Storage of the seeds of avocado (Persea americana Miller) permits the simultaneous planting of the seeds of cultivars that mature at various times of the year. If germination has been prompt and even, seedlings tend to be of uniform size throughout the planting. With procedures developed for storage, seeds could be shipped to any area of the world for propagation of plants for rootstocks or for seedling selection. Halma and Frolich (1) reported that the relationship of shell integrity to aflatoxin contamination (1).

Materials and Methods

‘Lula’ avocado seeds were supplied by Kendall Foods Inc., Goulds, FL. The seeds were washed and then immersed for 5 min in a suspension of 0.3% a.i. captan (N-[trichloromethylthio]-4-cyclohexene-1,2-dicarboximide). After being drained of excess water, the seeds were divided into similar samples of 12 seeds each based on uniformity of size, appearance, and freedom from decay and injury.

Samples of one lot of avocado seeds were placed in polyethylene (1.5 ml) bags perforated with 100 1/4-inch holes and closed with a plastic tie. Samples were stored for 8 months in chambers at 35, 40 and 45°F (1.7, 4.4 and 7.2°C, respectively) and 80-85% relative humidity.

Another index word, Persea americana.

Abstract. Germination of ‘Lula’ avocado seeds, which had been stored 3 or 5 months at 40°F (4.4°C), after 2 months was 100% for seeds stored in nonperforated polyethylene bags, 25 and 8%, respectively in perforated bags, and 8 and 0% in plastic mesh bags. Of plants from seeds stored in nonperforated polyethylene bags, 60% were suitable for grafting; plants from seeds stored in perforated or mesh bags were not suitable.

Results and Discussion

Germination was as rapid in stored as in unstored seeds at 45°F for 5 months at 40°F remained 100% germinable (Table 1). Germination was as rapid in stored as in unstored seeds (100% in 2 months). Seeds stored 3 and 5 months in perforated or mesh bags were not suitable.

Samples of a second lot of avocado seeds were placed in polyethylene (1.5 ml) bags that were nonperforated or perforated with 100 1/4-inch or 1/2-inch holes cut with a cork borer. Similar samples were also placed in mesh plastic bags. Samples were stored for 3 and 5 months in a chamber at 40°F and 80-85% relative humidity.

Germination tests were made with stored and unstored (freshly harvested) seeds of both lots. Seeds were planted base down in flats of moist sphagnum moss and kept in a greenhouse at ambient temp (80-90°F or 26.7-32.3°C) until plants emerged. Percentage germination in each population was recorded 2 months after planting. The number was also recorded of seedlings in each population judged to be suitable for grafting.

Concentrations of O2 and CO2 within nonperforated polyethylene bags were analyzed with a Varian model 920 (Varian Instrument Division, Palo Alto, CA) instrument equipped with a thermal conductivity detector that had 4 tungsten-rhenium WX filament. The series column system consisted of a 5-ft stainless steel silica gel (30-60 mesh), 1/4-inch outside diam column installed in the oven and operated at 266°F (130°C). A blank 12-ft copper, 1/4-inch outside diam column was connected between the external reference port of the detector. The blank and molecular sieves columns operated at 356°F (180°C). Gas samples were injected into an unheated gas sampling valve having a 0.25-ml loop. The carrier gas was helium flowing at 60 ml/min.

Relative humidities in chambers and bags were measured with an electric hygrometer (Hygrodynamics, Inc., Silver Spring, MD).

1 Use of trade names and manufacturer’s names is for identification purposes only and is not intended as a recommendation by the USDA of the article mentioned over similar articles by other manufacturers.


Literature Cited

Table 1. Germination of ‘Lula’ avocado seed as a function of the type of packaging used to store the seed for 3 and 5 months at 40°F.

<table>
<thead>
<tr>
<th>Type of bag</th>
<th>Percent germination after storage for—</th>
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<tbody>
<tr>
<td></td>
<td>3 months</td>
</tr>
<tr>
<td>Nonperforated polyethylene</td>
<td>100</td>
</tr>
<tr>
<td>Perforated polyethylene (100 1/4-in. holes)</td>
<td>25</td>
</tr>
<tr>
<td>Perforated polyethylene (100 1/2-in. holes)</td>
<td>25</td>
</tr>
<tr>
<td>Plastic mesh</td>
<td>0</td>
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*Polyethylene bags were 1.5 mil thick. All bags were tied closed.

Germination based on 12 seed per treatment was determined after 2 months in moist sphagnum moss in a greenhouse at ambient temp (80-85°F).

Ated polyethylene bags and in plastic mesh bags had 25% or less germinability 2 months after planting. Sixty percent of the seedlings from seeds stored in nonperforated polyethylene bags were suitable for grafting within 2 months of planting, whereas none of the seedlings from seeds stored in perforated polyethylene or mesh bags were suitable.

Seeds stored in the ventilated bags eventually germinated after 3-4 months, but the percentage germination generally averaged less than 100% because of fungal rot. These effects on germination are similar to those found in seeds stored under dry conditions where the tops and bottoms of stored seeds had to be cut off to foster water uptake to speed germination (1).

THE INFLUENCE OF GIBBERELLIC ACID ON THE GERMINATION OF AVOCADO SEEDS

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Additional index words. Persea americana.

Abstract. Data from a series of experiments and observations beginning in 1965 show that soaking avocado (Persea americana Mill.) seed in gibberellic acid (GA) consistently reduced the time required for germination and increased stem thickness and height of the young seedlings. The increase in stem thickness was not sufficient to be an aid in propagation of young seedlings by cleft or tip grafting but soaking seeds in a solution of GA could have utility in increasing the rate and uniformity of germination of avocado seeds.

Avocados are propagated by various methods of budding and grafting onto seedling rootstocks. This procedure poses no serious difficulty; however, seed often germinate slowly and irregularly. The regularity of germination varies somewhat with the cultivar. ‘Duke’, for example, selections of which have a degree of resistance to phytophthora root rot (Phytophthora cinnamomi Rand.), reportedly germinate so irregularly nurserymen prefer not to use them (1, 5).

The results indicate that ‘Lula’ avocado seeds store much better in a nonventilated bag, which retards moisture loss from seeds, than in a ventilated bag. The relative humidity was 99-100% in the nonperforated polyethylene bag, 89% in the polyethylene bag with 1/4-inch holes and 85% in either the polyethylene bag with 1/2-inch holes or the mesh bag. Serious rot problems, such as are encountered in packaging of fruits and vegetables (2), were anticipated in the nonventilated polyethylene bags. The use of the fungicide dip (0.3% captan) for avocado seeds probably helped to control decay at high humidity, but no data are available to support this point. The O₂ and CO₂ concns within the nonventilated polyethylene bags changed little during storage, and were 19% O₂ and 1% CO₂ after 5 months. These data indicate that the atm within the bag did not change sufficiently to inhibit decay organisms.

Conclusions

Storage of ‘Lula’ avocado seeds in nonventilated polyethylene bags can provide seeds that germinate promptly, and offers the possibility of year-round availability of rootstock material. Additional information is needed to show the effectiveness of the storage procedure with seeds of other Florida avocado cultivars stored up to a year under both laboratory and commercial conditions.

Literature Cited
