

RESEARCH REPORT TO:

THE AGRICULTURAL RESEARCH FOUNDATION FOR 2011

TITLE: VegNet Regional Pest Monitoring Program

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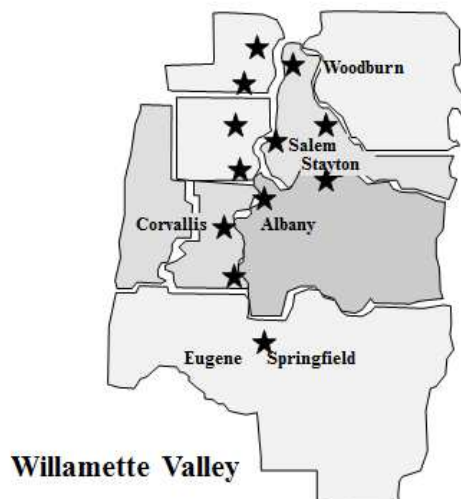
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This Report is also submitted to the Oregon Processed Vegetable Commission Broccoli and Cauliflower, Corn and Bean Research Committees.

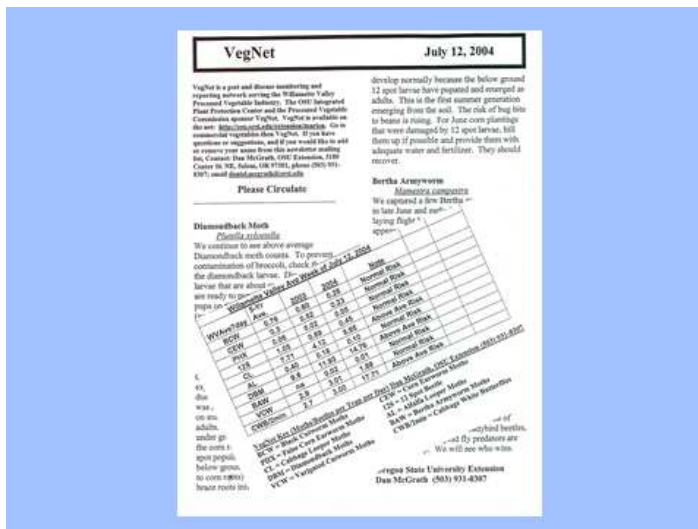
Introduction ~ Regional Pest Monitoring



VegNet is a regional pest monitoring and reporting network serving the Oregon processed vegetable industry, managed by the OSU Extension Service, and funded by the Oregon Processed Vegetable Commission. In the early spring of 2011, thirty six insect monitoring stations were established on

cooperating farms located strategically throughout the Willamette Basin and maintained during the growing season.

Farms were monitored with pheromone traps for adult insects (cabbage looper, cabbage white butterfly, diamondback moth, Bertha armyworm, black cutworm, corn ear worm, 12 spot beetles, and variegated cutworm). Selected broccoli and cauliflower fields were scouted for the immature stages of the lepidopteron pests and the cabbage aphid. Selected fields were scouted for 12 spot beetles using a standard sweep net sampling technique. Insect samples from were collected during the growing season from cooperating processors to determine which insect contaminants were intercepted by quality assurance programs.



VegNet newsletters were distributed to three hundred and twenty (320) growers and agricultural professionals and posted on the OSU Vegetable Website. The newsletters are like an insect weather report. They give growers advanced notice of pest population trends. They serve as vehicle to get out other timely information.



VegNet narratives emphasize that the best pest control decisions are made on the basis of field-specific scouting results. Regional pest monitoring helps growers and agricultural field representatives to adjust their scouting effort when an outbreak is detected. The combination of regional monitoring plus field-specific scouting reduces risk of crop loss.

On some occasions, the combination of regional monitoring and field-specific scouting provides opportunities to reduce insecticide applications when pest pressure is very low.

Regional pest trends serve as an “early warning” system which signals (high or low) when field-specific scouting efforts should be intensified.

