

Harvest

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*The following is an edited excerpt of a chapter from the fifth edition of **Oregon Viticulture**. Dr. Ed Hellman, viticulture extension specialist at Texas A&M University, edited this latest edition and has generously allowed me to share this material with you. The harvest chapter was co-authored by Ed and me when we were together in Oregon (I was a grower and Ed was the extension viticulturist). The harvest chapter is based on my own experience as a wine grower on Long Island and in Oregon. Not everything I write about is applicable to Pennsylvania but harvesting grapes share a lot in common no matter where grapes are grown. I would highly recommend **Oregon Viticulture** to grape growers of all experience levels. It is one of the most practical guides to grape growing that I know of. The book is published by Oregon State University Press.*

Harvest is the culmination of the entire year's effort, and it is by far the most intense, hectic, and often worrisome part of the season. The basic goal of harvest is deceptively simple: to deliver the grape crop to the winery. Satisfactory achievement of this goal, however, requires a coordinated logistical operation that can become quite complex for large vineyards. Careful advanced planning and preparation with attention to detail are absolute requirements. Perhaps above all is the need for preparation and flexibility to adapt to unplanned circumstances, especially bad weather. A well-executed harvest will deliver the grapes to the winery at their peak condition. But if harvest is poorly managed, it can diminish an otherwise high quality crop to a level of mediocrity.

This chapter will discuss the major considerations and activities involved with planning and carrying out a successful harvest. Most wine grapes in Oregon are harvested by hand, so this discussion does not address the unique concerns of machine harvesting. Harvest practices are very similar regardless of whether the vineyard is large or small; the main differences are in the number of pickers, equipment and supplies and delivery logistics.

Most people who get into the wine industry do not have any prior experience planning or executing a harvest. Some may have picked grapes but a good harvest is like a well-orchestrated play punctuated by some unforeseen surprises. There are no instruction books on how to harvest grapes. The best way is to participate and observe and ask questions of a grower with lots of experience.

The Vineyard

The vineyard is mostly done by veraison. Disease and pest control, canopy configuration, crop load, vineyard floor management are all pretty much set for the year. Either you got it done or you didn't. If you did, you put yourself in a position for a fine vintage and it will depend on the weather between now and harvest. But there are still things you can do in the vineyard such as:

- Minor crop adjustments, mainly removing pink berries, wings, or unripe clusters from red varieties, rotten one from reds and whites
- Last year someone told me that chipmunks were eating his grapes. What next? Keep birds, deer, raccoons, turkeys, bears, elk and other critters away from the vineyard. Don't ask me about the bear.
- We still do not know what to do about yellow jackets and wasps. Just try to not get stung. You may have to spray for them but check the PHI on any material you use.
- Fruit zone management is critical as the weather develops into harvest. If it gets cool and wet, more leaves might have to come off. Keep clusters separated to reduce fruit rots. Temperature in the fruit zone is critical for developing flavor and color. Opening the fruit zone makes picking go faster.
- Weeds – pickers hate picking with weeds in their faces. Knock the big ones down.
- If it rains and downy and/or powdery breaks out it may be necessary to spray again (watch your PHI). Set up nets to allow tractor access. Keep an eye (and nose) on late season rots including botrytis and sour rots. Pay close attention to the label and pre-harvest intervals.

Harvest Forecasting

It is impossible to accurately predict exact harvest dates at the beginning of the season; too many variables influence the rate of fruit ripening. However, with experience and good record keeping, it is possible to make reasonably accurate projections as the season progresses. At a minimum, the dates of major phenological (developmental) stages, such as budburst, bloom, etc., along with harvested yield and fruit quality parameters should be recorded for each block. Accompanying local weather records and degree-day accumulations will facilitate year-to-year comparisons.

Forecasting grape maturity (and weather) gets serious after veraison. Cluster sampling to monitor fruit ripening (See Chapter 33 Evaluation of Fruit Maturity) should begin about 3 to 4 weeks after veraison. The subsequent frequency of sampling will depend upon proximity to the desired ripeness and the rate of fruit ripening, which is greatly influenced by weather.

