HONEY BEE HIVE MANAGEMENT

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Pest/Disease	Treatment	Rate	Application	Precautions and Remarks
Varroa Mites	Formic Acid 46.7% (Formic Pro, Mite Away Quick Strip)	2 strips per colony for 14 days OR 1 strip per colony for 10 days, followed by a second strip for an additional 10 days.	Apply only when daytime high temperatures are between 50° and 85°F during week of application. Follow label directions for specific product.	Material is extremely caustic. Applicators should wear coveralls, long sleeves, long pants, acid-resistant gloves (PVC, neoprene, nitrile) and protective eyewear. Wear approved respirator with organic vapor cartridge. Do not open hives without PPE for 72 hours after application. Safe to apply during the honey flow.
	Thymol (ApiGuard, Thymovar, ApilifeVar)	Dosage prepackaged by manufacturer; follow label directions for bulk packaging.	Follow label directions for specific product.	DO NOT use during the honey flow. Remove product at least 30 days prior to honey harvest. Treatments are most effective during broodless periods. Use when daytime high temperatures are between 68° and 86°F. Do not use when temperatures are above 90°F. Thymol products are temperature sensitive; read and follow guidelines on specific product labels.
	Oxalic Acid Dihydrate (Apibioxal, EZ-OX, VarroxSan)	Liquid: up to 50 ml medicated syrup per hive body	Dissolve 35 g of oxalic acid dihydrate in 1 liter of 1:1 sugar syrup (warm syrup to completely dissolve crystals). Use syringe to trickle 5 ml of solution directly onto adult bees in each occupied bee space in each brood box.	Do not apply as liquid to any colony more than once per year during broodless period; this method may cause some bee mortality or overwintering bee loss.
		Vapor: 1-4 grams crystals per brood chamber	Seal all upper entrances, ventilation and cracks; smoke bees up from the bottom board; place up to 4 grams oxalic acid crystals into vaporizer; insert the vaporizer apparatus through the bottom entrance and cover entrance with towel; apply heat until all oxalic acid has sublimated.	Follow vaporizer manufacturer's directions for use. Oxalic acid can damage bee brood, and will not control varroa mites in capped cells. Most effective in late fall or early spring when little or no brood is present.
		Extended release strips: 1 strip for each 2.5 frames of brood	Fold strip in half and insert wrapped over top bars of brood frames, equally spaced around brood nest.	Remove strips 42-56 days after placement (3 full brood cycles). Most effective when little or no brood is present. **CAUTION:** Oxalic acid should be used only outdoors. Wear protective goggles, dust/mist filter, chemically resistant gloves, long-sleeved shirt, pants, shoes, and socks whenever handling, mixing, applying or cleaning up oxalic acid dehydrate. Also wear a respirator fitted with organic acid filter whenever applying with a vaporizer. Use only material labeled for use in honey bee colonies.
	Potassium Salt of Hop Beta Acids (HopGuard 3)	1 strip per 5 frames of bee brood	Open folded strips and place over top bars of brood frames, hanging within colony cluster. Apply up to 6 strips per year per hive, based on need. Bees may destroy and remove cardboard strips; if not, remove remnants by hand.	Use when daytime temperature is above 50°F. For best results, apply when no brood is present in the colony. If used while brood is present, application may need to be repeated 3 times at 2-week intervals. Do not apply to frames in honey supers; safe to use during honey flow if all label guidelines are followed.

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Pest/Disease	Treatment	Rate	Application	Precautions and Remarks
Varroa Mites (cont.)	Amitraz (Apivar, Apivar 2.0, Amiflex)	Apivar: 1 strip/5 frames of bees in brood chamber, with at least 2 frames between strips	Hang strip between frames in brood nest. Treat for minimum of 42 days and maximum of 56 days. Remove strips and discard. DO NOT reuse strips. Use chemical-resistant gloves to handle strips.	If hives are treated in the spring, prior to the first honey flow, strips must be removed at least 14 days prior to adding honey supers. Fall treatment can be applied as soon as honey supers are removed.
		Apivar 2.0: 1 strip per 5 frames of bees in the brood chamber	Hang strips in the heart of the brood nest. Remove strips after treatment period; do not exceed 70 days.	Remove honey supers prior to treatment; supers can be added immediately after removal of strips.
		Amiflex: 6 ml gel per brood chamber	Apply 3 ml gel onto wooden strips placed across tops of brood frames.	Remove wooden supports and remaining gel after 7 days, dispose as instructed on label. For high infestations, wait 7 days, apply second dose for additional 7 days. Honey supers can be replaced immediately following removal of excess material.
