

Managing Honeybees For Crop Pollination

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Beekeeping

- Occupation is agronomy
- Hobby is beekeeping
- Hobby Beekeeper: 1 – 49 hives
- Sideline Beekeeper: 50-499 hives
- Commercial Beekeeper: 500+ hives

Bees and Pollination

- More than 20,000 types of bees
- Bumblebees, honeybees, carpenter, ground, leafcutter, digger, sweat, carder, orchid
- Solitary or social
- Most play a role in pollination of plants
- Honeybees one of the most important because they are polytropic and they can be managed

What Honeybees Do

- They raise more bees
- Collect nectar, pollen, and water
- Stored nectar becomes honey
- Products for human use
 - Honey
 - Wax
 - Pollen
 - Nectar
- Pollination process also of some interest

Angiosperms

- Pollination – Transfer of pollen from the anthers of a flower to the stigma of that or another flower
- Self pollination vs. cross pollination
- Self compatible (cherry) vs. self incompatible (apple)



Pollination Process

- Bees depend on flowering plants
- Flowering plants depend on bees
- Form, color, and odor
- Bees visit flowers to fill their "sack" and pollen adheres to the body
- Pollen is deposited on next flower visited



Crops Pollinated

- Apples
- Almonds
- Avocados
- Soybeans
- Asparagus
- Broccoli
- Squash
- Cucumbers
- Peaches
- Kiwi
- Strawberries
- Cherries
- Blueberries
- Cranberries
- Cantaloupes
- Watermelon

Crops Pollinated

- Plums
- Pear
- Sunflower
- Lemon
- Lime
- Oranges
- Grapefruit
- Grapes
- Olives
- Nectarines
- Carrot
- Cauliflower
- Celery
- Pumpkins
- Okra
- Cabbage

Direct Impact on Agriculture

- Honey and Beeswax – Approximately \$200
- Value of fruit, vegetables, and seed – Approximately 150 times value of honey and beeswax
- Value of one hive – Approximately \$30,000
- Indirect Impact
- Alfalfa Seed – Alfalfa Hay – Meat and Milk

Indirect Impact on Agriculture

- Approximately 1/3 of total diet comes directly or indirectly from bee-pollinated plants
- Average household spends approximately 10% on food
- Average household income is \$54,453
- 111,162,259 households in United States
- \$2,017,706,163,109 per year

Why do we care?

History of Beekeeping

- 1947 – 5 million hives
- 2006 – 2.5 million hives
- 2007 – 500,000 to 1 million colonies died
 - Colony Collapse Disorder (CCD)
- Future of honeybees?
 - CCD
 - Mites and diseases
 - Pesticides

But didn't you say most pollination is done by wild honeybees or other types of bees?

Relying on Wild Colonies of Bees

- Aren't there enough wild honeybees or other types of bees to pollinate my plants?
- For commercial producers: Maybe not
- For home producers: Maybe not for much longer
 - Mites
 - Diseases
 - Pesticides

Using Managed Colonies

- Do I need honey bee colonies?
 - Commercial producer – highly recommended
 - Home producer – Not yet, but probably wouldn't hurt
- Okay, release the bees!
- Problems
 - Efficiency of pollination
 - Pollination different for every plant species

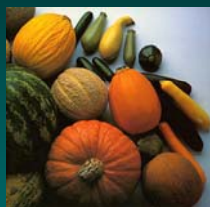
Alfalfa

- Alfalfa flowers must be "tripped"
- Pollen-gathering honeybees will trip flower, nectar gatherers won't
- Alfalfa is better pollinated by primary pollen gatherers (solitary bees)



Cucurbits

- Typically monoecious
- Flowers often only open for one day
- Pollen is often heavy, sticky
- Hand pollination
- Many varieties, especially commercial cucumbers, are gynoeious



Onion

- Pollination is not necessary to produce onions
- Only needed if producing onion seed
- Onions do not have very desirable nectar



Cotton

- Important source of nectar for honeybees
- Large number of damaging insects affect cotton
- Pesticide use has caused catastrophic loss of honeybees in cotton-producing areas



Apple

- Pollen carried by wind, but has little effect on fruit production
- Most varieties are self incompatible
- Certain varieties are cross incompatible
- Varieties do not bloom at same time
- Weather is often unfavorable
- Adequate numbers of pollinating insects are vital, especially in commercial orchards
- Honeybees are extremely important



Almond

- Nearly all produced in California
- Same pollination principles as apple
- Almonds are entirely reliant on honeybees for pollination



Cherry

- Tart Cherry
 - Self compatible
 - Still must be pollinated by bees
- Sweet Cherry
 - Self incompatible
 - Cross incompatible
 - High sugar content attracts solitary and feral bees
 - Bloom early, often during unfavorable flying conditions



Where's The Bees?

- You've determined that you need bees.
- You've done the research on your particular crop(s).
- Now , all you need are the bees.