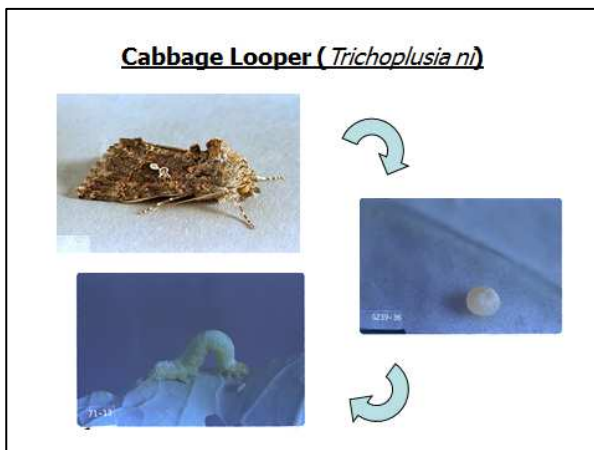
The goals of the VegNet Regional Pest Monitoring and Reporting System are:



1) to save growers money by providing them with advanced notice of population outbreaks for key vegetable pests in broccoli, cauliflower, snap beans, and sweet corn

2) to demonstrate the commitment by the Oregon Processed Vegetable industry toward the use of integrated pest management strategies to protect crops and the quality of the environment

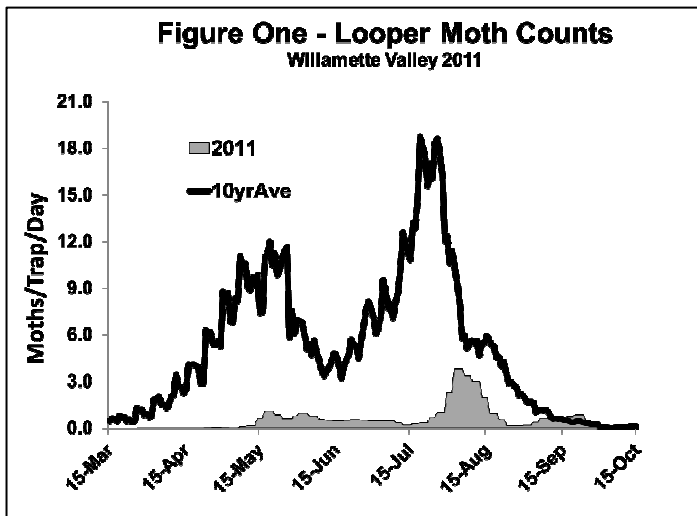
Results Part One ~ Broccoli and Cauliflower Pests



Cabbage Looper (*Trichoplusia ni*)

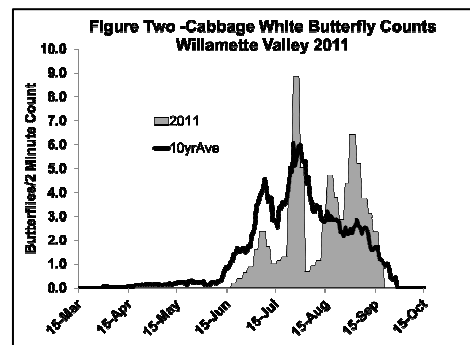
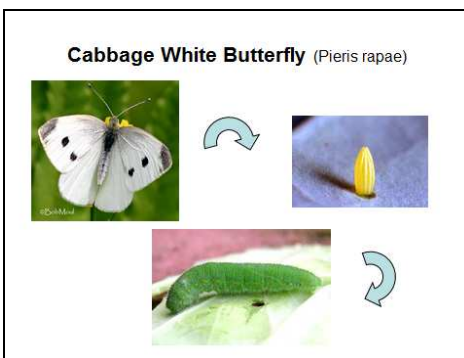
Four Lepidopteron insects and one aphid species damage and contaminate broccoli and cauliflower: diamondback moth (*Plutella xylostella*), cabbage white butterfly (*Pieris rapae*), Bertha armyworm (*Mamestra campestra*), cabbage loopers (*Trichoplusia ni*), and the cabbage aphid (*Brevicoryne brassicae*). Field scouting plus regional pest

monitoring generally do not lead to no-spray decisions because the probability of all five contaminating insect populations reaching low levels during the same growing season is very low. However, regional pest monitoring does lead to reduced number of insecticide applications. The 2011 growing season was a good example of reduced insecticide applications. Due to the cool, wet spring, insect pressure was relatively low. Many growers used a single application of insecticide to control aphids and

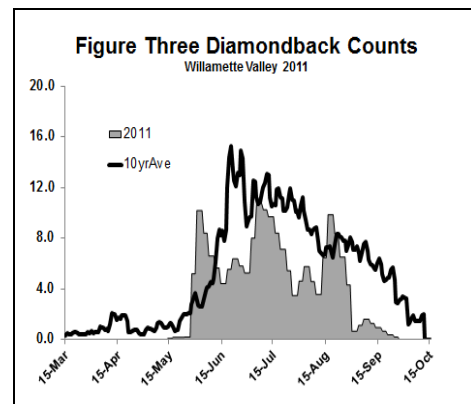
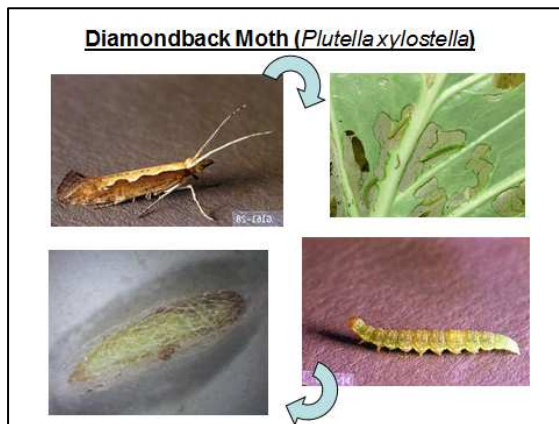


