

# BEGINNING BEEKEEPERS WORKSHOP

**Instructor: Randy Oliver (530) 277-4450** [randy@randyoliver.com](mailto:randy@randyoliver.com)

I suggest that you read each section of this outline in advance, so that you can better learn from the presentation during class itself.

For current information on class details and field sessions, rather than phoning me, please go to:

<http://scientificbeekeeping.com/announcements/>

## CLASS OUTLINE

### **(Class #1)/ 8:00 INTRODUCTION**

Class outline

History of beekeeping

**Slide show**--Basic honeybee biology

### **9:00 GETTING STARTED**

Apiary location

Equipment

Tools and protective gear

### **(Class #2)/ 10:00 BEE HUSBANDRY**

**Slide show**—Bee Husbandry in a Nutshell

### **11:00 WORKING WITH BEES**

Sting avoidance and treatment, immunity and allergy (handout)

Bee behavior; Understanding and handling bees

Moving, trucking, lifting, and combining colonies

### **12:00 LUNCH BREAK**

### **1:00 FIELD SESSION--Open up some beehives**

### **(Class #3)/ 2:00 PESTS, PARASITES, AND PROBLEMS**

Problems--Focus on *Varroa* and American foulbrood

### **(Class #4)/ 3:00 GETTING STARTED AND SEASONAL MANAGEMENT**

**Slide show**—Starting with bees

Colonies, nucs, packages, swarms

New colony management

### **4:15 REVIEW AND QUESTIONS**

# CONTENTS

FIELD SESSIONS .....	2
INTRODUCTION.....	4
BASIC HONEYBEE BIOLOGY (Slide show ).....	<b>Error! Bookmark not defined.</b>
GETTING STARTED.....	6
Randy's Equipment Recommendations (for non-migratory hobbyists) .....	6
APIARY LOCATION & MAINTENANCE.....	8
BUYING BEES TO GET STARTED.....	9
HOW TO WORK WITH BEES .....	10
LIFTING, MOVING AND TRUCKING COLONIES .....	16
QUEENS.....	17
SEASONAL MANAGEMENT SUMMARY (phenological table).....	21
BASIC BEEKEEPING MANAGEMENT (also slides) .....	22
SWARMING .....	25
FEEDING COLONIES.....	30
DISEASES, PESTS, AND PROBLEMS.....	31
Deadout Forensics in a Nutshell .....	32
HONEY NOTES AND OTHER PRODUCTS OF THE HIVE.....	41
Advice from Randy.....	43
FIRST YEAR CARE FOR YOUR NUC.....	45

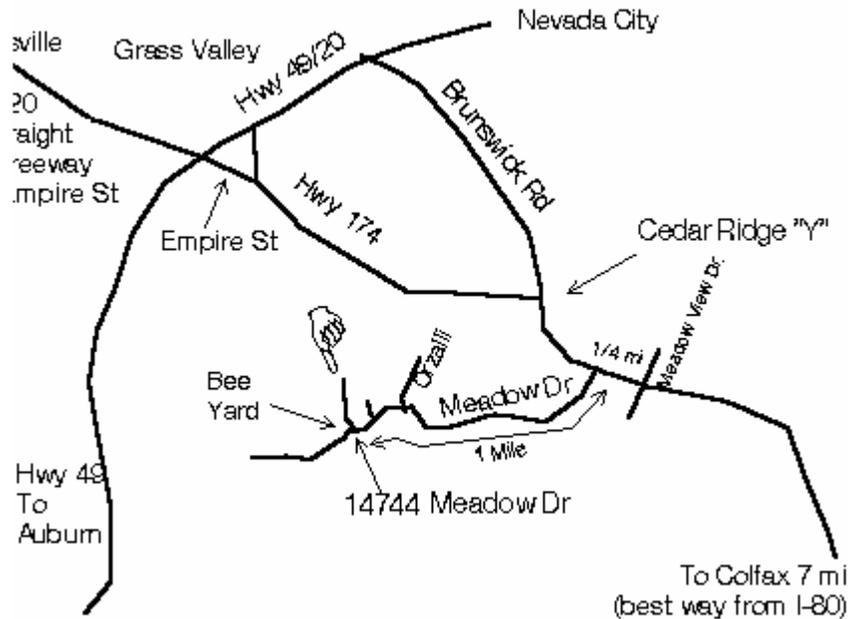
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## FIELD SESSIONS

Field sessions will usually be held at my home. We will only work bees on clear, warm days under ideal conditions. ***Always call my number (272-4450) the morning of a formal session to confirm that the session will be held. I will leave a message on the machine.*** For informal apprenticeship, call my cell (530.277.4450).

I will supply veils and hive tools for the first session. For subsequent sessions you should bring your own smoker, hive tool, and veil. I strongly encourage everyone to work without gloves. You are welcome to wear coveralls and boots, but light-colored, long-sleeve cotton work clothing is fine (two layers of clothing will stop bee stings). Shoes (as opposed to sandals) and cotton socks are recommended. **Please do not wear black or red clothing, wool or felt, wristwatches, or dark glasses.**

 *If you have any trouble reading this line in dim light, bring reading glasses.*  Bring a lunch and drink if the session spans noontime.



### Checklist

- Call 272-4450 to confirm
- Smoker
- Veil
- Hive tool
- Light clothes or coveralls
- Shoes or boots
- Reading glasses** (bee eggs are tiny)
- Lunch and drink

**Directions from I-80 east**—GPS works well.

Take the Colfax/Grass Valley offramp. Keep turning right until you are on Hwy 174. Don't miss when 174 turns left a mile out of town at Giovanni's restaurant! Go 1/4 mi past Meadow View Drive (about 6 miles from Colfax). Turn left on Meadow Drive. Go 1.1 miles up. Address 14744 on right.

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## INTRODUCTION

### BEES AND MAN

Many species of bees--about 3500 in U.S.

Honeybees evolved in Europe, Africa, and Asia

Very important in Man's history

Wild bees source of honey, brood, and pollen

Domesticated bees source of honey (no sugar) and wax (no oil)

Tax records for beeswax

Honeybees were brought to North America by early European settlers

Brought to Calif. by boat in early 1850'S

Early bees kept in gums

Rev. Langstroth invented movable frame hive with beespace (5/16") in 1851

Now about 300,000 beekeepers in U.S., about 2000-3000 commercial; total about 3 million colonies

95% have fewer than 25 colonies; 4% 25-99 colonies; 1% run up to 80,000 with crew

Very important for pollination--about \$15 billion

90% of paid pollination on West Coast; 70% in Calif.

### YOU AS A BEEKEEPER

Hobby and sideline beekeepers--don't copy commercial

### CALIFORNIA AS BEEKEEPING ENVIRONMENT

Seasons, honeyflows, yields, management earlier than books

Who can keep bees-- Time and strength needed

Beekeepers vs. bee havers--need to stay on top of varroa!

### ALLERGY

### APIARY SITING--ALMOST ANYWHERE, COVERED LATER

Neighbors and responsibility--water, swarming, flight path

## **COSTS**

Handling gear--one time (\$150)

Woodenware--new or used; danger of used (\$200 each, new)

Total for two colonies & gear--easily \$600

Bees, queens--more later

Where to buy--catalogs, local

## **LEARNING TO KEEP BEES**

***Apprentice to experienced beekeeper!!!!***

Bee class--formed to avoid mistakes

Join Association—political presence; support group; local--WAS, CSBA

Subscribe to journals

## **READING & RESOURCES**

### **Beginning texts**

Honey Bee Hobbyist by Norm Gary—good overall understanding, rather than how-to

First Lessons in Beekeeping, Dadant

The Beekeeper's Handbook by Diana Sammataro & Alfonse Avitabile

Homegrown Honey Bees by Alethea Morrison

Great beginners book free download: <http://pubs.cas.psu.edu/FreePubs/pdfs/agrs93.pdf>

Beekeeping for Dummies

Beekeeping in California [www.beeguild.org](http://www.beeguild.org) click "downloads"

The Honey Revolution: Restoring the Health of Future Generations by Ron Fessenden

Almond Pollination Handbook Traynor

### **References**

*The Hive and the Honey Bee*, Dadant

*ABC and XYZ of Bee Culture*, Root

*The Biology of the Honey Bee*, Winston

### **Beautiful prose**

*A Book of Bees*, Hubble

### **Journals**

*American Bee Journal*

*Bee Culture*

**U.C. Extension Apiculturist Dr. Eric Mussen** (530) 752-0472 [ecmussen@ucdavis.edu](mailto:ecmussen@ucdavis.edu);  
Eric is our "deep pocket" of beekeeping information

Newsletter <http://entomology.ucdavis.edu/faculty/mussen/news.cfm>

### **On the Web**

So many sites; so much erroneous information! Take everything with a grain of salt!

Most accurate and up to date is **ScientificBeekeeping.com**

## **GETTING STARTED**

### **THE RIGHT WAY TO KEEP BEES**

There is no one "right" way to keep bees. If you ask a dozen beekeepers for the "best" way to do something, they may all give you a different answer, and they may all be correct (or incorrect!). The right way for you depends upon what you want to get out of beekeeping, your constraints of time and money, whether it is for profit or enjoyment, your location, and many other factors.

In this class, I will suggest *general proven methods* that will get you off to a good start. Where you go from there is up to you!

**The "rules" for beekeeping:**

<http://scientificbeekeeping.com/the-rules-for-successful-beekeeping/>

<http://scientificbeekeeping.com/the-rules-redux/>

### **RANDY'S EQUIPMENT RECOMMENDATIONS (FOR NON-MIGRATORY HOBBYISTS)**

*(support your local beekeeping suppliers)*

#### **TOOLS & GEAR**

Smoker: 4" x 7" (I prefer dome-top stainless steel with narrow spout)

Hive tool--regular (get at least two)

Nylon bee brush

Zipper-veil, plastic-helmeted or hooded coverall bee suit

Extra string tie veil and helmet for light work or guests

Goatskin gloves with nylon cuffs--oil gloves before using, then whenever stiff

Rubber steel-toed rain boots--tuck pants inside

#### **HIVE EQUIPMENT**

Boxes: Use commercial or budget grade, good oil-based primer to **outer surfaces only**. Then high quality oil or latex top coat. (Sherwin Williams A 100 gets good reviews). Not worth cutting your own pine. Square up during assy. Outside dimensions are 16-5/16" x 19-7/8". Use 7d galvanized nails or 1-3/4" staples each way in corners. Stick with one brand, since dimensions are not uniform.

## **BOX SIZES**

For brood chambers, the commercial standard is "deep" equipment (9-5/8" depth). Many advantages, but boxes of honey are heavy (up to 90 lbs). In order to get around the weight issue, some use "medium" depth (6-5/8").

**Another alternative is to go to 8-frame deeps.** These are lighter, and better center of balance for handling. 8-frame hives require special tops, bottoms, and queen excluders.

Brood chamber : The first 18" of boxes is called the "brood chamber"—these boxes and the honey in them belong to the bees. Additional boxes then above a queen excluder are called "honey super" in which surplus honey for harvest can be stored.

