fertility (viability, germination and tube growth). First, pollen of each cultivar was exposed to boric acid at 0 and 100 ppm added to an agarized medium. For storage, pollen grains were conserved in freezer (-20°C), in refrigerator (+10°C) and at room temperature (25°C; control) during 0, 1, 6 and 12 months. The results showed that the addition of 100 ppm boric acid to the culture medium not only increased the pollen germination by 12-24.9% according to the cultivars but also resulted in an increased tube length after 5 h instead of 9 h in control (without boric acid). Pollen of all cultivars showed greater tolerance for low temperature storage -20 and 10°C and not for high temperature (25°C). Increasing storage period of pollen grains from 1 to 12 months, resulted in a decrease in those parameters in all cultivars tested, these reductions were evident after one month of storage. Pollen death occurred rapidly after 1 month when held at room temperature (25°C) while for temperatures storage of -20 and +10°C, pollen death occurred after 6 months. These pollen characters indicate a potential for using these pollen grains as pollinator for self-incompatible olive cultivars found in Al-Jouf conditions.

How to cite this article:

Mehri Hechmi, Mhanna Khaled and Feleh Echarari, 2015. *In vitro* Pollen Germination of Four Olive Cultivars (*Olea europaea* L.): Effect of Boric Acid and Storage. American Journal of Plant Physiology 10 (2): 55-67, 2015. (DOI: 10.3923/ajpp.2015.55.67)

Quality Improvement of Pummelo (*Citrus maxima* (Burm.) Merr.) Using Leaf-to-Fruit Ratio Arrangement and Fruit Bagging

Ummu Kalsum, Slamet Susanto and Ahmad Junaedi

Abstract: Pummelo fruit has a large size, a lot of assimilate will be required for fruit growth and development. The problem of pummelo cultivation is not only assimilate requirement for fruit growth but also the fruit quality, i.e. external and internal quality. The aims of this research were to evaluate the effect of leaf-to-fruit ratio, fruit bagging and their relationship on fruit development and quality. This research has been conducted at University Farm of Bogor Agricultural University from November 2013 until September 2014. The experiment was arranged in completely randomized factorial design with two factors. The first factor was leaf-to-fruit ratio with three levels (50:1, 75:1 and 100:1). The second factor was fruit bagging with four plastic colors (transparent, blue, red and yellow) and control (without bagging). The result showed that fruit of the control treatment dropped because of pest attack. Leaf-to-fruit ratio and fruit bagging affected fruit growth and quality. The highest leaf-to-fruit ratio (100:1) significantly increased fruit weight as compared with lower leaf-to-fruit ratio (75:1 and 50:1), i.e: 746.3, 641.4 and 603.3 g, respectively. There was no significant effect of leaf-to-fruit ratio on edible portion, juice content and vitamin C in all treatments, whereas bagging bag color has significantly affected on fruit quality. Red plastic resulted the largest fruit but poorest quality in total soluble solids and maturity index. Transparent and yellow plastic could be recommended for pummelo bagging, which showed better taste indicated by high total soluble solids, maturity index and vitamin C.

How to cite this article:

Ummu Kalsum, Slamet Susanto and Ahmad Junaedi, 2015. Quality Improvement of Pummelo (*Citrus maxima* (Burm.) Merr.) Using Leaf-to-Fruit Ratio Arrangement and Fruit Bagging. American Journal of Plant Physiology 10 (2): 68-76, 2015. (DOI: 10.3923/ajpp.2015.68.76)

Improving the Growth of Fennel Plant Grown under Salinity Stress using some Biostimulants

Gehan G. Mostafa

Abstract: The efficiency of some biostimulants, as natural and safe compounds for humans and environment, were studied on alleviation the adverse effect of salinity on *Foeniculum vulgare* (fennel). Seaweed extract (1.5, 3 and 4.5 cm L⁻¹), amino acids (1, 2 and 3 cm L⁻¹) and dry yeast (5, 10, 15, 20 and 25 g L⁻¹) were used, as foliar application. Humic acid (1, 2 and 3 g L⁻¹) was used, as foliar application and soil drench. Humic acid at 3 g L⁻¹ increased significantly most of the studied traits, when added as a soil application. Most of the studied traits increased gradually with increasing the concentration of dry yeast. The

concentrations of dry yeast (20 and 25 g L⁻¹) were the most effective treatments, as compared with other studied-substances for overcoming the negative effect of salinity. Enhancing plant growth under salinity stress, was combined with increasing the accumulation of potassium and reducing the sodium ions.

How to cite this article:

Gehan G. Mostafa, 2015. Improving the Growth of Fennel Plant Grown under Salinity Stress using some Biostimulants. American Journal of Plant Physiology 10 (2): 77-83, 2015. (DOI: 10.3923/ajpp.2015.77.83)