Introduction to Beekeeping

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Ground rules

• Cell phones off
• Please hold your questions until the end of a section so we can get through the material. There will be time for QnA and discussion
My Goals for this class

• Help you gain confidence that you can be a successful beekeeper
  – Increased understanding of what makes bees and bee colonies function and how you can use this knowledge to better manage your bees
  – Hands on experience

• Increased respect for the remarkable honey bee
The Craft of Beekeeping

- Bee keeping is complicated!
- There is no single correct approach to beekeeping
- Continuously learn from your bees
- Continuously learn from other beekeepers.

✓ Get involved, develop your knowledge and your network!
Keeping Bees – First Steps

• Check restrictions for beekeeping in your area

• Talk with your family and neighbors before getting bees
  – Are there swimming pools near by?
  – Does a neighbor have a strong allergic reaction to bee stings?

• Select your hive location carefully
  – Select a sunny location to set up your hives
  – Use fences, walls, or plants to direct your bees up!
  – Make sure it is easy to access and work on!
Strong bees starts with
Setting up the Bee Hive

- Sunny & warm
- Wind break
- Morning sun on the hive opening
- Easily able to access hive from sides or back
Critique this setup
Beekeeping supplies

• There is an overwhelming selection of options for the beekeeper
• There is no one “best” solution
• But there is a toolkit used by most beekeepers, and that is what we will look at today...
Langstroth Hive

- Telescoping cover and inner cover
- Honey supers
- Queen excluder
- Hive body
- Bottom board (screened or solid)
- Hive stand
Box options

• Hive bodies and honey supers come in 8 and 10 frame options
  – They are not interchangeable!
  – 8 frames are 20% lighter and are much easier to manage for the hobby bee keeper

• Hive bodies come in 3 depths: 9 5/8”, 7 5/8” and 6 5/8”
  – My backyard choice was to standardize on the 8 frame, 9 5/8” option
    • All equipment is interchangeable
    • I pull my honey frames one at a time (vs. pulling an entire box off), so honey super weight was not a problem.
My Beekeeper’s Toolkit
Other Tools in my kit
Personal Protection
“‘I’m not like other people, I can’t stand pain, pain hurts me’”
» Daffy Duck
# Startup Cost – 1 Hive

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unassembled</th>
<th>Fully Assembled</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 frame hive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>telescoping top with inner cover</td>
<td>1</td>
<td>28</td>
<td>32</td>
</tr>
<tr>
<td>Hive bodies</td>
<td>3</td>
<td>51</td>
<td>165</td>
</tr>
<tr>
<td>frames and foundation (9 5/8&quot;)</td>
<td>24</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Queen Excluder</td>
<td>1</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>screened bottom board</td>
<td>1</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$ 197</strong></td>
<td><strong>$ 232</strong></td>
</tr>
<tr>
<td>Clothing</td>
<td></td>
<td><strong>$ 35</strong></td>
<td><strong>$ 192</strong></td>
</tr>
<tr>
<td>Helmet</td>
<td>1</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Veil</td>
<td>1</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Gloves</td>
<td>1</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Vented bee suit with veil</td>
<td></td>
<td></td>
<td>170</td>
</tr>
<tr>
<td>Tools</td>
<td></td>
<td><strong>$ 64</strong></td>
<td><strong>$ 71</strong></td>
</tr>
<tr>
<td>Smoker (with guard)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hive Tool</td>
<td>4</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Frame perch</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Bee Brush</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$ 296</strong></td>
<td><strong>$ 495</strong></td>
</tr>
</tbody>
</table>
Purchasing Equipment tips

• Local stores and on line catalog options
• Stick with one supplier for hive components
  – Sizes differ a little between companies, so different parts of a hive may not fit well together
  – Some companies offer discounts for larger purchases.
• You can save money by building your own
  – Many good plans on line
  – Need table saw and hand tools
  – Time consuming, but very rewarding
Getting bees

• Get your equipment up and running before you get your bees!

