

Grade 1 –

Introduction to beekeeping



Irish Bee Foundation

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MODULE 2 – REVISION – SAMPLE QUESTIONS FROM PAST PAPERS

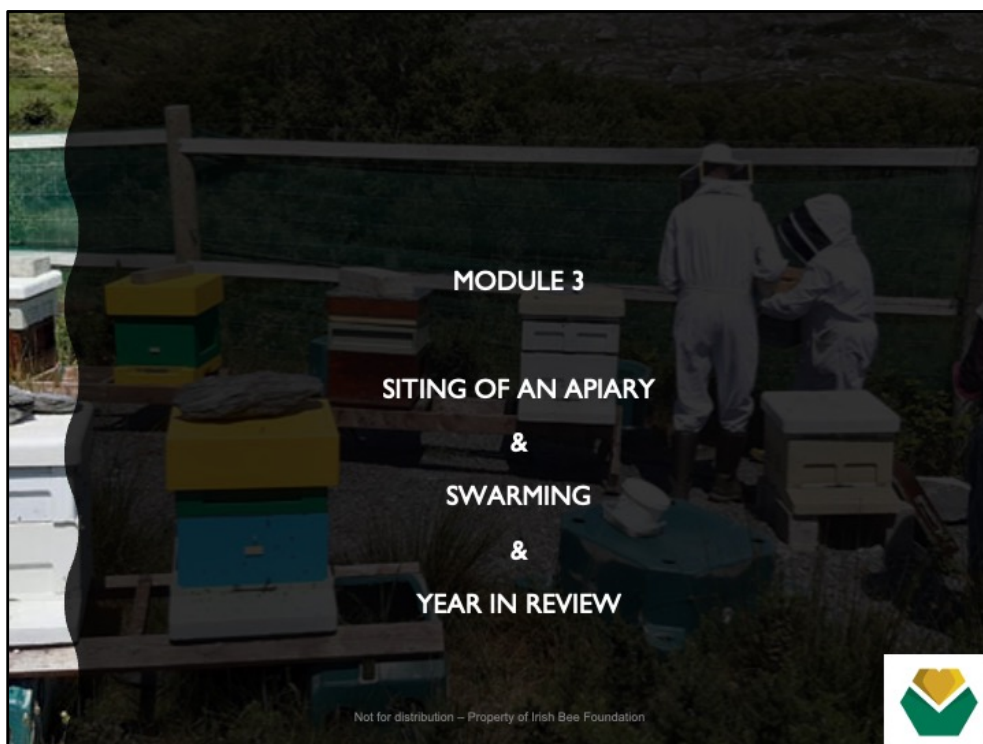
- ❖ What are the three cell types in a honey bee colony?
- ❖ The bee's body is divided into three parts – name them
- ❖ Name the four substances that honeybees collect
- ❖ How do bees benefit farmers?
- ❖ In the summer, how long does a worker bee live?
- ❖ What distinguishes capped worker brood from capped drone brood?
- ❖ What does more harm to bees, cold or dampness?
- ❖ What is the second or subsequent swarm called?
- ❖ What is usually present in a hive before a swarm will leave?
- ❖ What food is fed to queen bees?

