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**HORTICULTURAL ABSTRACTS**

**COMPILED FROM WORLD LITERATURE ON TEMPERATE AND TROPICAL FRUITS, VEGETABLES, ORNAMENTALS, PLANTATION CROPS**

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**AROEIRA, J.S.**

Dormencia e conservacao de sementes de algumas plantas frutiferas. (Dormancy and storage of the seeds of some fruit plants.) (English summary  $\frac{3}{4}$  p.) "Experience," 1962, 2:541-609, bibl. 64, illus.

Studies were carried out on the seeds of avocado, persimmon, guava, jaboticaba (*Myrciaria cauliflora*), lime (*Citrus reticulata* X *C. aurantifolia*), apple, papaw, mango, loquat, pear, peach, (*Eugenia uniflora*), date and vine. The percentage germination and the number of weeks taken for the whole sample (100-400) of freshly harvested seeds to germinate at 20-30° C. are recorded. In apple, pear and grape seeds dormancy was complete, and in peach almost so. Persimmon seeds responded unfavorably to sulphuric acid treatment, but very favorably to stratification at 3-10° C. for 6-8 weeks. The slow and limited germination of avocado seeds was improved greatly by cutting the apex of the testa, and strikingly by removing it completely. Freeing mango seeds from their stones had a similar effect. Data are recorded on the stratification responses of seeds of apple, pear, peach and vine. The oil, protein and starch contents are quoted for seeds of lime, papaw, guava, (*E. uniflora*), jaboticaba, date, avocado and loquat. Detailed results are recorded from experiments on the storage of seeds of avocado, guava, jaboticaba, lime, papaw, loquat and *E. uniflora*, in sealed containers or exposed to the air, at local atmospheric temperatures or at 3-10° C.—Esc. sup. Agric., Vicosa, Minas Gerais, Brazil.

**FREGONI, M., and GAMBI, G.**

Prontuario di frutticoltura. 1, 2. Riproduzione e moltiplicazione. 3. Caratteristiche delle cultivar di pero, pesco e mandorlo. (Fruit growing digest. 1, 2. Propagation by seed and vegetative means. 3. Characteristics of pear, peach and almond varieties.) "Inf. Ortofratlic.," 1963, 4:239-47, 311-21, and 327-32, illus.

In parts 1 and 2 diagrams, notes and tables give concentrated information on the propagation of pome fruits, stone fruits, bush fruits, nuts, figs, citrus, olives, carobs, persimmons, prickly pears, avocados, pomegranates, jujubes, *Cornus mas*, *arbutus*, blueberries, bananas, *Annona* spp., pineapples, date palms and coconut palms. Part 2

also includes a list of the principal apple varieties grown in Italy, with their fruit characteristics. Part 3 gives similar data for Italian pears, peaches and almonds.

**CHAPOT, H., and HUET, R.**

Une nouvelle variété d'avocat, l'avocat Romain. (A new avocado variety, the Romain avocado.) (Arabic English and Spanish summaries, 1/4 p. each.) "Al Awamia," 1963, No. 6, pp. 95-9, illus.

Developed from seed in Rabat, this variety, here briefly described, produces large, thin-skinned, full-flavored fruit rich in oil and ripening from January to March.

**FOGUET, J. L., and TOLL, J. G.**

Ensayos de germinación anticipada en semillas de palta. (Experiments on accelerating the germination of avocado seeds.) "Bol. Estac. exp. Agric. Tucuman," 94, 1963, pp. 6, bibl. 2, illus.

Germination was very markedly accelerated in the Mexican type of avocado by slicing off 3-4 mm. of the seed at the base and tip. A similar response was obtained with fresh and stratified seeds of the Guatemalan type. Stratification accelerated the early stages of germination, but the fresh seeds were the first to reach the final maximum percentage germination.

**BURNS, R. M., and Others.**

Poor drainage and excess soil moisture encourage spread of avocado root rot. "Calif. Agric.," 1963, 17(8): 13, illus.

Only 7 known avocado root rot infections were located out of 450 acres of avocados grown in Riverside County, and, of these, only one grove was extensively damaged. Root rot damage was again shown to be dependent on the introduction of *Phytophthora cinnamomi* in soils with poor drainage. Even in the best soils the rate of spread may be increased by excessive soil moisture.—Univ. Calif., Riverside.

**MOJE, W., KENDRICK, J. B., JR., and ZENTMYER, G. A.**

Systematic and fungicidal activity of D-, L-, and DL-ethionine, S-alkyl-DL-homocysteine derivatives, and methionine antagonists. From abstr. in "Phytopathology," 1963, 53:883.

