FINGER LAKES VINEYARD NOTES

NEWSLETTER NO. 6 **June 8, 2000**

IN THIS ISSUE...

CURRENT SITUATION

Timothy E. Martinson

After starting with a bang (85° temperatures brought vines from bud swell to 3 inch shoot growth over one weekend), cool rainy weather has slowed vine development. As a result, we are still at least 7 – 10 days away from 50% bloom on 'Concord' grapes. Historical data from Fredonia (available through their web site at: http://lenewa.netsync.net/public/PhenDate.htm) show a range for bloom of 510 to 640 degree-days, with an average of 580 dd. We are currently at around 400 dd (today is 6/6/00), and accumulate an average of 11 degree days per day – suggesting at least 11 to 14 days until 50% bloom, or 8-11 days until 'trace bloom' in Concords.

Cool temperatures mean slow disease development, but significant amounts of rainfall mean ample 'infection periods' for many diseases. With the extended time at 10 inch (more or less) shoot growth, many may be nearing the end of the recommended spray interval, but 'too early' for the immediate prebloom spray. The conservative approach in this case would be to 'add' another spray before prebloom – the low cost option being sulfur or an SI fungicide such as rubigan for powdery, plus captan or mancozeb for downy on susceptible varieties. Don't get too hung up on exact timing, however. While its nice to apply the prebloom spray at trace bloom, the important thing is to have adequate coverage from bloom through 3-4 weeks post-bloom.

In looking at area vineyards, I am seeing various degrees of ragged, split and distorted leaves, sometimes accompanied by apparently uneven flower cluster development. While some of the 'ragged leaf' symptoms are the result of hailstorms centered around Penn Yan, in other vineyards leaves appear somewhat mottled, puckered, and distorted. These symptoms are sometimes associated with mild cold injury, generally during bud swell.

While it may be too early to think about postbloom sprays, Wayne Wilcox mentions elsewhere in this newsletter that growers of botrytis-sensitive varieties may benefit from a botryticide application between bloom and bunch closure, when latent infections (that are dormant then develop later in the season) start. Choices include Vanguard, Rovral, and Elevate (recently registered in NY).

Finally, I recommend that you consult either the e-mail or Code-a-phone updates available from our office for up-to-date information on pest management, vine development, and cultural practices. It is updated twice weekly on Mondays and Thursdays. The Code-a-Phone number is **315-536-5549.** If you have access to e-mail and want to be put on the e-mail list, please send me a message at ***tem2@cornell.edu*** via e-mail or call our office to be added to the list.

TRAINING SYSTEMS FOR NEW YORK *VITIS VINIFERA* VINEYARDS

Bob Pool

Department of Horticultural Sciences
Cornell University, Geneva

Ed. Note: This is the first of a two part series. In this article Bob Pool explains some of the principles behind current training systems, and their advantages and disadvantages in the NY environment. Next

month, I will cover all the seasonal activities involved in canopy management using these systems. TEM

We've been growing grapevines in the Finger Lakes for more than 150 years. Concord, Catawba and *Vitis vinifera* are all grapevines. Why treat Chardonnay or Cabernet Sauvignon differently than Concord? Seems like a reasonable question; a list of the important differences between the native grapes and *vinifera* also highlights factors that need to be considered in *vinifera* vineyard design.

Trunk and bud cold hardiness. Winter cold injury is rare in our native grapes. Bud and trunk cold injury can be all too common with *vinifera.*

Disease. Native grapes are not immune to the common fungal diseases, but *vinifera* varieties are highly sensitive. Cultural practices should be selected that minimize disease infection and spread and which maximize spray coverage.

Fruit quality. Quality standards vary. Buyers of native and bulk wine varieties generally require only that grapes attain minimum maturity (brix) level. Additional quality attributes (varietal flavors, uniform maturity) influenced by training and fruit exposure are increasingly required by buyers of *vinifera* grapes. We expect high prices for *vinifera*, but only the highest quality fruit will command the highest prices.

