



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

# CRANBERRY VINE

June 1995

## THE STATION/PCCRF

**Station Update.** Another 1.5 acres have been planted. Last year's planting looks good. We have received a \$6,000 grant from the Cheney Foundation for museum improvements. There will be a PCCRF work day on July 21 for those who wish to help.

## MEETINGS

**Cranberry Field Day.** This year, Field Day will be

held on Tuesday, August 1. Registration and coffee will begin at 8:30 a.m.; talks will begin at 9:30. A tentative agenda is attached.

**Weed Research Plot Tours.** Long Beach, Monday, August 14, from 10:00 to approximately 12:00 at the Ocean Spray Receiving Plant on Sandridge Road. Grayland, Wednesday, August 16, 10:00 to 11:00; park at Steven Dzubay's warehouse off of Cranberry Road. Plots at Long Beach will feature numerous experiments on lotus and purple aster control. Plots at Grayland will feature silverleaf control. Pesticide credits will be given.

## WEATHER

One of the more interesting aspects of the weather has been the delayed bloom of McFarlin. The growing degree days this spring were about normal; the delay was likely the result of the cool rainy weather in June. How this affects our yield, remains to be seen.

Month	Rainfall (Inches)					Growing Degree Days				
	1995	1994	1993	1992	20 yr av.	1995	1994	1993	1992	10 yr av.
January	14.9	8.1	8.7	14.4	10.8	108	76	22	69	40
February	7.4	12.1	1.4	6.0	9.3	84	26	63	118	55
March	8.3	6.4	8.1	1.7	9.5	90	137	94	145	72
April	7.4	5.6	10.3	9.9	5.6	133	164	147	189	116
May	2.8	3.4	5.9	0.9	3.8	280	276	360	296	216
June	3.0	2.9	3.3	1.4	2.8	362	340	386	388	323
July		0.7	1.8	0.4	1.9		440	458	486	421
August		1.4	0.7	1.3	1.7		503	478	477	440
September		1.8	0.3	2.6	4.1		439	359	314	363
October		8.5	2.9	5.2	6.5		171	249	194	217
November		17.0	5.0	11.0	11.4		25	23	69	99
December		17.6	14.0	8.3	12.6		15	35	4	41
TOTAL		85.5	62.5	63.1	80.5		2612	2674	2749	2402



## DISEASE CONTROL

**Fruit Rot Control.** For fungicides to be most effective, a good residue must be left on the plant surfaces. Thus, there may be a slight advantage in applying fungicides for fruit rot in the morning, compared to the evening. When applied in the morning, the material will dry on the plant surfaces as the dew and applied water evaporate, usually within 2-3 hours. With the delayed bloom of McFarlins, time your spray on the basis of crop development, not the calendar. With this being a late season, pay special attention to the PHI. When applied at night (unless applied very late in the afternoon or early evening), the presence of dew does not allow the material to completely dry until the morning hours. The most important thing is that rainfall or irrigation not follow within at least 6 hours of the fungicide application. (adapted from Frank Caruso)

**Stem and Leaf Blight (*Botryosphaeria* and/or *Phyllosticta*).** This year there appears to be a fair bit of this disease. Symptoms are dead uprights with no other apparent cause. Upright leaves may have a brown-orange cast. The undersides of dead leaves have a lot of small black circular pinpoint-size fruiting bodies. Fungicide sprays during fruit development should help. A delayed dormant spray (approximately mid-late April - buds swollen but no leaves showing) of a good copper fungicide also will help.

## WEED CONTROL

**Poast.** There is finally some good news regarding pesticide registration. As most of you are aware, Poast has just been labeled for bearing cranberry bogs. Poast is a selective, broad-spectrum postemergent herbicide for the control of annual and perennial grass weeds. Before using it, make sure you have a cranberry label for bearing beds. On some occasions I have noticed cranberry phytotoxicity from Poast--changes in vine color, slowing of growth. The damage is not permanent but could cause a crop loss in sprayed areas. Damage is avoidable if several precautions are taken. 1) Calibrate your sprayer. The label calls for 5-20 gpa of spray solution per acre. In most cases I assume growers will use a backpack sprayer to apply the product. The gpa of these sprayers can