A marked reduction of *Phytophthora cinnamomi* stem canker development on avocado seedlings was obtained by root immersion in 25 p.p.m. ethionine for 7 days before inoculation. L-Methionine antagonized the effect of ethionine. Other S-alkyl-DL-homocysteine derivatives were less effective than ethionine. Eleven other soil fungi showed some degree of susceptibility to ethionine.—Univ. of Calif., Riverside.

**WOLFENBARGER, D. O.**

Biology and control of arthropod pests of sub-tropical fruits. "A.R. Fla. agric. Exp. Stats, 1961-62, pp. 333-4.

Avocadoes: Sevin reduced latania scale (*Aspidiotus lataeniae*) and avocado leafhopper (*Idona minuenda*) populations slightly more effectively than did Phosdrin. Both materials were equally effective against pyriform scale (*Protopulvinaria pyriformis*). Barbados cherry: In preliminary trials Sevin 50% w.p. at 2 lb. per 100 gal. reduced leaf-footed plant bug (*Leptoglossus phyllopus*) and stink bug (*Nezara viridula*) populations and fruit injury. Papaws: Populations of papaw whitefly (*Trialeurodes variabilis*) were reduced most effectively by Sevin 50% w.p. at 2 lb. per 100 gal. Against papaw fruit fly (*Toxotrypana curvicauda*), covering the fruit with paper or spraying with DDT have given good results. (See also H.A, 33:8221.)

**WILLIAMS, F. W., BROOKE, D. L., and RIGGAN, W. B**

The effect of price variation, skin blemish and firmness on retail sales of Florida avocados. "Bull. Fla. agric. Exp. Stats, 645," 1962, pp. 38, bibl. 4.

At the same price unblemished fruit was preferred to blemished fruit; at a 4-cent differential equal quantities were bought; and at 8 and 12-cent differentials more blemished fruit was bought. Fruit suitable for consumption within 1-2 days was preferred to that requiring longer storage, (See also H.A., 32:1645.)

**DICKINSON, T.A.**

Variety test report. "West. Fruit Gr," 1962, 16\*(6):38, illus.

In 11 years' avocado variety trials Creelman, a new Fuerte-Hass cross, proved of excellent quality. The fruits are green and pear-shaped, like Fuerte. Other varieties suitable for various regions of California are indicated.

\* Erroneously printed as Vol. 1 in the journal.

**DELPHEY, C. C.**

Promising avocado varieties. "Calif. Citrogr.," 1962, 47-413-15.

Brief descriptions are given of 8 green-fruited and 3 purple-fruited selections now being tested.

**MAXWELL, N. P.**

Cold hardiness of avocados during the January 1962 freeze. "J. Rio Grande Valley hort. Soc," 1962, 16:83-5.

Of 34 strains of avocado graded for frost resistance, all those of West Indian or

Guatemalan origin were killed back to the soil, whereas the Mexican types showed a wide range of tolerance. In the latter group trees less than 6 years old were more susceptible than older trees.—*Tex. agric. Exp. Stat.*, Weslaco.

**WALLACE, J. M., and DRAKE, R. J.**

A high rate of seed transmission of avocado sun-blotch virus from symptomless trees and the origin of such trees. "*Phytopathology*," 1962, 52: 237-41, bibl. 6.

A fuller account of H.A., 32: 5439.

**ZENTMYER, G. A.**

Resistance to phytophthora root rot of avocado. "*Proc. Carib. Reg. Amer. hort. Sci.*" 1961, 1961, 5 (9th annu. Mtg): 85-9.

High resistance to Phytophthora was found in a number of species of *Persea* and other genera of the Lauraceae, but none of these resistant species was graft-compatible with avocado. Slight resistance was observed amongst certain avocado varieties tested.—*Univ. Calif., Riverside*.

**MENDEZ VILLA, M.**

Practical measures to combat avocado seed borers. (Spanish.) "*Fitofilo*," 1961, 14(31): 4-7, illus., from "*Biol. Abstr.*," Sect E, 1962, 39, Abstr. 3778.

The pests are *Heilipus lauri*, *Conotrachelus aguacatae* C. *perseeae* and *Stenoma catenifer*. Measures to combat them include quarantine, the collection and destruction of infested fruits and the application of insecticides to the soil. Recommended insecticides are granulated 20% aldrin, 2.5% powdered dieldrin, 10% powdered chlordane and 2% powdered Folidol.

**YOUNG, R. E., ROMANI, R. J., and BIALE, J. B.**

Carbon dioxide effects on fruit respiration. II. Response of avocados, bananas and lemons. "*Plant Physiol*," 1962, 37: 416-22, bibl. 21.

