



**PLANNING AND DEVELOPMENT SERVICES  
DEPARTMENT**

455 Mountain Village Blvd.  
Mountain Village, CO 81435  
(970) 728-1392

**Agenda Item No.11**

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**TO: Mountain Village Town Council**

**FROM:** Rodney Walters, Town Forester

**FOR:** February 20, 2025

**DATE:** February 11, 2025

**RE: Work Session Regarding Potential Distribution of MCH Packets to Private Residents**

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**Attachments: Synergy Semiochemicals MCH packets quote, Environmental Protection Agency (EPA) label for MCH Packets, Safety Data Sheet (SDS) for MCH (3-methyl-2-cyclohexen-1-one), Manufacturer Application Rate instructions screen shot, Scientific Journal article abstract - 3-methyl-2-cyclohexen-1-one individual tree protection against spruce beetle attack in the southern Rocky Mountains**

Town Council member Tucker Magid has sent a request that MCH packets be made available to Town of Mountain Village (TMV) residents.

In considering this request two primary thoughts come to mind, the costs for doing so and how to mitigate any potential harmful effects verses benefits of distributing anti-aggregation MCH Packets to residents.

**Costs:**

The first consideration concerning the costs of distributing packets to residents are outlined below

- Costs of packets is approximately \$2.71 per packet plus shipping (Attachment 1)
  - Approximate cost of 1500 packets plus shipping is \$4165.
  - Chest Freezer to create additional storage capacity for the packets is \$200 - \$330
  - Time to distribute packets to residents is approximately 5-10 minutes per request (average 10 packets per request) is 750 to 1500 minutes which equals between 12.5 to 25 hours
  - Forester's time to prepare an instructional packet containing a sign off form, applications instructions, tree identification information and photographs, dosage requirements is approximately 8 - 12 hours.

**Potential for Harmful Effects:**

The second consideration reflects potential harmful effects verses potential benefits for doing so. When pesticides are distributed, the law requires that the applicator follow all the EPA label instructions (Attachment 2) for the specific product that is being applied and that the application rates do not exceed the limit defined by the label. The law also requires that SDS (Attachment 3) sheets be readily available to anyone who may be exposed to any chemical (generally employees, small business operators, or members of the public). There are potential legal risks associated with the label not being followed (for the applicator), which in this case would be the private residents who apply the chemicals or to anyone they hire to apply the chemicals

Legal risks to the Town may be nullified or reduced by making the label and SDS sheet available to each resident who receives packets and by requiring them to sign a form whereby they agree to follow all requirements of the Synergy Semiochemicals Corporation application and dosage instructions (Attachment 4) and the EPA label and by being given out a copy of the SDS sheet. Our instructions would specify a maximum dosage of 40 packets per acre according to the manufacturer's instructions. By receiving the MCH bubble cap packets, the residents would be assuming the responsibility for applying them correctly and for taking the precautions necessary to protect the environment and themselves (and their employees) from harm. MCH bubble caps are readily available to the public for purchase and are not controlled pesticides that require special licensing and certifications to purchase and apply.

The next aspect considers potential harm to residents due to exposure to the chemical. MCH is considered to have a low probability of causing toxicological harm to humans, but it may cause skin irritation, eye irritation, and respiratory irritation. The label provides 1<sup>st</sup> aid instructions for eye, skin, and inhalation exposure and if the chemical is swallowed. It provides instructions to avoid skin, eyes, or clothing contact, how to handle the bubble caps, and how to store and dispose of them (Attachment 2). If all the EPA label instructions are followed, then the health risks associated with the bubble caps are minimal. However, eye, skin, and even respiratory irritation are likely. In my experience, eye irritation is noticeable and even significant and respiratory irritation is noticeable (similar to menthol). The skin irritation is noticeable but easily managed with clothing and gloves. The respiratory irritation dissipates within 20 minutes to an hour and the eye irritation dissipates within a couple to a few hours. Effects, however, may differ with individuals. The skin irritation for me goes away by washing my skin with soap and water.

