SYMPOSIA

S02.074 (new version)

Assessment of preservation of fresh-cut nectarine halves by high pressure processing and controlled atmosphere with different pretreatments

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In this study the combined effect of post-cutting dips and high pressure processing (HPP) or controlled atmosphere (CA) on colour and texture of halved-nectarines was assessed. After post-cutting dip in ascorbic acid 2% (w/v) solution (AA) and 2% ascorbic acid plus 1% calcium lactate solution (AA+Ca), halved-fruit were submitted to HPP (200 MPa, 3 min, 10ºC) or stored under CA (10% O_2 + 10% CO_2). Then, fruit were refrigerated at 5 °C and 85-90 % relative humidity, 30 days for HPP and 10 days for CA. After post-cutting dips, AA+Ca pretreament was effective in maintaining colour and firmness as fruit showed a more yellowish and firmer flesh, however its effect was negligible at the end of the storage either it was combined with HHP or CA. In HPP halved-nectarines, colour and texture modifications occurred within the first day whereas these quality parameters remained rather constant afterwards. After 10 days of storage, flesh whitening and high firmness retention were found in halved-nectarines either they were stored in air or CA. In addition, 'Honey' nectarine cultivar showed a low sensitivity to browning reactions and therefore it might be a good choice for fresh-cut fruit market.

S02.501

The Effect of Savory and Eucalyptus Essential Oils on Postharvest Decay of Grape Berry (cv. Perlette)

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Gary mold is one of the principle microorganisms responsible for inducing postharvest losses of grape berry and other fruits. Preharvest application of synthetic fungicides or postharvest sulfor dioxide fumigation is generally used to control grape berry infections. Considering the concerns about side effects of these methods, in this study, the efficacy of plant essential oils (EOs) extracted from savory and eucalyptus leaves was evaluated. EOs used at three concentrations (150, 300 and 450 µl·L-) to Botrytis cinerea spoilage control in grape berry cv. Perlette using in vitro and in vivo methods. The results showed that all studied EOs concentrations had inhibitory effect on pathogen spread, among them savory oil at 300 and 450 µl·L- and eucalyptus oil at 450 µl·L- restricted *Botrytis cinerea* spoilage significantly. Based on obtained data, and regarding of abundance of these plant materials in southwest of Iran, use of their EOs as natural source of antimicrobial agents can be proposed.

S02.502

Development of Plant Mucilages-Derived Nanoparticles and its Application as an Edible Coating to Extend Shelf-Life of Cucumber (*Cucumis sativus* L.)

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This experiment was conducted to investigate the possibility of using natural polymers (plant mucilage's) as edible coatings (in nanometer scale) to improve cucumber shelf-life. Mechanical resistance of coating material and its permeability to CO_2 and O_2 were affected by interactions between the material and fruit epidermis; thus choosing suitable coating materials for decreasing fruit weight-loss, post-harvest disease development and extending shelf-life of horticultural crop is very important. In this research, some plant mucilages including tragacanth (*Astragalus gummifera*), mallow flower (*Malva sylvestris*) and seeds of plantain (*Plantago lanceolata*), basil (*Ocimum basilicum*), psyllium (*Plantago ovata*) and lallemantia (*Lallemantia royleana*) were extracted by water. Then, using a phase dispersion method, acetone fractions of the extracts dispersed in water solutions which had different HLB values (5-15) during different stirring velocity (500, 750 and 1000 rpm). Ethyl-cellulose™ was also used as semi-artificial polymer. The physical parameters of acquired nanoparticles were measured by particle size analyzer and SEM instrument. The solutions containing those particles were then applied as edible coatings on cucumber (*Cucumis sativus*) on the base of Randomized Complete Blocks Design (RCBD) with four treatments and nine replications. Results showed that mucilages of tragacanth, mallow flower, Lallemantia and ethyl-cellulose™ produced particles at nanometer scale (100-300 nm) at 1000 rpm and HLB 7 except for plantain, basil and psylium. Although all nanoparticles containing solutions as edible coatings did not reduce transpiration rate of cucumber, they really decreased cucumber spoilage caused by post-harvest disease, and extended shelf-life of the commodity. And thus, consumer acceptance of coated fruits would be higher.

S03.331

Doses of Nitrogen and Potassium Fertigation Cabbage in Greenhouse Culture

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The work evaluated reduction of doses of nitrogen and potassium applied by fertigation cabbage, Rampo hybrid, in relation to the recommended complete doses for conventional fertilization. The experiment was installed in area of the Department of Agricultural Engineering of the ESALQ/USP, Piracicaba-SP, Brazil. Ten treatments was evaluated: T1=100% de N + 100% of K_2O (Convencional); and excessively for fertigation in sixteen times: T2=100% de N + 100% of K_2O; T3=75% de N + 100% of K_2O; T4=50% de N + 100% of K_2O; T5=25% de N + 100% of K_2O; T6=100% de N + 75% of K_2O; T7=100% de N + 50% of K_2O; T8=100% de N + 25 of K_2O; T9=50% de N + 50% of K_2O; T10=25% de N + 25% of K_2O. They was evaluated horizontal diameter of heads (DH), vertical diameter (DV), weight of heads (PTCT), Weight of plants (PEPL), weight of leaves (PEFO), productivity (PROD) and relation DH/DV. It did not have significant difference between DH and DH/DV. It had significant difference between T1 and T10 for (DV and PTCT), with value of T1=15,3cm and T10=11,0cm. It did not have significant difference between treatments with fertigation for (PTCT). For PROD it had significant difference 5% of probability between data T1 (111,5 $t \cdot ha^{-1}$) and treatment T4= (55,2 $t \cdot ha^{-1}$). It did not have difference of (PROD) between treatments with fertigation.

S03.332

Evaluation of Nitrogen and Potassium Fertigation of Staked Watermelon in Greenhouse

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Greenhouse staked mini-watermelon researches are not usually found in Brazil, and also data related with fertilization, irrigation, and fertigation. South, southeast, and northeast Brazilian mini-watermelon markets have an increase offer and demand. In order to support this increase, it is necessary to acquire and improve knowledge about this kind of watermelon, enhancing its crop methods. The main goal of this work is to discuss nitrogen (N) and potassium (K_2O) application using

fertigation, during two production seasons. Doses of N and K_2O were applied ranging from 100%, 75%, 50%, and 25% according with usual fertilization recommendations for watermelon (150 kg·ha^{-1} of N and 150 kg·ha^{-1} K_2O). The P_2O_5 dose applied was 200 kg·ha^{-1}, using conventional or usual fertilization. The drip irrigation was adopted using microtubes, in order to provide water daily. While the fertigation was held weekly, during twelve weeks. The experimental delineation was done using random blocks with ten treatments and each treatment with four repetitions. Some productivity characteristics (fruits size, shape, and weight; peel thickness; and yield) were evaluated. The quality (soluble solids content, total titratable acidity and relation of soluble solids content/total titratable acidity) of fruits were also available. There wasn't statistical difference for any parameter related with crop aspects. However, it was found significant differences on titratable acidity and relation of soluble solids content / total titratable acidity.

S03.333

Influence of Different Soilless Culture Systems on Cantaloupe Growth, Productivity and Fruit Quality under Protected Cultivation

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The experiment was carried out at the experimental site of the Arid Land Agricultural Graduate Studies and Research Institute, Ain Shams University, Cairo, Egypt. Cantaloupe plants (*Cucumis melo* L.) 6004 F1 hybrid were grown under unheated plastic house, during 2006/2007 and 2007/2008 seasons. The experiment was carried out to investigate the effect of using different soilless culture systems on cantaloupe growth and productivity in different growing plantations to determine the best soilless culture system which could be used for increasing cantaloupe production with high quality under the Egyptian conditions. Three different soilless culture systems were used with the comparison by soil cultivation (control treatment) as follows: aeroponic, nutrient film technique (NFT), substrate culture (perlite in horizontal bags) and control (soil cultivation). Vegetative growth (plant length, number of leaves and total leaf area), physical quality of fruits (firmness, flesh thickness, fruit diameter and average fruit weight) total yield/plant and chemical quality of fruits (TSS, total acidity and vitamins C) were recorded. The results showed that NFT system gave the best vegetative growth, yield and quality comparing with the others treatments. All the soilless culture systems performed better than the soil system.

S04.066

Expression of Miarf2, a Mango Auxin Response Factor Like Gene, and the Adventitious Root Formation

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An auxin response factor 2 -like gene, MiARF2, was cloned from the cotyledon section of mango during adventitious root formation, In this study we examined its expression pattern during induction of the adventitious roots from the cotyledon section of mango and from the hypocoty of transgenic Arabidopsis (35S:MiARF2). RealTime-PCR showed that during formation of the first pattern adventitious root which is only induced from the PCS (proximal cut surface) of mango cotyledon crosscut segment without auxin treatment, MiARF2 began to express on PCS at the root initiation stage, and reached to the maximal expression level at developing stage of the roots. In Situ Hybridization indicated that MiARF2 could be detected only on PCS, and the high level of the expression was in vascular bundle, especially epithelial cells and parenchyma cells of phloem outside laticiferous canal, where is the histological original of the root initial. This suggested that MiARF2 might function as a regulator in initial of mango adventitious roots. Phenotype analysis of T3 transgenic Arabidopsis lines (35S:MiARF2) indicated about 20-30% reduction in length of hypocotyls of the transgenic seedlings in comparison with that of wild type. Moreover, the transcription levels of ANT and ARGOS genes in the transgenic seedlings were decreased. Therefore, reduction growth of hypocotyls of the transgenic lines might result from down regulated transcription of ANT and ARGOS by overexpression of MiARF2. Observation of the adventitious root formation from transgenic Arabidopsis(35S:MiARF2) indicated that the number of the adventitious roots induced from the hypocoty of two T3 transgenic lines was increased by 103% and 28%, respectively, in comparison with that of the wild type. This study also suggests that although MiARF2 only has a single DNA-binding domain (DBD), it can function as other ARF-like proteins containing complete DBD, middle region (MR) and carboxy-terminal dimerization domain (CTD).

