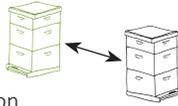


## 2. PREVENT PEST BUILD-UP USING NON-CHEMICAL PRACTICES

### ALL YEAR

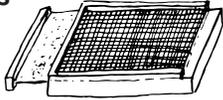
#### Hive Differentiation

Reduce mite transmission via bee drift by maximizing hive spacing and varying hive color and orientation.



#### Screened Bottom Boards

Studies show mixed results on *Varroa* but can also be used to increase hive ventilation.



### SPRING AND SUMMER

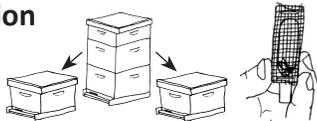
#### Re-Queen

Select mite resistant stock when available.



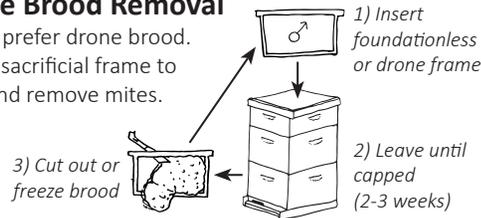
#### Brood Interruption

Split hives or cage queen to interrupt mite reproduction.



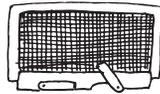
#### Drone Brood Removal

Mites prefer drone brood. Use a sacrificial frame to bait and remove mites.



#### Robber Screens

Install screens to reduce mite transmission via drift and robbing.



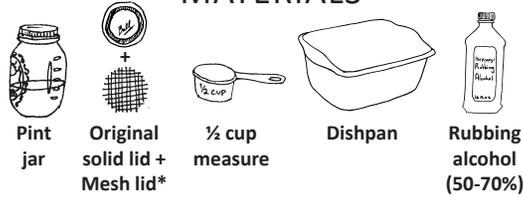
Note: other methods may be available but remember to do your research before use so you don't harm your hives!

## 3. SAMPLE REGULARLY (AT LEAST ONCE A MONTH)

### Alcohol wash

The most accurate way to determine *Varroa* levels in your hives

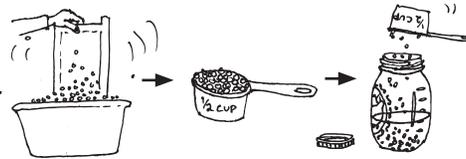
#### MATERIALS



\*1/8 inch hardware cloth, cut to match solid lid

#### 10 STEPS

- 1) Pour alcohol into jar. Set aside in easy reach.
- 2) Find a frame of open brood.  
*Check that the queen is not on frame!*
- 3) Shake adult bees from frame into dishpan. Scoop 1/2 cup (~300) bees and pour into jar.



- 4) Shake remaining bees from bin into colony.
- 5) Seal solid lid on jar and shake for 1-2 min.
- 6) Let jar sit for 1-2 minutes.
- 7) Replace solid lid with mesh lid.
- 8) Shake jar contents into empty dishpan.
- 9) Count mites.
- 10) Determine if mite # exceeds treatment threshold.

- See [Honey Bee Health Coalition Guide](#) for mite thresholds based on season. (Generally 1-2 mites/100 bees, or 3-6 mites/alcohol wash).
- See inside of brochure for treatment options.



Contact your local apiary inspector to inquire about a free kit!

# Integrated Pest Management (IPM) for *Varroa* mites

## WHAT IS IPM?

1. **KNOW YOUR PEST**
2. **PREVENT** pest build up using non-chemical practices
3. **SAMPLE REGULARLY** to track pest population levels
4. **INTERVENE** with pesticides when populations reach damaging thresholds (vary products to prevent pest resistance)

## 1. KNOW YOUR PEST

The *Varroa* Mite, (*Varroa destructor*) is an external parasite that feeds on honey bee adults and brood. They weaken bees, transmit viruses, and lead to colony death.