The weather: good growers develop multiple sources of weather information. This is critical in our region which can be impacted by severe storms from hurricanes to hail. Low pressure systems can be just as dangerous and even more unpredictable than a hurricane if they stall so be prepared when one approaches. Getting a great grape can be a matter of hours in coming off the vine or hanging on until after a dilution period has passed. Understanding the patterns of weather is critical knowledge mostly gained by experience but every year is different and you need to have access to reliable forecasting information. There are tremendous weather/climate resources on the internet. But don't ignore the evening news. The key to successful ripe fruit is knowing when you have reached the point when there is nothing to gain and it's time to pick.

Frost can stop a vintage in its tracks and growers should always have a plan for varying severity of frost in the vineyard and if it hits early, mid or late into the harvest. In most cases, the grapes should be removed as soon as possible after a frost event. Growers should be aware of passive and active measures to mitigate the effects of frost and consider the value of the crop in the field against the costs of implementing these measures.

Finally, let's be very clear on the viticultural objectives for fine wine production: fully mature and clean grapes delivered to the winery. It is all about the grapes. Mother Nature will have her say in it and you will adjust to her demands. But make your own demands on the vines, your team and yourself to achieve these goals.

Coordination between Vineyard and Winery

The basis for a successful harvest is good communication and cooperation between vineyard and winery. To minimize misunderstandings and potential conflict, it is highly recommended that the vineyard and winery enter into a grape purchase contract that details the responsibilities and performance of both parties. A properly constructed contract should include several performance and quality items that relate to harvest activities and delivery of the fruit. See Chapter 18 Marketing and Contracts, for a more complete discussion of grape purchase contracts. Now is a good time to review your grape contracts. If you have not yet negotiated contracts, it's not too late to do so.

The logistics for fruit delivery should be discussed with the winery at an early stage in the business relationship. It is very helpful for the grower to visit the winery and see firsthand the receiving and processing areas and equipment. Some of the issues that should be addressed are the ability of the winery to handle the size of truck or trailer that the vineyard intends to use. The winery's preference, if any, or ability to handle certain fruit containers (variously sized bins and boxes) is an important issue. It is also important to learn the winery's fruit processing rate, the hours of operation for the crushing crew, and the turnaround time for emptying fruit containers. The combination of these factors determines the amount of fruit that can be harvested and delivered in a day.

As the season progresses, winemakers commonly visit the vineyard one or more times to monitor crop development. These can be important times to review the expectations of both parties so there won't be any big surprises at harvest. There should be a very clear understanding between wine maker and grower (even if both are the same person) about what exactly are the maturity parameters (brix, acid, pH, flavor, skin and seed tannins, juice and skin color, shriveling, skin texture, etc) that determine harvest and who has control of the command to

begin the harvest. The winery probably has stylistic goals for the grapes and so they understand the best what they need from the fruit. In the case of the independent vineyard, the winery should be intimately involved in any decision to pick, if not the one to make the decision. During the later stages of ripening, fruit maturity parameters should be monitored and the results communicated to the winery in a timely manner. It is strongly suggested that the grower and winemaker walk the vineyard together to taste and critique the crop. Understanding phenolic profiles of skins and seeds, flavor development, the appearance of stems, the feel of the grape skin and color are all indicators of grape maturation. Disease, predation and other late season problems that may impact wine quality can also be assessed and, if possible, treated. The projected harvest time can be fine-tuned based on periodic fruit sampling, and the vineyard and winery can agree on a tentative harvest schedule. A winery should allow at least 1-2 days of advance notice to the vineyard that the grapes need to be harvested and delivered. As harvest time gets closer, frequent communications with the winery become more important. Often, the winery must coordinate fruit delivery from several different vineyards with their processing and fermenter capacities.