vary tremendously, depending on nozzle size, pressure and walking speed. Normally backpack sprayers operate between 15 to 20 psi, and usually a person's walking speed is 2.0 to 2.5 mph. Under those conditions if you have an 8002 lp nozzle, you will be around the 20-25 gpa delivery rate. However, the typical tendency is to slow down and really douse the grassy spots (spray to runoff is approximately 300 gpa). This may cause some damage. Based on experiments we have put out recently, the volume of delivery is the most important factor controlling phytotoxicity. For more information on calibration, consult WSU Bulletin PNW 320 - "Calibrating and Using a Backpack Sprayer". 2) Cranberries, especially new tips, are very sensitive to crop oil concentrate and other surfactants. Poor sprayer calibration can result in crop oil concentrate damage. Use lower rates of crop oil to minimize damage. 3) Environmental variables affect susceptibility to phytotoxicity. Avoid spraying during very hot weather or during a climatic shift in temperature. Applications during these conditions exacerbate vine damage. 4) Spray when the cranberry shoot tips are not growing rapidly. This would be before rough neck and after bloom (remember it has a 60 day PHI).

A few other things should be noted when using Poast. Do not exceed 5 pints per acre per season. As has been mentioned in the past, use only for control of actively growing true grasses, not plants with grass names, such as louse grass, or grasses that have stopped growing. It also won't work on annual bluegrass or fine fescues. For young, newly emerging grass, we have gotten fine control with rates as low as 0.5% (4 tsp/gal.) On perennial grass, higher rates may be necessary (1 to 1.5%). As always, apply the product in strict accordance with the label.

**PRISM Labeled for Non-Bearing Cranberries.** Prism herbicide is now labelled for non-bearing cranberries. Prism has a similar effect to Poast and Fusilade and will control grassy weeds if applied according to label directions. Apply Prism at 13 to 17 oz/A at the appropriate stage of growth for grassy weeds listed on the label. Always include crop oil concentrate. Do not apply Prism to bearing beds. Prism controls two grass species that Poast and Fusilade do not--annual bluegrass and fine fescues.



**Roundup.** Roundup may now be applied any time weeds are present on the bog up to 30 days prior to harvest. In order to use Roundup prior to fruit set, you must have a product with the new label or have a copy of the new label with you when you are applying the herbicide.

**Cranberry Weed Mapping.** IPM for cranberry weeds lags behind that of other pests. Work done by the University of Massachusetts (Else and Hillary) in that area has helped to put it into a new perspective. They classify weeds into four priorities. I have modified it for our weed species.

1) Zero Tolerance

"Weeds in this group are extremely damaging to cranberry yields and may kill vines. These weeds are difficult and expensive to control. Spread is rapid. These weeds should be eliminated when they first invade bogs." Included in these are dewberries, lotus, false lily-of-the-valley and silverleaf.

2) Serious Concern

"Weeds in Priority Group 2 are less damaging to yields than those in Group 1. However, these weeds are aggressive and difficult to control and may spread rapidly. These weeds should not be allowed to spread." These include yellow weed, aster, and upright blackberries.

3) Less Concern

"Weeds in this group may reduce yields. Yield impact is lower than in Groups 1 and 2. Spread or growth of these weeds is relatively slow. Control of weeds in Group 3 is not as difficult as control of weeds in Groups 1 and 2." These include perennial sedges, perennial grasses, rushes, willow, clover, and buckbrush.

4) Lowest Concern

"Weeds in this group are found primarily in bare spots, areas of poor cranberry vine growth, or at bog edges. Most are relatively easy to control. Underlying causes of poor vine growth should be addressed." Included are annual grasses and annual broadleaves, horsetail, and mosses.

What does this mean? Since it is difficult to control all the weeds in a given year, it allows you to focus on the most damaging weeds. Therefore, when you map your weeds, code them by priority to help management discussions next spring.

