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CODLING MOTH SEX PHEROMONE TRAPS

(Installation, Maintenance and Interpretation)

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Growers with apple and pear blocks will find their decisions on codling moth spraying easier if sex pheromone traps are installed in their orchards.

With correct installation and regular maintenance, the information that traps provide can help determine the need for and timing of sprays. The traps themselves will not control or prevent codling moth damage in orchards, but will sample and monitor the population levels. The numbers and locations of the moths caught provide the basis for decisions on if and where a spray is needed.

The first moth captures from these traps may also be used to provide the starting point of a program which uses degree-days or accumulated heat units to predict timing of sprays. The pamphlet "Predicting Codling Moth Dates with Degree-Days" is available from B.C. Ministry of Agriculture and Food offices.

TRAP ASSEMBLY AND MAINTENANCE

Traps are available through orchard supply outlets and are usually sold as unassembled three-trap kits. Each trap consists of one top and three replaceable bottoms, all made of plasticized cardboard, plus three rubber lures containing the codling moth attractant or sex pheromone. A length of wire is also supplied to hold the top and bottom together and to hang the assembled trap in a tree.

The top, bottom and sides should fit together snugly with the cut-out section of the bottom providing the only opening for moth entry. The traps are assembled as shown in the illustration on page 6.

The attractant or lure can be placed either in the centre of the sticky material of the bottom or suspended inside the top of the trap on a straight pin. Extra lures should be stored in a cool place in their original containers or in a screw top glass bottle. A refrigerator's freezer compartment provides the best conditions for storage.

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To ensure the effectiveness of the traps, replace lures and bottoms at six week intervals. Change the bottoms more frequently if debris or dust has caused a loss in stickiness of the material in the trap bottom. Old lures should be collected and disposed of where any scent left in them will not compete with your trap lures.

TRAP INSTALLATION

Trap Density

One trap per hectare is the recommended density for British Columbia apple and pear orchards. To determine the location and number of traps required for your orchard, make a map of the planting and divide it into one hectare square blocks (one hectare = 100 m x 100 m = 2.5 acres = 330 ft. x 330 ft.). Make the blocks as close to a hectare in size as possible and locate a trap in the centre of each block. Since most plantings are not square, see page 6 for more help in determining where to install traps and to determine how many are needed.

Trap Placement

If neighboring orchards are within 25 metres (75 ft.) of your trees, it is advisable to place traps in these orchards to reduce the number of moths that might be attracted to your traps. If this is not done, the extra moths caught might indicate that a spray is needed when it is not necessary. Place these traps three tree spaces or rows into the neighbor's orchard at 200 metre (650 ft.) intervals along the borders. If you are at odds with your neighbor, the traps can be placed in the border row of your orchard. Do not use the moth captures in these border traps to indicate if a spray is required.

Orchards with ravines or on very sloping land have special trap placement problems because moths must fly up-wind to follow the odor-trail of a lure to its source. As moths are active only at dusk and when winds are light, these conditions cause a lure's scent-trail to follow the air drainage patterns down hills and gullies. Under these conditions, traps inside an orchard should be moved from the centre to the uphill portion of the area it monitors. Outside traps should be located only along the border on the downhill side of an orchard and are not required on the orchard's uphill boundary.

Start-Up Date

Traps should be installed at the blossom-stage of apples (if the traps are to be used with degree-day summation programs, they must be installed in the orchard not later than the pink bud-stage).

Use your orchard map to locate the trees on which to hang the traps. Place each trap on a convenient limb inside the tree canopy at about eye level. Avoid any locations where sprinklers or machinery will damage the traps.

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RECORDING AND INTERPRETING TRAP CAPTURES

Records

An accurate record of weekly moth captures must be kept for each trap. Number each trap and locate that number on your orchard map to help in interpreting results. Make a record sheet to list the weekly captures for each trap. See example of record sheets on page 6.

Visit the traps each week, preferably on the same day. Count the trapped codling moths and record the number in each trap on the record sheet. Remove the trapped moths after each visit. You do not need to record moths caught in the traps in your neighbor's orchard, but do not neglect the servicing of these traps as they must remain functional.

One week after the traps are installed, begin to record your moth captures, but don't use this first week's catch in determining the need for spraying. Male moths emerge early and tend to wander about in search of females; therefore the traps may be picking up a two or three week accumulation of these moths in the first week. After the first week of trapping, all moth captures are of significance.

Treatment Levels

Orchards should be sprayed when the potential value of fruit damage from codling moth populations is expected to be more than the costs of spraying. Treatment levels can vary with the crop size, fruit prices, tree numbers, varieties, and other factors. The treatment levels used here should provide satisfactory results for most commercial orchards in British Columbia. With experience, growers may wish to raise or lower these treatment levels to suit their conditions. If you have no codling damage at all - you may be spraying too much!

