

Oregon Wine Advisory Board Research Progress Report

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Survey of the Beneficial and Pest Insect Fauna from Integrated Production and Non-Integrated Production Vineyards in the Willamette Region

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INTRODUCTION and BACKGROUND

The wine grape industry is rapidly growing in Oregon. By the year 2005, we could predict that Oregon will have over 10,000 acres in wine grape production. At a meeting last year, the Grapevine Improvement Committee acknowledged that little was known about the presence of potential pest and beneficial insects in Oregon vineyards. For instance, if there were a threat of Pierce's Disease, would any of the known vectors be present in or near our vineyards. Washington and California, with their contiguous acres of vineyards, have noted infestations of leafhoppers, mealy bugs, cutworms, and aphids. As vineyard plantings expand in Oregon, there is a greater possibility that some indigenous insects that are presently minor pests may become major pests in the future. In Western North America the piercing-sucking insects, i.e. phylloxera, leafhoppers, mealy bugs, and sharpshooters, are the greatest insect threat to vineyard production. With the rapid growth of the wine grape industry there is also an increase likelihood that non-native pest species will become established. Although Oregon has had little in the way of economic injury from insects on wine grapes, a number of insect species are present in the vineyard. We know little about the composition of this fauna. Additionally, there are no recommended methods for growers to monitor the insects in their vineyard. The objectives of this research are: 1. Describe and compare the beneficial insect fauna and piercing-sucking insects that are present in and near IP and non-IP vineyards in the Willamette valley. 2. Evaluate the ability of commercially available sticky traps, of sweep netting and d-vacuum. methods to monitor harmful and beneficial insects in the vineyard. 3. Evaluate if height of sticky traps in the vineyard influences the type and quantity of insect species caught.

METHODS

From the end of May to October, 1998, sweep-net samples and d-vacuum samples were taken from in and around selected blocks at IP vineyards and non-IP vineyards in the Willamette Region: (Croft Vineyards, Witness Tree Vineyards, Oak Grove Vineyards, Rex Hill Vineyards, King Estates Vineyard, Archery Summit Vineyards, Kraemer Vineyards, and Deckelman Vineyards). Samples were also taken at Golden Leaf Farms, Scott Henry Vineyards, Foris Vineyards and Bridgeview Vineyards in the Umpqua Region and Rogue Valley. Vineyards were selected to represent a cross section of IP to non-IP practices and several contained riparian areas near the vineyard. Collected insects are being identified, tabulated and a reference collection assembled. General habitat and practices have been grouped for analysis.

Sticky traps are easy to use and are a moderate to low cost method of monitoring insects. At each site, we made use of commercially available traps. They were 3 1/2" by 5" and either blue or yellow in color. Nine traps of each color were strategically attached to the trellises in each vineyard. Traps were placed in three rows of three: along the edge of the vineyard, in the center and at the edge of the block. In five vineyards sticky traps were placed from a height of 1 to 7 ft on 10 poles. The same pattern of placement was used for these sticky traps as was for the trellis sticky traps. The 10th pole was located near the riparian border to maximize catch. Approximately every 10-15 days the traps were collected and then replaced with new traps. The collected traps were brought back to the laboratory and frozen for analysis later. Presently the traps are being kept frozen and insect groups are being tallied and classified.

RESULTS and DISCUSSION

Sweep-net sampling: general

In the sweep samples over 14,000 insects were collected between June and September. The three largest groups were flies (3719), aphids (3210), and "hoppers" (2764). We feel that most if not all species of flies are of little consequence to grape growing in Oregon. They were found in the sweep samples primarily because they are nectar, pollen and organic debris feeders. Aphid numbers were explosive at the beginning of the season, then steadily decreased in all sites. Aphids could be a problem from time to time. However, most aphids caught in sweep-net sampling appear to be feeders of plants that were found between rows of grapes. Spiders stayed at a fairly constant level throughout the summer at all sites. Throughout, predators and parasites remained constant in relation to the numbers of all other insects collected. Ants had no detectable pattern of prevalence. The classification 'bugs' refers to the group of insects classified as true bugs (Order Hemiptera); these are of little consequence to Oregon grape growers. The "hopper" group includes leafhoppers, sharpshooters, spittlebugs, and treehoppers. This group has a high potential to inflict damage to grapes (leaves and fruit) and some species can be vectors of diseases such as Pierce's disease. June 2-12 was the period when most insects were found. July 15 to August 18 was the period when most "hoppers" were found (Fig 1). The best time to monitor "hopper" numbers, using the sweep net method, would be during this 4-week period.