Renting Colonies

- Many beekeepers rent out hives for pollination
- Commercial beekeepers want to rent out hundreds of colonies at a time
- Hobby or sideline beekeepers: not worth it/don't have time
- Unless you're really good friends with a beekeeper...

Pollination in Greenhouses

- Colonies are considered expendable
- Full-size hives are sometimes used, but “nucs” more common
- Bees must have adequate honey, as well as sugar syrup and pollen cakes
- Colonies need water source and exposure to outside; must not be overheated
- Recommend hiring colonies from a beekeeper

Pollination Summary

- Plants rely on bees for pollination
- There may not be enough bees to meet the needs of your crop
- Bringing in colonies of bees may be a necessity
- Unless you have a large commercial operation, most beekeepers won’t rent to you
- If you still must have the pollination, you must become a beekeeper

Reasons to Become a Beekeeper

- You have too much time and money
- You enjoy nature
- You like honey
- For pollination
- To increase the number of colonies
- To do something outdoors with your children or grandchildren
- Barry Hinson

For The Beginner

- You need 3 things to be a beekeeper
 - You need a desire to keep bees
 - You need to not be deathly allergic to bees
 - You need to have a healthy respect for bees
- The rest is just a little knowledge and money!

Equipment

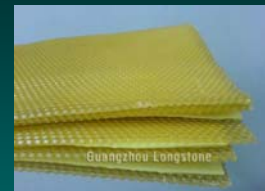
- Modern Beehive
 - Hive stand, bottom board, hive bodies, supers, hive cover



- Langstroth Hive
- Has proper bee spacing
- Frames can be removed for inspection
- Comes with frames
- Should be purchased new

Equipment

- Foundation
- Beeswax or plastic coated in beeswax
- Embossed with the beginnings of the comb
- Results in nice, neat frames
- Recommend beeswax
- Make sure plastic is coated in beeswax

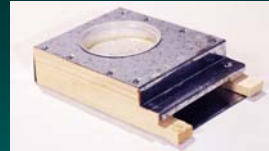


Equipment



Equipment

- Feeders
- Newly "hived" colonies must be fed
- Feeding also necessary if honey stores are running low
- Entrance feeder for warm weather/beginners
- Interior feeders for cold weather



Equipment

- Kits available from most beekeeping suppliers
- Run about \$150
- Now you just need bees



Sources of Bees

- Full-size beehive
- Should be from a reputable beekeeper
- Already established
- Any time of year
- Very expensive (\$300+)
- Don't get the joy of starting from scratch



Sources of Bees

- Queen and 3 pounds of bees
- Cost: \$75-100
- No comb, no brood, no food
- Must be fed for several weeks
- Order in January for April delivery
- Best option for beginners



Sources of Bees

- Cost: Free!
- Even though a swarm is free, it still may not be a good deal
- Can be daunting for a beginner
- Recommend seeking the aid of an experienced beekeeper



Sources of Bees

- Scaled-down version of a regular beehive
- Has bees, comb, brood, food
- Cost: \$125+
- Should be done in April or May
- Still have to be fed
- Easiest for a beginner



Medication/Pest Control

- American or European Foulbrood
 - Terramycin
- Nosema
 - Fumagilin-B
- Varroa mites
 - Apistan strips
- Tracheal mites
 - Menthol crystals
- Small hive beetle
 - Gardstar
- Wax moths
 - Paradichlorbenzene

I Have a Honey Crop, Now What?

- | | |
|---|--|
| <ul style="list-style-type: none"> • Leave the excess with the bees • Let another beekeeper come and harvest <i>your</i> honey • Harvest the honey yourself • Comb honey or extracted honey | <ul style="list-style-type: none"> • Uncapping device • Extractor • Filter • Containers • You can enjoy the honey yourself, give it to friends and family, or sell it |
|---|--|

Golden Rules for Being a Honey Producer

- 1) Only sell or give away an extremely high quality product
- 2) Don't undercut your fellow beekeeper

Other Stuff

- | | |
|--|---|
| <ul style="list-style-type: none"> • Bee blower • Queen excluder • Pollen traps • Honey graders • Bee brush • Bee escape • Boot bands • Branding irons • Spur embedders | <ul style="list-style-type: none"> • Frame cleaner • Frame grip • Spacers • Waxtube fastener • Hive scale • Smoker fuel • Comb cutters • Fume pads • Wax melters |
|--|---|

Suppliers

- Dadant and Sons – Hamilton, IL
 - (888)922-1293
- Walter T. Kelley – Clarkson, KY
 - (800)233-2899
- Brushy Mountain – Moravian Falls, NC
 - (800)233-7929
- Betterbee – Greenwich, NY
 - (800)632-3379
- Mann Lake – Hackensack, MN
 - (800)880-7694

Educational Resources

- Books
 - First Lessons in Beekeeping
 - How To Keep Bees and Sell Honey
 - The Hive and the Honey Bee
- Beekeeping clubs
 - State beekeeping associations
 - Local beekeeping clubs (Raytown: 913/856-8356)
- Local beekeepers

My Contact Information

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Questions?



Thank You!