Sampling. In order to make high quality wines a winemaker needs fully ripe and fault-free grapes. Your grape protection program throughout the growing seasons assures the latter. The former, in any cool-warm climate, may be difficult to achieve. Accurate and regular grape sampling is a way of collecting data points of fruit progress between veraison and harvest. New growers will often collect many data points (e.g. starting at 15-17 brix) while more experienced growers will use their intuition (e.g. 7-10 days before harvest) to guide their sampling. There are many ways to sample grapes. I prefer a random cluster sample taken at the same time of the day, usually in the early afternoon after the clusters have fully dried from morning dew. 20-30 randomly selected clusters per acre from every part of the vine should be collected then crushed. At minimum, brix, pH, and titratable acidity should be recorded. Red wine samples should be left on the skins, covered and allowed to soak overnight then analyzed for a shift in brix and pH. Sensory evaluation should accompany statistical analysis and careful notes should be taken according to juice aroma and flavor characteristics.

Harvest Preparations. Preparations for the current harvest should begin immediately following the previous year's harvest. A systematic review of the operation will identify the areas of planning and execution that need improvement, and these should be noted in a vineyard record book. Plans should be made to purchase or replace harvest-related supplies, materials, and equipment. Winery and labor contracts should be reviewed and modified where necessary.

Preparing the vines is well worth the effort in advance. Flawed berries/clusters should be removed prior to harvest to the greatest extent possible, making it faster and easier to harvest. This is an absolute requirement if grapes are machine harvested. Weeds, especially those growing into the fruit zone, should be trimmed back for easier access. If the fruit zone is covered by a dense layer of foliage then leave should be removed but be aware of the potential for sunburn.

As harvest approaches, monitoring of fruit quality and sampling continues. Late season problems such as outbreaks of downy mildew, sour rots, botrytis, yellow jackets, wasps, deer browsing, hail, raccoons, turkeys and even chipmunks must be ongoing. It's all a major headache but you have gotten the fruit this far, why lose it now. With anything applied to the grapes or vines, check the PHI (pre-harvest interval) on the label. Needless to say, bird nets and scare devices should be in place by now.

Throughout preparations you should be asking yourself, "what if it rains?"

Field conditions are a very important part of harvest and in the East they are often less than ideal. If the fields are dry, everything is easier, operations run smoother and at a quick pace and everyone from wine makers to harvest crews are in a good mood. If the weather sours so does everything else. In wet vintages everything takes longer and is more dangerous. You have to be ready to compensate for less than ideal conditions in amounts of time and effort to get a job done. It will take longer to pick, longer to load and longer to deliver. It's slippery and dangerous. Mud will become the dominant feature of the harvest and will have to be dealt with on bins, equipment, boots, etc. Water in bins with grapes is a no-no. Grapes will already be diluted but if a macrobin has a few inches of water in the bottom and is dumped in a press or fermenter, there goes the sugar reading. Cover bins immediately after they are filled.

Safety

Harvest is almost always a state of controlled chaos. There is a lot of equipment and people working near to each other, people are usually rushing or excited or tired, conditions may not be ideal – wet, cold, dark or otherwise, all of these can contribute to an accident. Safety doesn't just happen. It has to be part of a plan and everyone has to participate in it. It is YOUR responsibility to create and conduct a safe workplace. Safety should be the first item on the agenda each morning. Safety training sessions should be held for all workers. Proper first aid and emergency contact information should always be readily available. Think about the accidents that may occur: bee stings, cuts from picking tools, headaches, are among the most common. But there can be worse and you need to be prepared to respond.

Never compromise on safety. Design it into your operations and make it an integral part of everyday activities and get everyone involved. An accident is one sure way to ruin a vintage. T

Note: if conditions are wet, frosty or less than ideal extra precautions must be taken in the field.

Equipment

Equipment supply and service issues should be addressed well before harvest begins. Proper maintenance is critical to the smooth flow of harvest; an equipment failure on harvest day can bring the entire operation to a standstill. Perform a thorough check of all equipment and vehicles that will be involved with harvest including trucks, tractors, fork lifts, trailers, pick-ups, and 4-wheelers. Check all belts, fluids, lubrication, and air pressure. Properly licensed and trained drivers should be identified for all vehicles. Be sure that all vehicles are filled up with fuel at the start of each day, and maintain an adequate fuel supply at the vineyard.