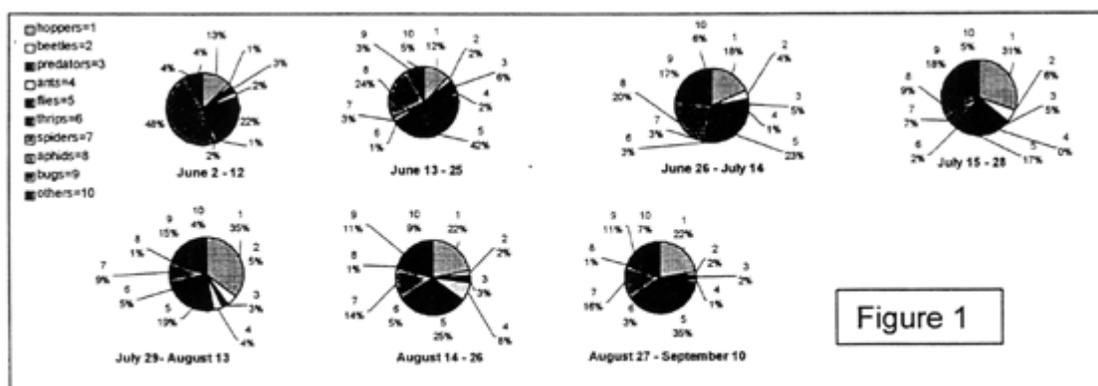


Figure 1. Occurrence of general groups of insects collected by sweep-net samples for combined samples for all sites for each sample period.

Sweep-net sampling: IP vs. non-IP

Agricultural practices (IP vs. non-IP) were rated on a 1-4 scale. For the sites we studied, a rating of 1 was assigned to the site that used the most conventional vineyard fanning practices and a rating of 4 was assigned to the site using the most IP practices.

For sites with conventional to minimum IP practices (rating 1- 1 1/2) predators and parasites remained at a rather constant level throughout the season (Figure 2). "Hoppers" rose to a high of 53% of the insects

collected by the end of July to mid-August and then dropped off quickly. Interestingly, thrips were never in very high numbers throughout the season.

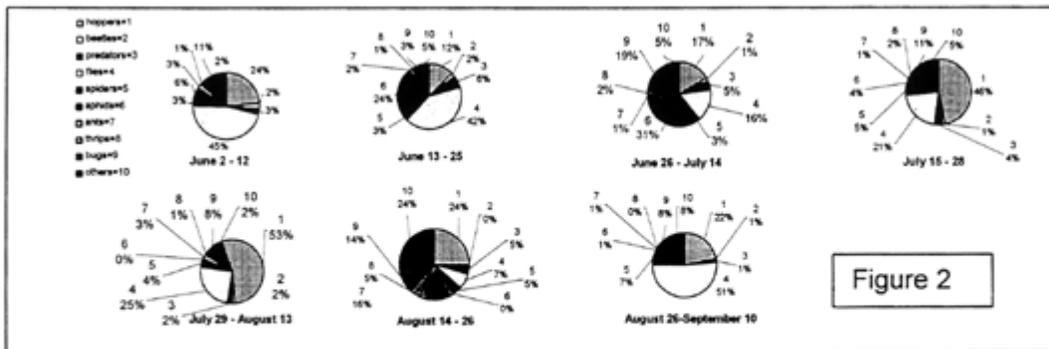


Figure 2. Occurrence of general groups of insects (% of total) collected by sweep-net sampling at vineyards classified conventional to minimum IP practices for each sample period.

The sites classified as moderate IP practices (2 - 2 1/2) had a much lower percent total hoppers during late July and August (Figure 3). The highest hopper occurrence was the end of the season, reaching 30% of the total. Of interest is that thrips were high at the beginning of the season, then dropped off quickly, suggesting that these species may have been associated with blooms of early season grasses and forbs. Again predator and parasites remained relatively constant as compared with the number of insects caught for each period.

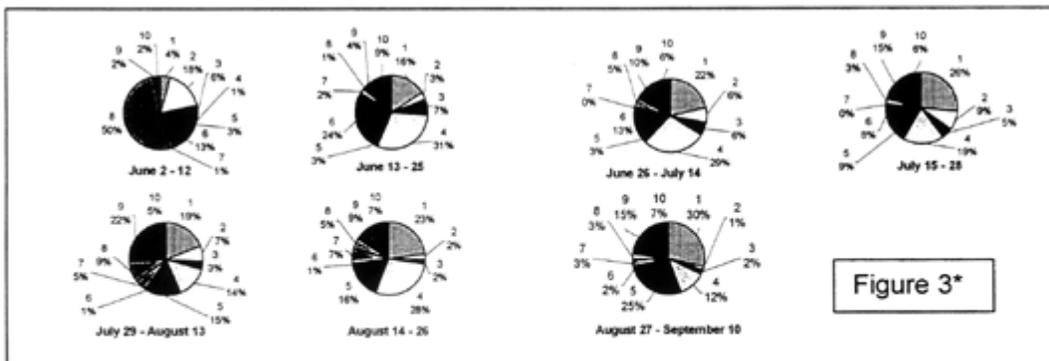


Figure 3. Occurrence of general groups of insects (% of total) collected by sweep-net sampling at vineyards classified as moderate IP practices for each sample period.