Brood chamber: *either*

two 9-5/8" "deep" boxes, or

three 6-5/8" "medium" boxes

Honey supers: two 6-5/8" supers for most areas. *Usually won't need until 2nd year.*

Frames: grooved top, grooved bottom with solid plastic waxed foundation. Preassembled frames (Mann Lake, Dadant) are well worth the added cost!

Queen excluder--metal-bound lasts longest, new plastic ones get good reviews

Telescoping cover with inner cover best; migratory cover O.K. as second choice

Bottom board: Screened handy if you use stickyboards to monitor mite levels, or use powdered sugar dusting for mite control; otherwise use solid bottom boards.

Hive stands: place hives individually on a pair of 8x8x16" cinder blocks (tip forward 1/2").

## **MISCELLANEOUS**

Extractor, knife, and bottler--rent

Feeders & feeding--jar at top is best; don't use Boardman entrance feeder

Pollen traps--wait

Solar wax melters--plans in books

Observation hives--wait for experience

Gadgets--don't buy yet

## **BE PART OF THE SOLUTION!**

Honey bees and native pollinators are struggling to cope with habitat alteration due to mankind, climate change, recently introduced parasites, and excessive use of insecticides. You can help these species by maintaining pesticide-free, bee-friendly gardens and landscaping, focusing upon planting a variety of pollinator-attractive plants to provide forage over the course of the year. Hedgerows of late-flowering

plants will bustle with activity from a variety of fascinating insects, the majority of which are beneficial. Be assured that bees visiting flowers have no interest in stinging!

The simplest way to choose appropriate flora is to look around your neighborhood and at nurseries for plants in bloom, and see whether pollinators are actively visiting them. Focus especially upon plants that flower in late summer and fall, when there is little else in bloom.

## BEEKEEPING SUPPLY CATALOGS

Most of these are in the Midwest or east, so phone hours, and shipping time and expense must be considered. Dadant and Mann Lake are the closest for shipping.

**Mann Lake Ltd.** 800-880-7694 [www.mannlakeltd.com](http://www.mannlakeltd.com)

**Dadant** (Chico phone 530-893-0921) 877-332-3268 [www.dadant.com](http://www.dadant.com)

**Betterbee** 800-632-3379 [www.betterbee.com](http://www.betterbee.com) *many unusual and cutting edge items*

**Brushy Mountain Bee Farm** 800-233-7929 [www.beeequipment.com](http://www.beeequipment.com), *honey, some unusual items*

**Water T. Kelley Co** 800-233-2899 [www.kelleybees.com](http://www.kelleybees.com) *old-time, good prices*

**B&B Honey Farm** info: 507-896-3955 order: 800-342-4811 [www.bbhonefarm.com](http://www.bbhonefarm.com)

**GloryBee Foods, Inc.** 800-456-7923 [www.glorybeefoods.com](http://www.glorybeefoods.com) *all supplies, but big on candlemaking and food products*

### Local Suppliers

**Sacramento Beekeepers Supply**, 2110 X Street, Sacramento, CA 95818, 916-451-2337, [sacbeek@cwnet.com](mailto:sacbeek@cwnet.com)

**Mann Lake** 1250 Harter Ave, Woodland, CA 95776 866-880-7678

**Dadant** 15C Valley Ct, Chico, 95973 530-893-0921

## APIARY LOCATION & MAINTENANCE

### PLACEMENT

Check local ordinances. However, "Out of sight, out of mind"

No apiary shall be located within 100' of any other property boundary without the consent of the adjacent parcel's owner.

Low profile: vandalism, theft, complaints

No. 1 rule: **location, location, location**; need flowers in 2 mi radius

Plenty of willing landowners--look for orchards or gardens

In a **warm, sunny, dry** place. Colonies in the shade sting more. Varroa likes cool.

Access by truck for loading

**High ground**, air drainage, no dampness

## SET UP & MAINTENANCE

**Avoid direct line of sight of public**—min. 100 ft line of sight to hive entrances to innocent passersby

Flight path and public nuisance; divert overhead with 6' flight screen

You may wish to leave a dark shirt flapping in the breeze at human height to accustom bees to movement.

Water source between hives and neighbor

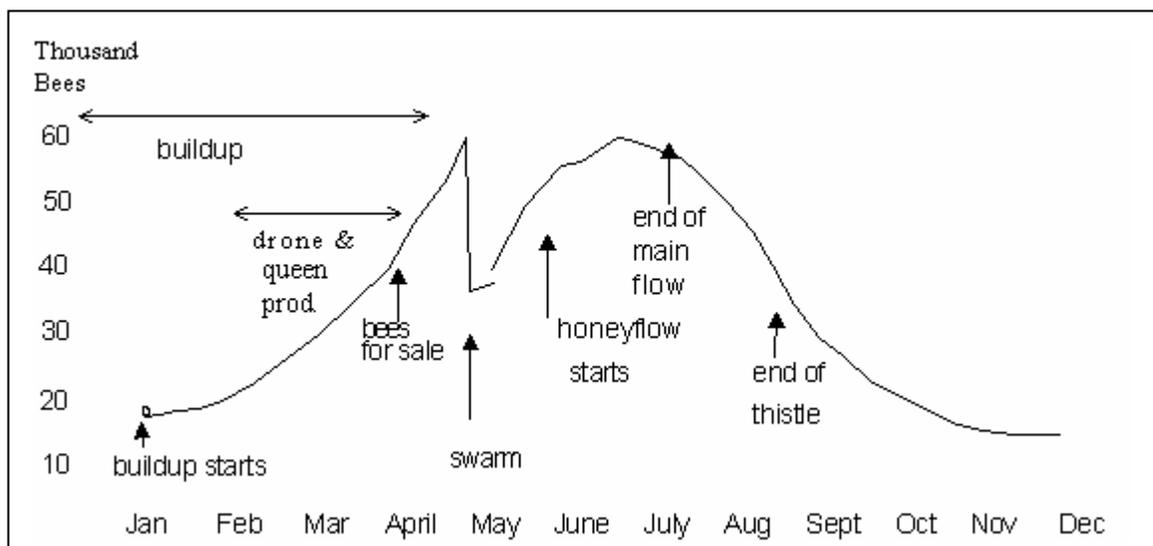
**Electric fence if possibility of bears**

Set colonies on individual stands; pair of cinder blocks best, front lower than rear.

Morning sun best for early nectar; **Face colonies east or southeast** if possible.

Control weeds in flight path and for fire danger. Cardboard on ground prevents weed growth. Herbicides are OK.

## BUYING BEES TO GET STARTED



## BIOLOGICAL BUILDUP OF BEES COINCIDES WITH FLOWERING SEASONAL BASIS

Natural annual cycle--sigmoid curve, interrupted by swarming

Starts after winter solstice--build up population for honeyflow

Buildup 6 wks for established colony, longer for small colony

Bees not available until April 1 - 15

Cluster of bees needed to heat brood and forage

Take advantage of early nectar and pollen flow for brood buildup--hard to do in Calif area since bees aren't available 'til April. Build up for next year.

#### **Obtaining bees: advantages & disadvantages of each**

**Swarms:** natural 2-12 lbs of bees & usu. old queen (virgin in afterswarm)

Adv.: draw comb really fast, "free"

Disad: old queen, late start, old unknown queen

Mgt: give brood, virgin won't lay for 2 wks

**Package bees:** 8-10 wks to full strength; about \$55 - \$75

Adv: No disease, new equip, young queen

Disad: slow buildup; helps to add brood

Recommendation: get 4 lb. pkg

**Established colonies**--about \$150-\$200

Adv: ready to go

Disad: **often junk equip or disease; *intimidating to work***

**Nucs (nucleus colonies)** 6-8 wks buildup for nuc; about \$90-\$125

Compromise of package & established colony

Adv: young queen and fast buildup

Disadv: usu. only available on deep frames; possible disease on frames

#### **Recommendations**

*Start with small colonies to build your confidence as colony size builds*

Don't start with too few or many colonies--get 2 - 5

**STARTING UP MANAGEMENT: SEE "NUC PICK UP INSTRUCTIONS" AT END.**

## **HOW TO WORK WITH BEES**

### **BASICS**

**Relax!**

**Cover your face and hair with a veil**

**Use a little smoke**

**Move smoothly like you're doing Tai Chi**

**Don't tap or bang the hive**

**Don't crush bees**

**"If you gonna be dumb about it, you better be tough!"**

## BEE STINGS

Bees need to sting to defend their stores; sting has been designed by natural selection to cause most irritation to mammalian predators. As a beekeeper, you will get stung!

Stylet, lancets, modified ovipositor, venom pumping, loss of stinger

Family members often allergic (1 out of 5)

<25 = 40% chance of allergy in lifetime; 50-200 = 10%; >200 no risk

Like picking blackberries--don't make a big deal about a few stings

## BEE BEHAVIOR--UNDERSTANDING AND HANDLING BEES TO AVOID STINGING

Honeybees are never aggressive--they are defensive. You are the aggressor to them!

Bees don't "think" like we do--don't anthropomorphise their behavior! They don't get mad, angry, vengeful, excited, etc.--certain stimuli simply initiate certain behavioral responses. **To understand bees, you must understand the stimuli and responses!**

Use all your senses to "read" the bees. Sight, hearing, smell, touch (OK, not taste). Before a colony goes into defensive mode, their movements change, the pitch of their buzzing changes, they emit the banana smell of alarm pheromone, and they start to "hit" you without stinging.

Imagine this analogy: **bees are like pit bull dogs**--they can be as sweet as pie, or with only a little warning, they can tear your arm off. Be aware of the "little warnings!" In the field sessions, we will work small colonies in the best of conditions--don't let this give you a false sense that bees cannot suddenly start stinging en masse.

If you disturb a colony of bees, and they start to sting you, cover your face and GET AWAY QUICKLY. Our European bees will rarely follow you very far. You can "lose" following bees by walking through shrubbery.

## IF YOU GET STUNG

The honeybee stinger releases about 90% of its venom in the first 20 seconds. Therefore, you should remove the stinger immediately!

It is not critical just how you remove the stinger, just do it quickly. Most beekeepers simply *scrape* the stinger out of their skin with a fingernail.

If you get stung in the eyelid, ear, nose or lip **it will hurt like hell! The stinger will be hard to remove**, so get away from the hive and ask someone to remove the stinger. Or use the rearview mirror of your car to see.

Apply a paste of meat tenderizer (papain) to the sting site to "neutralize" the venom. Take an antihistamine to reduce swelling and itching. Some swear by the homeopathic remedy "Apis."

Safety warning: If you receive over 50 stings at a time, consult your doctor for at least a week after the incident in case of tissue necrosis that the cause kidney failure.

## STING FACTS (FROM THE HIVE AND THE HONEY BEE)

It is normal to experience increased reactions to your first dozen or so stings, then for immunity to build until you have little or no reaction. A paste of aspirin or meat tenderizer helps alleviate itching and swelling; other cures may also help.

The more stings you get a year, the less chance you have of becoming allergic. Try to receive *at least* 50 stings every year; over 200 will guarantee you immunity.

Major swelling (such as your whole arm after a sting on the finger) is common, and not an indicator of allergy. This may occur your first sting each year. Take aspirin and antihistamines as soon as possible.

