Raisin Administrative Committee

Marketing Policy & Industry Statistics 2014

Raisin Administrative Committee

Marketing Policy & Industry Statistics
2014 - 2015 Marketing Season

As Presented to the RAC on October 2, 2014
and Submitted to the Secretary

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From Federal Marketing Order 989.54(e) Factors. When computing preliminary and interim percentages, or determining final percentages for recommendation to the Secretary, the Committee shall give consideration to the following factors:

(1) THE ESTIMATED TONNAGE HELD AT THE BEGINNING OF THE CROP YEAR.

(A) Tonnage held by producers.

52 tons of Other Seedless raisins were being held on Memorandum Storage as of July 31, 2014.

(B) Tonnage held by handlers.

Packer inventory of raisins as of July 31, 2014, with comparative tonnages for July 31, 2013 was as follows:

	PACKER INVENTORY * as of 07/31/13 Held Locally	***PACKER INVENTORY * as of 07/31/14 Held Locally***
Natural Seedless	**132,407**	**138,215**
Dipped Seedless	**1,576**	**1,341**
Golden Seedless	**4,917**	**7,116**
Zante Currant	**2,353**	**1,858**
Sultana	**26**	**8**
Muscat	**0**	**0**
Monukka	**179**	**146**
Other Seedless	**4,107**	**5,786**
Other Seedless Sulfured	**620**	**672**
TOTAL	**146,185**	**155,142**

** Includes packed and unpacked in sweatbox tons*

10 Year Natural Seedless Carry-in Inventory (Free Tonnage & Unreleased Reserve)

	Free Tonnage	Unreleased Reserve	Total
2005-06	114,792	26,257	141,049
2006-07	111,444	49,486	160,930
2007-08	105,430	20,864	126,294
2008-09	106,249	647	106,896
2009-10	126,824	12,154	138,978
2010-11	83,143	71	83,214
2011-12	110,206	2	110,208
2012-13	132,061	0	132,061
2013-14	132,407	0	132,407
2014-15	138,215	0	138,215
10 Year Average	***116,077***	***10,948***	***127,025***

(C) Estimated tonnage held by Committee as of August 1, 2014.

The Committee held 0 tons of Natural Seedless reserve pool raisins.

(2) THE EXPECTED GENERAL QUALITY AND ANY MODIFICATIONS OF THE MINIMUM GRADE STANDARDS.

(A) The 2014 harvest was 7 to 10 days early.

(B) During the 2013-14 crop year, incoming substandard and quality standards were maintained at the standard level. Substandard dockage has a maximum limit of 17% and B or Better maturity dockage allowance has a minimum limit of 35%.

(C) Although raisins produced from grapes grown outside of the State of California are not subject to volume regulations or grade and condition standards established under the marketing order, the surveillance and reporting provisions for any such raisins received by raisin handlers will continue for the 2014-2015 crop year. Arizona declared fruit must be validated as produced in Arizona or will be subjected to all requirements of California grown fruit.

(3) THE ESTIMATED TONNAGE OF STANDARD AND OFF-GRADE RAISINS WHICH WILL BE PRODUCED.

(A) The Committee met on August 14, 2014 and recognized the computed Trade Demand for Natural (sun-dried) Seedless and all other varietal types (see chart on page 8). The Committee voted to not establish volume regulations, thereby declaring Natural (sun-dried) Seedless and all other varietal types 100% Free. This resulted in no trade demands or volume regulations for the 2014/15 crop year.

Varietal Type	Estimated Production
Natural Seedless [+] **	308,711
Dipped Seedless**	3,614
Golden Seedless**	18,508
Zante Currant**	2,539
Sultana**	61
Muscat**	5
Monukka**	97
Other Seedless**	9,062
Other Seedless Sulf.**	491

[+] Beginning with the 2003-04 Crop Year, the Natural Seedless varietal type was modified through informal rule making to include Oleate Seedless (68 FR 42943: July 21, 2003).

** The Committee computed but did not accept a Trade Demand for all varietal types of raisins resulting in them being unregulated for the crop year 2014-15.

The 2014 August 1 grape estimate and the 2013 and 2012 final grape crops (in green tons) are as follows:

Varietal Type	***2014 est.***	Final 2013	2012
Wine	3,900,000	4,245,000	3,740,000
Table	1,200,000	1,226,000	987,000
Raisin	1,950,000	2,246,000	1,951,000
Total	7,050,000	7,717,000	6,678,000

Source: USDA California Fruit & Nut Review, August 14, 2014

(B) Estimate of Tunnel Dehydrated Raisin Production.

Production of Golden Seedless raisins in the 2013-2014 crop year was 21,402 swb tons. The carry-over from that year was 7,116 tons. Dipped Seedless production in 2013-2014 was 4,925 tons with a carry-over of 1,341 tons. The Committee will determine a 2014-15 crop estimate for Golden Seedless and Dipped Seedless raisins. (See chart above)

(C) Estimated Tonnage of Off Grade Raisins to be Produced.

The 2014 growing season was favorable resulting in an early harvest.

(4) THE ESTIMATED TRADE DEMAND FOR RAISINS IN FREE TONNAGE OUTLETS.

(A) The tonnage of raisins marketed in recent crop years in domestic and Canadian markets, including government purchases, on a packed tonnage basis is shown in the following table:

Domestic & Canadian Markets Packed Tons					
Varietal Type	2009-10	2010-11	2011-12	2012-13	***2013-14***
Natural Seedless	186,176	180,344	183,703	184,417	202,809
Dipped Seedless	3,629	4,803	1,618	2,847	3,056
Golden Seedless	11,699	12,614	11,986	12,486	11,928
Zante Currants	1,382	1,090	1,205	1,501	1,439
Sultanas	52	37	58	57	53
Muscats	0	2	0	0	0
Monukkas	126	101	142	71	94
Other Seedless	5,385	7,237	5,750	7,114	6,353
Other Seedless Sulf.	422	396	450	328	401
Total	208,871	206,624	204,912	208,821	226,133
Five-Yr. Average					211,072

(B) Free tonnage marketed in foreign markets during the past five years:

Export Markets Packed Tons					
Varietal Type	2009-10	2010-11	2011-12	2012-13	***2013-14***
Natural Seedless	152,246	129,198	119,373	108,816	142,757
Dipped Seedless	19	30	158	522	499
Golden Seedless	4,858	5,848	5,206	4,915	5,701
Zante Currants	781	1,003	905	1,231	1,434
Sultanas	0	0	0	0	0
Muscats	0	0	0	0	0
Monukkas	0	0	0	0	0
Other Seedless	1097	1,144	2,434	1,409	2,050
Other Seedless Sulf.	21	144	105	62	61
Total	159,022	137,367	128,181	116,955	152,502
Five-Yr. Average					138,805

(5) AN ESTIMATED DESIRABLE CARRYOUT AT THE END OF THE CROP YEAR FOR FREE TONNAGE AND, IF APPLICABLE, FOR RESERVE TONNAGE.

Free Tonnage – The Committee's unanimous recommendation on February 23, 2011 was approved by USDA to change the desirable carryout from 60,000 tons to 85,000 tons, for Natural (sun-dried) Seedless raisins. The desirable carry-out calculation for other varietal types remained at a rolling average of 2.5-months of prior year's shipments over the past five years, dropping the high and low figure. (The rule was published in the Federal Register on July 18, 2011.)

(6) THE ESTIMATED MARKET REQUIREMENTS FOR RAISINS OUTSIDE FREE TONNAGE OUTLETS, CONSIDERING THE ESTIMATED WORLD RAISIN SUPPLY AND DEMAND SITUATION.

The export and the domestic demand is supplied from free tonnage raisins. The export of California Natural Seedless raisins increased by 33,941 packed tons to 142,757 packed tons during 2013-2014 from 108,816 packed tons in 2012-13.

The following table shows the shipments of raisins on a packed weight basis for the 2013-2014 crop year.

Countries of Destination	Natural Seedless	Golden Seedless	Other
Australia	5,875	91	520
Belgium	2,574	7	0
China*	9,544	15	429
Denmark	3,785	0	0
Finland	1,249	0	0
France	764	0	0
Germany	16,223	0	0
Hong Kong	1,694	197	28
Indonesia	1,164	77	5
Israel	658	1,217	52
Japan	22,009	17	924
Malaysia	4,370	778	69
Mexico	3,923	29	1,014
Netherlands	5,764	0	193
New Zealand	1,961	99	49
Norway	3,124	0	0
Philippines	2,643	8	9
Singapore	1,889	455	45
Ireland	993	0	0
South Korea	5,415	6	21
Sweden	6,466	0	6
Taiwan	4,403	241	40
Thailand	1,543	119	65
United Kingdom	22,925	133	151
Russia	59	383	110
Latin America	4,286	21	228
All Other Markets	7,454	1,808	86
TOTAL	142,757	5,701	4,044

*Historically a large volume of China exports are transshipped directly to Japan.

The RAC will be sending a delegation to the International Conference of Dried Grape Producing Countries and will return with up to date statistics.

(7) CURRENT PRICES BEING RECEIVED AND THE PROBABLE GENERAL LEVEL OF PRICES TO BE RECEIVED FOR RAISINS BY PRODUCERS AND HANDLERS.

(A) Negotiations between packers and the RBA are being held pursuant to the terms of their contract.

Probable Prices to be Received by Producers for the 2014-2015 Crop

Natural Seedless	$ _____	*Per Ton*
Dipped Seedless	$ _____	*Per Ton*
Golden Seedless	$ _____	*Per Ton*
Zante Currants	$ _____	*Per Ton*
Sultanas	$ _____	*Per Ton*
Muscats	$ _____	*Per Ton*
Monukkas	$ _____	*Per Ton*
Other Seedless	$ _____	*Per Ton*
Other Seedless Sulf.	$ _____	*Per Ton*

(B) Current Prices Being Quoted by Handlers as of September, FOB

Natural Seedless	$ _____	*Per Ton*
Dipped Seedless	$ _____	*Per Ton*
Golden Seedless	$ _____	*Per Ton*
Zante Currants	$ _____	*Per Ton*
Other Seedless	$ _____	*Per Ton*

(8) THE TREND AND LEVEL OF CONSUMER INCOME.

With five years of GDP growth in the books since the end of the Great Recession, conditions finally appear to be returning to something closer to normal. While nonfarm employment growth fell short of expectations in August, our forecast for the second half of the year has been ratcheted up based on better data on international trade, the ISM surveys, construction spending and consumer confidence. We now expect real GDP to rise at a 2.9 percent pace in the third quarter and look for a 3.0 percent gain in 2015 and 3.1 percent growth on 2016. The next 10 quarters should mark the strongest run of economic growth since the middle part of the last decade.

The improved economic performance reflects the lagged effects of stronger job and income growth, which along with lower gasoline prices should keep consumer spending on a solid trajectory. Business fixed investment spending also looks to be a little stronger and the economy is getting a big lift from increased energy production. Even the housing recovery

should get back on track, albeit a very slow one. The age of fiscal restraint is also coming to an end, as improving tax revenues allow government spending to increase a bit.

Stronger economic growth will also pull inflation and interest rates a little higher. But with the global economy struggling and commodity prices weakening, inflation should remain relatively modest, giving the Fed the freedom it needs to move cautiously and incrementally. As long as that message is telegraphed well, bond yields should also rise gradually.

Source: Wells Fargo Monthly Outlook, US Overview; September 10, 2014.

Historically, California raisins maintain good market demand regardless of economic conditions.

(9) ANY OTHER PERTINENT FACTORS BEARING ON THE MARKETING OF SUCH RAISINS INCLUDING THE ESTIMATED SUPPLY AND DEMAND FOR OTHER VARIETAL TYPES AND REGULATIONS APPLICABLE THERETO.

On September 19, 2014, the USDA announced that 42 of California's 58 counties were designated as primary natural disaster areas due to damages and losses caused by drought from January 1, 2014 to the present. The raisin producing counties of Fresno, Tulare, Madera, Kings and Kern were all included in the disaster declaration.

