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Feasibility of Using Fruit Size and Percentage Dry Weight to Predict Maturity

C.W. Coggins, Jr.—
Department of Botany and Plant Sciences, University of California, Riverside, California 92521.

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The objective of this study was to determine the feasibility of using fruit size and percentage dry weight to predict maturity and to establish release harvest dates. The primary questions were (1) can maturity be predicted in a reliable way, and (2) can maturity districts be defined?

This study was requested by the Production Research Advisory Committee (PRAC) of the California Avocado Commission and was pursued as a joint project between the University of California (C.W. Coggins, Jr. and S.K. Lee) and the California Department of Food and Agriculture (George Meske of CDFA). CDFA collected, weighed, and analyzed fruit for percent dry weight. UCR collated, analyzed, and summarized the data. Also, UCR has the responsibility of reaching conclusions and providing timely reports. Coggins presented an oral report to PRAC on June 14, 1984 and confirmed the main points via letter on June 18 to Mr. Ted Todd (Chairman of PRAC). A progress report, which was prepared August 16, 1984, was given to Dean L.G. Weathers. This report was subsequently transmitted to Mr. Ralph Pinkerton of the California Avocado Commission. The oral report in June was based on results with 6-8 ounce fruits, and led to the recommendation that such a study not be continued into the 1984-85 season. The August progress report was based on results from all sizes studied and reached the same conclusion. The purpose of this report is to provide a written summary regarding the study.

The study consisted of 19 'Bacon,' 22 'Hass,' and 21 'Zutano' sites. These sites, which were located by George Meske and Rob Wedin and approved by PRAC, are specified in Tables 1-12. At each site, 11 trees were selected in the coldest part of the grove. Two trees were used for preliminary sampling (to determine when percent dry weight was high enough to start the main study) and 9 trees were used for the results reported herein.

Healthy-looking fruit of 5 size categories were collected weekly (depending on availability) from the interior portion of each tagged tree. Weights of harvested fruit were checked with a field scale to assure that they were of the right size and were analyzed for percent dry weight by CDFA.

Harvest of a particular size at a given experimental site was started at approximately 17% dry weight for 'Bacon' and 'Hass' and at approximately 16% dry weight for 'Zutano'—as determined by the preliminary samples collected from 2 of the 11 trees. Harvest was continued until all fruit of a particular size equaled or exceeded 20% dry weight for 'Bacon' and 'Hass' and 19% for 'Zutano'—as determined by the "official" samples collected from the 9 data trees.

In general, size 1 (3.5-4 oz.) fruit were in short supply on 'Bacon' and 'Zutano' trees. The same was true for size 5 (10-12 oz.) for 'Hass' trees. Although we processed the data obtained from these, we concluded that the data were not sufficiently informative to warrant presentation. Furthermore, observed maturity frequently occurred by, or prior to, the 7th sampling date. This interfered with our original plan to report predicted maturity based on 5 and 7 sampling dates. However, since observed maturity differs greatly over short geographic distances (as discussed later), maturity prediction for a particular size/variety/location is academic.

Predicted and observed maturity dates presented in Tables 1-12 were obtained from linear regression equations as specified in footnotes to the tables. We also evaluated the data for quadratic and cubic components and learned that nonlinear components were not sufficient to justify reporting dates based on curvilinear regressions. While this is a valid general statement, for a few locations, significant nonlinear components were present over the percent dry weight ranges studied. Ideally, this report, and any industry program making use of maturity predictions for regulatory purposes, should take such differences into consideration. Linear versus curvilinear differences are probably site specific and perhaps site/year specific. This would add considerable complexity to the program. However, as mentioned earlier, this complication is academic since such a program appears to be inappropriate due to the fact that maturity dates differ greatly over short geographic distances.

The data of Tables 1-12 are shown in districts as defined in the February 1984 version of University of California Leaflet number 2356, entitled "Economic Trends in the California Avocado Industry." Within districts, experimental sites have been listed in alphabetical order. Also, for the following discussion, we have elected to use results from 6-8 ounce (size 3) fruit of the three varieties studied. Results for the other sizes are similar.

Each predicted maturity date was based on 45 data points (9 fruit each sampling date for a given fruit size category X 5 sampling dates). In some cases, the predicted maturity date agreed well with the observed maturity date. However, in many cases, the predicted date was considerably earlier than the observed date. In no case did predicted maturity occur later than observed maturity.

