





MECHANICAL HARVESTING OF WINE GRAPES

8. INFLUENCE OF MECHANICAL HARVESTING ON THE BUDDING AND FERTILITY OF GRAPEVINES

There is a lot of uncertainty among producers regarding the effect of mechanical harvesting on the sustainability of the grapevine.

8.1 Bud break

Bud break is a function of the climatic conditions leading up to bud break, the build-up of reserves by the grapevine during the growth season preceding bud break, and the physical characteristics of the shoot on which the bud is located. If the cold requirements have been satisfied, warm conditions in early spring stimulate the buds to break. Delayed budding occurs most often in the Coastal Region where there are higher minimum temperatures during winter, due to the moderating influence of the ocean. Vineyards in the interior which are subject to a more continental climate (extreme differences between day and night temperatures) are less susceptible to delayed budding.

8.2 Climatic conditions

What is considered sufficient cold to meet the cold requirement of the grapevine? This topic has not been researched scientifically in South Africa. Our knowledge of this is based on observations over many years and the interpretation of historic climate data. The last week of May and the first week of June appear to be the crucial period. This critical window period can move to an earlier or later stage, depending on the climatic conditions in a given year. The norms which were determined in the late 1980's and which are still currently used, indicate that the average weekly temperature (calculated from average daily temperatures) should be 15°C and lower, with a minimum daily temperature of at least 9.9°C for continuous periods of three days and longer.

8.3 Reserves

For proper budding to take place, the grapevine must have had sufficient vigour in relation to crop yield in the preceding season, so that enough reserves could be built up. Reserves are primarily built up in the post-harvest period. In addition to fertilization and irrigation, the leaves must be healthy to be photosynthetically active. Photosynthetic activity in the leaves of a vine starts decreasing 30 days after the leaf reaches maturity and continues to decrease until an age of 90 days. Excessively vigorous canopies with extensive shade can however shorten this lifespan. By the end of ripening, the lowest three to four leaves on the shoot are no longer producers and do not contribute to the feeding of clusters. Even though the photosynthetic activity in the leaves decreases, they can still contribute to the build-up of reserves once the harvest is done. The reserves that are stored toward the end of the season are predominantly derived from the younger leaves in the canopy (leaves higher up on the primary shoots as well as leaves on lateral shoots) which still have photosynthetic capacity.

Leaves in the cluster zone which are removed by the shaking action of mechanical harvesters do not make the biggest contribution to the build-up of reserves. By the time it is harvest, these leaves are usually no longer photosynthetically active. Care must be taken to avoid excessive removal of leaves on the middle and upper sections of vine shoots. The young growth at the tips of shoots and on lateral shoots should stay healthy and must be protected against late infections of powdery mildew and downy mildew after the pressing season. The extent to which the lower sections of the shoots already start to lignify during the harvest season, is a good indication that sufficient reserves have been built up.

In the post-harvest period there is a second peak of root growth. This peak and the build-up of reserves take place simultaneously and good post-harvest irrigation and fertilization are thus essential. With dry land vineyards, reserve build-up depends on sufficient rain after harvest. It is important to apply post-harvest fertilizers as soon as possible after pressing, according to Nietvoorbij's norms of removal of N, P and K per ton of grapes. In this way, the nutrition can be utilised by the roots to build up reserves. This application must preferably take place within one month after harvest.

Vigorously growing shoots can sustain themselves and do not contribute to the build-up of reserves. Consider the grapevine shoots that climb up the anchors of telephone and power lines or grow horizontally in the canopy – they can reach a length of a number of meters and still continue growing.

8.4 Physical features/characteristics of the shoot

Buds on thicker shoots break less easily than those on shoots that are at pencil thickness. Thus it is important to avoid excessively vigorous growth conditions – it is not conducive to good quality either. Buds which are damaged during the shaking action of mechanical harvesting will not bud properly or, might not bud at all.

8.5 Fertility

Fertility of a grapevine bud is determined during November and December, about 15-18 months before harvest. Temperature, light and cytokinins play the biggest role here, but water stress can also have an impact. The amount of light in the canopy is determined by the density of the canopy.

Unless there was an abnormal amount of damage to buds during the mechanical harvesting process, mechanical harvesting should have little or no effect on fertility.

Department of Viticulture and Oenology, Stellenbosch University
Author: Johannes van Rensburg | Reviewed by: Dr Albert Strever (aestr@sun.ac.za)