## BOG MANAGEMENT

**Plant Nutrition.** Based on recently published research by Demoranville and Davenport (J Sm Frt & Vit, vol 2(3):81-88, 1994), the application of foliar or granular K supplements to cranberry plants with sufficient levels of tissue K had no effect on fruit yield in two consecutive years. Granular K application actually decreased yield at one location. In another study, Davenport found that continued heavy dosing of K caused calcium and magnesium tissue levels to decrease. The use of foliar K supplements timed to coincide with late fruit set and the middle of the fruit sizing period did not lead to an increase in berry weight. The claims that these materials increase fruit number or weight and, therefore, fruit yield, could not be substantiated by their research. Many of these supplements are quite costly, particularly if applied aerially. Based on this research, this cost is not justified. Nevertheless, many growers use foliar K and swear by it.

If you are going to consider a major foliar K program, do a leaf analysis (this August) and try for a good annual maintenance of nutrients to avoid depressing Ca and Mg levels. Remember, good fertility programs require very astute observations about the way each bog is looking and then making fine adjustments. Regardless, don't make any major changes just because your neighbor is doing it. As most of you know, this can easily backfire. Consider the following when foliar feeding.

- Urea will increase the uptake of minor elements.
- Light will usually increase the uptake of most nutrients, i.e., many of the nutrients are absorbed during stomata openings on the leaf. These close at night.
- Rapid leaf dying decreases uptake.
- Early morning is an ideal time for foliar sprays.
- Chelate forms of micro-nutrients (Fe, Zn, Cu) are by far the most effective.
- Foliar feeding is most effective for micronutrients and when there is a need for immediate response.

- Foliar sprays are most effective only during "critical stages of the plant's development", e.g., boron during bloom.
- Young foliage will absorb more nutrients than mature foliage.
- Surfactant wetting agents often help uptake.
- Biuret is an impurity in some urea formulations and is toxic at high concentrations. When using urea as a foliar spray, make sure it has a low biuret content.
- Very heavy cropping may create a temporary potassium deficiency which could be alleviated by regular K leaf feeding.
- Beware of many foliar nutrient formulations. Some carry a fancy price tag and are only cheap inorganic non-proprietary materials.
- Avoid a shotgun approach to foliar spraying. Use a rifle approach instead, focusing on the most limiting nutrient.
- There is a difference between foliar feeding and liquid fertilizer. Foliar feeds should not be washed off the leaves. Liquid fertilizer, such as fish fertilizer, should be washed into the ground.
- Test for incompatible material when making your own mix.
- If you are using a strong acid (phosphoric acid) or a strong base (potassium hydroxide) for foliar/liquid feeding, be careful. These materials can easily cause permanent blindness or third

degree burns. Always wear safety glasses and protective clothing. When diluting, don't mix these materials together. Don't add water to acid--"Do as you oughta, add acid to water."

**Frost Damage.** This year, as in all years, there are a few bogs which are showing symptoms of mild frost damage. The terminal fruiting bud of a cranberry upright is botanically called a mixed bud (possessing both the vegetative and fruiting buds within the bud scales). Depending on when the cold damage occurs and how cold it is, damage can occur to either the vegetative bud, fruiting bud or both. Normally the vegetative bud is quite hardy, but once it starts to grow it may be more sensitive than the flower. Light frost damage at this time (rough neck) will typically kill the vegetative meristem and not the flower, resulting in an umbrella bloom. Hail will cause similar damage. A serious frost before this time may typically kill just the flower. The big question is, what effect does umbrella bloom have on this year's and next year's yield. A serendipitous research study I did a few years ago answers this question. We clipped off the tips of McFarlin and Stevens uprights in May to represent an umbrella bloom effect and then followed those uprights for fruit set, bud size, fruit per upright, and flower bud set for the next year (Table 1). The results varied by site and variety, but basically fruit set and number of fruit/upright were reduced by about half and return bloom, for Stevens, decreased 4-fold. Therefore, you can still get a crop (this year and next), albeit at a somewhat reduced level. Since all these variables changed by site, it appears that bog vigor is an important determinant in the response of the damaged upright.

Table 1. Effect of early shoot tip removal on fruiting of McFarlin and Stevens cranberry.