Breaking out with hives indicates minor allergic reaction, but don't be alarmed.

**Serious reaction to *any* allergen (like peanuts) is indicated by cramps or nausea, fainting, shock, and difficulty breathing. Rush to a hospital, especially older people. Anaphalactic shock may be treated with an adrenaline (epinephrine) injection. You may wish to have your doctor prescribe you an "Epi-Pen" to keep around for emergencies.**

## HANDLING BEES TO MINIMIZE STINGING:

No. 1 tip: **KEEP GENTLE BEES**, requeen if they get "hot"

**ALWAYS WEAR A VEIL!** Bees aim for the eyes, and key in on hair. Cover these to avoid most stings! ***Turn your collar up to protect the back of your neck.***

Be relaxed and confident, don't be afraid! Bees sting nervous people.

Work smoothly and slowly, don't rush, jerk, or make fast movements (like tai chi)

***Smoke bees whenever the guard bees' heads start following your movements!***

Avoid crushing bees or jarring the hive; pry frames slowly; ***slide your fingers onto frames, so you push bees out of the way***

Use the right amount of smoke; don't oversmoke

Work in the middle of a clear, warm, day when the field force is out; don't push dusk!

Wear a veil and light-colored cotton clothes, no black or red, or wool

Scrape stings immediately and cover or mask the alarm pheromone

**Gently pinch bees in your hair;** don't swat at bees

"Lose" following bees by walking through shrubbery

## HOW TO USE SMOKE

The smell of smoke initiates honeybee absconding behavior--they stop defending the colony, and start gorging on honey (even if they have to uncap it!). It also inhibits their ability to smell alarm pheromone. Smoke also acts as a general bee repellent if you want them to move. It also masks your body smell.

- Use a nontoxic effective smoker fuel: pesticide-free burlap, punky wood, leaves, road-crushed pine needles, wood stove pellets, commercial cotton products. Dry grass does not work!
- Fuel must be bone dry to smolder well.
- Light fuel from bottom, add more while pumping. Get a good bed of coals at the bottom of the fuel, then pack more fuel firmly on top too keep smoke cool. Keep smoker upright to maintain thermosiphon draft. Will go out if laid on side.
- Smoke must be cool, white, and dense.
- Puff one puff (depending on weather and size of colony) into entrance so the smoke disappears inside. If smoke immediately blows out, you have found the "exhaust" side of the entrance. Blow smoke into other (intake) side of entrance.
- **You only need to smoke the exposed bees—guard bees hang out at the periphery of the cluster—don't over smoke!** When inspecting colony, gently smoke the bees on the top bars so they go down and give you grip space. Any time bees' heads are looking at you, or guards fly up to bounce off your hand, smoke them gently down.
- If you've been away from smoked bees for a few minutes, smoke them again before reaching toward them.

### THE FOLLOWING PUT BEES "ON EDGE"

- Anything that seems like a bear—mammal smell, jarring, **nighttime disturbance**.
- Any **inadvertent taps** on hive with the smoker, hive tool, etc.
- **Alarm pheromone** from crushing bees, stinging bees, or upset hive next door.
- **Cool or windy** weather. Shady hive location.
- **Being hungry**, lack of honeyflow, robbing
- Being bothered by **skunks**, cattle, ants, etc.
- **ANY KIND OF FAST MOVEMENTS.**

### MINIMIZING STINGING

Position or screen colonies so that there's no direct line of sight between the guard bees and passersby within 100 feet.

**Anyone in the beeyard should wear a veil to avoid stings in the face** and scalp. Defensive bees aim for your eyes; cover them or face downward if a bee threatens you. If bees threaten, walk away!

Bees may cause stinging problems the first day after you move them into a yard. Move them as gently as possible, and feed them light syrup *starting before* you move them in.

**Many surprise stinging incidents are due to using a weed whacker close to a colony.** Weed whack at dusk in full gear, let bees settle overnight.

Guard bees react to quick or jerky movements near the hive. **All your movements near a colony should be "Tai Chi" smooth and graceful.** Waving your hands or arms will attract defensive bees.

Defensive bees aim for dark spots--eyes, watch bands, sunglasses--avoid these. Bees target dark, bearlike moving predators. When near hives avoid black or red (bees see red as black) clothing, any wool (animal hair), and cover any dark hair or beards.

Guard bees will usually give you "**warning bumps**" before they sting. Heed them!

When splitting the brood chambers, if the lower frames start to lift up when you lift the top box, this crushes bees, and you will need to puff in smoke immediately! Pry the frames down with minimum lifting of the upper box, and minimum disruption.

Always pinch any bee buzzing in hair. It will not give up until it stings someone! Never swat a bee out of your hair--it will most likely return to sting someone in the eye! If bees get in your hair, get far away from the hive **quickly!**

If a bee lands on your hair--no problem. But if it starts a high-pitched buzzing, and starts digging in, always pinch and kill it (it won't give up until it stings someone!). Never swat a bee out of your hair--it will most likely return to sting someone in the eye!

General Summertime Tips: Keep cans of soft drinks covered--bees and wasps may enter and sting you in the mouth or throat. Avoid walking barefoot in lawns containing blooming white clover. Watch for bees who have fallen into swimming pools--they may sting when bumped into or lifted.

Keep in mind that Joe Public is totally freaked out about bee stings. Educate your neighbors how to avoid stings, to scrape a sting out quickly, not to wave their hands at bees, and to apply meat tenderizer immediately to the sting.

## TIPS

- You can drink through the lower mesh of your veil--you don't have to expose your face. The mesh also filters out bees from your drink!
- Be careful when tasting honeycomb in the beeyard. A bee can land on the comb while it is on the way to your mouth!
- Gentlemen--be careful about peeing outside near defensive bees.
- Waving your hand will attract defensive bees. You can draw threatening bees away from visitors by waving your hand in the air, then having the visitor walk away.

- Bee is on your veil screen: ***Don't panic.*** If you see its belly, it's outside; if you see its back, it's inside. If a bee gets in your veil, look up toward the sun. The bee will fly toward the light, away from your face; pinch the bee at the seam of your screen and lower fabric.
- Bee in your clothing: ***Don't panic.*** Move away from any circling bees. Loosen cuff/neck/zipper. Aim opening upward and toward light--bee will fly out.
- Bees loose in your car: ***Don't panic.*** Bees in car will normally fly to windows and ignore you. Open windows for them to fly out.
- IMPORTANT: ***Never walk away from a beehive and approach a bystander with your veil still on.*** You will often lead bees to the bystander and he/she will be stung. Take your veil off long before you approach them. If you don't feel comfortable doing that, you have no right to approach any unprotected person.

### **CAUSES OF TYPICAL STINGING INCIDENTS**

- Working in poor weather, or hive in the shade
- Moving bees at night--loading or unloading in the dark
- Weed whacking near a colony--from debris hitting the hives
- Bees in hair from not wearing a veil--happens faster than you can imagine!
- Taking off your veil after bee work, but still in beeyard

### **ALL ABOUT BEE STINGS (OUCH!)--INFORMATION FOR THE PUBLIC**

Most species of bees and wasps will rarely sting a human. Honeybees, yellowjackets, and hornets are the exceptions. Many "bee" stings are actually from yellowjacket wasps ("meat bees"). Only the honeybee leaves its stinger in your skin, then dies shortly afterwards. Other bees and wasps can sting multiple times.

### **STING ALLERGY**

Bee venom is relatively harmless to most people (and may have health benefits). It is nearly impossible to receive enough stings from European honeybees to cause venom toxicity. Unfortunately, many people are concerned that they are "allergic" to bee stings.

Sting allergy is ranked on a scale of 1 through 6. A "normal reaction" (swelling and itching) is rated 1, a "large local reaction" (mass swelling) is rated 3, and a "life threatening systemic reaction" (anaphylaxis) is rated 6. The percentage of persons truly at risk for dying from bee stings in their lifetime is extremely small--somewhere in the range of 1 out of 10,000-100,000 persons.

Major swelling (such as your whole arm after a sting on the finger) is common, and not an indicator of serious allergy. This may occur with your first sting each year. Even experiencing hives all over your body after a sting does not indicate that you are becoming dangerously allergic, and is not a cause for alarm.

## FEAR FACTOR

The vast majority of people have nothing to fear from bee stings. Death from bee stings is exceedingly rare: only 1 person out of **14 million** dies from bee stings each year. You are **six times more likely to die from a dog bite** than bee stings! (And 5 times more likely to die from lightning). You are more likely to die from a car accident driving to the hospital, than you are from the bee sting! The chance of dying from mass stinging is minuscule--a healthy person can usually survive 500-1000 stings! (Not that you'd want to find out).

## LIFTING, MOVING AND TRUCKING COLONIES

Honey is heavy--deep super can weigh 90 lbs, big colony can weigh 250 lbs!

**Learn to lift properly—support box weight on your knee or belly.**

Don't twist your back, use your legs!

Get a helper

**Work multiple beehives on your knees to avoid bending over.**

Hand trucks with big pneumatic tires are great, but can jar frames and irritate bees.

## CHANGING HIVE LOCATION

Field bees will return to old stand and be defensive, and create a public hazard.

Either:

1. Move the hive up to two feet a day, using movable landmarks to guide bees to new position, or
2. Wait 'til dusk and move at least two miles away—leave there for at least two weeks for field force to die from old age, then move back.

## TRUCKING BEES

- Lots of disasters happen when bees are being moved. Learn from the mistakes of others! Follow these recommendations studiously to avoid trouble:
- **Be prepared!!!!** When you're moving live bees, anything can happen, and you will have to deal with it. Always carry full gear, a flashlight, ropes or straps, and a smoker.
- **Wear full gear**, and have a fully suited helper. Bees will fly toward a flashlight at night.

- Bees will crawl into clothing at night, and will crawl up pants legs from the truck bed.
- **Load at dusk (not dark)**; unload strong colonies at dawn, esp. in warm weather.
- Don't leave field bees--they are a danger to the public!
- Don't bother colonies prior to moving. Do not hammer on boxes!
- **Smoke the colony before touching it.** Set hives down *gently* on bed of truck.
- **Strap boxes together tightly** with ratchet nylon straps. Tie hives in place so they can't slide if you put on the brakes.
- You can often get away with stuffing the entrance for a short while, but you risk killing the bees if they get excited or hot. Professionals always **leave the entrances wide open**. If necessary to close, use a full size screen cover, or cover the whole hive with net, sheet, or shadecloth.

## QUEENS

### NATURAL SITUATION: SWARMING AND SUPERSEDURE, 1½ YEARS NORMAL QUEEN LIFE

Swarm cells on bottom of frames in Spring

Supersedure cells of side of frame (usu. single) in Summer/Fall

Sometimes mother & daughter lay together

Often supersedure if colony is sick.