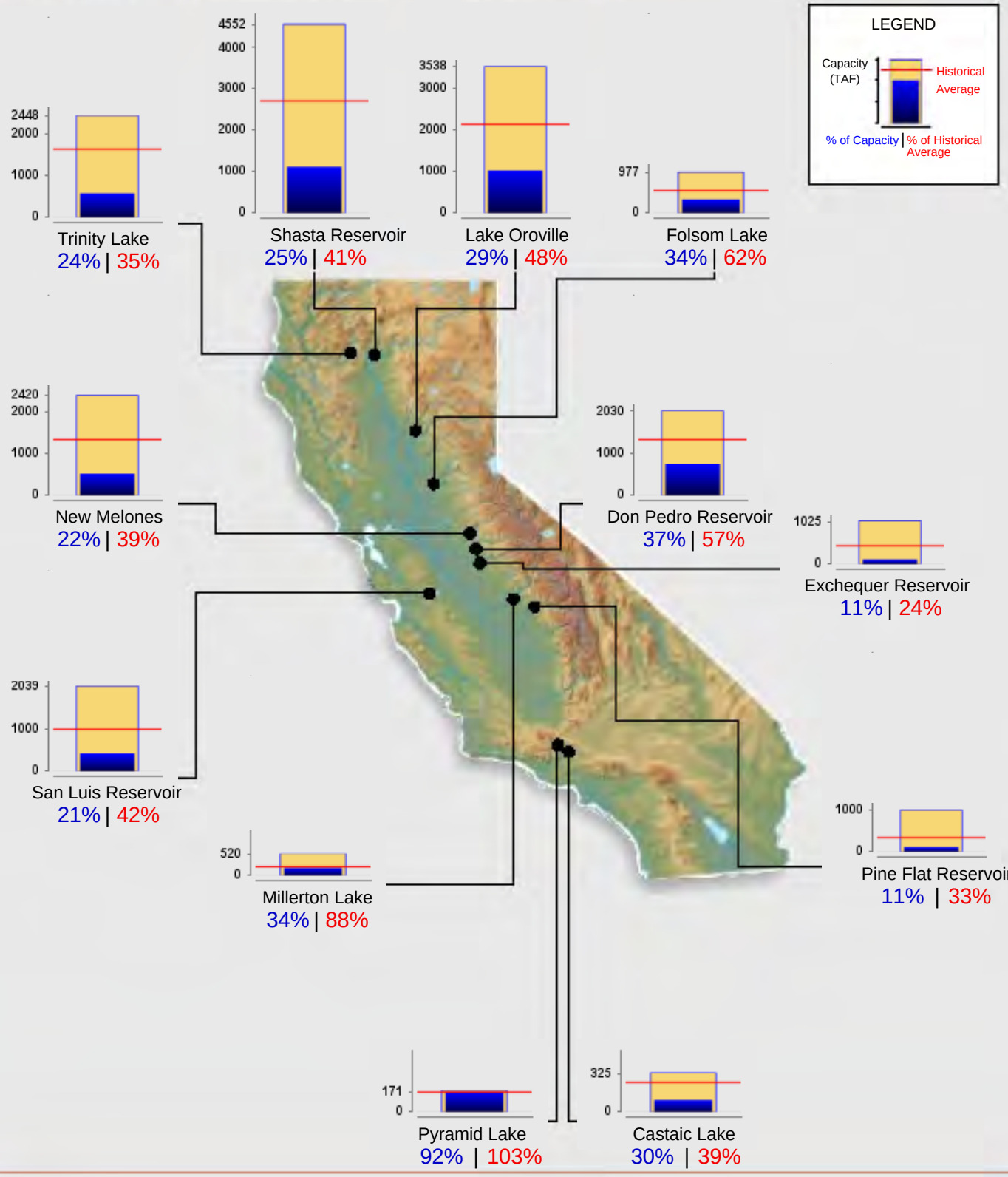
This designation follows a season of 4.99 inches of precipitation in the Fresno area, compared to an average of 11.5 inches.
Irrigation water storage in key storage facilities in the Central Valley ranges from 11% to 34% of capacity.

Consequences of this drought for raisin grape growers are extraordinary costs by lowering domestic wells, shorter deliveries by state and federal project systems, added power costs to pump from domestic wells, and lower raisin production due to less available irrigation water.

Reservoir Conditions

Ending At Midnight - October 16, 2014

CURRENT RESERVOIR CONDITIONS



Graph Updated 10/17/2014 04:15 PM

Calculated Trade Demand

Raisin Administrative Committee

2014-2015

		Natural Seedless	Dipped Seedless	Golden Seedless	Zante Currants	Sultanas	Muscats	Monukkas	Other Seedless	Other Sulf. Seedless
	Base Shipments (Packed Tons)	345,566	3,555	17,629	2,873	53	0	94	8,403	462
./.	Shrink Factor (5 yr avg)	0.94605	0.83176	0.90922	0.84743	0.76618	(1.21372)	0.86811	0.87011	0.96944
	Shrink %	5.395	16.824	9.078	15.257	23.382	221.372	13.189	12.989	3.056
=	Base Tonnage (Sweatbox Tons)	365,272	4,274	19,389	3,390	69	0	108	9,657	477
x	90% Formula	90%	90%	90%	90%	90%	90%	90%	90%	90%
=	Adjusted Base	328,745	3,847	17,450	3,051	62	0	97	8,692	429
	Physical Inventory 07/31/14	138,215	1,341	7,116	1,858	8	0	146	5,786	672
-	Desirable Inventory	85,000	866	4,123	687	5	0	22	1,492	80
=	± Inventory Adjustment	(53,215)	(475)	(2,993)	(1,171)	(3)	0	(124)	(4,294)	(592)
=	Computed Trade Demand	275,530	3,372	14,457	1,880	59	0	(26)	4,397	(163)
	2014/15 Final Trade Demand	**N O T R A D E D E M A N D E S T A B L I S H E D**								

NOTE: Prior Years' Practice sets 500 minimum
2013/2014 Shrink for Natural Seedless Raisins is 4.8519%.

General Information: Shrink

In the processing of raisins, a shrinkage occurs. Annually, the "shrinkage" varies due to growing conditions. Shrinkage is computed by determining the disappearance between the total available natural condition supply and the quantity reported as processed. This "Shrinkage" or loss is reflected as a conversion factor throughout this report to account for the difference between natural condition "sweatbox" and processed "packed" weights.

The table on this page shows the annual conversion factors used to convert packed tonnage figures to a sweatbox basis.

Conversion Factors are applied to reported packed weight to determine the sweatbox equivalent. Packed tons are divided by the conversion factor to obtain the equivalent sweatbox weight.

Conversion of sweatbox weight to a packed weight basis is accomplished by multiplying the sweatbox weight by the conversion factor.

	09-10	10-11	11-12	12-13	13-14
Natural Seedless	0.955	0.943	0.934	0.946	0.952
Dipped Seedless	0.827	0.890	0.862	0.891	0.688
Golden Seedless	0.926	0.897	0.893	0.912	0.918
Zante Currants	0.873	0.834	0.832	0.845	0.854
Sultanas	0.626	0.647	0.969	0.898	0.691
Muscats	-9.089	1.000	1.000	0.021	1.000
Monukkas	0.821	0.930	1.124	0.660	0.806
Other Seedless	0.802	0.772	0.915	0.904	0.958
Other Seedless Sulf.	0.913	0.867	1.047	1.056	0.964

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Table 1

California Bearing Grape Acreage
By Varietal Type, Production and Yield Per Acre

	BEARING ACREAGE					
Year	Total	Wine	Table	Raisins	Fresh Grape Production (tons)	Yield Per Acre (tons)
2005	800,000	477,000	83,000	240,000	6,978,000	8.72
2006	797,000	480,000	83,000	234,000	5,726,000	7.18
2007	789,000	480,000	82,000	227,000	6,230,000	7.90
2008	786,000	482,000	83,000	221,000	6,532,000	8.31
2009	789,000	489,000	84,000	216,000	6,548,000	8.30
2010	789,000	489,000	84,000	209,076	6,544,000	8.29
2011	792,000	497,000	85,000	210,000	6,700,000	8.46
2012	796,000	506,000	85,000	205,000	6,488,000	8.15
2013	793,000	508,000	85,000	200,000	6,678,000	8.42
2014	820,000	525,000	95,000	200,000	7,717,000	9.41
TEN YEAR AVERAGE	795,100	493,300	84,900	216,208	6,614,100	8.31

Source: Agricultural Statistics Board NASS, USDA - July 2014

The total production of grapes in California continues to be influenced more by the change in production per acre than by any change in bearing acreage. The ten year average grape production per acre was 5.2 tons - 1940-49; 6.2 tons - 1950-59; 7.1 tons - 1960-69; 7.0 tons - 1970-79; 7.92 tons - 1980-89 and 8.02 tons for the ten years 1990-99. The increased production per acre has been significant in the increase in total grape production. The 10 year average bearing acreage for 1940-49 was 501,785 acres, the 10 year average for 1980-89 was 643,329 acres and 673,270 acres for the ten years 1990-99.

Table 1A

California Non-Bearing Grape Acreage
By Varietal Type

NON-BEARING ACREAGE				
Year	Total	Wine	Table	Raisins
2004	36,069	26,639	6,626	2,804
2005	38,281	25,856	7,531	4,894
2006	39,977	27,280	8,268	4,429
2007	59,000	43,000	10,000	6,000
2008	58,000	44,000	10,000	4,000
2009	54,000	42,000	9,000	3,000
2010	50,000	38,000	9,000	3,000
2011	52,000	37,000	11,000	4,000
2012	54,000	38,000	13,000	3,000
2013	58,000	45,000	10,000	3,000
TEN YEAR AVERAGE	49,933	36,678	9,443	3,813

Source: CA Grape Acreage Report, April 15, 2014

Table 2

California Total Annual Grape Production
By Varietal Type and Utilization
2009-2013
(Fresh Tons)

Varietal Type	2009-2010 Crop		2010-2011 Crop		2011-2012 Crop		2012-2013 Crop		*2013-2014 Crop*	
	Tons	*%*	*Tons*	*%*	*Tons*	*%*	*Tons*	*%*	*Tons*	*%*
Raisins										
Dried	1,463,000	75.92	1,665,000	80.09	1,541,000	75.06	1,508,000	77.10	1,831,000	81.41
Crushed	307,000	15.93	274,000	13.18	373,000	18.17	300,000	15.34	328,000	14.58
Canned	20,000	1.04	25,000	1.20	25,000	1.22	25,000	1.28	25,000	1.11
Fresh Sales	137,000	7.11	115,000	5.53	114,000	5.55	123,000	6.29	65,000	2.89
Total Production	1,927,000	29.45	2,079,000	30.96	2,053,000	31.64	1,956,000	29.27	2,249,000	28.93
Wine										
Crushed	3,703,000	98.93	3,589,000	98.90	3,343,000	98.82	3,700,000	98.93	4,245,000	100.00
Fresh Sales	40,000	1.07	40,000	1.10	40,000	1.18	40,000	1.07	N/A	N/A
Total Production	3,743,000	57.20	3,629,000	54.04	3,383,000	52.14	3,740,000	55.96	4,245,000	54.61
Table										
Dried	34,000	3.89	55,000	5.46	55,000	5.04	56,000	5.67	53,000	4.14
Crushed	85,000	9.73	124,000	12.30	210,000	19.23	100,000	10.13	180,000	14.07
Fresh Sales	755,000	86.38	829,000	82.24	827,000	75.73	831,000	84.19	1,046,000	81.78
Total Production	874,000	13.36	1,008,000	15.01	1,092,000	16.83	987,000	14.77	1,279,000	16.45
Total Grape										
Dried	1,497,000	22.88	1,720,000	25.61	1,596,000	24.60	1,564,000	23.40	1,884,000	24.24
Crushed	4,095,000	62.58	3,987,000	59.37	3,926,000	60.51	4,100,000	61.35	4,753,000	61.15
Canned	20,000	0.31	25,000	0.37	25,000	0.39	25,000	0.37	25,000	0.32
Fresh Sales	932,000	14.24	984,000	14.65	941,000	14.50	994,000	14.87	1,111,000	14.29
Total Production	6,544,000	100.00	6,716,000	100.00	6,488,000	100.00	6,683,000	100.00	7,773,000	100.00

Percentages in Relation to Total Annual Production and Type of Production

Source: Agricultural Statistics Board NASS, USDA, Noncitrus Fruits and Nuts - July 2014. Percentages computed by the RAC.

Table 3

Raisin Deliveries By Varietal Types
2004-2013
(Sweatbox Tons)

Varietal Type	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Natural Seedless	265,262	319,126	282,999	329,288	364,268	298,532	354,878	346,132	311,090	364,794
Dipped Seedless	5,839	8,044	2,456	3,225	4,845	3,827	4,440	2,352	3,644	4,925
Golden Seedless	19,353	15,474	13,833	17,626	19,782	17,008	21,827	21,960	17,340	21,402
Zante Currants	3,495	3,800	2,968	3,347	2,912	2,708	3,468	3,167	2,976	2,885
Sultanas	34	75	216	93	67	63	66	76	68	58
Muscat	0	2	7	3	5	8	5	3	0	0
Monukka	235	156	364	280	287	155	140	130	111	85
Other Seedless	2,649	8,353	5,170	5,231	6,529	7,304	11,351	9,035	9,655	10,469
Other Seedless, Sulf.	374	412	963	687	521	413	808	471	381	530
TOTALS	297,241	355,442	308,976	359,780	399,217	330,018	396,983	383,326	345,265	405,148

Table 3A

Top 20 Destinations for Crop Year 2013-2014
Natural Seedless
(Packed Tons)

YTD Rank	Destination	YTD Tonnage 8/01/13-7/31/14	Previous YTD tonnage 8/01/12-7/31/13
1	United States	191,998	175,204
2	United Kingdom	22,925	11,999
3	Japan	22,009	19,450
4	Germany	16,223	11,099
5	Canada	10,811	9,213
6	China*	9,544	9,006
7	Sweden	6,466	6,532
8	Australia	5,875	3,199
9	Netherlands	5,764	3,337
10	South Korea	5,415	4,551
11	Taiwan	4,403	4,476
12	Malaysia	4,370	3,557
13	Mexico	3,923	3,131
14	Denmark	3,785	2,928
15	Norway	3,124	3,146
16	Philippines	2,643	2,380
17	New Zealand	1,961	1,753
18	Singapore	1,889	1,562
19	Hong Kong	1,694	1,600
20	Thailand	1,543	2,024

*Historically a large volume of China exports are transshipped directly to Japan.