worms in broccoli during 2011. No broccoli or cauliflower was rejected during the 2011 growing season due to insect contamination. Regional pest monitoring for broccoli and cauliflower pests is focused on detecting outbreaks and signaling growers and agricultural professionals

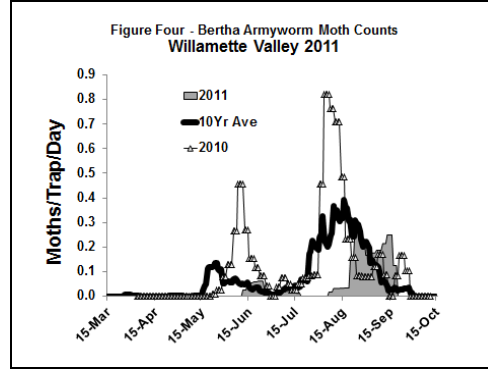
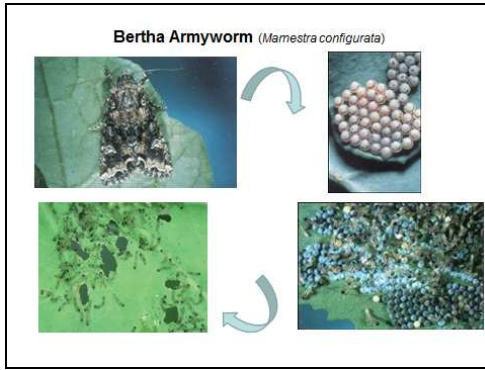
when to intensify their field scouting and to increase their aggressiveness in preventing crop losses. Cabbage looper moth counts were below average during the 2011 growing season (Figure one).



Cabbage white butterfly counts were average during 2011 (Figure two).



Diamondback moth counts were average in 2011 (Figure Three).



Bertha armyworm moth counts were below average during 2011 (Figure Four).

Generally, it takes the combined outbreak of several insect populations during the same growing season to produce a significant “worm” loads.

**Table One: Broccoli Loses Due to Looper Contamination
Willamette Valley, Oregon 1998 to 2011**

<u>Year</u>	<u>Moth Counts</u>	<u>Totes ¹⁾ Rejected</u>	<u>Losses Adjusted ²⁾ by Volume (\$/5,000Tons)</u>
1998	moderate	313	\$18,537
2000	low	20	\$1,848
2001	high	63	\$8,043
2004	moderate	24	\$2,297
2005	high	235	\$17,938
2006	low	0	\$0
2007	low	0	\$0
2008	high	0	\$0
2009	high	0	\$0
2010	moderate	0	\$0
2011	low	0	\$0

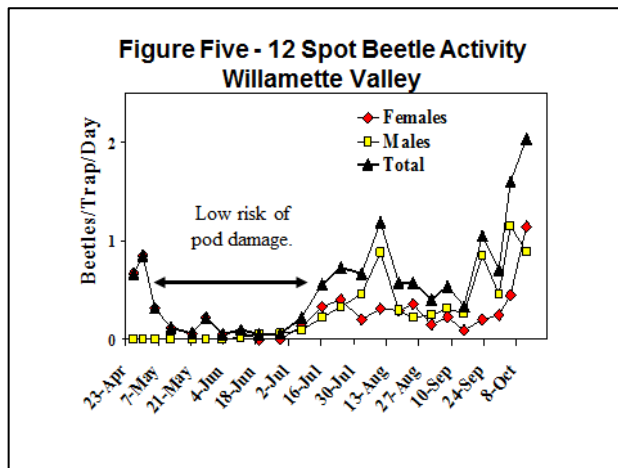
1) Totes of broccoli rejected due to Cabbage looper contamination.

2) Dollar loses per ton of broccoli, average raw-product prices.

