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## Cultural Practices for Autumn Royal Table Grapes

*Nick Dokoozlian, Bill Peacock,  
Don Luvisi and Steven Vasquez*

Autumn Royal is a late-maturing black seedless table grape developed by David Ramming and Ron Tarailo of the USDA-ARS in Fresno, CA. The cultivar, formerly known and tested as USDA selection #A97-68, was released in 1996 and resulted from the cross of Autumn Black x C74-1. In addition to several USDA numbered selections, its parentage includes Blackrose, Calmeria, Flame Seedless and Ribier. The cultivar produces large, dark purple to black berries which ripen in late September to mid-October. The commercial appeal of Autumn Royal rests on its large berry size and late maturity, as well as the fact that relatively few inputs are required for the production of high quality fruit.

The natural berry size of Autumn Royal is the largest among currently available seedless cultivars, limiting the need for berry sizing treatments. Without gibberellin or girdling, berry weight can average 8 grams or more. In comparison, girdled and gibberellin treated Thompson Seedless berries typically weigh between 6 and 7 grams. Berries are ovoid to ellipsoidal in shape, and purple-black to black in color. The berry flesh is firm and translucent, and the skin low to medium in thickness. A prominent seed trace occurs in some seasons. It is estimated that approximately 350 acres of this cultivar have been planted since its release in 1996.

### Site Selection and Planting

Depending upon soil type and growing conditions, Autumn Royal exhibits moderate to high vigor when planted on its own roots. Vine vigor is typically increased when the cultivar is grafted to the rootstocks most commonly used for table grape production in the San Joaquin Valley (ex. Harmony, Freedom). The cultivar appears to be well adapted to a wide range of soil types and is commonly spaced 7' to 8' between vines and 12' between rows. When anticipated vine vigor is moderate, in-row spacing may be reduced to as little as 6'.

### Training and Trellising Systems

Quadrilateral cordon training and spur pruning are suggested for maximum productivity and fruit quality. Depending upon vine vigor and in-row spacing, 28 to 32, 2-bud spurs are normally retained on quadrilateral cordon trained vines. Bilateral cordon training is not recommended due to inadequate productivity (i.e., too few spurs may be retained per vine). Cane pruning is not generally recommended for this cultivar, primarily due to the potential for overcropping, as well as reduced berry size and fruit color accumulation. Differences in fruit quality between cane and spur pruned vines appear related to crop load effects, as well as to cluster location on the cane. Basal nodes (nodes 1, 2 and 3) generally

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produce larger clusters and berries compared to nodes from the mid (5 or 6) or apical (>10) portions of the cane.

Quadrilateral cordon trained vines may be trellised to either the standard California “T” or open gable systems.

## **Productivity**

Long-term productivity appears to be variable. Data collected in a small test plot located near Delano showed that yields ranged between 700 and 750 boxes per acre over a four year period for vines trellised to the standard California “T” system. However, annual yields were erratic, and in one season dropped to as little as 400 boxes per acre. A similar experience was recently observed in Fresno County, where a commercial block trellised to the open gable system produced 800 boxes per acre in 1998 (third leaf) but only 400 boxes in 1999. At present the reason for these yield fluctuations is unknown, but may be related to climatic conditions during the fruit bud differentiation period. We are currently examining the effects of crop load on the yield variability of this cultivar in greater detail.

## **Fruit and Crop Load Management**

Early observations indicated that crop load has a significant impact on the fruit quality of Autumn Royal. Optimum crop load obviously varies among vineyards, depending upon vine vigor, berry set and tipping practices. Cluster counts prior to bloom often range between 20 and 35 per vine. Untipped clusters may weigh up to 4 pounds at harvest, making them difficult to harvest and pack. Cluster tipping is therefore used to reduce cluster size and decrease crop load. Some berry thinning or shoulder removal may also be necessary if berry set is excessive. Clusters tipped to 7 or 8 shoulders typically weigh between 2 and 2.5 pounds at harvest. Based on this estimate, vines adjusted to 25 clusters would produce about 2 packed boxes of fruit per vine or 900 boxes per acre (based on 8' x

12' spacing). The severity of both cluster thinning and tipping are reduced in seasons of low fruitfulness.

## **Gibberellic Acid**

**Berry thinning.** Berry set or cluster compactness may be excessive in many cases. A recently completed study suggests that a single application of 1 to 2 g GA/ac at 80% to 90% bloom effectively reduces the fruit set of this cultivar. Bloom applications also increase berry weight and length, and in some seasons decrease the number and size of seed traces per berry. We did not find these applications to be detrimental to return fruitfulness the following year.

**Berry sizing.** Autumn Royal does not respond to GA applied at berry set, and this treatment is not recommended.

## **Girdling**

Berry weight can be increased 10 to 15% by girdling at berry set, but this treatment delays color development and prolongs harvest. As a result, this treatment is generally not recommended. Similar to other late-season cultivars, color or maturity girdles appear to have little effect on fruit quality. At least one case of inadequate healing has been noted when maturity girdles were used.

## **Color Development**

Color development is normally not a problem as long as crop load is regulated and proper canopy management practices are followed. We have not evaluated the effects of ethephon on color development, but would expect the result to be similar to that for other black table grape cultivars.

## **Canopy Management**

Canopy management practices, including shoot thinning, basal leaf removal and summer pruning, are similar to those normally performed on other

cordon trained/spur pruned cultivars. Open canopies are desired near harvest to reduce humidity and increase wind movement following a rain.

## **Special Problems and Considerations**

As noted earlier, seasonal variability in production has been observed as a problem. In some cases berry set may be excessive, resulting in clusters which become too tight or compact. GA applied at bloom overcomes this problem. Prominent seed traces, commonly observed in some seasons, also appear to be reduced by GA applied at bloom.

Autumn Royal has a relatively weak cluster framework, and the attachment between the rachis and pedicel is fragile. Berries may separate from the rachis with their pedicel intact during harvest. Packing clusters in bags generally avoids this problem.

Autumn Royal berries are susceptible to berry cracking and rot. A relatively thin berry skin, along with well-filled or tight clusters, enhance its susceptibility to these problems. Cracking is most commonly observed near the stylar scar of the berry. Clusters may withstand small amounts (1/4") of precipitation during the fall, depending upon post-rain conditions, without suffering significant damage. However, prolonged periods of inclement weather can result in significant fruit losses due to rot.

**Nick Dokoozlian is a viticulturist in the Department of Viticulture and Enology at the University of California, Davis. Bill Peacock, Don Luvisi and Steven Vasquez are viticulture Farm Advisors, University of California Cooperative Extension, in Tulare, Kern and Fresno Counties, respectively. The authors thank the California Table Grape Commission for financial support, as well as the many growers who contributed their vineyards and time for this research.**