Treatment	% Fruit Set						Fruit/Upright					Uprights w/flower buds (%)	
	McFarlin			Stevens			McFarlin			Stevens		McFarlin	Stevens
	Bog Site												
	A	B	C	A	B	A	B	C	A	B	A	A	
Normal upright	37	26	50	48	46	1.2	0.6	1.2	1.8	1.3	66	76	
Tip removal (umbella bloom)	18	17	57	32	18	0.4	0.2	1.0	0.9	0.7	52	19	



**Pollination.** McFarlin bloom seems to be running 7 to 14 days behind normal this year. Based on our research last year, we were able to achieve a significant increase in yield by leaving bees in longer to pollinate the late bloom. The old adage that fruit not set by the 4th of July won't make it, is not entirely true. However, the ability of uprights to set late bloom appeared to be bog-dependent. One bog set good fruit on 30% of the flowers opened after July 4; the other two, less than 10%. Hence, there likely is a vigor component to late fruit set. The big problem with leaving bees is with fireworm spray. Fireworm does not appear to be behind normal flight patterns and optimal spray timing may interfere with pollination, in which case use a pesticide such as Dipel ES or pyrenone. Dipel is made from a natural bacteria. It is only partially effective against fireworm so cannot be strongly recommended. Its activity can be improved by adding pyrenone at 3-6 oz/Ac. Pyrenone by itself is not a bad insecticide for fireworm, but is tricky to use well. Multiple applications of these products may be necessary to achieve adequate control. The application must be made against the young larvae. Apply at night using minimal water volume and a spreader-sticker. Our work with pyrenone suggested comparable kill to diazinon, but if any worm has webbed, it will be difficult to get control, regardless of what you use.

We have also been doing some research on ways to reduce bee kill with traditional insecticides. Spraying at night and irrigating it off in the morning has been suggested. Does this work? Our data is too preliminary to comment, but one trend was very striking. A light irrigation (15 minutes) reactivated the insecticide and actually caused more bee kill than no irrigation at all. At least 1½ to 2 hours of irrigation were required to reduce bee kill. Some insecticides are formulated to cause minimal bee toxicity (e.g., Sevin XLR) once it has dried. Rewetting in the morning with irrigation may enhance bee kill with this product. Realize you are playing with fire when applying insecticides when the bees are out.

Two more good reasons to use insecticides judiciously: the most obvious is to reduce killing bumble bees still on the bog after bloom and secondly, to reduce the kill of predatory insects (e.g., spiders). Cranberry bogs usually have a

healthy spider population, which can help greatly in the control of certain insects.

## PUBLICATIONS

**Compendium of Blueberry and Cranberry Diseases**, edited by Frank L. Caruso and Donald C. Ramsdell. This reference book contains a thorough examination of the diseases and disorders affecting cranberry and blueberry plants. Each individual write-up includes an introduction, a description of symptoms, a description of the causal organism or factors which are involved, information on the disease cycle and epidemiology, control strategies, and a brief bibliography. The book is 120 pages with 190 color photographs and 25 black and white illustrations. It would be an invaluable addition to your library. The price is U.S. \$30; elsewhere \$37. The book can be purchased through APS Press, the American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; phone: 612-454-7250. I have a copy if anyone wants to look at it before buying.

**Pesticide Newsletter.** It is difficult to stay current on pesticide issues and obtain good (non-biased) scientific information on the subject. Alan Schreiber's team at WSU's Food & Environmental Quality Laboratory publish *Agrichemical and Environmental News* monthly and it is priceless if you are involved with any of these issues. To subscribe, contact A. Alan Schreiber, Food and Environmental Quality Laboratory, WSU, 100 Sprout Road, Richland WA 99352-1643; phone: 509-375-9462; FAX: 509-375-9460.

## PESTICIDES

**Poor Water Quality.** Pesticide spraying with high pH water becomes a problem in applications using lower volumes of water. Many pesticides work best in spray water that is slightly acidic, between pH 5 to 6. However, some of our water sources test between pH 7.5 and 8.2. Neutral is pH 7.

Applicators, too, sometimes create a pH problem by adding to the spray mix components that raise the pH. For instance, applying boron in the form of Solubor will raise the pH of water from 7 to about 8.9. High pH can reduce the effectiveness of some pesticide chemistry and shorten its residual activity.