	Vadescana (Norroa)	1 pouch (500 mL) per brood box, followed by second pouch within 1-3 weeks. OR 2 pouches (500 mL) per brood box at same time	Place open pouch(es) on top bars just above brood nest, leave until bees have consumed (aprox. 1-3 weeks); remove empty pouches.	Open brood must be present to be effective. Optimal timing is during spring build-up or after splitting colonies. Do not use during heavy nectar flow when product will be overly diluted by incoming nectar. Do not use during severe nectar dearth when product will be consumed by adult bees rather than incorporated into brood food Can be used up to twice per year, as part of IPM strategy, and rotated with other miticides to reduce likelihood of resistance.
	Fluvalinate (Apistan)	1 strip/5 frames of bees in brood chamber	Hang strip between frames in brood nest. Treat for minimum of 42 days and maximum of 56 days. Remove strips and discard. DO NOT reuse strips. Use chemical-resistant gloves to handle strips.	Treat hives in spring before first honey flow or in late summer or fall after surplus honey has been removed. Supers may be returned to hive following treatment. Never consume or sell contaminated honey. Many mite populations are resistant to this product.
Tracheal Mites	Menthol 99.94% granules in packet (Menthol, Mite-A-Thol)	1.8 oz (50 grams)/colony	Place packet on top bars when daytime high temperature is above 70° and below 80°F; place on bottom board if temperature is above 80°F. Remove packet after 10-12 weeks and discard.	Remove product at least 4 weeks prior to spring honey flow to prevent honey contamination. In the fall, remove surplus honey prior to treatment. DO NOT use product when temperature is below 60°F. Use of fumigants for varroa mites (formic acid, thymol) is effective against tracheal mites as well.
	1:2 Shortening-sugar patties	1 patty (thoroughly mix 1 part vegetable shortening with 2 parts granulated sugar)	Place 1 flattened patty (aprox. 1/3 cup) on top bars above brood nest when brood is being reared in hive.	Grease patties do not kill tracheal mites, but may slow their spread within a hive by interfering with mite host-finding ability. Check often, as patties are extremely attractive to small hive beetles.
Nosema	Bioclohexylammonium fumagillin (Fumadil-B, Fumagilin-B)	Mix with syrup according to manufacturer's product label directions for number of hives needing treatment.	Mix with sugar syrup and feed to honey bees. Feed 2 gallons of syrup for fall treatment; 1 gallon syrup for spring treatment.	DO NOT use during honey flow. Stop treatment at least 4 weeks prior to addition of any honey supers. May not be effective against *Nosema cerana*.

Pest/Disease	Treatment	Rate	Application	Precautions and Remarks
Nosema (cont.)	Nozevit	1 mL (20 drops) per 12 fluid ounces of light syrup.	Feed medicated syrup to each hive 2 times, 10 days apart, in the spring and/or the fall.	DO NOT use during honey flow. Stop treatment at least 4 weeks prior to addition of any honey supers. [Nozevit is NOT a medication or an antibiotic; it is a feeding supplement which, in some cases, appears to lower the overall spore count in Nosema-infected bees.]
Small Hive Beetles	Under-hive beetle traps (Freeman Beetle Trap, IPK Trap, West Beetle Trap)	1 trap per hive	Level hive in all directions. Replace or modify bottom board to hold plastic or metal tray. Fill tray with vegetable oil, mineral oil, or soapy water.	Trap will accumulate hive debris (dust, wax, pollen, mites) in addition to beetles; check tray regularly and replace liquid as needed.
	In-hive beetle traps (Beetle Jail, Beetle Blaster, Beetle Eaters, Hood Trap)	Up to 2 per hive body	For traps with one chamber, fill reservoir one half to three quarters full with vegetable or mineral oil. Place between top bars of frames near outside walls of hive body. For traps with multiple chambers, add apple cider vinegar or other bait in addition to oil.	Oils coat and suffocate beetles but are not attractive, baits attract beetles but do not kill them; baitable traps are recommended. Inspect traps frequently and replace oil/bait. Bees may cover trap openings with propolis. Beetle bait recipe: combine 1 cup water, ½ cup apple cider vinegar, ¼ cup sugar, and the peel of 1 ripe banana (chopped in small pieces); allow to ferment 1-2 days.
	Permethrin (Gardstar 40% EC)	5 ml per gallon of water	Thoroughly drench soil in area 18-24 inches wide in front of each hive. Apply late in evening when few bees are active.	Mow grass/vegetation around hives prior to application. Apply only after high numbers of beetle larvae have been found in a hive. Soil drench kills only adult beetles emerging from soil; does not prevent adults flying from other areas. Permethrin is HIGHLY TOXIC TO HONEY BEES; do not contaminate hives or other surfaces that bees may contact. Apply with sprinkler can, never with pressure sprayer.
