Pub. TB 16-00

Cultural Practices for Crimson Seedless Table Grapes

Nick Dokoozlian, Bill Peacock, Don Luvisi and Steven Vasquez

Crimson Seedless is a late-season red seedless table grape developed by David Ramming and Ron Tarailo of the USDA Fruit Genetics and Breeding Research Unit, Fresno, CA. Crimson Seedless, previously known as selection #102-26, resulted from a cross of Emperor x Selection #C33-199. The variety was released to the industry in 1989. Crimson Seedless is one of the most important table grape cultivars in California, with 8,000 acres planted in the San Joaquin Valley since 1989. Crimson Seedless ripens in mid-September and, weather permitting, can be held on the vine through mid-November. The cultivar extends the availability of California seedless table grapes into the late fall and early winter. With proper cultural practices, Crimson Seedless berries are similar in size and shape to Thompson Seedless, and develop a bright red or crimson color by harvest. A primary factor driving the growth of this variety is the high retail demand. Crimson Seedless has superior eating characteristics; berry texture is firm and crisp, and its flavor is excellent.

Site Selection and Planting

Crimson Seedless is highly vigorous when planted on its own roots. Interestingly, vine vigor does not appear to increase significantly when the cultivar is grafted to the rootstocks most commonly used for table grape production in the San Joaquin Valley (ex. Harmony, Freedom). While the cultivar is adapted to a wide range of soil types and growing conditions, moderate vigor sites are preferred. Vines may become extremely vegetative when planted in deep, fertile soils where early season growth cannot be controlled by withholding irrigation. Excessive nitrogen fertilization and irrigation should therefore be avoided in order to control canopy size. Vines are 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' if quadrilateral cordon training is utilized.

Training and Trellising Systems

Initial observations indicated that Crimson Seedless required cane pruning for adequate yields. As a result, most Crimson Seedless vineyards are head trained and cane pruned. However, an increasing number of growers report satisfactory yields with quadrilateral cordon training and spur pruning. A trial conducted at the Kearney Agricultural Center revealed that packable yields per vine were generally similar for quadrilateral/spur and head/cane vines under the standard California “T” trellis. While cane pruned vines produced greater cluster numbers and total yield than spur pruned vines, less fruit from cane pruned vines obtained adequate color for harvest. The number of clusters per retained node was greater for spur pruned vines, and these vines also produced larger berries compared to cane pruned vines.

AGRICULTURAL BLDG., 2500 W. BURREL, VISALIA, CALIFORNIA 93291-4584 --- TEL (559) 733-6363, FAX (559) 733-6720
Cooperative Extension Work in Agriculture and Home Economics, U.S. Department of Agriculture, University of California, Tulare County Cooperating

Head training and cane pruning are generally recommended for vines trellised to the open gable, "Y" or similar system. With a large, expansive trellis such as the open gable, as well as proper canopy management practices, vine capacity and yield potential are typically increased compared to the standard "T" system. The primary advantage of gable system is that more canes or fruiting wood can be retained per vine without a proportional increase in canopy density. Up to 12 canes per vine are normally retained on the open gable system.

If the standard California "T" trellis is utilized, the quadrilateral cordon trained/spur pruned system offers several advantages over the head trained/cane pruned system. First, spur pruning is less complicated and generally less expensive than cane pruning. Second, because clusters are borne within a defined region of the canopy, fruit management practices (cluster thinning) and harvest are easier to perform. Basal leaf removal and other practices used to improve canopy microclimate are also easier to perform. The latter is particularly important since thefruit of Crimson Seedless requires significant sunlight exposure for optimum color development. Third, this system generally has lower humidity and in the fruiting region, an important consideration for a late ripening cultivar. Regardless of the pruning method, at present the standard "T" system can be covered with plastic (in order to protect fruit from fall rains) more easily than the open gable system. Under the standard "T" trellis, 8 canes are typically retained on head trained vines, while 28 to 36, 2-bud spurs are retained on quadrilateral cordon trained vines (i.e., 7 to 9 spurs per cordon).

Productivity

Production generally ranges between 700 and 900 boxes (22 lb.) per acre for vines trellised to the standard California "T" trellis (quadrilateral cordon/ spur pruned or head trained/cane pruned vines). Yields are often greater when more extensive trellising systems, such as the open gable, are utilized.

Fruit and Crop Load Management

It may be necessary to reduce crop load in years of high bud fruitfulness, particularly if cluster number per vine exceeds 40. Excessive crop loads delay maturity and decrease color accumulation. Due to the moderate cluster size of this variety, little tipping or shoulder removal is necessary.