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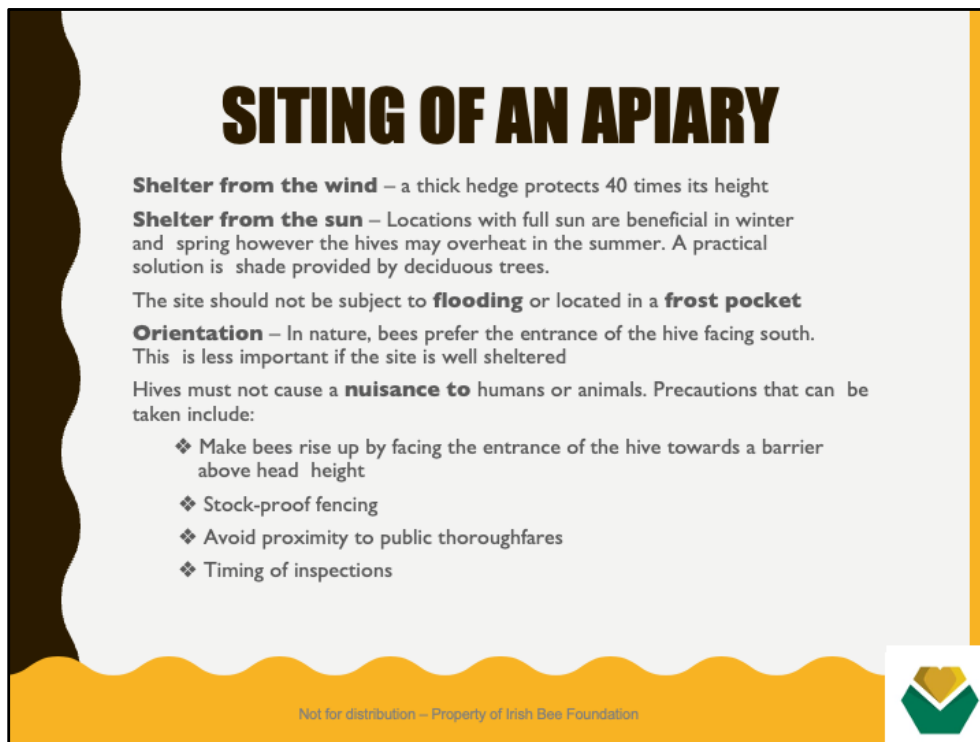
This revision covers essential knowledge from Module 2, focusing on honeybee anatomy, colony structure, and foraging behavior. Key questions may include:

- Cell Types in the Hive: Worker, drone, and queen cells.
- Bee Anatomy: Divided into the head, thorax, and abdomen.
- Foraging Materials: Bees collect nectar, pollen, propolis, and water.
- Seasonal Roles: Worker bees' lifespan in summer and winter varies, with a shorter life in the summer.



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Choosing the right location for an apiary is crucial for bee health and ease of management:

- Shelter from Wind: Position the hives behind thick hedges or barriers; a hedge can protect an area up to 40 times its height.
- Sunlight Exposure: Full sun is beneficial in colder months, but shading (e.g., deciduous trees) may be needed in summer to prevent overheating.
- Flooding & Frost: Avoid areas prone to standing water or frost pockets to prevent moisture and dampness in the hive.
- Orientation: South-facing entrances are preferred, especially if the site lacks natural shelter, helping bees warm up and orient.
- Avoid Nuisance: Hives should not disturb nearby people or animals. Options include placing barriers, stock-proof fencing, or setting hives away from paths.

HIVE ARRANGEMENT

Ensure enough room of inspection: 9 times the hive footprint per hive (rule of thumb)

Drifting: the tendency of bees from one colony to accidentally enter another when returning from foraging flights

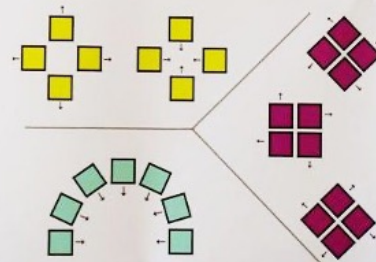
Drifting causes the **weakening of colonies** from which bees drift ❖ Drifting can spread **disease**

Examples of **arrangements of multiple hives** in an apiary to minimise drifting:

- ❖ 4 hives facing north, south, east, west
- ❖ Large circle with entrances facing outwards or inwards
- ❖ 8 hives in a block with 2 facing out on each side of the square
- ❖ Use objects such as shrubs/rocks etc. or different colour hives to reduce drifting

Apiary layouts

Three apiary layouts designed to minimise drifting



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Proper hive arrangement minimizes drifting, where bees accidentally enter neighboring hives, spreading disease and weakening colonies.

- Spacing: Allow for approximately nine times the hive's footprint to ensure easy inspection.
- Orientation: Arrange hives in configurations like a circle or square, with entrances facing different directions.
- Landmarks: Use shrubs or colored hives as landmarks to help bees recognize their hive, reducing drifting.

PLANNING OF APIARY VISITS

The answers to **Hooper's Five Questions** will give the beekeeper **all** the information needed to manage colonies:

1. Has the colony sufficient room?
2. Is the queen present and laying the expected quantity of eggs?
3. A) (early in season) Is the colony building up in size as fast as other colonies in the apiary? B) (mid season) Are there any queen cells present in the colony?
4. Are there any signs of disease or abnormality?
5. Has the colony sufficient stores to last until the next inspection?