Another consideration is potential harm to the environment. If the EPA label is followed (Attachment 2) and the bubble caps are not applied at a dose exceeding 80 packets per acre and they are kept out of water ways and wetlands the harm is minimal, with the greatest risk going to birds (likely crows) or mammals (perhaps squirrels) that may tamper with the packets. The packets likely don't kill these animals but could effect their health, especially in the short term.

My biggest concern of overdosing (exceeding 40 – 80 packets per acre) is a diminishing effect of the packets to repel beetles and potential to begin acting as an attractant. The scientific literature does indicate that overdosing can reduce the effectiveness of the product, but I have found no scientific literature stating that it can act as an attractant the way that the anti-aggregation pheromone, verbenone can.

Another consideration is the bubble caps being applied for the purpose of protecting individual trees from spruce beetle. Although the label allows MCH bubble caps to be applied for spruce beetle, the scientific literature indicates that MCH can help reduce spruce beetle populations at forest scale coverage but has little proven effect in repelling spruce beetles in individual trees and only shows potential to repel spruce beetle in individual trees if also administered with a pheromone known as AKA. MCH alone is mostly effective toward Douglas fir beetle, so applying it for spruce beetle could possibly be wasteful (attachment 5). With all the above in mind, the potential harm to the environment is minimal as long as 80 bubble caps per acre is not exceeded and the bubble caps are not put into waterways or wetlands.

### **Summary:**

To summarize, the potential risks are low if the instructions and label are followed and there could be a greater potential to reduce Douglas fir beetle pressure in and around our Town if MCH bubble cap, packets are distributed more widely. I do believe the risks of distributing MCH bubble caps to TMV residents can be managed by creating a form whereby those receiving the bubble caps accept all responsibility for applying them. They would be required to sign a form stating their agreement to follow all manufacture instructions and the label and accept all responsibility for

applying the packets. In distributing the bubble caps to residents, we would only give them an appropriate number of packets for their property size, for example, a resident for a 1-acre property would be given a maximum of 40 packets, a resident for a ½ acre property would be given a maximum of 20 packets etc. I would provide a quick instruction sheet showing the manufacturer's instructions and a longer instruction fact sheet with information to correctly identify trees (Douglas fir verses subalpine fir) along with the EPA label and the SDS sheets. As you can see, there are several levels of complexity to consider in distributing the MCH bubble caps, but if the community really wants this, it can be done.

**Council Discussion:**

Staff would like Council to discuss the merits of creating an MCH packet distribution program for private residences and give staff direction to create such a program if desired.



# Attachment 1: Synergy Semiochemicals Price Quote, MCH Bubble Caps (500mg)



**Synergy  
Semiochemicals**  
PROTECTING TREES NATURALLY

QUOTE

7572 Progress Way  
Delta, BC V4G 1E9  
Canada  
(604) 454-1122  
semiochemical.com

Quote No. 5132  
Date 2/4/2025  
Account # 21486  
Created By Julien Grebert  
Terms Due on receipt

## BILL TO

Town of Mountain Village  
**Contact** Rodney Walters  
455 Mountain Village Blvd.  
Suite A  
Mountain Village, CO 81435  
United States

## SHIP TO

Town of Mountain Village  
**Contact** Rodney Walters  
455 Mountain Village Blvd.  
Suite A  
Mountain Village, CO 81435  
United States

ITEM	DESCRIPTION	QUANTITY	UOM	UNIT PRICE	AMOUNT
3311 - Synergy Shield MCH (single bubble USA only)	repellent single bubble; USA only	2,510.00	EA	\$2.71	\$6,802.10
Freight	2510 MCH	1.00	EA	\$128.94	\$128.94
3311 - Synergy Shield MCH (single bubble USA only)	repellent single bubble; USA only	5,000.00	EA	\$2.71	\$13,550.00
Volume Discount		5,000.00	EA	\$-0.05	\$-250.00
Freight	5000 MCH	1.00	EA	\$324.38	\$324.38
<b>Memo :</b>		Subtotal			\$20,555.42
<b>Taxes :</b>		Taxes			\$0.00
<b>Currency :</b> US Dollar		Total Amount			\$20,555.42

GST No. 849163076 All international and US orders are payable in US funds. Use Quote number when ordering. Quotes are valid for 30 days and do not include customs clearance, duties or taxes for orders sent outside of USA or Canada. Our shipping terms for international orders are CPT.

