AIP Activity 7: The economic and quality impacts of leaf removal, cluster positioning and shoot positioning Dr. Kevin Usher

Syrah production practices

Syrah grown without leaf removal resulted in wines with predominant flavours and aromas of red fruit, black pepper, vegetative and astringent. The following practices outline the qualitative changes in Syrah.

1. Removal of six basal leaves prior to bloom can be used to reduce yield (up to 60% in this study). This is a function of reduced berry number per cluster and berry weight. This practice increases phenolics (tannins, anthocyanins, flavonols and tartaric esters) but wine astringency was reduced. Flavour and aroma profiles were altered by increasing the intensity of black pepper while reducing the intensity of characters associated with less ripe fruit.
2. Removal of four basal leaves prior to bloom can be used as a moderated practice to reduce yield (up to 23% in this study) without reducing berry size. Yield reduction was due a reduced number of berries per cluster and not a reduction in berry size. The phenolic concentrations increased moderately but the wine was more astringent. Black pepper aroma increased slightly while the fruit retained vegetative and meat characteristics.
3. Removing 100% of leaves in the fruiting zone at fruit set results in Syrah with red and cooked fruit attributes while astringency is reduced. Phenolic concentrations increased in the fruit. With this practice there were no reductions in yield and maturity was not delayed.
4. Removing 50% of leaves in the fruiting zone at fruit set retained astringency and resulted in wine with moderate levels of fruit and floral aromas. There was no impact on fruit maturity.
5. Removing 100% of leaves in the fruiting zone at veraison results in Syrah with red fruit, black fruit and floral characteristics while vegetative and meat flavours and aromas were reduced. With this practice there were no reductions in yield and maturity was not delayed.
6. Removing 50% of leaves in the fruiting zone at veraison resulted in no increase in phenolics. The fruit was moderately vegetative and astringent and resulted in wine with low intensity of red fruit and floral aromas. There was no impact on fruit maturity and yield was not reduced.
7. Mechanical leaf removal at pre bloom and fruit set was a successful practice which emulated leaf removal by hand with similar results but reduced cost per acre by 90%.

Riesling production practices

Riesling grown without leaf removal resulted in wines that were citrus and floral with elevated acidity. The following practices outline the qualitative changes in Riesling.

1. Removing 100% of leaves in the fruiting zone at fruit set results in an increased quercetin concentration in the skin (up to a two fold increase) while flavan-3-ols did not change. Wines from this practice had more body with honey and sweetness flavour and aroma attributes.
2. Removing 50% of leaves in the fruiting zone at fruit set results moderate levels of body and the honey and sweetness flavour and aroma attributes. Quercetin levels were not elevated and flavan-3-ols decreased.

3. Removal of 100% of leaves in the fruiting zone at veraison results in tropical, herbal/spicy, floral and honey characteristics in the wines. Quercetin concentration increased two fold while flavan-3-ol concentration decreased.
4. Leaf removal of 50% in the fruiting zone at veraison results in herbal, floral and citrus with moderate tropical fruit attributes. Quercetin concentrations were not elevated but this practice had the highest concentration of flavan-3-ols.

Sauvignon blanc production practices

Sauvignon blanc wine without leaf removal was described as citrus and musk/sweat flavour and aroma with elevated acidity. The following practices outline the qualitative changes in Sauvignon blanc.

1. Removing 100% of leaves in the fruiting zone at fruit set results in wines characterized by vegetative, citrus and musky flavour and aroma attributes. This fruit had elevated levels of Quercetin.
2. Removing 50% of leaves in the fruiting zone at fruit set results in floral, apple/pear and moderate vegetative flavour and aroma attributes. Quercetin concentration was at normal levels.
3. Removal of 100% of leaves in the fruiting zone at veraison results in wine with significant longevity on the palate, body/mouthfeel, tropical and sweetness flavours and tropical aroma. Citrus and herbaceous flavours and aromas were low. This fruit had elevated levels of Quercetin.
4. Leaf removal of 50% in the fruiting zone at veraison results in tropical, pear, apple and sweetness flavours and tropical aroma with moderate body/mouthfeel and low citrus, musk and vegetative characters. Quercetin was not elevated with this practice.

Merlot Production practices

Row direction is a decision made at planting and is one of the initial growing practice decisions required to establish a vineyard which can have an impact on fruit maturation and quality. There is little information available about row direction in BC viticulture.

1. Rows planted in a North-East/South-West row direction on the east side of the Okanagan Valley intercept more light and heat from the morning sun while intercepting less intense light and heat in the afternoon. This results in later fruit maturation by up to two weeks. Wines made from this fruit had different characteristics depending on the fruits location in the canopy. Shaded clusters with this row direction were vegetative and had low colour. Exposed fruit displayed high levels of fruit flavour and aroma.
2. Rows planted in a North-West/South-East row direction on the east side of the Okanagan Valley intercept more light and heat from the afternoon sun while intercepting less intense light and heat in the morning. Fruit maturation was delayed by up to two weeks. Shaded clusters with this row direction had low body. Exposed clusters had high levels of phenolics and body.

A common viticultural practice is to position clusters to change fruit quality characteristics.

1. Manipulating clusters so they are shaded results in an increase in vegetative flavour and aroma and reductions in body, fruit flavour and aroma and anthocyanins.

2. Manipulating clusters for sun exposure increases phenolics, reduces titratable acidity and in wine results in elevated body and reduced vegetative characters.