Vigor. Native varieties are usually own rooted, and the fact that they are still grown indicates some level of tolerance to our soil conditions, but they were not selected for optimal tolerance. High yield is the primary objective for native grape production, and often vine size is traded for yield. *Vinifera* are grown on rootstocks specially selected for high tolerance to our soil problems. This results in a larger, healthier root system. Because of the need to avoid overcroping, and because yield may be further reduced by cold injury, *vinifera* vineyards typically have excessively large rather than undesirably small vine size.

Growth habit. Native varieties have a procumbent, trailing growth habit; they generally benefit from high training. *Vinifera* varieties have semi-erect to erect growth habits. Low or medium training systems are most appropriate.

The free versus shoot positioned canopy. With the exception of GDC trained vines, shoot positioning is rarely done to our native varieties. Neither are the majority of the world's *vinifera* vineyards shoot positioned, but many *vinifera* vineyards in New York and elsewhere are now trained to a vertically shoot positioned (VSP) form. What caused this trend?

For many years dry land farming, poor weed control options and virus infection all combined to reduce vigor and vine size in most of the world's *vinifera* production areas. With improved nutrition, better fungicides, development of clean planting stock and greater utilization of irrigation vine size increased dramatically.

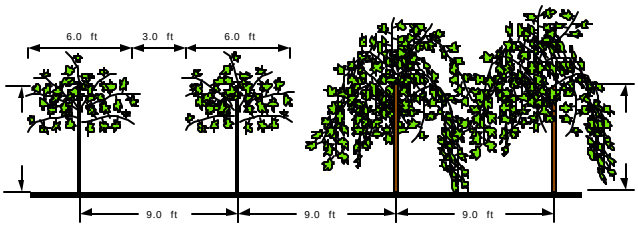

Figure 1. *The difference between moderate and high vigor leaf canopies that are not shoot positioned (free). The two vines on the left represent moderate vigor vines. Their canopies can be penetrated by direct light beams, and sprays. The vines on the right represent high vigor vines. The increased vigor results in very dense canopies, poor light and spray penetration, shaded renewal zones and interior leaf senescence.*

The increased vigor created new problems. For instance, in the Napa Valley vines were commonly planted 8 feet apart in rows spaced at 12 feet. Vine size in the older "low-vigor" vineyards, was larger than we are used to, but the standard T-trellis combined with mid-canopy cordon training produced a canopy form similar to those in figure 1. These are desirable open canopies carried on simple, inexpensive one or two wire trellis. The canopy form is similar to that of a tree. Sunlight can penetrate the canopy, and sprays reach all leaf and fruit surfaces.

However, with improved technology came much increased vine size. The simple trellis was not able to support the increased growth; the result was the so-called "California sprawl." Vines formed many, long shoots with lots of lateral development. Shoots grew so long that they could not remain erect. The result was a hay stack effect (figure 1 – right hand side). Canopy interiors were densely shaded, bud fruitfulness was reduced, resulting in low crops and even greater vegetative growth. Fruit quality also suffered because of the imbalance between vegetative and fruit growth. Fruit had poor color, vegetative flavors, high malic acid and high juice pH.

Vertically shoot positioned (VSP) training was one part of the solution. The goal of VSP is to produce a thin, tall leaf canopy which sprays can penetrate easily, and a uniformly well-illuminated fruiting zone (figure 2). It is not so much that VSP guarantees an open canopy, but should the canopy become too big, the grower can do something about it. When shoot growth extends above the top wire, it will tip over and shade the lower parts. Summer pruning of the top and sides is used to remove this unwanted growth and to prevent shade or excessive canopy thickness. Leaf removal is often done to prevent fruit shading. Hedging the traditional forms removes more desirable foliage than undesirable excess foliage.