Another problem is hard water (water containing calcium, magnesium, or iron ions). These free ions react with certain pesticide chemistries to either deactivate them or precipitate them out. Our water is especially high in iron.

Water containing soil particles (silt or clay) can also cause problems. If you mix glyphosate-based products, such as Roundup, with such water, the soil particles can absorb the pesticide and render it inactive.

Several water-conditioning agents that are on the market lower the pH of the water, then buffer it to hold the lower pH as pesticides and nutrients are added. They also contain sequestering agents that react with the free hard water ions to tie them up and make them ineffective. Modified from *Ag Retailer*, April/May 1995.

**Worker Protection Standard (WPS) and Restricted Entry Interval (REI).** In my opinion, these rules are still unclear. According to the WSDA, here is what cranberry farmers must do when applying a pesticide. First, read the label. It will say on the label whether written or oral notification must be given to workers. If it says written or written and oral, then you must post. If it says written or oral, or just oral then you can tell your workers verbally. Most of the cranberry labels indicate we can get by with verbal notification. Regardless of posting requirements, you must have a written record of what you are going to spray prior to the application. This is a running record of all your applications. It should have the chemical name, EPA number, time, and date of application, type of warning, location, and the REI. It needs to be posted next to your safety poster (central to the workers' gathering place). You can obtain a safety poster from Gemplers (1-800-382-8473).

As an aside, all the above is only relative to workers on the farm, not to the general public or independent consultants who may access your farm. Therefore, unless you have workers, you don't have to be concerned with posting. Nevertheless, it is still good policy.

Regarding the REI, the following list, based on product labels, gives the new legal reentry intervals for pesticides used on cranberry bogs.

#### REI for Cranberry Pesticides

	<u>Restricted Entry Interval</u>
<u>Insecticides</u>	
Bt products	12 hr
Diazinon	12 hr
Guthion	48 hr
Lorsban	24 hr
Orthene	24 hr
Pyrenone	12 hr
Sevin	12 hr
<u>Fungicides</u>	
Champ 23% a.i.	12 hr
Champ Formula 2	48 hr
Bravo, Terranil, Supanil Carbamate	24 hr
Dithane, Maneb, Manex, Manzate, Penncozeb	24 hr
Kocide	48 hr
Top Cop	24 hr
Ridomil	12 hr
<u>Herbicides</u>	
Devrinol	12 hr
Casoron, Norosac	12 hr
Evital	12 hr
Fusilade	12 hr
Mirage, Rattler, Roundup	12 hr
Poast	12 hr
Princep	12 hr
Weedar 64	48 hr
Weedone CB	12 hr
<u>Fumigants</u>	
Basamid	24 hr
Vapam	48 hr

Always look on the label of the product you are using to confirm the REI. Worker protection standards allow for reentry prior to the interval with two exceptions. These are:

1) "Limited Contact" Activities. Under this exception, workers are permitted to enter pesticide treated areas during restricted entry intervals (REI) in order to perform certain activities that would involve relatively little exposure, or "limited contact," with pesticide-treated surfaces. Workers must be

provided with personal protective equipment (PPE) to minimize exposure. The time workers can remain in treated areas must not exceed eight (8) hours in any 24-hours period. In most cases, the time spent in the treated area is expected to be less than eight hours.

2) Exception for Irrigation Activities. Under this exception, irrigation workers are permitted to enter pesticide-treated areas during the REI. Like the exemption for limited contact activities, workers must be provided with appropriate PPE to minimize exposure. The time allowed in the treated areas must not exceed eight (8) hours in any 24-hour period.

### MISCELLANEOUS

**Taxes.** Are you paying taxes on your cranberry bog at the open space rate or at the normal assessed value? For those of you not assessed as open space, the saving for conversion is significant (~one-half rate) with almost no risk. Contact your County Assessor's Office to be sure.

**Cranberries on the Internet?** Those of you who enjoy using E-mail should subscribe to the cranberry E-mail list server which has just been established at the University of Wisconsin. It is a great way to get good information and communicate with people working on cranberries. To subscribe send a message to [listserv@wisplan.uwex.edu](mailto:listserv@wisplan.uwex.edu). The message should only say: subscribe cranberry-list first name last name. To post a message use: [cranberry-list@wisplan.uwex.edu](mailto:cranberry-list@wisplan.uwex.edu).