### Common Signs of Mite Damage:

- Damaged pupae and pupal cells
- Physically deformed bees (shriveled/missing wings, short abdomens)
- Patchy brood pattern or reduced brood/workforce
- Visible mites on bees indicate high level of infestation; often sudden colony collapse



# 4. INTERVENE WITH PESTICIDES IF PESTS EXCEED THRESHOLDS (≥4 MITES/SAMPLE)

See [Honey Bee Health Coalition Guide](#), pg. 9 for updated and exact thresholds based on colony phase:



**MITICIDES AT-A-GLANCE** Always follow the label! The label is the law. Find full labels on the [EPA database](#):

Product Name Active Ingredient [mode of action] EPA Registration Number	Season [temp] = does not kill mites under cappings	Honey super safe?	Treatment Duration	Application Type	Personal Protective Equipment (PPE)
<b>Apivar®</b> , <b>Apivar® 2.0</b> Amitraz [contact] 87243-1 and 87243-5 Synthetics	[Not Temp Dependent] Spring Fall	<b>NO</b>	6-10 weeks <i>no more than 2x/year</i>  Can add supers 14 days after removing strips	PLASTIC STRIP 	For ALL miticide applications, wear a long sleeve shirt, pants, closed toe shoes, socks and chemical resistant gloves. These are additional requirements for SOME miticides.
	[Not Temp Dependent] Spring Fall	<b>NO</b>	1 week <i>no more than 2x in a row or 4x/yr</i>  May need to repeat. Can add supers after 7 day treatment	GEL APPLICATOR 	Respirator with an organic particulate filter
<b>Apiguard®</b> Thymol [fumigant] 79671-1 Essential Oils	[60-105°F] Spring Fall	<b>NO</b>	4-8 weeks  Can add supers any time after treatment concludes	GEL OR GEL TRAY 	Respirator with an organic particulate filter
	[64-95°F] Spring Fall	<b>NO</b>	26-32 days  Wait 4 weeks after treatment to add honey supers	FOAM WAFER 	Respirator with an organic particulate filter
<b>Formic Pro®</b> Formic acid [fumigant] 75710-3 Organic Acids	[50-85°F] Kills mites in capped brood! Spring Summer Fall	<b>YES</b>	2-3 weeks 	GEL STRIP 	Respirator with an organic particulate filter <i>Recommended (not required)</i>
	[No Temp Restriction] Spring Fall Winter	<b>YES</b>	Immediate (but may need to repeat)	POWDER, TABLET: Spray Fumigation (liquid) Dribble Fumigation (vapor) 	Respirator with an organic particulate filter
<b>Api-Bioxal®, Ex-Ox Tablets®</b> Oxalic acid dihydrate [contact, fumigant] 73291-2 and 101743-2 Organic Acids	[No Temp Restriction] Spring Fall Winter	<b>YES</b>	Immediate (but may need to repeat)	LIQUID DRIBBLE 	Respirator with an organic particulate filter
	[No Temp Restriction] Spring Summer Fall	<b>YES</b>	6-8 weeks 	FIBER STRIP 	Respirator with an organic particulate filter
<b>Varroxsan®</b> Oxalic acid dihydrate [contact] 94413-3 Organic Acids	[No Temp Restriction] Spring Summer Fall	<b>YES</b>	2-4 weeks 	CARDBOARD STRIP 	Respirator with an organic particulate filter
	[55-99°F] Spring Summer Fall	<b>YES</b>	2-6 weeks <i>Do not apply more than 4 pouches per year</i> 	LIQUID-FILLED POUCH 	Respirator with an organic particulate filter
<b>HopGuard III®</b> Potassium salt of hops beta acids [contact] 83623-2 RNAi	[No Temp Restriction] Spring Fall	<b>YES</b>	2-6 weeks <i>Do not apply more than 4 pouches per year</i> 	LIQUID-FILLED POUCH 	Respirator with an organic particulate filter
	[No Temp Restriction] Spring Fall	<b>YES</b>	2-6 weeks <i>Do not apply more than 4 pouches per year</i> 	LIQUID-FILLED POUCH 	Respirator with an organic particulate filter

**For ALL products:** Read entire label, use strictly in accordance with precautionary statements and directions, and with applicable state and federal regulations. It is a violation of Federal law to use any product in a manner inconsistent with its labeling.

**Norroc Notes:**

- Not effective during peak nectar flow or dearth
- Less effective when supers in place
- Only effective when open brood is present
- Can be used in combination with other miticide products