Results Part Two ~ Snap Bean Pests



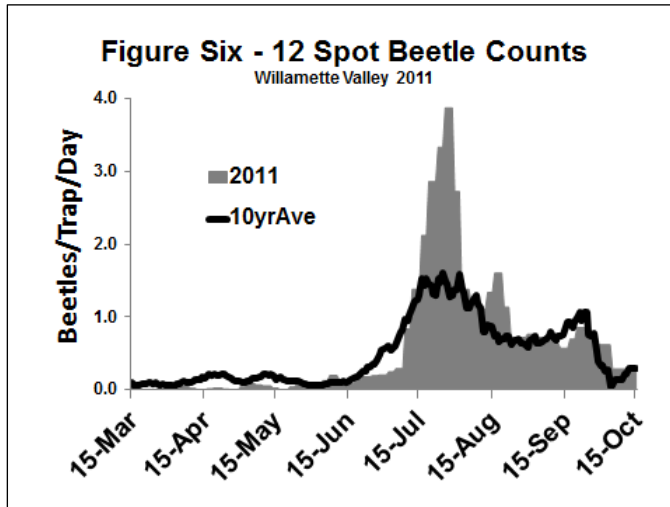
Twelve Spot beetle populations are monitored on a regional basis with yellow sticky traps. Spray decisions are based on site specific sampling with a sweep net.



Yellow sticky traps produce continuous sampling data. This reveals the life cycle of the beetle (Figure Five). There is early spring activity when the female beetles come out of winter hibernation. After laying their eggs, these beetles die. The above ground population of twelve spot beetle disappears. The population goes

underground where the larvae of the beetles eat the roots of several vegetable crops especially sweet corn.

In mid July, the first summer generation of twelve spot beetles emerges from the soil. The gender ratio (males to females) returns to normal. The second generation of beetles emerges from the soil in October and over winters. The male beetles are smaller bodied and tend to die off during the winter. The female beetles survive the winter and reemerge the following spring.



Twelve spot beetle populations were above average during the 2011 growing season (Figure Six.) The progress of the 12 spot beetle life cycle can be detected on a regional basis and reported to growers using the VegNet electronic newsletter. In some years, growers are able to take advantage of a sustained

period of low beetle pressure during the early flower period to reduce insecticide sprays based on sweep net sampling and action thresholds on early plantings (Figure Seven and Eight). Once the beetle counts exceed, on average, two beetles per trap per day, insecticide applications are justified.

Figure Seven - 12 Spot Beetle Control Programs

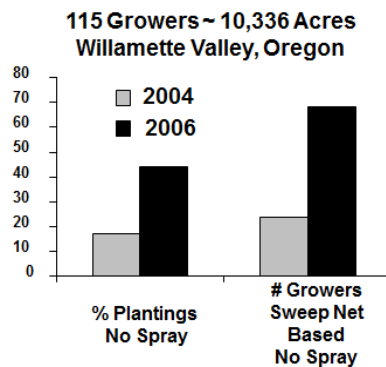
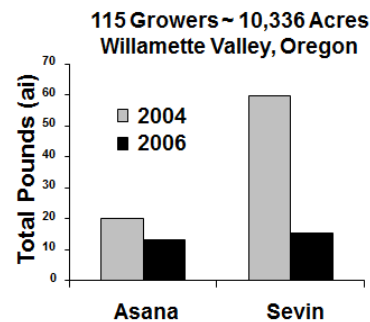
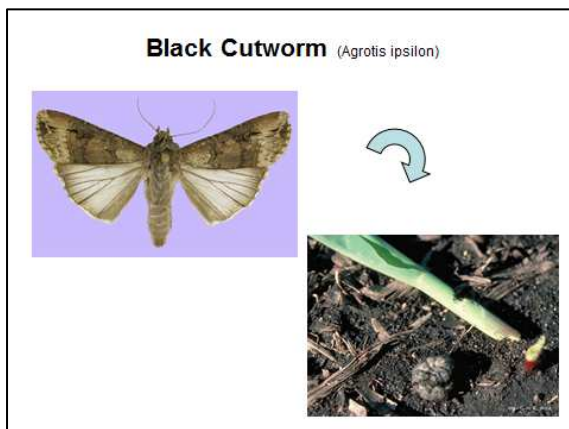


