2015 ANNUAL CENTRAL COAST STRAWBERRY MEETING

February 20, 2015

Light Brown Apple Moth (LBAM)

Mary Lou Nicoletti
Santa Cruz County Agricultural Commissioner

PRINT

Home Page

Welcome

Welcome to the University of California Cooperative Extension - Santa Cruz County website. We hope you find this information useful and beneficial for your business practices and home use.

Our Mission

The University of California Cooperative Extension is dedicated to protecting and improving the resources and quality of life in Santa Cruz County by providing research-generated knowledge and techniques related to agriculture, natural resources and youth development.

Current News

New Publication from UC IPM

Support UC Cooperative Extension with Your Gift

MAKE A GIFT

UCCE Santa Cruz County Fund

Agriculture Calendar

Event Name	Date
Irrigation & Nutrient Management Meeting	2/19/2015

PRINT

Strawberries & Caneberries

The strawberry and caneberry (raspberries and blackberries) program is run by Mark Bolda and serves the grower community via traditional agricultural extension, research and investigation of problems in these important crops in Santa Cruz, Monterey, and San Benito Counties. Current areas of proposed research include enhancing yield and post harvest quality of promotion of winter strawberry production,investigations into the cost of production of caneberries, and being on the alert for issues arising from the transition from methyl bromide to alternative soil fumigants.

2012 Sample Costs To Produce Raspberries

PRINT

UC IPM Website for Strawberries

http://www.ipm.ucdavis.edu/PMG/selectnewpest.strawberry.html

UC IPM Pest Management Guidelines

University of California's official guidelines for pest monitoring techniques, pesticides, and nonpesticide alternatives for managing pests in agricultur floriculture, and commercial turf. More

Authors & credits | All crops | Download PDF | Recent updates

General Information

- Characteristics of Strawberry Cultivars Commonly Grown in California (6/08)
- Drip Fumigation (6/08)
- Field Preparation (6/08)
- Field Selection (6/08)
- Handling Strawberry Transplants (6/08)
- Relative Toxicities of Insecticides and Miticides Used in Strawberries to Natural Enemies and Honey Bees (6/14)
- General Properties of Fungicides used in Strawberries (5/10)
- Fungicide Efficacy for Strawberry Diseases (10/13)
- Most Effective Treatment Timings for Key Diseases (10/13)

Diseases

- Angular Leaf Spot (4/05)
- Anthracnose (6/08)
- Botrytis Fruit Rot (6/08)
- Charcoal Rot (1/13)
- Common Leaf Spot (6/08)
- Fusarium Wilt (1/13)
- Leather Rot (6/08)
- Mucor Fruit Rot (6/08)
- Phytophthora Crown Rot (6/08)
- Powdery Mildew (6/08)
- Red Stele (6/08)

Insects and Mites

- Aphids (5/10)
- Beet Armyworm(5/10)
- Cabbage Looper (5/10)
- Corn Earworm (5/10)
- Cutworms (5/10)
- Cyclamen Mite (5/10)
- European Earwig (6/08)
- Garden Symphylan (6/08)
- Leafrollers (3/13)
- Lygus Bug (6/12)
- Root Beetles (6/08)
- Saltmarsh Caterpillar (5/10)
- Slugs (6/08)
- Spider Mites (10/14)
- Spotted Wing Drosophila (5/10)
- Vinegar Fly (5/10)
- Western Flower Thrips (5/10)
- Whiteflies (5/10)

Weeds

- Strawberry Weed Photo Gallery, with Common and Scientific N
- Integrated Weed Management (6/12)
- Special Weed Problems (6/12)

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Strawberry

Leafrollers

Scientific Names:
Garden tortrix: *Ptycholoma* (= *Clepsis) peritana*
Light brown apple moth: *Epiphyas postvittana*
Orange tortrix: *Argyrotaenia franciscana* (=*A. citrana*)
Apple pandemis: *Pandemis pyrusana* and others
(Reviewed 6/08, updated 3/13)

In this Guideline:

DESCRIPTION OF THE PESTS

Several leafrollers in the family Tortricidae are present in strawberry and vegetable-growing areas of the Central Coast. Of t
most likely to be found feeding on strawberry fruit. The orange tortrix and apple pandemis are primarily foliar feeders. The li
species, was first detected in the San Francisco and Monterey Bay areas in spring 2007. The adults of all of these leafrollers
bell-shaped tortricid moth wings while at rest. Some leafrollers have only one generation in a year, but most leafrollers that
4 generations a year, depending on species and location. When disturbed, these leafroller caterpillars wriggle vigorously.