Trucks and Trailers. The typical large-equipment needs for harvest include flatbed trucks or trailer-trucks to transport harvest bins to the winery. Since these trucks are typically only used at harvest time, rental trucks are usually the best option for nearby winery deliveries. Commercial truck haulers are often more appropriate for delivery to more distant wineries. Trucks of the proper size should be selected to fit your needs for delivery to the wineries. A 24-foot flatbed truck with a minimum of 33,000 GVW (gross vehicle weight) can carry up to 24 large harvest bins (4X4X2), double-stacked, which is about 8 to 10 tons of fruit. Trucks should come equipped with a minimum of six 2-inch straps, preferably with ratchet STRAPS, to secure the bins to the trailer. The proper use of straps is critical to ensure load safety and security. This applies to ropes as well. Learn to tie a trucker's knot to achieve maximum tautness of tie down ropes.

Be sure to reserve trucks with the rental agencies or services with a commercial carrier at least six weeks prior to harvest, and follow-up to confirm reservations as harvest time gets close. Rental trucks should be picked up a few days before the anticipated start of harvest to ensure availability and to give drivers time to familiarize themselves with the vehicle.

Each truck should be supplied daily with the materials the driver will need, including: adequate cash to pay for weight scales and the driver's lunch, maps, rags for wiping windows, gloves and a list of weight scales. All drivers must have a Farm Endorsement on their driver's license. A farm endorsement allows approved drivers to operate CDL equipment within a 250 mile radius of their farm without a CDL license. A tare weight on each truck should be obtained at a licensed scale, with the truck completely empty.

Additional trailers, preferably tilt-type, are pulled by tractors to shuttle bins back and forth from the picking area and the truck staging area. These trailers typically hold from two to four 4x4 grape bins, which enable them to be pulled through vineyard headlands or even down wider rows.

Safe and timely delivery of fruit is so important to a successful harvest and making good wine. During harvest, I spent about 50% or more of my time delivering grapes and picking up empty bins. It is a critical logistical component to the harvest.

Pickups. A pickup truck is commonly the vineyard manager's mobile office so it contains the harvest record books, picking tickets, ticket/punch card pouches, a scale to check picking bucket weights.

Pickups also serve as portable supply depots, and should be outfitted with a first aid kit, rubber gloves, drinking water and cups, soap and water for hand cleaning, paper towels, toolbox with necessary tools for equipment repair, sharpening stones, extra picking buckets and picking shears, and other miscellaneous items as described below.

Tractors. Tractors with forklift attachments are used to move and load bins onto trailers. They may also be used to pull smaller trailers for transportation of bins or boxes within the vineyard. Forks should be installed on tractors before harvest; be sure to lubricate and test for proper operation. It is also a good idea to supply each tractor with a small first aid kit, a jug of drinking water, towels, WD-40 or similar lubricant, shears, and a bucket for the driver to pick while waiting. Prior to harvest, tractor drivers should practice loading bins and other operating skills such as turning and backing up with trailers. Safe operating procedures should be reviewed, especially braking and turning on hills and moving with people in the rows.

Other Vehicles. A multi-passenger van or small bus may be needed to transport a picking crew within a large vineyard. 4-wheelers are very handy throughout the year, and can be particularly useful for quick transportation of winemakers into the field, grape sampling, bird patrol, checking harvest crews, and getting to and from the office.

Supplies and Materials

Harvest requires many different materials and supplies that may not be used at other times of the year. The required number of each item will depend on the size of the harvest and size of the crew.