We have concluded that tracking percent dry weight changes gave us poor maturity prediction capabilities; we have further concluded that such predictions are too poor for use by the California avocado industry. In reaching these conclusions, we took good, mediocre, and poor predictions into consideration. However, we wish to point out that, in a workable system, "problem case" situations should either be rare or, if not rare, they should be mild enough to be tolerated. In connection with this, we point out the following: the predicted maturity date for 'Bacon' was 35 days early at Bonsall, 19 days

early at Corona, and 29 days early at Somis (Table 2); the prediction for 'Hass' was 20 days early at Valley Center, 28 days early at Irvine, and 36 days early at Somis and Santa Paula (Table 7); the prediction for 'Zutano' was at least 25 days early for 4 of the San Diego sites, 14-26 days early for Midcounty sites, 41 days early at San Luis Obispo, and 30 days early at Woodlake (Table 10). Additional cases of poor prediction could be cited; thus, it is obvious that poor predictions ("problem cases") are neither rare nor mild.

Considering the fact that we sequentially sampled the same trees and examined changes as fruits were getting close to maturity, we were somewhat surprised at our poor ability to predict maturity. It is obvious that fruit-to-fruit variability was high and it is probable that predictions could be improved somewhat by using larger numbers of fruit. Also, we believe predictions could be improved considerably by taking appropriate environmental factors into consideration. However, a detailed study aimed at improving predictions seems unnecessary for reasons given earlier in this report.

As stated earlier, observed maturity dates differ greatly over short distances. For example, the maturity of size 3 'Bacon' differed by 22 days between Somis and Santa Rosa Valley (Table 2); the maturity of size 3 'Hass' differed by 19 days for Escondido (low) versus Escondido (high), 26 days between Carpinteria" (low) and Carpinteria (high), and 30 days between Somis and Santa Rosa Valley (Table 7); and the maturity of size 3 'Zutano' differed by 22 days between Lindcove and Woodlake (Table 10).

In addition to these rather large differences over short distances, in some cases, maturity dates were similar over long distances. For example, the maturity dates for Escondido (low), Rancho California, and Goleta were 1 day apart for size 3 'Bacon' (Table 2). Likewise, there was only 1 day difference in maturity for size 3 'Hass' between Escondido (high) and Carpinteria (low) and 1 day difference for size 3 'Zutano' between Fallbrook (high) and Orosi (Tables 7 and 10, respectively).

Differences in maturity dates over short distances and the presence of similar maturity dates over long distances has led us to the conclusion that maturity districts cannot be defined. This conclusion was reached when results for a given fruit size within each of the three varieties was examined. In view of the number of varieties (and fruit size categories) being marketed in California, it seems clear that workable maturity districts cannot be defined.

Summary

1. Tracking percent dry weight changes gave poor maturity predictions. Such predictions are too poor for use by the California avocado industry. From the standpoint of the harvesting/regulatory/marketing scenario which led to this study, improved maturity prediction capabilities are not needed—due to the following conclusion.

2. Observed maturity dates varied too much over short distances to permit useful maturity districts to be defined. Maturity is probably strongly influenced by elevation, direction of slope, and possibly by many cultural and environmental factors.

3. With respect to CDFA's practice of releasing avocados for harvest by size/variety/location, we recommend that CDFA continue its cautious or conservative

approach.

4. The decision was made jointly by the UCR and CDFA investigators and by PRAC to terminate this area of research prior to the start of the 1984-85 season.

Report prepared October 1984.

Table 1. Predicted and observed maturity dates for size 2 'Bacon' avocado-1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	8 Nov	26 Nov	0.73
Escondido (high)	1 Nov	3 Nov	0.57
Escondido (low)	22 Nov	2 Dec	0.74
Fallbrook (high)	28 Sept	15 Nov	0.74
Fallbrook (low)	--[u]	--[u]	--[u]
Valley Center	16 Nov	26 Nov	0.62
		Span: 30 days	
Midcounties			
Corona	19 Nov	17 Nov	0.69
Irvine	31 Oct	3 Nov	0.57
La Cresta	--[v]	15 Nov	0.75
Rancho California	21 Oct	14 Nov	0.76
		Span: 14 days	
North Counties			
Carpinteria	--[v]	23 Dec	0.29
Fillmore	--[v]	28 Nov	0.66
Goleta	--[u]	--[u]	--[u]
Ojai	--[v]	1 Dec	0.34
San Luis Obispo	--[v]	18 Jan	0.69
Santa Paula	--[v]	17 Dec	0.50
Santa Rosa Valley	--[v]	26 Nov	0.47
Somis	17 Dec	19 Dec	0.59
Ventura	--[v]	19 Dec	0.24
		Span: 53 days	