Garden tortrix

The adult garden tortrix is a buff-brown moth that is about 1/4 inch (6 mm) long. Each of the forewings is marked with a da

caterpillars are 1/2 to 3/4 inch (10 to 18 mm) long. Updated information on light brown apple moth and regulatory quarantine procedures in California can be found on the UC IPM Web site and at your county Agricultural Commissioner's office.

DAMAGE

Most leafroller larvae, including the light brown apple moth, tie one or more strawberry leaves together with white webbing to create shelters. Larvae can also create shelters by binding leaves or the sepals of the calyx to fruit and may feed from these sheltered areas on the surface or internal tissues of fruit.

Early in the season, the garden tortrix serves a valuable function in breaking down and recycling old leaf and fruit litter. It generally does not cause significant damage when strawberry plants are small. However, as the population increases and the plant canopies close in, more ripening berries come in contact with trash where they may become exposed to the tortrix larvae. When this happens, larvae will often spin a nest in creases along the berry's surface and may chew small, shallow holes in the berry, incidental to their scavenging. Thus, as populations increase in late spring or early summer, significant fruit losses can result from both larval contamination and secondary rots invading the feeding holes. During late June and July, contamination of south coast fields just before the berries are sent to the processors can be a serious problem. Fruit damage can appear similar to that caused by other Lepidoptera larvae including corn earworm, armyworms, and cutworms.

The light brown apple moth is unique; its detection in strawberry fields will result in difficulties shipping fruit out of the quarantine area.

MANAGEMENT

In areas with a chronic tortrix problem, it may be feasible to remove accumulated trash in spring around the plants to limit the potential for a large population buildup. This is especially important in summer plantings and second year fields where it is more likely for leafrollers to be present. Because it is difficult to distinguish the light brown apple moth larvae from other leafrollers in appearance and behavior, a preventive approach, consisting of sanitation, monitoring, and chemical treatments, targeting all leafrollers is currently suggested for strawberry fields within quarantine zones. This will ensure that no larvae will be present in harvested fruit. This approach will avoid shipment delays and possible loss of fruit marketability.

Organically Acceptable Methods

Remove dead vegetation from strawberry fields to reduce overwintering populations. Sprays of *Bacillus thuringiensis* and the Entrust formulation of spinosad are acceptable for use in organically certified strawberries. Sprays of *Bacillus thuringiensis* can be more effective if applied multiple times at close intervals, because it exposes survivors of previous applications to another dose of this material. Additionally, it can be helpful to lower water carrier volumes to concentrate the dose of the material ingested by the larvae.

Monitoring and Treatment Decisions

There are several ways to monitor for leafrollers, including the light brown apple moth.

In the spring, before the commencement of harvest, begin monitoring by examining plants for larvae. Leaf rolls made by larvae are not hard to find and tend to consist of one or more (usually mid-aged) strawberry leaves webbed together. If a leafroller or the concomitant webbing is detected, it is recommended to search more thoroughly in the immediate vicinity of the initial find, because leafrollers often aggregate. Larvae in fruit can be detected during harvest. The infested fruit and larvae should be destroyed. Webbing under the calyx, frass, or holes in the fruit, all indicate leafroller activity. Fruits have to be observed closely, since early leafroller instars are exceedingly small and can hide under the calyx.

The following materials are listed in order of usefulness in an IPM program, taking into account efficacy and impact on natural enemies and honey bees. When choosing a pesticide, also consider information relating to environmental impact. Not all registered pesticides are listed. Always read label of product being used.