S06.050

Study of Some Morphological and Biochemical Characteristics of 10 Iranian Local Pomegranate (*Punica granatum* L.) Cultivars

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Iran is one of the primary origins of pomegranate in the world. In the most parts of this country, pomegranate trees exist wildly or domestically. Although there are many local and commercial cultivars in Iran, a few researches has been done for identification of these cultivars by using descriptors. In this research we have made a morphological and chemical study of the fruit, arils and juice of 10 Iranian local pomegranate cultivars, including fruit weight, fruit diameter, calyx diameter, length of fruit, length of fruit with calyx, calyx length, skin thickness, rind weight, aril yield, weight of 100 arils, juice content of 100 g arils, pH, total soluble solids, titratable acidity and maturity index. In addition to these, some attributes such as fruit skin color, aril color, kernel hardness, fruit taste and gustative quality were evaluated by sensory panel. According to the results, all of the characteristics in the 10 cultivars had statistically significant differences ($p<0.05$) and these cultivars showed a high range of diversity because of their pomological traits. 'Shahvare Shirine Yazd' showed the highest mean values of fruit weight (378.8 g) and Fruit equatorial diameter (93.4 mm), so this cultivar with Yellowish-green fruit skin color had the largest fruit among the 10 studied cultivars. The greatest weight of 100 arils (42.45 g) was obtained with this cultivar, too. The minimum mean values of fruit weight (184.2 g), fruit diameter (73.45 mm), length of fruit with calyx (85.2 mm), length of fruit (67.6 mm), calyx length (17.6 mm), weight of 100 arils (34.1 g), juice content of 100 g arils (73.3 ml) belonged to 'Poust Siyahe Yazd' with the smallest fruit and blackish-purple fruit skin color. Considering the results, it can be stated that 'Shahvare Shirine Yazd' and 'Alak Parande Saveh' were the best cultivars for fresh consumption.

S06.051

Leaf Nutrient Status of Major Apple Growing Area of Kashmir Valley-1i :Dangiwacha and Rohama Block

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As many as 248 leaf samples of Dangiwacha and Rohama blocks were collected during mid-July and analysed for macro- and micronutrient contents. Leaf nutrient analysis reveals that 84.69 and 92.00 per cent samples were sufficient in nitrogen (N) content in Dangiwacha and Rohama, respectively, while as a small percentage of samples (10.20 and 4.00%) was deficient in N content. Unlike N, Phosphorus (P_2O_5) was deficient in 75.51 and 88.66 per cent samples in Dangiwacha and Rohama, respectively. However, potassium (K) was deficient in all the

analysed samples of both the blocks. Amongst the micronutrients, iron (Fe) was recorded more than sufficient in 29.59 and 20.66 per cent samples in Dangiwacha and Rohama, respectively. While Fe was not deficient in any sample, the copper (Cu) was deficient in 28.57 and 16.66 per cent samples of Dangiwacha and Rohama, though some samples were high in Cu in the respective blocks. The percentage of samples sufficient in manganese (Mn) and zinc (Zn) was high in both Dangiwacha and Rohama blocks, though a small percentage of samples were either deficient or high in these elements in the two blocks. The data further reveals that average N, P_2O_5, K, Fe, Cu, Mn and Zn contents of leaf samples varied a little between the two blocks, though range of the respective nutrient elements varied much. In Dangiwacha, the respective mean N, P_2O_5 and K contents were 2.20, 0.12 and 0.73 per cent where as in Rohama the contents of the respective elements were 2.07, 0.11 and 0.84 per cent. The respective mean Fe, Cu, Mn and Zn contents were recorded 266.61, 6.09, 74.91 and 55.31 ppm in Dangiwacha against 252.7, 7.29, 95.92 and 51.99 ppm recorded in Rohama.

S06.320

Determination of Pomological Characteristics of Some Pomegranate Cultivars in Dörtyol (Turkey) Conditions

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In this study, fruit quality characteristics of some pomegranate cultivars ('Hicaz', 'Katırbaşı', 'Çekirdeksiz' and 'Kara Mehmet') were determined in Dörtyol, Hatay, Turkey. Several pomological characteristics of the cultivars were determined during the 2002 and 2006 growing season. Averaged over the 4 years, pomegranate cultivars had a range of 241.1-319.8 g for fruit weight, 67.5-78.7 mm for fruit height, 75.2-85.3 mm for fruit width, 2.9-4.0 mm for skin thickness and 57.7-64.1% for percent of arils. In addition, the total soluble solid content was between 14.3 and 16.6%, pH between 2.97 and 3.20, acidity between 0.39 and 1.59%. Pomegranate cultivars had green or yellow background color, red or pink of coverage on peel and aril color, soft, semi-hard and hard firmness seeds. According to data obtained, 'Hicaz' and 'Katırbaşı' cultivars were found to promising for pomegranate cultivation in Dörtyol ecological conditions.

S06.321

Performans of Some Peach and Nectarine Cultivars in the East Mediterranean (Hatay/Turkey) Conditions

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Production of peach and nectarine (*Prunus persica*) in East Mediterranean Region (Turkey) has increased during recent years, requiring information on the performance of modern cultivars in the region. Thus, a long-term project was conducted to investigate bloom date, harvest date, fruit quality, and yield of various peach and nectarine under conditions of East Mediterranean region during 2002 to 2006. 'Early Red', 'Redhaven', 'Dxired', 'Washington', 'J.H. Hale' peach cultivars and 'Cherokee', 'Independence', 'Nectared 4', 'Nectared 6', 'Nectared 8' nectarine cultivars were used in this study. The analysis of average response over five years indicated that 'Early Red' both bloomed (21 March) and harvested earlier (6 June) than other peach cultivars, while 'Cherokee' and 'Independence' harvested earlier (15 June) than other nectarine cultivars. Averaged over four years, fruit weight was determined between 84.5 and 130.1 g; flesh/seed ratio between 8.0 and 15.2; total soluble solids (TSS) between 10.0 and 13.1%; pH between 3.27 and 3.52; titratable acidity between 0.58 and 0.83% for peaches and fruit weight was determined between 36.7 and 83.1 g; flesh/seed ratio between 5.8 and 7.7; TSS between 11.4 and 13.4%; pH between 2.95 and 3.49; titratable acidity between 0.86 and 1.40% for nectarines. Yield values ranged from 8.8 kg/tree (J.H. Hale) to 20.8 kg/tree (Dixired) for peaches, and 7.4 kg/tree (Nectared 4) and 14.3 kg/tree (Cherokee) for nectarines. Overall, 'Redhaven', 'Early Red' and 'Dixired' peaches, and 'Cherokee' and 'Independence' nectarines showed satisfactory to great performance in this long-term evaluation.

S06.322

Impact of Superabsorbent and Organic-Mineral Fertilizer on Growth and Yielding of Sweet Cherry Trees

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Hydrophylic polymers have been designed for agriculture as plants available water retention compounds and nutrients carriers (Taylor, Halfcare 1986, Nowosielski 1994, Szwonek 1996, Szwonek, Nowosielski 1996, Szwonek, Felczyńska 1998 Szwonek, Nowosielski 2000, Al-Humaid 2005, Bartnik 2008). Organic - mineral fertilizers manufactured of municipal residues are more and more used in practice as source of nutrients for plants and organic matter incorporated into the soil at the same time (Siuta et al.1988, Mazur 1996, Klock 1997, Czekała 1999, Kiapas-Kokot, Zabłocki 2003, Dobrowolska et al. 2007, Szwonek et al. 2007, Szwonek, Laszlovszky-Zmarlicka 2009). There was the trial with sweet cherry cv. Burlat/P-HLA carried out over six years. In autumn of 2003 three years old sweet cherry trees were planted under field conditions. Prior to trees dibbling, superabsorbent Stockosorb Agro and organic-mineral fertilizer Biotop manufactured of municipal sediment residues were separately or simultaneously applied into the pits. The treatment doses of Stockosorb Agro and Biotop were as follows: Biotop 1 kg, Stockosorb Agro 160 g, Biotop 1kg + Stockosorb Agro 160 g. None Biotop or Stockosorb treated soil served as a control. Effect of treatments on growth of trees and their yielding was evaluated. Biometrical measurements and evaluations indicated positive influence of Biotop and Stockosorb but most of all Biotop + Stockosorb composition on trees trunk cross sectional area, one year shoots length and also yield of fruits, hundred fruits weight as well as fruits extract content.