Avocodos, bananas and lemons were subjected to 0, 5, and 10% CO<sub>2</sub> at 5, 10, and 21% O<sub>2</sub>. Carbon dioxide delayed the onset of the respiratory rise in the avocado, reduced the rate of O<sub>2</sub> uptake at the climacteric peak and prolonged storage life. In the banana the induction of the climacteric was postponed, but the rate of respiration at the peak was unaffected by CO<sub>2</sub> treatment whenever the peak occurred; the suppression of the climacteric pattern and the extension of storage life was particularly pronounced in an atmosphere of 10% CO<sub>2</sub> combined with 10% O<sub>2</sub>. Carbon dioxide caused an unprecedented stimulation of respiration in lemons. This phenomenon was more striking with 10 than with 5% CO<sub>2</sub>, and more in combinations of CO<sub>2</sub> with air than with O<sub>2</sub> concentrations below air. There appeared to be an increased utilization of sugar and

acids as a result of CO<sub>2</sub> treatment. In general, the life of lemons was prolonged by CO<sub>2</sub>, especially at the lower levels of O<sub>2</sub>. (Authors' summary. For part I see H.A., 33: 202, and see also H.A., 32: 3650.)—Univ. Calif., Los Angeles.

**SINCLAIR, W. B, LINDGREN, D. L., and FORBES, R.**

The sorption and retention of ethylene dibromide by fumigated citrus and avocado fruits. "J. econ. Ent," 1962, 55: 236-40, bibl. 3.

Valencia and navel oranges, lemons and avocados were fumigated in a gas-tight metal chamber (100 cu. ft. capacity) with EDB at dosages of 0.5 and 1.0 lb. per 1,000 cu. ft. for 2 hours at 70° F. The amount of EDB absorbed was determined immediately after treatment and thereafter at intervals for 7 to 10 days. Lemons absorbed nearly twice as much as oranges, but at the end of 7 days the amounts retained by both were approximately 1 p.p.m. Avocados absorbed approximately 5 times as much as the navel oranges, and at the end of 7 days the navel oranges retained only a trace of EDB, whereas the Zutano avocados, at the end of 10 days, retained more than 25 p.p.m. of the fumigant. (From authors' abstract.)—Univ. of Calif., Riverside.

**SACHER, J. A.**

Relations between changes in membrane permeability and the climacteric in banana and avocado. "Nature," 1962, 195: 577-8, bibl. 10.

Experiments with bananas are described which showed a progressive increase in the rate of leakage of solutes into the intercellular spaces accompanying respiratory rise with the onset of the climacteric. Similar observations were made on avocados.

**VOGEL, R.**

Notes on the history and future of avocado growing in Corsica.

(French, with 8-line summaries in English, German, Spanish and Russian.) "Rapp. annu. Inst. franc. Rech. fruit. Outre-Mer 1960-61, reprinted in Fruits d'Outre Mer," 1962, 17: 243-4, illus.

At the Citrus Experimental Station of Corsica the varieties Nabal and Anaheim (Guatemalan), Topa-topa (Mexican), Fuerte (hybrid Mexican X Guatemalan) and Booth (hybrid Guatemalan X West Indians) have shown most promise. The rootstocks used so far have been Mexican only, because of their frost resistance. Side grafting was more satisfactory than crown grafting as regards wind resistance.—Stat. exp. Agrumic. Corse.

**DE LA ROCHA G., G.**

Preliminary results of trials with rootstocks for avocado. (French.) From English summary in "Proc 16th int. hort. Congr., Brussels," 1962, 1962, Vol. 1, p. 399.

Results are given of long-term field trials with several types of Mexican avocado as

rootstocks for the Fuerte variety. Data on vigor, productivity and fruit quality are given in detail for each trial.—Estac. exp. agric., La Molina, Lima.

**BERGH, B. O., and WHITSELL, R. H.**

A possible dwarfing rootstock for avocados. "Yearb. Calif. Avoc. Soc.," 1962, 46: 55-62, bibl. 15, illus.

Bacon, Hass and Fuerte scions were grafted on self-pollinated seedlings obtained from a tree with short internodes and thick stems known as Mt 4. Bacon and Hass trees set fruit 1½ years after planting, instead of the usual 3 to 4 years. Hass tended to be more strikingly dwarfed than either Bacon or Fuerte. Bacon was more spreading on the dwarfing stock than on a normal rootstock.—Univ. Calif.

**EMBLETON, T. W., and Others.**

Chlorine and other elements in avocado leaves as influenced by rootstock. "Proc. Amer. Soc. hort. Sci.," 1962, 80: 230-6, bibl. 25.

Experiments on the effects of rootstock on the Cl content of avocado leaves have been reported previously (H.A., 32: 3637). Rootstock race and variety also significantly affected the N, P, K, Ca and Mg contents of the scion leaves. Furthermore, the percentages of P, K, Ca and Mg in Hass and Fuerte leaves from trees on seedling rootstocks were more variable than those in leaves from these trees propagated on their own roots by cuttings.—Univ. Calif., Riverside.