z Based on 19.7% dry weight. Size 2 - 4-6 oz.
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates .
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 2. Predicted and observed maturity dates for size 3 'Bacon' avocado-1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	8 Oct	12 Nov	0.73
Escondido (high)	11 Nov	19 Nov	0.66
Escondido (low)	9 Nov	24 Nov	0.81
Fallbrook (high)	28 Oct	9 Nov	0.77
Fallbrook (low)	26 Oct	16 Nov	0.67
Valley Center	1 Nov	17 Nov	0.81
		Span: 15 days	
Midcounties			
Corona	1 Nov	20 Nov	0.80
Irvine	4 Nov	8 Nov	0.77
La Cresta	--u	4 Nov	0.78
Rancho California	11 Nov	23 Nov	0.81
		Span: 19 days	
North Counties			
Carpinteria	26 Nov	20 Dec	0.78
Fillmore	24 Nov	17 Dec	0.59
Goleta	17 Nov	23 Nov	0.41
Ojai	3 Dec	14 Dec	0.72
San Luis Obispo	--v	13 Jan	0.63
Santa Paula	18 Nov	15 Dec	0.67
Santa Rosa Valley	13 Nov	28 Nov	0.58
Somis	21 Nov	20 Dec	0.75
Ventura	22 Nov	14 Dec	0.60
		Span: 51 days	

z Based on 19.7% dry weight. Size 3 6-8 oz.
X Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.

TABLE 3. Predicted and observed maturity dates for size 4 'Bacon' avocado-1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	7 Oct	29 Oct	0.80
Escondido (high)	28 Oct	13 Nov	0.79
Escondido (low)	22 Oct	1 Nov	0.63
Fallbrook (high)	27 Oct	1 Nov	0.59
Fallbrook (low)	30 Oct	10 Nov	0.76
Valley Center	16 Oct	6 Nov	0.72
		Span: 15 days	
Midcounties			
Corona	3 Nov	8 Nov	0.39
Irvine	17 Oct	29 Oct	0.72
La Cresta	--u	--u	--u
Rancho California	5 Nov	9 Nov	0.72
		Span: 11 days	
North Counties			
Carpinteria	14 Nov	4 Dec	0.36
Fillmore	19 Nov	8 Dec	0.66
Goleta	14 Nov	18 Nov	0.56
Ojai	17 Nov	4 Dec	0.64
San Luis Obispo	5 Jan	8 Jan	0.69
Santa Paula	6 Nov	30 Nov	0.55
Santa Rosa Valley	10 Nov	19 Nov	0.57
Somis	18 Nov	13 Dec	0.70
Ventura	17 Nov	9 Dec	0.42
		Span: 51 days	

z Based on 19.7% dry weight. Size 4 - 8-10 oz.
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 4. Predicted and observed maturity dates for size 5 'Bacon' avocado—1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	26 Oct	30 Oct	0.69
Escondido (high)	10 Nov	15 Nov	0.39
Escondido (low)	20 Oct	26 Oct	0.70
Fallbrook (high)	--[u]	--[u]	--[u]
Fallbrook (low)	--[v]	8 Nov	0.37
Valley Center	--[v]	2 Nov	0.54
		Span: 20 days	
Midcounties			
Corona	--[u]	--[u]	--[u]
Irvine	--[v]	21 Oct	0.33
La Cresta	--[u]	--[u]	--[u]
Rancho California	--[v]	20 Nov	0.19
		Span: 37 days	
North Counties			
Carpinteria	--[v]	12 Nov	0.55
Fillmore	8 Nov	22 Nov	0.62
Goleta	--[v]	8 Nov	0.36
Ojai	28 Nov	1 Dec	0.53
San Luis Obispo	--[u]	--[u]	--[u]
Santa Paula	7 Nov	18 Nov	0.42
Santa Rosa Valley	8 Nov	10 Nov	0.43
Somis	17 Nov	8 Dec	0.51
Ventura	9 Nov	28 Nov	0.51
		Span: 30 days	