### QUEENRIGHT VS. QUEENLESS

Stages (and sign of) of queenlessness:

1. Cluster loses integrity--bees scatter randomly over the combs; bees agitated.
2. Bees start emergency cells in a day or two if there are eggs/larvae available. If they are successful in raising an emergency cell, or have a virgin queen, they will act as though they are queenright, and **keep the brood cells cleaned and empty and ready for eggs**. On the other hand, if queenless, they will store nectar and pollen in the middle of brood area.
3. Once hopelessly queenless: become nervous on combs, wings shimmer/flutter, fan loudly in response to smoke ("queenless roar"), defensive stinging, store nectar and pollen in brood area (stored pollen has "greasy" look), may drift from colony, often lots of drones. Colony dwindles.
4. After about 3 weeks of queenlessness, laying workers begin laying multiple eggs in cells, or eggs off center or on sides. Worker cells get oversize drone larvae and bullet-shaped cappings--watch for small drones, often chalkbrood and EFB.

**Solution:** Combine laying worker colony with queenright colony

### QUEEN EVALUATION CRITERIA

Great colony-to-colony variation

Gentle, no "following"

Early buildup

Solid brood pattern & lots of brood--greatest predictor of honey crop

Disease resistance, esp. to *Varroa*

Low swarming impulse

Color and race--not as important as matching characteristics to your desires

## REQUEENING

- Problem with any of above
- Trial of other stock
- On regular basis—vigorous young queens really help with colony disease resistance and honey production. Colonies with older queens tend to swarm in spring.
- Time to requeen: spring or fall

## OBTAINING QUEENS AND QUEEN INTRODUCTION

- Raise your own if your existing queen had good characteristics. Split off a nuc.
- Allow very good queen to naturally supersede.
- Choose breeder by selection criteria, not color Purchase local (less stress) or by mail--show cage
- Order early and notify mailman to hold at post office or hand deliver

## FINDING THE QUEEN

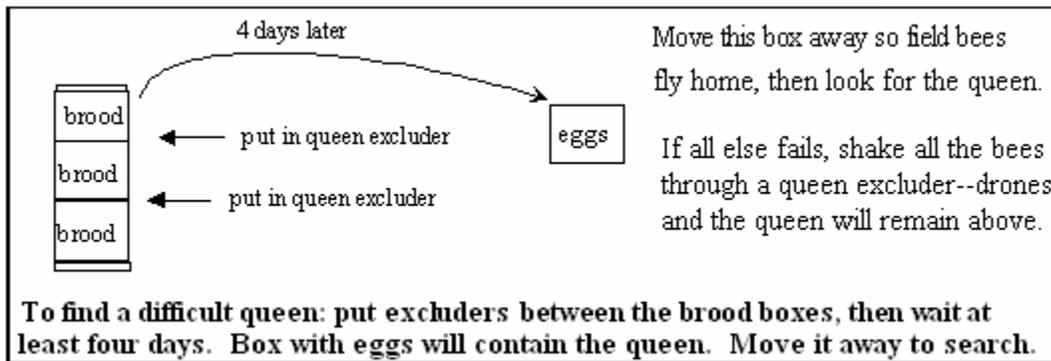
- Generally, you don't need to actually see the queen--just observe her handiwork--eggs, pattern, amount of brood
- Only search under the best weather conditions--warm, sunny, no wind.
- Put on your dang reading glasses!  *If you have any trouble reading this line in dim light, bring reading glasses.* 
- If there is no honeyflow, feed light syrup the day before to avoid defensiveness.
- ***Search with the sun behind your shoulder for best lighting.***
- The queen will usually be on a brood frame near the center of the cluster; occasionally on honey frames or elsewhere.

- Pull frames gently straight up until you clear the box, so you don't roll or brush bees. To avoid rolling the queen as you remove frames, start by removing an outside frame away from the cluster, then push other frames into the space created.
- Start with the frames closest to you, and work away.
- Look first for a freshly exposed queen on the side of the next frame still in the box, then at the far side of the frame you've removed, then at the near side.
- Look quickly--a queen that is simple to spot in the first 5 seconds after removing a frame will often be nearly impossible to spot a minute later after she moves
- Use a consistent scan pattern--circle the perimeter, then look in the center.
- Watch for queens ducking back and forth around the bottom edge of a frame.
- Watch for a bee moving "differently" on the combs--queens move "deliberately."
- Ignore the workers and drones, and define your "search image"--long tapered abdomen, wider legs, shiny thorax, deliberate traveling across the combs.
- The queen stands up taller than the other bees, and can often be spotted by looking down between combs, or by holding the comb at an angle. A stationary queen is often surrounded by a ring of "attendants."
- If stymied, use the queen excluder trick below.

## QUEEN INTRODUCTION

- Do not leave a caged queen in the sun for even a moment! She will die from overheating. Keep cage inside your clothing for best temperature.
- Introduction is most successful during honeyflow or when feeding syrup.
- It is easier to introduce closely-related queens.
- Introduced queen is accepted most readily by young nurse bees with open brood.
- Caged queen must be brought to full laying condition, and take on colony odor.
- Mailing cage introduction: remove (kill) old queen & cells; remove attendants; pull cork to expose candy; place cage screen side exposed between two brood frames.
- Two-step method: same as above, but don't expose candy plug yet. Check back in 24 hrs to see if bees are trying to "ball" the queen by hanging on tight to the screen or biting it. Don't expose candy plug until bees are walking lightly over the screen and offering the queen food.

- Push-in cage of 1/8" hardware cloth is even better. Push deep into comb over emerging brood with pollen cells available.
- For best results, introduce the queen into a nuc of young bees and brood. When she's laying well, place the nuc over a sheet of slit newspaper on top of a well-fed, dequeened colony .
- If a colony's been queenless for a while, combine it with a queenright colony.



## QUEEN SUPPLIERS

The less time the queen is in the mail, the better--especially in hot or cold weather. Make sure you notify UPS or your postal carrier not to leave the queen delivery in the mailbox or outside. Make arrangements to pick them up or have them hand delivered. Overnight air is best for out of state queens. Mann Lake has a list of suppliers on the Web:

[http://www.mannlake.com/publications/BEE\\_SUPPLIERS.pdf](http://www.mannlake.com/publications/BEE_SUPPLIERS.pdf)

Glenn Apiaries lists suppliers of mite-tolerant queens

<http://members.aol.com/queenb95/catalog.htm> "resources" at bottom of page

Upon delivery, give the queens a drop of water on the screen, and keep in a warm room (70-95°F) away from the sun.

## SEASONAL MANAGEMENT SUMMARY (PHENOLOGICAL TABLE)

<b>The Beekeeping Year--Grass Valley* (2500' elevation)</b>		
<i>Month/Condition</i>	Flowers Blooming	Management
January <i>Colony buildup</i>	ALDER, rosemary	Check that queens are laying by Jan 15; treat for varroa before brood is sealed?
February <i>Buildup &amp; Almonds</i>	ALMOND, willow, manzanita, quince	Check for stores, space, disease, move to almonds, syrup stimulate weak colonies
March <i>Buildup, Fruit Bloom, Manzanita flow</i>	MANZANITA, PLUM, filaree, radish, mustard, ceanothus, dandelion	Reverse brood chambers;super for manzanita?; check weight if it's rainy--colonies starve now; monitor varroa
April--busy month <i>Fruit Bloom, then dearth, Swarming</i>	APPLE, CHERRY, OAK, pear, buttercup, Scotch broom, maple, poppy	Reverse brood chambers, swarm control, start packages, requeen, make splits, pick up swarms, trap pollen, get supers ready, monitor varroa
May <i>Wildflower honeyflow</i>	BLACK LOCUST, ceanothus, lupine, madrone, vetch, clover, mtn misery, poison oak	Pick up swarms, super up when locust blooms, trap pollen; monitor varroa before adding supers!
June <i>Main honeyflow</i>	BLACKBERRY, COFFEEBERRY, sweet clover, <b>buckeye</b>	Check supers ahead of flow, don't let supers overfill, trap pollen
July <i>Star thistle flow</i>	STAR THISTLE, TOYON, herbs, chicory, fennel	Normal end of honeyflow; possible star thistle flow if wet winter.
August <i>Nectar dearth</i>	thistle, madia, ornamentals	Pull honey, extract while it's warm, feed pollen supp; <b>treat for varroa August 15th!!!!</b>
September <i>Nectar dearth</i>	ornamentals & irrig pasture	<b>Treat for varroa</b> , watch for robbing, requeen?, feed pollen supp patties
October--last bee work <i>Fall buildup</i>	ASTERS, IVY, poppy, dandelion, thistle	Fall feeding (check colony weight) syrup and pollen, arrange stores, monitor varroa
November <i>Queens stop laying</i>	rosemary, ornamentals	Entrance reducers, winter prep, varroa check, oxalic acid dribble effective
December <i>Colony clustered</i>	alder, ornamentals	Don't disturb
*Dates are approximate, depending upon, elevation, temperature, and rainfall. ©Randy Oliver 1983, rev 2013		

## BASIC BEEKEEPING MANAGEMENT (ALSO SLIDES)

***Your contract with your bees: you provide the bees the best husbandry possible; you get to keep any surplus honey beyond their needs.***

Have no illusion that you will ever make the bees do anything. Only by understanding natural bee behavior, and encouraging and helping them in their ways, can you make it appear that you are "making" them do anything.

"The bees have their definite plan for life, perfected through countless ages, and nothing you can do will ever turn them from it. You can delay their work, or you can even thwart it altogether, but no one has ever succeeded in changing a single principle in bee-life. And so the best bee-master is always the one who most exactly obeys the orders from the hive."

--*The Bee-master of Warrilow* Ticknor Edwards 1920

**Timing is everything!** You need to know the timing of your local blooms, and have your bees ready, and supers on when the flow comes. ***Nature does not take excuses nor give you a second chance.*** The same applied to swarm prevention, varroa mite management, and winter preparation.

***Life for bees in nature is brutal. Many, if not most, swarms are not successful at survival. Either they get rained upon, can't find a suitable cavity, die from parasites or predation, or aren't able to store enough honey to make it through the winter. At least half of all colonies die in nature each year—so don't beat yourself up if one of yours does! Just restock the hive with fresh bees.***

### THE RULES OF BEEKEEPING

- 1. Bees need a warm, dry bedroom.***
- 2. Bees need lots of flowers so that they can store honey for the winter.***
- 3. Bees need to manage parasites.***

***End of rules—anything else is just somebody's idea as to how best to create the above.***

There are no rules--only generalities. Bees will make exceptions to every rule!

Don't expect any two seasons to be the same!

There is no "right way" to manage bees--depends upon your location, timing, goals, etc.

All beekeepers screw up regularly, and none of us ever stop making mistakes. Beekeeping will always consist of a series of surprises!

Understand bee biology and behavior, plant biology, and seasonal patterns, and make appropriate management decisions as needed.

There is no reaching the end of the beekeeping learning curve!