**GUSTAFSON, C. D.**

The salinity problem in growing avocados. "Yearb. Calif. Avoc. Soc.," 1962, 46: 100-5, bibl. 10.

In irrigation trials to reduce tip burn the chloride content of the soil was found to be highest from September to November. Leaching effectively removed the salts from the root zone. The top 18-20 in. of soil should be moist at all times, and the number of irrigations should be increased when the chloride content of the water is high. An irrigation 1 Va to 2 times heavier than normal should be made every 4 to 6 weeks.

## **SUB-TROPICAL FRUIT AND PLANTATION CROPS**

**MARSH, A. W., and GUSTAFSON, C. D.**

An avocado irrigation program. "Yearb Calif. Avoc. Soc.," 1962, 46: 39-41, bibl. 2.

Sufficient irrigation to wet the soil to a depth of 15 to 20 in. should be given when 12-in.-deep tensiometers read 40 to 50 centibars. When 24-in.-deep tensiometers read 45

centibars the duration of the irrigation period should be doubled. Further irrigations should be adjusted to maintain a reading of about 10 on the 24-in. tensiometers. Where the salt content of the irrigation water is moderately high, the duration of approximately every sixth irrigation should be increased by 25 to 30%.— Univ. Calif.

**RICHARDS, S. J., WARNEKE, J. E., and BINGHAM, F. T.**

Avocado tree growth response to irrigation. "Yearb. Calif. Avoc. Soc.," 1962, 46: 83-7.

Hass avocado trees under 3 different irrigation treatments received water when the soil suction reached  $\frac{1}{2}$ , 1 or 10 bars, and the trees on each irrigation plot received high, low or no applications of calcium nitrate. The circumferences of the trunks approximately 6 in. above the bud union were measured from 1956 to 1961. In the  $\frac{1}{2}$ - and 1-bar treatments low N applications increased growth compared with the no-N treatment, but at high N levels growth was reduced. In the 10-bar treatment both fertilizer levels reduced growth. In general, the best growth was obtained by maintaining 1-ft. tensiometer readings at 50 (centibars) or lower, particularly where salinity or excess fertilizer was present.

**KADMAN, A.**

Soil treatments with iron chelates to cure chlorotic avocado trees in Israel. "Yearb. Calif. Avoc. Soc.," 1962, 46: 73-5, bibl. 2.

Chlorotic seedlings of 8 varieties growing in pots in soil containing approximately 65% CaCO<sub>3</sub> were treated with iron chelates (Sequestrene 330 Fe and Chel. 138 HFe) at 5 g. per pot and immediately watered with 500 ml. of distilled water. Plants treated with Chel. 138 began to improve within 10 days of treatment and all symptoms of chlorosis had disappeared 2 weeks later. Sequestrene 330 had only slightly reduced the symptoms 1 month after treatment. Chlorotic trees in the orchard treated with Chel. 138 at 30 to 60 g. per tree also showed no symptoms 3-8 weeks later.—Nat. Univ. Inst. agric., Rehovot, Israel.

**MCCARTY, C. D., DAY, B. E., and JORDAN, L. S.**

Control of bermuda grass in avocado orchards. "Yearb. Calif. Avoc. Soc.," 1962, 46: 106-8, bibl. 2.

To obtain effective control an oil spray should be applied at regular intervals. This should contain 50% or more of aromatic compounds (if a less toxic oil is used it should be combined with oil-soluble dinitro compounds). A second spray and any later sprays should be applied when 20% regrowth of the original stand has occurred. Spraying a mowed stubble is as effective and more economical than spraying a tall stand of grass provided the stubble is not protected by a layer of clippings. —Univ. Calif., Riverside.

**McCARTY, C. D., PLATT, R. G., and LEWIS, L. N.**

Pruning avocado trees. "Yearb. Calif. Avoc. Soc.," 1962, 46: 42-3, bibl. 3.

Pruning is discussed, and it is concluded that avocado trees should normally be pruned only when necessary to facilitate other orchard operations.

**GOODALL, G. E, HANSEN, D. M, and BURNS, R. M.**

Santa Barbara County avocado root rot soil survey. "Yearb. Calif., Avoc. Soc.," 1962, 46: 63-7, bibl. 9, illus.

The survey showed that 16% of the acreage was affected by phytophthora root rot. The principal soil series were rated for root rot incidence; recent alluvial soils were the safest, and old terrace soils the most hazardous.—Univ. Calif.