Bins and Boxes. Harvest bins are constructed of wood or food-grade plastic and are available in several sizes. The most common sizes used in vineyards are (L:W:H dimensions in feet): 4:4:2 (capacity: 900 lb); 4:4:1.5 (675 lb); 4:4:1 (450 lb). Plastic liners are available for wooden bins, and they make cleaning bins much easier. One-piece molded plastic bins have lower maintenance costs than wooden bins and are also easy to clean. Some wineries prefer that grapes, particularly Pinot noir, be delivered in smaller containers to minimize fruit breakage during harvest and transportation. These boxes (also called totes or FYBs) are plastic, stackable, and have ventilation and drainage holes. They come in different dimensions and capacity, but commonly hold up to 30-40 pounds of grapes. These boxes require a different set of harvest logistics and are generally more complicated and time consuming to use. Often, a surcharge will be imposed by the vineyard to cover the additional expense. In some cases wineries supply the containers in which they want the grapes to be delivered. Arrangements should be made to pick them up before harvest. Remember: the winery must have a system to move grapes from the bins you use into their processing stream. This requires careful coordination between the winery and vineyard. The worst case scenario is having to pitch-fork grapes from a bin into the destemmer. This is slow and ruins the fruit.

All bins should be cleaned before and after harvest. Wooden bins often require maintenance to repair loose brackets and to replace bad wood or plastic liners. It is a good idea to have extra rivets and nails on hand for quick repairs during harvest.

Bins need to be labeled with the vineyard name/logo so they can be identified no matter how they are stacked.

A vineyard must have enough bins on hand to complete, at minimum, the day's planned harvest. Before the harvest season begins, figure out how many bins will be needed based on the projected size of the harvest, deliveries and turn around time at the wineries. Harvest should not be determined by bin availability.

Picking Containers. Fruit is picked into small containers such as 5-gallon buckets (food grade plastic), then transferred into larger bins for transport to the winery. Buckets should have drainage holes drilled into the bottoms. Commonly, enough buckets are kept on hand to supply two buckets per picker, with some extras for replacement or in case the pickers have to wait to dump their fruit into bins. Alternatively, smaller boxes or totes can be used as both the picking and transporting container. Picking buckets or boxes should be cleaned at the end of each day. Wood bins should be stored indoors or under tarps when not in use.

Picking Shears. Picking crews sometimes have a preference for a certain type of picking shear. This should be discussed with the crew leader or labor contractor prior to harvest. Shears should be oiled and sharpened before harvest and periodically thereafter. Sharpening stones and a good cleaner/lubricant such as WD-40 should be kept on hand throughout harvest. Knives damage delicate pinot noir clusters and are not recommended.

Picking Tickets. Every grower must have a method of compensating the grape harvesters. The easiest way is to pay by the hour. However, many vineyards pay by the pound or bucket. This involves the use of tickets or punch cards to monitor the number of picking units that each harvester has accumulated on each picking day. Typically, a monitor stands by the grape bins and hands a picker a ticket for each bucket dumped. At the end of the day, pickers count and report their total tickets or holes punched. A random check of a picker's count will assure accuracy and honesty. Ideally, the total weight of the recorded tickets will match the tare weight of the delivery for that load of grapes. Experience indicates that the tare will usually be exceeded by ticket totals. This is why it is essential that qc monitors in the field insist that buckets be completely full before they are dumped.

Fruit Maturity Monitoring. The vineyard should have all of its own equipment and supplies to monitor fruit maturity. This should include, at minimum, a hand-held refractometer, a pH meter with accompanying buffers for calibration, and a titration apparatus. All equipment should be calibrated before harvest and pH meters should be recalibrated daily.

Health Items. Several health-related items are required by federal law to be provided for all workers, including portable toilets, washing facilities and drinking water. First Aid kits should be readily accessible, and well-stocked with bandages of various sizes, antiseptic, aspirin, and medicines for bee-stings and poison ivy.

Phones and Radios. Frequent communications among key personnel is critically important for a smooth harvest operation, but often these people are spread out in different locations. A cell phone is indispensable for the vineyard manager, who must stay in close contact with the wineries and truck drivers, weather forecasts, as well as vineyard personnel. Thus it is very helpful to have cell phones for all key personnel including the vineyard crew supervisor and truck drivers. Radios can be used for shorter within-vineyard communications.