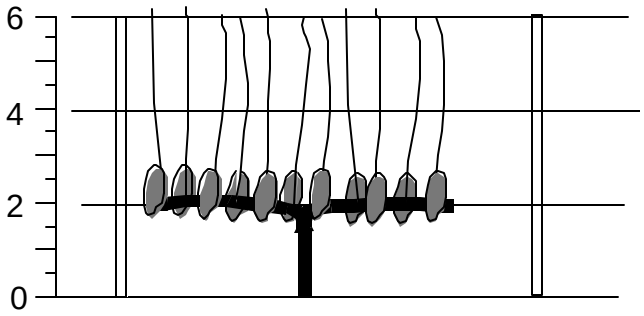

Figure 2. *VSP training can use either cordons or canes. Canes can be tied flat or arched as for Pendlebogen. The keys are: a low head, vertical shoot positioning resulting in a thin, vertical leaf canopy and summer pruning (hedging) and leaf removal to prevent shading and crowding of the fruiting zone.*

Why do I say that VSP is only part of the solution? There were two big problems with the monster vines. One was the fundamental vigor level. Remember the vines were overfilling allocated space in rows spaced 12 feet apart. Just cutting off the extra growth didn't change the basic growth potential (figure 3). The hedged vines just kept growing. Repeated hedging was required, and it was soon learned that hedging during the fruit ripening period delayed fruit development and maturity.

Figure 3. *Amount of growth removed during hedging the big vine in figure 1. Note that the vegetative growth potential is much greater than the canopy volume as defined by hedging (indicated by the gray box.)*

The second problem is light interception (figure 4). Traditional vine forms as in figure 1 are three-dimensional. They have height, length (established by the vine space in the row) and width (up to 12 feet for vines growing in 12 foot rows.) VSP vines are essentially two-dimensional. They have height (established by the hedging height) and length (established by the in-row vine spacing). Of course they do have a third dimension, but the goal is to keep the third dimension very small; to have narrow canopies.

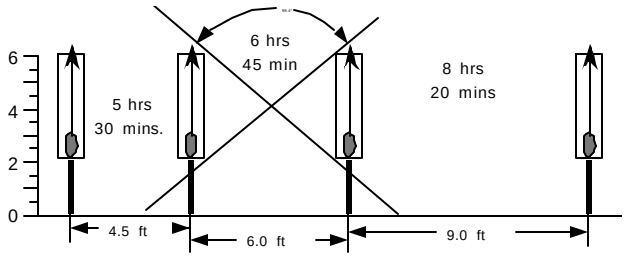

Figure 4. *Effect of distance between canopies on light interception in VSP trained vineyards. Lines define the sun angles where sunlight is not intercepted by grape leaves. Times indicate the number of hours for each row distance during which direct light hits the ground rather than the vine.*

However, widely spaced narrow canopies capture only fraction of available sunlight. Figure 4 shows that when VSP rows are spaced 9 feet apart, there is a greater than 8 hour period at mid-day when sunlight reaches the ground rather than being intercepted by leaves. Reducing the inter-row spacing increases the proportion of light intercepted by the vine rather than by the ground or cover crop. A commonly accepted rule of thumb is that the between-row space should about equal the height of the canopy. The standard New York trellis is 6 feet high (this can go up to 7 feet without creating too much problem). Thus VSP rows should be about 6 feet apart to achieve reasonable light interception.

Reducing inter-row space also affects vine vigor. A vine spaced at 12' x 8' can exploit 96 square feet of vineyard soil. A vine spaced 6' x 6' has 36 square feet of floor space, only about 1/3 that available to the wide spaced vine. This has the effect of reducing vigor and vine size. Of course there are two rows of canopies, they are just less dense canopies.

Because six foot high trellis reflects the stature of a human one can see why the 6 feet wide and six feet high layout is the most common row spacing in Europe, and why so many new vineyards in California are being planted at that distance. Why doesn't everyone adopt this row spacing? The usual answer is equipment. Depending upon your own situation the equipment issue may be large or not so large.