A.	SPINOSAD			
	(Entrust)#	1.25-1.5 oz	4	1
	(Success)	6 fl oz	4	1

MODE OF ACTION GROUP NUMBER[1]: 5
COMMENTS: Most effective against younger larvae. Rotate to an insecticide with a different mode of action after two successive applications. Maintaining proper pH of the spray tank water is critical for maximum efficacy.

B.	CHLORANTRANILIPROLE			
	(Coragen)	3.5-5.0 fl oz	4	1

MODE OF ACTION GROUP NUMBER[1]: 28

C.	BACILLUS THURINGIENSIS ssp. KURSTAKI#			
	(Thuricide)	Label rates	4	0

MODE OF ACTION GROUP NUMBER[1]: 11
COMMENTS: Treat when armyworms are still small. To be effective, Bt must be applied no later than the 2nd instar.

D.	METHOXYFENOZIDE			
	(Intrepid 2F)	6-12 fl oz	4	3

MODE OF ACTION GROUP NUMBER[1]: 18

E.	SPINETORAM			
	(Radiant SC)	6-10 fl oz	4	1

MODE OF ACTION GROUP NUMBER[1]: 5
COMMENTS: Rotate to an insecticide with a different mode of action after two successive applications (Success/Entrust have same mode of action). Maintaining proper pH of the spray tank water is critical for maximum efficacy.

F.	DIAZINON*	12.75 fl oz/100 gal water	3 days	5

MODE OF ACTION GROUP NUMBER[1]: 1B

CANADA – Canada is our County's largest trading partner. Our County ships over $40 million dollars worth of strawberries each year.

Growers must sign a **Compliance Agreement** with the Agricultural Commissioner if strawberries (or other berries) will be shipped to **Canada**. You agree to:

- Implement an IPM program aimed at leafrollers
- Apply appropriate treatments if leafrollers are found
- Do visual inspections on production fields on a weekly basis starting 30 days before harvest, and keep scouting records
- The scouting must be done by a licensed PCA or an "approved scout"
- Mark Bolda is conducting approved scout trainings in March
  - Held at UCCE Auditorium, 1432 Freedom Boulevard in Watsonville
  - Wednesday March 4 from 8 – 9 AM – IN ENGLISH
  - Thursday March 5 from 8 – 9 AM – IN SPANISH
- Questions on shipping to Canada? Call the Ag Commissioner office 763-8080

Field Fumigation Update

Santa Cruz County
Agricultural Commissioner's Office
175 Westridge Drive
Watsonville, CA 95076
(831)763-8080
www.agdept.com
Juan Hidalgo
Deputy Agricultural Commissioner

2014 Fumigation Season Review

- 2014 Fumigation season statistics
- Areas in need of improvement
- DPR Chloropicrin mitigation measures
- 2015 Santa Cruz County fumigation Permit Conditions

