Southern Oregon Research and Extension Center

Vine Snapshot

OSU Oregon State University | Oregon Wine Research Institute | Rogue Valley Winegrowers Association

A flyer edited for The Grape and Wine Industry of Southern Oregon
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No. 8 February 2013

In This Issue:

Weather Synopsis (G. Jones) January has come and gone producing cold and dry conditions across Oregon and much of the western US. Oregon experienced temperatures from 3-4°F below normal while precipitation varied from 20% to 40% below normal. However, the snow water equivalent (SWE) remained at or above normal (98-107%) in the watersheds feeding into Oregon wine regions after the wet November-December.

Both short and long term weather/climate drivers for the western US remain as they were in January.

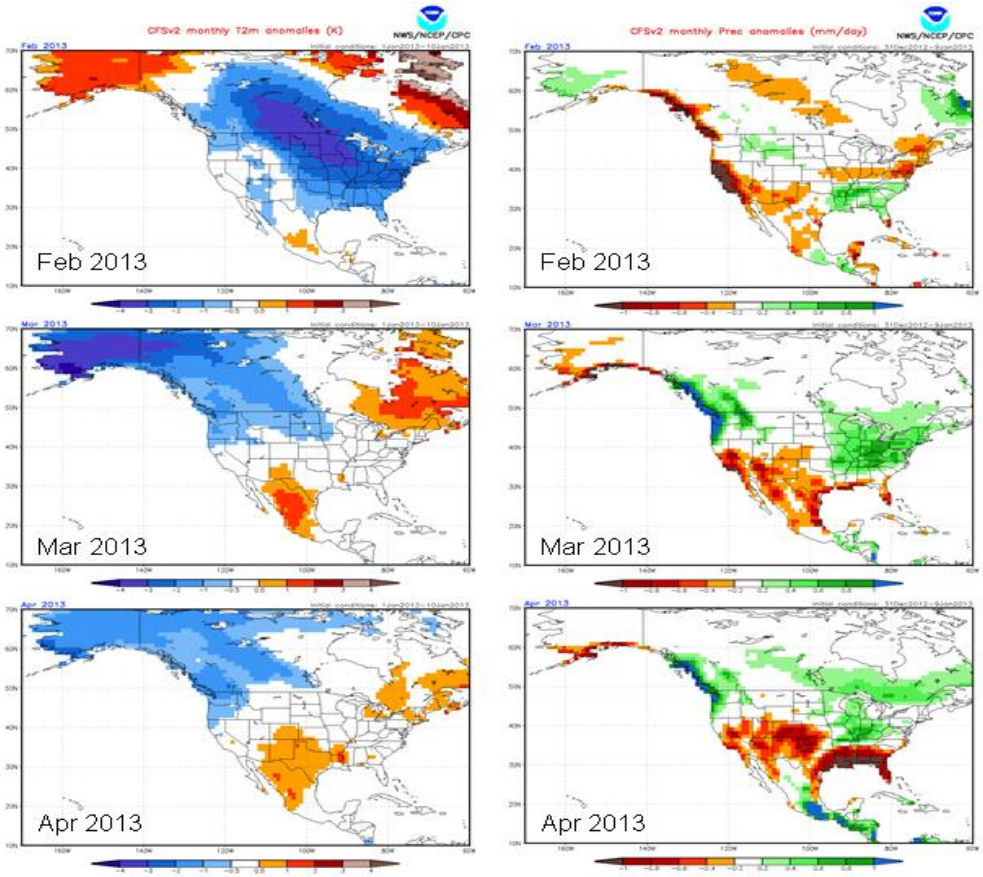

Figure 1: February through April temperature (left panel) and precipitation (right panel) forecasts from the National Centers for Environmental Prediction (NCEP) coupled forecast system model (CFS).

The North Pacific has remained in a cold phase similar to the last few years (cold PDO) while the Tropical Pacific has held its neutral state (some in the media call this La Nada). The Climate Prediction Center (CPC) is forecasting that "it is considered unlikely that an El Niño or La Niña will develop during the next several months, and ENSO-neutral is favored through Northern Hemisphere spring and early summer 2013."

Current CPC short term forecasts (6-10, 8-14, and 30 day) are calling for a greater likelihood of below normal temperatures and below normal precipitation through the end of February. Longer term forecasts through early spring (Feb-Apr) are showing the PNW to likely be near normal to slightly below normal for temperatures, with equal chance of slightly above to slightly below normal precipitation (Figure 1). California is forecast to have an equal chance of slightly above to slightly below normal temperatures, but more likely to have below normal precipitation.