**Attachment 2: MCH Bubble Caps (500mg) EPA Label**

90515-1

3/21/2014

1/4



U.S. ENVIRONMENTAL PROTECTION AGENCY  
Office of Pesticide Programs  
Biopesticides and Pollution Prevention Division (7511C)  
1200 Pennsylvania Avenue NW  
Washington, DC 20460

EPA Reg. Number:

Date of Issuance:

90515-1

MAR 21 2014

Unconditional

Name of Pesticide Product:

Synergy Shield MCH

**NOTICE OF PESTICIDE:**

Registration  
 Reregistration  
(under FIFRA, as amended)

Name and Address of Registrant (include ZIP Code):

Synergy Semiochemical Corporation  
c/o Technology Science Group, Inc.  
712 5<sup>th</sup> Street, Suite A  
Davis, CA 95616

Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Biopesticides and Pollution Prevention Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA file number for information furnished by the registrant. The above named pesticide is hereby registered under the

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on her motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

This registration does not eliminate the need for continual reassessment of the pesticide. If the EPA determines at any time that additional data are required to maintain in effect an existing registration, the Agency will require submission of such data under section 3(c)(2)(B) of FIFRA.

This product is unconditionally registered in accordance with FIFRA Sec. 3(c)(5) and is subject to the following terms:

1. Submit and/or cite all data required for registration of your product under FIFRA section 3(c)(5) and section 4 when the Agency requires all registrants of similar products to submit such data.
2. A one year study is required to satisfy the Storage Stability and Corrosion Characteristics requirements (Guidelines: OCSPP 830.6317 and 830.6320). You have 18 months from the date of registration to provide these data.
3. Revise the EPA Registration Number to read, "EPA Reg. No. 90515-1."
4. Submit three (3) copies of the revised final printed labeling before you release the product for shipment.

A stamped copy of the label and an A-79 Enclosure are enclosed for your records.

Signature of Approving Official:

Date:

Robert McNally, Director  
Biopesticides and Pollution Prevention Division (7511P)

3/21/14

# E-SUBMISSION

2/4

## Synergy Shield MCH

**ACCEPTED**

**ACTIVE INGREDIENT:**

3-methyl-2-cyclohexen-1-one.....97.9%

**OTHER INGREDIENTS:**.....2.1%

**TOTAL:**.....100.0%

MAR 21 2014

Under the Federal Insecticide, Fungicide,  
and Rodenticide Act, as amended, for  
the pesticide registered under  
EPA Reg. No. 90515-1

**KEEP OUT OF REACH OF CHILDREN  
CAUTION**

FIRST AID	
<b>If in eyes</b>	<ul style="list-style-type: none"> <li>• Hold eye open and rinse slowly and gently with water for 15 – 20 minutes.</li> <li>• Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If on skin or clothing</b>	<ul style="list-style-type: none"> <li>• Take off contaminated clothing.</li> <li>• Rinse skin immediately with plenty of water for 15 – 20 minutes.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
<b>If swallowed</b>	<ul style="list-style-type: none"> <li>• Call poison control center or doctor immediately for treatment advice.</li> <li>• Have person sip a glass of water if able to swallow.</li> <li>• Do not induce vomiting unless told to do so by a poison control center or doctor.</li> <li>• Do not give anything by mouth to an unconscious person.</li> </ul>
<b>If inhaled</b>	<ul style="list-style-type: none"> <li>• Move person to fresh air.</li> <li>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible.</li> <li>• Call a poison control center or doctor for treatment advice.</li> </ul>
Have product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-222-1222 for emergency medical treatment information.	

