heads and dirt penetration in the July and December groups, this difference in yield is possible—and thus there may have been no differences between treatments.

The number of deaths in both the July- and December-shorn groups was considerably higher than in the April group. Shearing during the inclement weather in December would encourage such common diseases as pneumonia. The low nutritive value of the range forage would also cause nutritional stress due to the body energy losses. Nutritional stress may be a contributing factor in deaths among the July group as well. Forage was plentiful and of good quality at the April shearing date, so nutritional stress should not have been a factor in the higher death rate (table 3) after shearing; however, nights were still cold (less than 40°F) which would undoubtedly stress the ewe.

Sheep mortality can be influenced by the choice of shearing date. Sheepmen should try to select a season relatively free of wide fluctuations in temperature, should provide shelter where possible after shearing, and should keep the freshly shorn ewes on a high plane of nutrition.

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TABLE 1. AVERAGE NUMBER OF LAMBS BORN AND WEANED FROM THREE LAMBINGS BY SHEARING DATE

Shearing date	Lambs born per ewe	Lambs weaned per ewe	Survival percentage
April	1.10	.89[a]	80.96
July	1.09	.91[a]	83.23
December	1.19	1.07[b]	89.92

[a, b] Values bearing unlike superscripts are significantly different ($P < 0.05$).

TABLE 2. PERCENTAGE OF OPEN EWES AND EWES HAVING MULTIPLE LAMBS BY YEARS BY SHEARING DATE

Shearing date	Percentage of open ewes			Percentage of ewes with multiple births		
	1964	1965	1966	1964	1965	1966
April	14.0	4.0	2.4	26.5	14.6	19.5
July	9.5	4.8	11.4	10.5	23.3	13.6
December	6.6	1.8	5.3	28.5	33.3	10.5

TABLE 3. EWE DEATH LOSS

Shearing date	Total deaths	Time distribution of deaths*		
		April–July	July–December	December–April
	%	%	%	%
April	19	49.2	32.6	18.2
July	32	32.6	48.0	19.4
December	38	23.0	38.5	38.5

* Corrected for different number of days.

R. M. BURNS

PLASTIC CONTAINERS

avocado nursery

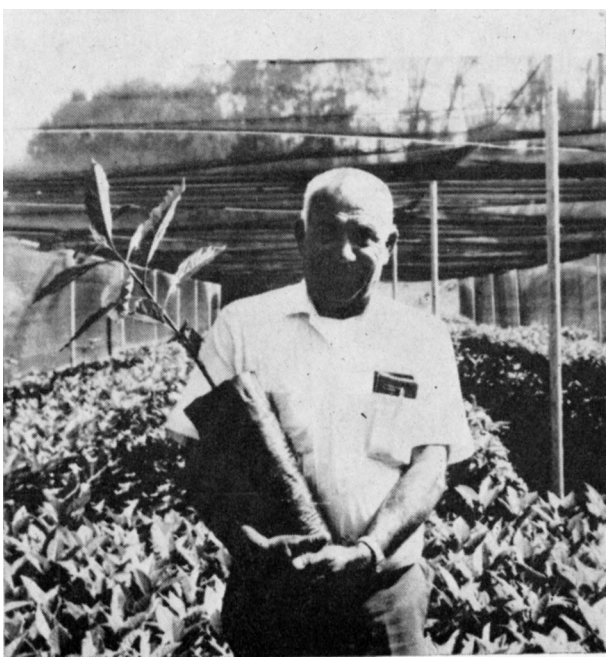
PLASTIC CONTAINERS for avocado nursery trees are relatively new in California, but nurserymen are showing increasing interest in them. One of the most popular avocado nursery containers for many years has been the tarpaper cylinder made from heavy roofing paper. These tarpaper containers have two main shortcomings: the relatively high labor cost of cutting and stapling; and frequent disintegration.

Polyethylene containers have been used for a number of years to propagate such tropical plants as coffee, rubber, and cocoa. In these instances the plastic container is usually a long polyethylene bag that is open at the top but closed at the bottom, with holes for drainage.

One of the first uses of plastic containers for avocados was in a nursery near Teziutlan, Mexico in June 1963, These containers were made from 8 mil black polyethylene tubing. This was cut with a regular paper cutter into 14-inch lengths. When flat, they were 10 inches wide, and when full of soil, made a container approximately 6 inches in diameter. The nurseryman was planning to reuse the plastic and he demonstrated how the container could be slipped off without being cut and without disturbing the soil and roots of the tree.

Two cooperative trials were started in California in November 1963, one at the W. E. Frey Nursery in Escondido and the other at the W. H. Brokaw Nursery in Ventura. In each of these trials 200 containers, 14 inches long, were cut from a long length of 8 mil black polyethylene tubing. The containers when filled were 6 inches in diameter. The material for each container cost about 15 cents.