Where does that leave you if you are set up to manage 9 foot rather than 6 foot rows? A solution for the wider-than-optimal spaced vineyard was developed by Nelson Shaulis – canopy division (GDC in his case). GDC was designed specifically for Concord. Although it is used extensively for *vinifera*, it is really not well suited for varieties with an upright growth habit. GDC is especially unsuitable for New York *vinifera* because of its very extensive cordon system. A cold winter can mean retraining the whole vineyard, an expensive proposition with GDC.

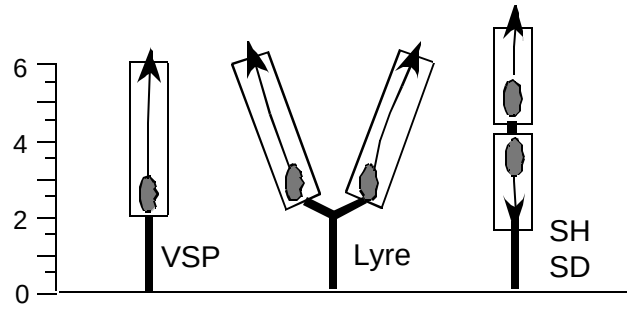

Figure 5. *Three VSP forms. The simple VSP is best suited for 6-7 foot rows spacing. The other two are divided canopies. Lyre trained vines are divided into two vertical canopies. Scott Henry (SC) and Smart Dyson (SD) are divided vertically so that each row has two stacked leaf canopies. The arrows indicate the direction of shoot growth*

Alternative forms of canopy division for VSP trained vines have been developed. Lyre training was devised in France as an adaptation of GDC for varieties with upright growth habits (figure 5). Like GDC, it produces an aerial simulation of close canopy spacing while retaining widely spaced trunks. Although it is possible to use standard equipment in 9 foot Lyre trained rows, it is neither pleasant nor a very good idea. At Geneva we have had more success with Lyre trained vines using a 10 foot row space. There are many acres of Lyre trained vines in the Napa Valley of California (usually with 12 foot rows). However, I don't really recommend using Lyre training for new vineyards in New York. As with GDC, the extensive trellis is expensive and requires considerable labor to maintain. Two rows of simple VSP are similar to and less problematic than one row of Lyre trained vines.

Using Lyre training to correct excessive vigor in widely space rows. Dividing the canopy into two vertical portions can be used to address the problem of excessively vigorous vines planted in wider-than-optimal row spacing. However, converting 9 foot rows to Lyre is not a good idea. Some growers have converted alternate rows leaving every other row as simple VSP. The fruit and wine quality from the Lyre trained rows has justified the investment, but only half the vineyard is improved.

Vertical division (Scott Henry, Smart-Dyson). If the goal is for the trellis height to match the row width, one might ask, "Why not install a 9 foot trellis?" There is no question that total light interception would be improved, but several problems come to mind. Problems like cost and stability are obvious, but less obvious is the question of trellis fill. There is no point in having a trellis without leaves. Think how long shoots have to be in order to fill a 9 foot VSP canopy and how much of the growing season would pass before the trellis could be filled.

Vertically-divided training systems were designed to get around this limitation. The first approach was Tekuata Two Tier training, devised by Richard Smart in New Zealand. The basic idea was to stack two 3 foot high VSP canopies one on top of the other. (similar to the last figure in this paper which demonstrates a version of Smart Dyson training only the lower cordon is near ground level and both canopies are upright). It turned out that an Oregon grape grower, Scott Henry, independently developed a more practical solution. Scott Henry had big Chardonnay vines in 12 foot rows. He installed two wires at 3-1/2 and 4 feet and tied canes to each. The shoots from the upper canes were trained up and those from the lower canes encouraged to point down. Thus he created a vertically divided canopy. He was able to retain more total buds and ripen the crop. In the process some potential vigor was turned into crop and the remaining canopy was better distributed.