S07.043

The Bioavailability of Dietary Phenolic and Polyphenolic Compounds

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Fruits and vegetables contain a diverse array, and sometimes substantial quantities, of potentially protective phenolic and polyphenolic compounds. The fate of these compounds following ingestion varies depending upon relatively small structural differences. Compounds absorbed in the small intestine typically appear in the circulatory system at peak sub-µmolar concentrations after 1-2 h as glucuronide, sulphate and methylated metabolites and thereafter appear to be treated by the body as xenobiotics as they are rapidly excreted in urine. Studies with ileostomists have shown that substantial amounts of some dietary polyphenolics pass from the small to the large intestine where they are subjected to the action of the colonic microflora that break them down to simple phenolic acids which enter the bloodstream prior to being excreted in urine in amounts that usual greatly exceed the quantities of compounds absorbed in the small intestine. Research on the bioavailability of green tea flavan-3-ols, orange juice flavanones, apples dihydrochalcones and coffee chlorogenic acids will be discussed.

S07.299

Consumer Acceptance of Novel Fruits and Fruit Products: A Cross-Cultural Comparison of Consumer Innovative Behaviour and Segmentation

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This presentation presents results of the consumer survey that was conducted in November, 2009, in four European countries – Poland, The Netherlands, Greece and Spain within WP 1.3 of the ISAFRUIT Project. We first focused on the influence of personal characteristics of the respondents, the evaluation of general fruit product characteristics, product evaluations of specific novel fresh fruits and fruit products and demographics on consumers' acceptance of fruit innovations. Furthermore, we identified cross cultural consumer segments, who each value different product characteristics. Moreover, these consumer segments differ in demographics, their willingness to accept fruit innovations and their personal characteristics. Policy recommendations for future product development of fresh fruits and fruit products and communication strategies were formulated based on the results of the consumer survey and the identified cross cultural consumer segments.

S07.300

Breeding for Health Effects of Fruits and Vegetables: Which Selection Markers to Use?

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A large body of epidemiological evidences associates fruits and vegetables (FAV) consumption to reduction of chronic diseases. These have brought a renewed interest from the industry to breed FAV with improved health benefits. Already, a number of cultivars with increased titer in bioactive compounds have been released to the market. Yet there are concerns that the targets used by breeders to select "super-FAV" may not be congruent with their action in the human body and the metabolic faith of phytochemicals in the organism. For instance, the use of antioxidant activity as a marker of health potential of a commodity may not be satisfactory, since it bears poor correlation the body's antioxidant level. In order to protect the public from false claims, human clinical trials should be the ultimate marker needed to demonstrate beyond any doubts if the new health traits transferred to the crops really reduced incidence of diseases. This means that breeders should work hand in hand with nutritionists and clinicians to demonstrate the health benefits of FAV. This conference will thus outline some of the pitfalls of current selection strategies and will highlight some elements that should be considered when creating new health improved FAV.

S07.301

Consumer Attitudes to Health in Fruit and Vegetables

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Nutrition recommendations encourage increasing the consumption of fruit and vegetables (FAV). Although consumers acknowledge that FAVs are good for health, the consumption of FAV in many countries is still below recommended levels. Promoting FAVs as one entity may not respond to consumers' perception of these products, since the use context of fruits and vegetables tends to be different. Perceived healthiness in FAVs is closely linked with perceived naturalness and any added ingredients or processing may dilute the perceived healthiness of products. Health is only one factor influencing consumers' choices, and other factors such as hedonic pleasure, convenience or price can counteract perceived healthiness as a choice motivation. Although explicitly expressed attitudes are positive towards FAVs there are certain cultural and partly unrecognised images that may act as barriers for accepting FAVs. Fruits, and especially vegetables are seen as feminine foods and this may be decrease men's willingness to use them. Current research is revealing more positive health effects of FAVs and many of these new findings can be linked to specific compounds in FAVs. In food products these new effects need to be conveyed to consumers through information using different kinds of health-related claims. Combining a new positive health effect to a product that originally is perceived as being healthy is a challenge since any modifications of the basic product may be perceived as lowering the perceived naturalness and thereby also perceived healthiness. Consumers do not tend to be overly enthusiastic about new health effects unless it aligns with their existing knowledge and experience.

S08.276

Evaluation of Table Olive Cultivars in the Apulian Region

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The scope of the research was to valorize the pomological characteristics of some table olive cultivars identified in the Apulia region (Southern Italy). Several "types" per cultivar were individualized and were evaluated from 2005 to 2007. Fruit and stone characteristics (weight, length, width, thickness, ratio length/thickness and ratio length/width, shape, peel colour and form of the apex) and pulp characteristics (weight, thickness and yield in percentage) were determined. Particular attention was placed to pulp yield, that is very important for industrial utilization. The data were submitted to the analysis of variance using MSTAT-C software and the Duncans's Multiple Range Test was adopted for the mean separation. The results of analytical study showed high differences in fruit, stone and pulp characteristics. This experimental work confirms the heterogeneity of table olive germoplasm in Apulia, and shows that analysis of fruit characteristics help to study the genetic variability in olives and hence facilitates the selection.

S08.277

Olive Fruit Characteristics and Oil Composition of Cultivar "Leccino"

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"Leccino" is an old Apulian olive variety-population, with good bio-agronomical characteristics, but it is very heterogeneous. It is cultivated in the production zone of "Terra di Bari" P.D.O. (Protected Designation of Origin) oil, with additioned mention "Murgia dei Trulli e delle Grotte" (D.M. del 04/09/1998). "Terra di Bari" P.D.O. oil is produced from olives of "Cima di Mola" (50%) and from minor cultivars (50%); among the latter, there is the "Leccino" cultivar. The aim of this research was to study the qualitative characteristics of the single-cultivar oil in order to find possible elements of typicality and to identify the parameters from which the quality of such oil depends. The olive samples were picked by hand in different farms of the Bari province (Apulia region, Southern Italy) in November, during a five year period, from 2003 to 2007. Fruit and stone characteristics (weight, length, width, thickness, ratio length/thickness and ratio length/width, shape, peel colour and form of the apex) and pulp characteristics (weight, thickness and yield in percentage) were determined. The oils obtained, by 3-phase centrifugal extraction system, were analysed, after 3 months of storage according to the officials methods, for the determination of chemical characteristics (acidity, peroxide index, UV absorption), sterols content and composition and fatty acids composition. The results showed high differences in fruit, stone and pulp characteristics. Regarding oil characteristics: total sterols range from 212.77 to 309.74 mg100 g; in the sterols composition there is the b-Sitosterol with 83.63 %, Campesterol with 2.87 % and Δ 7-Stigmastenol with 0.31 %. in average. In conclusion the "Leccino" cultivar was characterized by good percentage of pulp, low acidity and peroxides number, high concentration of total b-Sitosterol and absence of trans-linoleic and trans-oleic acid.

S09.426

Financial Analysis of Rose Crop Var. Charlotte Grown on Substrates with Drainages Recirculation

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In Colombia, rose cultivation has historically developed in soil but, due to cost, sanitary and agronomic aspects, flower producers began to adopt the use of crops on substrates. The aim of this study was to determine the suitability and financial viability of the cropping system of rose var. Charlotte cultivated in four types of substrate and soil, with three percentages of recirculation. In the Agricultural Biotechnology Center SENA Mosquera, in greenhouse conditions, plants of var. Charlotte grafted on 'Natal Briar' were planted in raised beds with a capacity of 8 liters at a rate of 6.5 plants/m^2 - inv. For the financial analysis were considered the technical aspects, fixed and variable costs, investment costs and operation and the revenues generated by the sale of the flower of the treatments. We calculated IRR, NPV and RB / C from projected cash flows to six years. The treatments 100% coconut fiber and soil showed the lowest rates due to the high cost of coconut fiber and low productivity rose cultivation in soil, which explains the reduced income from sales of this treatment. Treatment 35% burned rice husk - 65% coconut fiber with 50% recirculation, with an IRR of 198% and RB / C of 2.08 is the most feasible and financially desirable for the commercial production of rose var. Charlotte in the savannah of Bogotá.