RAC - September 2014

Table 4

Free Tonnage Shipments By Country of Destination
Natural Seedless Raisins
August 1 - July 31
(Packed Tons)

Country of Destination	2012-2013	*2013-2014*	Percent Gain/Loss (2012-2013=100%)
European Countries			
Austria	224	237	5.64%
Belgium	377	2,574	582.64%
Denmark	2,928	3,785	29.26%
Ireland	344	993	188.68%
Finland	1,649	1,249	-24.24%
France	164	764	367.32%
Germany	11,099	16,223	46.16%
Israel	388	658	69.56%
Italy	89	193	116.85%
Netherlands	3,337	5,764	72.75%
Norway	3,146	3,124	-0.70%
Spain	449	534	18.87%
Sweden	6,532	6,466	-1.02%
Switzerland	0	44	100.00%
United Kingdom	11,999	22,925	91.05%
Total European Countries	42,725	65,533	53.38%
Latin American Republics			
Brazil	589	486	-17.40%
Colombia	315	311	-1.27%
Costa Rica	233	379	62.23%
Dominican Republic	862	1,055	22.32%
Ecuador	4	9	101.67%
Mexico	3,131	3,923	25.28%
Panama	471	469	-0.50%
Puerto Rico	42	0	-100.00%
Venzuela	106	254	139.74%
Others	1,074	1,324	23.23%
Total Latin American Republics	6,829	8,210	20.23%
Other Countries			
Australia	3,199	5,875	83.63%
China	9,006	9,544	5.98%
Hong Kong	1,600	1,694	5.87%
Iceland	300	277	-7.69%
Indonesia	1,531	1,164	-23.94%
Japan	19,450	22,009	13.16%
South Korea	4,551	5,415	18.97%
Malaysia	3,557	4,370	22.86%
New Zealand	1,753	1,961	11.87%
USSR - Russia	64	59	-7.94%
Philippines	2,380	2,643	11.04%
Singapore	1,562	1,889	20.96%
Taiwan	4,476	4,403	-1.63%
Thailand	2,024	1,543	-23.78%
Others	3,809	6,168	61.92%
Total Other Countries	59,262	69,014	16.46%
GRAND TOTAL	108,816	142,757	31.19%

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Table 4 ZC

Free Tonnage Shipments By Country of Destination
Zante Currant Raisins
August 1 - July 31
(Packed Tons)

Country of Destination	2012-2013	*2013-2014*	Percent Gain/Loss (2012-2013=100%)
European Countries			
Austria	0	0	0.00%
Belgium	0	0	0.00%
Denmark	0	0	0.00%
Ireland	0	0	0.00%
Finland	0	0	0.00%
France	0	0	0.00%
Germany	0	0	0.00%
Israel	16	20	21.53%
Italy	0	0	0.00%
Netherlands	0	193	100.00%
Norway	0	0	0.00%
Spain	0	0	0.00%
Sweden	9	6	-34.29%
Switzerland	0	0	0.00%
United Kingdom	0	21	100.00%
Total European Countries	25	240	856.38%
Latin American Republics			
Brazil	44	0	-100.00%
Colombia	0	0	0.00%
Costa Rica	0	0	0.00%
Dominican Republic	0	0	0.00%
Ecuador	0	0	0.00%
Mexico	0	0	0.00%
Panama	0	0	0.00%
Puerto Rico	0	0	0.00%
Venzuela	0	0	0.00%
Others	0	7	100.00%
Total Latin American Republics	44	7	-83.79%
Other Countries			
Australia	24	71	188.78%
China	344	420	22.21%
Hong Kong	0	2	100.00%
Iceland	0	0	0.00%
Indonesia	64	5	-91.86%
Japan	435	507	16.33%
South Korea	8	21	166.37%
Malaysia	224	59	-73.59%
New Zealand	0	7	100.00%
USSR - Russia	0	0	0.00%
Philippines	9	9	0.00%
Singapore	42	43	2.25%
Taiwan	12	32	174.37%
Thailand	0	8	100.00%
Others	0	3	100.00%
Total Other Countries	1,162	1,187	2.13%
GRAND TOTAL	1,231	1,434	16.51%

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Table 4A

Free Tonnage Export Shipments

(Excluding Canada)

Natural Seedless Raisins

2009 - 2013

(Packed Tons)

	2009-2010	2010-2011	2011-2012	2012-2013	*2013-2014*
August	15,767	15,156	12,636	11,805	9,980
September	19,494	10,434	11,561	11,309	10,547
October	10,429	4,828	10,006	9,939	12,084
November	8,087	8,428	10,790	7,569	10,462
December	11,816	10,275	9,574	7,773	12,396
January	12,668	11,313	9,325	8,803	12,088
February	11,088	9,317	8,625	8,714	12,174
March	12,435	11,661	9,066	9,217	13,113
April	12,346	11,706	8,867	8,737	13,119
May	13,664	11,425	10,164	8,566	13,051
June	11,666	12,030	10,005	7,421	12,426
July	12,786	12,625	8,754	8,963	11,317
TOTAL YEAR	152,246	129,198	119,373	108,816	142,757

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Table 4B

Free Tonnage Export Shipments

(Excluding Canada)

Zante Currant Raisins

2009 - 2013

(Packed Tons)

	2009-2010	2010-2011	2011-2012	2012-2013	*2013-2014*
August	112	121	84	125	106
September	39	96	92	84	125
October	154	30	102	61	128
November	70	109	89	100	124
December	73	67	29	54	68
January	42	91	25	46	119
February	49	51	58	142	150
March	48	35	69	172	71
April	50	106	64	148	184
May	42	108	78	146	67
June	45	58	97	51	179
July	57	131	118	102	113
TOTAL YEAR	781	1,003	905	1,231	1,434

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Table 5

Free Tonnage Shipments To Domestic And Canadian Markets

(Including Government)

Natural Seedless Raisins

2009 - 2013

(Packed Tons)

	2009-2010		2010-2011		2011-2012		2012-2013		*2013-2014*	
	Tons	**%**	***Tons***	***%***	***Tons***	***%***	***Tons***	***%***	***Tons***	***%***
August										
Packed	5,701	39	5,673	37	6,445	39	5,656	34	4,900	31
Bulk	8,737	61	9,609	63	10,251	61	11,017	66	10,656	69
TOTAL	**14,438**	100	**15,282**	100	**16,696**	100	**16,673**	100	**15,556**	100
September										
Packed	6,823	39	6,677	39	6,091	37	5,234	36	5,204	35
Bulk	10,591	61	10,420	61	10,395	63	9,358	64	9,791	65
TOTAL	**17,414**	100	**17,097**	100	**16,486**	100	**14,592**	100	**14,995**	100
October										
Packed	6,937	41	6,478	38	6,577	39	6,624	37	6,871	38
Bulk	10,012	59	10,727	62	10,264	61	11,368	63	11,232	62
TOTAL	**16,949**	100	**17,205**	100	**16,841**	100	**17,992**	100	**18,103**	100
November										
Packed	7,944	45	6,509	41	6,665	40	6,450	41	6,469	39
Bulk	9,869	55	9,543	59	10,107	60	9,405	59	10,171	61
TOTAL	**17,813**	100	**16,052**	100	**16,772**	100	**15,855**	100	**16,640**	100
December										
Packed	6,235	42	6,253	39	5,612	38	5,485	41	5,353	36
Bulk	8,755	58	9,971	61	9,014	62	7,980	59	9,488	64
TOTAL	**14,990**	100	**16,224**	100	**14,626**	100	**13,465**	100	**14,841**	100
January										
Packed	5,774	40	5,936	39	5,197	36	5,443	35	5,126	31
Bulk	8,814	60	9,295	61	9,270	64	9,991	65	11,316	69
TOTAL	**14,588**	100	**15,231**	100	**14,467**	100	**15,434**	100	**16,442**	100
February										
Packed	4,021	29	5,264	38	5,097	33	4,712	33	5,290	35
Bulk	9,818	71	8,687	62	10,212	67	9,637	67	9,814	65
TOTAL	**13,839**	100	**13,951**	100	**15,309**	100	**14,349**	100	**15,104**	100
March										
Packed	6,472	37	6,464	38	5,990	36	5,575	36	5,747	34
Bulk	10,807	63	10,502	62	10,574	64	9,995	64	11,031	66
TOTAL	**17,279**	100	**16,966**	100	**16,564**	100	**15,570**	100	**16,778**	100
April										
Packed	5,862	36	5,452	39	4,824	33	4,846	30	5,367	28
Bulk	10,235	64	8,654	61	9,905	67	11,472	70	13,585	72
TOTAL	**16,097**	100	**14,106**	100	**14,729**	100	**16,318**	100	**18,952**	100
May										
Packed	4,673	34	4,867	37	4,188	29	4,819	30	4,580	24
Bulk	9,197	66	8,169	63	10,073	71	11,189	70	14,863	76
TOTAL	**13,870**	100	**13,036**	100	**14,261**	100	**16,008**	100	**19,443**	100
June										
Packed	4,691	32	4,858	37	3,953	31	4,574	38	4,579	27
Bulk	10,081	68	8,299	63	8,947	69	7,344	62	12,374	73
TOTAL	**14,772**	100	**13,157**	100	**12,900**	100	**11,918**	100	**16,953**	100
July										
Packed	5,092	36	4,995	41	4,475	32	4,880	30	4,862	26
Bulk	9,035	64	7,042	59	9,577	68	11,363	70	14,140	74
TOTAL	**14,127**	100	**12,037**	100	**14,052**	100	**16,243**	100	**19,002**	100
TOTAL YEAR										
Packed	70,225	38	69,426	38	65,114	35	64,298	35	64,348	32
Bulk	115,951	62	110,918	62	118,589	65	120,119	65	138,461	68
TOTAL	**186,176**	100	**180,344**	100	**183,703**	100	**184,417**	100	**202,809**	100

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Table 6

Free Tonnage Shipments To All Market Outlets
2006 - 2013
(Sweatbox Tons)

Variety	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	*2013-14*
Natural Seedless								
Domestic & Canada	203,889	201,355	200,775	194,879	191,211	196,682	194,950	213,084
Export Free	109,727	148,243	131,587	159,363	136,982	127,808	115,031	149,989
Total	**313,616**	**349,598**	**332,361**	**354,242**	**328,193**	**324,490**	**309,981**	**363,073**
Dipped Seedless								
Domestic & Canada	5,628	4,668	3,192	4,389	5,397	1,876	3,195	4,441
Export Free	0	0	0	23	34	184	585	724
Total	**5,628**	**4,668**	**3,192**	**4,412**	**5,431**	**2,060**	**3,780**	**5,165**
Golden Seedless								
Domestic & Canada	13,505	12,620	12,899	12,632	14,066	13,419	13,697	12,988
Export Free	3,312	5,404	5,832	5,245	6,521	5,828	5,392	6,208
Total	**16,817**	**18,024**	**18,731**	**17,877**	**20,587**	**19,247**	**19,089**	**19,196**
Zante Currants								
Domestic & Canada	1,481	1,717	1,786	1,583	1,307	1,448	1,777	1,684
Export Free	1,041	3,222	2,060	895	1,205	1,089	1,458	1,680
Total	**2,522**	**4,939**	**3,846**	**2,478**	**2,512**	**2,537**	**3,235**	**3,364**
Sultanas								
Domestic & Canada	255	85	78	83	57	60	64	76
Total	**255**	**85**	**78**	**83**	**57**	**60**	**64**	**76**
Muscats								
Domestic & Canada	4	9	14	0	2	0	23	0
Export Free	0	0	0	0	0	0	0	0
Total	**4**	**9**	**14**	**0**	**2**	**0**	**23**	**0**
Monukka Type								
Domestic & Canada	228	338	376	153	109	126	108	117
Export Free	0	1	1	0	0	0	0	0
Total	**228**	**339**	**377**	**153**	**109**	**126**	**108**	**117**
Other Seedless								
Domestic & Canada	4,135	5,141	5,408	6,716	9,374	6,283	7,873	6,634
Export Free	421	802	942	1,367	1,482	2,659	1,559	2,140
Total	**4,556**	**5,943**	**6,350**	**8,083**	**10,856**	**8,942**	**9,432**	**8,774**
Other Seedless Sulfured								
Domestic & Canada	1,110	655	254	462	456	430	311	416
Export Free	0	0	0	23	166	100	59	64
Total	**1,110**	**655**	**254**	**485**	**622**	**530**	**370**	**479**
TOTAL ALL VARIETIES	**344,736**	**384,260**	**365,203**	**387,813**	**368,369**	**357,992**	**346,082**	**400,244**
Government Reserve - Nat'ls	**982**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Government Reserve - Zantes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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Table 6A

Free Tonnage Shipments To All Market Outlets
2006 - 2013
(Packed Tons)