Smart Dyson training was developed to simplify the trellis and to take advantage of cordon training. Smart Dyson uses a mid-high cordon with half the arms trained to upward pointing spurs (figure 5) and half to downward pointing spurs.

Which is right for me? If the decision has been made to use some form of **VSP**, then ranking of choice is fairly easy. The best trellis is the simplest. Anything more complex that simple VSP is a compromise brought about because of an unwillingness to invest in appropriate equipment or mis-judgments in matching the scion, rootstock and spacing to the site and soil in question. Simple VSP is easy to train and retrain, the trellis is inexpensive to install and maintain. The canopy has desirable characteristics, and so long as vigor is appropriate, the trellis is quickly filled and only a minimal amount of hedging or leaf removal will be necessary.

From a quality standpoint, **Lyre** is the next desirable choice. Lyre trained vines can be managed with standard equipment and produce very desirable canopies. However, there are major drawbacks to Lyre in the East. The Lyre trellis is expensive to install and maintain. Lyre training is most efficient with permanent cordons, but cordons are seldom permanent in New York. Lyre trellis can be used with head and cane training, but the effort to deal with trunk renewal can be considerable relative to simple VSP. Lyre is not suitable for 9 foot row spacing, so it really won't work where a 9 foot row has produced excessively large vine size. (11 feet spacing is probably more practical than 10 feet.) For many, the biggest drawback is that Lyre trained vines cannot be machine harvested.

Scott Henry training is probably the most practical solution when 9 foot rows have resulted in excessive vine size. Standard equipment may be used. Excessive vine size is partly converted to crop, partly displayed more efficiently, and partly suppressed. What are the drawbacks? The suppression issue is one. Shoot orientation has a dramatic effect on individual shoot vigor. Thus when half the shoots are trained vertically upright and half vertically downward, you are, in effect, stepping on the gas for half the vine and stepping on the brakes for the other half. When vine vigor is not high, this can create dire consequences for the lower half of the vine. Vigor can be so suppressed that neither the fruit nor the wood matures. There is always room for concern that the composition of the fruit from the upper canopy will differ significantly from that of the lower canopy.

One solution is to make sure that the canes retained for the lower canopy developed from shoots which grew upward and which were well illuminated. An additional simple step is to avoid excessive shoot positioning for the downward pointing canopy. Just brushing the lower shoots out and down so that they are not growing into the upper half of the canopy creates the ballerina version of SH. The image is a narrow upright upper canopy and a more skirt-like lower canopy. One doesn't have to go to either extreme. The degree of rigor in developing a downward pointing canopy can be adjusted to the vigor of the individual vine.

Smart Dyson is probably the most efficient vertically divided system, but we have already pointed out the problem of cordon life in New York. The other problem is the need to develop downward pointing arms. These are not easy to create as they are at a considerable vigor disadvantage in comparison with the upright arms. Thus maintaining the lower half of the SD cordons can be problematic.

Trellis and wire placement. There is no 'right' layout for these systems. The following diagrams show some examples of suggested wire placement.

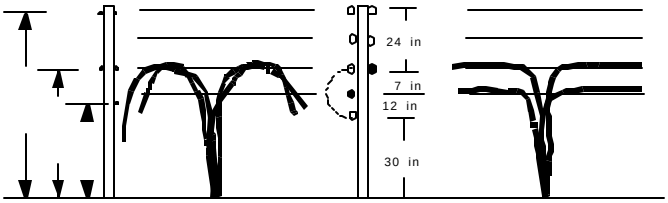

Figure 6. *Wire placement for vertical shoot-positioned (VSP) vineyards. Standard pendlbogen (arched cane) placement is shown on the left. The diagram on the right, based on Richard Smart's recommendations, can be used for standard VSP (non-divided) or divided Scott Henry canopies. With standard VSP, shoots are all trained upward with moveable catch wires. For Scott-Henry, lower arms are trained downward with a catch wire. Smart-Dyson vines typically have upward and downward pointing spurs on each cordon arm.*