Seed germination rates and seedling measurements in comparable numbers of plastic and tarpaper containers were made periodically in both trials. There were some differences in germination and growth, but these were not significant.



Avocados growing in plastic bags at the Los Padres Avocado Nursery, Watsonville. These polyethylene containers have holes in the bottom for drainage.

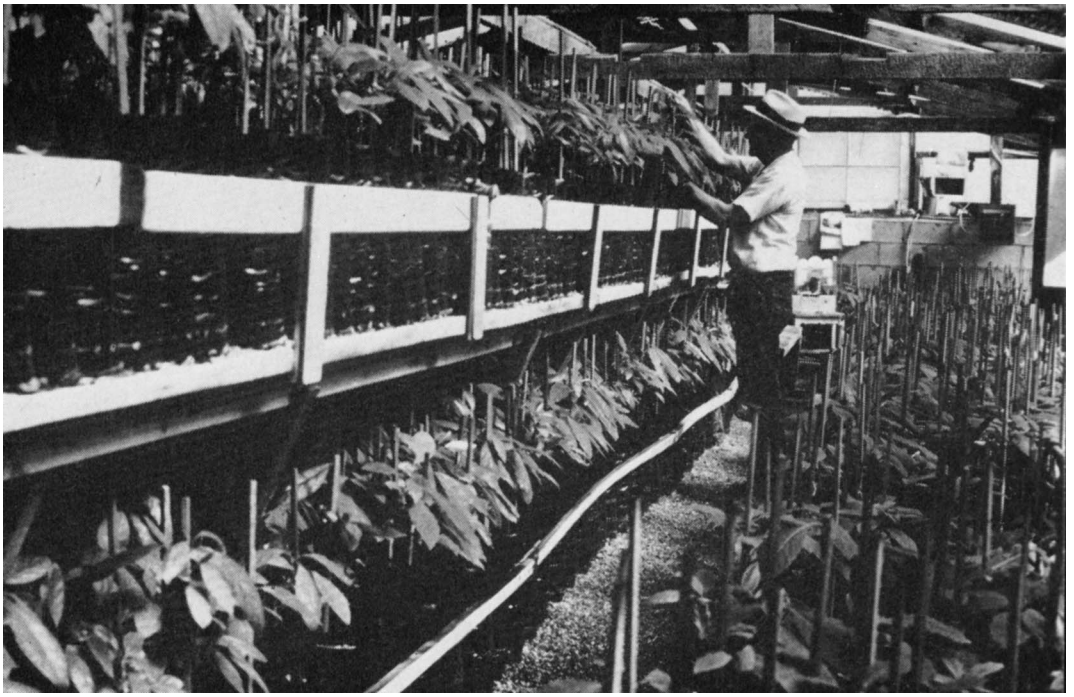
for trees

A commercially acceptable number of seedlings in both types of containers at both nurseries were budded and were eventually sold together at the normal planting time.

Subsequent to starting the trials, avocado nursery trees were observed growing in plastic bags in the Homestead area of Florida, and also tea cuttings grown experimentally at the University of Florida at Gainesville. The tea cuttings were in relatively long, narrow plastic bags containing a mixture of peat and perlite. The bags were placed upright in wooden lettuce crates to provide support and to facilitate easier movement.

One of the first problems with polyethylene containers was that they are not rigid as tarpaper containers, which meant special handling is necessary when filled with soil. W. H. Brokaw has developed a metal bin and form which allows simultaneous filling of six plastic containers. Getting the proper soil mix to eliminate sagging of the container when filled is another problem, as well as determining the proper amount of tamping when filling. Some avocado nurserymen have also experienced some problems with excess moisture at the bottom of plastic bags indicating that the number of holes in the bottom, and irrigation techniques, are very important with this container.

R. M. Burns is Farm Advisor, Ventura County. *The following people assisted with this project: C. Delphey, Farm Advisor Emeritus; C. Gustafson and B. Lee, Farm Advisors in San Diego and Ventura counties, respectively; and the late W. Thorn, Laboratory Technician, University of California, Riverside. Avocado nurserymen W. Britt of Watsonville, W. Brokaw of Ventura, T. Gary and C. Gofourth of Santa Paula, and E. Frey of Escondido also assisted in this study.*



Avocados growing in plastic bags in a greenhouse at the Troy Gary Nursery near Santa Paula. Picture taken April 1, 1969.

An evaluation of one of the first trials in California comparing plastic and tarpaper containers. Plastic containers in the middle were cut from polyethylene tubing. Picture taken in June 1964, at the W. H. Brokaw Nursery near Ventura.

Avocados growing in plastic containers at the W. H. Brokaw Nursery at Saticoy in Ventura County. Black polyethylene used in the foreground and yellow in the background. There are 85,000 containers at this location. Picture taken April 17, 1969.