The short to long term forecasts above are consistent with historical west coast climate data when the Pacific is showing cold PDO and ENSO-neutral conditions. These conditions historically bring a slightly cooler than normal spring with near normal precipitation for the western US.

Trunk Diseases (G. Balint)

A few growers in Southern Oregon showed concern on the increasing number of vines with canker symptoms. This article is a follow up of Melodie Putnam's (Director of Plant Clinic, OSU) webinar presented on January 30, 2013. Grapevine trunk diseases such as eutypa dieback, botryosphaeria canker and esca all contribute to grapevine decline, reducing productivity and longevity. This group of diseases causes considerable economic loss being estimated at $8.3 billion in Australia and $260 million in California.

An investigation of wood diseases in table grapes in the Coachella and San Joaquin Valleys of California showed that 94% of the vineyards had esca disease while 65% had botryosphaeria canker with at least 12 different fungal species isolated from symptomatic wood.

A survey for grapevine trunk diseases of French vineyards indicated that up to 83% of vineyards showed symptoms of esca and/or black dead arm while eutypa dieback was recorded in up to 53% of vineyards. It was estimated that around 11% of French vineyards are unproductive due to these three diseases.

So far, there is not any systematic study of these pathogens in Southern Oregon and the economic impact is not known.

Several species within the Botryosphaeriaceae (Crous *et al.* 2006) *Phomopsis* and *Phaeoacremonium* as well as *Phaeomoniella chlamydospora* and *Eutypa lata* have been shown to be part of a pathogen complex causing trunk diseases of grapevines (van Niekerk, 2008).

Eutypa dieback is caused by *Eutypa lata*, however some other species have been associated with this disease according to Gubler from UC Davies. Symptoms are characterized by stunted shoots with shortened internodes, and small, chlorotic, cupped, tattered leaves with marginal necrosis and dead interveinal tissue (Fig. 2). Foliar symptom expression is mainly detected during the spring. Most flowers dry before opening and berries that develop from an infected spur position usually appear small and straggly. After infection in the pruning wounds and colonization of the trunk vascular tissues and cordons, a brown, wedge-shaped necrosis usually develops. Pruning out such trunks and retraining trunks with new shoots is the only management option that can be exercised. If the cankers are not associated with shoot stunting, and yellow, tattered leaves distal to the canker, it's probably not eutypa.

Figure 2. Eutypa dieback symptoms during vegetation a) and trunk cross section b).

Eutypa spores are dispersed by wind and rain and their discharge is abundant in winter, decreasing with onset of spring. Systemic infection of vines can

occur when spores land on open pruning wounds. In either case, the resulting cankers always migrate from the point of infection downward towards the base of the vine. The diseased trunks can be replaced during dormant pruning if disease is apparent. Affected trunks must be cut well below the point of disease expression (6 inches or more) in order to eliminate the fungus from the vine.

Some studies indicated that pruning wounds made on grapevines early in the dormant season are more susceptible to *E. lata* infection and remain susceptible for a longer time in comparison with wounds made later in the dormant season, with wood age at time of pruning having no significant effect on wound susceptibility (Chapuis *et al.*, 1998). In France, the period of susceptibility declined from 7–9 weeks with mid-winter pruning, to only 1–2 weeks with late-winter pruning (Larignon and Dubos, 2000).

Esca disease complex commonly comprises five syndromes (Surico et al., 2008). Its main causal agents are *Phaeomoniella chlamydospora*, *Phaeoacremonium aleophilum*, *Fomitiporia mediterranea*, and *F. punctata*. A symptom that is often observed, especially on young esca-affected vines, is apoplexy (Fig. 3), which is characterized by the dieback of one or more shoots and is accompanied by leaf drop and the shriveling and drying of fruit clusters. Healthy leaves can dry up within a few days. Usually, this violent event occurs in midsummer, particularly when dry, hot weather follows rainfall.

Figure 3. Symptoms of esca on shoots and leaves of grapevines.

Pruning wounds are known as infection portals for all of these pathogens. Several studies have indicated that air-borne inoculum of these pathogens is present in vineyards for long periods of time, especially when weather conditions are favorable for spore release and dispersal and inoculum is therefore available for infection of susceptible wounds (van Niekerk *et al*., 2010a).

One study indicated a high level of pathogen incidence in the painted pruning wounds where a commercial pruning wound sealant was used in order to prevent natural infection. This suggests that treating pruning wounds with non-fungicidal paints or pruning wound sealants is not effective in preventing infection by trunk pathogens (Niekerk et al. 2011).