S09.427

The Ease of Transmission and Management of Tobacco Mosaic Virus in Greenhouse Stock Plants

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Tobacco Mosaic Virus (TMV) is a troublesome virus in greenhouse stock plant production. Experiments were carried out to investigate the ease with which the virus spreads from infected greenhouse plants to non-infected plants through workers clothing, cutting tools, and contaminated greenhouse benches. Two tobacco cultivars (*Nicotiana tabacum* cvs White Burley and Samsun NN were used as indicator plants. Three commonly used materials for dustcoats (cotton and polyethylene fiber) and for gloves (latex) were tested as vehicles for transmission of the virus. Contacts made by workers on plants were simulated by creating various contact grades on infected and then healthy plants. The slightest brushing of the materials against infected plants and thereafter on healthy ones caused a disease incidence of >70%, 60%, 30% for cotton, latex, and polyethylene fiber, respectively. Cleaning of cotton and polyethylene fiber clothing materials using various cleaning agents in a simulated laundry condition eliminated the virus. The efficacy of various disinfectants used in cleaning greenhouse cutting tools depended on the concentration and time of exposure. A five-minute dip into a 10% dry milk solution (mass/vol), 2.7% benzoic acid (vol/vol) or 16% trisodium phosphate (TSP) (mass/vol) prevented the spread of the virus to non-infected plants. Spraying stock plants with the milk solution before cutting the foliage with a TMV-contaminated tool significantly reduced the rate of TMV transmission. However, milk was only effective against TMV for 15 minutes after spraying

S09.428

The Effects of Different Aggregate on the Formation and Characteristics of Tulip Bulbs at the Ring Culture

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This study was carried out between October 2005-July 2006 in greenhouse at Ankara University Faculty of Agriculture Department of Horticulture in order to determine the effects of different growing mediums, aggregates on the formation and characteristics of tulip bulb under ring culture. 'Queen of the Night' and 'Negrita' tulip cultivars were used as plant material and bims, perlite, sand cocopeat and peat, were filled into 3 liters volume pots, base parts of which were cut out, have been used for growing. Study has shown that different aggregates had statistically important effect on plant height (cm), primary bulb diameter (cm), primary bulb height (cm), primary bulb weight (cm), secondary bulp number (including primary bulb) and it has been found out that there is an interaction between aggregates and species. Although there has been statistically insignificant difference between differrent aggregates for leaf number, primary bulp circumference and total bulp weight, an important difference has been measured among the species. Finally, it has been found out that soilless agriculture techniques can be applied for tulip production, and results supporting this argument have been determined.

S12.365

Evaluation of Chemical Composition of Four Roselle Cultivar Calyces under Different N- Fertilizer Rates

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Four different Roselle cultivars, Sudan-1, Sudan-2, Sewa and Aswan were studied under four N-rates (0.00, 184, 276 and 368 kg N/ha) to evaluate dry calyces contents of Ca, K, Na, Mg, Vitamin C and calcium oxalate (mg/100g) in a split plot design, during 2007 and 2008 seasons at the Agricultural Experiment Station, Hada Al-Sham, King Abdul Aziz University, Saudi Arabia. The highest Ca concentrations were found in Sudan-1 cv. under 0.00 N (1629 mg/100g), Sudan-2 cv. under 184 and 368 kg N/ha, respectively. The lowest Ca concentrations were 1498, 1501 and 1502 mg/100g for Sewa cv. under 184, 0.00 and 276 kg N/ha, respectively. K concentrations were the lowest in Sewa cv. under 368 kg N/ha (2023 mg/100g) but Sudan-1 cv. under 184, 0.00 and 276 kg N/ha had the highest K concentrations. Sudan-2 cv. had the highest Na contents under 368, 276 and 184 kg N/ha with values of 7.76, 7.33 and 7.12 mg/100g, respectively, while Aswan and Sewa had the lowest Na concentrations. Mg concentrations ranged from 430 mg/100g in Sudan-2 under 276 kg N/ha to 325 mg/100g in Sudan-1 under 368 kg N/ha. The highest vitamin C concentrations were found in Sewa cv. under 276, 184 and 368 kg N/ha with values of 73.83, 68.96 and 68.64 mg/100g, respectively. Sewa cv. also had the lowest calcium oxalate concentrations under 184 kg N/ha and 0.00 kg N/ha with values of 1.574 and 1.359 mg/100g, respectively.

S12.366

Genetic Variability of the Local Variety "Horcal Onion"

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The objective of promoting the cultivation of the "Horcal" onion in the neighbouring area of the provinces of Palencia and Burgos is to create a quality brand. Obtaining the foundational seed or representative of this type of onion is part of this strategy. We are dealing with a plant population very affected by the local conditions and the farmer's selection, which morphologically is quite uniform. A task was commenced identifying the closest cultivars, starting from a population represented by 13 samples of seed proceeding from the same number of cultivators. The objective is to find polymorphisms among the seed samples. The ones that are closely similar will be considered belonging to the same cultivar. The technique of AFLP molecular markers was used, extracting the genomic DNA of germinated seeds. A Cluster analysis was conducted with the data obtained, applying the UPGMA (Unweighted Pair-Group Method with Arithmetical Averages) algorithm, using the Jacard coefficient. It was possible to observe two well distinguished groups with a 44.5% similarity, one with 4 samples and another of 9. In the most numerous group the minimal similarity is of 56%, with four samples with an 84.6% similarity, which are the ones

that are the closest genetically. The results are not conclusive, thus they need to be repeated more times. Nevertheless, they are very coincidental and complementary from those obtained in the morphological characterization, and although a great uniformity was not observed, the morphological variability found could explain that a genetic similarity of almost 50% exists.

S12.367

Morphologicall Characterization of the Local Variety "Horcal Onion"

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In the area bordering the provinces of Palencia and Burgos a local variety of onion known as "Horcal" is traditionally grown, which is the fundamental ingredient in the production of the Burgos black pudding sausage. Due to the fact that no study has ever been done, it has been considered convenient to conduct one on its characterization, thus creating a figure of quality to promote and stimulate its farming for the benefit it can have on the local economy. The aim of the study was to characterize morphologically the bulbs of this variety and study its variability. It began in 2006 and finalized in 2008. A tract of land was established for trial in Palenzuela (Palencia). The evaluation was made with seed samples taken from various growers. Thirty-four (34) samples were evaluated, along with two commercial varieties: Babosa and Dulce de Fuentes. The morphological characterization was made following the guidelines of the Allium spp. descriptors of the IPGRI-FAO (International Plant Genetic Resources Institute). Data was taken regarding: weight, shape, diameter, height, diameter of the neck, shape of the apex, shape of the base, colour of the tunic and colour of the pulp. The statistical process of the results was done with the ANOVA test, using the SAS statistical package (V8). Sufficient morphological uniformity was observed among the bulbs of the "Horcal" onion grown in this area. The morphological characteristics which define the bulb are: large size, the weight is more than 300 g ; shaped quite plane, it technically corresponds to a shape between spherical plane and rhomboidal; the apex is slightly prominent; the base almost flat; the tunic, thin and dark brown, is slightly adhered to the pulp, which is white.

S13.338

Evaluation of Rootstocks for Watermelon Grafting with Reference to Plant Development, Yield and Fruit Quality

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Watermelons cv. Sugar Baby and Crimson Sweet were sown on 6 February (year 1) and 20 February (year 2) and either self-rooted or grafted on to *Cucurbita* sp. rootstock RS 841 F1 (Royal Sluis) bottle gourd *Lagenaria siceraria* (Molina) Standl. f. *clavata* (year 1) and *L. siceraria* f. *clavata* and *L. siceraria* f. *pyrotheca* (year 2). Plant growth recorded during post-grafting hardening with a minimum temperature of 8 or 16 °C, and plants were transplanted to the field. From the results, it was found that in year 1, plants hardened at higher temperatures were taller and had a higher total fresh weight at the time of transplantation than those hardened at 8 °C. Hardening at 16 °C resulted in higher leaf number per plant at transplantation for the grafted plants of both varieties, irrespective of the rootstock, whereas total leaf area at the same stage differed between scions and rootstocks. In year 2, the grafted plants of Crimson Sweet hardened at 16 °C were taller and had larger leaf area at the time of transplantation than those hardened at 8 °C. In the case of Sugar baby no differences were observed. In both years fruit yield was significantly higher in grafted plants than in self-rooted plants, whereas sugar content (° Brix) depended on scion and rootstock. The mean fruit weight of the grafted plants of both scions was higher than that of the self-rooted plants. From these results, it is concluded that for early sowing hardening is better performed at a high minimum temperature (16 °C), whereas in the later sowing this was less critical. Grafting is beneficial for fruit yield, but fruit sugar content may vary with the scion-rootstock combination.

S13.339

New Source of Yellow Rind in Watermelon [*Citrullus lanatus* (Thunb.) Mansf.]

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Watermelon [*Citrullus lanatus* (Thunb.)Mansf.] is one of the important cucurbitaceous vegetable crops. In present day cultivars the most common rind color are solid green (dark, medium and light), striped (narrow, medium, and wide dark green stripes on a light green background), and gray (a light green background with a medium or dark green network of reticulations). Breeding for specific rind color is often a challenge to attract consumers. The rind colors and patterns of watermelon fruit have been among the major objectives of breeding. Keeping in view a yellow rinded watermelon, VRW-3 has been identified at Indian Institute of Vegetable Research, Seed Production Center, Kushinagar, Uttar Pradesh, India from a local stock collected from Shahjahanpur, Uttar Pradesh, India. This genotype has been identified from a diverse genetic stock of 45 lines. Controlled self pollination and selection was applied to produce a homogenous line for stable yellow rind color. It is monoecious with small (3.0-3.5 kg), round fruit with yellow rind. It is the first ever line identified in India for this trait. VRW-3 is a unique watermelon line having yellow rind which is a surprise. It possesses desirable fruit quality with red purple flesh with an average Brix of 11. Fruits contain 6.7 mg/100 g ascorbic acid. 4.95 mg/100 g carotenoids, 0.192% citric acid and 10.0% oxalic acid. It could be a useful parent for introducing yellow rind into adapted cultivars to make them eye appealing. The fruits of VRW-3 are very attractive and delicious in taste with a unique aroma. Harvesting of fruits starts 75-80days after sowing. Fruits of this line are small in size weighing 3.0-3.5 kg which suits the icebox segment that is the need of the hour for nuclear families. This precious material will be highly useful for developing yellow rinded cultivars and hybrids of watermelon.