**EPA Reg. No.:** (pending as File Symbol 90515-R)

**EPA Establishment No.:** XXXXX-XX-XX

**Manufactured by:** Synergy Semiochemical Corporation  
7061 Merritt Avenue  
Burnaby BC, V5J 4R7 Canada

- Net Contents:**
- 10 units; (500 mg) (1000 mg)per unit; XX ounces total
  - 50 units; (500 mg) (1000 mg)per unit; XX ounces total
  - 100 units; (500 mg) (1000 mg)per unit; XX ounces total

**PRECAUTIONARY STATEMENTS**

**HAZARDS TO HUMANS AND DOMESTIC ANIMALS – CAUTION:** Harmful if swallowed or absorbed through skin. Causes moderate eye irritation. Avoid contact with eyes, skin or clothing. Avoid contact with liquid contents. Do not puncture reservoir. Prior to use, open storage bag in a well-ventilated area and allow any accumulated vapors to vent. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum or using tobacco. Remove and wash contaminated clothing before reuse.

**ENVIRONMENTAL HAZARDS:** For terrestrial uses: Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean highwater mark, except under forest canopy. Do not contaminate water when disposing of equipment washwaters or rinsate.

**DIRECTIONS FOR USE**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

**Host Tree Stands:** Standing and fallen Douglas-fir and Spruce trees and stumps, and stands containing significant numbers of Douglas-fir or Spruce trees. Use on trees in forests; municipal and shade tree areas; recreational areas such as campgrounds, golf courses, parks and parkways; ornamental and shade tree plantings; suburban areas; and rights of way and other easements.

**Pests:** MCH is an antiaggregation pheromone for the Douglas-Fir Beetle (*Dendroctonus pseudotsugae*) and the Spruce Beetle (*Dendroctonus rufipennis*). Synergy MCH Shield deters mass attack in tree stands and protects susceptible trees.

**Application Rate:**

Placement on trees:

Place Synergy Shield MCH on trees over 8 inches in diameter on north face of tree at 6 to 12 feet in height. Staple into flashing being careful to **not** puncture the reservoir.

Individual trees and area 1 acre or less:

(For 500 mg units)

Place 2 or 4 Synergy Shield MCH on each tree, depending on risk of attack and size of tree. For large trees over 24 inches diameter, add 1 more Synergy Shield MCH for each additional 8 inches in diameter, 3 feet above the previous Synergy Shield MCH.

(For 1000 mg units)

Place 1 or 2 Synergy Shield MCH on each tree, depending on risk of attack and size of tree. For large trees over 24 inches diameter, add 1 more Synergy Shield MCH for each additional 12 inches in diameter, 3 feet above the previous Synergy Shield MCH.

Forested stands over 1 acres:

(For 500 mg units)

Minimum dose – 40 Synergy Shield MCH/acre. For low to moderate beetle pressure, place 1 Synergy Shield MCH/tree in a grid pattern with 32 foot centers.

Maximum dose – 80 Synergy Shield MCH/acre. For high to extreme beetle pressure, place 1 Synergy Shield MCH/tree in a grid pattern with 23 foot centers.

(For 1000 mg units)

Minimum dose – 20 Synergy Shield MCH/acre. For low to moderate beetle pressure, place 1 Synergy Shield MCH/tree in a grid pattern with 46 foot centers.



Maximum dose – 40 Synergy Shield MCH/acre. For high to extreme beetle pressure, place 1 Synergy Shield MCH/tree in a grid pattern with 32 foot centers.

**Timing:** Place Synergy Shield MCH at least 2 weeks prior to the expected attack flight of the pest. Under normal weather conditions the Synergy Shield MCH is effective for 60 days. Use a second treatment as needed.

**Notes:** For best results, remove all beetle-infested trees on property before application. Consider the use of pheromone traps to reduce population pressure.

**STORAGE AND DISPOSAL**

Do not contaminate water, food, or feed by storage or disposal.

**Pesticide Storage:** Store in sealed storage bag in a cold, dry place. Store below 32°F (0°C) or as cold as possible.

**Pesticide Disposal:** Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Handling:** Nonrefillable container. Do not reuse or refill this container. Place empty bag in trash.