Miscellaneous. Numerous assorted items will also be necessary or useful for harvest including: trash cans, rags or paper towels, tarps and rope for rainy days, soap and brushes for cleaning buckets and other materials and equipment.

Picking Crew

An experienced picking crew can make or break a harvest. If you have pickers who can follow instructions and sort the good from the bad grapes this can have a huge impact on wine quality particularly in a marginal vintage. Try to use the same pickers each year who know what you want and know your vineyard.

As a rule, friends and family do not make good grape pickers. Working for pizza is not a professional way to conduct a harvest. Even worse is setting a harvest date in advance according to when they are available. Grapes should be harvested when they are ripe, not when labor is available to pick them.

The size of the picking crew depends upon the amount of fruit that will be picked in a given day. This of course is determined in conjunction with the winery and depends upon its receiving and processing capacity for the day. The number of needed pickers can be estimated by dividing the day's planned harvest quantity by the average amount picked per worker in a day. Picking rates can vary considerably among individuals, and are influenced by picker experience, the accessibility of fruit clusters, condition of fruit (amount of green or diseased), and cluster size. Regardless of the picking crew size, adequate supervisory personnel is required to keep harvest progressing at the desired rate and to ensure quality control of the picked fruit. A typical, relatively large picking crew might consist of a crew chief, two tractor drivers, four quality control monitors/ticket distributors, and 20-25 pickers.

Small vineyards may be able to find pickers through friends, neighboring vineyards, or a local temporary employment office. Requirements for larger crews are usually met by making arrangements with a licensed labor contractor. A current list of licensed contractors may be available from the Bureau of Labor and Industries. Or, ask your neighbor for recommendations.

Labor contractors supply the picking crew and bear the burden of all government forms and other employer-required paperwork. However, it is very important to understand that the grower has the ultimate responsibility for proper payment to the picking crew. Therefore, the grower should carefully inspect the contractor's paperwork,

including the license, required bond, worker's compensation coverage and, if transportation is provided to the crew, a current certificate of vehicle inspection. A contract should always be executed between the grower and the labor contractor, and it is recommended that a lawyer be consulted to prepare an appropriate contract. The outline below itemizes some of the major responsibilities and provisions related to harvest that should be included in a contract between the vineyard and a labor contractor.

Contractor's Responsibilities and Provisions:

1. Insure that the pickers meet all State and Federal requirements.
2. Supply the requested number of pickers for specific times and dates.
3. Provide each picker with grape harvest shears. (can be a grower responsibility)
4. Restrict his personnel in the vineyard only to workers.
5. Contractor, or a designated representative, is personally present with the pickers during harvest operations.
6. Pay the pickers and supply vineyard with a complete list of pickers names prior to receiving payment.
7. Monitor quality and completeness of picking; if unsatisfactory, a penalty will be deducted from the total payment.
8. Coordinate and control distribution of pickers among rows consistent with the harvest methods of Grower.
9. "Hold Harmless" the vineyard from any act or accident while employees are on vineyard property.
10. Keep to an absolute minimum, inclusion of leaves and material other than grapes.

Grower's Responsibilities and Provisions:

1. Supply picking receptacles.
2. Operate trucks, tractors and trailers in an efficient manner to minimize delays for the harvest crew.
3. Assist pickers in emptying containers into bins or other receptacles and sort the picked grapes for quality.
4. Supply the crew with drinking water, toilet and washing facilities as required by Oregon Agricultural Code.
5. Pay contractor at specified rate.
6. Copies of weight receipts or other weight records will be available on request to Contractor.
7. Payment to contractor will be within specified number of days after completion of harvest.
8. Payment will be based upon the weight receipts from grapes delivered to wineries.

It is critical to have an experienced vineyard foreman or manager monitor the work of the pickers throughout the day to make sure they are picking correctly and thoroughly. Do not just send them out into the field and go back to the house. Care about what ends up in the bins.

