



How Do Thompson Seedless, Fiesta And DOVine Compare In New Raisin Vineyard Planting Decisions?

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Raisin variety options are increasing. New vineyard planting decisions now typically involve four choices -- "standard" Thompson Seedless, Thompson Seedless 2A clone, Fiesta, and DOVine. These are all categorized under the Federal Raisin Marketing Order (when sun-dried) as "natural seedless." Varieties of other categories include Zante Currant, Muscat of Alexandria, Monukka, and "other seedless" which mostly involve table grape varieties such as Perlette and Flame Seedless. The "natural seedless" category choices are described as follows:

Thompson Seedless. Thompson Seedless is known for its adaptability and versatility. It adapts well to many soil types, including fairly sandy soils; its culture is well established and familiar to growers. Vine longevity is remarkable, and vineyards retain their relative real estate value. It is known as the ultimate "multipurpose" variety due to its wide use in fresh table, cannery, crushing (wine, concentrate, and brandy), dehydrator, and sun-dried raisin uses. Its popularity could be considered a drawback; the large acreage must be harvested in a 3-4 week period. Typically, about 175,000 acres of the State's total 260,000 acres of Thompson Seedless are used for raisin production each year, requiring a peak labor demand of an estimated 55,000 workers.

"Standard" Thompson Seedless. This refers to common wood sources taken from non-clonal commercial vineyards. Thompson Seedless was introduced into California (from Europe via a New York nursery) in 1872 by William Thompson of Yuba City. All of our Thompson Seedless vineyards originated from this single wood source. Virus disease testing has shown that many, if not all, of these vineyards commonly carry a mild form of leafroll virus (known as grapevine leafroll-associated closterovirus-type 4). The virus is only mildly debilitating but can contribute to reduced vine fruitfulness (as much as 16% less) and overall yield (as much as 10% less) for raisin and crush uses. Virus-free planting material is now available which eliminates this concern.

2A Thompson Seedless. This is a heat-treated, virus-free clone of Thompson Seedless. It originated from a single wood source and has a proven track record of productivity. It is preferred for new plantings of Thompsons for raisins and crushing. Table grape tests are still in progress.

Fiesta. Fiesta originated from a complex cross made in 1965 by Dr. John Weinberger at the USDA Horticultural Field Station in Fresno. It was released in 1973 for early ripening (10-14 days ahead of Thompson Seedless) and the

ability to produce high quality raisins. However, plantings have only increased significantly in the last 8 years (3,840 acres in 1996) due to earlier concerns over seed traces in the raisins. These concerns have now waned, and interest in the variety has increased. It is not used as a table grape because of its sensitivity to gibberellic acid.

Fiesta fits in well with Thompson Seedless producers because of similar cultural practices. It enables harvest to begin 10 to 14 days earlier to reduce rain risk and extend labor demand. Its soil adaptability is similar to Thompson Seedless, but expect less growth in loamy sands to sands. Yields are comparable to or slightly higher than Thompson Seedless. Fiesta is well suited for DOV. It has performed well under several different divided and non-divided fruit zone DOV systems with cane cutting in the second week of August.

Fiesta is more susceptible to powdery mildew, bunch rot, and Pierce's disease than Thompson Seedless. Mildew control is more critical, especially with vigorous vines. Bunch rot increases more rapidly in fruit left on the vine past full ripening. Plantings in Pierce's disease "hot spots," such as next to pastures and alfalfa fields, have experienced serious vine losses.

Vine pruning requires additional attention due to cane variability. Canes are variable in diameter and internodal length. Also, many do not mature to their full length and lateral shoots dominate in growth. Therefore, pruners must be instructed to prune to strong, mature lateral canes or to leave more smaller, shorter canes than usual.

Over-drying and raisin caramelization can be problems with Fiesta. The fruit dries 20% faster than Thompson Seedless and typically is harvested when temperatures are higher.

Therefore, Fiesta should be rolled early to allow curing in the roll rather than risking over-drying and caramelization. Fiesta caramelization tends to produce dark, puffed- up raisins ("puff balls") that float out during processing.

DOVine. DOVine was released by Dr. David Ramming of USDA in 1995 as an early ripening variety with DOV potential. It was primarily selected for its early ripening (2-3 weeks before Thompson Seedless) and high raisin quality characteristics. Fruitfulness is low at nodes 1 and 2 at the base of fruiting canes, assuring that a minimal number of clusters remain in a fresh state behind the severed canes during DOV. The variety's high vigor provides potential for a large vine framework and canopy adapted to more expansive trellising and the demands of cane renewal for DOV. Fruiting canes are well-matured, have closely-spaced nodes, and are medium to large diameter.

DOVine is not as well suited to conventional raisin farming as Thompson Seedless and Fiesta. Its high vigor and dense canopy with standard trellising contribute to fruit zone shading and more difficult powdery mildew control. Establishment and maintenance of head training can be difficult due to the tendency for renewal canes to originate toward the ends of previous year's canes. A conventional tray drying system is only recommended where the vines have moderate vigor as in sandy soil or when grafted onto a medium vigor root system. Vigor control through controlled drip irrigation and nitrogen fertilization will be necessary in most sites.

DOVine's greatest potential is with a large, expansive DOV trellis system where the canopy can be spread. Success has been demonstrated on open gable or overhead systems where cordon training is practiced. For example, DOV

raisin yields have been in the 3-4 ton per acre range with an open gable DOV trellis at the Kearney Agricultural Center. Vertical or south side systems may not handle the vigor unless controlled with irrigation or planted on limiting soils.