S13.340

Reactive Oxygen Species Are Involved in Brassinosteroid-Induced Stress Tolerance in Cucumber

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Brassinosteroids (BRs) induce plant tolerance to a wide spectrum of stresses. To study how BR induces stress tolerance, we manipulated the BR levels in cucumber (*Cucumis sativus*) through a chemical genetics approach and found that BR levels were positively correlated with the tolerance to photo-oxidative and cold stresses and resistance to Cucumber mosaic virus. We also showed that BR treatment enhanced NADPH oxidase activity and elevated H_2O_2 levels in apoplast. H_2O_2 levels were elevated as early as 3 h and returned to basal levels 3 d after BR treatment. BR-induced H_2O_2 accumulation was accompanied by increased tolerance to oxidative stress. Inhibition of NADPH oxidase and chemical scavenging of H_2O_2 reduced BR-induced oxidative and cold tolerance and defense gene expression. BR treatment induced expression of both regulatory genes, such as *RBOH*, *MAPK1*, and *MAPK3*, and genes involved in defense and antioxidant responses. These results strongly suggest that elevated H_2O_2 levels resulting from enhanced NADPH oxidase activity are involved in the BR-induced stress tolerance.

S14.306

Yield and Kernel Quality Performances of Five Sweet Corn Hybrids Grown in Conventional and Organic Systems of Agriculture

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Organic agriculture has become lately increasingly attractive to Romanian farmers. The most pressing question for such farmers is how to most properly combine the requirements of organic agriculture with the necessity of obtaining high yields of an adequate quality of these yields. The results presented in the paper try to answer to this question as far as sweet corn is concerned. Concretely, five sweet corn hybrids (Prima, Deliciul verii, Estival, Dulcin and T145) released by the ARDS Turda, highly adequate to the Transylvanian environment, were tested in 2008-2009 in three different locations (Turda, Jucu and Morău, Cluj County), both under N input specific for conventional agriculture (100 kg N/ha and 150 kg N/ha), and under low N input (50 kg N/ha), or no N input, specific for organic agriculture. Effects of these different systems of N uptake were noted on ear yield and on yield elements of sweet corn as well as on yield quality (content of kernels in glucose, starch, raw protein and total N). Total ear yield was significantly increased by the high doses of N input only in semi-late hybrids (Dulcin, T145) while in early hybrids (i.e. Prima, Deliciul verii, Estival), which are best sells on the market, the additional mineral N didn't significantly affect the total yield. Also, glucose, starch and raw protein content of kernels were, practically, not significantly affected by the additional mineral N fertilization in all tested sweet corn hybrids. Really significant increases of the total N content in kernels were found only in semi-late sweet corn hybrids at N150 level of fertilization. Since the raw protein was not significantly affected by the high doses of mineral N applied, it seems that the increase of the total nitrogen of kernels is represented mainly by mineral compounds (probably nitrates and/or nitrites).

S14.307

The Use of Lupine Seeds as Nitrogen Fertilizer

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We studied the use of lupine seeds as fertilizer to provide a slow release N source. The main objective was to compare different strategies to apply lupine seeds (*Lupinus angustifolius* L. cv. Azuro and cv. Boruta) as N-fertilizers for a white cabbage crop (*Brassica oleracea capitata* L. cv. Impuls). Since during the germination process the seedlings use storage carbohydrates as an energy source by respiration, the amount of carbon in the plant and hence the C:N ratio decreases with time. With leaf expansion and the onset of photosynthesis the flow of carbon will invert. Thus the main hypothesis of this research was that incorporating germinated lupine seeds after a certain time of growth (when the C:N ratio reached its minimum value) could increase the N release of this plant-derived fertilizer. The incorporation of lupine seeds with a short germination period of 12 days increased the N released from this plant-derived fertilizer. However, N release and cabbage yield were similar in this treatment and when shredded lupine seeds were used, which represent a more practical fertilizing method. The use of shredded does not imply soil tillage needed to prepare the seed bed, sowing, and incorporating of seedlings

S14.308

Response of Smooth Cayenne pineapple to organic fertilizer in southwestern Nigeria

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Nigerian growers cannot access the lucrative market on organic pineapple due to dearth of technologies on organic fruit production. Consequently, between August 2008 and January 2010, a study was conducted at the University of Agriculture Abeokuta, Nigeria to determine the optimum rate of composted poultry manure (PM) for an organic pineapple. At transplanting (early vegetative phase), pineapple plantlets spaced 60cm x 30cm in paired rows separated by a 1.5m corridor on a low fertility sandy soil received composted PM at the rate of 2.5, 5.0, 10.0 and 20.0t/ha. The study was repeated on another plot 10months after transplanting (late vegetative phase) but application rate was increased to 40t/ha. Plants which received no poultry manure served as control. At 4 MAT, the effects of 10 or 20 t PM/ha did not differ significantly. Compared with control, they significantly increased plant height, leaf area and canopy diameter but not total dry matter accumulation. Between 10-15 MAT, poultry manure rates did not significantly affect vegetative growth. At 2 MAT foliar content of N, P and K content increased with rate of poultry manure applied. At 12 MAT, foliar Mg and Ca content peaked at 5 and 10t poultry manure/ha, respectively. Other nutrients had no consistent trends. Compared with control, application of 5t poultry manure/ha doubled fruit yield (41t/ha). Further yield increases at higher PM rates were slight. For optimum yield of pineapple in south western Nigeria application of poultry manure at 15 t/ha (10t followed by 5t/ha) is recommended.

S16.030

Shoot Density, Basal Leaf Removal and Cluster Thinning on the Portuguese Vine Variety 'Touriga-Nacional': Effects on Canopy Microclimate, Yield, and Quality Parameters of Grape and Wine

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During 3 years (2004-2006), in Dão region (centre of Portugal), with the Portuguese red grape variety 'Touriga-Nacional', the effects of the following interventions on the canopy microclimate, yield, fruit composition and wine quality were evaluated: shoot density (23 [SD23], 17 [SD17] and 11 [SD11] shoots/m row), basal leaf removal at fruit zone (without [LR0] versus with [LR1]) and qualitative (≈40%) cluster thinning (without [CT0] versus with [CT1]). During the growing season several parameters were measured: leaf area, leaf water potential, leaf gas-exchanges, leaf layer number (LLN), canopy size, intercepted radiation (PFD), fruit composition, yield and vigour. The reduction of shoot density and cluster thinning slightly improved canopy microclimate, by reducing LLN and therefore increasing PFD interception at fruit zone, while basal leaf removal affected these parameters in a much stronger way. The yield was not affected by the basal leaf removal, but it was significantly reduced by decreasing shoot density and by cluster thinning. The cluster thinning effect was, however, more pronounced, due to the small number of bunches, which didn't present a higher mass. None of the interventions significantly improve the grape qualitative parameters at harvest, although, the cluster thinning allowed an adequate industrial ripening to be achieved sooner, which would have permitted to perform the harvest at least one week earlier. Remarkably, the yield values obtained (8.5 to 17.9t/ha) were higher than the allowed ones for Dão PDO wines (60hl/ha), but did not affect the alcohol content or the phenolic composition of grapes and wine. The shoot thinning affected the cane prune mass and the lateral shoots number, with a higher equilibrium attained with SD17. The main disadvantage of highest shoot density was the time for manual pruning, which increase from 30hr/ha (SD11) to 90hr/ha (SD23). The results obtained suggested SD17-LR0-CT0 as the best strategy to be followed.

S16.319

Evaluation, Virus Testing and Healthy Status Improvement of New Grapevine Cultivars from Republic of Moldova

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On basis of new created cultivars were selected valuable genotypes with strategic importance for the development of viticulture in Republic of Moldova both for producers and breeding programs: 'Apiren alb', 'Apiren roz', 'Apiren Negru de Grozesti', 'Apiren roz Basarabean', 'Apiren roz extratimpuriu', 'Romulus', 'Prezentabil' et al. Formulated criteria for selection were high productivity and quality, advanced resistance to unfavorable conditions of environment, adaptability to local climatic conditions. Attention was paid especially to improving the assortment for table grape utilization, mainly with seedless and early repining cultivars, also ensuring diversification of products of technological processing of grapes and obtaining of ecological pure, dietetic and curative products. The phytosanitary evaluation of selected genotypes, in order to ensure virus-free planting material, revealed their worrying health condition. The virological check finding the virus particles presence in 70-80% of analyzed cases. Serologically were identify the Grapevine fanleaf virus (GFLV), Grapevine virus A (GVA), Grapevine virus B (GVB), Grapevine fleck virus (GFkV), Grapevine leafroll-associated virus (GLRaV 1-3). According the ELISA results the most widespread were fined GFLV, GLRaV-1, GLRaV-3 and GVB. In many cases the GVA was established in mixed infection with GLRaV-3. For virus eradication and production of virus-free initial biological material was selected the way of grapevine improvement via meristem culture. The best results of in vitro meristem propagation were obtained for three variants of Murashige & Skoog: i) MS supplemented with 1 mg/l BAP; ii) MS supplemented with 1 mg/l BAP and 0,2mg/l ANA; iii) MS with 2mg/l glicine, 1000mg/l casein, 100mg/l inositol and 1 mg/l BAP, 0,5mg/l AIA. Regenerative rate vary specifically for different genotypes. Application of ANOVA revealed the most influence of genotype in regenerative capacity of meristem (75.8%).