Figure Eight - Beetle Insecticide on Snap Beans

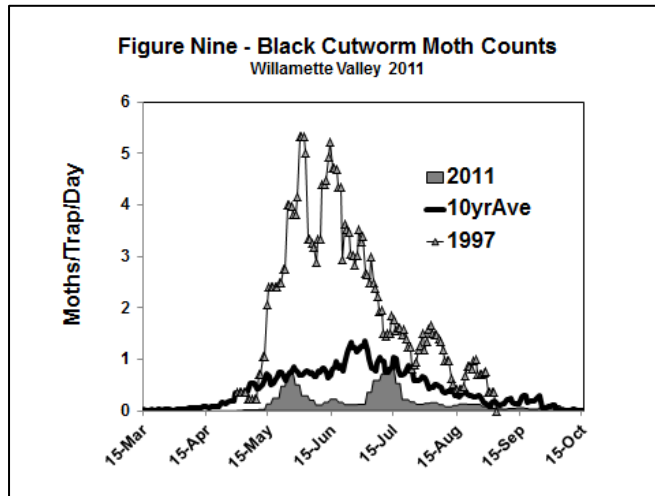


Results Part Three ~ Sweet Corn Pests

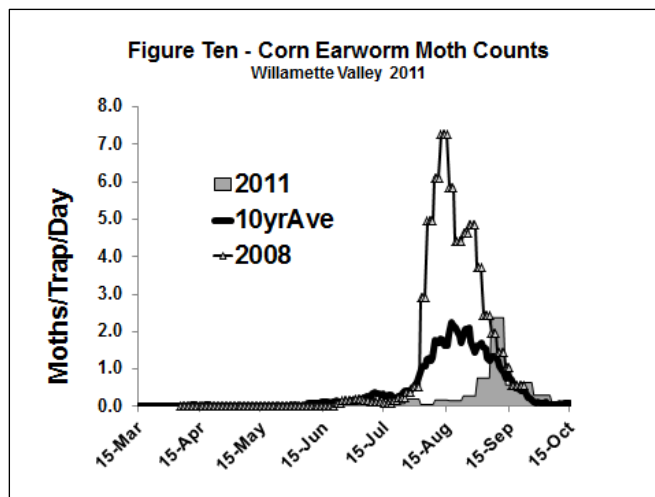


Cutworms are hard to detect in the field because early cutworm instars are small, gray-brown in color, and subterranean. Significant cutworm moth egg laying flights, on the other hand, are easy to detect. Black cutworm outbreaks occur about once per decade.

The last major Willamette Valley black cutworm outbreak occurred in 1997.



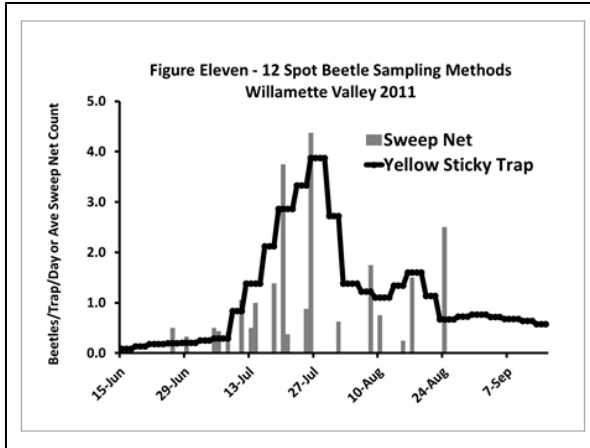
Black cutworm moth counts were below average during the 2011 growing season (Figure Nine).



Corn earworm moth counts were below average on a regional basis during 2011 but variable from field to field (Figure Ten). Even in a low pressure year, fresh market growers will need to apply insecticide sprays at first silk.

Conclusion

The VegNet regional pest monitoring program sponsored by the Oregon Processed Vegetable Commission, on occasion, has saved growers money by providing growers and agricultural professionals with early warnings of insect pest outbreaks. The warnings prompted increase field scouting. Increased field scouting led to more aggressive spray programs. This has significantly reduced the amount of broccoli rejected due to looper contamination even during high pressure years.



The combination of regional pest monitoring plus field scouting has allowed growers, in some cases, to reduce insecticide applications without significantly increasing risk of crop damage. For example, we find that sweep net sampling of bean fields correlates well with regional trends (Figure Eleven). We have demonstrated that when

field-specific scouting shows that the beetle counts in a bean fields is low at the same time that the regional population trend for the beetles is also low, it is reasonably safe to skip the insecticide.

Processors have taken advantage of this integrated pest management program in their stewardship marketing campaigns. If we are going to claim that we are good stewards of the food system, we need to use proven field scouting and pest monitoring techniques to justify when sprays are needs. Occasionally, we can skip a spray without putting the crop at risk. Our hope is that an authentic stewardship program may help Oregon processors to maintain market shares with national brokers of processed food who are aggressively looking for ways to protect and enhance their brand image.

The VegNet Newsletter, which is widely circulated in the Willamette Basin serves as a platform for dealing with new issues that arise during the growing season.