**Timing is everything--if you are even a little late for a honeyflow or mite treatment, all is lost for the season! Nature does not take excuses or give second chances.**

### **MAIN GOALS:**

- Build up strong colonies by May 15 honeyflow, or for almonds Feb 10
- Prevent colonies from swarming
- Give best location and plenty of supers to store honey
- Prevent disease

Population buildup starts in early January--need to maximize for main flow

Buildup 6 wks for established colony--longer for nucs, etc

One strong colony makes more honey than two medium strength colonies

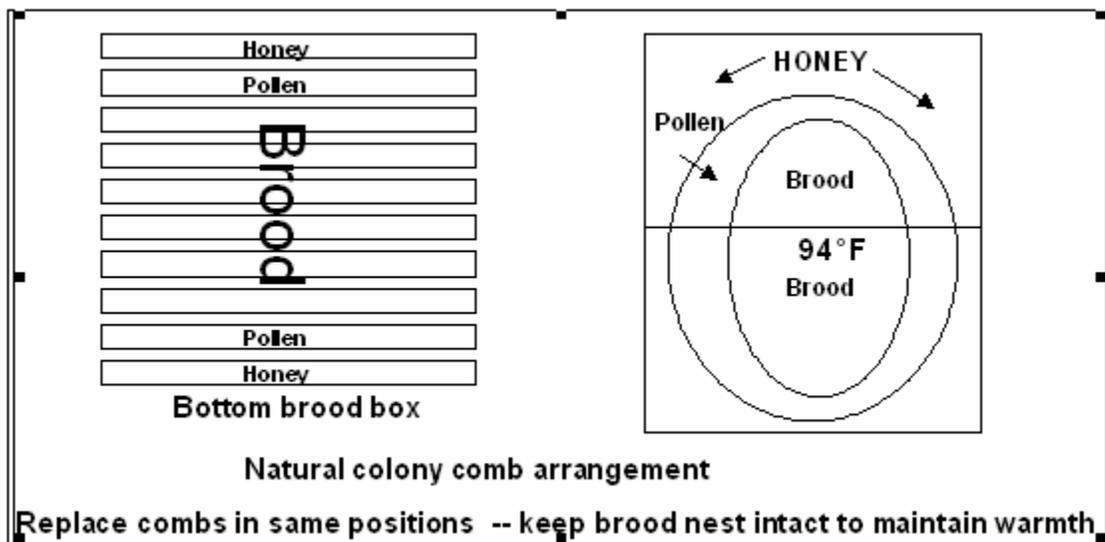
### **Natural cycle**

In spring, eat way up through stores--abandon lower combs. Honeyflow starts--bees normally store honey in dark combs above; crowd queen down. Need to store honey and pollen for winter stores. The cluster and broodnest yo-yos down the combs during nectar flows, up during dearth.

### **GENERAL FRAME MANIPULATION TIPS**

- . Bees draw foundation best above the cluster, immediately above brood
- When "drawing" foundation, reverse outer 3 frames on each side, but don't split brood
- I suggest using 10 frames in the brood chambers--***always squeezed tightly together.***
- Use 10 frames of foundation in honey supers; once you have drawn comb, you may use 9 frames for easier uncapping.
- Bees will only draw foundation if you see "**whitening of the combs**" due to honeyflow or feeding of light syrup.
- In general, never split brood (exceptions for swarm control)
- **Tip:** combs of honey are heavy, combs of brood are light in weight
- Place uneven or damaged combs between straight combs for repair by the bees
- Cut out excessive drone comb
- In general, don't rearrange the combs--the bees know what they're doing! In the lower brood box, outside combs are always honey, next combs in hold pollen facing in, inner 6 combs are for brood. Upper brood box similar, but more honey.

- Replace combs when they get dark and rubbery and full of disease spores



## SPRING MANAGEMENT

Check colonies by 2nd week of Jan for egg laying

Work bees only when cluster has broken and bees are flying--above 60°F

If most brood is up in the top box, **reverse brood chambers** to put brood below, emptied combs above--it's easier for bees to expand the brood nest upward due to rising warmth

May want to stimulative feed syrup or pollen

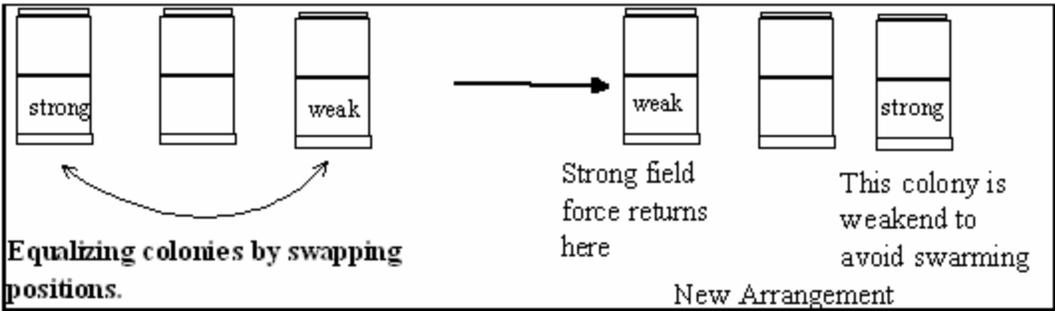
Now is when **strong colonies can starve** in inclement weather--check weight

Challenge: Get colonies strong but not swarming

Equalize colonies for strength-see figure.

Critical **period: 6 wks before honeyflow (April 1-15) to produce future foragers.**

**Maximize brood rearing during this period by feeding pollen supplement if necessary due to poor weather.**



**ASSESSING COLONIES**

- Look at the entrance for number of guards, active flight, pollen loads, distended abdomens indicating a honeyflow is on, signs of disease or trash.
- Heft the hive, especially those with poor flight. If colony is not gaining weight along with the rest, something is wrong!
- Check inside for good laying pattern, solid circles of sealed brood, pollen surrounding brood, brood of all ages, adequate honey stores, adequate open comb for expansion.
- It is far easier to assess if you have several colonies to compare. Always open up weaker or lightweight colonies to determine their problem.
- Don't let diseased colonies die and get robbed out. That will spread disease.

***Note: weak colonies may starve at the same time that strong colonies are making honey!***

**COMBINING COLONIES**

- No problem during honeyflow—just put one on top of the other
- Scented syrup spray
- Newspaper method

**SWARMING**

Problem: loss of bees and honey, loss of good queen, break in egg laying means fewer foragers during honeyflow

Causes: time of season, cavity filled with honey and brood, older queen. Genetic component.

Prevention: disrupt colonies sensing that the broodnest is crowded. Keep young queens, don't allow colony to feel crowded by the honey band above the brood—move frames or reverse chambers, give plenty of space, equalize or divide

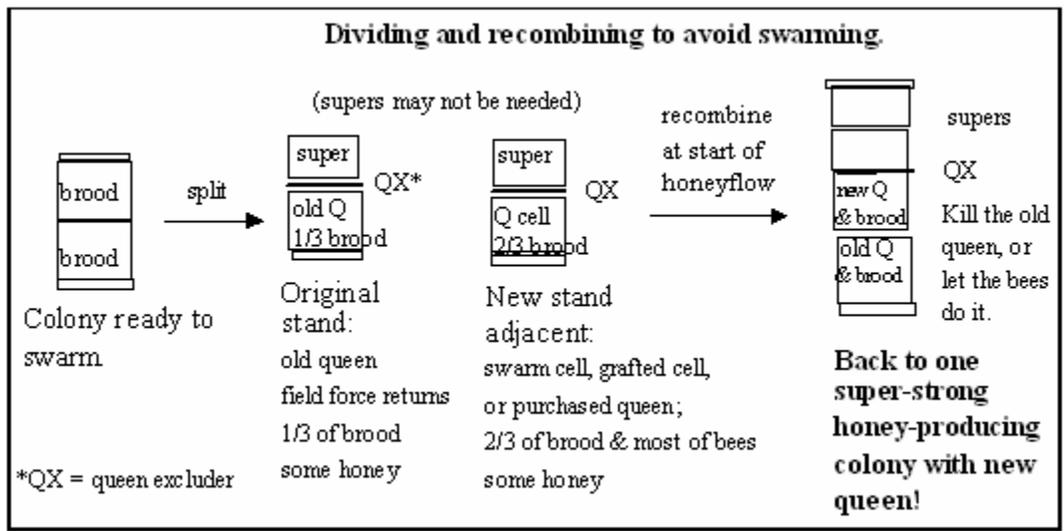
**Swarming is a natural process.**

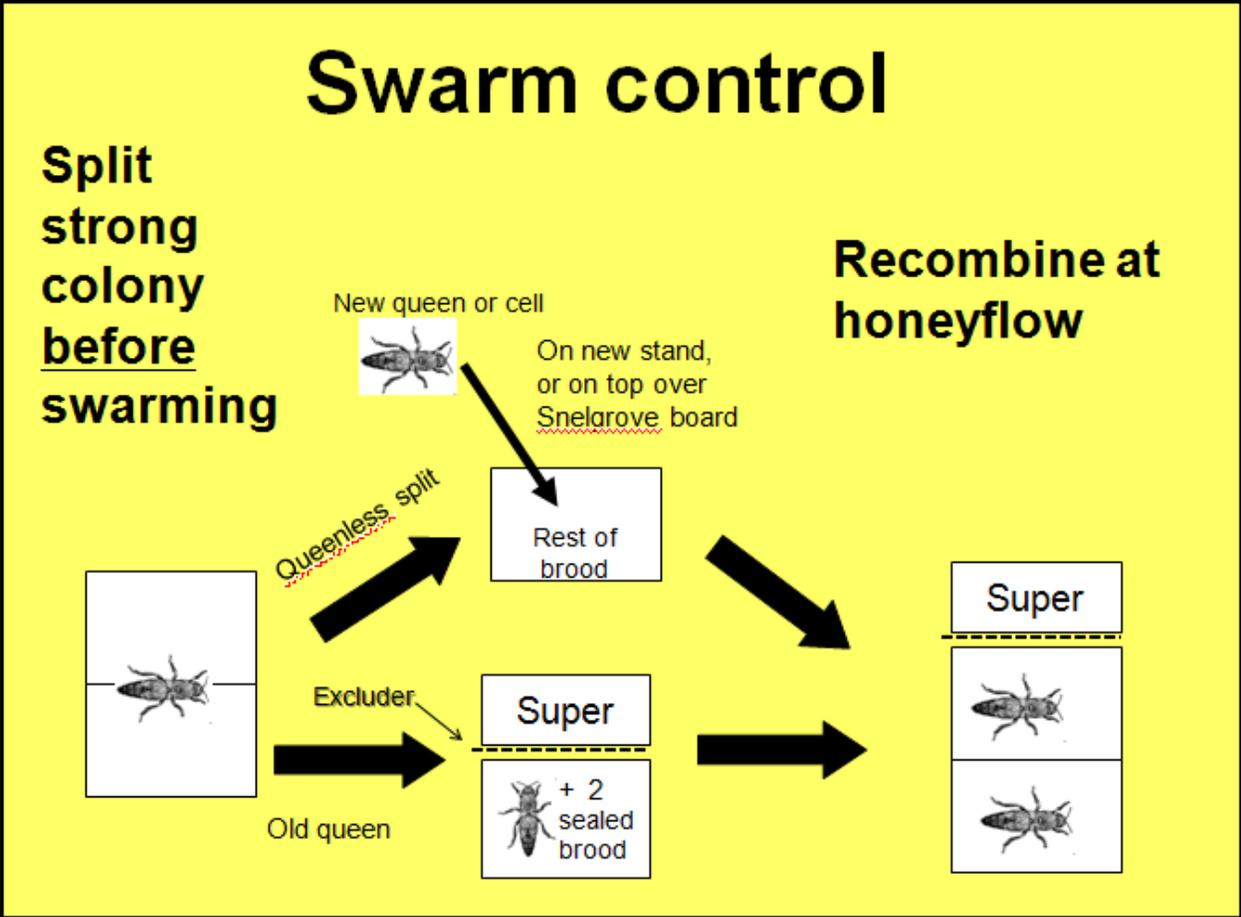
**You won't be able to completely prevent it.**

**If your colony swarms, it's not the end of the world (*but check it in 14 days to make sure the new queen is laying*)**

**PREVENTION OPTIONS (IN ORDER OF IMPORTANCE)**

- Requeen with young, well-bred queens
- Give plenty of storage and brood space below the cluster
- Reverse brood chambers
- Put a super of drawn comb under the brood nest.
- Steal brood, split, or equalize colonies when you see swarm cells starting
- Divide colonies then recombine--this is my preferred method. See figure below.
- Cut out queen cells every 10 days (as a last resort)





The above strategy works very well for the Sierra Foothills.

