Cooperative Extension
Coastal Washington Research & Extension Unit
Long Beach, WA 98631

CRANBERRY VINE

June 1994

THE STATION/PCCRF

PCCRF. Incredible new changes have been made on the farm during the last two work days. New bogs have been planted, a 16 variety cranberry germplasm trial established, ditch lining put in, the museum expanded, and a new pump purchased, to name only a few. My thanks to all who made this possible.

MEETINGS

WSU Cranberry Field Day. Friday, July 29, 1994, 8:30 - 3:30, Cranberry Research Station, Long Beach WA 98631. Field Day will be cosponsored by the Pacific Coast Cranberry Research Foundation. Proceeds from lunch will go to the Foundation to help support cranberry research. A program is included at the end of this newsletter. Pesticide credits will be given.

Cranberry Weed Control Plot Tour. Friday, August 19, 1994, 10:00 - 12:00. Meet in the blueberry field at Cranguyma Farms, Long Beach (off Sandridge Road, 1.5 miles north of Pioneer Road). Pesticide credits will be given. I am very pleased with several treatments for silverleaf, buttercup, purple aster and lotus control.

WEATHER

	Rainfall (Inches)					Growing Degree Days				
Month	1994	1993	1992	1991	20 yr av.	1994	1993	1992	1991	10 yr av.
January	8.1	8.7	14.4	8.1	10.8	76	22	69	36	40
February	12.1	1.4	6.0	10.1	9.3	26	63	118	110	55
March	6.4	8.1	1.7	6.6	9.5	137	94	145	92	72
April	5.6	10.3	9.9	9.0	5.6	164	147	189	122	116
May	3.4	5.9	0.9	3.1	3.8	276	360	296	198	216
June		3.3	1.4	1.8	2.8		386	388	285	323
July		1.8	0.4	0.6	1.9		458	486	423	421
August		0.7	1.3	5.3	1.7		478	477	437	440
September		0.3	2.6	0.2	4.1		359	314	465	363
October		2.9	5.2	2.4	6.5		249	194	214	217
November		5.0	11.0	10.2	11.4		23	69	102	99
December		14.0	8.3	7.7	12.6		35	4	55	41
TOTAL		62.5	63.1	65.1	80.5		2674	2749	2409	2402

I have noticed a major difference in weed control with preemergent herbicides this year compared to previous years. To account for this difference, I did a few comparisons between this year and last in total rainfall + irrigation used for frost protection for 2 cranberry bogs from March through June. In 1993, there were 10 to 16 more inches of water passing through the cranberry bog soil profile than

in 1994. The important thing to note is that, as the amount of water increases, herbicide effectiveness decreases. Another frequent concern about weather in May and June is the effect on pollination. Does one rainy week in June have a major impact on yield if the rest of the month is good pollination weather? Our pollination data on screening bees out for various time periods would suggest that a complete covering of blossoms for 7 days has a minor to moderate effect on overall yield. The inference from this is that a loss of one week of pollination does not equate to a crop disaster.

INSECT CONTROL

Spraying for Second Hatch of Fireworm. Growers are reminded that this year there may be an early second hatch and protection of the bees against poison is very important. You may not notice any dead bees and think all is well, but the effects may be very subtle, such as reduced collection of pollen on sprayed bogs. We hope to get some good data during this year. If you have to spray and the bees are out there, Pyrenone is a very safe insecticide for bees and provides decent control against black-headed fireworm. In general, spray as soon as second generation larvae are seen.

Cranberry Girdler. We continue to find many areas of girdler damage on bogs, catching growers unaware. There are several options for girdler control. If pheromone traps are used to monitor adult girdler populations, diazinon 14G should be applied at peak flight of the moths and again two weeks later. If diazinon is used it is important that the restrictions and warning on the label be strictly followed. Remember that liquid insecticide sprays aimed at either adults or larvae are largely ineffective as a control.