Following each apiary visit, the beekeeper keeps **records** of the answers to Hooper's five questions for planning purposes

REDDs: Room, Eggs, Development, Disease, Stores

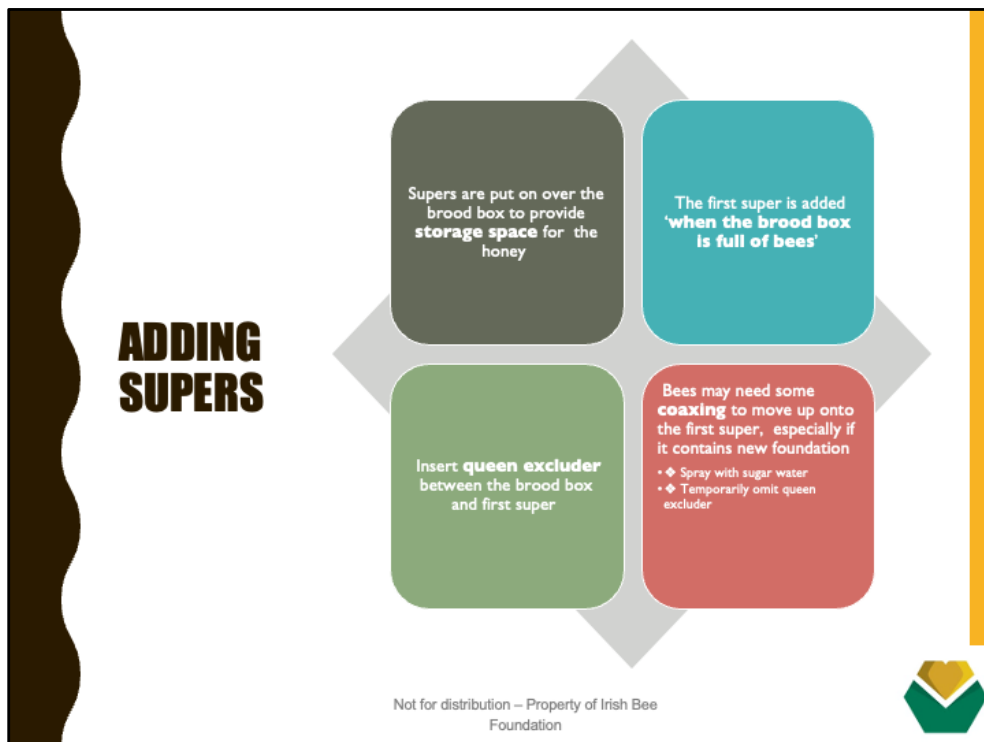
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Using Hooper's Five Questions helps guide inspections and keep hives healthy:

- Room: Ensure the colony has enough space to prevent swarming.
- Eggs: Confirm the queen is laying adequately.
- Development: Assess if the colony is growing at the expected rate.
- Disease: Look for signs of illness or abnormalities.
- Stores: Check if there is enough food for the bees until the next inspection.

After each visit, record your observations to track colony health and progress. REDDS (Room, Eggs, Development, Disease, Stores) summarizes these essential inspection points.



Supers provide additional space for honey storage, especially important during peak nectar flow. Add supers as needed, ideally before the brood box is completely full, to prevent crowding and encourage honey storage above the brood area.

SWARM CONTROL

Beekeepers must make every **effort to prevent swarming** as stray swarms are a public nuisance and losing a swarm equates to losing the honey crop

❖ The much debated subject of **clipping the queen's wing(s)** delays swarming as the old queen leaves with 50-60% of the colony on the day the first queen cell is sealed (Day 8). If the queen can't fly, she may well be lost, but the swarm will return.

❖ The first real signs a colony is preparing to swarm will be **eggs or larvae in queen cells** which will be discovered during routine inspections

❖ Planned **swarm control measures** must be implemented **immediately**

❖ All swarm control measures are designed to **disrupt the swarming process** in some way to prevent the loss of a swarm

❖ The beginner should adopt one swarm control method such as the **artificial swarm** and follow it strictly until they become more experienced

❖ Swarm control involves **separating** any **one** of the following **from the other two**:

- ❖ The Queen
- ❖ The Brood
- ❖ The Flying Bees

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Swarming can lead to the loss of half a colony, impacting honey yield and creating public safety concerns:

- Queen Clipping: Clipping a wing delays the queen's exit if swarming begins, often resulting in the swarm's return to the hive.
- Routine Inspections: Check for eggs in queen cells as an early sign of swarming.
- Swarm Control Methods: Methods like the artificial swarm can help manage the process. Swarm control usually involves separating the queen, brood, or flying bees.