First Brood - Apple orchards with average captures of two moths per trap for two weeks in a row will require a codling moth spray, but do not spray until the timing is favourable, see Timing Sprays below. For pears, the treatment level is an average of five moths per trap for two consecutive weeks.

Second Brood - For apples, treatment levels are same as first brood - two moths per trap for two consecutive weeks. Pears become more susceptible to moth damage as the fruit sizes and softens, therefore the treatment levels are a three moths per trap average per two week period.

In an apple orchard where moth captures from all traps have averaged less than the treatment level, some individual traps may have averaged two or more moths for two weeks, the area around these traps should be sprayed. Remember, a trap which captures five moths the first week and none the next has captured a weekly average of more than two moths over the two week period.

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Also if a trap has no moths the first week, but has caught five the following week, delay spraying until the end of the following or third week.

Timing Sprays

First Brood (May to June) - Moth captures determine the need for spraying; weather conditions determine the timing. Do not spray until treatment levels occur.

The most accurate method to fix the time of this spray is by the use of the degree-day or heat accumulation program. This program can determine moth and egg development from daily temperatures to predict when the first spray is best applied.

Other, but less effective methods can also be used for first brood spray timing. Some of these methods are:

1. Female codling moths must have several warm days to mature their eggs and then have temperatures of 17°C at dusk (approximately 8:00 p.m. to 9:00 p.m. - Daylight-Savings Time in Okanagan area) to mate and to lay their eggs. Spraying should begin when these eggs hatch. Hatching should occur one to two weeks later under normal temperature conditions. If the weather is cool in this two week period, delay the spraying an another week.
2. Watch for codling moth larval "stings" on the fruit in the upper parts of the trees. Spray when this fruit damage appears.
3. Use the timing of spray bulletins announced by local radio stations, or, from the recorded code-a-phone messages at local district horticultural and packing house offices.

The insecticides recommended in the Tree Fruit Production Guide will provide about three weeks of protection from fruit damage. Do not expect a sudden drop in moth captures after a spray is applied - the insecticides protect the fruit from larval attack, but may not provide a high kill of adults. If the moth count continues to be high for two weeks after a spray is applied, do not be concerned. However in the third and fourth weeks after the spray was applied, if the moth captures reach treatment levels apply a second spray.

Second Brood (end of July to mid-September) - Trap captures will show both the timing and the need for a spray. If captures reach treatment levels (as discussed above) apply a spray as soon as possible. In late July and August the temperatures at dusk are usually ideal for codling moth mating and egg-laying and there is no need to delay spraying. Remember, you have three weeks protection following a spray and, that additional control will be needed only if the moth counts are again high in the third and fourth weeks after spraying.

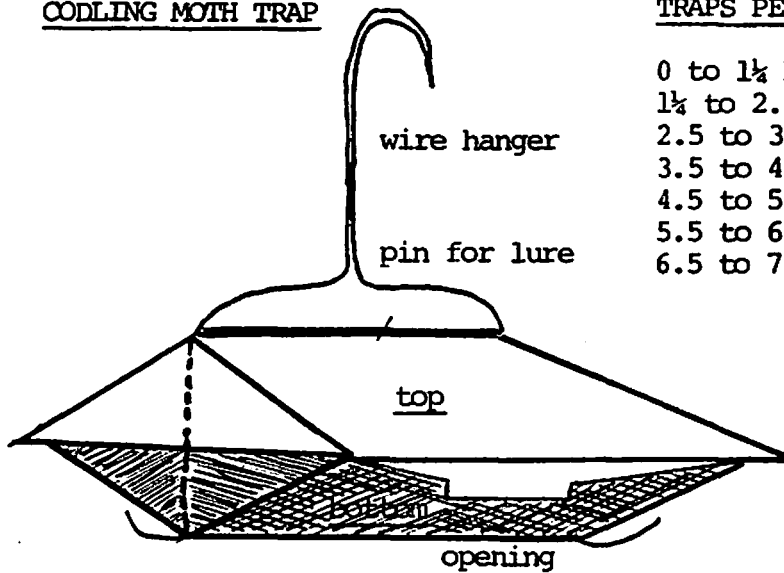
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During late August to mid-September, further sprays may be required to prevent fruit damage if trap captures reach treatment levels, and, if evening weather conditions have been favourable for mating and egg laying. Continue to record trapped moth numbers until within two weeks of harvest or until cool weather. Moth activity stops when temperatures at dusk are consistently below 17°C, about mid-September.