Gibberellic Acid

Berry thinning. One gram of GA per acre applied at approximately 80% to 90% bloom reduces fruit set and increases berry length and berry weight. This application does not reduce total or packable yield per vine, nor does it impact return fruitfulness. Higher rates of GA result in excessive berry thinning (straggly clusters) and shot berry formation, as well as an unacceptable reduction in return fruitfulness the following year.

Berry sizing. Our work suggests that GA rates effective for berry sizing are detrimental to the productivity and fruit quality of Crimson Seedless. GA rates > 20 g/ac cause foliar toxicity and reduce the budbreak and return fruitfulness of cane pruned vines the following year. High rates of GA applied at fruit set also reduce fruit color and increase berry shatter at harvest. Unfortunately, GA rates tolerable by the vine and fruit do not increase berry size consistently. Some growers report using 10 to 20 grams of gibberellic acid per acre, applied 2 weeks after set, for fruit sizing. Although these applications are not detrimental to return fruitfulness or fruit quality, we have not found them to be effective for increasing berry size. As a result, GA berry sizing applications are not recommended for this cultivar.

Girdling

Trunk girdles applied at berry set (4-5 mm berry diameter) increase the berry weight and yield of Crimson Seedless approximately 30%. This is the primary technique used to increase berry size. Girdles applied at berry set also reduce fruit color

and delay fruit coloration. Girdles applied at berry softening have no effect on berry size or color and are not recommended.

Color Development

Nearly all Crimson Seedless vineyards in California require Ethrel (ethephon) for optimum color development. Application rates typically range between 3/4 to 1 pint Ethrel per acre. Our work indicates Ethrel applications in mid-July (at the initiation of berry softening or veraison) and mid-August (3 to 4 weeks after veraison) are more effective for fruit coloration compared to those performed later in the season. Although Ethrel reduces berry firmness compared to untreated fruit, the reduction can be minimized by performing the initial application 3 or 4 weeks after berry softening (typically mid-August). Other than a slight delay in color accumulation, applications in mid-August provide similar effects on fruit coloration as applications performed in mid-July.

Canopy Management

Shoot thinning should be performed on spur pruned vines when shoot length reaches 10" - 12". Many growers also remove the sterile shoots from the canes of head trained vines at this same time. Shoot positioning must be performed on the open gable or other divided canopy systems.

It is critical that clusters be exposed to adequate sunlight during ripening for maximum fruit coloration. Basal leaf removal is recommended on spur pruned vines. The removal of basal leaves surrounding the clusters on cane pruned varieties is also recommended. Leaf removal should be performed near berry set, or after fruit softening. Shoot trimming or hedging may also be performed to improve cluster exposure to sunlight and to reduce humidity within the fruiting region. Hedging should be performed after berry softening to avoid potential problems with fruit sunburn. Both sides of the canopy should be trimmed to allow the uniform penetration of sunlight into the canopy interior. Portions of clusters receiving inadequate sunlight will remain green or obtain only partial color.

Care must be taken not to remove too much foliage when hedging. Excessive foliage removal may slow fruit maturation and significantly retard fruit color development. Extensive hedging prior to berry softening may also stimulate lateral shoot growth and necessitate additional shoot trimming.

Harvest and Fruit Quality

Unless fruit is exposed to inclement weather, the fresh and postharvest quality of Crimson Seedless generally improves as the fall progresses. Fruit harvested in late-October generally has greater soluble solids and color, lower titratable acidity, and firmer berries compared to fruit picked in mid-September. Berries from clusters picked in mid- to late October also maintain greater firmness during storage compared to clusters harvested in September. In some cases, delaying harvest also decreases the rate of fruit weight loss during storage. The potential for inclement weather, and significant fruit losses dueto rot, obviously increases as harvest is delayed. Selecting a harvest date for Crimson Seedless appears to be a compromise between obtaining optimum fruit quality and avoiding potential losses due inclement weather.

Special Problems and Considerations

The fruit of Crimson Seedless holds well on the vine through November in the absence of significant fall rainfall. Bunch rot and berry “slip skin” (due to infection by *Botrytis cinerea*) are problems if heavy precipitation (>1/4") is followed by periods of cool temperatures. Compared to many other cultivars, Crimson held up well during the wet and cool 1998 growing season.

Mildew control must be continued through the fall to avoid the establishment of powdery mildew on the cluster stem and rachis. The cultivar is susceptible to phomopsis, and the disease should be monitored and treated in the early spring as needed.

Crimson Seedless berries do not appear to be highly susceptible to early or late season cracking. Sunburn can be a problem, but the variety appears to be less susceptible to sunburn than Thompson Seedless.

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.**