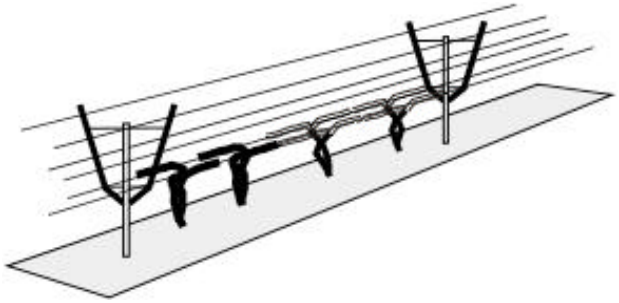

Figure 7. *Lyre training. Vines on left are cordon pruned and those on right are cane pruned. Often growers will choose to train alternate vines to alternate sides of the trellis. Sometimes a quadrilateral form is used where each vine has four cordons.*

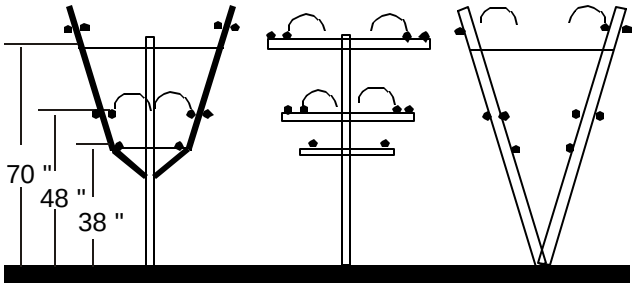

Figure 8. *Three different trellis systems used to create lyre canopies.*

SPRING PEST MANAGEMENT MEETING REVIEW

Tim Weigle
Senior Area Extension Educator, Grape IPM

It was my pleasure to be able to host the annual spring meeting held May 23, at Lance Fullager's Vineyard Supplies. Approximately 130 participants attended with 110 signing up for pesticide recertification credits. Dr. Andrew Landers, Senior Extension Association in Pesticide Application Equipment, once again put together an excellent demonstration of the new sprayer technology that is available for insecticide and fungicide applications. I would like to thank all the speakers who made this an educational event. Greg English-Loeb did his usual outstanding job of hitting the high points of insect management along with fielding many questions. Ron Gardner and George Good were somehow able to make sense of the Pesticide Applicator Certification Program and Food Quality Protection Act, respectively, and present them in language we could understand.

Special thanks to Ed Pinneo and the rest of the Bluff Point Growers Benevolent Barbecue Association for their hard work in preparation of the burgers and dogs. I would also like to thank Vivian Jones from the Yates County Extension Office for doing much of the work behind the scenes to make this meeting a success.

We thank the following for companies sponsoring the barbecue and meeting.

BASF
Bayer
Dow Agrosciences
Dupont Elf Atochem
Gowan
JMS Flower Farms
Mycotech Tomen Agro
Valent
Zeneca

ELEVATE REGISTERED

Wayne Wilcox
Department of Plant Pathology
NYS Agricultural Experiment Station

Elevate 50WDG (fenhexamid) is now registered for use in the State of New York to control Botrytis bunch rot on grapes. The labeled rate is 1 lb/A, with a maximum of three applications per season (no more than two in a row before alternating to another Botrytis fungicide). It may be used up to the day of harvest.

Elevate represents a new class of chemistry, and is unrelated to any of the exisiting compounds on the market. Thus, there should be no cross-resistance between it and Rovral or Vangard, and it is an excellent choice for use in rotational programs designed to minimize the development of resistance to these materials. A program alternating Elevate and Vangard should protect both compounds, while providing an opportunity to give Rovral a rest in vineyards or locations where Rovral's performance may have slipped after regular use over the years.