**ZENTMYER, G. A., THORN, W. A., and BURNS, R. M.**

Field trials for resistance to phytophthora root rot. "Yearb Calif. Avoc. Soc.," 1962, 46: 88-93, bibl. 9.

In trials of 8 different combinations of scions and rootstocks, and in which the planting holes were infected with *Phytophthora cinnamomi* at the time of planting, the greatest resistance was shown by Duke cuttings followed by Hass on Duke seedling rootstocks grown from self-pollinated seeds. Duke cuttings were more resistant than seedlings, but Duke seedlings were more resistant than Topa Topa seedlings. Seedlings of *Persea skutchii*, *P. caerulea* and *P. borbonia* were all highly resistant. (See also H.A., 33: 1559.)—Univ. Calif., Riverside.

**McMURTY, J. A., and JOHNSON, H. G.**

The avocado brown mite in relation to its natural enemies. "Yearb. Calif. Avoc. Soc.," 1962, 46: 76-81, bibl. 2.

Studies on the population trends of *Oligonychus punicae* and its predators, *Stethorus picipes*, *Typhlodromus (Amblyseius) hibisci* and *T. (A) limonicus*, in Californian orchards.

**BEAN, R. C.**

Avocado maturity studies: a discussion of possible applications of various physical measurements to non-destructive testing. "Yearb. Calif. Avoc. Soc.," 1962, 46: 94-9, bibl. 1.

The problems are discussed of applying maturity tests, including color tests, absorption

of X-rays and similar radiation, measurements of heat capacity and transfer, and ultrasonic and electrical measurements. The use of electrical impedance measurements appeared to be the most promising method, and a very good correlation between the relative conductance and the fruit weight was found regardless of variety when a capacitance matching apparatus was used. A weak correlation with fruit maturity was observed when the system was immersed in water.—Univ. Calif., Riverside.

**SMITH, R. J.**

Progress report on fruit picking machine. "Yearb. Calif. Avoc. Soc.," 1962, 46: 44-5, illus.

A machine is illustrated which is self-propelled and self-guiding. The picker sits in a swing seat hanging from a boom with switches at his feet by which he can adjust the angle of the boom, raise or lower the seat and drive the machine forwards or backwards.—Univ. Calif.

**DICKINSON, T. A.**

Bin handling avocados: less damage, lower cost. "West. Fruit Gr.," 1962, 16 (9): 20, illus.

In the field the avocados are placed in large plywood boxes, each holding 850-900 lb., which are carried by truck to the packing house and then conveyed to an overhead brushing station. After cleaning with dry brushes the fruits are culled and conveyed to a second brushing station, and from there to sizing chutes. The avocados are taken to the packing area in tubs lined with foam rubber, and are packed in either wooden lugs or cardboard cartons.

**WOLFENBARGER, D. O.**

Tolerance of avocados to ethylene chlorobromide and ethylene dibromide dipping and fumigation. "J. econ. Ent.," 1962, 55: 556-7, bibl. 4.

Fruit of 5 avocado varieties, within 6 hours of harvest, was immersed for 20 min. in solutions of ECB or EDB at 115° F. or was fumigated with these compounds for 2 hours, usually at 73-88°F. The EDB-treated fruit ripened more rapidly than the ECB-treated fruit, and the fumigated fruit ripened more rapidly than the dipped fruit. In both cases untreated fruit ripened the slowest. As the fumigation dosage was raised the ripening time tended to lessen. An occasional fruit with a slight off-flavor resulting from the highest dosage was not a serious drawback.—Sub-trop. exp. Star., Homestead. Fla.

**YOUNG, R. E., POPPER, C. S., and BIALE, J. B.**

Specific activities of phosphate esters of avocado fruit tissue as determined by neutron activation. From abstr. in "Plant Physiol.," 1962, 37(Suppl.): xxxiii-xxxiv.

The total amount of adenine nucleotides did not change with ripening, but the ratio of ADP to ATP decreased markedly. The specific activities of ADP and AMP increased, and that of ATP decreased. The concentration of G-6-P decreased slightly with ripening, but the specific activity of P-32 in G-6-P increased markedly and was several-fold higher than that of ATP. The amount of unknown ester (U-2) increased 5-fold with ripening, and the specific activity was much greater than that of ATP. Incorporation of P-32 into U-2 was stimulated by DNP.—Univ. Calif., Los Angeles.

**JANSEN, E. F.**

The metabolism of ethylene in the avocado. "Abstrs Paps 1st inst. Congr. Food Sci. Technol.," 1962, 1962, p. 23-4.

At a level of 2,000 p.p.m. of ethylene in the surrounding atmosphere, green avocados metabolized 0.042 to 0.051% of both ethylene-C-14 and ethylene H-3. At a level of 250 p.p.m., 0.015% of ethylene was incorporated into the fruit. Approximately 1% of the incorporated ethylene was converted to CO-2. The composition of the metabolites and metabolic pathway of the ethylene are discussed.—W. reg. Res. Lab., Albany, Calif.