z Based on 19.7% dry weight. Size 5 - 10-12 oz .
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 5. Predicted and observed maturity dates for size 1 'Hass' avocado—1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
El Cajon	21 Nov	23 Nov	0.46
Escondido (high)	--[v]	29 Nov	0.17
Escondido (low)	7 Nov	19 Nov	0.73
Fallbrook (high)	5 Oct	5 Nov	0.62
Fallbrook (low)	5 Nov	23 Nov	0.72
Valley Center	18 Nov	20 Nov	0.41
		Span: 24 days	
Midcounties			
Corona	13 Oct	6 Nov	0.80
Irvine	17 Nov	27 Nov	0.59
La Cresta	20 Nov	2 Dec	0.65
Rancho California	27 Oct	9 Nov	0.76
Redlands	4 Nov	11 Nov	0.72
		Span: 23 days	
North Counties			
Carpinteria (high)	--[u]	--[u]	--[u]
Carpinteria (low)	26 Dec	29 Dec	0.14
Cayucos	3 Dec	12 Dec	0.70
Fillmore	--[u]	--[u]	--[u]
Goleta	14 Dec	18 Dec	0.32
Ojai	6 Dec	17 Dec	0.47
San Luis Obispo	--[u]	--[u]	--[u]
Santa Paula	--[v]	17 Nov	0.48
Santa Rosa Valley	--[u]	--[u]	--[u]
Somis	28 Nov	14 Dec	0.48
Ventura	--[v]	28 Nov	0.36
		Span: 42 days	

z Based on 20.0% dry weight. Size 1 - 3.5-4 oz .
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates .
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 6. Predicted and observed maturity dates for size 2 'Hass' avocado—1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
El Cajon	8 Nov	17 Nov	0.82
Escondido (high)	1 Dec	15 Dec	0.43
Escondido (low)	18 Nov	24 Nov	0.67
Fallbrook (high)	6 Oct	7 Nov	0.68
Fallbrook (low)	7 Nov	24 Nov	0.77
Valley Center	18 Nov	23 Nov	0.49
		Span: 38 days	
Midcounties			
Corona	11 Oct	8 Nov	0.80
Irvine	4 Nov	29 Nov	0.78
La Cresta	15 Nov	25 Nov	0.81
Rancho California	21 Oct	21 Nov	0.84
Redlands	11 Nov	26 Nov	0.80
		Span: 21 days	
North Counties			
Carpinteria (high)	--[u]	--[u]	--[u]
Carpinteria (low)	14 Dec	26 Dec	0.55
Cayucos	9 Dec	15 Dec	0.76
Fillmore	15 Dec	29 Dec	0.54
Goleta	11 Dec	31 Dec	0.58
Ojai	10 Nov	12 Dec	0.58
San Luis Obispo	14 Jan	14 Jan	0.65
Santa Paula	11 Dec	24 Dec	0.77
Santa Rosa Valley	18 Nov	24 Nov	0.64
Somis	13 Dec	28 Dec	0.66
Ventura	8 Dec	25 Dec	0.72
		Span: 51 days	

z Based on 20.0% dry weight. Size 2 - 4-6 oz.
Y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 7. Predicted and observed maturity dates for size 3 'Hass' avocado—1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
El Cajon	29 Oct	5 Nov	0.77
Escondido (high)	28 Nov	5 Dec	0.66
Escondido (low)	6 Nov	16 Nov	0.63
Fallbrook (high)	26 Oct	2 Nov	0.65
Fallbrook (low)	27 Oct	10 Nov	0.66
Valley Center	21 Oct	10 Nov	0.65
		Span: 33 days	
Midcounties			
Corona	27 Oct	3 Nov	0.61
Irvine	29 Oct	26 Nov	0.68
La Cresta	--[u]	--[u]	--[u]
Rancho California	16 Nov	18 Nov	0.53
Redlands	13 Nov	25 Nov	0.85
		Span: 23 days	
North Counties			
Carpinteria (high)	--[v]	8 Nov	0.66
Carpinteria (low)	15 Nov	4 Dec	0.60
Cayucos	2 Dec	13 Dec	0.68
Fillmore	9 Dec	3 Jan	0.80
Goleta	29 Nov	21 Dec	0.64
Ojai	9 Nov	5 Dec	0.56
San Luis Obispo	15 Dec	10 Jan	0.76
Santa Paula	19 Nov	26 Dec	0.85
Santa Rosa Valley	12 Nov	21 Nov	0.59
Somis	15 Nov	21 Dec	0.68
Ventura	10 Nov	13 Dec	0.69
		Span: 64 days	