Entomopathogenic nematodes are recommended for girdler control and have worked adequately in other regions applied 2-3 weeks after peak flight. Also, growers in BC, Wisconsin and Massachusetts have had good results controlling girdler by sanding affected areas. Sand helps stimulate insect-damaged runners/roots to grow and provides an apparently unfavorable environment for girdler larvae (possibly increases their exposure to native predators such as spiders). Growers are strongly encouraged to use these more environmentally benign treatment methods.

Black Vine Weevil on Wet-Harvested Bogs. This year and last we noticed several wet-harvested bogs with weevil damage. This scenario is easily avoided if the early signs of weevils are noticed before damage. If identified early, a grower can still treat with flooding. Look around the edges of the bogs or in areas where they have been weak and dying back before for notching on the new tips of leaves. Also look for notching on the weeds around the bog. Salal, for example, shows notching very readily. Alternatively, you can sweep in these areas to pinpoint some of the hot spots. If you find a significant amount of notching or weevils in your sweep net, then by all means flood for two weeks post-harvest. Flooding in the fall is more effective than flooding in the spring (small weevils are easier to kill than large ones). Follow it up with a monitoring of larvae in the spring to see how successful your kill was. A weevil larva which has been killed by floodwaters appears distinctly bloated and white in color.

Root Weevil Control - a Progress Report, by Dr. Carl Shanks and Andy Broaddus. Root weevils continue to terrorize growers and researchers of strawberries, raspberries, blueberries, and cranberries. They must rank among the upper 2% of the most difficult insects to kill. There are few new materials to test and it is very difficult to obtain registration--an old excuse but very true. Fortunately we have a few promising materials to work with this year.

Imidacloprid (BAY NTN 33893, Confidor, Admire). This chemical was promising against black vine weevil larvae, but not adults, in a laboratory test. Results in the field have been inconsistent but more testing will continue. The rate of 0.50 lb ai/acre in the spring gave about an 85% reduction in numbers of strawberry root weevil larvae in the field. This treatment will be tested further in 1994-95.

Pirate (AC 303,630, Stalker). This chemical has been tested only in the laboratory. Pirate 3SC was diluted in water to give a concentration of 0.04% of actual toxicant. Strawberry leaves were dipped in the dilution, allowed to dry, and then adult black vine weevils were placed on them. The weevils were killed within 24 hours. This chemical will be field tested in 1994.

Cryolite. This fluorine compound is the same mineral used in aluminum smelting. Ocean Spray entomologists (Larry Dapsis and Andy Broaddus) discovered that a bait composed of 80% dried apple presscake and 20% cryolite was very effective against adult black vine weevils. The Gowan Company is working toward registration on cranberries and an IR-4 project is being conducted at PCCRF. It will be field tested extensively this year. Six acres in Grayland are being tested with this bait at five rates (10, 20, 30, 40 & 60 lbs formulated material per acre). Based on sweep samples in treated and untreated plots 2 days after application, weevil control increased as the rate of bait per acre increased, ranging from approximately 40% control at the 10 lbs/ac rate to 90% control at the 60 lbs/ac rate. These results are preliminary as the experiment is still in progress. Growers will get a report of the final results at Field Day.

Furadan. Furadan granules are an old standby for weevil control. It can be extremely nasty to apply. It is absolutely essential to wear full protective gear when applying Furadan. Also note that it has very poor repeatability with respect to effectiveness when used in the same field year after year. Apply during the last week of June and the last week of July.

Asana. Growers on dry-harvested bogs probably will have obtained a Section 18 for Asana by the time this goes to press. In the past, Asana has been marginally effective against black vine weevil. Our research has shown that there are several techniques which can markedly improve the control of adult weevils that a grower gets with Asana. First, it is important to understand that Asana has a short duration of effectiveness on the vines. Essentially you will control only the weevils that you thoroughly soak with Asana at the time of application. The rest of them may be temporarily knocked down but will come back within a few days. Therefore, timing of the spray and volume of water is critical. If it rains or the sprinklers come on, you will lose effectiveness. It is very important to treat on warm, calm nights when you have maximum weevil activity. It is even better to sweep before you spray to assure that the weevils are there are on top of the vines--their most susceptible state. Low volumes of water such as 100 gal/acre applications are probably not high enough to thoroughly wet the vines for good kill. Higher volumes of water, 200-300 gal/acre might be more effective. Use the full rate of Asana. Dr. Shanks' data indicates that if it is combined with a full rate of Guthion in the tank mix, the control lasts longer and is more effective. It is very important that anyone using this spray combination wear full protective clothing since it has to be put out with a hand gun or boom sprayer.