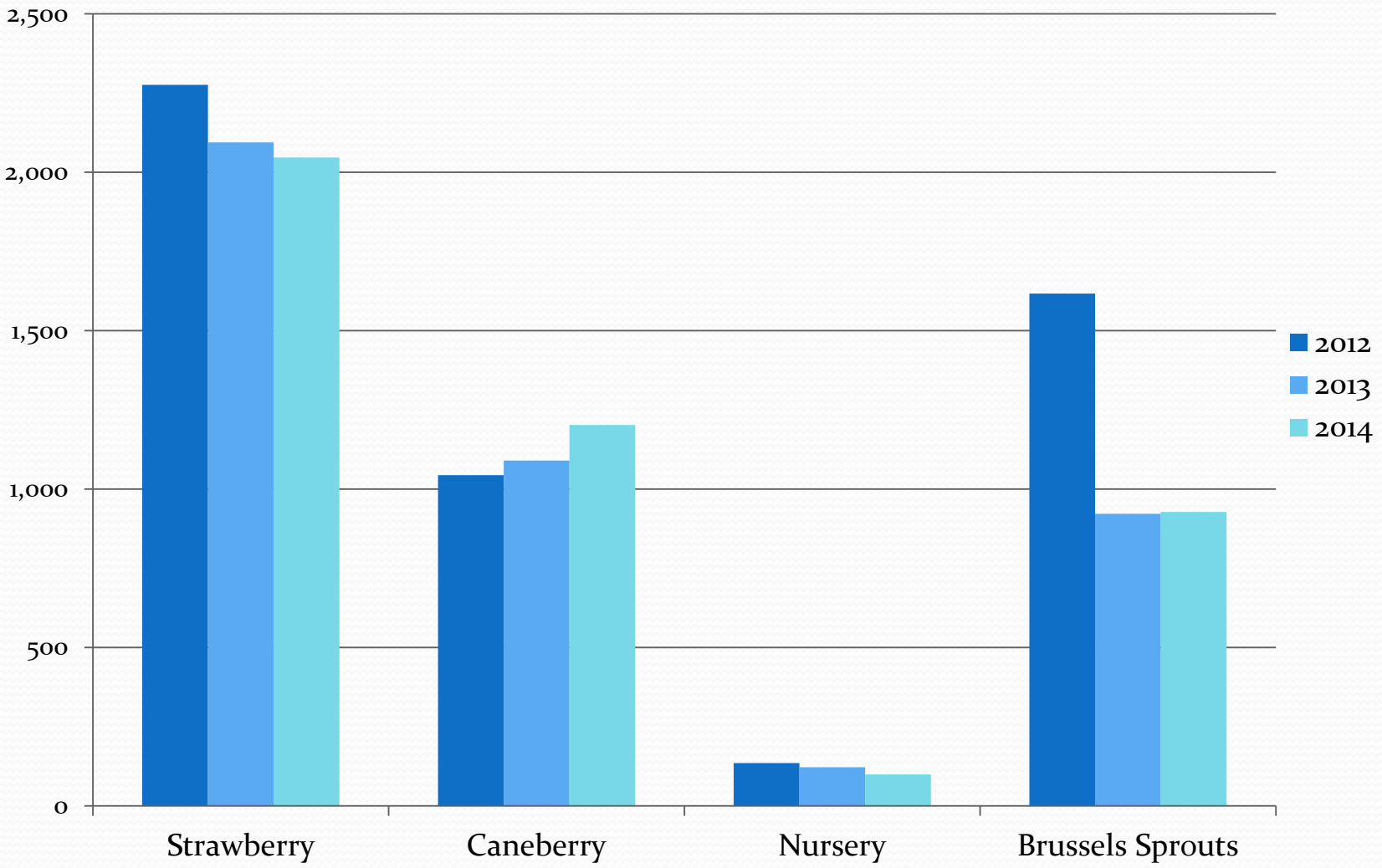
2014 Santa Cruz County Fumigation Statistics

- Inspectors evaluated over 150 Fumigation Work Plans
- The Commissioner's office received over 300 Notices of Intent for soil fumigations
- Average area fumigated 13 acres
- Smallest area fumigated 0.25 acres
- Largest area fumigated 40 acres
- Top commodities fumigated:
  - Strawberry
  - Caneberry
  - Brussels Sprouts
  - Nursery

Fumigated Acreage by Commodity in 2014

• Strawberries	2,047 acres
• Caneberries	1,202 acres
• Brussels Sprouts	928 acres
• Nursery	99 acres
Total	4,276 acres