z Based on 20.0% dry weight. Size 3 – 6-8 oz.
Y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 8. Predicted and observed maturity dates for size 4 'Hass' avocado-1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
El Cajon	--u	--u	--u
Escondido (high)	8 Dec	12 Dec	0.59
Escondido (low)	1 Nov	14 Nov	0.60
Fallbrook (high)	--v	30 Oct	0.32
Fallbrook (low)	--v	19 Nov	0.74
Valley Center	3 Nov	7 Nov	0.63
		Span: 43 days	
Midcounties			
Corona	--u	--u	--u
Irvine	31 Oct	14 Nov	0.68
La Cresta	--u	--u	--u
Rancho California	--u	--u	--u
Redlands	--u	--u	--u
		Span: N/A days	
North Counties			
Carpinteria (high)	--v	16 Nov	0.16
Carpinteria (low)	--u	--u	--u
Cayucos	--u	--u	--u
Fillmore	5 Dec	26 Dec	0.74
Goleta	--v	20 Dec	0.47
Ojai	14 Nov	29 Nov	0.59
San Luis Obispo	--u	--u	--u
Santa Paula	19 Dec	26 Dec	0.72
Santa Rosa Valley	--v	9 Nov	0.55
Somis	20 Dec	24 Dec	0.64
Ventura	17 Nov	9 Dec	0.36
		Span: 47 days	

z Based on 20.0% dry weight. Size 4 = 8-10 oz.
X Based on linear regression of first 5 sampling daces.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 9. Predicted and observed maturity dates for size 2 'Zutano avocado-1983-84. [z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	12 Oct	27 Oct	0.69
El Cajon	4 Nov	15 Nov	0.65
Escondido (high)	16 Nov	20 Nov	0.59
Escondido (low)	31 Oct	17 Nov	0.58
Fallbrook (high)	29 Sept	12 Oct	0.12
Fallbrook (low)	--[u]	--[u]	--[u]
Valley Center	17 Oct	7 Nov	0.81
		Span: 40 days	
Midcounties			
Corona	18 Oct	13 Nov	0.77
Irvine	--[u]	--[u]	--[u]
La Cresta	5 Nov	3 Dec	0.64
Rancho California	14 Oct	31 Oct	0.56
Redlands	9 Nov	17 Nov	0.75
		Span: 33 days	
North Counties			
Cayucos	22 Nov	6 Dec	0.70
Ojai	30 Nov	9 Dec	0.46
San Luis Obispo	18 Nov	12 Dec	0.30
Santa Paula	16 Nov	21 Nov	0.11
		Span: 21 days	
San Joaquin Valley			
Lindcove	9 Oct	18 Oct	0.61
Navelencia	3 Oct	18 Oct	0.54
Orosi	15 Oct	2 Nov	0.62
Porterville	3 Oct	4 Oct	0.69
Woodlake	25 Oct	7 Nov	0.73
		Span: 34 days	

z Based on 18.6% dry weight. Size 2 - 4-6 oz.
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.

