University of California Cooperative Extension

VINE LINES
from fresno county

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WATERBERRY - 1982
1982 GRAPEVINE CERTIFIED NURSERY LIST
SUMMARY OF ETHEPHON ON GRAPES
RAISIN DAY AT C.S.U.F.

WATERBERRRY - 1982

"Waterberry" is widespread and serious this year. It is present in virtually every Thompson seedless vineyard and some show very serious effects, particularly in young Thompson table grape vineyards. It is showing up in other varieties, such as Flame Seedless and Fiesta, as well.

Symptoms

The symptoms began to appear fairly early this year with the onset of berry softening and ripening. Actually, the berries did not have much time to become "watery" this year. The bunch stem structure became brown and dried so fast that some of the berries just dropped off or began to shrivel and raisin immediately. This rapid shriveling and drying is often referred to as "bunch wilt" or "bunch stem die-back."

We began to note the earliest symptoms on July 12 during the berry softening stage. These early symptoms appeared on the capstems as small spots of darkening tissue. This small area became brown in natural Thompsons and dark brown to almost black in most table grapes.

Several or many capstems may be affected, mostly on the bottom of the cluster and the ends of the laterals. The symptoms may involve entire clusterettes, a portion of the main branching or even the entire cluster framework.

Sometimes many of the berries will become watery due to the gradual interuption of sugar and other constituents moving into the berries from the collapse and plugging of conductive tissue. The berries then become flaccid, shriveled, and raisined as the movement of water to the berry finally becomes restricted.

Conditions Associated With Waterberry

Waterberry is more prevalent in certain varieties, years, vineyard blocks, and areas within vineyards.

Certain years, such as 1982, produce some waterberry in all Thompson Seedless vineyards. Severe locations may show symptoms on 70 to 80% of the clusters in such years.

Hot weather is often blamed for waterberry. This is probably because the

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symptoms develop faster during the heat. However, close observation will often reveal symptoms developing before the hot weather. Actually, we tend to have more waterberry problems following cool periods just before or during fruit ripening. The unusually cool days and nights in the late June - early July this year may have influenced this year's waterberry.

In contrast, 1981 was an unusually hot weather and low waterberry year. We had above normal temperatures from mid-June to mid-September in 1981. There were only 11 days of normal to below normal daily average temperatures during that three-month period. Thus, we had very little waterberry in a year with hot weather before and throughout the ripening and waterberry induction period.

Waterberry is often blamed on too much crop or too much or too little irrigation. The condition is commonly referred to as nature's way of reducing excess crop. Actually, waterberry can be very serious in light-cropped vines such as well-thinned Thompson Seedless table grapes. It is also prevalent in hail and frost damaged, light-cropped vines this year.

The water excess or deficit ideas have not shown consistent patterns either; waterberry is found in moderately or heavily irrigated vines as well as in all soil types and irrigation methods.

Certain soil or distinct vine growth areas in vineyards are more susceptible. The tendency is for waterberry to be worse in the more vigorous areas. However, not all of these areas could be considered very vigorous, just more vigorous than the weaker, low-waterberry area.

Some growers experience much more waterberrry than their neighbors, even in adjoining, contiguous blocks. This implicates management as a contributing factor.

Theories on the Cause of Waterberry

The exact cause of waterberry is unknown. Apparently, no disease pathogen is involved. This has been verified by California and European plant pathologists. Thus, it is assumed to be a physiological disorder.

Numerous investigations have been pursued in waterberry or similarly described disorders, particularly by the Europeans. The two most widely discussed theories involve hormonal or nutrient imbalances.

To date, plant hormone or growth regulator treatments have shown no promise. We have evaluated a number of them, including gibberellin, and gotten no benefit. Vine nutrient imbalance theories have received the most attention in California and foreign work. This is especially true of possible calcium, magnesium, and potassium imbalances. However, we have found no relationship of these nutrients to waterberry in numerous field trials. These trials included massive soil applications, repeated foliar sprays, and even individual cluster dipping in solutions containing calcium, magnesium, or potassium. Thus the calcium treatment recommendations we occasionally hear about are of no value as far as we know.

Current Investigations and Results

Our most recent work now implicates nitrogen and possibly phosphorus in waterberry problems. This has come about through tissue analysis survey work, nutrient solution cluster dip studies, and fertilization trials.

We found that the leaf petioles in waterberry problem areas and the cluster stems of waterberry clusters have significantly higher total nitrogen and ammonium nitrogen levels than non-affected ones. We also found that we could increase waterberry by dipping clusters in ammonium

phosphate solutions. This led to the establishment of seven trials to see if nitrogen and phosphorus fertilizer practices could influence the incidence and severity of waterberry. This work is in progress.

Some of the trial locations now show increased waterberry from increased nitrogen or nitrogen plus phosphorus treatments. This verifies our suspicions that high nitrogen can contribute to a vineyard's susceptibility to waterberry. High phosphorus appears to be additive to high nitrogen in some vineyards.

At this point the exact role that nitrogen plays in the waterberry problem is not known. It doesn't appear to be just an effect of nitrogen on vine vigor, as waterberry symptom areas vary widely in vigor among one another. Other suggested relationships include possible direct ammonium toxicity to the tissues, greater phenol (tannins) production to phytotoxic levels, or temporary nutritional imbalances from the higher nitrogen. Unfortunately, this work does not provide a cure-all for waterberry as we would like. However, susceptible vineyards or soil locations within vineyards should be checked for nitrogen levels. We have demonstrated that waterberry problems can be reduced in some areas through lowered nitrogen levels. Keep this in mind when planning your fertilizer program next year.

In the meantime, we will keep you informed through "Vinelines" of the progress of our nine waterberrry trials this year. This includes seven fertilizer, one gibberellin, and one crop level trial.

1982 GRAPEVINE CERTIFIED NURSERY LIST

The State of California Department of Food and Agriculture has prepared an up-to-date list of nurseries participating in the grapevine registration and certification program. This list includes names and addresses, type and age of block, and kind of varieties and rootstocks grown. They are the direct sources of grapevine planting material certified as free of known viruses.