I- Tree growth

I.1- Vegetative growth

a- All the studied trees varied greatly in all growth phases i.e. shoot length, increase in shoot length, No. of leaves/shoot, leaf length, width and shape. As well as leaf dry weight and leaf area.

b- As for the relationship between leaf area and its length and width, it was found that:

leaf area= 0.70 x leaf length (cm.) x leaf width (cm.)

I. 2- Leaf nutrients content

The trees under study differed greatly in their leaf nutrients content of nitrogen, phosphorus, potassium, calcium and magnesium.

II- Fruit set and fruit drop

Fruit set percentages of the studied trees were high, since it ranged between 88.10-96.81%, meanwhile, fruit June drop varied between 16.61-26.17%, while preharvest drop ranged between 5.76-12.39%. All the studied trees differed in fruit set, June drop and preharvest drop.

III- Fruiting

a- Trees L_7 & L_8 & M_{10} & M_{12} & H_2 and L_9 gave the highest yield as kg./tree.

b- Trees L_7 and L_8 produced the largest number of fruits/tree as compared with other trees.

c- The highest values of yield as kg./cm^2 of trunk-cross sectional area were obvious with trees J_{10} & L_8 & H_2 & D_1 and L_7.

V - Fruit quality

1- Fruit physical properties

All trees showed great differences in all fruit physical properties i.e. fruit weight, length, diameter, index, pulp thickness, pulp firmness, seeds weight, percentage, seeds number, weight of 100 seeds, and fruit colour.

2- Fruit chemical properties

a- Fruits of trees F_1 & J_{11} & F_7 & A_2 & L_5 and J_1 contained the highest percentage of total soluble solids.

b- Trees M_{10} & D_6 & L_4 & H_{11} & L_2 & L_7 & L_8 & D_1 & J_{12} and L_9 produced fruits with the lowest content of acidity.

c- The highest ratios of T.S.S./acid were found with fruits of trees L_4 & L_2 & D_6 & M_{10} & L_7 and L_8.

d- The richest fruits in ascorbic acid content were produced by trees H_2 & J_1 & M_{12} & J_9 & L_{10} & J_6 & J_9 & B_3 & L_8 & K_9 and L_{12}.

e- Fruits of trees J_{11} and F_1 contained the highest percentage of total sugars as compared with those of other trees.

V- Evaluation of seedling guava trees

Some fruit physical and chemical properties of great importance in determining fruit quality were considered in evaluating the studied trees. These properties were: fruit weight, pulp thickness, seed percentage, acidity, total soluble solids percentage, vitamin C. In addition, tree yield is considered by great value in evaluating trees, therefore it is assumed to resemble four characteristics. Consequently, the evaluation study resulted in selecting two seedling trees. They were L_8 and L_7 which can be used in vegetative propagation as horticultural clones, owing to their superiority in both yield and fruit eating quality, whereas, tree M_{10} is recommended for producing high yield for canning processes.

6. LITERATURE CITED

Abu Amara, N.M. (1976): Physiological studies on the rooting ability of guava cuttings M.Sc. Thesis. Fac. Agric. Ain Shams Univ. Egypt.

Agnihotri, B.N.; K.L. Kopur and K.R. Goel (1962): Ascorbic acid content of guava fruit during growth and maturity. Sci. and Cultd., 28: 435-6 (Hort. Abst. 33: 4033).

Ahmed, S. (1961): Cultivation of guava in West Pakistan Agric. Pakistan., 12: 245-61.

Ali, C.N. and M.N. Westwood (1965): Rooting of pear cuttings as related to carbohydrate, nitrogen and rest period. Proc. Amer. Soc. Hort. Sci., 88: 145-150.

Amer, M.E. (1960): The suitability of local guava varieties for canning and freezing M.Sc. Thesis, Fac. Agric., Cairo Univ.

Anon, (1961): Rooting in guava. Indian Hort. 5: 4-11. (Hort. Abst. 32: 3898).

Ashiru, G.A. (1968): Physiological studies of rooting cuttings of M.M. 106, MII apple (Malus sylvestris) Colens. Diss. Abstr. Sect. B., 28: 3550. (Hort. Abst. 39: 186).