TABLE 10. Predicted and observed maturity dates for size 3 'Zutano' avocado-1983-84. [z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	13 Oct	13 Nov	0.75
El Cajon	7 Oct	10 Nov	0.81
Escondido (high)	18 Nov	28 Nov	0.69
Escondido (low)	31 Oct	13 Nov	0.68
Fallbrook (high)	8 Oct	3 Nov	0.59
Fallbrook (low)	3 Nov	12 Nov	0.44
Valley Center	21 Oct	15 Nov	0.79
		Span: 25 days	
Midcounties			
Corona	23 Oct	18 Nov	0.82
Irvine	--[v]	12 Oct	0.47
La Cresta	11 Nov	25 Nov	0.60
Rancho California	6 Nov	30 Nov	0.74
Redlands	24 Oct	19 Nov	0.79
		Span: 49 days	
North Counties			
Cayucos	20 Nov	11 Dec	0.79
Ojai	29 Nov	10 Dec	0.50
San Luis Obispo	17 Nov	28 Dec	0.55
Santa Paula	8 Nov	4 Dec	0.42
		Span: 24 days	
San Joaquin Valley			
Lindcove	9 Oct	15 Oct	0.76
Navelencia	3 Oct	11 Oct	0.58
Orosi	11 Oct	2 Nov	0.65
Porterville	4 Oct	4 Oct	0.63
Woodlake	7 Oct	6 Nov	0.72
		Span: 33 days	

z Based on 18.6% dry weight. Size 3 - 6-8 oz.
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.

TABLE 11. Predicted and observed maturity dates for size 4 'Zutano' avocado-1983-84. [z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	24 Oct	12 Nov	0.87
El Cajon	11 Oct	29 Oct	0.82
Escondido (high)	18 Nov	24 Nov	0.75
Escondido (low)	17 Oct	5 Nov	0.83
Fallbrook (high)	13 Oct	25 Oct	0.72
Fallbrook (low)	4 Nov	16 Nov	0.71
Valley Center	19 Oct	12 Nov	0.83
		Span: 24 days	
Midcounties			
Corona	10 Nov	13 Nov	0.73
Irvine	9 Oct	9 Oct	0.64
La Cresta	--[u]	--[u]	--[u]
Rancho California	27 Oct	15 Nov	0.82
Redlands	9 Nov	18 Nov	0.74
		Span: 40 days	
North Counties			
Cayucos	18 Nov	4 Dec	0.67
Ojai	15 Nov	3 Dec	0.65
San Luis Obispo	12 Dec	3 Jan	0.58
Santa Paula	8 Nov	18 Nov	0.46
		Span: 46 days	
San Joaquin Valley			
Lindcove	8 Oct	14 Oct	0.59
Navelencia	6 Oct	9 Oct	0.61
Orosi	16 Oct	27 Oct	0.78
Porterville	--[v]	3 Oct	0.77
Woodlake	8 Oct	1 Nov	0.78
		Span: 29 days	

z Based on 18.6%. dry weight. Size 4 = 8-10 oz.
X Based on linear regression of first 5 sampling daces.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study

TABLE 12. Predicted and observed maturity dates for size 5 'Zutano' avocado-1983-84.[z]

Location	Predicted Maturity Date[y]	Observed Maturity Date[x]	Correlation Coefficient[w]
San Diego County			
Bonsall	29 Oct	5 Nov	0.81
El Cajon	17 Oct	21 Oct	0.68
Escondido (high)	9 Nov	15 Nov	0.58
Escondido (low)	14 Oct	30 Oct	0.80
Fallbrook (high)	--[v]	21 Oct	0.63
Fallbrook (low)	23 Oct	9 Nov	0.68
Valley Center	10 Oct	9 Nov	0.72
		Span: 25 days	
Midcounties			
Corona	--[u]	--[u]	--[u]
Irvine	--[u]	--[u]	--[u]
La Cresta	--[u]	--[u]	--[u]
Rancho California	18 Nov	19 Nov	0.63
Redlands	17 Nov	17 Nov	0.67
		Span: N/A days	
North Counties			
Cayucos	18 Nov	27 Nov	0.41
Ojai	7 Nov	16 Nov	0.55
San Luis Obispo	--[u]	--[u]	--[u]
Santa Paula	5 Nov	11 Nov	0.40
		Span: 16 days	
San Joaquin Valley			
Lindcove	--[v]	11 Oct	0.84
Navelencia	9 Oct	10 Oct	0.59
Orosi	27 Oct	28 Oct	0.72
Porterville	--[u]	--[u]	--[u]
Woodlake	26 Oct	30 Oct	0.61
		Span: 20 days	

z Based on 18.6% dry weight. Size 5 - 10-12 oz.
y Based on linear regression of first 5 sampling dates.
x Based on all sampling dates.
w Refers to the linear relation between dry weight and time—based on all sampling dates.
v Mature by 5th sampling date.
u Inadequate supply of fruit for study.