# Attachment 3: Safety Data Sheet (SDS)



**Synergy  
Semiochemicals  
Corporation**

## **Safety Data Sheet**

### **MCH (3-methyl-2-cyclohexen-1-one)**

#### **SECTION 1. IDENTIFICATION**

**Product Identifier** MCH

**Other Means of** N/A

**Identification**

**Recommended Use** Pheromone release device for **Douglas fir beetle** (*Dendroctonus pseudotsugae*) and **Spruce beetle** (*Dendroctonus rufipennis*)

**Restrictions on Use** Not for household usage

**Initial Supplier Identifier** Synergy Semiochemicals Corporation  
7572 Progress Way  
Delta, British Columbia,  
Canada  
V4G 1E9

For Information: (604) 454-1122

**Emergency Telephone Number** CANUTEC @ 1-(613)-996-6666

#### **SECTION 2. HAZARD IDENTIFICATION**

**Classification** H226: Flammable liquid and vapor  
H315: Causes skin irritation  
H319: Causes serious eye irritation  
H335: May cause respiratory irritation

**Label Elements** N/A

**Other Hazards** N/A

#### **SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

<b>Chemical Name</b>	<b>CAS No.</b>	<b>Concentration</b>	<b>Common name / Synonyms</b>	<b>Other identifiers</b>
3-methylcyclohex-2-en-1-one	1193-18-6	N/A	N/A	N/A

## SECTION 4. FIRST-AID MEASURES

<b>Inhalation</b>	Remove victim from area to fresh air. Seek medical attention if irritation persists.
<b>Skin Contact</b>	Wash area well with soap and warm water. Seek medical attention if irritation persists.
<b>Eye Contact</b>	Wash eyes with water or saline solution for at least 15 minutes and seek medical attention.
<b>Ingestion</b>	Plastic release device is unlikely to be ingested. Give water or milk to dilute and consider medical attention if large quantities ingested. Do not induce vomiting.
<b>Most Important Symptoms and Effects, Acute and Delayed</b>	Irritation to skin and mucous membranes.
<b>Immediate Medical Attention and Special Treatment</b>	Treat symptomatically and supportively.

## SECTION 5. FIRE-FIGHTING MEASURES

<b>Extinguishing Media</b>	
<b>Suitable Extinguishing Media</b>	Dry powder fire extinguisher, carbon dioxide fire extinguisher.
<b>Unsuitable Extinguishing Media</b>	<b>Water.</b>
<b>Specific Hazards Arising from the Product</b>	<b>Fumes from combusting plastic membrane may be irritant or toxic.</b>
<b>Special Protective Equipment and Precautions for Fire-Fighters</b>	No data

## SECTION 6. ACCIDENTAL RELEASE MEASURES

<b>Personal Precautions, Protective Equipment, and Emergency Procedures</b>	If devices are intact, no special precautions required. If devices have been punctured or are leaking, latex or vinyl gloves are recommended.
<b>Methods for Containment and Cleaning Up</b>	Collect devices for disposal in domestic garbage. Any liquid present that has leaked out may be absorbed with vermiculite or other spill kit. Wash area with soap and water.

## SECTION 7. HANDLING AND STORAGE

<b>Notes</b>	Chemicals are inside a sealed plastic release device.
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**Precautions for Safe Handling** Handle with latex or vinyl gloves, wash hands after handling devices.

**Conditions for Safe Storage** Store away from children and pets in sealed container in a cool, dry place.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Chemical Name	ACGIH® TLV®		OSHA PEL	
	TWA	STEL	TWA	STEL
3-methylcyclohex-2-en-1-one	N/A	N/A	N/A	N/A

**Notes** No data for exposure limits.

**Appropriate Engineering Controls** N/A

**Individual Protection Measures**

**Eye/Face Protection** Safety glasses.

**Skin Protection** Organic-resistant gloves as appropriate.

**Respiratory Protection** Ventilated area as required for personal comfort.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance** Clear to slightly yellow liquid, packaged in plastic membrane release device.