**CATCHING SWARMS**

**QUESTIONS TO ASK FOR SWARM PICK UP**

1. How high is it (do you have a ladder that will reach it?) Swarms in trees are always higher than they appear from the ground!
2. How large is it (softball, football, basketball?)
3. What is it located on (a branch, side of the house?)
4. Have owner go outside and confirm above answers.
5. How long has it been there? Old swarm may be hot, may leave. Does it have combs showing, or are they going into an opening--now it's an established colony!
6. Is it bothering anyone? This is the answer for high swarms. Leave it be...

## **TOOLS AND EQUIPMENT FOR HIVING A SWARM**

1. Bee suit & brush (no smoker--smoke will make a swarm abscond)
2. Ladder, shears, saw
3. Cardboard box, bucket, trash can, sheets, big piece of cardboard
4. Empty hive with combs, top & bottom
5. Tip: a cardboard apple box can be modified to make a good temporary beehive!
6. A 5-gal plastic pail hung loosely by the handle on the end of a pole can be lifted up under the swarm and shoved up to dislodge it. Lower to ground and put a screened lid over it.

## **HOW TO HIVE A SWARM--SLIDES**

Shake queen and bees into or in front of box, cover, come back at dusk (don't leave any bees—spray branch with insecticide if necessary)

Bees usu. very docile; don't smoke, or they may abscond

Caution: Swarms shaken from overhead will sting when they fall on you!

Wear full gear to discourage bystanders from getting too close.

## **ONCE YOU'VE CAUGHT A SWARM**

Make increase, *or*

Combine smaller swarms with each other or a weak colony

Add frames of brood to the swarm and feed syrup

Check quality of the queen (virgins won't lay for 2 weeks)

## **SUMMER MANAGEMENT & HONEY HARVEST**

Honey harvest--Options

You only get a harvest if there is a "surplus" above what bees need for Winter

First year--normally no surplus; just do "scrape" extraction of frames from the top box; strain through nylon stocking, then feed sugar syrup to replace stores.

Extracted (liquid) honey

Comb honey--Section, cut comb, chunk

Obtaining a honey crop

Know timing of honey flows--super before flow starts

Relocate colonies to better flows, or move uphill to follow bloom

Whitening of comb indicates time to add supers

Best with drawn combs--stimulates hoarding

Bottom super

Super in advance for room to process nectar

Harvest when it won't shake--usu. after thistle

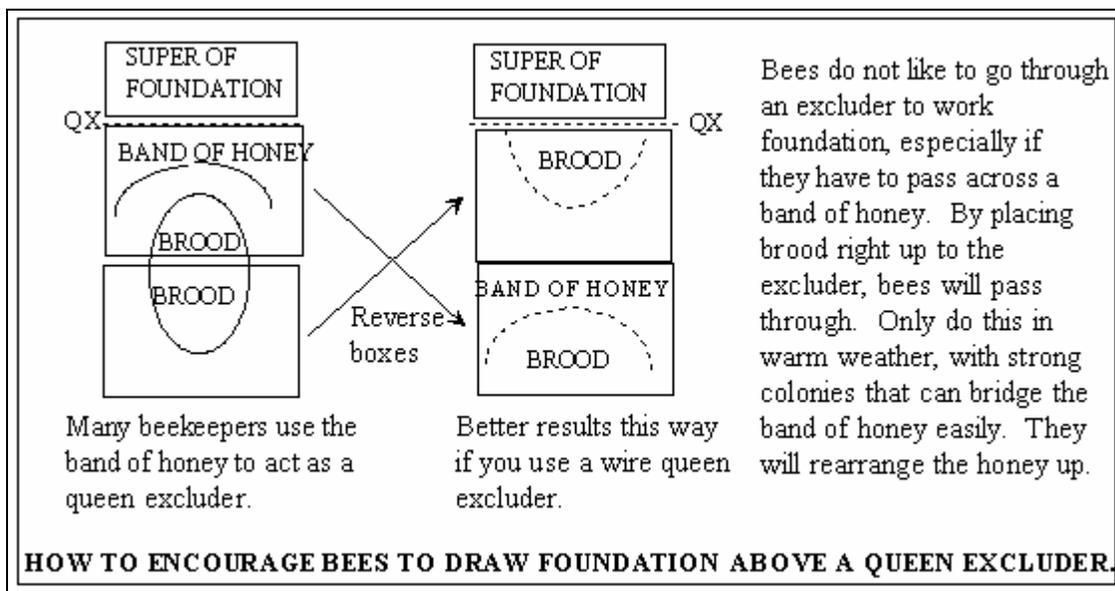
Separate colors or mix together

Cut comb honey is easy; not sections. Use "thin surplus" foundation in center frames.

Removing bees: shake & brush, fume boards (Bee Go, benzaldehyde), escape, blower

Extracted honey: slides--rent extractor & work together

Store supers wet or dry--dry on top of colony to avoid robbing



## LATE SUMMER MANAGEMENT

Post-harvest mite control

Late summer pollen supplement feeding for better wintering and spring buildup. This is critical if you are away from summer irrigation and colonies aren't getting enough pollen!

## Fall MANAGEMENT

Completed by Nov 1--Q's stop laying, too cold to feed

Bees form a cluster--~94°F in center, 41°F at edge; don't keep the rest warm

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Take winter losses in the fall--combine weak colonies; ***don't try to winter a colony with fewer than 6 full frames of bees!***

"Fat" bees & stress--make sure there's a ring of pollen around brood, or feed pollen.

**Feeding pollen subst. in late summer is the most effective way to get strong colonies the following spring.** "Fat" young fall bees winter and build up best.

### **ARRANGEMENT OF COLONY**

Arrange combs if necessary with chimney of empty dark comb into upper box for heat generation so bees can move up in cold weather.

Stores and feeding--Heavy but not honeybound--about 130 lbs total hive weight. Test: takes two fingers to lift front of hive.

Requeening if queen is poor

### **WINTER MANAGEMENT**

Exposure--sun and good air drainage

Moisture--hive elevated & tipped forward

Mice--entrance reducers

Starvation happens Feb - April when brood nest is expanded

## **FEEDING COLONIES**

For the hobbyist, feeding syrup may only be necessary when drawing foundation in the brood nest when you first start a new colony.

Use inverted top feeder jars, placed immediately *above* the cluster; reduce hive entrance to avoid robbing. Clear quart jars with small nail holes in the lids work great. Invert jar over inner cover hole, and surround with an empty box. **Better, make a dedicated feeder lid out of a scrap of plywood**, with a hole to fit a jar lid in the center. Then you can see the syrup level easily. I don't recommend Boardman entrance feeders, nor for the hobbyist, insert feeders or top tub-type (Miller) feeders.

You may also need to feed colonies in the Spring if they become critically low in stores during extended poor weather or nectar dearths. Note that weak colonies, with little field force, may be starving at the same time that stronger colonies are putting on weight! Strong colonies with large brood nests may starve during rainy weather from Feb-April.

Do not overfeed colonies to the point that there is no room for broodrearing! About a quart of syrup a day is sufficient for stimulation.

With experience, you may find feeding light syrup useful to artificially stimulate brood rearing, to help with queen introduction, or to improve colony "morale." Feeding light syrup

frees the bees from the need to forage for sugar, and allows them to concentrate their efforts on pollen collection, expanding the broodnest, and wax production.

### **THERE ARE TWO MAIN CONCENTRATIONS OF SUGAR SYRUP USED:**

Light (1:1) syrup in spring to feed colonies for buildup. Roughly equal amounts by volume, or 10 # sugar in 5 qts hot tap water--makes about 2 gallons. ***Don't sweat the exact exact proportions.***

In order to encourage bees to draw foundation without storing sugar syrup as "honey" I recommend an even "lighter" syrup—30% sucrose. Make this by filling a container half full of granulated sugar, and then topping it off with hot water as you stir.

Heavy (2 sugar:1 water) in fall to build up stores for winter, or emergency feed. Mix 20 # granulated sugar w/ 5 qts boiling water (makes ~2½ gal)

### **Pollen Patty or Pollen Supplement:**

Pollen provides the protein necessary for broodrearing. Calif usu. lacks pollen in summer/fall. If your bees are in an area where there is little pollen flow in late summer and fall, feeding pollen supplement will greatly improve colony health and wintering ability, and produce larger colonies in early spring. To tell if there is adequate natural pollen available, look at the brood combs--there should be a ring of pollen surrounding them.

**Refer to the Bee Nutrition articles at [scientificbeekeeping.com](http://scientificbeekeeping.com)**

## **DISEASES, PESTS, AND PROBLEMS**

### **GENERAL**

***Colonies get sick and die! Don't beat yourself up over it.*** Bees have not yet come to terms with the newer parasites of the colony.

***Maintain colony immunocompetence by making sure that they have enough pollen or pollen supplement during dearths!***

Two main problems to watch for: ***Varroa*** and **American Foulbrood (AFB)**

2012 update: we may need to start watching nosema.

### **WARNING SIGNS OF COLONY PROBLEMS**

1. Inadequate flight at entrance compared to others.
2. Lack of returning pollen foragers; lack of pollen around brood.
3. Dead/dying/crawling bees in front of entrance.
4. Bees with deformed wings.
5. Mite counts by some means--after nutrition, this is most important.

6. Irregular brood pattern.
7. Dead/dying larvae/pupae.
8. Poor adult bee:brood ratio--first sign of impending colony collapse (due to excessive loss of workers).  
Not enough workers to adequately cover the brood.
9. Sealed:open brood ratio of less than 50% suggests high larval mortality.
10. Amount of jelly around day-old larvae--this is best indicator of colony nutritional state.
11. Colony not gaining weight consistent with other colonies in the apiary.
12. Not consuming syrup or pollen supplement.
13. Bees on combs agitated rather than calm, or lack of cohesive cluster.

### **AMERICAN FOULBROOD (AFB)**

AFB is the only disease that contaminates the combs permanently. Kill bees with laquer thinner or ether, burn combs or pack 10 into a taped apple box and take to landfill. Boxes, top, and bottom board can be sterilized by scraping, and then toasting brown with a propane torch.