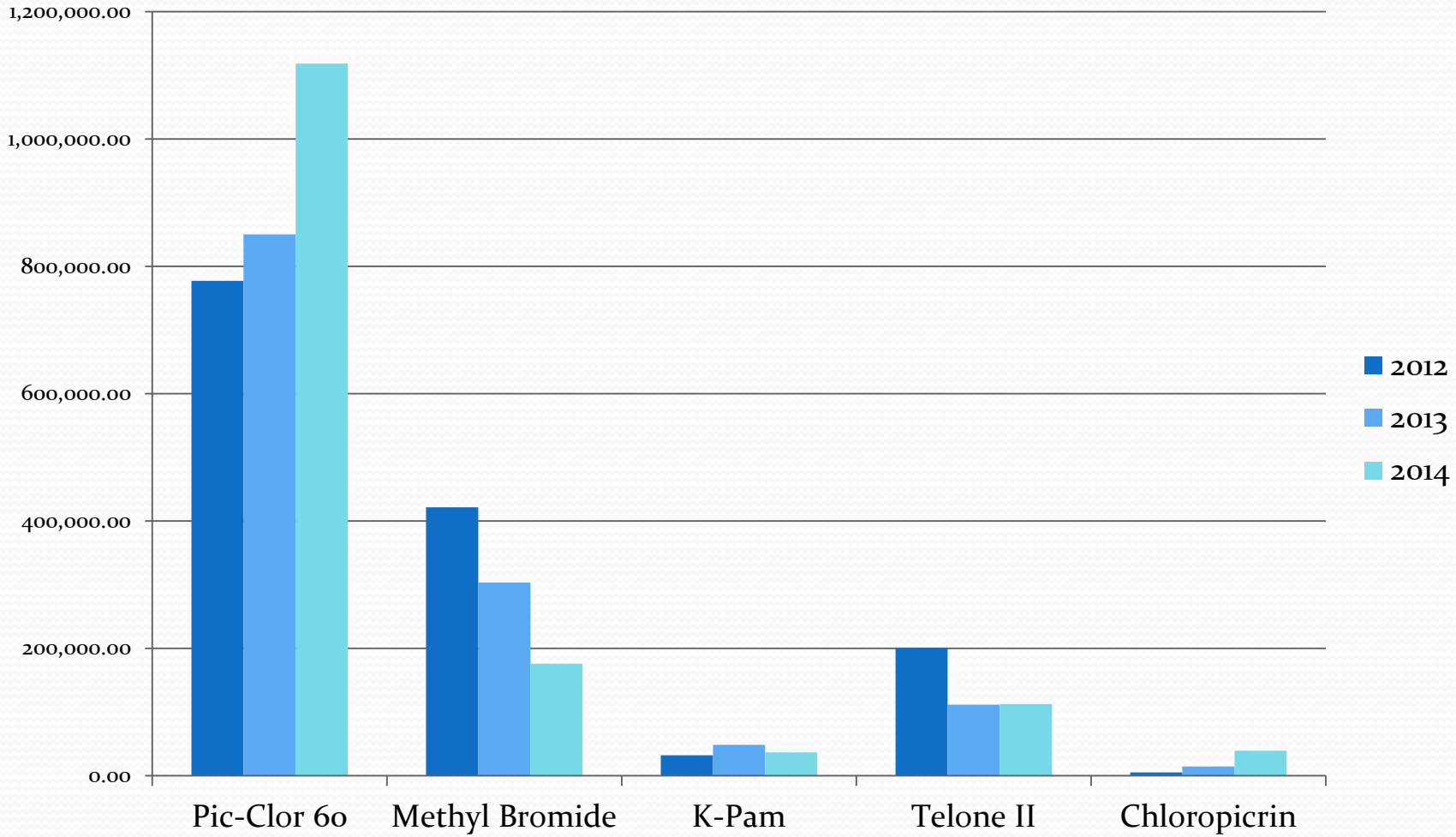
3 Year commodity acreage comparison



Santa Cruz County fumigants used in 2014

• Pic-Clor 60	1,118,457 lbs
• Methyl bromide	175,910 lbs
• Telone II	112,282 lbs
• 100% Chloropicrin	39,150 lbs
• K-Pam	36,611 lbs
Total	1,482,410 lbs

3 Year fumigant use comparison (pounds)



Areas in need of improvement: Respecting Buffer Zones

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Areas in need of improvement: Respecting Buffer Zones