**Odour** Nutty, caramel-type odor packaged in release device

**Odour Threshold** N/D

**pH** N/A

**Melting Point and Freezing Point** -21°C

**Initial Boiling Point and Boiling Range** 197°C

<b>Flash Point</b>	68°C
<b>Evaporation Rate</b>	N/D
<b>Flammability (solid, gas)</b>	N/D
<b>Upper and Lower Flammability or Explosive Limit</b>	N/D
<b>Vapour Pressure</b>	0.34mm
<b>Vapour Density (air = 1)</b>	>1
<b>Relative Density (water = 1)</b>	0.97
<b>Solubility in Water</b>	Insoluble.
<b>Solubility in Other Liquids</b>	Soluble in alcohol, acetone, ether, petroleum ether.
<b>Partition Coefficient, n-Octanol / Water (Log Kow)</b>	N/A
<b>Auto-ignition Temperature</b>	N/D
<b>Decomposition Temperature</b>	N/D
<b>Viscosity</b>	N/D

## SECTION 10. STABILITY AND REACTIVITY

<b>Reactivity</b>	N/D
<b>Chemical Stability</b>	<b>N/D</b>
<b>Possibility of Hazardous Reactions</b>	<b>None.</b>
<b>Conditions to Avoid</b>	Exposure to UV, oxidizing agents or open flame
<b>Incompatible Materials</b>	Oxidizing agents, chlorinating agents, caustics, amines, strong acids, strong heating or flame
<b>Hazardous Decomposition Products</b>	Oxides of carbon.

## SECTION 11. TOXICOLOGICAL INFORMATION

### Likely Routes of Exposure

Inhalation  Skin contact  Eye contact  Ingestion

**Acute Toxicity**

LC50 N/D  
 LD50 (oral) N/D  
 LD50 (dermal) N/D  
 Notes

Skin Corrosion / Irritation N/D

Serious Eye Damage / Irritation N/D

STOT (Specific Target Organ Toxicity) - Single Exposure N/D

Aspiration Hazard N/D

STOT (Specific Target Organ Toxicity) - Repeated Exposure N/D

Respiratory and/or Skin Sensitization Possible with repeated exposure.

**Carcinogenicity**

Chemical Name	IARC	ACGIH®	OSHA
3-methylcyclohex-2-en-1-one	No	No	No

**Notes****Reproductive Toxicity**

Development of Offspring N/A

Sexual Function and Fertility N/A

Effects on or via Lactation N/A

Germ Cell Mutagenicity N/A

Interactive Effects N/A

**SECTION 12. ECOLOGICAL INFORMATION**

Ecotoxicity None.

**Persistence and Degradability** N/D  
**Bioaccumulative Potential** None.  
**Mobility in Soil** N/D  
**Other Adverse Effects** None.

## SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal Methods** Dispose of in residential garbage as non-hazardous waste.

## SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Technical Name (for N.O.S. entry)	Transport Hazard Class(es)	Packing Group
N/D	N/D	N/D	N/D	N/D	N/D

**Special Precautions** None.  
**Environmental Hazards** N/A  
**Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code** N/A