American Foulbrood	Oxytetracycline hydrochloride (Terramycin Pre-Mix, Tetra Bee Mix, Tetroxy)	Mix 8.75 grams of Oxytetracycline powder with 1 pound of powdered sugar, or use premixed product.	Apply 1 ounce (2 tablespoons), 3 times, at 4 to 5 day intervals to the tops of the frames in the brood chamber. Dust the mixture onto the tops of frames, around the edges of the brood chamber to avoid powder killing uncapped brood.	DO NOT use during honey flow. Stop treatment at least 6 weeks prior to addition of any honey supers. Requeening hive, or caging queen for 10 days, to break brood cycle at time of application will increase effectiveness of treatment.
	Tylosin (Tylan)	Mix 2 teaspoons product with 1/4 cup powdered sugar.	Apply aprox. 3 tablespoons, 3 times, at 4-5 day intervals to the top of the frames in the brood chamber. Dust the mixture onto the tops of frames, around the edges of the brood chamber to avoid powder killing uncapped brood.	Tylosin is recommended for use when foulbrood is found to be resistant to other treatments. Use only under the supervision of a state apiary inspector. *NOTE: As of January 1, 2017, federal law requires a written prescription or veterinary feed directive from a licensed veterinarian to purchase veterinary antibiotics.* *NOTE: AFB is extremely contagious. Antibiotics cannot cure AFB-infected honey bees. Destruction of infected colonies (bees and hives) by burning is mandatory. Apiary should be quarantined; all other colonies in the apiary should be treated with antibiotic, then inspected again in 4 weeks. If AFB is suspected, contact state apiary inspector.*

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European Foulbrood	Oxytetracycline hydrochloride (Terramycin Pre-Mix, Tetra Bee Mix, Tetroxy)	Mix 8.75 grams of Oxytetracycline powder with 1 pound of powdered sugar, or use pre-mixed product.	Apply 1 ounce (2 tablespoons), 3 times, at 4 to 5 day intervals to the tops of the frames in the brood chamber. Dust the mixture onto the tops of frames, around the edges of the brood chamber to avoid powder killing uncapped brood.	DO NOT use during honey flow. Stop treatment at least 6 weeks prior to addition of any honey supers. Requeening hive, or caging queen for 10 days, to break brood cycle at time of application will increase effectiveness of treatment.
	Tylosin (Tylan)	Mix 2 teaspoons product with 1/4 cup powdered sugar.	Apply aprox. 3 tablespoons, 3 times, at 4-5 day intervals to the top of the frames in the brood chamber. Dust the mixture onto the tops of frames, around the edges of the brood chamber to avoid powder killing uncapped brood.	Tylosin is recommended for use when foulbrood is found to be resistant to other treatments. Use only under the supervision of a state apiary inspector. *NOTE: As of January 1, 2017, federal law requires a written prescription or veterinary feed directive from a licensed veterinarian to purchase veterinary antibiotics.*
Greater Wax Moth (Fumigation of Stored Bee Hive Supers and Other Beekeeping Equipment)	Paradichlorobenzene 100% (Para Moth)	3 oz crystals for a stack of up to 5 hive bodies	Sprinkle crystals on paper or cardboard, placed on top bars of the uppermost hive body in stack. Cover tightly, using tape to seal gaps between hive bodies if necessary. Stacks should be inspected every two to three weeks, add more crystals if needed.	Use in well-ventilated area. Never use on a live colony of honey bees or on combs of un-extracted honey. Not usually necessary after first freeze of fall season. Unstack supers and allow to thoroughly air out for at least 2 weeks prior to placing back on hive.
	Glacial Acetic Acid (80%)	150 mL (2/3 cup) per stack of up to 5 hive bodies	Soak an absorbent pad (such as cotton wool) with acetic acid and place on top bars of topmost super; cover tightly. Use tape to seal gaps between hive bodies if necessary. Stacks should be inspected every two to three weeks and treatment repeated if necessary.	Never use on a live colony of honey bees. Repeated use of acetic acid can cause corrosion of metal parts such as wires, nails and frame rests.
	Aluminum phosphide Phostoxin Weevil-cide	 150-225 pellets/1,000 cu ft 30-40 tablets/1,000 cu ft	**NOTE:** Special license, training and precautions are needed for purchase or use of aluminum phosphide. Read and follow all label directions. Wear proper PPE at all times.	Honey from treated hives or supers may only be used for bee food, not for human consumption or sale.