Variety	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	*2013-14*
Natural Seedless								
Domestic & Canada	188,944	193,609	191,929	186,176	180,344	183,703	184,417	202,809
Export Free	101,684	142,541	125,789	152,246	129,198	119,373	108,816	142,757
Total	**290,628**	**336,150**	**317,718**	**338,422**	**309,542**	**303,076**	**293,233**	**345,566**
Dipped Seedless								
Domestic & Canada	4,673	3,651	3,480	3,629	4,803	1,618	2,847	3,056
Export Free	0	0	0	19	30	158	522	499
Total	**4,673**	**3,651**	**3,480**	**3,648**	**4,833**	**1,776**	**3,369**	**3,555**
Golden Seedless								
Domestic & Canada	12,384	11,263	11,539	11,699	12,614	11,986	12,486	11,928
Export Free	3,037	4,823	5,217	4,858	5,848	5,206	4,915	5,701
Total	**15,421**	**16,086**	**16,756**	**16,557**	**18,462**	**17,192**	**17,401**	**17,629**
Zante Currants								
Domestic & Canada	1,244	1,535	1,536	1,382	1,090	1,205	1,501	1,439
Export Free	875	2,881	1,771	781	1,003	905	1,231	1,434
Total	**2,119**	**4,416**	**3,307**	**2,163**	**2,093**	**2,110**	**2,732**	**2,873**
Sultanas								
Domestic & Canada	181	42	56	52	37	58	57	53
Total	**181**	**42**	**56**	**52**	**37**	**58**	**57**	**53**
Muscats								
Domestic & Canada	4	5	2	0	2	0	0	0
Export Free	0	0	0	0	0	0	0	0
Total	**4**	**5**	**2**	**0**	**2**	**0**	**0**	**0**
Monukka Type								
Domestic & Canada	208	269	347	126	101	142	71	94
Export Free	0	1	1	0	0	0	0	0
Total	**208**	**270**	**348**	**126**	**101**	**142**	**71**	**94**
Other Seedless								
Domestic & Canada	3,135	4,944	4,363	5,386	7,237	5,750	7,114	6,353
Export Free	319	771	760	1,096	1,144	2,434	1,409	2,050
Total	**3,454**	**5,715**	**5,123**	**6,482**	**8,381**	**8,184**	**8,523**	**8,403**
Other Seedless Sulfured								
Domestic & Canada	555	491	406	422	396	450	328	401
Export Free	0	0	0	21	144	105	62	61
Total	**555**	**491**	**406**	**443**	**540**	**555**	**390**	**462**
TOTAL ALL VARIETIES	**317,243**	**366,826**	**347,196**	**367,893**	**343,991**	**333,093**	**325,776**	**378,635**
Government Reserve - Nat'ls	**923**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Government Reserve - Zantes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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Table 7

Free Tonnage Shipments To Domestic And Canadian Markets
(Including Government)
Natural Seedless Raisins
1998 - 2013
(Packed Tons)

Crop Year	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
*1998-99	15,620	14,734	19,730	15,400	13,686	14,019	13,751	16,118	11,302	10,850	12,897	11,569	169,676
1999-2000	14,081	13,757	17,721	15,389	12,668	10,260	11,082	14,355	12,299	12,963	13,975	7,775	156,325
2000-01	11,303 **	9,391 **	13,002 **	11,793 **	23,696	20,097	14,028	14,611	15,275	13,249	13,324	14,348	174,117
2001-02	17,192	13,049	18,783	15,541	11,745	15,457	12,655	13,878	14,187	13,815	12,253	16,065	174,620
2002-03	16,163	16,661	17,326	15,181	13,496	14,971	12,147	15,556	14,059	13,661	12,835	14,998	177,054
2003-04	13,761	17,209	18,345	14,976	14,326	14,663	14,965	16,557	14,086	12,819	13,742	14,636	180,085
*2004-05	17,930	17,431	17,644	16,638	16,166	15,088	14,385	17,298	17,717	14,014	15,525	13,844	193,680
2005-06	18,773	17,176	17,600	17,322	14,255	14,502	14,440	17,066	14,914	13,331	16,065	10,914	186,358
2006-07	16,991	16,214	18,942	16,066	13,685	15,136	14,589	16,853	15,759	16,448	12,451	15,810	188,944
2007-08	17,805	14,936	18,918	16,826	13,117	17,155	16,624	16,097	15,936	15,166	13,940	17,089	193,609
2008-09	15,753	15,731	18,649	15,869	15,039	16,044	14,387	16,871	15,912	15,395	16,845	15,436	191,929
2009-10	14,438	17,414	16,949	17,813	14,990	14,588	13,839	17,279	16,097	13,870	14,772	14,127	186,176
*2010-11	15,282	17,097	17,205	16,052	16,224	15,231	13,951	16,966	14,106	13,036	13,157	12,037	180,344
*2011-12	16,696	16,486	16,841	16,772	14,626	14,467	15,309	16,564	14,729	14,261	12,900	14,052	183,703
*2012-13	16,673	14,592	17,992	15,855	13,465	15,434	14,349	15,570	16,318	16,008	11,918	16,243	184,417
***2013-14**	15,556	14,995	18,103	16,640	14,841	16,442	15,104	16,778	18,952	19,443	16,953	19,002	202,809
TEN YEAR AVERAGE													
	16,590	16,207	17,884	16,585	14,641	15,409	14,698	16,734	16,044	15,097	14,453	14,855	189,197

*** No Pool Established**

**** Months shipments under reported and tonnage recorded Dec/Jan.**

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Table 8

Free Tonnage Made Available For Disposition In Commercial Trade Channels
Natural Seedless Raisins
2004 - 2013
(Sweatbox Tons)

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	*2013-14*
Natural Seedless Total Deliveries	265,262	319,126	282,999	329,288	364,268	298,532	354,878	346,132	311,090	364,794
Free Tonnage Purchased	265,262	263,287	254,703	279,895	316,913	253,752	354,878	346,132	311,090	364,794
Reserve Tonnage Purchased (a)	72,789	31,975	52,689	69,604	35,844	56,798	64	0	0	0
Total Tonnage Purchased	338,051	295,262	307,392	349,499	352,757	310,550	354,942	346,132	311,090	364,794
Packers' August 1 Carryin (b)	95,003	114,792	111,444	105,430	106,249	126,824	83,143	110,206	132,061	132,407
Total Disposable Tonnage	433,054	410,054	418,836	454,929	459,006	437,374	438,085	456,338	443,151	497,201
Commercial Shipments	317,998	298,454	313,616	349,598	332,362	354,242	328,193	324,490	309,981	363,073
July 31 Carryout (calculated)	115,056	111,600	105,220	105,331	126,645	83,132	109,892	131,848	133,170	134,128

(a) Export and 10+10

(b) Packers' Carryin Inventory Report

Table 9

SUPPLY AND DISPOSITION
NATURAL SEEDLESS RAISINS
2004-2013
(Sweatbox Tons)

	2004-05	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	*2013-2014*
Total Disposable Free Tonnage	433,054	410,054	418,836	454,929	459,006	437,374	438,085	456,338	443,151	497,201
Disposition										
Domestic & Canada	205,002	195,822	203,889	201,355	200,775	194,879	191,211	196,682	194,950	213,084
Export Free	112,996	102,632	109,727	148,243	131,587	159,363	136,982	127,808	115,031	149,989
Total Disposition	317,998	298,454	313,616	349,598	332,362	354,242	328,193	324,490	309,981	363,073
Carryout (Calculated)	115,056	111,600	105,220	105,331	126,644	83,132	109,892	131,848	133,170	134,128
Reserve Tonnage										
Total Available Supply	101,358	82,096	77,783	70,257	48,002	56,934	71	2	0	0
Released for Export*	0	0	0	0	25,438	11,604	0	0	0	0
Other Disposition	101,358	82,096	77,783	70,257	22,564	45,330	71	2	0	0
Exports										
Free Tonnage	112,996	102,632	109,727	148,243	131,587	159,363	136,982	127,808	115,031	149,989
Reserve Shipments	0	0	0	0	0	0	0	0	0	0
Total Exports	112,996	102,632	109,727	148,243	131,587	159,363	136,982	127,808	115,031	149,989

*** Raisin-Back**

RAC - September 2014

Table 10

Supply And Disposition Of Reserve Pool Tonnage
Natural Seedless Raisins
2006-2013
(Sweatbox Tons)

	2006-2007 Crop Year	2007-2008 Crop Year	2008-2009 Crop Year	2009-2010 Crop Year	2010-2011 Crop Year	2011-2012 Crop Year	*2012-2013 Crop Year*	*2013-2014 Crop Year*
SUPPLY								
Reserve Tonnage	28,297	49,393	47,355	44,780	0	0	0	0
Carry In From Previous Year	49,486	20,864	647	12,154	71	2	0	0
Total Reserve Supply	77,783	70,257	48,002	56,934	71	2	0	0
DISPOSITION								
10 & 10**	52,689	69,604	10,406	45,194	64	0	0	0
Export*	0	0	25,438	11,604	0	0	0	0
Raisin Diversion Program	0	0	0	0	0	0	0	0
Government	982	0	0	0	0	0	0	0
Non-Normal Outlets	0	0	0	0	0	0	0	0
Distillation	0	0	0	0	0	0	0	0
Donations	1,139	6	4	15	3	2	0	0
Miscellaneous	2,109	0	0	50	2	0	0	0
Carry Out To Subsequent Year	20,864	647	12,154	71	2	0	0	0
Total Disposition	77,783	70,257	48,002	56,934	71	2	0	0

** Includes all Reserve for Free Usage Sales

* Raisin-Back

RAC - September 2014

Table 11

Supply And Disposition Of Reserve Pool Tonnage
Natural Seedless Raisins
2013-2014 Crop Year
(Sweatbox Tons)

SUPPLY			
Reserve Tonnage	**0**		
Carry In From Previous Crop Year	**0**		
Total Reserve Supply			**0**
DISPOSITION			
10 & 10	**0**		
67(j)	**0**		
Export	**0**		
Raisin Diversion Program	**0**		
Government/Food Aid	**0**		
Non-Normal Outlets	**0**		
Exemption/Loss	**0**		
Donations	**0**		
Total Disposition			**0**
Carry Out To Subsequent Crop Year			**0**

RAC - September 2014

Table 12

Reserve Pool Percentages
Natural Seedless Raisins
1999-2013

Crop Year	Preliminary Percentages Free	Preliminary Percentages Reserve	Secretary Established Free	Secretary Established Reserve	Date Established	Basis for Pool Payments Free	Basis for Pool Payments Reserve
1999-2000	73	27	85	15	06/23/00	85	15
2000-01	35	65	53	47	08/01/01	53	47
2001-02	56	44	63	37	07/19/02	63	37
2002-03	41	59	53	47	04/03/03	53	47
2003-04	65	35	70	30	08/10/04	70	30
2004-05	100	0	100	0	10/05/04	100	0
2005-06	74	26	82.5	17.5	05/23/06	82.5	17.5
2006-07	89.75	10.25	90	10	04/10/07	90	10
2007-08	84.75	15.25	85	15	02/20/08	85	15
2008-09	86.75	13.25	87	13	03/10/09	87	13
2009-10	84.75	15.25	85	15	06/25/10	85	15
2010-11	100	0	100	0	10/05/10	100	0
2011-12	100	0	100	0	08/15/12	100	0
2012-13	100	0	100	0	08/15/13	100	0
2013-14	100	0	100	0	08/14/14	100	0

RAC - August 2014

Table 13

Comparison Of Packer Acquisitions By Week
Natural Seedless Raisins
2009-2013
(Sweatbox Tons)

Week of Delivery	2009-2010	2010-2011	2011-2012	2012-2013	*2013-2014*
1	0	7,041	172	64	8
2	0	1,362	15	130	29
3	0	1,350	303	1,181	50
4	47	752	2,383	1,000	11
Comparative 4 Week Total	47	10,505	2,873	2,375	98
5	90	1,376	22	119	420
6	2,506	1,053	97	1,510	3,986
7	5,368	1,423	492	2,826	8,785
8	9,815	4,459	3,364	10,782	16,960
9	22,195	10,394	9,596	18,663	20,481
Comparative 5 Week Total	39,974	18,705	13,571	33,900	50,632
10	38,094	22,669	12,455	26,281	21,172
11	29,239	30,781	19,225	34,830	26,995
12	32,437	33,332	21,203	31,458	27,254
13	29,838	27,798	22,864	28,078	22,268
Comparative 4 Week Total	129,608	114,580	75,747	120,647	97,689
14	24,054	34,013	23,197	24,869	23,259
15	25,535	28,483	24,999	15,751	15,568
16	12,521	23,320	21,531	10,453	15,611
17	7,559	8,681	10,181	4,163	36,395
Comparative 4 Week Total	69,669	94,497	79,908	55,236	90,833
18	7,373	12,488	16,239	17,688	17,898
19	5,401	10,716	13,478	7,932	7,788
20	5,654	14,013	11,433	5,428	6,693
21	2,002	6,419	10,394	10,622	2,146
22	1,773	5,402	5,485	1,093	2,132
Comparative 5 Week Total	22,203	49,038	57,029	42,763	36,657
23	5,001	4,888	7,273	2,865	4,690
24	4,455	4,461	13,813	3,449	21,407
25	1,800	3,691	5,995	9,370	3,273
26	2,015	4,027	5,645	3,679	2,993
Comparative 4 Week Total	13,271	17,067	32,726	19,363	32,363
27	2,534	2,436	5,055	5,035	3,615
28	2,500	3,384	4,895	2,424	5,203
29	2,594	3,237	6,905	1,447	2,176
30	1,191	4,784	8,647	1,489	2,957
Comparative 4 Week Total	8,819	13,841	25,502	10,395	13,951

Table 13

Comparison Of Packer Acquisitions By Week
Natural Seedless Raisins
2009-2013
(Sweatbox Tons)