Ashmawy, M.F. (1973): Studies on pecan propagation by cuttings. M.Sc. Thesis. Fac. Agric. Al-Azhar Univ. Cairo.

Baily, L.H. (1960): Manual of cultivated plants. The Macmillan Company; New York PP. 1116.

Bakr, E.I.M. (1970): Studies on vegetative and generative cycles of growth in seedy and seedless guava trees under Giza conditions. Ph.D. Thesis. Fac. Agric. Cairo Univ.

Balasubrahmanyam, V.R. (1959): Studies on blossom biology of guava (Psidium guajava L.) Indian J. Hort., 16: 69-75). (Hort. Abst., 30: 6175).

Bartolini, G.; P. Fiorino and M. Bouzar (1977): Studies on the effect of immersing cuttings in water. The effect of steeping in water of differing pH on the rooting of olive cuttings cv. Frantoio. Rivist Lella ortofloro frutticollutra Italiana 61(6): 409-417 (Hort. Abst. 48: 10125).

Bowers, F.A.I. and H.Y. Nakasone (1960): Selection and naming of a new guava variety. Hawaii, Fm. Sci., 8(4): 1-2. (Plant breeding Abst. 32: 1818).

British Colour Council (1938): Horticulture colour Issued in collaboration with the Royal Hort. Soc.

Brown, J.D. and O. Lilleland (1946): Rapid determination of potassium and sodium in plant material and soil extracts by flame photometry. Proc. Amer. Soc. Hort. Sci. 48: 341-346.

Brutsch, M.O. (1971): Rooting and early growth of Carya illinoensis (Wang.) stem cuttings M.Sc. Thesis. Fac. Agric. Natal Univ. Pietermaritzburg, South Africa.

Caballero, J.M. and L. Rallo. (1977): Duration of the rooting period in olive semi hard-wood cutting under mist. Olea, December, 29-39 (Hort. Abst., 50: 1976).

Cajlahian, M.H. and T.V. Neknasova (1962): The dormant period in peach plants and the ability of cuttings from dormant to form shoots and roots. Daklady Akad. Nauk. SSSR, 142: 226-29. (Hort. Abst. 33: 337).

Chapman, H.D. and P.F. Pratt (1961): Methods of analysis for soils, plants and waters. Univ. of Calif., Division of Agric. Sci.

Champan, K.R.; B. Paxton; J. Saranah and P.D. Scudamore-Smith (1981): Growth, yield and preliminary selection of seedling guavas in Queensland. Australian Journal of Experimental Agriculture and Animal Husbandry 1981. 21(108): 119-123 (14 ref.).

Chandler, W.H. (1958): Evergreen Orchards. Henry Kimpton, London, PP. 452.

Chauhan, K.S. and L.D. Maheshwari (1970): Effect of certain plant growth regulators, seasons and types of cuttings on root initiation and vegetative growth in stem cuttings of peach variety sharbati. Rajasthan college of Agric., Udaipur. Ind. of Hort. 27(3/4). 136-40.

Chauhan, K.S. and T.S. Reedy (1974): Effect of growth regulators and mist on rooting in stem cuttings of plum (Prunus domestica L.) Indian J. Hort., 31(3): 229-31. (Hort. Abst. 46: 3014).

Coit, J.E. (1945): The ubiquitous guava. Calf. Citrogr., 40: 408 (Hort. Abst. 16: 481).

Coston, D.C. and G.W. Krewer (1983): Air rooting of peach cuttings, Clemson University, South Carolina 29631, U.S.A. Combined Proc., Int. Plant Prop. Soc., 32: 414-8.

Couvillon, G.A. and A. Erez (1980): Rooting, survival and development of several peach cultivars propagated from semihard wood cuttings. Hort. Sci. 15(1): 41-3.

De Garcia Paula, R.D. (1952): The guava and its products an important source of vitamin C. Bol. Int., 3(7): 7-13. (Hort. Abst. 25: 1035).

Eggler, W.A. (1961): Stem elongation and time of cane initiation in pines. Forest Sci. 7: 149-158. In Koslowski, T.T. (ed): Shoot growth in woody plants. Bot. Rev. [illegible], 30: 335-92.