DISEASE CONTROL

Reducing Fruit Rot. The current recommendations for protection against fruit rot and promotion of keeping quality of fresh fruit are for two sprays after bloom. Dr. Bristow has found that an early spray at the end of bloom is more important with regard to enhancing keeping quality than a later spray. This is also important with regard to maintaining liberal PHI standards for fungicide residue. Dr. Bristow recommends Mancozeb followed by Bravo or the reciprocal in order to improve keeping quality. If a high incidence of fruit rot has been a problem in your pack out, review your irrigation schedule. Irrigate in a manner that does not extend the duration of the dew period, giving the vines ample time to dry out, such as an early morning irrigation. Many of the highest incidents of rot occur where vines are lush from over-fertilization or weed growth which promotes high humidity conditions and lengthens the time it takes the vines to dry out. We are beginning a research program on evaluation of the most efficacious spray protocol for protection against fruit rot and within a few years should have better answers in terms of timing and fungicides for this problem.

Twig Blight. Timing of first cover spray for lophodermium is based solely on spore development. Be sure to follow IPM recommendations for timing. The second spray should be applied in mid-July. A third cover spray near the end of July can be used if you have a serious problem. Bravo and Mancozeb have been shown to provide the best control over the years. We see the biggest problem with twig blight in areas that do not receive good sprinkler coverage. These areas should be sprayed by hand.

Red Leaf Spot on New Bogs. With luxuriant vigor you may get an outbreak of red leaf spot, in which case control can be achieved by spraying with Bravo, Maneb, or Mancozeb.

WEED CONTROL

Weed Wiping. Several growers continue to use a Roundup/2,4-D mix. According to Monsanto, mixing these two together before they are diluted in water could result in a cottage cheese-like consistency. Therefore, dilute with warm water first, before mixing them together. In many instances the 2,4-D mix with Roundup is not necessary. Remember that any use of 2,4-D on hot days can result in some volatilization of 2,4-D and some enhanced potential for vine damage. Under these circumstances you will likely do more harm than good.

As I have noted in the past, when wiping only part of the canopy, we have had our best results using a higher concentration of Roundup (20%). Also, I have had good luck with Himalayan blackberry using a cut stump application with a 50 to 100% Roundup solution.

BOG MANAGEMENT

Leaf Sampling. It is next to impossible to make a good fertilizer recommendation based on soil samples alone, your gut feeling, or your neighbor's program. Leaf analysis can be a very valuable tool for refining our fertilizer practice.. The time to take a sample for its greatest usefulness is late August. Use this sample for next year's fertilizer program.

Rodent/Vole Control. In spring/early summer I am usually besieged with phone calls about rodent damage. Most of the damage is minor and limited to cut vines in the main runs. However, I have seen many instances where significant losses have occurred. If you see a random pattern of dead uprights, what do you do about the problem? Short-tailed meadow mice or voles (*Microtus montanus*) are very prolific little fellows and can have 5 to 6 litters per year, averaging 6 young per litter. Gestation is 21 days and the young are sexually mature in one month. Because of their fecundity, failure to suppress populations may have some serious ramifications. One breeding pair can result in up to 300 new voles. Populations are cyclic within and between years so monitoring can be tricky.

I highly recommend four non-chemical approaches to control. This consists of 1) frequent mowing of your ditch bank to reduce food and protective habitat for the voles, 2) maintaining "mouser cats", 3) encouraging raptors by mowing ditch banks to allow owls, hawks, and kestrels easier visual contact with their prey; one raptor will eat 360-400 voles/year; it also gives the vole less alternative food sources to build up populations, and 4) flooding, if possible.

For raptors, consider artificial perches (a great 4-H, or Boy or Girl Scout project--call me for plans). Research indicates that these have been moderately effective in some situations.