Lots of spores in old combs--rotate out when they get dark

Diseases is spread by robbing of deadouts

Genetic factor--some bees more resistant to disease than others

Hygienic lines--uncapping and removal genes

### **BEES CAN HANDLE MANY PATHOGENS IF NOT STRESSED**

Colony stress--most important factor in disease. Stress factors:

Lack of pollen (protein)

Mites, esp. Varroa--can cause Parasitic Mite Syndrome

Lack of nectar or honey (energy)

Long confinement due to weather

Too much moisture, lack of ventilation in cold weather

Colony too weak

### **DEADOUT FORENSICS IN A NUTSHELL**

It's OK to put fresh bees into all deadouts except AFB kills. Scrape out any wax moth webs and cocoons first. May help to spray deadout combs with 10% bleach solution and let dry.

1. Varroa kill: **usu. lots of honey in food chamber and no bees**, bees disappear quickly (usually in fall or winter), a few scattered capped pupae and adults in brood nest (heads facing out), **white deposits on brood cell "ceilings,"** brood combs often have tobacco smell. No dead bees in hive.
2. Failed or lost queen: bullet-shaped **drone cells throughout brood nest** (in worker cells), usu. little honey, often **lots of greasy-looking pollen** stored throughout lower brood nest.
3. AFB (American Foulbrood): colony dwindles slowly and didn't make honey, **salt and pepper brood pattern with sunken perforated cappings**, pupal tongues, **black "scale" on cell floors**, if fresh, caramel-colored dead larvae will stink and "rope out;" burn all combs and sterilize boxes.
4. Virus or nosema collapse: no or few dead bees in hive. Generally little or no brood, but sometimes sealed brood left if collapse is sudden (CCD). Supersedure cells often present. May collapse to a handful of bees and a healthy-looking queen. Colony may recover fully in spring.
5. Starvation: little honey, patch of **dead bees in cells with their tails sticking out**
6. Tracheal Mite: usu. die in late winter with **lots of dead bees on bottom board**, may have bees wandering around with disjointed wings.

Don't let colonies get to deadout stage. Robbing of deadouts spreads all diseases and mites. Inspect any colonies that appear weak, are not building up, or are not putting on honey.

## HONEYBEE DISEASE AND PEST CONTROL (*REVISED 2011*)

### MAIN PROBLEMS

1. **Varroa**—refer to [ScientificBeekeeping.com](http://ScientificBeekeeping.com) and see below
2. **AFB**—always inspect any poorly-performing hive. Sniff for AFB smell. Be concerned if you see a **spotty brood pattern**. Best to burn the combs and sterilize the box (hot wax tank, pressure wash, scorch with torch, or 1:10 bleach:water soak. You can save the bees by shaking onto new combs of foundation, and feeding oxytetracycline for the first three weeks, or Tylosin once in syrup.
3. **Nosema ceranae**—may be a problem. If colonies aren't building well, sample bees for spores with a microscope. Refer to [scientificbeekeeping.com](http://scientificbeekeeping.com)

### VARROA/VIRUS MANAGEMENT

**Varroa allows viruses to go epidemic in the hive. Control varroa in order to control virus epidemics.**

Varroa management is easier in apiaries with only a few colonies, and you may be able to get by with no treatments **so long as mite levels stay low, and don't exceed 5 mites per 100 bees in September**, 2/100 in October. You must monitor mite levels in early spring, before supering (mid May), on August 15, and in October. Stickyboard counts of natural mite drop are OK if you get enough readings, but

don't put too much stock in their accuracy. Ditto with drone brood inspection. Better are "accelerated" mite drops using powdered sugar. Best a "jar" sample of 300 bees from the broodnest. Knock the mites off with rubbing alcohol (my favorite), detergent water, or powdered sugar.

**Monitor mite levels in early spring, again before supering, then at August 15<sup>th</sup> to see if you need to remove your supers and treat, and finally in late fall.** Knowing the actual level of the pest is at the heart of any IPM program.

## MITE MONITORING

See <http://scientificbeekeeping.com/sick-bees-part-11-mite-monitoring-methods/>

**The August 15<sup>th</sup> date is the most important!!!!** Make sure that you get mite levels down on this date, so that the colony can rear healthy young bees to make it through the winter!

### YOU HAVE THREE AVENUES OF MITE MANAGEMENT:

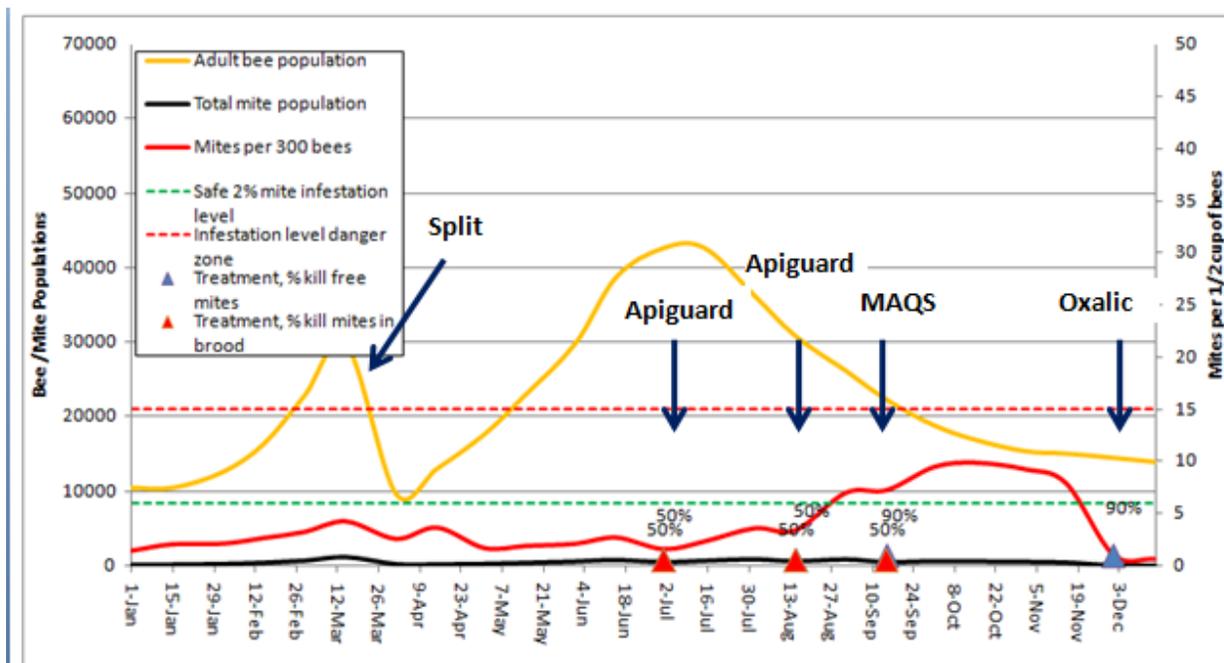
- Naturally resistant bee stock--#1
- Biotechnical methods . See <http://scientificbeekeeping.com/varroa-management/biotechnical-methods/>, <http://scientificbeekeeping.com/sick-bees-part-12-varroa-management-getting-down-to-brass-tacks/>
- Treatments—I recommend the "natural" miticides.

### I RECOMMEND USING A COMBINATION OF THE FOLLOWING (IN ORDER OF EFFECTIVENESS):

1. Mite-resistant bee stock (VSH, Russian, other survivor stock); *this is most effective!*
2. Making splits in spring/summer. Treat with Hopguard or oxalic dribble to minimize the mite level (best if broodless).
3. Maintain broodrearing during late summer—feed pollen supplement if necessary.
4. Apiguard gel; 25 g on a card placed between the brood chambers (spring, summer, fall). See <http://scientificbeekeeping.com/the-learning-curve-part-3-the-natural-miticides/>
5. Oxalic acid dribble in Nov or Dec when colonies have the least brood. See <http://scientificbeekeeping.com/oxalic-acid-treatment-table/> for important details!
6. Miteaway Quick Strips formic acid gel (any season except cold winter). See <http://scientificbeekeeping.com/an-early-summer-test-of-mite-away-quick-strips/>
7. Drone brood removal (spring)
8. Sugar dusting over a screened bottom (moderately effective)

	<b>Seasonal Varroa Management Options</b>
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Method	Spring	Summer	Fall	Winter
Drone trapping	X	X		
Splits	X	X		
Sugar dusting	X	X	X	X if dry
Apiguard (thymol)	X	X	X	X if >55F
MAQS (formic)	X?	X	X	X if >55F



Typical foothill management:

- **Spring:** split, drone trap or sugar dust . Get mite levels very low before placing on honey supers!
- **Early summer:** By July 1 the honey flow is typically over—check mite levels. MAQS can be used even with honey supers on.
- **Late summer/fall:** Then track mite levels closely from August 1 until cold weather—treat if necessary!
- **Early winter:** Wrap up with an oxalic acid dribble at low point of brood rearing in winter (late Nov-early December) for a “clean” start for the coming season.

#### NOTES & FORMULAS

**Oxytetracycline (OTC):** preventative for AFB, cure for EFB. Can be applied as a powder, or as an "extender patty." Use in spring and/or fall only when bees are stressed, or there is robbing going on, or

you suspect exposure to AFB. OTC treatment must be discontinued 45 days prior to supering for honey. There is a new antibiotic, Tylosin, which does not readily break down; I do not recommend for hobbyists.

**OTC dusting:** You must give three dustings, 4 days apart. Use a premixed powder such as Tetra-B, or Terra-Pro, or mix your own. For 50 doses (17 colonies) mix one 6.4 oz pkg OTC Soluble Powder with 3 lbs powdered sugar. Use a shy 1/4 C per dose. I only recommend if you have seen AFB in a nearby colony, as a prophylactic treatment.

## Honeybee Problem and Disease Identification

Randy Oliver 1995 rev 2003

Problem or Disease	Effect	Cause	Age of Bees Affected	Diagnostic Characteristics	Control
Varroa Mite	Damaged pupae, colony death, leads to virus epidemic	External mite	Pupae & adults	Alcohol wash of bees from broodnest	See scientificbeekeeping.com
<b>Deformed Wing Virus</b>	<b>Adult bees with deformed wings</b>	<b>Virus</b>	<b>Pupae, adults</b>	<b>Gray pupae, bees with shrivelled wings on combs or walking on ground</b>	<b>Get varroa levels down immediately!</b>
American Foulbrood	Kills brood	Bacterial	<u>Older</u> larvae & pupae	Peppered pattern; sunken, perforated cappings; odor; "roping" of brown, melted larvae; black scale in cells	Burn diseased frames; prevent with OTC and genetic breeding. The only disease that equipment can't be reused.
Bears	Tear open hives			Boxes torn open	Electric fence, rooftop, horse trailer
Livestock	Knock over hives	Cattle scratching			Fencing
Skunk	Eat bees		Adult	Scratched soil, hot bees	Chicken wire or sprinkle 1 tsp lye crystals on ground
Mice	Nest in combs			Hive trash at entrance	Entrance reducer, poison
Birds	Eat bees in flight		Adult		
Hornets, Yellowjackets	Eat bees		Adult		Trapping, anti-robbing screens, poison (don't poison bees!)