Botryosphaeria dieback has been proposed as the name to describe the wide range of different grapevine trunk disease symptoms such as leaf spots, fruit rots, shoot dieback, bud necrosis, vascular discoloration of the wood and perennial cankers associated with species of the Botryosphaeriaceae. Jose Ramon Urbez-Torres of Agriculture and Agri-Food Canada presented a review of research on the Botryosphaeriaceae species in grapevine over the past decade. This article could be found following this link http://www.fupress.net/index.php/pm/article/view/9316.

Twenty one different species are currently known from this family to occur on grapes and causing disease symptoms. Botryosphaeriaceae species move endophytically beyond the lesions which could have implications in the nursery industry since the young, symptomless canes may be infected.

Figure 4. Symptoms of bot canker (dead spurs, brown vascular tissue on cordon cross section and leaf) on grapevines

Genetic studies in California suggested that grapevines are more at risk from inoculum from other grapevine and fruit crops than from riparian areas or ornamentals like willows.

One study conducted in New Zealand showed that removal of inoculum sources such as mummified berries and infested vineyard cuttings and fungicide sprays may be required before bud burst to manage botryosphaeria dieback.

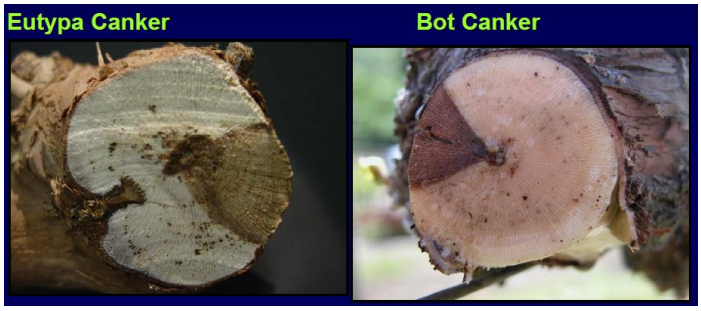

Figure 5. Cross sections through cordon infected with *Eutypa* sp. and Bot canker.

Francois Halleen of ARC Infruitec-Nietvoorbji in South Africa showed that sucker or spring wounds posed an entry port for several trunk disease pathogens in addition to *E. lata*, which has been demonstrated in the past. Wine grape cultivars had a higher pathogen incidence than table grape cultivars. The same researcher showed that insects such as ladybirds, ants, beetles, and earwigs can carry spores of trunk pathogens and they may infect pruning wounds, where they feed on bleeding sap.

Disease management

Vincent Dumot from the Bureau National Interprofessionnel du Cognac in France has been evaluating the long-term effects of different cultural practices on the development of eutypa dieback and esca diseases. The cane-pruned system resulted in less foliar symptoms of eutypa dieback but more dead plants than for cordon-pruned. Higher nitrogen inputs resulted in more severe foliar symptoms and greater plant mortality. Of the rootsocks, 41B showed fewer symptoms of eutypa dieback, but more symptoms of esca than the other rootstocks.

Eutypa and *Botryosphaeria* cannot be chemically eradicated. However, in order to reduce the frequency of infection by these pathogens some fungicides or painting solutions might be used prophylactically. In recent years myclobutanil (Rally 40 WP) and thiophanate methyl (1% Topsin M) have been registered in some regions, as a tank mix that can be sprayed on pruning wounds. These treatments are effective for only 2-3 weeks while pruning wounds remain susceptible for up to 6-8 weeks during the winter. The California researchers looked at other wound-protecting compounds and found that household detergents were effective, but most caused phytotoxicity in the vine during the subsequent growing season.

Double pruning provides 90-95% control of botryosphaeria and eutypa dieback based on decreased susceptibility during late winter and early spring in California. Recently a highly antagonistic strain of *Trichoderma viride* has been isolated from a grapevine pruning wound and is currently being developed into a biocontrol product. In another recent development, Vitiseal paste (certified organic product in California) sprayed onto wounds at a concentration of 10% acts as a physical barrier and has anti-fungal properties. Finally, spray application of lime sulphur during dormancy has resulted in a 75% reduction in fruiting bodies on bark of pathogens involved in botryoshphaeria dieback. Another sustainable practice is eliminating and burning pruning wood debris, which not many people are doing in our region.

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The Branch and Twig Borer and the Importance of Vineyard Sanitation (R.Hilton)

If you are looking for another reason to get rid of your prunings, feel free to add insect control to your list. Removing or thoroughly destroying your prunings is a crucial element in the management of the branch and twig borer, *Melalgus confertus*, a beetle in the Bostrichidae family which are commonly known as the powderpost beetles (Fig. 6).