Week of Delivery	2009-2010	2010-2011	2011-2012	2012-2013	*2013-2014*
31	1,716	3,695	5,111	1,520	3,739
32	1,833	2,219	11,187	1,718	3,453
33	2,257	3,062	1,302	1,469	3,963
34	1,813	2,428	2,431	1,960	2,342
Comparative 4 Week Total	7,619	11,404	20,031	6,667	13,497
35	1,373	1,843	1,892	1,366	7,809
36	419	2,033	4,010	519	705
37	769	1,348	2,084	760	1,453
38	913	1,495	2,961	629	2,438
39	307	1,081	1,433	884	1,043
Comparative 5 Week Total	3,781	7,800	12,380	4,158	13,448
40	258	1,826	1,882	1,162	1,889
41	1,201	1,549	1,919	835	1,488
42	743	1,238	1,493	1,509	1,452
43	275	1,536	1,738	1,397	1,841
Comparative 4 Week Total	2,477	6,149	7,032	4,903	6,670
44	230	1,058	1,758	1,241	1,666
45	634	1,223	1,833	1,044	1,168
46	(25)	428	1,291	740	1,395
47	48	439	1,486	186	1,248
Comparative 4 Week Total	887	3,148	6,368	3,211	5,477
48	143	1,776	2,826	22	538
49	0	3,358	3,650	19	744
50	2	1,445	137	567	777
51	5	1,353	535	682	218
52	27	212	5,817	6,182	1,202
Comparative 5 Week Total	177	8,144	12,965	7,472	3,479
YEARLY TOTAL	298,532	354,878	346,132	311,090	364,794

RAC - September 2014

Table 14

Free Tonnage Supply And Demand Situation
Natural Seedless Raisins
1999-2013
(Sweatbox Tons)

Crop Year	SUPPLY Acquired	Percent Free	Free Tonnage	Carryin	Purchased From Reserve	Total Free Supply	SHIPMENTS Canada and Domestic	Export (Free)	Total Disposition	Computed Carryout
1999-2000	299,910	85.0	254,923	101,946	3,586	360,455	166,127	97,342	263,469	96,986
2000-01	432,616	53.0	229,287	97,109	84,867	411,263	185,429	109,598	295,027	116,236
2001-02	377,328	63.0	237,716	116,131	76,827	430,674	186,361	112,272	298,633	132,041
2002-03	388,010	53.0	205,668 **	132,135	76,146	413,949	189,160	108,480	297,640	116,309
2003-04	296,864	70.0	207,818 **	129,345	61,186	398,349	191,376	112,860	304,236	94,113
2004-05	265,262	100.0	265,262	95,003	72,789	433,054	205,002	112,996	317,998	115,056
2005-06	319,126	82.5	263,287 **	114,792	31,975	410,054	195,822	102,632	298,454	111,600
2006-07	282,999	90.0	254,703 **	111,444	52,689	418,836	203,889 ***	109,727	313,616	105,220
2007-08	329,288	85.0	279,895	105,430	69,604	454,929	201,355 ***	148,243	349,598	105,331
2008-09	364,268	87.0	316,913	106,249	35,844	459,006	200,775 ***	131,587	332,362	126,644
2009-10	298,532	85.0	253,752	126,824	56,798	437,374	194,879 ***	159,363	354,242	83,132
2010-11	354,878	100.0	354,878	83,143	64	438,085	191,211 ***	136,982	328,193	109,892
2011-12	346,132	100.0	346,132	110,206	0	456,338	196,682 ***	127,808	324,490	131,848
2012-13	311,090	100.0	311,090	132,061	0	443,151	194,950 ***	115,031	309,981	133,170
2013-14	364,794	100.0	364,794	132,407	0	497,201	213,084 ***	149,989	363,073	134,128
TEN YEAR AVERAGE										
	323,637	100 *	301,071	111,756	31,976	444,803	199,765	129,436	329,201	115,602

* Percentage is a weighted average
** Adjusted for exempt tonnage
***Includes Government Free

RAC - September 2014

Table 15

Calculated Free Tonnage Disappearance
Natural Seedless Raisins
2004-2013
(Sweatbox Tons)

Crop Year	Reported Beginning Physical Inventory	Free Tonnage	Reported Ending Physical Inventory	Free Tonnage Disappearance	Handler Reported Shipments (Packed Tons)	Calculated Shrink (a)
2004-05	95,003	338,051	114,792	318,262	300,435	5.60%
2005-06	114,792	295,262	111,444	298,610	284,030	4.88%
2006-07	111,444	307,392	105,430	313,406	290,628	7.27%
2007-08	105,430	349,499	106,249	348,680	336,150	3.59%
2008-09	106,249	352,757	126,824	332,182	317,718	4.35%
2009-10	126,824	310,550	83,143	354,232	338,422	4.46%
2010-11	83,143	354,942	110,206	327,878	309,542	5.59%
2011-12	110,206	346,132	132,061	324,277	303,076	6.54%
2012-13	132,061	311,090	132,407	310,744	293,233	5.64%
2013-14	132,407	364,794	138,215	358,986	345,566	3.74%

(a) The calculated shrinkage was determined by dividing Handler Reported Shipments by Free Tonnage Disappearance and deducting the result from 100%.

RAC - September 2014

Table 16

Natural Seedless Raisins Diversion Program
Historical Data
2003-2013

RDP Year	Number of Certificates Issued	Number of Acres	Number of Pounds	Average Tons/Acre
Combined--Diverted and Removed:				
2013	0	0	0	0
2012	0	0	0	0
2011	0	0	0	0
2010	0	0	0	0
2009	0	0	0	0
2008	0	0	0	0
2007	0	0	0	0
2006	0	0	0	0
2005	0	0	0	0
2004	0	0	0	0
2003	236	8,198.20	30,598,695	1.87
		8,198.20	30,598,695.00	1.87
Diverted:				
2013	0	0	0	0
2012	0	0	0	0
2011	0	0	0	0
2010	0	0	0	0
2009	0	0	0	0
2008	0	0	0	0
2007	0	0	0	0
2006	0	0	0	0
2005	0	0	0	0
2004	0	0	0	0
2003	0	0	0	0
		0.00	0.00	0.00
Removed:				
2013	0	0	0	0
2012	0	0	0	0
2011	0	0	0	0
2010	0	0	0	0
2009	0	0	0	0
2008	0	0	0	0
2007	0	0	0	0
2006	0	0	0	0
2005	0	0	0	0
2004	0	0	0	0
2003	236	8,198.20	30,598,695	1.87
		8,198.20	30,598,695.00	1.87

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United States Department of Agriculture

Foreign Agricultural Service

September 2014

Raisins: World Markets and Trade

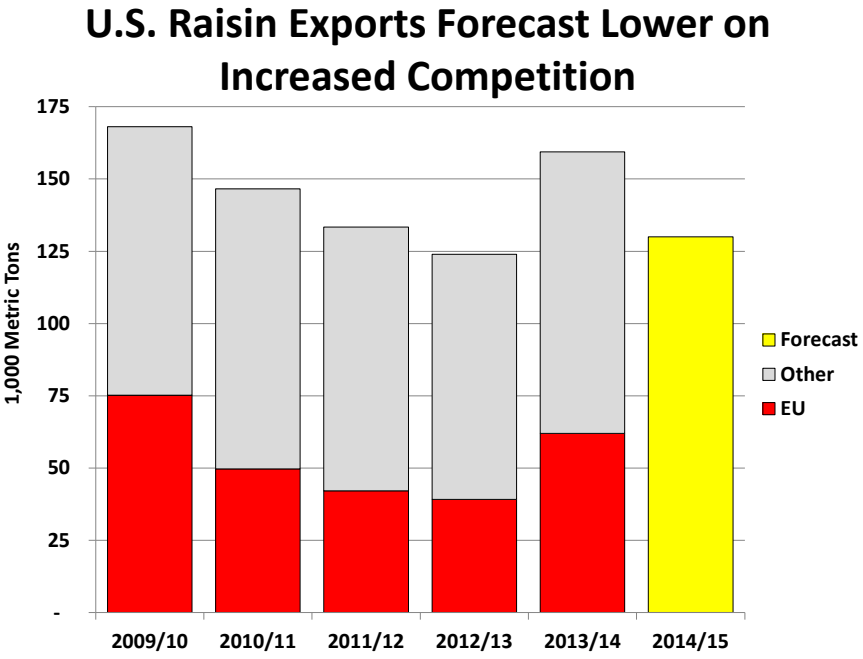
Global Raisin Production Up Marginally

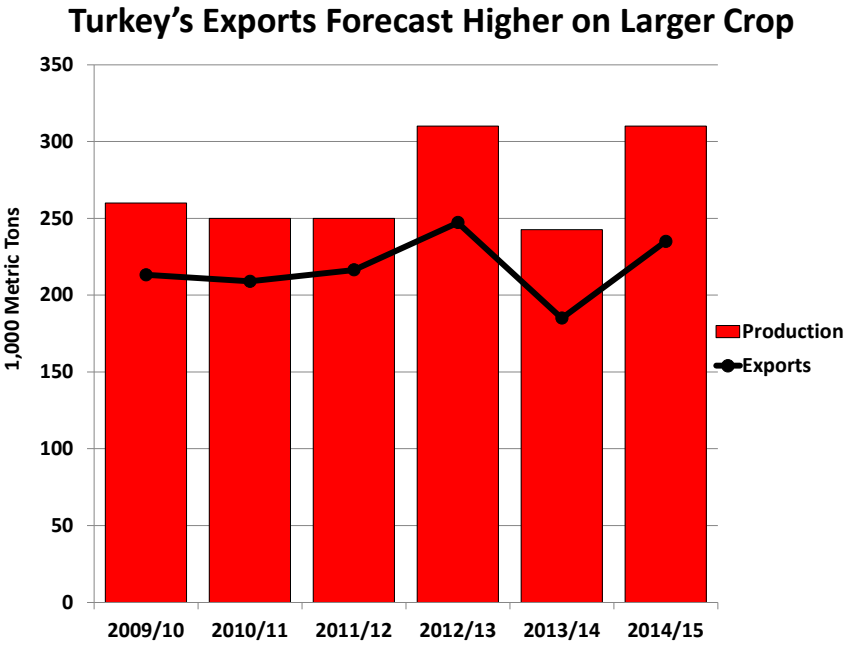
Global raisin production for 2014/15 is forecast at a record 1.2 million metric tons, up 5 percent from the previous year as gains in Turkey more than offset losses in the United States. Consumption, which lagged production the previous four years, is also at a record 1.2 million tons. World trade is nearly 5 percent higher, primarily due to rising shipments to the European Union.

U.S. production is forecast to drop 14 percent to 320,000 tons based on lower yields as reported in the California Raisin Grape Objective Measurement Report. The crop has struggled with the lack of water, while hail in the spring hit some vineyards during bloom. Exports are set to decline nearly 20 percent to 130,000 tons on increased competition from Turkey, particularly in the EU. Ending stocks, which expanded over the last 4 years, are down 13 percent to 99,000 tons on lower available supplies.

Turkey's production is forecast to rebound, reaching the previous record of 310,000 tons on favorable weather and expanding area following last year's spring freeze and hail damage. With higher available supplies, exports are projected to rise nearly 30 percent to 235,000 tons as Turkey reclaims market share in the EU. Ending stocks are forecast to reach 27,000 tons, the highest level in nearly a decade, despite a recent rise in domestic consumption.

China's production is forecast to increase 10 percent to 180,000 tons as disruptions in fresh grape sales





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are expected to divert higher volumes to raisin processing, more than offsetting the effects of an April frost in Xinjiang, the largest producing region. Green raisins account for 60 percent of total production and are mostly consumed as snack foods, while dark raisins account for 40 percent of output and are primarily used by low-end bakery shops. Since domestic consumption accounts for a vast majority of the harvest, exports are limited at just 35,000 tons.

Chile's production is forecast to rebound 5 percent to 66,000 tons following last year's frost that lowered grape output. Most raisins are produced from discarded table grapes, unsuitable for fresh consumption. Nearly all the harvest is destined for export markets such as the EU, United States and Mexico.

South Africa's production is forecast almost 10 percent higher to 50,000 tons based on increased area and yield following last year's frost damage. Exports are expected marginally higher with the majority shipped to the EU.

Afghanistan's production is forecast 5 percent higher to 36,000 tons due mostly to increased area. Farmers typically dry 25 percent of their grape crop, but a higher percentage of grapes are dried if travel into and through Pakistan becomes problematic. However, the drying process is a major constraint for the industry as it predominately occurs in conditions that produce lower quality raisins. Top export markets include India and Russia.

EU imports are forecast to rise 3 percent to 340,000 tons on increased demand from households as well as the manufacturing sector.

Revised 2013/14

World **production** is revised down from the September 2013 estimate by 35,000 tons to 1.14 million.

- Uzbekistan is slashed 18,000 tons to 17,000 on lower yields.
- Chile is lowered 14,000 tons to 62,000 due to frost damage.
- Argentina is decreased 9,500 tons to 24,500 as a late frost combined with excessive rain to lower yields.

World **exports** are revised down 55,000 tons to 687,000.

- Turkey is cut 35,000 tons to 185,000 on smaller exportable supplies resulting in lower shipments to the EU.
- Chile is lowered 15,000 tons to 59,000 on smaller exportable supplies.
- Uzbekistan is revised down 15,000 tons to 15,000 on smaller exportable supplies.
- United States is raised 19,000 tons to 159,000 due to higher-than-anticipated shipments to Europe.

World **imports** are revised down 34,000 tons to 671,000.