A Comparative Study of Thompson Seedless 2A, Fiesta and DOVine

These three varieties were directly compared in a replicated trial at the Kearney Agricultural Center during 1995 and 1996. The own-rooted vines, planted in 1991, were compared for differences in vine growth, bud fruitfulness, vine nutrient levels, berry ripening and composition, and raisin yield and quality. Brush weights were taken at pruning. The results follow:

Fruit Ripening and Yield ([Table 1](#))

DOVine ripened earliest and was harvested 10 days earlier with a 1° Brix+ higher soluble solids, giving it at least a 2-week edge on ripening. Fiesta did not ripen earlier than Thompson Seedless, possibly due to higher cluster numbers and greater crop load. However, raisin yields were statistically similar among the varieties. Berry weights were heaviest with Fiesta, followed by DOVine and Thompson Seedless. Berry titratable acidity was highest with Thompson Seedless, followed by Fiesta and DOVine. Bunch rot was highest with DOVine but not significantly different between Fiesta and Thompson Seedless. Airstream sorter raisin grades were similar, except that % Substandard was higher in DOVine than in Thompson Seedless.

Bud Fruitfulness ([Table 1](#) and [Figure 1](#))

Cluster numbers per vine ([Table 1](#)) were highest with DOVine, followed by Fiesta and Thompson Seedless. However, the higher

cluster numbers appear to be offset with lighter clusters, resulting in similar yields among the varieties.

Variety fruitfulness differences can be explained by their bud fruitfulness characteristics along the canes. Bud break, shoot number, and cluster number data by cane node position were taken by Michael Costello, Fresno County Farm Advisor, in 1996. The results are shown in [Figure 1](#). All 3 varieties had low fruitfulness at the first 3 basal nodes. Thompson Seedless 2A reached its maximum fruitfulness at nodes 4 and 5, then changed little through node 15. Fiesta reached its maximum fruitfulness at nodes 5 and 6 and with higher overall cluster numbers per node. DOVine's fruitfulness gradually increased throughout the cane length except for a dip at nodes 9 and 10.

All 3 varieties show appropriate fruitfulness characteristics for DOV. Low fruitfulness at nodes 1 and 2 minimizes cluster numbers in the vines' renewal zone, even on 2-node renewal spurs. Renewal zone clusters must otherwise be removed by hand in the spring or after cane cutting.

Vine Nutritional Comparison ([Table 2](#))

Bloom time petiole samples were taken from the plots in 2 years. Variety differences were minor. Fiesta had the lowest nitrogen but the highest zinc levels. Thompson Seedless had the lowest potassium and calcium levels but the highest magnesium and boron levels. DOVine had higher potassium levels than Thompson Seedless. Generally, fertilizer practice would be similar among the varieties except that potassium may be less needed with own-rooted DOVine. Nitrogen fertilization should also be very modest with DOVine because of its tendency to be overly vigorous, as noted by the high pruning brush weights given in [Table 1](#).

Summary

Thompson Seedless will continue to be a dominant variety because of its adaptability, versatility, familiarity and longevity. Using the 2A clone assures uniform and productive planting material.

Fiesta enables earlier harvest scheduling and is suitable for new DOV plantings. However, greater attention will be required in cane selection at pruning, fungal disease management, and the potential for over-drying

raisins and caramelization. Do not plant Fiesta next to potential Pierce's disease source sites.

DOVine's destiny appears to be largely limited to new DOV plantings. Early ripening is its greatest asset. Its high vigor and growth characteristics are best suited to cordon training and expanded DOV trellises. Head-trained DOVine with a conventional trellis is difficult to manage. Restricted irrigation and nitrogen fertilizer use will be necessary to control vine vigor in many sites.

Table 1.
Raisin Variety Comparisons, Kearney Agricultural Center
Two-Year Summary of Yield and Fruit Quality Components
1995 and 1996 Treatment Means

	Harvest Date	Berries			Clusters			Raisins			Pruning weight ² Lbs/ vine
		Weight	Soluble Solids	Titratable acidity				Yield Tons/acre	Airstream Grades		
		gms	°Brix	g/100 ml	No./vine	Wt./lbs. ¹	Rot/vine		% B+B	% Substd.	
DOVine	8/28	2.14 b	21.6 a	0.32 c	73 a	0.93	18 a	2.79 a	77.6 a	5.8 a	13.99 a
Fiesta	9/8	2.34 a	20.3 b	0.37 b	64 b	1.10	4 b	3.21 a	79.5 a	4.8 ab	8.52 c
Thompson 2A	9/8	1.90 b	20.5 b	0.40 a	46 c	1.22	1 b	2.86 a	81.3 a	4.0 b	10.89 b

¹Not statistically analyzed as weights were based on composite samples of 48 clusters per variety (6 per replication).

²One year data only, 1995.

³Values with like letters within a column are not significantly different at the 5% level.

Table 2.
Raisin Variety Comparison
Kearney Agricultural Center

Two-Year Summary of Bloom Petiole Mineral Nutrient Analysis
1995 and 1996 Treatment Means

	Total N %	Nitrate-N ppm	Phosphorus %	Potassium %	Calcium %	Magnesium %	Boron ¹ ppm	>Zinc ¹
DOVine	0.79 a ²	192 ^a	0.69 ^a	2.48 ^a	1.31 ^a	0.61 a	34 ^b	52 ^b
Fiesta	0.69 ^b	56 ^b	0.69 ^a	2.11 ^{ab}	1.28 ^a	0.51 ^b	33 ^b	58 ^a
Thompson 2A	0.84 ^a	189 ^a	0.62 ^a	1.89 ^b	1.07 ^b	0.63 ^a	39 ^a	48 ^b

¹One year data only, 1996.

²Values with like letters within a column are not significantly different at the 5% level.

Figure 1. Bud fruitfulness characteristics of Fiesta, DOVine, and Thopson Seedless 2A canes from node positions 1-15. Average of 8 replications, 996.