• Three options for getting bees
  – Purchase a package of bees
  – Purchasing an existing hive or a nuc
  – Collect a Swarm
Bee Packages

• What you get:
  – 3lb of bees and a queen
  – Bees are bred to be predictable and easy to work with

• When:
  • Once a year only
  • Order before March for delivery in April

• How to get one:
  • Contact your local bee guild
  • Carrier Bees or other local bee supply business

• Cost: Around $75
Purchase a Hive or Nuc

• What you may get:
  – Queen, bees & larvae
  – Pulled frames
  – Unknown temperament and origin

• When:
  – Any time available

• How to get one:
  – Craigslist or contacts at a bee guild
  – You swap out new frames for “pulled” frames and must have all other equipment ready to go

• Cost: 5 frame colony $150 (craigslist quote)
Catch a Swarm

• What you get:
  – Local bees
  – Unknown temperament
  – Unknown queen

• When:
  – March through April

• How to get one
  – Join your local bee guild and get on the swam list
  – Join your local bee guild and join the swam team
  – Craigslist

• Cost: Free to $110
Ok – now what?
Now that you are all set up,
Let’s talk a little bit about Bees
The Queen

• Queens are “made” by the workers
  – To replace a failed queen
  – Or to swarm

• The queen as the ovaries of the “super organism”
  – Can lay up to 1500 eggs per day
  – Can “choose” to lay worker eggs or drone eggs

• “The queen is dead! Long Live the Queen!!”
  – Unproductive queens are replaced by the colony
  – She can live up to 7 years (but 2yrs is more normal)
The Worker

• All female bees
• Any worker bee had the potential to become a queen
  – All bees are fed royal jelly for the first 3 days of life
  – Worker bees are switched to pollen and nectar diet.
  – Queen bees are fed royal jelly their entire life
• Workers live around 6 weeks
Drones

• The male bees in the hive
• Entire role is to take mating flights, seeking out other queens to mate with
• They are expendable when times are tough
Honey Bee Lifecycle

<table>
<thead>
<tr>
<th></th>
<th>Egg</th>
<th>Larva</th>
<th>Pupa</th>
<th>Total Development Time</th>
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</thead>
<tbody>
<tr>
<td>Queen</td>
<td>3 days</td>
<td>5 1/2 days</td>
<td>7 1/2 days</td>
<td>16 days</td>
</tr>
<tr>
<td>Worker</td>
<td>3 days</td>
<td>6 days</td>
<td>12 days</td>
<td>21 days</td>
</tr>
<tr>
<td>Drone</td>
<td>3 days</td>
<td>6 days</td>
<td>14.5 days</td>
<td>24 days</td>
</tr>
</tbody>
</table>
Foraging

• Worker bees forage for pollen, nectar, water and tree resins (propolis)
• Food that is not consumed by the colony is stored and consumed when no food is available

Trophallaxis
Nectar

- Nectar is converted into Honey or Wax depending on colony needs
- Nectar is “ripened” into honey
- Honey is then the “heat source” – carbohydrate – for the colony.
Pollen

- Pollen is the protein for the colony and is essential for colony survival
- Pollen is a key trigger for colony expansion or contraction throughout the year.
Water

- Water is essential to the bee, the bee colony, and to honey production.
- A bee colony can consume up to 1 liter of water per day
Propolis

- Bees collect plant resins (sap) and use it to seal small gaps in the hive
Organization in the Hive
Hive Inspections

- Use a checklist
- Start with the outside
  - Activity level
  - Pollen coming in
  - Dead bees on the ground (type? Age? Cause?)
  - Signs of ants or other predators
  - Condition of equipment
- Inside
  - Seasonally predictable
  - Brood patterns
- Be respectful, be intentional, be quick
When to Open a Hive

• Best to inspect when most of the bees are out foraging.

• Sunny, warm, and wind free days
  – 65 to 95 degrees

• Mid day is best. Target 10am to 4pm

➢ If your bees are happily going about their business, they are less likely to be concerned with you.
Preparations before Opening

• Smoker is full, lit and smoking before you open a hive.

• Bee suit is clean and your veil is on.
  – You don’t want to have bees flying before you put that veil over your head.

• All supplies you might need are with you and ready to be used
  – Do not leave an open hive unattended
  – Do not leave your smoker unattended
  – Do not leave the hive open longer than absolutely necessary
Calm Bees: Tips When Opening a Colony

• Stand on the side or the back of the hive, not the front.
  – Standing at the front will prevent foragers from returning

• Be gentle. Avoid bumping or snapping sounds which will alarm the bees

• Use enough smoke to make the worker bees comfortable

• Avoid crushing bees!
Visit
Strong colonies:
Let the bees do the fighting for you

• A focus on STRONG colonies will reduce impact of disease.
  – Good colony location (sunny and warm)
  – Room to grow when they need it
  – Feed when they need it
Colony health