**SCHROEDER, C. A., KAY, E., and DAVIS, L. H.**

Totipotency of cells from fruit pericarp tissue in vitro. "Science," 1962, 138: 595-6, bibl. 17, illus.

Callus derived from avocado fruit pericarp grown in vitro for several generations developed roots with stele, endodermis, cortex, epidermis and root cap. No correlation between environment and root production was demonstrated. (Authors' abstract.)—Univ. Calif., Los Angeles.

**U.S. WEATHER BUREAU FRUIT FROST SERVICE**

Frost protection information. "Calif. Citrogr.," 1962, 48: 23.

Critical temperatures for oranges, grapefruit, mandarins, lemons and avocados.

**SWEENEY, R. C. H.**

The Australian-bug (*Icerya purchasi*) and the Seychelles-scale (*Icerya seychellarum*) in Nyasaland. "Nyasaland Fmr For.," 1962, 6: 20-5, bibl. 4.

*I. purchasi* has been recorded on citrus, avocado, tung, mango and a number of ornamentals including roses. Light infestations may be controlled by white oil emulsion sprays, more severe ones by malathion 25% w.p. at 1 oz. per 3 gal. sprayed over the plants and the surrounding soil surface. *I. seychellarum* has been found on coffee, lemon, fig, mango and ornamental shrubs, but is seldom of economic importance and is controlled by natural enemies. ,

**OPPENHEIMER, C.**

Selection of clonal rootstocks for mango and avocado. From summary in "Proc. 16th int. hort. Congr., Brussels," 1962, 1962, Vol. 1, p. 397.

In trials with mango rootstocks the use of polyembryonic types enabled greater uniformity to be attained in the orchard, the variety Sabre consistently giving the best results. Rootstocks for avocado are being selected for tolerance to saline irrigation water and high Ca content of the soil, and clones are being established by vegetative propagation of cuttings under mist. Nat. Univ. Inst. Agric., Rehobot.

**WELLS, A. W.**

Effects of storage temperature and humidity on loss of weight by fruit. "Mktg Res. Rep. U.S. Dep. Agric.," 539, 1962, pp. 15, bibl. 17, illus.

The rates of weight loss of apples, peaches, lemons, oranges and avocados, stored at various temperatures and humidities, were measured in laboratory tests. At a constant temperature and for limited periods the rate of weight loss by about 50% for each 100% increase in vapor pressure deficit. The rate of weight loss increased or decreased with an increase or decrease in temperature, even though the vapor pressure deficit remained constant. The loss of weight varied inversely with the size of the fruit. Softening of oranges, as measured by compression, varied with the quantity of weight loss. (From authors' summary.) Under comparable storage conditions Golden Delicious and Grimes Golden apples lost approximately twice as much weight as Jonathans. Rates of moisture loss from 4 peach varieties were almost identical.

**FURON, V.**

The production of avocado plants in the Ivory Coast. (French, with 8-10-line summaries in English, German, Spanish and Russian.) "Rapp. annu. Inst. franc. Rech. fruit. Outre-Mer 1961-62, reprinted in Fruits d'Outre Mer," 1962, 17: 573-6, illus.

Advice given on avocado nursery establishment includes the complete avoidance of chloride fertilizers, even for West Indian rootstocks, which are more resistant than the Mexican types to chlorides and also to *Phytophthora cinnamomi*. Open soil, basket pots or polythene bags are used for planting out the germinating seeds after removing the tap roots. Side grafting has proved more satisfactory than other methods; scions with terminal buds about to burst are inserted half-way up the stems of rootstock seedlings 20-30 cm. tall. Grafting and post-grafting care are described in detail.

**FROLICH, E. F.**

Etiolation and the rooting of cuttings. "Proc. 11th annu. Mtg Prop. Soc." 1961, pp. 277-83, bibl. 10, illus.

A review of the literature on the effect of light on the production of root initials is followed

by an account of an etiolation technique for rooting avocado cuttings, which would not root by normal methods. Seedling rootstocks in small containers were grafted with the scion variety which was cut back to near the union. When the buds started to break the plants were kept in the dark at 70-75° F. until the shoots were 3 in. long. The plants were then brought into the light, but the etiolated shoots were wrapped in a paper cylinder filled with vermiculite. When leaves began to develop the shoots were either girdled at the base and allowed to root in the vermiculite, or detached and rooted as cuttings in a propagating case. Such etiolated shoots rooted well. It was also found that the degree of inhibition of rooting was dependent on the period of exposure to light at a given intensity, and that the earlier in its development the shoot was exposed to light, the greater was the inhibition of rooting. The color of the light did not affect its root-inhibiting properties.—Univ. Calif., Los Angeles.