- Communication
  - Improve communication among growers, PCA's, Field Worker crews and neighbors
  - Ensure employees understand what buffer zone postings are and their purpose
  - Ensure employees stay outside of posted buffer zones
  - Remember that people cannot walk thru a buffer zone area
  - Remember that buffer zones cannot be used as parking areas

Areas in need of improvement: Respecting Buffer Zones

- Ensure adjacent agricultural growers have received required notification prior to posting a buffer on their property
- Ensure required buffer zone signs are posted and stay up for the duration of the buffer zone period
- When fumigating on property you control and when you will have field workers harvesting on another part of the same property, consider posting buffer zone signs on your own property so that workers are aware of where not to park their vehicles and which areas they cannot harvest

Areas in need of improvement:
Field monitoring for signs of problems

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Areas in need of improvement: Field monitoring for signs of problems

- Monitor your field for signs of problems
- Be pro-active, try to identify potential problems before they occur
- If you believe field workers or other people may experience adverse effects due to a situation in the fumigated area, ask those people to leave the area
- Contact your PCA and the Agricultural Commissioner
- Ensure all required field postings are visible and posted correctly to keep people out

Areas in need of improvement:

Understand Fumigation Requirements

Review fumigant label requirements

RESTRICTED USE PESTICIDE
DUE TO ACUTE TOXICITY AND CARCINOGENICITY
For retail sale to and use by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator's certification.

Pic-Clor 60

A multi-purpose liquid fumigant for preplant treatment of soil to control plant parasitic nematodes and to help manage certain soil-borne diseases and symphlyans in cropland.
Not for use in greenhouses or other enclosed areas and
not for use in drip or other chemigation applications.

ACTIVE INGREDIENTS:

1,3-Dichloropropene	39.0%
Chloropicrin	59.6%
OTHER INGREDIENTS:	1.4%
TOTAL:	100.0%

This product weighs 12.1 lbs./gal. @ 68°F (20°C).
Contains 4.7 pounds of 1,3-Dichloropropene and 7.2 pounds of Chloropicrin per gallon.

KEEP OUT OF REACH OF CHILDREN

DANGER **PELIGRO**
POISON [Note : « Poison » will be printed in red.]
Si Usted no entiende la etiqueta, busque a alguien para que se la explique a Usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

IN ALL CASES OF OVEREXPOSURE, GET MEDICAL ATTENTION IMMEDIATELY.
TAKE PERSON TO A DOCTOR OR TO AN EMERGENCY TREATMENT FACILITY.

FIRST AID	
If inhaled:	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, and then give artificial respiration, preferably by mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If on skin or clothing:	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.
If in eyes:	• Hold eyes open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after 5 minutes, and then continue rinsing eyes. • Call a poison control center or doctor for treatment advice.
If swallowed:	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.

Areas in need of improvement:

Understand Fumigation Requirements

Review specific County conditions

SANTA CRUZ COUNTY
AGRICULTURAL COMMISSIONER

METHYL BROMIDE
FIELD FUMIGATION
2014 PERMIT CONDITIONS

Users must comply with the following:

- California food and Agricultural Code
- California Code of Regulations (CCR Title 3)
- Product labeling
- **WHEN REQUIREMENTS DIFFER, THE MOST RESTRICTED REQUIREMENTS, WHETHER IT IS THE LABEL, REGULATIONS, OR PERMIT CONDITIONS MUST BE FOLLOWED.**
- The following additional county conditions:

Areas in need of improvement: Understand Fumigation Requirements

- Review fumigant label requirements and specific County conditions
- Be familiar with specific laws and regulations pertaining to soil fumigants
- Different fumigants have different conditions, take the time to review the information carefully
- When unsure about a requirement speak to your PCA or contact your local Agricultural Commissioner

Chloropicrin Mitigation Measures

- The Department of Pesticide Regulation (DPR) has added new use requirements to protect bystanders and residents from acute (short-term) exposures to chloropicrin
- DPR's restrictions affect all fumigants that contain chloropicrin as an active ingredient