- Russia is reduced 16,000 tons to 29,000.
- EU is lowered 10,000 tons to 330,000.

For additional information, please contact Tony Halstead at 202-720-4620,
or *Tony.Halstead@fas.usda.gov*

To download additional data tables, go to Production, Supply and Distribution Database (PSD Online): (http://apps.fas.usda.gov/psdonline/psdHome.aspx), scroll down to Reports, and Click the plus sign [+] next to Coffee
FAS Reports and Databases:

Current *World Market* and *Trade* Reports*:*
http://apps.fas.usda.gov/psdonline/psdDataPublications.aspx
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http://usda.mannlib.cornell.edu/MannUsda/viewTaxonomy.do?taxonomyID=7
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http://apps.fas.usda.gov/psdonline/psdHome.aspx
Global Agricultural Information Network (Agricultural Attaché Reports):
http://gain.fas.usda.gov/Pages/Default.aspx
Global Agricultural Trade System (U.S. Exports and Imports):
http://apps.fas.usda.gov/gats/default.aspx

Raisin Production, Supply and Distribution for Select Countries

Metric Tons (Dry Weight Basis)

	2009/10	2010/11	2011/12	2012/13	2013/14	Sep 2014/15
Production						
United States	304,361	358,157	348,631	313,795	371,492	320,000
Turkey	260,000	250,000	250,000	310,000	242,635	310,000
China	185,000	135,000	100,000	150,000	165,000	180,000
Iran	145,000	147,000	150,000	180,000	160,000	160,000
Chile	65,000	72,500	74,000	68,500	62,200	65,500
South Africa	43,000	23,475	37,900	46,000	46,000	50,000
Afghanistan	31,000	34,000	32,000	26,727	34,300	36,000
Argentina	27,000	34,000	31,500	32,000	24,500	33,000
Uzbekistan	26,000	26,000	35,000	22,000	17,000	20,000
Australia	13,600	7,400	13,400	12,500	10,000	10,000
Other	20,300	19,300	22,000	21,000	20,000	20,000
Total	1,120,261	1,106,832	1,094,431	1,182,522	1,153,127	1,204,500
Domestic Consumption						
European Union	342,500	339,400	325,800	344,000	332,000	342,000
United States	206,492	208,646	215,579	203,885	226,767	220,000
China	150,300	101,800	91,000	138,200	144,700	165,000
Turkey	51,047	43,200	35,900	47,133	60,000	70,000
Australia	33,500	36,100	36,900	33,600	34,700	37,500
Iran	24,100	24,500	28,200	30,300	29,300	35,000
Canada	29,300	33,600	27,500	27,500	29,000	30,000
Japan	29,700	29,300	29,500	29,800	30,000	30,000
Russia	71,700	51,300	44,700	46,600	29,000	30,000
Brazil	27,000	23,000	22,900	26,000	25,400	26,000
Mexico	22,300	19,700	27,000	24,300	25,000	25,000
United Arab Emirates	19,500	19,000	20,200	22,100	23,300	25,000
Iraq	15,900	16,300	18,500	20,900	18,300	22,000
Ukraine	17,600	18,800	18,600	20,900	16,000	16,000
Kazakhstan	1,100	7,000	15,000	6,300	12,300	15,000
South Africa	4,000	7,775	13,400	14,200	11,300	13,000
India	9,300	7,600	8,500	8,800	12,500	10,000
Algeria	8,500	8,400	8,900	8,500	9,000	9,500
Malaysia	6,800	6,800	7,500	7,900	7,000	8,000
New Zealand	7,900	8,000	7,900	7,300	7,500	7,500
Other	61,670	55,400	48,200	55,600	55,400	58,700
Total	1,140,209	1,065,621	1,051,679	1,123,818	1,138,467	1,195,200
Ending Stocks						
United States	71,578	93,952	111,714	114,294	113,611	98,611
Turkey	4,700	4,500	3,500	21,167	20,702	26,702
Chile	100	400	400	368	368	668
Afghanistan	0	0	0	0	0	0
Algeria	0	0	0	0	0	0
Other	800	0	0	0	0	0
Total	77,178	98,852	115,614	135,829	134,681	125,981

Split Marketing Year (example: 2013/14)
For Northern Hemisphere countries, the marketing year begins in August of the first year (2013/14).
For Southern Hemisphere countries, the marketing year begins in January of the second year (2013/14).

Raisin Production, Supply and Distribution for Select Countries

Metric Tons (Dry Weight Basis)

	2009/10	2010/11	2011/12	2012/13	2013/14	Sep 2014/15
Imports						
European Union	339,300	337,100	322,200	340,200	330,000	340,000
Australia	22,700	29,500	24,600	23,800	27,000	30,000
Canada	29,300	33,600	27,500	27,500	29,000	30,000
Japan	29,700	29,300	29,500	29,800	30,000	30,000
Russia	71,700	51,300	44,700	46,600	29,000	30,000
Brazil	27,000	23,000	22,900	26,000	25,400	26,000
United Arab Emirates	19,500	19,000	20,200	22,100	23,300	25,000
Iraq	15,900	16,300	18,500	20,900	18,300	22,000
China	13,300	16,200	22,500	20,900	18,700	20,000
Mexico	16,900	15,000	20,100	17,400	17,000	17,000
Ukraine	17,600	18,800	18,600	20,900	16,000	16,000
Kazakhstan	1,100	7,000	15,000	6,300	12,300	15,000
United States	21,123	19,401	18,012	16,594	13,979	15,000
India	9,300	7,600	8,500	8,800	12,500	10,000
Algeria	8,500	8,400	8,900	8,500	9,000	9,500
Malaysia	6,800	6,800	7,500	7,900	7,000	8,000
New Zealand	7,900	8,000	7,900	7,300	7,500	7,500
Taiwan	7,200	8,000	6,700	7,400	7,500	7,500
Colombia	6,400	6,100	6,100	7,400	6,700	7,000
Peru	6,900	6,200	6,100	6,200	6,100	6,000
Other	34,000	23,700	22,900	26,322	24,600	25,500
Total	712,123	690,301	678,912	698,816	670,879	697,000
Exports						
Turkey	213,200	209,000	216,400	247,200	185,000	235,000
United States	168,021	146,538	133,302	123,924	159,387	130,000
Iran	122,000	122,600	121,800	149,700	130,700	125,000
Chile	63,600	70,200	73,600	67,154	59,000	62,500
South Africa	40,200	16,800	24,800	31,900	35,000	37,200
China	48,000	49,400	31,500	32,700	39,000	35,000
Afghanistan	27,400	30,300	28,900	22,677	29,300	30,800
Argentina	23,250	29,200	29,100	29,050	22,000	29,000
Uzbekistan	22,700	22,700	32,900	20,000	15,000	18,000
European Union	8,800	8,700	9,400	8,200	8,000	8,000
Other	5,700	4,400	3,200	4,800	4,300	4,500
Total	742,871	709,838	704,902	737,305	686,687	715,000

Split Marketing Year (example: 2013/14)
For Northern Hemisphere countries, the marketing year begins in August of the first year (2013/14).
For Southern Hemisphere countries, the marketing year begins in January of the second year (2013/14).

Antioxidants

1. "A Randomized, Un-blinded, Single Research Site, Comparator Study of Raisins Versus Alternative Snacks on Cardiovascular Risk Factors In Generally Healthy Subjects"

Harold Bays MD, FACP, FACE, FNLA

This was a randomized, un-blinded, single research site, comparator study of raisins versus alternative snacks on cardiovascular risk factors in generally healthy subjects. Study participants were instructed to orally consume one prepackaged serving of raisins (90 kcal/serving), or one prepackaged comparator snack (100 kcal/serving) orally administered three times daily before breakfast, lunch, and dinner with 8 oz. of non-caloric fluid (preferably water) over 12 weeks.

Hypothesis of this study was that routine raisin consumption over 12 weeks would improve cardiovascular risk factors compared to generally equal calorie alternative snacks.

The objective of this study was to compare the effects of raisins three times per day versus alternative snacks three times per day on cardiovascular risk factors in generally healthy subjects.

Primary objective/endpoints were change at week 12 for raisin versus control snacks regarding:

- Fasting plasma glucose levels
- Plasma glucose levels 2 hours after administration of 75 g oral glucose
- Body weight

Secondary objective/endpoints were change at week 12 for raisin versus control snacks regarding:

- Hemoglobin A1c
- Blood pressure (systolic and diastolic)
- Body mass index

Other endpoints included laboratory of special interest

- Potassium
- Alanine aminotransferase (ALT)
- Aspartate aminotransferase (AST)
- Alkaline phosphatase (Alk Phos)
- Fasting serum insulin (Insulin was not an apriori "endpoint of special interest" in the protocol. It was added at time of study analysis due to its potential relevance to other measured metabolic parameters.)

Conclusion:
Overall, this study supports regular consumption of raisins as reducing the important cardiovascular risk factors of postprandial plasma glucose and blood pressure, which may help account for the favorable effects of grapes (and thus potentially raisins) on possibly reducing the risk for cardiovascular disease.

2. "Raisin Effects on Biomarkers of Coronary Heart Disease in Elderly Men and Women"

Maria Luz Fernandez, PhD, University of Connecticut

A randomized, controlled study with 17 men and women aged 50-70 years were involved in the study. They were encouraged to walk or to walk and eat 1 cup of raisins per day or just eat 1 cup of raisins per day. The intervention improved the lipid risk profile for all groups by resulting in a reduction in both total cholesterol and LDL-C. The authors suggested that the increase in fiber intake was a likely contributor to the reduction in LDL-C for RAISIN and RAISIN + WALK. The reduction in blood pressure for RAISIN and RAISIN + WALK may have resulted from antioxidant effects of the raisin polyphenols. In conclusion, risk factors for CVD were affected significantly by consuming raisins or increasing steps walked. Blood pressure, plasma total cholesterol and LDL-C were significantly decreased by all interventions, while walking lowered plasma TG. Raisins lowered the risk for inflammatory damage by decreasing one of the markers of inflammation associated with diabetes and coronary heart disease (tumor necrosis factor – alpha -TNF-α.).

3. "Raisins, Cyclo-oxygenase – 2 and Cancer Prevention"

Andrew J. Dannenberg, M.D., NewYork-Presbyterian Hospital/ Weill Medical College of Cornell University, New York, NY.

One of the antioxidant compounds in raisins and some other fruits and vegetables is catechin. When catechins were fed to tumor-prone mice by the noted cancer researcher Dr. Andrew Dannenberg and his colleagues, there was a 70 percent reduction in the number of tumors compared to control animals (not fed additional catechin). This type of study adds to the body of evidence linking phytochemical components of fruits and vegetables to reduction in the risk of colorectal cancer, colorectal adenomas and other gastrointestinal tumors.

4. "Antioxidant Capacity and Cholesterol Concentration in Human Subjects"

Carl L. Keen, Ph.D., Professor and Chair, Department of Nutrition, University of California – Davis, Davis, California.

Subjects eating raisins (4 servings) daily for 4 weeks increased the plasma antioxidant capacity. This in turn decreased the level of circulating oxidized low-density lipoprotein (LDL), so-called bad cholesterol, in subjects. High levels of LDL cholesterol are associated with increased cardiovascular disease. Oxidized LDL is especially problematic because the oxidized particles in the bloodstream are more likely to add to plaque on the artery wall. These data clearly show raisins are an important part of a diet that encourages 8 to 13 servings of fruit and vegetables loaded with important phytochemicals and antioxidants.

5. "Value of Raisins for Reduction of Oxidative Stress, Endothelial Dysfunction, and Inflammation in Obesity"

Janet Walberg Rankin, Ph.D., Professor in Human Nutrition, Foods, and Exercise, Virginia Tech., Blacksburg, Virginia.

Research expert on oxidative stress and disease, Janet Walberg Rankin, studied the effect of raisins with their important antioxidant contribution on oxidative stress and inflammation in overweight subjects. It is well known that oxidative stress triggers an inflammatory response that increases disease risk. Together with graduate student Mary Whitlock, Dr. Rankin looked at whether the modest, easily accessible raisin can benefit obese individuals. They showed lowered levels of markers of inflammation, C-reactive peptide (CRP) and interleukin-6 (IL-6). These findings are important because those eating high fat meals or who are obese have elevated levels of CRP and IL-6. High levels of these components adversely affect proper blood vessel functioning. Thus, those with high oxidative stress tend to have blood vessels that do not appropriately dilate and relax. Foods, such as raisins, that are good sources of antioxidants, especially flavonoids and phenolics, can be helpful in fighting oxidation stress and improving blood vessel function.

6. "Raisin effects on in vitro demineralization of teeth"

Clifton Carey, PhD, Director of Administration, American Dental Association – Paffenbarger Research Center

Strong evidence exists that food particles retained on the teeth will lead to Demineralization of the tooth enamel and dental caries. (caries) (Kashket et al, 1996). This led to the idea that foods which are perceived as 'sticky' will be more cariogenic than non-sticky snack foods. Raisins have been perceived by the general public and by pediatric dentists as the ninth stickiest food out of a list of twenty-one popular snacks. Despite this, there is no evidence that raisins contribute to the demineralization of teeth. In fact measurement of food that is on the tooth 5 minutes after swallowing showed that foods that are less soluble in oral fluids are retained for longer times. Specifically, raisins although perceived as quite sticky, they are easily cleared from the oral cavity. These observations suggest that raisins may not contribute to tooth demineralization significantly because the sugars are removed from the dentition before the plaque mass has the opportunity to generate sufficient acid to lower the pH below 5.5. There is also research that shows that raisins contain compounds that inhibit the *in vitro* growth of *S. mutans,* thus making raisins less cariogenic than other foods. However, the *in vitro* research with 10% raisin juice showed that it had the potential to demineralize tooth enamel but that this was less than orange juice with its citric acid.