**SAMISH, R. M., and GUR, A.**

Experiments with budding avocado. "Proc. Amer. Soc. hort. Sci.," 1962,81: 194-201, bibl. 15.

A comparison was made between the take of avocado buds (varieties Benik and Fuerte) on 1-, 2 and 3-year-old Duke seedling rootstocks in the nursery row and on 3-year-old rootstocks in tins. Bud take decreased with increasing age of the rootstock, and budding was a complete failure on the rootstocks in tins. Immersing the budwood for 24 hours in a solution of 50 p.p.m. IAA improved bud take, particularly on the older rootstocks. Immersion in distilled water reduced bud take. Immersion in IAA at 800 p.p.m. tended to increase bud abscission. Large buds with partially open scales showed higher rates of abscission than smaller buds with closed scales. Cutting back the rootstock at the time of budding, leaving a 20-25-cm. stub covered with leaves, improved bud take under conditions of water stress. Covering the raffia ties with paraffin wax improved bud take under severe climatic conditions. The most successful treatment for inducing bud break after autumn budding was girdling the rootstock above the bud and cutting it back a month later. (From authors' summary.)—Nat. Univ. Inst. Agric., Rehovot.

**GUR, A.**

The role of growth substances in the abscission of avocado buds. "Phyton, Argentina," 1962, 19: 179-84, bibl. 24.

Normal medium-sized plump buds with closed scales, which are not liable to drop, were found to contain more free auxins than large buds with open scales which do tend to drop. Small undeveloped buds were also low in free auxin. Immersing budwood in solutions of IAA did not affect abscission at low concentration, decreased it at higher, and increased it at still higher concentrations. The application of IAA to an incision in the rootstock above the bud had no effect on the abscission rate of the bud, whereas NAA increased abscission when applied in this way. Dipping the ventral side of cut bud shields in concentrated solutions of IAA and NAA increased abscission. (From author's summary.)—Hebrew Univ., Rehovot.

**BINGHAM, F. T.**

Magnesium nutrition of avocados under sand culture conditions. "Proc. Soil Sci. Soc. Amer.," 1963, 27: 58-61, bibl. 13, illus.

In a 5-year sand culture experiment young avocado trees were kept without Mg for 21 months. The development of deficiency symptoms is described. The only significant changes in leaf composition were a decrease in Mg and corresponding increases in K and Ca. Leaf blades and petioles were essentially the same in composition. Acutely deficient trees recovered completely within 2 months of transfer to complete nutrition. Foliar sprays of 1.2% magnesium nitrate failed to correct the deficiency, but at 3 and 4 times this concentration there was an appreciable response without leaf injury. Values of 0.3-0.6% are regarded as normal for Mg in autumn samples of leaves of the current year. Leaf values of 0.2% Mg or less were found for deficient trees. Flowers were produced, but practically no fruit was set on the Mg-deficient trees.—Univ. Calif., Riverside.

**JOHNSTON, J. C.**

Treatment of frost-injured trees. "Calif. Citrogr.," 1963, 48: 106, 116-19.

Practical advice on treatment for citrus and avocados.

**ANON.**

Irrigation systems for citrus. (Spanish.) "Not. agric. Serv. Shell Agric., Venezuela," 1963, 3: 51-2, illus.

Furrow, hill-side, basin and sprinkler irrigation methods briefly discussed with reference to topography and erosion control.

**POPENOE, J.**

Summer avocado varieties. "Proc. Fla. St. hort. Soc." 1962, 1963, 75: 358-60, bibl. 6.

The poor quality of summer-ripening avocado varieties is discussed, and 18 varieties are briefly described. Simmonds and Ruehle are recommended for commercial planting. (From author's summary.)—Sub-trop. Exp. Stat., Homestead, Fla.

**GUSTAFSON, C. D.**

Soil fumigants aid avocado replants. "West. Fruit Gr," 1963, 17(6): 32, illus.

Replant trees were planted 1 month after the soil had been treated with a number of fumigants, and measurements were subsequently made of the circumference, height

and width of each tree. Nematode populations were very low, and *Phytophthora cinnamomi* was absent both before and after treatment. Measurements made 19 months after treatment showed that Telone, methyl bromide and Mylone had increased tree growth considerably, but the trees on Nemagon-treated plots were little better than the untreated controls.

**BEAN, R. C., PORTER, G. G., and BARR, B. K.**

Carbohydrate metabolism of avocado. II. Formation of sugars during short periods of photosynthesis. "Plant Physiol.," 1963, 38: 280-4, bibl. 20, illus.