Beginners are advised to learn one method thoroughly before exploring alternatives.

IF A SWARM EMERGES

❖ When a swarm first settles down and forms a **cluster** it is relatively **easy to capture** it in a suitable skep or box

❖ If the beekeeper knows for certain it is **his swarm** (it was seen coming out) it can be **treated in the same way as the artificial swarm** just discussed – use only foundation in the brood box to take advantage of a real swarm's natural tendency to draw comb

❖ Swarms from unknown sources should not be hived in an apiary with other bees until their **disease status** and the **quality of the queen** have been assessed

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When a swarm clusters, it is easiest to collect and re-hive:

- Use of a Skep: Capture the swarm with a skep or box, which can later be transferred to a permanent hive.
- Disease Check: Swarms from unknown sources should be isolated and checked for diseases before being integrated into your apiary.

This process ensures the new swarm can thrive without introducing illness to existing colonies.

PREPARING TO TAKE A SWARM

The beekeeper must **assess the risks** involved in taking a swarm before taking action. Use of ladders is particularly high risk

❖ Recently emerged prime swarms are usually **docile** but become more **defensive** the longer they have been out, particularly if they can't forage for nectar.

❖ At the very minimum, a veil should always be worn

Equipment needed:

- ❖ White sheet
- ❖ Skep or suitable box
- ❖ Goose wing or bee brush
- ❖ Water spray (mister)
- ❖ Smoker (never smoke the swarm cluster)
- ❖ These should be carried at all times during the swarming season



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When preparing to collect a swarm, assess safety, especially if it's in a high or difficult location. Necessary equipment includes:

- White Sheet: Placed under the swarm to easily gather bees.
- Skep or Box: Used to capture the swarm.
- Bee Brush or Goose Wing: Gently moves bees without harming them.
- Water Spray: Calms bees by simulating rain.
- Protective Gear: Even a docile swarm can become defensive if disturbed for too long.

TAKING THE SWARM

Place a **white sheet on the ground** under the swarm ❖ **Knock bees onto sheet** or directly into skep/box

❖ **Invert skep/box over the bees** on the sheet and provide a small entrance

❖ Wait for all **bees to join the queen** in the skep/box (assuming she is inside) – they can be encouraged with smoke if necessary

❖ If the queen is not in the box, the swarm will return to her – try again!

❖ Once the bees are all in, **fold the sheet around the skep/box**, tie off securely, and move to new site.

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When capturing the swarm:

- Place a white sheet on the ground.
- Knock the bees onto the sheet or directly into a skep/box.
- Invert the skep and wait for all bees to enter.
- Ensure the queen is inside; otherwise, the swarm may return to her.

Once contained, the swarm can be moved to a new site.

HIVING THE SWARM (METHOD 1)

- ❖ Use 18" x 3' board (approx.) to form a **ramp up to the hive entrance**
- ❖ Place skep/box on ground in front of the hive and **untie and spread out the sheet**
- ❖ **'Dump/Spill' the bees** onto the sheet and they will soon start making their way up the ramp and into the hive
- ❖ The bees can be encouraged with a little smoke
- ❖ Watch for the queen!



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This method uses a ramp to guide bees into the hive:

- Place the skep/box in front of the hive, untie the sheet, and let bees walk up.
- A gentle smoke puff can encourage movement.
- Watch for the queen as she enters the hive, ensuring colony stability.

HIVING THE SWARM (METHOD 2)

'Dump/Spill' bees directly into empty brood box and **place frames with foundation gently on top of them**

As the bees climb up, the frames will sink naturally to their final position. Do not push them to avoid squashing bees

- ❖ Put the crown board and roof in position
- ❖ It is advisable to close the entrance during this procedure as the queen may land near the entrance.

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Alternatively, dump bees directly into the brood box:

- Place frames gently on top to avoid squashing.
 - Ensure the crown board and roof are in place.
 - Closing the entrance temporarily prevents the queen from leaving.
- This method quickly establishes the swarm in its new home.