7. "Raisins as a Functional Food for Oral Health"

Christine D. Wu, M.S., Ph.D., Professor, Department of Periodontics, University of Illinois, College of Dentistry, Chicago, Illinois.

Raisins contain compounds including oleanolic acid that inhibit *in vitro* growth of *Streptococcus mutans*, one of the major bacteria in the mouth responsible for tooth decay. Oleanolic acid and other compounds in raisins also inhibit organisms associated with periodontal disease, including *Porphyromonas gingivalis* and *Fusobacterium nucleatum*. Oleanolic acid is effective in suppressing *in vitro* plaque formation by *Streptococcus mutans*. Prevention of plaque formation on the tooth surface is critical both for preventing tooth decay and promoting healthy gums.

Food Preservation

8. "Phenolic Content, Antioxidant Activity and Antimicrobial Properties of Raisins in Food Systems"

Luis Cisneros-Zevallos, Ph.D., Assistant Professor, Department of Horticultural Sciences, Texas A&M University, College Station, Texas.

Raisins have a considerable concentration of phenolic compounds. This analysis showed that they were quinic and gallic acid, chlorogenic and caffeic acids, catechin, and epicatechin. Golden raisins have more of many of these compounds because the antioxidant effect of the sulfite used in golden raisins inhibits the loss of these compounds. Raisin juice extracts and concentrates also have significantly increased numbers of these compounds, so they have the potential to reduce the growth of harmful microorganisms and prevent browning of cut produce. According to studies conducted by Luis Cisneros-Zevallos and his team at Texas A&M, raisin extracts were shown to reduce the growth of known food pathogens such as *Listeria monocytogenes* and *Escherichia coli* 0157:H7 in a variety of model food systems. This has great importance to food safety and to the produce industry as a non-food additive solution to help extend the shelf life of food and reduce food-borne disease.

9. "Inhibition of Lipid Oxidation by Raisin Paste in Cooked Ground Meat"

Daren Cornforth, Ph.D., Professor, Nutrition & Food Sciences, Utah State University, Logan, Utah.

Raisins are recognized as a good source of dietary antioxidants. Adding raisin paste or extract to cooked ground beef or pork at just 1% to 2% of the weight improved its flavor after storage due to inhibition of rancidity by the antioxidants. Addition of the raisin extract to chicken at the same levels was also effective but did cause the meat to darken. In all cases the addition of the small amount of raisins did not affect the flavor of the meat.

10. "Evaluation of the Potential Anti-Microbial Properties of Raisins and Their Application in Food Safety and Preservation"

Mark A. Daeschel, Ph.D., Professor, Food Microbiology and Safety, Oregon State University, Corvallis, Oregon.

Pathogenic bacteria, including *Escherichia coli 0157:H7, Staphylococcus aureus* and *Listeria monocytogenes,* were inhibited in jerky systems containing 25% or 50% raisins. Raisins were shown to have the same preservative properties as sodium nitrite in meat systems. Raisins' innate combination of antioxidants, sugar and acids were shown to be as effective as the sodium nitrite in inhibiting organisms that cause food- borne disease and in maintaining food safety. This is good news because producers of jerky, sausages, hot dogs and other cured meats may be able to reduce or eliminate the use of nitrite additives.

Use of raisins to replace sodium nitrite in cured meats has many health benefits. First, the nitrite may form cancer-causing nitrosamines during digestion. Second, unlike the sodium nitrite, raisins

add no sodium. This is important for those on sodium-restricted diets. Third, addition of raisins may improve the overall nutritional profile of cured meats, such as jerky, since the raisins provide antioxidants and make it possible to produce a palatable product that is lower in fat.

Fiber

11. "Raisin Dietary Fiber: Composition and Characteristics"

Mary Ellen Camire, Ph.D., Professor, Department of Food Science and Human Nutrition, University of Maine, Orono, Maine.

Dietary fiber and other components may reduce the risk of heart disease and cancer by binding bile acids and causing their elimination from the body. Camire's study confirms that eating fibrous foods, such as raisins, caused the elimination of bile acids. This in turn stimulates the body to replace the excreted bile acids using its own cholesterol, thus potentially lowering serum cholesterol and the risk of coronary heart disease. Furthermore, bile acids that are bound by fibers such as those in raisins will not be metabolized in the gut to a more toxic form that can cause harmful changes on the colonic wall, and this may potentially reduce cancer risk.

12. "Raisins as a Source of Inulin"

Medallion Labs, Minneapolis, Minnesota.

California raisins are a good source of inulin, a naturally occurring fiber-like carbohydrate that helps keep the colon healthy. Independent laboratory analysis by Medallion Labs, a laboratory known for their analytical work for nutrition labeling in the U.S., showed that a standard 1/4-cup serving of California raisins contains 1.5 grams of inulin. Recommended daily intake levels of inulin have yet to be established. However, inulin is one of the soluble fibers. Health benefits of inulin are the subject of active research and new functions are being documented. Some of these include its effects on cholesterol levels and gut health. Its role as a prebiotic has received much attention because prebiotics are important to support immune function both in the gut and in the body.

13. "Beneficial Effects of Raisins on Colonic Function with Possible Implications for the Prevention of Colon Cancer"

Gene A. Spiller, Ph.D., Head, Sphera Foundation and Health Research Studies Center, Los Altos, California.

The combination of dietary fiber and tartaric acid in sun-dried raisins plays an important role in colon function and health. The study was designed to test the hypothesis that eating 2 to 4 servings of raisins per day may improve colonic health. Research by Dr. Spiller found a positive correlation between consuming sun-dried raisins and a reduction in some colon cancer risk factors. For example, raisins increased fecal weight and caused material to move through the colon faster (called faster transit time). Increased transit time and increased fecal weight is important not only to have a properly functioning gastrointestinal tract and to reduce constipation and

hemorrhoids, it also means that any toxic materials that might be in the diet or produced by metabolism in the gut will have little time to adversely affect the colon wall. Raisins reduced the alkalinity in the colon. Both the faster transit and lowered pH are associated with reduced colon cancer risk. The authors concluded that 2 servings of raisins per day caused moderate but beneficial changes in colon function.

Nutrient Composition

14. "The Impact of Pre-exercise Snacks on Exercise Intensity, Stress, and Fatigue in Children"

Debra R. Keast, PhD; Carol E. O'Neil, PhD, MPH, RD; Julie M. Jones, PhD, CNS, LN
Objective: This study examined the association of dried fruit consumption with nutrient intake, diet quality, and anthropometric indicators of overweight/obesity.

Design: Analyses of dietary and anthropometric data collected from adult (19+ years) participants (n=13,292) of the 1999-2004 National Health and Nutrition Examination Survey were conducted. Dried fruit consumers were defined as those consuming amounts ≥⅛ cup-equivalent fruit/day and identified using 24-hour recalls. Diet quality was measured using the Healthy Eating Index-2005 (HEI-2005). Covariate-adjusted means, standard errors, prevalence rates and odds ratios were determined to conduct statistical tests for differences between dried fruit consumers and non-consumers.

Results: Seven percent of the population consumed dried fruit. Adult shortfall nutrients for which there were mean intake differences ($p<0.01$) between consumers and non-consumers were: fiber (+6.6 g/d), vitamin A (+173µg RAE/d), vitamin E (+1.5 mg AT/d), vitamin C (+20 mg/d), calcium (+103 mg/d), magnesium (+72 mg/d), and potassium (+432 mg/d). Dried fruit consumers had improved MyPyramid food intake, including lower SoFAAS intake, and a higher SoFAAS score (11.1±0.2 vs 8.2±0.1) than non-consumers. The total HEI-2005 score was significantly higher ($p<0.01$) in consumers (59.3±0.5) than non-consumers (49.4±0.3). Covariate-adjusted weight (78.2±0.6 kg vs 80.7±0.3 kg), body mass index (27.1±0.2 vs 28.1±0.2), and waist circumference (94.0±0.5 vs 96.5±0.2) were lower ($p<0.01$) in consumers than non-consumers, respectively.

Conclusions: Dried fruit consumption was associated with improved nutrient intakes, a higher overall diet quality score, and lower body weight/adiposity measures.

Glycemic Effects, Sustainable Energy and Healthy Snacks

15. "Effects of Carbohydrate Supplementation Form on Gastrointestinal Tolerance and Running Performance"

Brandon Too, Sarah Cicai, Kali Hockett, Elizabeth Applegate, Brian A. Davis and Gretchen A. Casazza

Purpose: We examined the effects of raisins and sport chews on running performance and gastrointestinal (GI) tolerance.

Methods: This study recruited 11 competitive male (29.3 ± 2.4 yrs) endurance runners and triathletes to complete an 80-min sub-maximal (75% VO2peak) running bout followed immediately by a 5K time trial and a 10K time trial 24 hours later. Subjects ingested 3 randomized treatments (raisins, sport chews, and water only) with each treatment separated by 7 days. Heart rate (HR), respiratory exchange ratio (RER), blood glucose, lactate, free fatty acids (FFA), glycerol, insulin, electrolytes and creatine kinase, GI symptoms and rating of perceived exertion (RPE) were recorded every 20 minutes during the sub-maximal exercise test and at the end of the 5K. We also measured whole body muscle soreness and fatigue and mood disturbance via questionnaires.

Results: VO2, HR, body weight changes, muscle soreness and fatigue, total mood disturbance and RPE during the submaximal exercise bout did not differ due to treatment. However, RER was highest during the sport chews treatment, followed by the raisins and water was the lowest (0.92 ± 0.01, 0.91 ± 0.01, 0.89 ± 0.01 for raisin, chews and water respectively). FFA and glycerol were higher with water than both CHO treatments. Blood glucose was higher for both carbohydrate treatments compared to water. Plasma creatine kinase was higher for all exercise time points with raisins versus chews and water. Time to complete the 5K time trial was faster for both carbohydrate treatments (20.6 ± .8, 20.7 ± .8, 21.6 ± .8 min for raisin, chews and water respectively). GI disturbance was mild (less than 1 out of 6) for all treatments with only belching higher in both CHO treatments compared to water.

Conclusion: Both the raisins and sport chews maintained high blood glucose levels and improved running performance compared to water only. Running performance between the raisins and sport chews were similar and their GI tolerance was good. Raisins provided a good, natural carbohydrate source that had similar physiological and performance benefits as a commercially available product

16. "The Impact of Pre-exercise Snacks on Exercise Intensity, Stress, and Fatigue in Children"

Jennifer M. Sacheck, Tamar Kafka, Helen Rasmussen, Jeffrey B. Blumberg, and Christina D. Economos

Purpose: Few studies have examined how the composition of snacks affects athletic performance in children. We investigated whether the macronutrient and flavonoid

content of 3 pre-exercise snacks differentially affected exercise intensity, stress, and postgame fatigue in young soccer players.

Methods: At 1 h prior to a 50-min soccer game, 115 children (9.1 ± 0.9 y) were randomly assigned to consume 1 of 3 isocaloric snacks: 1) nutrient dense/high flavonoid (HF) raisin/nut bar; 2) low flavonoid (LF) peanut butter graham bar; or 3) low flavonoid/high sugar (LF/HS) rice cereal bar. Blood glucose and salivary cortisol and IgA were measured before consuming the snack and immediately following the game. Game exercise intensity was measured by accelerometry. Self-administered questionnaires were used to assess diet quality and physical and mental fatigue after the game.

Results: The children spent approximately 33% of the game in moderate to vigorous activity and 49% of the game in sedentary activity. The snack consumed was not related to exercise intensity. Mean post-exercise blood glucose ($P<0.001$) and cortisol ($P<0.05$) increased and IgA levels decreased ($P<0.001$) from pre-game values. The pre-exercise snack did not predict the post-exercise outcome for any of these parameters after controlling for pre-exercise values of the biomarkers, age, gender, BMI, exercise intensity, game-time water consumption, and diet quality. Children who reported symptoms of fatigue were more likely to have consumed the LF/HS snack ($P<0.05$).

Conclusion: The pre-exercise snacks formulated for this study did not affect blood sugar or salivary biomarkers of stress following a soccer game in young children. The nutrient content of the single snack did not differentially influence these biomarkers or the exercise intensity; however subjective feelings of fatigue may be associated with low flavonoid/high sugar snacks. Future investigations are warranted to further explore the effects of pre-exercise snacks on exercise, performance, stress and fatigue in children.

17.“Glycemic Index in the Management of Type 2 Diabetes Mellitus”

Carla Miller, PhD, RD, Ohio State University

The glycemic index of the diet decreased following a 9-week intervention in which 109 diabetics were instructed to increase their intake of fruit and dried fruit, total dietary fiber (including soluble and insoluble fiber) and the percentages of energy from protein and total fat (including saturated and monounsaturated fat) improved. IN addition to a changed GI of the diet, there was a significant reduction in body weight and body mass index (weight (kg)/height (m2)) in both men and women and a significant reduction in waist circumference in men. More fruit including raisins and other dried fruit was consumed following the intervention, which is consistent with the dietary pattern recommended in the Dietary Guidelines 2005. These studies show the importance of fruit, including dried fruit, and dietary fiber in the diet of diabetics. Thus, a carbohydrate-controlled portion of raisins can readily be incorporated into a well-constructed diabetic diet.