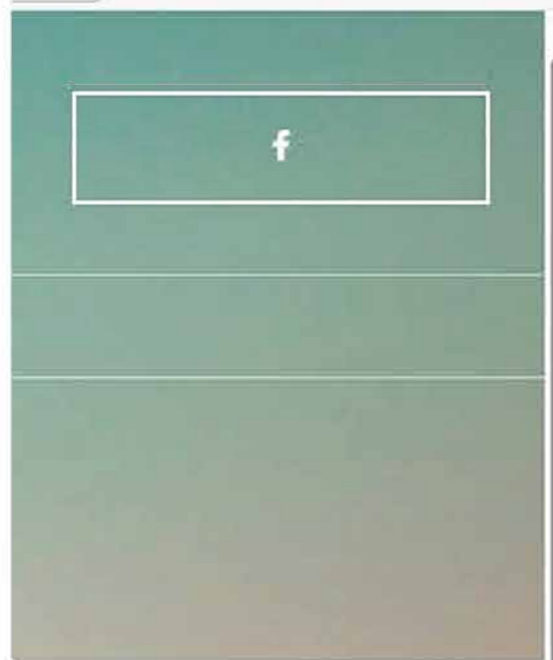
## SECTION 15. REGULATORY INFORMATION

**Safety, Health and Environmental Regulations** N/A

## SECTION 16. OTHER INFORMATION

**Date of Latest Revision** August 26<sup>th</sup>, 2019

## Attachment 4: Manufacturer application Rate Instructions



How do I use MCH for tree protection?	
Biology of a Douglas-Fir Beetle Attack	
Where to use MCH	
Single and Double Bubbles	
When and How to Use MCH	
Useful Tips	
<b>Application Rates For Synergy Shield MCH Single (500mg) Bubbles (USA only)</b>	<b>Individual trees and areas 1 acre / 0.4 hectare or less:</b> <ul style="list-style-type: none"><li>Place 2 to 4 Synergy Shield MCH on each tree, depending on risk of attack and size of tree.</li><li>For large trees over 24 inches / 61 cm diameter, add 1 more Synergy Shield MCH for each additional 8 inches / 20.3 cm in diameter, 3 feet / 1 meter above the previous Synergy Shield MCH.</li></ul>
Application Rates For Synergy Shield MCH Double (1000mg) Bubbles (Canada & USA)	<b>Forested stands over 1 acre / 0.4 hectare:</b> <ul style="list-style-type: none"><li>Place 40 Synergy Shield MCH/acre or 99 per hectare. For low to moderate beetle pressure, place 1 Synergy Shield MCH/tree in a grid pattern with 32 foot centers*.</li><li>You do not need to place a bubble directly on the tree. You can apply it to any other tree, building or even a post hammered into the ground.</li><li>For high beetle pressure, place 1 Synergy Shield MCH/tree in a grid pattern with 23 foot / 7 meter centers*. Maximum dose – 80 Synergy Shield MCH/acre or 198 per hectare.</li></ul> <p>*"Centers" means from the center of one tree to the center of the next.</p>



## Attachment 5: Journal Article Abstract - 3-methyl-2-cyclohexen-1-one for individual tree protection against spruce beetle attack in the southern Rocky Mountains



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Volume 110, Issue 5  
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### JOURNAL ARTICLE

## 3-Methylcyclohex-2-en-1-one for area and individual tree protection against spruce beetle (Coleoptera: Curculionidae: Scolytinae) attack in the southern Rocky Mountains [Get access >](#)

E Matthew Hansen , A Steven Munson, Darren C Blackford, Andrew D Graves, Tom W Coleman, L Scott Baggett

*Journal of Economic Entomology*, Volume 110, Issue 5, October 2017, Pages 2140–2148,  
<https://doi.org/10.1093/jee/tox208>

**Published:** 07 September 2017 **Article history** ▾

 [Cite](#)  [Permissions](#)  [Share](#) ▾

### Abstract

We tested 3-methylcyclohex-2-en-1-one (MCH) and an *Acer* kairomone blend (AKB) as repellent semiochemicals for area and single tree protection to prevent spruce beetle (*Dendroctonus rufipennis* Kirby) attacks at locations in Utah and New Mexico. In the area protection study, we compared host infestation rates of MCH applications at three densities (20, 40, and 80 g MCH ha<sup>-1</sup>) against a control treatment over 0.64 ha plots centered within ~1.25 ha treatment blocks. All treatments included two baited funnel traps within the plot to assure spruce beetle pressure. Following beetle attack, plots were surveyed for new spruce beetle attacks and to quantify stand characteristics. The probability of more severe spruce beetle attacks was significantly reduced, by ~50%, in each of the MCH area treatments compared with the control treatment but there was no significant treatment difference among the MCH deployment densities. For the single tree protection study, we compared attack rates of MCH, *Acer* kairomone blend (AKB), and MCH plus AKB on spruce beetle-baited trees against bait-only trees. Each treatment was applied over a range of host diameters to test for host size effects. Seventy-five percent of control trees were mass-attacked, about one-third of MCH- and AKB-alone spruce was mass-attacked, and no MCH plus AKB spruce were mass-attacked. These results suggest that MCH alone is a marginal area and single tree protectant against spruce beetle but that deployment with other repellents can significantly increase treatment efficacy.

**Keywords:** [pheromone](#), [bark beetle management](#), [Dendroctonus rufipennis](#), [semiochemicals](#), [Engelmann spruce](#)

**Issue Section:** [FOREST ENTOMOLOGY](#)

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