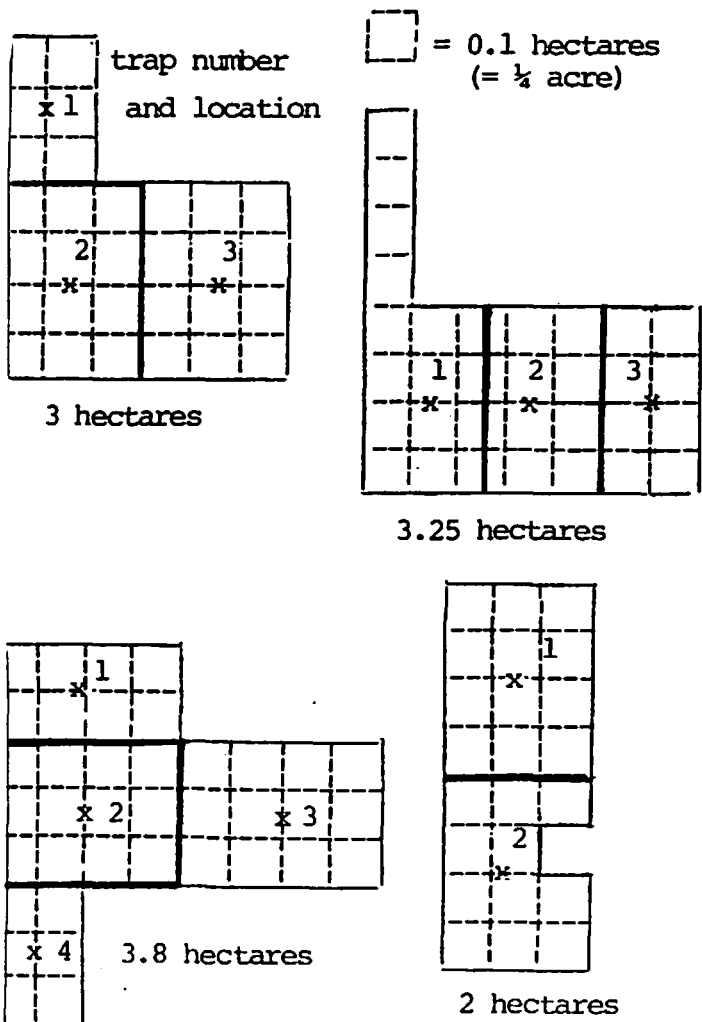
POINTS TO REMEMBER

1. Use the recommended trap density. The need to spray was determined with the traps at one per hectare, more or less traps will affect moth captures.
2. Place traps on limbs within the tree canopy, not on poles or stakes between trees.
3. Keep the traps in good condition and keep accurate records.
4. Remove all moths from traps after each weekly count.
5. Other types of insects may appear in the traps - be sure of your codling moth identification.
6. Change trap bottoms after six weeks of use. Change the bottom whenever the sticky surface becomes spoiled with pieces of insects or other debris.
7. Change the lures at six week intervals and remove the old lures from the orchard.
8. Where over-tree irrigation is used, it may be necessary to replace the tops of some traps during the season.
9. The residual protection from sprays can be shortened if heavy rains or irrigation occurs within two days of application.
10. The timing of sprays is important. The degree-day program can improve timing.
11. Most important - ask questions if any of these instructions need to be clarified, or, if moth captures and results are not what you expected.

PJP:fb
1/20/86

CODLING MOTH TRAPTRAPS PER HECTARE

- 0 to 1½ ha - use 1 trap (= 3 acres)
 1½ to 2.5 ha - use 2 traps (= 3 to 6 acres)
 2.5 to 3.5 ha - use 3 traps (= 6 to 8½ acres)
 3.5 to 4.5 ha - use 4 traps (= 8½ to 11 acres)
 4.5 to 5.5 ha - use 5 traps (= 11 to 13½ acres)
 5.5 to 6.5 ha - use 6 traps (= 13½ to 16 acres)
 6.5 to 7.5 ha - use 7 traps (= 16 to 18½ acres)

ORCHARD MAPS AND TRAP LOCATIONSMOTH CAPTURE RECORD

Date	Captures from Inside Traps					Outside Orchard		Total All Traps
	1	2	3	4	Total	5	6	
May 8	Installed traps					-	-	-
May 15	1	0	5	1	7	3	2	12
May 22	0	0	1	0	1	0	1	2
May 29	4	1	2	0	7	2	2	11
June 5	1*	0	1	2	4	1	1	6
June 12	2	0	2	2*	6	1	2	9
June 19	2	1	0	3	6	4	2	12
June 26	0	0	0	1	1	0	1	2
July 3								
July 10								
July 17								
July 24								

* Spray needed around traps.

(Change lures and bottoms on June 19 and July 31)