Pickers expect to be paid on time, whether it is at the end of each day or week. Harvest labor is typically the biggest annual operating expense for a vineyard. Be prepared for this large outflow of cash. It is important to budget the harvest according to your crop estimates and make sure that funds are available to cover all harvest costs. Remember, the worse the weather the higher almost all harvest costs will be.

Documentation. If you are supplying your own labor, you need to be sure you obtain the proper documentation from your workers. The day before picking is to begin (do not do it on the first day of picking, as the crew is too anxious to get started), fill out i-9s for all new workers, collect and photocopy all the necessary documents from your workers – I-551 cards and social security cards. Explain exactly how, how much and when they will be paid. Explain all harvest and safety procedures in detail. Be sure they know who their supervisors are. Have all of your proper documents posted. Be aware of possible spot checks by INS, DOL or BOLI.

Safety. This cannot possibly be emphasized enough. One serious accident can put a permanent blemish on a harvest, not to mention be very costly. Safety at all levels, from equipment operators to pickers must be stressed every day. Anticipate dangerous situations. Remain in compliance with all WPS, FSLA and other federal and state regulations. The safety of your crew should be a paramount concern. Planning, organization, discipline and

control all help to reduce the possibility of an accident. Be especially careful when conditions are wet and people, bins, vehicles, etc. tend to slip and slide.

Field Operations

The day before harvest, all equipment should be moved into the field and staged in the proper locations. Bins should be placed in the blocks to be picked. All supplies and materials should be available in adequate numbers and in proper operating condition.

Harvest usually begins early, at first light. Each day of harvest, the crew should receive picking instructions, including reminders to thoroughly pick each vine and to pick up any dropped fruit. Picking buckets or boxes must be completely full if the contract calls for piecework payment. Emphasize avoidance of picking green second crop, unripe and/or diseased fruit and to keep leaves and other foreign material out of the grapes. Safety precautions and reporting procedures should be emphasized and reviewed daily.

The design and size of a vineyard influences the harvest procedure, particularly the handling of bins or boxes. One common method is to load a small tilt-trailer with two bins and move it through the vineyard, staying in close proximity to the picking crew. Pickers dump their full buckets into the bins, collect a receipt for each bucket, and resume picking. When the bins are full, they are transported to a central truck staging area and deposited close to the truck. Another tractor with front forks loads the bins on to the delivery truck. A second tractor and trailer, operating behind the first, keeps harvest progressing by providing empty bins for the pickers. Meanwhile, the first tractor and trailer reloads with empty bins and returns to the picking site. Many modifications of this method are possible, but the objectives are to position the bins as close as possible to the crew, to always have empty bins in position for the pickers, (they dislike waiting), and to quickly transport and load full bins on to the delivery truck.

Quality Control. A key aspect influencing the quality of grapes delivered to the winery are the sorting practices used during harvest. Sorting may be the single most influential quality practice you perform during the harvest. There are various control points in the harvest and delivery process where QC can be done. Sorting can take place at two points in the field – on the vine and at the grape bins. Pickers should be carefully instructed on what not to pick. Clear examples should be shown, not just explained. In this case, a picture is really worth a thousand words. At collection points where lugs or buckets are dumped into larger bins, careful sorting can be done. A winery really interested in quality will sort on the press pad, often before and after the destemmer. In regions like ours where rain and damaged fruit can be a problem, sorting is the single most effective way to insure quality in an imperfect vintage. In addition to removal of green or underripe fruit, clusters are closely examined for diseases. Most wineries have very low tolerance for powdery mildew infected fruit. Clusters with botrytis bunch rot may be trimmed to remove the damaged fruit, or discarded whole. There is often some level of tolerance for botrytis in white winegrapes, but essentially zero tolerance for red grapes. Any foreign material included with the harvested grapes is generically referred to as MOG (material other than grapes). Commonly this includes grape leaves and canes, but paper, cans and other trash can make their way into picking bins without diligent quality control procedures and supervisory personnel. Grape harvest contracts commonly emphasize that MOG should be minimized and may provide for a penalty if a specified percentage is exceeded.