Minimum Buffer Zone Distances

- When TIF is used = 25 feet
- Non-TIF less than 6 acres = 60 feet
- Non-TIF more than 6 acres = 100 feet
- Untarped = 100 feet

Buffer Zone Distance Reduction Credit

- Fumigant labels allow buffer reduction credits for certain conditions and practices, however, buffer reduction credits will only be allowed for 60% TIF tarps

LABEL ALLOWED CREDITS

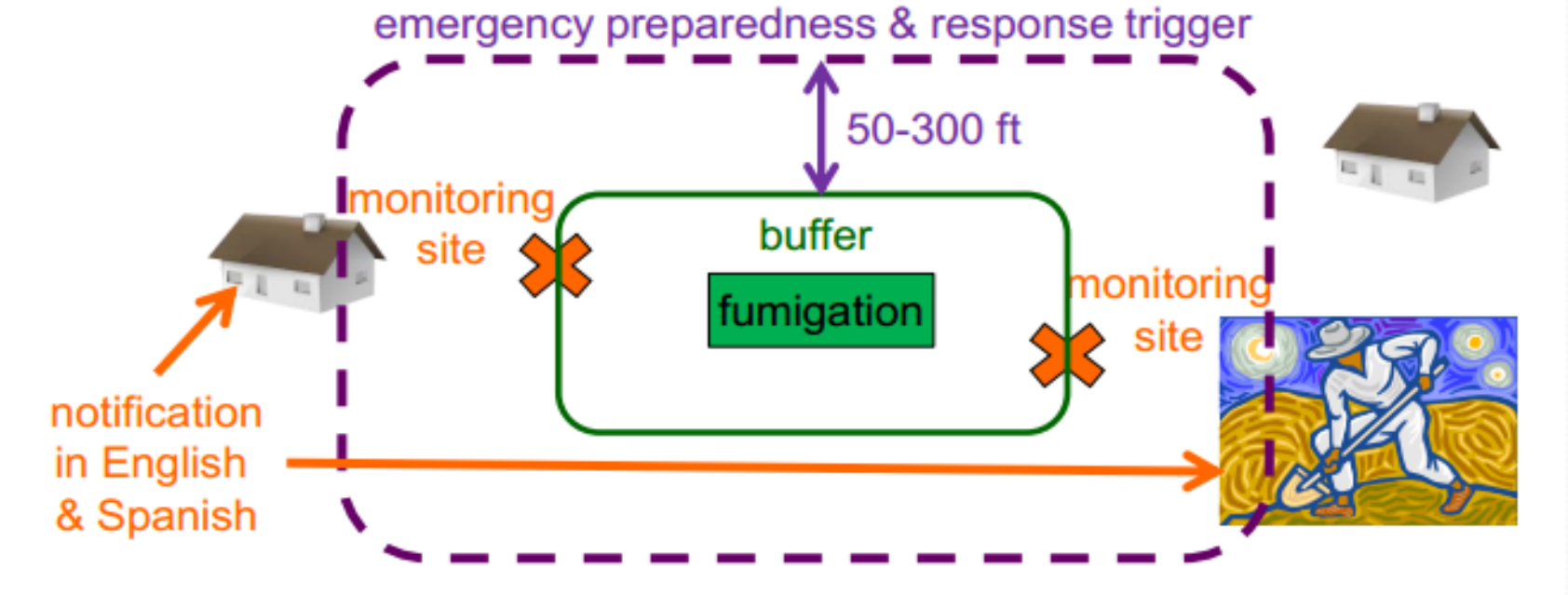
Condition or Practice	Label % Reduction
Low perm tarp	20, 40, or 60
Soil OC 1-3%	10, 20, or 30
Clay >27%	10
Soil temp <50° F	10
Symmetry	10
Thiosulfate	15
Water seal	15

Emergency Preparedness and Response Measures

- When triggered:
  - And response information for neighbors is chosen, notifications must be provided in English and Spanish
  - If fumigant site monitoring is chosen then additional requirements apply:
    - Monitoring at the edge of the buffer zone
    - Monitor at least two locations in direction of residences, businesses, and downwind; monitor all sides of buffer if calm wind
    - Person monitoring must have full olfactory capabilities (e.g. not impaired by allergies or colds)