The assimilation of C-14 O-2 into sugars and phosphate esters was studied in avocado leaf discs during photosynthetic periods of 10 sec. to 16 min. The labelling of mannoheptulose phosphate was demonstrated after a short photosynthetic period, but no evidence of perseitol phosphate was found. Fructose, sedoheptulose, mannoheptulose, and possibly ribulose, in their unphosphorylated forms, became labelled very early. Mannoheptulose and sucrose continued to accumulate at a linear rate over a long period of time, whereas the production of fructose and sedoheptulose soon resulted in saturation. A mechanism is suggested for the accumulation of mannoheptulose based on a phosphatase specific to ketose esters and a kinase specific to fructose and sedoheptulose. (From authors' summary for Part I see H.A., 32:5437) Univ. Calif., Riverside.

**PRISTA, L. N., and ALVES, A. C.**

A biochemical study of the leaves of *Persea americana* Mill. Card. Diet. (Portuguese, with French and English summaries 8 lines each.) "Garcia de Orta," 1961, 9: 501-8, bibl. 12.

Medicinal properties, flavonoids and potassium (75% of ash) and nitrate contents of avocado leaves.

**FURON, V.**

The pollination of avocados in the Ivory Coast. (French.) "Rapp. annu. Inst. franc. Rech. fruit. Outre-Mer" 1961-62, reprinted in "Fruits d'Outre Mer," 1963, 18: 197-9, bibl. 7.

The floral biology of 4 avocado varieties is described. No evidence of wind pollination was found in tests with greased plates. The types of insect found on the inflorescences are listed. In varieties such as Booth and Pollock each flower opens for about 3 hours on a single afternoon in the receptive phase and for 6-7 hours the following morning when no longer receptive but shedding pollen, which can be transferred the same day to newly opening flowers. In other varieties such as Lula and Peterson, however, the short receptive phase occurs in the morning and the pollen is shed in the late morning

and afternoon of the next day. The fact that fruit is set under these conditions indicates that the pollen remains viable over night, but hitherto all attempts to prove this on artificial media have failed. The average 2-4% fruit set, although low, is adequate for good yields.—Stat. d'Azaguie, Ivory Coast.

**MILLER, M. P., TUNRRELL, F. ML, and AUSTIN, S. W.**

Cooling avocado trees by sprinkling. "Calif Agric.," 1963, 17(7): 4-5, illus.

Fruit drop in avocados is apt to become excessive if the weather suddenly turns hot during the fruit setting period. Eleven tests were carried out to determine the effects on air temperature of sprinkling the trees, and the results of 3 representative tests are presented here. With initial air temperatures of 90°F. or more reductions in temperatures of 5 to 7°F. were obtained when air was moving at about 4 m.p.h. and the sprinklers wet both sides of the trees in two adjacent rows and one side of the trees in the rows beyond. The maximum potential cooling from water evaporation was not obtained in these tests because the R.H. was only raised by 6 to 12% from initial levels of 20 to 25%.—Univ. Calif., Riverside.

**RUEHLE, G. D., and CONOVER, R. A.**

Ferbam as a control for avocado scab. "Proc. Fla. St. hort. Soc." 1962,1963,75:363-4.

Ferbam was as effective as tribasic copper sulphate for the control of avocado scab (*Sphaceloma perseae*). Captan, dodine and a combination of the 2 fungicides were less effective. None of the treatments had a significant effect on yield.—Sub-trop. Exp. Stat., Homestead, Fla.

**BEN-YEHOSHUA, S, ROBERTSON, R. N., and BIALE, J. B**

Respiration and internal atmosphere of avocado fruit. "Plant Physiol.," 1963,38: 194-201, bibl. 27.

A fuller account of H.A., 32: 3650. (See also 33: 1561.)

**SOSNICK, S. H.**

Orderly marketing for California avocados. "Hilgardia," 1962, 33: 707-72, bibl. 40.

This study describes the sources and trends of supply, concentration and collaboration among handlers, heterogeneity of the commodity, seasonality and storability, handling costs and selling policies. In addition, quantitative characteristics of the wholesale demand for Calavo avocados are estimated, both by years and by weeks. Finally, the study develops a procedure for planning sales within a season to the best advantage of California growers and handlers. (Author's summary.)

**GASKINS, M. H., and WINTERS, H. F.**

Herbicide trials with young tropical and subtropical fruit and nut trees. "Proc. Fla. St. hort. Soc." 1962, 1963, 75: 418-20.

Diuron was shown to be safe to use on newly planted trees of mango, avocado, litchi, macadamia, *Dovyalis abyssinica* and carambola. Atrazine caused damage to *D. abyssinica* and carambola.—U.S.D.A., Miami, Fla., and Beltsville, Md.