S18.275

Contribution of Banana to the Food Security and Nutrient Intake of People Living with HIV and Aids (PLWHA) in the Lake Victoria Basin

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A survey was undertaken in Rachuonyo (Kenya), Bukoba (Tanzania) and Rakai (Uganda) districts to assess the contribution of banana to household food security and nutrition of PLWHA and assessed the potential nutritional benefit of providing nutrient enhanced banana to PLWHA. Data were collected through interviews with 373 PLWHA using key informants and focus group discussions. The majority (71.5%) of the respondents were females aged 20-50 years; most had no higher than primary level education. They were also small scale farmers (with gardens <1 acre) who produced, consumed and sold different types of bananas. The most popular bananas were kibuzi (Rakai district), FHIA and Yangambi Km 5 (Bukoba) and Bluggoe and apple banana (Rachuonyo). The main attributes desired were taste, market value, yield, drought tolerance, availability of planting materials and shelf life. Planting materials were mainly sourced from own farms and neighbors. Over half of the respondents indicated that their food harvests were inadequate. The dietary diversity score and energy intake were also lower than desired. Banana contributed substantially to household food intake for PLWHA in the 3 districts. Based on the energy and nutrient intake data, it was concluded that PLWHAs require supplementary food. A banana based nutrient enhanced food supplement made by blending banana flour (61%) with soybean flour (39%) and multi-nutrient fortificant pre-mix (0.2% of mixture) was distributed to 15 respondents and their nutrient intake estimated. The product contained 459.7 kcal, 15% protein and substantial levels of vital vitamins and minerals. The product was well accepted and increased energy and nutrient intake by the recipients. At the recorded intake level (average of 66g per person per day), intake of energy and a few nutrients was still below recommended daily allowances (RDA) and about 204 g of the nutrient enhanced banana flour was required to achieve RDA.

S18.276

Exploring the Accumulation of Se and S in Tropical Plants

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Selenium (Se) is considered as one of the essential elements for normal growth and developments of plants and animals. It has the potential for preventing cancer related diseases in human beings and animals. The intake of Se has to be in organic form but then most plants can only uptake in inorganic form, and the bioavailability of Se to plants is determined by several environmental and genetic factor of a particular plant species. A study was conducted to investigate the accumulation of Se in tropical plant species. Leaf and flower tissue samples from more than 100 taxa and 47 plant families were collected from herb garden in Serdang (3°16'67" N and 101°70'00" E), Malaysia. The plant tissue samples were analyzed for Se and S concentration using ICAP. There was a significant difference in Se and S concentration within families, genera and species. Lowest tissue Se concentration was found in *Euphorbiaceae*, *Tiliaceae* and *Cannaceae* with <1ug per g of dry matter; and the highest was in *Gramineae*, *Plumbuginaceae*, and *Acanthaceae* with >350 ug per g of dry matter. Among the genus, *inophyllum*, *auriculata*, *vulgaris*, and *javanica* were the hyperaccumulators of Se with more than 330 ug per g of dry matter. However, there was a variation in tissue Se concentration among the various taxa of each genus and family. The tissue S concentration ranged from 3.0 to 0.03% of dry matter with highest S concentration in *Melastomataceae*. There was no correlation between the Se and S concentration among the tropical species sampled. The images and tissue Se, S concentration of these tropical species are presented.

S18.277

Chlorophylls $_{(a\ \&\ b)}$ and Carotene Inductions on RGB Formulas Properties for the Digital Pixels of Mango's Leaves

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This study experimented and evaluated sexteen cultivars of healthy Mango's leaves (*Mangifera indica* L.) full-fledged\mature (6 month) old from *Mango* Spp. namely Taimour, Dabsha, Aromanis, Zebda, Fagri Kelan, Alphonse, Bulbek heart, Langra, Compania, Mestikawi, Hindi-Sinnara, Ewais, Montakhab El Kanater a, Mabroka, Royal-hindi Royal-hindi and Sediek (Symbol: Ta, Da, Ar, Ze, Fa, Al, La, Hi, Co, Bu, Me, Ew, Mo, Ma, Ro and Se) under nine formula of color space tests such as (sRGB 0÷1,CMY, CMYK,XYZ ,CIE-L*ab,CIE-L*CH,CIE-L*uv,Yxy and Hunter-Lab) and RGB 0÷FF/hex triplet utilizing digital color photographs as tool for obtainment the natural color information for each cultivar on the upper and lower surfaces of Mango's leaves as a non-destructive analyses then the result linked with total pigment estimation as a destructive analyses. Since the total pigments structure and concentration were given indication for color tone of the pixel (natural color information) from the digital picture. On the other hand the color space properties followed the direction of total pigments structure and concentration%. The formula of color space tests can evaluation the total pigments of the leaves. Our study estimation the digital color space characteristics of pixels for upper and lower Mango's leaves for evaluation the total pigments using the pixels of digital picture. Our location study in the visual green color degrees from the visible color of electromagnetic spectrum in wavelength between (~520 to 570) nm and frequency between (~ 580-530 THz).

S18.278

Banana Somatic Hybrids between 'Guo Shan Xiang' (Aab, Silk) and 'Dong Guan Da Jiao' (Abb) Obtained by Asymmetric Protoplast Fusion

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In South China, 'Dong Guan Da Jiao' (ABB) is a local banana cultivar resistant to *Fusarium oxysporum* f. sp. cubense (Foc) race 4.. and 'Guo Shan Xiang' (AAB, Silk) is a popular commercial variety planted, but susceptible to Foc. To introduce chromosome fragments or a few chromosomes from'Dong Guan Da Jiao' (the donor protoplasts) to 'Guo Shan Xiang' (the recipient protoplasts), we developed an asymmetric protoplast fusion with 20% (w/v) polyethylene glycol. The protoplasts derived from embryogenic cell suspensions of 'Guo Shan Xiang' and 'Dong Guan Da Jiao' were respectively treated with 1.5 mM iodoacetamide (IOA) and with ultraviolet light (UV) at an intensity f 50 W/m2 for 120 s. A total of 148 regenerated green plants were obtained and 17 of which were survived in greenhouse. RAPD profiles suggested that, 9 of them were somatic hybrids by the presence of both parent bands, and others only had the recipient bands. Cleaved Amplified Polymorphic Sequence analysis by using mitochondrial and chloroplast universal primer pairs showed that all the regenerated plantlets shared the same cpDNA and mtDNA profiles as that of the recipient, no donor band was existed. Ploidy detecting of the putative asymmetric somatic hybrids by Flow cytometry suggested that the putative asymmetric somatic hybrids were triploid with the same ploidy as that of the recipient plants ,'Guo Shan Xiang', and there were neither heteroploid nor polyploidy existed. Genomic in situ hybridization analysis indicated that, three of the seventeen putative somatic hybrids, which had 4-10 DNA segments from the 'Dong Guan Da Jiao' inserted into the chromosome of the recipient plants, and two of the hybrids showed significant different in morphology from the parent plants. Yield analysis and micropropagation through plant tissue culture with their suckers and tolerance assay of the hybrids to Foc are carrying out.

SEMINARS

Sm02.222

Fire Blight (*Erwinia amylovora* (Burrill) Winslow): A New and Emerging Disease on Pear, Apple and Quince in Morocco

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In May 2006, symptoms associated to fire blight were observed on pear (*Pyrus communis*), apple (*Malus pumila*), and quince (*Cydonia oblonga*) trees at flowering and early fruit set stages in an orchard in the Meknès Region. Pure cultures of bacteria were obtained through isolation from either washed tissues or directly from bacterial ooze on the host. The isolates were identified as *Erwinia amylovora* on the basis of colony morphology, biochemical and physiological tests. In addition to pathogenicity, immunofluorescence (IF), PCR and Real time-PCR were used to confirm the identity of the isolates. These results confirmed for the first time the occurrence of fire blight in Morocco. In 2007, fire blight reappeared in five other orchards with disease incidences from 1 to 60%. In 2008, besides Meknès region, the disease was reported from 60 orchards in 5 counties including El Hajeb, Séfrou, Ifrane, Taounate and Khenifra. In 2009 the situation became more serious and the number of infected orchards reached 71 and about 114 ha were dug up and incinerated. To eradicate the disease, over 215 ha of pear, apple and quince have been destroyed. The disease was reported in different cultivars of pear (Williams, Pass Crassan, Doc Guyot, Cocia), apple (Galla, Start krinson, Golden) and Quince (Champignon, Vranj). These data, clearly demonstrate that the disease is spreading rapidly in the main pome fruit producing regions. Therefore occurrence of fire blight in Morocco poses a serious threat to the pome fruit industry.