DRONE LAYING QUEENS

- ❖ The **size of the cell dictates whether an egg is fertilised or not** – smaller cells (worker cells) allow the egg to be fertilised, but larger cells (drone cells) don't
- ❖ If a queen runs out of sperm, she will end up laying unfertilised eggs in worker cells
- ❖ This will mimic the laying worker situation with drones being produced in worker cells
- ❖ As the colony is queen right, a **new queen can be introduced successfully**



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A drone-laying queen indicates a queen that no longer produces fertilized eggs due to sperm depletion:

- Symptoms: Worker cells contain drones, similar to a laying worker situation.
- Remedy: Introduce a new queen, as this maintains colony structure and prevents excessive drones, which contribute little to hive productivity.

FEEDING BEES

❖ Winter feed is made up of **2 lb white granulated sugar, mixed with 1 pint of water** - 2:1 mix. Gently heat and stir until sugar is dissolved.

❖ In the spring/summer a solution of **1 lb of white granulated sugar to 1 pint of water** is usually used – 1:1 mix

❖ The syrup is offered to the bees by means of **feeders** placed on the hive

❖ Feeding should take place **when and if the bees need it**, when there are insufficient stores, a dearth of nectar, and after removal of their honey crop

❖ The amount of stores required by a colony to carry it through the winter varies with the strain of bee. An average honeybee colony requires about **18–22 kg or 40–50lb** to do so. Checking that bees have sufficient stores is done by hefting the hive

❖ Late flowering plants like ivy can provide a large crop in some years, but should not be relied upon

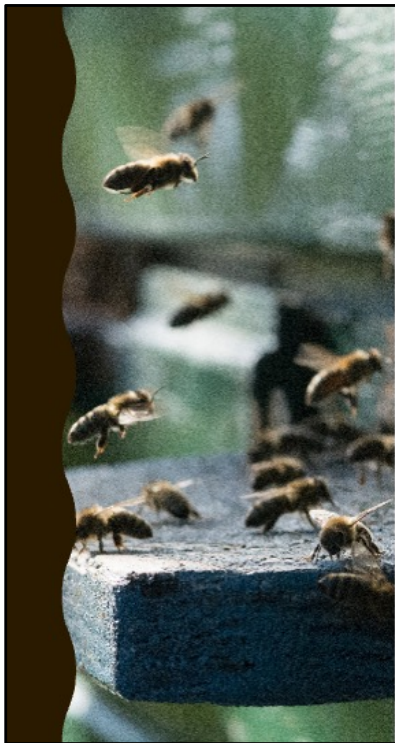
❖ If bees are short of stores in the winter and likely to starve, **fondant** is placed over the crown board feed hole or on top of the frames

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Feeding supports bees when natural food is scarce:

- Winter Feed: A thicker syrup of 2:1 sugar-to-water ratio.
- Spring/Summer Feed: A lighter 1:1 mix for brood rearing.
- Winter Needs: An average colony needs about 18–22 kg of honey stores to survive winter.
- Avoid Robbing: Prevent robbing by feeding in the evening and ensuring feeders are secure.



ROBBING

❖ **Robbing:** bees from a strong colony (or wasps in late summer) enter and **steal honey** from a weaker colony. If present in the weaker colony, **diseases** can be carried back to the strong hive.

❖ **Keep hives in good condition** – do not allow space between hive boxes

❖ **Don't leave bits of comb or honey** lying around in the apiary

❖ If bees find honey in a nearby hive, or in comb laying around the apiary, they will do the **round dance** to communicate the presence of food to the other bees in their hive

❖ **Reducing the entrance to the hive** can help avoid or stop robbing

❖ When feeding, avoid spilling or leaving syrup open to bees in the apiary. Avoid leaky feeders. Apply the feed to all colonies at the same time in the **late evening**.

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Robbing occurs when strong colonies or wasps steal honey from weaker hives. Tips to prevent robbing:

- Reduce Hive Entrance: Helps defend against robbers.
- Avoid Exposed Honey: Keep the area clean of comb and honey spills.
- Uniform Feeding: Feed all hives at the same time to avoid competition.

OVERWINTERING

❖ Honeybees have to survive a cold, foodless period – the winter

❖ The **winter bee's** altered physiology allows her to live 5-6 months to ensure colony survival

❖ Bees cope with the cold by **creating heat using their own bodies** and retaining this heat by crowding together in a **cluster**. Heat is created by rapidly contracting and relaxing their flight muscles.

❖ The cluster is centered on the brood nest, next to the stores of honey. It then moves upwards, keeping in contact with the food. If bees consume all the honey above them, they can move sideways.

❖ If the cluster becomes separated from the food source by more than 20-30 mm, the bees cannot move to it. This is known as **isolation starvation**.