Figure 6. Adult beetle (from UCIPM)

Some of the older literature on this beetle may refer to it as *Polycaon confertus*, for some reason this alternate name was often used when the beetle was a problem in fruit trees, where it can occasionally be a pest. However, it is in vineyards where this beetle seems to cause the most trouble. This beetle is distributed along the west coast and the larvae feed on dead hardwoods, including oaks, madrone, and manzanita. When a vineyard is next to wooded habitat, as is usually case in Southern Oregon, the beetle simply considers the vineyard as a potential food source.

The adult beetles feed in the bud axil or shoot crotch and this can result in the shoot flagging and wilting. Shoot flagging can have other causes, such as botrytis, but with the branch and twig borer there will be a tell tale feeding excavation at the base of the shoot, on more than one occasion I have found an adult beetle occupying the feeding cavity.

But the larval injury is usually the more serious problem (Fig. 7). The adult beetles will often lay their eggs in the spring by pruning wounds. The larvae mine and feed in the wood and there is a single generation per year. While the larvae generally feed on dead and dying hardwoods, a stressed and recently pruned grapevine can also be a suitable host. These larvae are usually discovered when pruning occurs in the winter.

Figure 7. Cane damage produced by larvae (from the Ken Gray collection at OSU)

The tunnels excavated by the larvae are packed with frass and debris. The larvae are whitish and "c" shaped and can get to about ½ inch long (Fig. 8). The adults are dark brown, cylindrical and also around ½ inch long.

Figure 8. Larva in wood (from UCIPM)

The damage from the larval feeding, if left unchecked and reinfestation occurs, can become extensive. When damaged wood is found it should be pruned out, removed from the vineyard and destroyed. The more decaying wood left in the vineyard, the more likely it becomes that the adult

beetles will venture from the surrounding habitat and investigate the vineyard as a possible dwelling place.

Small vineyards, nestled in the woods do benefit from an abundance of natural enemies and other biological control agents that reside in the native habitat and are thereby close at hand to combat potential pests. But in the case of *Melalgus confertus*, a woodland native that is a potential pest itself, the wooded habitat can serve as a source of trouble.

However, encouraging good vine vigor and removing prunings and other dead wood, such as nearby wood piles will generally deter this insect from taking up residence in the vineyard and becoming a problem. But when infestations do occur, the key is to locate them early and prune out the infected wood. Attempts to spray for the adult beetles when they are active in the spring have met with little success. So the best management plan for this pest is vigilance and good vineyard sanitation, particularly if the vineyard is next to a forested area. As always, if you suspect that you have a branch and twig borer problem or find individuals (adults or larvae) that you want to have positively identified, feel free to give me a call or drop the specimens off at the Research Center.

Spur vs. Cane Pruning (G. Balint)

Many questions came up in the last couple of weeks regarding what type of pruning should be used in Southern Oregon vineyards. Because of the cultivar diversity, clones and lack of research conducted in our region on this important cultural practice there is not strong evidence to endorse one or the other. However, some growers indicated that they use both types of pruning in their vineyards depending on variety. Many vineyard operations around the world use mainly one or the other pruning system in order to deal with cold hardiness issues. Moreover, nowdays the grape growers are looking to keep the cost per ton of grapes low in order to increase the farm profitability. By using mechanical pre-pruning up to $150 per acre/year can be saved. Only cordon training and spur pruning is recommended for this.

Advantages of cordons and spurs over cane-pruning include:

- ✓ elimination of labor involved with tying canes to trellis wire;
- ✓ ability to achieve more uniform shoot growth along a longer vine space distance. A cane laid out 3 or 4 feet often exhibits non-uniform shoot growth and vigorous shoots near the head and towards the distal end of the cane, but relatively poor shoot growth in the mid-cane region. This non-uniformity is not as obvious with cordon-training;
- ✓ ability to use double-pruning of spurs as a means of suppressing basal shoot development on the spurs and having a few days of frost injury avoidance;
- ✓ easy to prune vines using unskilled labor.

Advantages of head-training and cane-pruning, on the other hand, include:

- ✓ fewer pruning cuts per vine;
- ✓ better node fertility with varieties that have low fruitfulness of basal buds (e.g., Sauvignon blanc and Nebbiolo);
- ✓ less shoot thinning required with varieties that have propensity to push a lot of non-count or base buds (e.g., Cabernet Sauvignon);
- ✓ less pest pressure in some cases. For example, older wood of cordons and spurs can accommodate phomopsis cane and leaf spot inoculum, mealybugs, and European red mites;
- ✓ in high-vigor situations, the minimization of perennial wood is thought by some to be a management tool to help reduce vegetative growth of big vines, however, the evidence is not strong to support this statement.