Sm03.005

The Moorish myrtle, history, and recovery of Alhambra garden lost species

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The myrtle (*Myrtus communis* L.) was the plant species most representative of the al-Andalus gardens. It appears on chronicles, poems, and old agricultural books and is still used in the contemporary Alhambra and Generalife gardens in Granada. The oldest garden spaces still existing in the Islamic palaces are named after this plant, as the "Patio de los Arrayanes (=myrtle) de la Alhambra" and the "Patio de los Arrayanes del Generalife", today known as the "Patio de la Acequia". Several documents of botanists and travellers, from XVI and XVII Centuries, refer to a special type of myrtle, different to the rest, which existed at the Alhambra. Carlos Clusio (*Carolus Clusius*), after saw it at the Alhambra, stressed its wide and piled leaves. He defined several types of myrtle and named them as *Myrtus Baetica*, as was accepted by botanists worldwide that knew it leaving descriptions and drawings. The rarity of this plant made out gradually diluting their knowledge, first mistaking it for the other varieties of myrtle, then forgetting about its existence, even in the territory where he grown. European Botanical science in XX Century *Myrtus baetica* did not appear, just in few occasions as bibliographic citations. It appeared as if its existence had been a mistake of the pre-Linnean botanists and as this species was not really distinguishable from the broad-leaved myrtle. The study, performed in collaboration with the University of Granada and with the Patronage of the Alhambra and the Generalife, discusses the botanical historiography of *Myrtus baetica* considering genetic, morphologic and phonologic analysis. Nowadays, a project focused in the propagation of this species has been set up in order to prevent its loss. *Myrtus baetica* was easily recognizable taxon that still exists. It is distinguishable from others myrtle for having the leaves usually grouped in whorls of threes (not opposite as usual in the rest of the myrtles), very large, carinate, appressed to the stem and reflex at maturity. Branching is upright, with higher vigour, reaching up to ten meters high. Several centennial specimens have been located at the Alhambra gardens and their track is kept in various accounts and photographs of the nineteenth Century, when it was more common than today. Some several-fold-centenary specimens have also been found in different populations of mountains of the ancient Kingdom of Granada in the Alpujarras, Jaén and also in Northern Morocco. Additionally to that, this species is used in the U.S. gardening and a specimen was in Ciudad del Cabo was found by Susan Andrew in 1992. The myrtle (*Myrtus communis* L.) was the plant species most representative of the al-Andalus gardens. It appears on chronicles, poems, and old agricultural books and is still used in the contemporary Alhambra and Generalife gardens in Granada. The oldest garden spaces still existing in the Islamic palaces are named after this plant, as the "Patio de los Arrayanes (=myrtle) de la Alhambra" and the "Patio de los Arrayanes del Generalife", today known as the "Patio de la Acequia".

Sm08.272

Influence of Cutting and Harvest Day Time on the Essential Oils of Lemon Balm (*Melissa officinalis* L.)

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The effects of cutting and /or harvest day time on the essential oil content addition to its constituents of *Melissa officinalis* L. plants were carried out at Shanghai Institute of Plant Physiology and Ecology (SIPPE), Shanghai, China, during the years of 2007 and 2008. The oil content varies greatly with a range of 0.12 % to 0.25 % (0.048 to 0.1000 g per plant) during the first and second cutting. The oil yield was particularly high at 5 pm (0.25 % or 0.1000 g per plant) during the first cutting. Harvest day time at 5 pm resulted the highest percentages of the main

components (citronellal, citronellol and geranyl acetate) of essential oil extracted from *Melissa officinalis* L. plants. The highest percentage of monoterpene compounds was resulted at 5 pm during the first and second cutting. The highest percentage of sesquiterpene compounds was resulted at 1 pm treatment during the first cutting while it resulted at 3 pm treatment during the second cutting.

Sm10.207

Economic Analysis of Tomato Losses in Ibadan Metropolis, Oyo State

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The study examined economic loss analysis involving four varieties of tomato namely: UC82B, Roma, VT563/JM94/47 and Ibadan local in Ibadan, Oyo State. A random sampling technique was used to collect information on traders' characteristics, types of post harvest loss, intensity of damages and marketing margin accrued from the losses. The data were analyzed with the aid of descriptive statistics, simple margin analysis and t-test. The results showed that more men were involved in wholesaling of tomato while more women were involved in retailing of tomato. Most of the respondents have been in the business for more than 10 years. The major causes of economic losses to tomatoes were physiological, pathological and mechanical damages. In the UC82B variety, pathological damage constituted the greater percentage (44%) of losses; while the greatest cause of damage in Roma and VT563/JM94/47 was physiological and was put at 44% and 36% respectively. Ibadan local suffered the highest kind of damage traced to mechanical factors to the tune of 39%. . There was a significant difference ($p<0.05$) in the mean percentage damage of UC82B compared to the three other tomatoes varieties ($P<0.05$), while there was no significant ($p>0.05$) difference between mean percentage damage of VT563/JM94/47 and Ibadan local varieties. Based on the losses in the marketing margin, there was reduction of 34% in marketing margin of UC82B, Roma 85%, VT563/JM94/47 94%, and Ibadan local 79% at the retail level. Provision of improved mode of transportation and storage, is thereby recommended to minimize losses in tomatoes.

Sm13.226

Effect of Fertigation Practices through Water Soluble Fertilizer and Micro-Nutrient in Sweet Cherry for Karewa Land of Kashmir Valley

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Effect of water soluble fertilizer along with micro-nutrient has positive effect on qualitative and quantative characteristics in sweet cherry cv. Bigarreau Noir Grossa. Maximum shoot growth was recorded when plant was treated with 100% of the full doses of WSF along with micronutrient as compare to other treatments. The higher yield was observed when plant is treated with 80% of the full doses through Water Soluble fertilizer along with micronutrient. Fertigation with 80% WSF of NPK at 8 splits(T2) and fertigation with 100% WSF of NPK + 1 ppm Zn + 0.75 ppm B + 10 ppm Ca (T4) registered maximum fruit weight. The least fruit cracking (1.86 %) was noted with fertigation with 80% WSF of NPK + 1 ppm Zn + 0.75 ppm B + 10 ppm Ca (T5). The maximum TSS was also observed with T5. The higher leaf nitrogen and phosphorus were observed with fertigation with 100% WSF of NPK + 1 ppm Zn + 0.75 ppm B + 10 ppm Ca (T4) while as higher levels of leaf potassium was recorded with 100% WSF of NPK at 8 splits (T1). Maximum uptake of iron and Cu was observed in treatment T1. However, leaf Zn content was highest when plants were supplemented with water soluble fertilizer along with micro-nutrient. As far as Mn uptake is concerned, higher uptake of Mn (60 ppm) was observed in T5. Sweet Cherry plants should be fertigated with 60% or 80% WSF of full dose of fertilizer along with micro-nutrients @ 1 ppm Zn +0.75 ppm B +10 ppm Ca for maximum benefits.

THEMATIC

T02.018

Somatic Embryogenesis and Plant Regeneration from Flower Parts of *Citrus*

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Plant regeneration through somatic embryogenesis was investigated in Washington navel orange, Satsuma mandarin, Lemon, Variegated lemon, Lime, Citron , Pummelo, Rough lemon , Sour orange , Volkamer lime and Rangpur lime using stigma, style and ovary as explants. Explants were cultured on MS medium supplemented with 50 $g \cdot l^{-1}$ sucrose, 500 $mg \cdot l^{-1}$ malt extract and 3 $mg \cdot l^{-1}$ BA. Two months later, somatic embryos were induced from embryogenic callus. The percentage of embryo formation and number of embryo germinated depended on the explant type and genotype. Better results were obtained when stigma explants of Variegated lemon and Citron were used. After ten months, somatic embryos developed into plantlets at a frequency ranged from13.3% for Lime to 66.7 % for Lemon. Virus presence was tested by ELISA and RT-PCR . The obtained results indicated that the plantlets regenerated through somatic embryogenesis are CTV-free. RAPD analysis was used to assess the genetic stability of obtained plantlets as compared to the mother plants. The results indicated that most plantlets were belonging to the respective mother plants and the polymorphism percentage was genotype and explant- dependant.

T08.210

Effects of Grafted Seedling on Yield, Quality and Vitamin-C of Tomatoes Growing in Greenhouse

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The study was carried out in order to determine the effects of rootstocks on yield, quality and vitamin-c content of tomatoes which was grown in glasshouse. In this study, Beaufort was used as rootstocks and Kobra Fı tomato cultivar was used as scion. Seedlings were grafted by tube grafting technique. Plants were planted with (100-50) x 50 cm spacing in glasshouse and each treatment was replicated 4 times with 10 plants. The grafted tomatoes and the ungrafted control plants were compared as regarded to early and total yield, quality parameters and vitamin-C content. It was determinated that grafted plants had much more total yield and longer survival than ungrafted control plants. Vitamin-C is no difference between grafted and ungrafted plants.