❖ **Feeding** with sugar syrup can ensure that the bees have sufficient stores to survive the winter

❖ Hives must be weatherproof and allow **air circulation** to keep them dry. Bees can survive extreme cold but cannot cope with dampness. Appropriate ventilation is essential



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Winter survival depends on adequate food stores and hive warmth:

- Cluster Formation: Bees huddle to generate heat, centered on the brood nest.
- Ventilation: Hives should be ventilated to prevent dampness, which is more harmful than cold.
- Isolation Starvation: Occurs if the cluster cannot reach food within 20-30 mm due to extreme cold.



TEA BREAK



YEAR'S WORK IN THE APIARY

The beekeeping year starts at the end of August/early September, when the honey has been taken off and the colonies are being prepared for winter

- ◆ The aim is to ensure that every colony has a good start the following spring by going into winter in optimum condition
- ◆ The colony should have a young queen and plenty of bees
- ◆ The colony must be free of disease and protected from predators and pests
- ◆ The bees must be in sound waterproof hives so that they are dry
- ◆ They must be situated in a dry, warm, unexposed apiary

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The beekeeping year starts in late August/early September with preparations for winter:

- Health and Population: A healthy colony with ample bees and a young queen is ideal for winter.
- Protection: Hives must be sound, weatherproof, and predator-proof.

AUGUST

- ❖ Remove the supers and extract them
- ❖ Feed colonies if they have insufficient reserves in the brood box
- ❖ Make hives bee-tight and reduce entrances to prevent robbing
- ❖ Otherwise avoid opening a colony unless absolutely necessary
- ❖ Start varroa treatment if you are using Apiguard etc.



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August tasks include:

- Removing and extracting honey supers.
- Reducing hive entrances to prevent robbing.
- Starting varroa treatments, if needed.

SEPTEMBER

Assess the amount of honey in the brood box

- ❖ Feed the bulk of the winter stores required – aim to get stores completely surrounding the brood nest. Heft the hives to check the weight
- ❖ Ivy will be coming into flower but don't rely on this to provide winter stores, as bad weather may not allow your bees to forage on it
- ❖ Store supers correctly to reduce the chances of damage by wax moths

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Feed bees for winter, as ivy may not provide enough reserves. Heft hives to check for weight, ensuring sufficient stores surround the brood.

OCTOBER

Check whether colonies are being bothered by wasps or robber bees - Make sure all hives are bee-tight and wasp-tight. Keep entrances small until the first frosts have killed the wasp nests.

- ❖ Remove the entrance blocks and fit a mouse guard to deep entrances
- ❖ Complete varroa treatments according to manufacturer's instructions – Record the batch numbers of treatments used and the dates of insertion and removal. This is a legal requirement.