As discussed earlier in the spring, the optimum timing for Botrytis sprays is still questionable. In New York, we traditionally have emphasized the importance of applications at veraison and preharvest, and these indeed can be beneficial, especially on varieties that are prone to cracking. However, I am increasingly convinced of the importance of controlling infections that occur between bloom and bunch closure, particularly under wet weather conditions.

Although we are hoping that the Botrytis activity of the strobilurins (Abound, Sovran, Flint) might be sufficient if they are used during the bloom through bunch closing period to control other major diseases, I wouldn't depend on the strobies by themselves under high pressure conditions (e.g., if it keeps on raining like it has). Thus, on highly susceptible *vinifera* varieties (Chardonnay, Pinot Noir, etc.) under wet conditions, I'd be inclined to use either a full rate of Vangard or Elevate, or one-half to two-thirds of this rate in combination with one of the strobies. (Or maybe it will stop raining). Also, be aware that the high-nitrogen programs that some growers have been adopting can increase the probability of Botrytis losses, and plan accordingly.

STAFFING CHANGES AT OUR OFFICE

Timothy E. Martinson

We have two new employees working with the Finger Lakes Grape Program. **Katie Tomlinson** has returned to Cooperative Extension as office support specialist after working two years at the New York Wine & Grape Foundation. Please welcome her back when you contact our office. **Chris Wager,** a student at Syracuse University (College of ESF) and experienced vineyard worker, is summer assistant working on several projects.

UPCOMING EVENTS

June 19-23, 2000. Seattle, Wa. National American Society of Enology and Viticulture Annual Meeting. The millennium Annual Meeting will feature a truly international program that looks back at the last 50 years of winegrape and wine research, featuring an exposé on current research and cutting-edge topics. Some highlights of the enology program will be sessions featuring Wine Flavor, Biotechnology, Analysis and Aging while the viticulture sessions will look at Plant Materials, Vineyard Mechanization, Vine Balance and Pest Management. In addition to the enology and viticulture sessions, the 2000 Annual Meeting will also host a Sensory Symposium, a Cold Hardiness Workshop and an Experimental Design From Vineyard to Winery Workshop. The Sensory Symposium and Cold Hardiness Workshop will take place on the Monday before the Annual Meeting begins. Contact (530) 753-3142 Fax: (530) 753-3318 or *www.asev.org* for more information.

July 6. Canandaigua Vineyards, Dresden. *Twilight Meeting 7-9 PM.* Andrew Landers will provide a field demonstration of ESS systems electrostatic sprayer recently purchased by Canandaigua, and share data he is collecting on sprayer performance. A selection of small vineyard equipment from various manufacturers will also be demonstrated, in cooperation with Vineyard and Winery Management magazine. Tim Martinson will offer discuss crop potential for 1999 and current production issues. Contact us at 315-536-5134 for more information.

July 5-6. Locations in Finger Lakes. Field demonstrations associated with Winery & Vineyard Management's Summer Seminars. Demonstrations are open to growers without charge; full seminar at Geneva Ramada (aimed at new startup vineyards and wineries) has fee. Field demonstrations include: 2:00 PM, July 5 Hazlitt 1852 vineyards – demonstration of Scott-Henry training; 3:15 July 6 at Lakewood Vineyards, field equipment demonstrations. To attend, contact Vineyard & Winery Management by June 30th at 607-535-7133 or *www.vwm-online.com* for more information.

July 19-21. Clarion Hotel and Conference Center, Ithaca, NY. *25th Annual American Society of Enology and Viticulture Eastern Section Symposium and Annual Meeting.* Symposium topic is 'Synergy of Food and Wine – The Science of Creating and Marketing Wine as Food'. Please see program and registration form inserted in this newsletter.

August 17. NYS Agricultural Experiment Station, Geneva, NY. *Fruit Field Day.* This field day is aimed at Apple, small fruit, and grape growers, and will feature visits to experimental plots, equipment demonstrations, and a free lunch. Look for more information in future *Vineyard Notes.*

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JUNE 8, 2000

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