18. "Determination of the Glycemic and Insulinemic Responses to Raisins and the Application of Raisins as a Pre-exercise Snack for Persons with Impaired Glucose Tolerance"

Craig Mattern, Assistant Professor, State University of New York at Brockport

Raisins fed as a pre-exercise food to 22 exercisers (approximately half with normal and abnormal glucose tolerance) resulted in similar increases in blood glucose to those observed with a popular energy bar. These observed increases in blood glucose for raisins and energy bar were less than a standardized glucodex solution. The blood insulin response to the pre-exercise meal with raisins, especially in a sedentary population, produced statistically lower insulin values than the standardized glucose solution or the energy bar. All three test substances including Raisins resulted in similar mobilization of free fatty acids from adipose tissue during exercise. Thus, raisins resulted in a similar glucose response during exercise when compared to an energy bar and were less than the standardized glucose solution. The good news is that the insulin responses to raisin ingestion prior to, and in the early phases of exercise, were more favorable than those observed with the energy bar. Thus, raisins can be an excellent food for use by exercisers to help deliver the right kind of carbohydrates.

19. "Determination of the Glycemic and Insulinemic Indexes of Raisins in Three Populations"

Steve Hertzler, Ph.D., Assistant Professor of Nutrition, The Ohio State University, Columbus, Ohio.

The glycemic index (G.I.) and insulin index (I.I.) of raisins was determined on three different populations. In 10 sedentary adults, the G.I. of raisins was determined to be an average of 49.4. A nearly identical G.I. value for raisins was found for 10 prediabetic individuals. In the 11 endurance athletes, the G.I. of raisins was 62.3. As expected, the highest insulin index was found in prediabetic subjects (I.I. = 54.4) and the lowest was found in sedentary subjects (I.I. = 47.3). While the I.I. for athletes was 51.9, the overall insulin excursion in trained athletes was not nearly as great, showing the effects of training on insulin sensitivity and glucose utilization. Interestingly, California raisins in this study came in as a moderate glycemic food, which is different from the 'high' classification they are given in published tables. Data for published tables have not been collected on California raisins, and the population studied is not from the United States.

20. "Raisin Consumption and Exercise Performance of Endurance Athletes"

Mark Kern, Ph.D., Department of Exercise and Nutritional Sciences, University of California – San Diego, San Diego, California.

Raisins were shown to be a good alternative to sports gels in a study conducted with endurance athletes under two different conditions. In studies by Mark Kern, San Diego State professor and author of the CRC Desk Reference on Sports Nutrition (2005, CRC Press), endurance-trained cyclists (4 males and 4 females) completed two feeding-performance trials where changes in metabolism and cycling performance were compared after consumption of raisins (a moderate to

low glycemic index food) versus a commercial sports gel (a high glycemic index food). There were no differences in performance in the 45 minute cycling trial (at 75% VO2max). No gastrointestinal discomfort was reported with either the gel or raisins. Measures of metabolic substrates after exercise were the same with both the sports gel and raisins except there were more free fatty acids after the pre-exercise ingestion of raisins. This increase in the free fatty acids indicates that raisins subtly, but favorably, improved metabolism. The authors concluded that raisins have similar performance effects to commercial sports gel products, but raisins are a better alternative since they provide more micronutrients, an acid-neutralizing load to the kidneys and are a more cost-effective and convenient food for use during exercise.

21. "The Effects of a Raisin-Peanut Pre-Event Meal on Indices of Energy and Fatigue in Young, Trained Soccer Players (10-12 Years of Age) Playing a Standard Game"

Gene A. Spiller, Ph.D., Head, Sphera Foundation and Health Research and Studies Center, Los Altos, California.

Feeding raisins along with peanuts and water to 10 to12 year old children prior to a soccer game resulted in lower increases in blood glucose and insulin than a snack of a white bagel and lemonade. This is important because it means a more steady fuel supply to the exercising muscle of the young players. Lower insulin levels are advantageous because high levels of circulating insulin can promote the laying down of fat and may lead to insulin resistance, a concern among U.S. children today, where rates of obesity and type-2 diabetes are increasing dramatically.

Satiety

22. "The Effects of a Pre-Meal Raisin Snack on Satiety and Food Intake in Children"

Dr. G. Harvey Anderson, Professor, Nutritional Sciences and Physiology. Department of Nutritional Sciences, University of Toronto.

Three experiments were conducted to determine how raisin snacks influences appetite and calorie intake in 8-11 year old children.

First Experiment
Children were asked to visit the lab for three times and during each visit they were asked to eat until comfortably full one of three snacks: (1) raisins, (2) grapes or (3) a mix of almonds with raisins. In a half an hour, a lunch meal with pizza was provided to kids and again they were asked to eat it until they felt comfortably full. The results of this experiment indicated that after the raisin snack, kids consumed about 21% less pizza compared with other snacks. The total calories received from the snack and lunch meal were lower after raisins compared to other snacks.

Second Experiment
The equicaloric (150 kcal) snacks were provided to children and food intake was measured with a pizza meal in 30 min, similarly as in the first experiment. When total calories consumed were calculated after the snack and pizza meal, the calories after the snack with raisins were similar to

those after just water, while other snacks led to higher calorie intake when compared with water. It was concluded that raisins was the only snack that does not increase calorie intake when provided before a lunch meal.

Third Experiment

All children received the same breakfast (skim milk, cereals and orange juice), morning snack (medium apple) and the lunch (turkey sandwich with a cup of 2% milk). Then in the afternoon (between 3:30 and 4 pm in the lab) they ate, until comfortably full, one of the four after-school snacks: (1) raisins, (2) grapes, (3) potato chips and (4) chocolate chip cookies. The results of this experiment demonstrated that calorie intake after raisins was the lowest compared to other snacks. Thus, children consumed about 1.5 times more calories with grapes or potato chips, and about twice more calories with cookies.

Conclusion

The results of this project indicate that raisins compared to other popular snacks reduce appetite and provide the lowest energy intake.

FY 2012-2013

- Development of improved raisin grapes for mechanical harvest including types resistant to powdery mildew: David Ramming
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes: Peter Cousins
- Evaluation of Nematode Resistant Rootstocks for Use with Early Ripening Raisin Varieties Grown for Dried on the Vine Raisin Production: Stephen Vasquez
- Node position, shoot emergence, and yield components of cane-pruned raisin grapes: Matthew Fidelibus

FUNDED CROP PRODUCTION RESEARCH

FY 2011-2012

- Breeding rootstocks resistant to aggressive root-knot nematodes
  Principle Investigator: Peter Cousins
- Development of improved raisin grapes for mechanical harvest including types resistant to powdery mildew
  Principle Investigator: David Ramming
- Node position, shoot emergence, and yield components of cane-pruned raisin grapes
  Principle Investigator: Matthew Fidelibus
- Advancing maturity of raisin cultivars using potassium sprays applied just prior or during the ripening phase
  Principle Investigator: William Peacock

FUNDED CROP PRODUCTION RESEARCH

FY 2010-2011

- Advancing maturity of raisin cultivars using potassium sprays applied just prior or during the ripening phase, by Bill Peacock
- Sustainable Controls for Vine Mealybug – 2010, by Kent Daane
- Crop yield and economics of San Joaquin Valley vineyards under alternative weed management strategies, by Anil Shrestha
- Identifying and correlating populations to fruit damage in raisin production systems, by Stephen Vasquez
- Node position, shoot emergence, and yield components of cane-pruned raisin grapes, by Matthew Fidelibus
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins
- Development of improved raisin grapes for mechanical harvest including types resistant to powdery mildew, by David Ramming

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FY 2009-2010

- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins
- Advancing maturity of raisin cultivars using potassium sprays applied to fruit just prior or during the ripening phase, by Bill Peacock
- Development of improved raisin grapes for mechanical harvest including types resistant to powdery mildew, by David Ramming
- Sustainable Controls for Vine Mealybug, by Kent Daane
- Movento, Much More Than an Insect Growth Regulator, by M. McKenry
- Identifying raisin moth damage in raisin production systems, by Stephan Vasquez
- Evaluation of abscission agents for grapes, by Matthew Fidelibus

FY 2008-2009

- Evaluation of novel abscission agents to facilitate mechanical harvesting of raisin grapes, by Matthew Fidelibus
- Grapevine Cultivar and Drying Method Effects on Raisin Yield and Quality, by Matthew Fidelibus and Hildegarde Heymann
- Development of improved raisin grapes for mechanical harvest including types resistant to powdery mildew, by David Ramming
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins
- Spider mite management, by N. Mills
- Sustainable Controls for Vine Mealybug: Mating Disruption, by Kent Daane
- Sustainable Controls for Vine Mealybug: Biological Control, by Kent Daane

FY 2007-2008

- Water use of Thompson Seedless grapevines growing in a weighing lysimeter and trained to an overhead trellis system used for dried on the vine (DOV) raisin production, by Larry Williams
- Evaluation of novel abscission agents to facilitate mechanical harvesting of raisin grapes, by Matthew Fidelibus
- Grapevine cultivar and drying method effects on raisin yield and quality, by David Ramming
- Development, Testing and Introduction of Grape Rootstocks with Broad and Durable Nematode Resistance, by Howard Ferris and M. Andrew Walker
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins
- Sustainable Controls for Vine Mealybug: Mating Disruption, by Kent Daane

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FY 2006-2007

- Cost of Feasibility of Mechanically Harvested Continuous Tray Dried Raisins, by Stephan Vasquez
- Overhead Arbor Trellis Systems: Canopy Structure and Function in Relation to Irrigation Requirements, by Matthew Fidelibus, Lawrence Schwanki, and Stephan Vasquez
- Evaluation of novel abscission agents to facilitate mechanical harvesting of raisin grapes, by Matthew Fidelibus and Carlos Crisosto
- Development of improved raisin grapes for mechanical harvest including types resistant to powdery mildew, by David Ramming
- Sustainable Controls for Vine Mealybug: Mating Disruption, by Kent Daane and Walt Bentley
- Development, Testing and Introduction of Grape Rootstocks with Broad and Durable Nematode Resistance, by Howard Ferris and M. Andrew Walker
- Grapevine Cultivar and Drying Method Effects on Raisin Yield and Quality, by Matthew Fidelibus and Hildegarde Heymann
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins

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FY 2005-2006

- Raisin Research on DOV Using the Within Row Alternate Bearing Method (WRAB DOV), by Bill Peacock
- Evaluation of Training Systems, Trellises, Row Direction, and Grape Cultivars for Dry-on-Vine (DOV) Raisin Production, by Matthew Fidelibus
- Evaluation of Canopy Separation and Defoliation Practices for Mechanized Raisin Harvest on Traditional Trellises, by Matthew Fidelibus and Stephan Vasquez
- Overhead Arbor Trellis Systems: Canopy Structure and Function in Relation to Irrigation Requirements, by Matthew Fidelibus and Stephan Vasquez
- Physiological Implications of Harvest Pruning Raisin Grapes, by Matthew Fidelibus and D. Smart
- Development of Improved Raisin Grapes for Mechanical Harvest including Types Resistant to Powdery Mildew, by David Ramming
- Development, Testing and Introduction of Grape Rootstocks with Broad and Durable Nematode Resistance, by Howard Ferris and M. Andrew Walker
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins
- Sustainable Controls for Vine Mealybug: Mating Disruption, by Kent Daane

FUNDED CROP PRODUCTION RESEARCH

FY 2004-2005

- Development of Improved Raisin Grapes for Mechanical Harvest Including Types Resistant to Powdery Mildew, by David Ramming
- Breeding Rootstocks Resistant to Aggressive Root-Knot Nematodes, by Peter Cousins
- Development, Testing and Introduction of Grape Rootstocks with Broad and Durable Nematode Resistance, by Howard Ferris and M. Andrew Walker
- Developing Sustainable Control Options for the Vine Mealybug in California, by Kent Danne
- Investigation of the Grape Mealybug Complex and its Natural Enemies to Improve Biological Control, by Kent Daane and Mark Battany
- Use of Vine Mealybug Sex Pheromone for Monitoring and Mating Disruption, by Walt Bentley and Kent Daane
- Leafroll Disease Revisited, by D.A. Golino
- Develop and Implement Control Methods for Eutypa Dieback, by Doug Gubler
- Investigations Into Pathogenicity of *Phomopsis viticola* as a Cause of Cankers and Bud Death in Grapes, by George Leavitt
- Pheromones for Sampling Major Mealybug Pests in California Vineyards, by Jocelyn Millar
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- Evaluation of Training Systems, Trellises, Row Direction, and Grape Cultivars in Dry-on-the-Vine (DOV) Raisin Production, by Matthew Fidelibus
- Evaluation of Canopy Separation and Defoliation Practices for Mechanized Raisin Harvest on traditional Trellises, by Matthew Fidelibus
- Evaluation of Nematode Resistant Rootstalks for Use with Early Ripening Raisin Varieties Grown for Dried-on-the-Vine Raisin Production, by Stephan Vasquez
- Raisin Research on DOV Using the Within Row Alternate Bearing Method (WRAB DOV), by Bill Peacock