Eid, M.M. (1980): Some studies on guava propagation. M.Sc. Thesis, Fac. Agric. Ain Shams Univ. Cairo.

El-Agamy, S.Z.A. (1970): Studies on some varieties of guava. M.Sc. Thesis. Fac. Agric. Cairo Univ.

El-Azab, E.M. (1965): Studies of propagation, pruning, irrigation and flower bud induction in guava. M.Sc. Thesis. Fac. Agric. Alex. Univ. Egypt.

El-Fakharani, E.M.M. (1986): Anatomical and Physiological studies on vegetative propagation of some deciduous fruit trees Ph.D. Thesis. Fac. Agric., Moshtohor, Zagazig Univ. Egypt.

El-Kholey, L.A.F. (1987): Studies on the performance, productivity and fruit characteristics of some loquat trees. M.Sc. Thesis Fac. Agric., Moshtohor, Zagazig Univ. Egypt.

El-Rawi, A.K. (1976): Influence of IBA on rooting of soft wood cuttings of Olea europea cv. Ashrasy. Mesopotamia. Journal of Agriculture 11(1). 37-43 (Hort. Abst. 47: 7876).

El-Wakeel, A.T. and M.A. El-Badey (1971): Possibilities of selection in the seedlings progeny of Egyptian guavas. Agric. Res. Rev. Cairo, 49(5): 139-46.

El-Zorkani, A.S. (1968): A preliminary report of vitamin C, sugars and acid content of guava (Psidium guajava L.) Agric. Res. Rev. Cairo 46(3): 107-26.

Erez, A. (1984) Improving the rooting of peach hardwood cuttings under field conditions. Hort. Sci., 19(2): 245-7.

Fadl, M.S. and H.T. Hartmann (1967): Relationship between seasonal changes in endogenous promotors and inhibitors in pear bud and cuttings bases and the rooting of pear hard wood cuttings. Proc. Amer. Soc. Hort. Sci., 91: 96-112.

Fiorino, P. (1967): Pear propagation by cuttings, using the bottom heat technique. investigation on some factors which can affect rooting. Riv. Ortoflorofruitic. Ital., 52: 527-37 (Hort. Abst., 38: 4911).

Fouad, M.M. (1965): Studies on vegetative propagation by cuttings for hard to-root deciduous fruits, the "Le conte" pear. Ph.D. Thesis, Fac. Agric. Cairo Univ.

Gabr, M.F. (1976): Studies on the possibility of vegetative propagation of olives. M.Sc. Thesis. Fac. Agric. Cairo Univ.

Godston, J. and M. Chanin (1946): The guava, a fruit containing a new vitamin C. Rev. Inst. Def. Cafe Costra Rica, 17: 278-8 (Hort. Abst. 17: 995).

Guerriero, R. and F. Loreti (1968): Studies on the propagation by cuttings of clonal apple root-stocks with bottom heat. Riv. Ortoflorofruitic. Ital., 52: 757-78. (Hort. Abst. 39: 4174).

Hartmann, H.T. and D.E. Kester (1972): Plant Propagation Principles and Practices. Second edition Prentice Hall, Inc., Engle wood cliffs, New Jersy., U.S.A.

.....; **W.H. Griggs and C.I. Hansen (1960):** Old home pear rootstock propagation by hard-wood cuttings. Calif. Agric., 14(10): 9-10 (Hort. Abst. 31: 236).

Haseeb, G.M.M. (1985): Morphological and physiological studies on growth and fruiting of some guava varieties M.Sc. Thesis, Fac. Agric. Cairo Univ.

Hess, C.E. (1961): A study of plant growth substances in easy and difficult to root cuttings Proc. Intern. Pl. Prop. Soc. 9: 39-43.

Horwitz, W. (ed.) (1970): Official methods of analysis. Association of Official Analytical chemists. 11th ed.; Washington, D.C. pp.

Howard, B.H. (1968): The influence of (IBA) and basal temperature on rooting of apple rootstock hard-wood cuttings. J. Hort. Sci. 43: 23-31.