*Legend – same as Figure 2.

The occurrence of hoppers in the IP vineyards never passed 33% the entire season (Figure 4). From June to July aphids and true bugs were in the majority of the collection. This is probably because of the diversity of other plants besides grasses and grapes present in these vineyards. Even though predators and parasites seem to stay in a rather constant ratio with the rest of the insects collected, there appeared to a larger 'build-up' of spiders (non-insects but predaceous) as the season progressed.

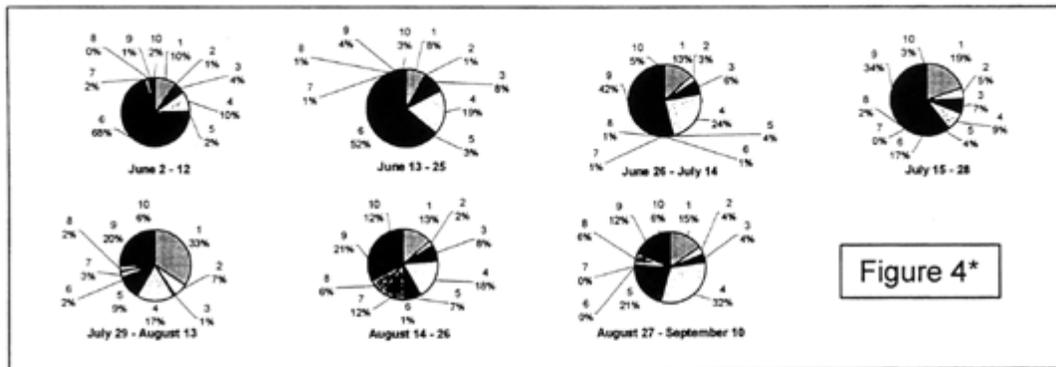


Figure 4. Occurrence of general groups of insects (% of total) collected by sweep-net sampling for each sample period at vineyards classified as using the most IP practices for this study.

*Legend = same as Figure 2.

If sweep-net sampling were used to monitor insect occurrence in the vineyard, the best sampling times, as indicated in our preliminary data, would be before or at bloom time, midsummer, and about the time of the beginning of veraison. More research is needed before firm conclusions can be made about these trends. It should, however, be noted that the sweep net is an important tool monitoring insects in the vineyard. A cautionary note is that this method does not sample the vine directly. Thus, many of the insects found may never venture to the vine.

D-Vac sampling

D-vac sampling was done directly on the vines. This method is the most accurate way to identify what is on the grapes. Insects that were collected by this method could be assumed to occur on the grape plants, at least part of the time. This does not necessarily mean that they feed on the plant; it just means that they were present. However, insects of possible economic importance were found (Table 1). These specimens have been sent to taxonomic experts for confirmation. The blue-green sharpshooter, a known vector of Pierce's disease, was found in all four regions sampled. Spittlebugs, also possible PD vectors, were present in all regions sampled. The grape leafhopper was found in the North Willamette and in the Rogue. Normally, this is not a problem in Oregon but it has caused occasional damage in southern Oregon and in the Columbia and Yakima valley regions of Washington. The grape cane gall maker was found throughout the Willamette Valley and in the Rogue. It is a grape pest in the East and Mid-West. Feeding by adults and larvae can cause bud damage and can result in shoot ragging. It was previously thought the weevil was not established West of the Rocky Mountains. A grape flea beetle was found throughout the Willamette Valley and Umpqua. The grape flea beetle is another pest from the East and California that apparently is now present in Oregon vineyards.

Table 1.
Occurrence of insects of possible economic importance to Oregon Vineyards
(D-vac samples)

Region	Blue-green sharpshooter	Grape cane gall maker	Grape Leafhopper	Grape flea beetle	Spittle bug
N. Willamette	X	X	X	X	X
S. Willamette	X	X		X	X
Umpqua	X			X	X
Rogue	X	X	X		X

Sticky trap sampling. At the time of this report the sticky traps from the 1998 season are currently being analyzed and are about 50% complete.