With the chemical approach for vole control, there are several options but let me stress that NO poisons/baits are registered for on-bog use. They must be used only off the bog. The acute toxicant zinc phosphide (ZP Rodent bait) is a fast-acting, single dose stomach poison. Bait usually comes soaked on milo grain. Some orchardists prefer making their own formulation with cut apples and carrots. This appears to work best in the winter. Rodents develop a quick avoidance for this bait so it cannot be used too frequently as they won't feed on it. The anticoagulant baits (chlorophacinone, trade name Rozal, and diphacinone, trade name Ramak brown and green) kill after 3-5 days of continuous feeding. More than a single feeding is usually necessary with anticoagulants. All baits are attractive to domestic pets and also kill non-target birds and other wildlife. It is very important to avoid injury to non-target animals. Do not pile the bait, pick up all spills, avoid treating areas where there is little or no vegetation, do not apply to bare soil. All these baits are on the "may affect" pesticide list for endangered species--please treat them with appropriate caution.

Best control with all baits will occur with applications in the fall (after harvest). Spring and summer applications are only moderately effective. Place bait in their holes or in a feeding station protected from rain/sprinklers. You don't necessarily want long-lasting material as it may be picked up by non-target animals.

It is always difficult to know what degree of control you are getting. This, however, is essential knowledge. One easy way is to put ¼ apple section

in runs and monitor the number of munches left after 12 hours before you put out baits. Then follow up with more apple sections a week or two after you put out the bait. In general, for one or two voles it is not worth the effort. However, an outbreak in population may occur and it is important to be prepared. For more information ask for Extension Bulletin PNW154.

Natural bumble bee food sources, by Rod Macfarlane. Bumble bees store very little food reserves. Therefore, improving the sequence of flower sources around cranberry bogs is considered the leading way to maximize residential populations of bumble bees. In the Pacific Northwest, in order of descending importance, the main cranberry pollinating species are *Bombus occidentalis, B. mixtus, B. melanopygus,* and *B. edwardsii*. *B. edwardsii* occurs only in the Bandon area. Queens of these species emerge from hibernation from late January to mid-April. Colonies are started from mid-February until early May.

The first important flowers for bumble bees in spring are two native pussy willow species. They start flowering in late January, peak about mid-March and gradually decline over the next five weeks. Willows provide the major food source for the first flush of bumble bee nest formation by *B. melanopygus* (red banded bumble bee) followed by *B. mixtus* (orange rear end, cranberry bumble bee). However, willows are poor quality food sources and are seldom used for pollen so the queens deplete their fat reserves. Rain dilutes the nectar in the catkins, which can remain wet for two hours after rain. Similarly, dandelion (less attractive than apple flowers) is subject to nectar dilution, while the small bell flowers of most of the heath family (ericaceae) protect the nectar within the flower from being diluted. The longest and most extensive dearth in food supplies around the bogs with even better food supplies occurs for about two weeks at the end of March.

In April, evergreen huckleberries, with the less attractive but longer flowering salal in reserve, provide the next main floral sources for bumble bees. In the Bandon area, manzanita also flowers at this time and then the quite attractive madrone followed by the more attractive greasewood. Throughout much of the Pacific Northwest in the latter part of April and the first part of May, dewberry (small native blackberry) and blueberries provide the most attractive food sources for bumble bees. Dewberry flowering extends to a limited extent into the period of first cranberry flowering. The large flowered native blackberry (thimbleberry) and wildrose produce attractive pollen for bumble bees; thus, flowering extends long enough to compete for a while as pollen sources with cranberry flowering.

Other common flowers, notably salmonberry, twinberry and other huckleberries, flower from March until early May for the first two species. Their flowers are considerably less attractive to bumble bees. Scotch broom (mainly a pollen source), labrador tea, and native crabapple seem to have limited attractiveness to cranberry pollinating bumble bees.