..... **(1978):** Field establishment of apple rootstock hardwood cuttings as influenced by conditions during a prior stage in heated bins. East Malling Res. Stat., Maidstone, UK. J. Hort. Sci., 53(1): 31-7.

Howard, B.M. (1970): Low cost fruit trees. Part I. propagating with hardwood cuttings. Part II. Hardwood cuttings technique is perfected. Comm. Gr, 1970. No. 3866, PP. 155-59, No. 3867, PP. 191-93 (Hort. Abst. 40: 5300).

Howard, R.S.; M. Harrison and C.A. Fenlon (1983): Effective auxin treatment of leafless winter cuttings. E. Malling. Res. Stat. Maidstone. ME. 19, 5 Bj UK Pubi. wantage UK 1983, 73-85.

.....; M. Harrison and K.A.D. Mackenize (1979): Cutting response to wounding. Res. E. Malling Res. Sta. For 1979 pp. 74-5.

Ibrahim, I.M.; A.T. El-Wakeel, S.E. Bahlool and M. Ashmawy (1976): Propagation of Pyrus communis rootstock by hard wood cuttings. Agric. Res. Rev. 54: 29-34.

Jacoboni, F. and G. Fontanazza (1976): A new method of olive propagation. Italian Agricola, 113(1): 104-112 (Hort. Abst. 47: 6000).

Mc Gregor, W.H.D. (1958): Seasonal changes in the rates of photosynthesis and respiration of Loblolly pine and white pine. Ph.D. Thesis, Duke Univ., Durham North California.

Mercado, F. and D.E. Kester (1966): Factors affecting the propagation of some interspecific hybrids of almond by cuttings Proc. Amer. Hort. Sci. 88: 224-230.

Minessy, F.A.; A.A. Taha and E.M. El-Azab (1967): Studies on propagation of guava. Alex. J. Agric. 15: 225-244.

Mougheith, M.G.; I.A. Hassaballa and G.H.I. El-Banna (1974): Fruit growth, dropping and quality of some seedy guava trees. Ann. Agric. Moshtohor, 2: 90-107.

Moustafa, A.A. (1973): Studies on the propagtion of fig by cuttings and the favourable factors. M.Sc. Thesis, Fac. Agric. Cairo Univ.

Mukherjee, S.K. and M.N. Dulta (1967): Physio-chemical changes in India guava during fruit development. Curr. Sci. 1967, 36: 674-5, (bibl. 2). (Hort. Abst. 38: 8666).

Murphy, J. and J.P. Riely, (1962): *A* modified single solution for the determination of phosphate in natural water. Anal. Chemi. Acta, 27: 31-36.

Nahlawi, N.; J. Humanes and J.M. Philippe (1975): Factors affecting the rooting of olive softwood cuttings. Proc. XIX intern Hort. Cong. Warszawa, IB, PP: 593.

Nakasone, H.Y.; J.E. Brekke and C.G. Cavaletto (1973): Fruit and yield evaluation of ten clones of guava (Psidium guajava L.) Research Report, Hawaii Agricultural Experiment Station 1-976 (No. 218): 16 pp. (8 ref.).

Nalawadi, U.G.; A.A. Farooql, M.A. Narayanareddy Gubbaiah and A.S. Nalini (1973): Studies on the floral biology of guava (Psidium guajava L.) Mysore J. Agric. Sci., 7(1) 24-37 (Plant breeding Abst. 44: 2725).

Nicotra, A. and C. Damiano (1975): Rooting trial of several peach and plum varieties by hardwood cuttings. Istituto sperimentale per La fruit coltura, Rome, Italy, Acta Hort. 54: 63-70.

Nouman, V.F. (1982): Studies on the propagation of olive trees. M.Sc. Thesis, Fac. Agric., Zagazig Univ. Egypt.

Nussbaum, J.J. and A.L. Leister (1972): Rooting of "Swan Hill" Fruitless olive California Agriculture 10(4): 12-18.

Popenoe, W. (1932): Manual of tropical and subtropical fruits. The Macmillan company, New York. PP. 474.