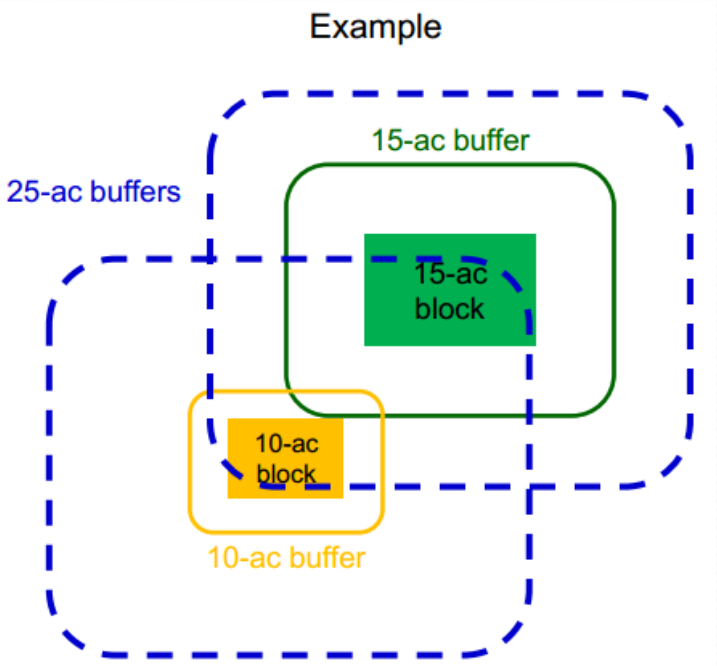
Emergency Preparedness and Response Measures

- Notification or Site Monitoring



Overlapping Buffer Zones

- Label prohibit overlapping buffers within first 12 hours
- For non-TIF/untarped acreage is combined to determine buffer if overlap during first 36 hours
- Combined acreage cannot exceed 40 acres
- Fumigations using TIF are excluded from the combined acreage requirements



Fumigation Time Restrictions

- For non-TIF/untarped fumigations:
  - Applications must start no sooner than 1 hour after sunrise
  - Applications must end no later than 3 hours before sunset

- TIF fumigations have no time restrictions

Additional Requirements

- Maximum fumigated acreage in 24 hours at one site:
  - Non-TIF/untarped = 40 acres
  - TIF = 60 acres
- Notice of Intent must be submitted at least 48 hours prior to application
- Application must start within 12 hours of specified time
- When the fumigation emergency response plan is implemented the Agricultural Commissioner must be notified immediately
- TIF tarps cannot be cut earlier than 9 days after the fumigation

Chloropicrin Mitigation Documents

Additional information on DPR's chloropicrin mitigation measures can be obtained at…

www.cdpr.ca.gov/docs/whs/chloropicrin.htm

2015 Santa Cruz County Fumigation Conditions

- Most fumigation Conditions currently in place will remain in place
- These include:
  - Using EPA approved tarps for fumigants containing chloropicrin as an active ingredient (except methyl bromide)
  - Tarps cannot be perforated until 216 hours (9 days) have elapsed from the time of fumigation completion

2015 Santa Cruz County Fumigation Conditions (continued)

- Applications must be done by a Pest Control Business
- Buffer zone credit allowed for qualified tarps only (except methyl bromide)
- Notice of Intent to fumigate must be submitted at least 48 hours prior to the start of the fumigation
- Proposed fumigations within a ¼ mile of a public school must be submitted at least 5 days prior to the start of the fumigation
- Weather in the vicinity of the fumigation should be evaluated for adverse temperature and wind conditions prior to fumigation

2015 Santa Cruz County Fumigation Conditions (continued)

The DPR chloropicrin mitigation requirements will require inclusion of new County conditions such as the need to provide notifications in English and Spanish and/or other additional requirements

Questions?