T09.240

Research on Identifying Polyploidy by Flow Cytometry in *Lagerstroemia indica* and *Lagerstroemia subcostata*

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Flow Cytometry is one of the ideal methods in the identification of the polyploidy in *Lagerstroemia indica* and *Lagerstroemia subcostata*, for it distinguished chimera and tetraploidy.To prepare favorable nucleus suspensions, leaves were pretreated, and five different isolation buffer (Arumuganathan's buffer, Otto buffers, Tris-$MgCl_2$ buffer, Galbraith's buffer and Lysis buffer) were used to prepare the nucleus suspension. To reduce the impact that phenolic act on the samples, PVP was added to the isolation buffer. The comparison shows that pretreatment of the

leaves enhance the isolation efficiency, the sample prepared by Lysis buffer shows the best resolution in *Lagerstroemia indica*, with the smallest variation coefficient (CV) 4.73. The sample prepared by PVP - added-Otto buffers shows the best resolution in *Lagerstroemia subcostata*, with the smallest variation coefficient (CV) 4.66.

T12.232

Relationship between Endogenous Free IAA Levels and Peroxidase Activities during Root Development from Shoot Microcuttings of Persian Walnut Varieties

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Recent studies with walnut (*Juglans regia* L.) have indicated the significant effects of endogenous free IAA levels on adventitious rooting. In the present study, a comparative analysis of the adventitious rooting of microcuttings of two groups of *Juglans regia* L. varieties (easy-to-root and difficult-to-root) was carried out on vermiculte-DKW medium and in this period, the endogenous IAA content and peroxidase (POX) enzyme activity- isoenzymes that also participate in IAA catabolism- was assayed every 7 days. Results showed that the maximum concentration of endogenous auxin was required during the induction phase of rooting. Noticeable aspect in this survey was that varieties with difficulty to root (Howard and Kerman) had lower increase of endogenous IAA levels during this phase of root formation than the other varieties (Sunland and Chandler). POX enzyme showed the similar pattern of activity along rooting formation of all the varieties with the minimum level of activity observed in the induction phase and the maximum one in the initiation phase. Besides, there was a significant difference in changes of POX activity between two types of walnut varieties according to root ability. Our results confirmed that there is a reverse relationship between endogenous IAA content and POX activity changes during the root development of all the samples and walnut varieties with better root capacity clearly showed this opposite relationship.

T13.229

Evaluation of Animal Droppings and Their Combinations with NPK 15:15:15 Fertilizer on Dry Season Tomato Productivity

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Much of tomato production in Nigeria is carried out in savanna agro-ecological zone of the country during the dry season under irrigation. Yield response of the crop to applied organic and inorganic fertilizer is usually low due to frequent irrigation. A field experiment was therefore carried out in humid Jos Plateau, Nigeria during the 2009 dry season at the Federal College of Land Resources Technology, Kuru, Teaching and Research farm to determine yield response of tomato to applied poultry and cattle dropping, NPK 15:15:15 alone or in combination with half dosage of the fertilizers. There were six treatments (20 t/ha poultry dropping (PD), 20 t/ha cattle dropping (CD), 100 kg/ha NPK, 10 t/ha PD, 10 t/ha CD and the control with fertilization) laid out in a randomized complete block design and replicated three times. Growth parameters recorded were days to 50% flowering and fruiting and no. primary branches plant^{-1}. Yield characters were number of fruits plant^{-1}, mean fruit weight and fruit yield t/ha. Application of organic and inorganic fertilizers significantly ($p<0.05$) enhanced all the characters measured compared with control treatment. The result also showed that applied poultry dropping alone or in combination with NPK consistently increased the crop development, yield and yield components compared to other treatment means. Application of cattle dropping alone or in combination with NPK influenced tomato productivity better than the control treatment but inferior to applied poultry droppings due to early weed emergence in treatment plots.

T15.024

Apple Scab, *Venturia inaequalis* (Cooke) G. Wint., in India

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Apple scab is generally controlled by calendar-based fungicide applications regardless of the presence of ascospores of the causal fungus, *Venturia inaequalis* (Cke.) Wint. (anamorph *Spilocea pomi* Fr.),, in the orchard. In India, the disease causes significant economic losses in the states of Jammu & Kashmir, Himachal Pradesh and Uttarakhand in each season, the 3rd largest apple growing state in the country. Yield losses during epidemic years in 1996 and 2008 in the region went up to 70 per cent. In a fourteen-year study (1992-2009) conducted in apple orchards in Indian Himalayas, pseudothecia development started during November - December and progressed steadily when moisture and temperature conditions were favourable. Ascospore maturation peaked between pink bud and fruit set stages and was completed by fruit set stage or shortly thereafter (6 – 10 meteorological weeks). To improve spraying efficiency with reduced fungicides use, reliable scab warnings are helpful. Weather data and scb incidence were accumulated over 15 years and analyzed for validation of Mills criteria to establish its relevance in rescheduling fungicide applications under monitored spray programme (µMETOS). Our results revealed 2 day (light infection), 1 day (moderate infection) and 1 day (severe infection) delay in symptom expression under orchard conditions. The number of cumulative degree-days for 50 and 95 per cent ascospore discharge was approximately 418 and 792, respectively for orchards situated at 1900-2200 m asl and > 1182 (95% ascospore discharge) for orchards situated at >2200 m asl. When comparing PAD levels in different orchards under similar weather conditions, there was a clear relationship between PAD in the spring and the outbreak of scab on fruits and foliage in the autumn on poorly managed orchards. PAD values were 50 times higher in the poorly managed orchards than in the integrated managed orchards.

T15.025

Detection of Tomato Mosaic Virus in Tomato Seed and Treatment by Thermotherapy

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Tomato (*Solanum esculentum* Mill.) crop is highly susceptible to viruses, including the Tomato mosaic virus (ToMV), Tobamovirus. The symptoms vary from tiles, wrinkle, reduction, curvature of leaflets and irregular ripening of fruits. This disease requires attention because of their easy dissemination, which can be made by means of contact, cultural practices or contaminated seed. Its control is mainly based on the use of virus-free seeds. For detection of the pathogen, different methods may be used, including molecular or biological, such as the use of indicator plants. This method requires appropriate facilities and large time consuming. Furthermore, the existence of strains of Tobacco mosaic virus (TMV), Tobamovirus, may cause symptoms similar to those caused by ToMV, making the biological test more complex. So, when it comes to establishing the health of a seed lot, the use of indicator plants may be replaced by the test of monoclonal-ELISA. The DAS-ELISA is a technique relatively sensitive and is widely used for preliminary identification and quantification of viruses in plants. This study aimed to evaluate the efficiency of the ELISA test for detection of ToMV in tomato seeds and determine the time ideal for seed treatment by thermotherapy using dry heat (70 ºC). The DAS-ELISA test, using the tomato seeds, was an efficient method. The thermotherapy for 24 hours showed effective in eradicating the virus, and cause less damage to the seed physiological quality.

T15.026

Effect of Maize as Barrier on Incidence of Viral Infection in Pepper /Lettuce/ Maize Mixture in Southwestern. Nigeria

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Vegetables are mostly grown with food crop during rainy season in south western Nigeria. Especially leafy vegetables because of low economic returns resulting from market glut during the season. This has made some farmer to shift to exotic crops like lettuce or cabbage which command higher price. However, low yield is being recorded because of lack of information on appropriate practices in their cropping system. Likewise, pepper is the second most important fruit vegetable in the country. This is being attacked majorly by pepper mosaic virus (PMV) and pepper mottle virus and most of the farmers do not have direct access to control of the virus and low yield are persistently recorded. Therefore the experiment was carried out to identify cultural practice to reduce virus infection and compatibility of the mixture. The result showed that the yield of pepper was increased by 22% in maize intercrop and pepper mottle virus incidence was reduced by 75%. Maize and lettuce yield were hardly affected in intercrop although pepper yield was decreased by 15%. However, yield of pepper was significantly increased by planting at spacing of 90 x 30cm in sole crop and 90 x 45cm in intercrop. The highest efficient utilization of land (EUL) was 2.33 and highest benefit /cost ratio of 4:1 were obtained from spacing of pepper at 90 x 45cm in pepper/lettuce/maize mixture. In conclusion planting of maize as barrier in pepper/lettuce/maize mixture is beneficial and greatly reduced PMV.

T15.236

A Two-Year Survey of TSWV Occurrence on Globe Artichoke in Sardinia (Italy)

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Globe artichoke, grown over an area of approximately 13,000 hectares, is a major horticultural crop in Sardinia (Italy). The first reports of severe symptoms of plant stunting, chlorosis, distortion and necrosis of leaves and globes, date back to the beginning of the 2000s. In 2004 the Tomato Spotted Wilt Virus (TSWV) was detected on plants collected from artichoke fields located in a district in the north of the island (Valledoria, Sassari) where the outbreaks were till then concentrated. To monitor the spread of disease epidemics, the occurrence of TSWV in the main artichoke-growing areas of the region was surveyed for two years. Approximately 2,000 samples recovered from 114 and 85 sites, in 2008 and 2009 respectively, were analyzed by hybridization of tissue prints on nylon membrane with a specific probe for TSWV. Infected plants were found both in northern districts other than that where disease was first noticed, and in artichoke fields located in the central western part of the island. On the other hand, the reduction of the severity of the outbreaks noticed by growers in the last years seemed to be reflected in the results of our survey, which showed a decrease in disease incidence in the districts initially hard-hit by TSWV epidemics. So far, the main regional areas for nursery production of artichoke plants, located in the south of Sardinia, have not been yet reached by the disease.