Porlingis, I.C. and I. Therios (1976): Rooting response of juvenile and adult leafy, olive cuttings to various factors. Jour. Hort. Sci., 51: 31-39.

Pregl, F. (1945): Quantative organic Micro-analysis. 4th Ed. Churchill, London.

Ruchie, G.F. (1946): Promising new guava varieties Proc. Fla. St. Hort. Soc. 1946: 127-31. (Hort. Abst. 17: 2628).

Ruehle, G.D. (1946): Promising new guava varieties Florida State Hort. Soc. Proc. 59: 127-131.

Sachan, B.P. and K. Ram (1970): Ascorbic acid content of different varieties of guava (Psidium guajava L.) grown in Allahabad region. Ind. Fd. Pack, 24(1): 16-7. (Plant breeding Abst., 44: 5433).

Santini, R. Fr. (1953): Identification and determination of polybasic organic acids present in sweet indian cherries (Mulpighia punicifolia L.) and three varieties of guava (Psidium guajava L.) Jour. Agric. Univ. Puerto Rico, 37: 195-8. (Hort. Abst., 24: 922).

Schrader, O.L. (1955): Notes on guava selection. Rev. Agric. Piracicaba, 30: 45-8. (Hort. Abst. 25: 3288).

Sharma, K.K. (1975): Effect of IBA on rooting of cuttings of guava (Psidium guajava L.). Punjab Agricultural Journal, 1975, 15, ½, 46-47.

Sinha, R.B.; P.C. Mallik and V.S. Chhonker (1964): Effect of plant regulators on root age guava cuttings. Indian J. Hort. 19: 120-7.

Singh, R. and O.P. Seghal (1965): Studies on the blossombiology of "Psidium guajava L.", II. Pollen studies, stigmal receptivity and fruit set. Indian Jour. Hort. 25, 52-59.

Singh, U.R.; I.C. Pandey, N.P. Upadhyay and B.M. Tripathi (1976): Description of some guava varieites (Psidium guajava L.). Progressive Horticulture 1976. 8(2): 5-12 (5 ref.).

Smith, F.; M.A.; Gilles, J.K. Hamilton and P.A. Godess (1956): Colourimetric method for determination of sugar related substances. Anal. Chem., 28: 350-6.

Snedecor, G.W. (1956): Statistical Methods. 5th Ed. Ames. Iowa, U.S.A. The Iowa Stat. Univ. Press. pp.

Teaotia, S.S. and J.C. Pandey (1961): Effect of growth substances on the rooting of guava stem cuttings Sci. and cult. 27: 442-4., bibl. 3. illus (Hort. Abst. 32: 3899).

..... and Others (1962): Study of some guava varieties (Psidium guajava L.) of uttar paradesh. Indian Agric. 6: 47-43. (Hort. Abst. 37: 1746).

Thonte, G.T. and V.R. Chakrawar (1982): Physico-chemical characters of the certain types/strains of guava (Psidium guajava L.) Progressive Horticulture 1982. 14(4): 269-272 (8 ref.).

Treeby, M.T. (1983): Effect of indole butyric acid on rooting kiwifruit and guava hard wood cuttings 1983. Sunrays Horticultural Research Inst., tute, Irymple. Victoria, Australia 3498. Plant Propagator 1983. 28(4): 7-10 (15 ref.).

Tripathi, R.S. and B.M. Gangwar (1971): Biochemical changes as indices of maturity in guava. Progressive Hort. 3(1): 17-23. (Hort. Abst., 44: 2880).

Wally, Y.A.; M.M. El-Hamady, S.T. Boulos and N.M. Abu-Amara (1981): Rooting experiments on guava using hardwood stem cuttings. Egyptian Journal of Horticulture. 1981. 8, 1: 77-86.

Webber, W.J. (1942): Extending guava production to California. Proc. Amer. Soc. Hort. Sci. 41: 228233.

Vogel, A. (1968): A Text Book of Quantitative Inorganic analysis longmans, New York, PP. 1216.

Yadav, I.S.; S.N. Pandey and M.P. Singh (1974): Clonal propagation of Prunus persica Ham. A par root-stock. Ind. J. Hort. 28(3): 210-3 (Hort. Abst. 44: 163).