

Research & Development

Lang Vineyards project explores water management and conservation



by Dave Gamble

With growing concerns about global warming, the subject of water management is becoming increasingly important for irrigated vineyards. This would apply to virtually all vineyards which incorporate irrigation in their viticultural management programs.

The challenge of monitoring water levels in vineyard soils is a key element both from viticultural and water availability points of view and a wide variety of methods have been employed, ranging from simply observing shoot tip growth rates and leaf surface temperature up to high tech sub surface sensors.

Though the need for irrigation was underlined this summer in the Niagara region, it has always been a critical issue in B.C.'s Okanagan Valley where rapid urban growth has placed new demands on a very finite supply of water. In this context the whole question of water management is not only a matter of interest, it is a crucial issue. Since water is vital for grape growing in this region, particularly in the near desert conditions of the southern Okanagan, grape growers are growing increasingly conscious of maintaining access to their needed supply, as well as conserving and making the most of what they use.

We were interested to explore where high tech water management is at and some of the cutting edge systems. One example is ESI's 'Gro-Point' system. This spring Lang Vineyards on the Naramata Bench northeast of Penticton commenced a trial of ESI's soil moisture sensors in a four acre block of their home vineyards. Winemaker Bernhard Schirrmeister said he was interested in seeing how the system might assist in fine-tuning their irrigation practices as well as maximizing grape quality. If the trials work out as he hopes, the program would be expanded into some of their other vineyards in the valley which would be monitored remotely.

Lang Vineyards' ESI system was provided by AquaFirst Technologies of Victoria which began the installation on March 6 this spring. Bernie Neufeld of AquaFirst

explained that the heart of the installation was a series of sub surface moisture sensors which are manually read with a hand-held display unit.

The trial was an entry-level approach and Bernie said that the sensors can also be incorporated into a computer system that will remotely monitor conditions in separated vineyards or even automatically operate irrigation systems by radio.

Asked how the ESI system works, Bernie explained

that the sensor units (see illustration) operate on a principle similar to radar in that electronic signals are sent out and the 'bounce-back' time is read. The more moisture in the soil the denser it is and the quicker the signal returns.

The sensors are permanently installed in the vineyard soil and they are manufactured of stainless steel with the electronics sealed in waterproof epoxy.

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In the Lang Vineyards trial installation, leads from the sensors come out at the surface where they can be read by the display unit.

Bernie explained that the sensors are built to 'read' a 17 inch area of soil. In the Lang Vineyards installation three pairs of sensors are located in the 4 acre test block. One sensor of the pair is located vertically at the 12" depth of feeder roots. The second sensor is located at a depth of about 3 feet in a horizontal position.

In operation Bernie said the upper sensor indicates the moisture available to the feeder roots, while the lower one indicates when the water has reached its maximum useful

depth. In an automated system he said this sensor would shut off the irrigation application.

This would suggest that any form of irrigation system... overhead, drip or sub-surface emitters could be monitored or controlled by the ESI system. Scheduling abilities would allow for time based, demand and deficit irrigation, based on soil moisture and other environmental parameters.

Lang's Bernhard Schirmeister explained that the four acre test block was selected because there is 20 years of experience and data on it. He said it was located on a slope of about 30° which provides a good test of the system. Water moves downhill under the surface and builds up toward the bottom of the slope. For this reason their over-

head irrigation begins on the upper part of the slope, and is applied for a shorter period toward the bottom. The new system should allow them to monitor this differential to improve timing and optimize water use.

Bernhard said that if the trial is successful, Lang Vineyards is looking forward to installations in their remote vineyards which could be monitored from the winery. By being able to remotely read when one of these vineyards requires irrigation, it will save unnecessary trips to find out.

AquaFirst's Bernie Neufeld said that several other larger B.C. wineries are considering larger remote controlled and possibly automated systems.

More information on AquaFirst can be found at www.aquafirst.ca and Lang Vineyards website is www.langvineyards.com.