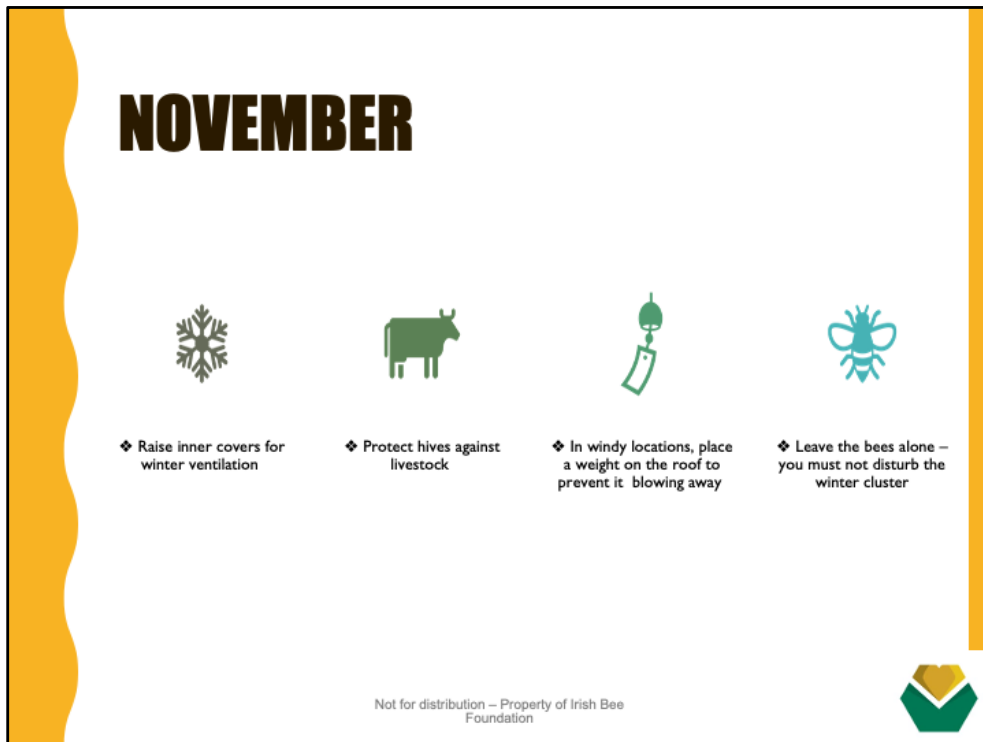


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Protect against pests:

- Wasp Prevention: Keep entrances small until the first frost kills wasps.
- Mouse Guards: Install to prevent rodent intrusion.



During these months, conduct regular checks:

- Review records to plan for the next year.
- Prepare new equipment and monitor hives for damage or overturned guards.

DECEMBER & JANUARY

- ❖ Check on your bees every couple of weeks to make sure all is well
- ❖ Use records to review the past year
- ❖ Identify what worked and why and determine what didn't work and why not
- ❖ Plan your activities for the coming year – colony increase, queen rearing etc.
- ❖ Make or buy any additional equipment needed
- ❖ Visit apiary occasionally and check that no hive has been overturned and that mouseguards are still in place

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During these months, conduct regular checks:

- Review records to plan for the next year.
- Prepare new equipment and monitor hives for damage or overturned guards.

FEBRUARY

- ❖ Increasing day length means that the queen is starting to lay. Pollen loads being taken to the hive indicate increased brood-rearing activity
- ❖ Greater activity means that bees will start making inroads into their winter stores. Crumbs of beeswax on the floor or alighting board indicate bees are opening the cells and using their stores. Heft the hive to check that the colony has sufficient food
- ❖ Make sure that the water source near the apiary is in a sunny spot that will warm the water before the bees drink it. A chilled bee will be unable to fly back to the colony

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MARCH

- ❖ Make sure all colonies are flying well when weather conditions are suitable. Check for large pollen loads being taken into the hive.
- ❖ On a warm day, use a little smoke and lift the inner cover. Bees should look as strong now as they did in September.
- ❖ Look for visible excreta on the top bars, which is a sign of dysentery.
- ❖ Remove the props under the inner cover and close the feed hole
- ❖ Heft the hive, and, if necessary, feed fondant in contact feeder over the winter cluster. Don't feed until the weather is good enough for the bees to take cleansing flights
- ❖ Don't look at the brood nest too early or the bees may kill the queen. Wait for a warm day in April

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APRIL

- ❖ In mid-April, start regular brood nest inspections of larger colonies
- ❖ Keep records of what you see
- ❖ Look out for signs of swarming
- ❖ Add a queen excluder and super when the brood box is full of bees
- ❖ Remove any old, broodless combs, and replace them with frames of foundation
- ❖ Feed the colony with syrup (one to one ratio of a Sugar to water solution) if necessary to help them draw out the comb
- ❖ List the steps of your favourite method of swarm control – make sure that you have all the necessary equipment to hand

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MAY

- ❖ Make sure the colonies have sufficient room
- ❖ Continue adding supers as each new box on the hive fills with bees
- ❖ Continue regular brood box inspections
- ❖ Remove supers or frames full of honey that are ready for extraction
- ❖ Replace with empty supers to prevent colony congestion

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JUNE

- ❖ Continue as in May
- ❖ If swarming has been successfully controlled, the need for very regular inspections is coming to an end
- ❖ If there is a 'June gap' in your area, make sure that your bees have sufficient food reserves. NB if they have supers with honey, do not feed
- ❖ Try to make sure that a newly mated queen resulting from swarm control measures is heading your main honey-producing colony. This will greatly reduce the chance of the colony swarming a second time

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JULY

- ❖ July is the main honey month for most beekeepers
- ❖ Estimate how much honey is in the supers
- ❖ Don't add more supers unless you know that the bees need them
- ❖ At this time of the year, the brood nest is beginning to contract
- ❖ Be aware that bees could still be collecting nectar from crops like borage

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GO RAIBH MAITH AGAIBH

THANK YOU ALL