Time of day that picking occurs can affect wine quality. Most growers prefer to start early in the morning and deliver grapes in the afternoon. However, morning dew can have significantly reduce sugar levels. Picking should commence once fruit has had a chance to dry. If rain is a threat, bins should be stored indoors or covered.

Record Keeping. The vineyard manager should record all pertinent harvest data, including the vineyard block number or name, the row numbers that were picked, the quantity of fruit picked, number of bins, fruit quality parameters, and the name of the purchasing winery. Also record the number of workers and the number of hours worked. Additional observations on the vineyard, the fruit, or the harvesting process should be recorded for future reference. Yield per acre is important data, as are harvest cluster weights that will help verify crop yield sampling accuracy.

Delivery. Picking should end early enough to leave ample time for delivery of grapes. Typically, a harvest day may end by noon or early afternoon. The driver should be with the truck when it's loaded and perform a safety

walk around, paying special attention to the security of the load and the estimated weight. Do not overload a truck! Prior to departure, call the winery to let them know the truck is leaving and give an ETA and load size. Find out if there is any hang up at the crush pad. Be sure the driver has all proper directions and maps (a GPS device would be best). When the truck returns, it should be hosed off and staged at the point of loading for the next picking session. Most importantly the driver must weigh the load and keep the weight ticket. Do not give the ticket to the winery. This is the same as cash, it must be kept for the vineyards records and billing purposes.

If it is the vineyard's bins that are used to deliver grapes then the vineyard must pick up the empty bins to be used again. Keep track of the location and number of bins and retrieve them from the wineries as soon as possible so they are available again for harvest. There must always be enough bins to accommodate the next harvest day. It is important to plan for time to pick up empty bins. Often, vineyards will pick for 2 days with a day in-between to collect bins for the next picking date.

Clean-up and Preparations for Next Harvest Day. After each day of harvest, buckets should be rinsed and picking shears should be cleaned, oiled and sharpened. Tractors and trailers should be hosed off. Preparations for the next picking should be made by refueling vehicles, loading empty bins on to trailers, and staging all equipment in its proper location. Move portable toilets to the new field to avoid long walks (down time). All consumable supplies should be replenished. Grape sampling should continue to monitor ripeness and forecast harvest dates. **Threats.** There are plenty of intangibles and unpredictable events associated with harvest, e.g. the crew gets 2 cents a pound more to pick at the neighbor's vineyard so they just don't show up one morning, equipment breakdowns, hurricanes and frost, INS shows up and asks to review all worker documentation, wine makers are going berserk, disease, bees, birds, raccoons, turkeys etc. You cannot let your guard down for a minute. Always be prepared for a wet harvest and be thankful if you get a dry one. Everything is slower, less easy and comfortable and more expensive if it's raining. Safety becomes a big issue on slick roads, fields and surfaces so be extra careful. Ironically, wet vintages cost the most and return the least. It's agriculture. Do not lose track of the birds and other animals competing for your fruit. Even though you are in the midst of harvest you still have to protect the grapes every day. Analyze the threat situation before harvest and have a plan to deal with each one.

Wrap Up and Recovery. At the completion of harvest for the year, all equipment and tools should be cleaned and stored. Grape trailers should be placed on blocks. Rented trucks and other equipment should be cleaned and returned. Get invoices out to the wineries. Start planning a long, well-deserved vacation. Remember to visit the wineries in the winter or spring to taste wines made from your grapes! Talk to the wine maker about what went right and wrong during the harvest and how you can improve next year.

Winemakers: Here's a suggestion... if you were pleased with the grapes you received make sure you give wine to your growers. If you do, they will be grateful and will work extra hard to deliver good grapes to you in future vintages. It's a good way to educate them about your wine style, methods and goals. It's just a gracious thing to do

Good luck and try to have fun. If you have questions, ask. Experienced grape growers usually have all the answers. Remember safety always comes first!

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