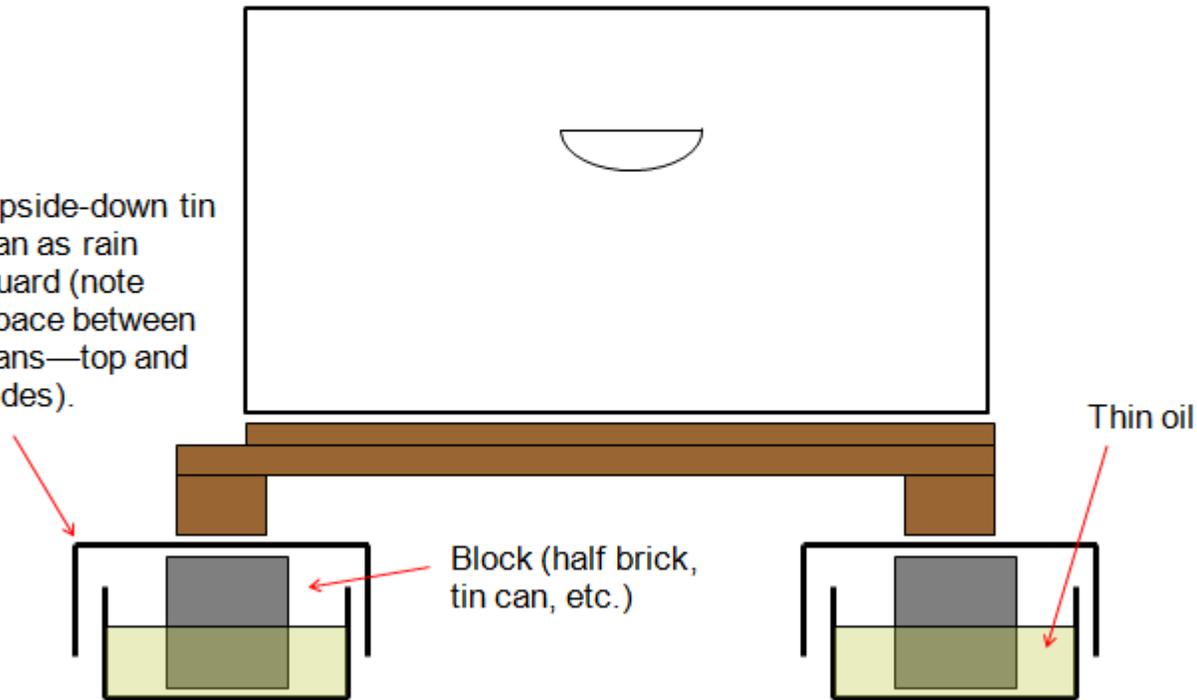
<b>Problem or Disease</b>	<b>Effect</b>	<b>Cause</b>	<b>Age of Bees Affected</b>	<b>Diagnostic Characteristics</b>	<b>Control</b>
Ants	Bother or kill bees; steal honey; usu. not a problem			Ants entering colony, bees fighting ants	Terro ant bait; or 1 Tbl ea peanut butter and honey, plus 1 tsp boric acid, in screened jar. See following plans for ant guards.
Wax Moth	Damage combs	Wax "worms"		Silken tunnels	Strong colony, cold storage, paradichlorobenzene
Nosema	Poor buildup	Protozoan	Adults	Must sample for spores microscopically.	Feed protein. Fumagillin treatment.
Chalkbrood	Kills brood	Fungus	Older larvae	"Mummies"	Good pollen flow. Genetic breeding
Tracheal Mite	Winter loss, general stress	Internal mite	Adult	Dissection under 'scope; colony dies in winter with a cluster of dead bees & dead bees on bottom	Generally don't worry about it. Menthol, Crisco patty, genetic breeding
Sacbrood	Kills brood	Viral	Older larva	Grayish propupa with raised head	None

<b>Problem or Disease</b>	<b>Effect</b>	<b>Cause</b>	<b>Age of Bees Affected</b>	<b>Diagnostic Characteristics</b>	<b>Control</b>
Moldy Combs	Looks ugly	Fungi		On damp combs	Bees will clean up
Starvation	Colony death	No honey	All	Dead bees are headfirst in combs	Feed honey, syrup, or sugar. Danger in March and April.
Robbing	Steal honey, disease transmission	Honeybees		Bees probing at hive cracks; fighting with guards; clouds of bees on boxes.	Prevention, reduce entrance, protect weak colonies, don't expose honey combs or drop scraps
Laying Worker		No queen	Brood	Scattered eggs, drone brood in worker cells	Combine with queenright colony
Failing Queen		Queen out of stored semen	Brood	Poor pattern, drone brood in worker cells	Requeen
Pollen Dearth	Colony stress	No pollen	All	No pollen stored	Feed pollen or substitute

# Rain-proof Ant Guards

(Use four per hive)

Upside-down tin can as rain guard (note space between cans—top and sides).



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## HONEY NOTES AND OTHER PRODUCTS OF THE HIVE

"The fruit of bees is desired by all, and is equally sweet to kings and beggars and it is not only pleasing but profitable and healthful; it sweetens their mouths, cures their wounds, and conveys remedies to inward ulcers." Saint Ambrose

### Honey notes

All raw honeys will granulate, or "sugar," in the bottle. You can help delay granulation by keeping your table honey warmer than 65° F, or by **freezing it in the jar for longer term storage**. If the honey should sugar, you can reliquify it by placing the bottle out in the warm sun, or in hot water, or by gently microwaving it (avoid overheating, so you don't damage the flavor).

Honey is superb for table use on toast, cereal, pancakes or in beverages. Honey also helps baked goods to brown, and to stay soft and moist longer. In cooking, try to find recipes specifically for honey, otherwise, the general rule is to replace 1 cup of sugar with 1 cup of honey, and reduce the liquid by 1/4 cup; reduce baking temperature by 25 degrees. Honey is sweeter than sugar-- the quantity may need to be reduced.

**Medical uses:** Try honey and lemon juice for a soothing cough syrup. Honey and apple cider vinegar in hot water is a popular tonic. Due to its antibacterial properties, honey makes a wonderful wound dressing that promotes rapid healing-- use as you would an antibiotic ointment-- it can be a "miracle cure" for difficult wounds. See [http://my.webmd.com/content/article/14/1668\\_50175.htm](http://my.webmd.com/content/article/14/1668_50175.htm)

Note: honey (nor any food other than breast milk) should not be fed to infants under 6 months of age. Their gut can go anaerobic, and very rarely botulism can develop.

For a great deal of information on the health benefits of honey, read: The Honey Revolution by Ron Fessenden, MD

## OTHER PRODUCTS OF THE HIVE

### BEESWAX.

Melt in pot in electric skillet, water in skillet. Put scraps in alum coffee pot, heat in skillet 'til it melts (don't boil), pour at 160°F into tapered styrofoam cup to cool.

Great for candles, blocks for handymen, furniture polish, cosmetics, hand salves

Honey/wax cleanup: generally use warm water to quickly dissolve honey; wax will float; hotter water (150°F) will also melt wax--but melted wax may leave a film; very hot water and detergent will dissolve wax

### PROPOLIS

Remove from hands or clothing with denatured alcohol

Make medicinal ticture with Everclear alcohol; great for skin & mouth disease, mouthwash, aftershave

**POLLEN**

Good market for local fresh pollen.

**POLLINATION RENT**

Ready market for almonds, lesser market for other crops; requires truck

**QUEEN AND NUC SALES**

For intermediate and advanced beekeepers

**ROYAL JELLY**

Can make you so virile, that others make be at risk! Product of queen rearing

# FIELD SESSION OUTLINE

## Make sure that I demonstrate all!

lighting smoker	arranging and cleaning frames
smoking the colony	identifying queenless colony
how much to smoke bees	whitening of comb
reading bee defensive behavior	finding queens
using the hive tool	marking queens
how to remove & replace frames	inspecting for brood disease
how to handle bee-covered frames	seeing foulbrood combs
normal brood nest layout	shaking and brushing bees
identifying eggs, larvae, pollen, honey	swarm pick up
judging age of brood	
judging queen quality	

### FIRST YEAR CARE FOR YOUR NUC

Please go to <http://scientificbeekeeping.com/first-year-care-for-your-nuc/> for the latest version

### THREE THINGS FOR BEGINNERS TO AVOID (FROM DR. JAMES TEW)

1. Bee trees, bees in walls, etc.
2. "Bee fever"
3. **Fear because of a bad stinging incident**

### NUMBERS TO MEMORIZE

Eggs hatch after 3 days.

Worker development takes about 19-21 days, drones 24 days, queens 16 days (all approx).

Worker larvae are fed for 5 days, queens for 6 days.

In a healthy colony, the ratio of sealed brood cells to open brood is better than 1:1.

A virgin queen can emerge 10 days after death of the old queen.

A dequeened colony will have a new queen laying within 26 days, or is probably hopelessly queenless.

Newly-hatched or swarm virgins will usually begin laying in 8-14 days.

## ADVICE FROM RANDY

A few words to you enthusiastic beginners. Beekeeping has opened a new and wondrous world to you—there is nothing like it! It can bring you close to nature, and offer a lifetime of learning!

If you do much reading or talking with other beekeepers, your head will soon be spinning with the myriad methods and strategies for the "best" ways to manage your colonies, or to get the most honey, etc.

In the bee journals you will find paid advertisements for super-duper queen bee stocks, the newest equipment, and all kinds of fancy new gadgets and gizmos. Every one, with considerable hyperbole, will promise to revolutionize your beekeeping.

How can you possibly try all these things? In a word: don't. You don't have the time, the experience, the number of colonies, or the money. Just relax, avoid the temptation, and let me give you some sage advice from a beekeeper who has already made *more* mistakes and wasted *more* money than you will in the rest of your beekeeping career.

First, bees will generally keep themselves (with the exception of *Varroa* control), and it's easy to do them more harm than good if you don't understand them well.

Second, get everyday *standard* equipment and follow *standard* management for the first few years.

Third, don't rush out and buy every new gizmo--it will probably end up collecting dust in the garage. Give the market a year or two to test it, then see if it's still offered for sale. The same goes for any magic potion that claims that it will solve your bee health problems.

Fourth, find an experienced beekeeper whose style or operation you like, and simply emulate his or her methods. The best test for finding a mentor is to see if he/she has extra bees for sale each spring.

Finally, as far as I'm concerned, basic success in hobby beekeeping boils down to a few important rules:

1. Stay on top of varroa, or everything else is moot!
2. Timing is everything--colony management, seasonal honeyflows, varroa control
3. Find a good location.
4. Get gentle, productive, disease-resistant stock.
5. Learn to work bare-handed, always wear a veil, get stung at least 50 times per year!
6. Don't use junk equipment.
7. Observe the bees at the entrance often; learn to recognize pollen and nectar flows, robbing, defensiveness, and colony morale.
8. Learn your local honeyflows and anticipate them by having supers ready.
9. Give the colony plenty of room for brood rearing and nectar storage as they need it.
10. Work the bees only in good weather.
11. Extract while it's still hot.

12. Don't let them starve or go queenless.
13. Get along well with your neighbors.
14. ***Most important: work alongside an experienced beekeeper until you are comfortable and confident with bees!***