**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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COOPERATIVE EXTENSION



Washington State University

Long Beach Research and Extension Unit

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### Cranberry Insect & Disease IPM Calendar - WSU PLS-78.

Not all pests will be in all fields. Listing a pest at a point on this calendar does not mean that treatment is necessary. Always determine by appropriate methods (sweep net, pheromone traps, visual inspection, etc.) if the pest is present and if treatment is necessary. See PNW-247 for more information on these pests and WSU Cooperative Extension Bulletin EB845 for specific chemical recommendations.

Time Period	Activity
Late dormant (March 15-31)	Disease - stem and leaf blight (sprays)
Late March through April	Insect - scout for black vine weevil Disease - scout for <i>lophodermium</i> twig blight
Buds break dormancy	Disease - stem and leaf blight, cottonball (sprays)
Late April through early May	Disease - scout for rose bloom
Mid-April to early May	Insect - black vine weevil adults (spray) and larvae (apply nematodes)
Rough neck (approx. May 1)	Disease - rose bloom (spray)
Late hook (May 15 $\pm$ 5 days)	Insect - fireworm, tipworm, fruitworm (spray) Disease - rose bloom, stem and leaf blight (spray)
Early bloom	Disease - cottonball (spray)
80% blossom drop, bees gone	Insect - fireworm, fruitworm, tipworm (sprays) Disease - fruit rot, storage rot, <i>lophodermium</i> twig blight (sprays)
About July 1 - 7	Insect - cranberry girdler (apply nematodes or appropriate chemical if pheromone traps show need). Scout adult black vine weevil and spray
July 1 - 15	Disease - fruit rot, storage rot, <i>lophodermium</i> twig blight (sprays)
July 25 - August 10	Insect - fireworm (only if 3rd generation larvae are present), fruitworm, <i>lecanium</i> scale (sprays) Disease - fruit rot, storage rot, <i>lophodermium</i> twig blight, <i>phytophthora</i> root rot (sprays)
August 20 -25	Disease - fruit rot, storage rot, <i>lophodermium</i> twig blight (sprays)
mid- to late September	Insect - black vine weevil larvae (apply nematodes)
October	Insect - black vine weevil (hold flood water 4-7 days if a problem exists)

PLS - 78 prepared by Carl Shanks, Peter Bristow, Kim Patten, and Arthur Antonelli, Washington State University, March 1995.



**TENTATIVE AGENDA**  
**WASHINGTON STATE UNIVERSITY CRANBERRY FIELD DAY - 1995**  
 Long Beach Research & Extension Unit  
 Tuesday, August 1, 1995

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

9:30 - 3:00

Dr. Kim Patten - WSU - Long Beach: Research on weed control, frost tolerance and injury, pond ecology, bee management and pollination.

Dr. Pete Bristow - WSU - Puyallup: How to use fungicides so they will work.

Dr. Steve Booth - WSU - Vancouver: Weevil control with fungus.

Jere Downing - The Cranberry Institute: Update on pesticides and environmental issues.

Grower Panel: Foliar feeding--what we use, when and how much, successes and failures.

Malcolm McPhail - PCCRF: Where do we go from here?

Lunch (Salmon barbecue)

Dr. Lynell Tanigoshi - WSU - Vancouver: The future of IPM in cranberries.

Sue Butkewich - Ocean Spray: Weed control issues.

What is this weed? Display of fresh bog weeds which are hard to ID. Also try to stump the botanist--bring your unknowns.

Bog Tour - Arrow grass control, variety trials, bumble bee gardens, Poast efficacy trials.

Used cranberry equipment sales (All PCCRF members are welcome to exhibit and sell their used equipment during Field Day).

Research Displays - Vole control with raptor perches, methods to reduce bee poisoning with insecticides, ways to increase pollen collection by honey bees, pond ecology and water quality, sensor behavior during a frost - do you really know what your minimum temperature is?, winter and spring hardiness of Stevens flower buds.

Commercial exhibits.

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On the evening of July 31, there will be a reception and potluck at the McPhail farm.