• Strong colonies maximize new bees (recruitment)
  – The queen has sufficient room to lay eggs
  – Plenty of nurse bees to take care of brood
  – Adequate food stores in the hive

• Strong colonies minimize death (Attrition).
  – Loss of bees through wear and tear, disease, and starvation,
  – Attrition is reduced average lifespan of the worker

• Our task is to maximize recruitment potential while minimizing attrition.
Maximizing New Bees

• Good colony location
• Equipment in good shape
  – No cracks or gaps that would let predators or bad weather into the hive
  – Equipment is serviceable (safe for you)
• Room to grow when they need it
• Feed when they need it.
  – Don’t take too much when harvesting honey.
Good colony location

- Sunny & warm
- Wind break
- Morning sun on the hive opening
- Easily able to access hive from sides or back
Room to Grow:
Seasonal Changes in the Hive

Typical colony population growth curve (very approximate)
Adding a Second Brood Box

• Colony growth happens very fast!
  – One bee takes roughly 5 times the space of a brood cell.
  – The colony needs to take full advantage of nectar and pollen flows in order to survive the winter.

• Colony is telling you they need more room when:
  – There are lots of bees
  – The hive is heavy
  – White wax
Two Brood Boxes, Lots of Bees
Adding a Honey Super

• Just another name for a box with frames
  – Often a Medium or Shallow box
  – Consider weight when determining what you are going to use for honey supers

• Use a Queen Excluder to keep the honey free from brood

• Don’t mix honey frames with brood frames
Two Brood Boxes, Lots of Bees

Other Options

• Check to see if there are bees in both boxes
  – Bees may have entirely moved up – leaving the lower box empty.
  ✓ You may want to swap box positions.

• Check for queen cells, especially if both boxes are stuffed with bees
  – They may be preparing to swarm
  ✓ Options may be to split the hive or let them swarm
Queen Cells
Too Few Bees

• Queenless hive or failing queen
  – Hive inspection reveals no brood, or spotty brood.
  – Hive inspection reveals no queen
  – Hive inspection reveals queen cells.
  – Bees are loud and agitated

✓ Possible solutions:
  • Requeen
  • Combine colonies

• Disease, starvation...
  – Increase bee longevity
Increasing Bee Longevity

• Focus on the big items
• Focus on those items we can control
• Learn from your bees and learn from other bee keepers.
Starvation

- Spring is a high risk
  - Lots of new brood
  - Low food stores
  - Winter bees too tired to forage
  - Spring rains or frost can kill food supply or prevent foraging.

- Watch carefully!
  - Heft the box to check weight
  - Look for capped honey
  - Feed if at risk!
Ants and Wasps

• Strong, healthy colonies are rarely killed by ants and wasps
  – Ants can push a weak colony out of the hive
  – Wasps feed on brood and can overrun a colony

• Simple preventative maintenance usually does the trick
  – Set wasp traps out early in the year
  – Use ant barriers or traps if needed
  – Don’t use spray insecticides around your hives!
Varroa destructor

- Breeds in capped brood cells and feeds on larva and adult bees.
- Mite infestation can kill a bee colony.
- Biggest risk is in late autumn through early spring
- Infested colonies will often have large number of bees with deformed wing virus.
- Try to keep mite levels below a 1% infestation rate in adult bees
Deformed Wing Virus

• Numerous bees with stunted wings in front of the hive
• Most visible indication of a heavy Varroa mite load
Testing for Varroa

• Slide in a solid bottom board for 24 hours
  – Recommendation is to use white board with cooking spray so mites stick.
  – Carefully remove board and count mites
  – This is a crude measurement, but may be sufficient to determine any action needed

• Bottom board count tolerances:
  – Spring: > 10 mites
  – Fall: >50 mites (personally, I think this is way too high)
Closer look at Infestation Rate

- Rate affected by bee population changes
- A manageable mite load in one month could quickly turn into a major issue later on.
Bottom line with Varroa

- Your colonies will have Varroa mites
- They become a serious risk to colony health when the ratio of mites to bees is too high
- Your task is to learn how to read the signs and take appropriate action
IPM Approach to Treating for Varroa

• Large, healthy colony in a good location is your best defense!
• Use screened bottom boards so mites naturally fall out of the hive
• Use a drone frame
• Treat with a miticide in fall and spring.
• As a beekeeper, continue to learn and adapt
END