Before and during the early part of cranberry flowering, greasewood (only in the Bandon area), and cascara or chittham seem to be quite attractive nectar and pollen sources for both bumble bees and honey bees. During the main flowering of cranberry, blackberry, and to a lesser extent, white clover and catsear (false dandelion) provide the most common alternative flowers for bumble bees and honey bees. Marsh cinquefoil provides an attractive nectar source for both bumble bees and honey bees while cranberries are flowering. Marsh cinquefoil is deemed to be complementary to cranberry pollination because it helps maintain the colonies and does not provide a competing pollen source for honey bees.

After cranberries finish flowering, many of the areas around the cranberry bogs throughout the Pacific Northwest have limited food sources,but adjacent hills or tidal sites provide some food from goldenrod and other species of the daisy family.

The amount of alternative flowers around bogs compared to the spring dearth period suggests it is more critical to provide food sources before cranberry flowers rather than during flowering.
From this evaluation of natural food sources around cranberry bogs and variations in feral populations, we conclude that supplemental plantings of bee forage in spring should support better bumble bee populations. Further details on food sources will be presented in the next Cranberry Vine.

PESTICIDES

Washington State Poison Center. Please be sure their number is posted near or on all your phones. Emergency no. - 206-526-2121; their general information no. - 1-800-732-6985.

MISCELLANEOUS

Cranberry BMP's. The cranberry farmers have embarked on a new journey, that of proactively controlling their own regulatory destiny. With the help of the EPA, Pacific County Conservation Commission, Pacific County Soil Conservation Service, WSU, and the PCCRF, farmers are developing BMP's (Best Management Practices). The process allows growers to define how to best manage each practice, such as burning or surface water management. Once these BMP's are approved by the DOE and State Conservation Commission, they can eventually be turned back into individual farm plans for each grower. This should give growers legal precedence for farming, streamlining of the permit process, and cost sharing with the SCS for certain BMP recommendations. BMP's also have a research component. We are working on two projects--pond water treatments and frost protection, both of which have tremendous potential to improve surface water quality.

CAVEAT: The information in this newsletter was selected with good intentions by the editor. To simplify the presentation of information, it is sometimes necessary to use trade names. No endorsement of product is intended nor criticism implied. Where pesticides are mentioned, be sure to follow the labels exactly. If you have comments or suggestions regarding the newsletter, please write to the editor.

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TENTATIVE AGENDA

WASHINGTON STATE UNIVERSITY CRANBERRY FIELD DAY - 1994

Long Beach Research & Extension Unit -

Co-sponsored by the Pacific Coast Cranberry Research Foundation

Friday, July 29, 1994

8:30 - 9:30 Coffee and doughnuts
Registration & Exhibitor Displays

9:30 - 11:00

Dr. Rod Macfarlane - WSU - Long Beach (Visiting Entomologist from New Zealand): Bumble bee, honey bee, and pollination research update.

Dr. Michael Norman - WSU - Long Beach (Post Doctoral Weed Scientist): The mobility and longevity of Casoron in cranberry bogs.

Dr. Kim Patten - WSU - Long Beach: Weed control, frost control, and pond water clean up - a research update.

Andy Broaddus - Ocean Spray: Research update on blackheaded fireworm control and cryolite bait for weevil control.

11:00 - 11:15 Break

11:15 - 12:15

Ludger Wennemann - WSU - Pullman (PhD Entomology Student): How long do entopathogenic nematodes last in cranberry soils?

Dr. Steve Booth - WSU - Vancouver (Post Doctoral Entomologist): Entopathogenic fungi - Their natural occurrence in bogs and use for weevil control.

Ms. Miranda Wecker (BMP Facilitator): Cranberry BMP's - Progress Report.

Dr. Pete Bristow - WSU - Puyallup: Controlling fruit rots.

12:15 - 1:30 Lunch[1]

1:30 - 3:30

Grower Panel - Using Vapam for preplant renovation - Grower experiences - "Never had a better looking field in my life." or "This stuff is worthless."

Jere Downing - Cranberry Institute: Update on pesticide registration and CI sponsored research.

Malcolm McPhail - Pacific Coast Cranberry Research Foundation: What we've done and what's next!

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[1] Lunch is sponsored by the Pacific Coast Cranberry Research Foundation; suggested donation is $7.00. All proceeds will go to the Foundation to help support cranberry research on the West Coast.

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