Management of bee nutrition in drought and fire affected areas

The 2019/20 summer continues to challenge the beekeeping industry. Drought conditions remain in large areas throughout Australia and fires have devastated the industry.

Through all this activity, normal operations must continue. It's important that beekeepers are equipped to provide for their bees during these challenging times. This fact sheet, developed by Dr Doug Somerville, with AgriFutures Honey Bee Program and the Australian Honey Bee Industry Council, aims to equip beekeepers with fundamental bee nutrition knowledge (water, nectar and pollen) to help during these challenging times.

1. Water

- Water is the number one essential ingredient for colonies to survive hot weather (35°C+)
- Stronger colonies may consume up to one litre per day
- Water must be within 200 metres of the apiary
- Place hives near clean water source, or place water container in apiary
- Do not let containers run out of water
- Place “floaties” in container (e.g. sticks), otherwise bees will drown when collecting water
- Most field bees will be collecting water when temperatures reach the late 30ºCs and into the 40ºC.

Figure 1
Drinking water source for honey bees. Sticks have been used as "floaties" to prevent drowning.
2. Nectar

Have the bees got sufficient stored honey?

- **Dry sugar**
  - 1 to 2 kilogram per hive
  - Doesn’t stimulate colonies
  - Unused sugar can be retrieved and used elsewhere when required

- **Thick syrup = stores**
  - 1:2 parts (water:sugar)
  - Usually five to 10 litres per feed one or two weeks apart or until the colony does not store any more syrup

- **Thin syrup = Stimulation**
  - 1:1 (water:sugar) usually one to two litres per feed once or twice a week

Is the desired outcome to stimulate breeding?

- **YES**
  - Feed 1:1 (water:sugar) in small amounts (one to two litres) once or twice a week

- **NO**
  - Don’t worry

Never feed honey. It is expensive, makes bees aggressive (robber stimulus), it’s high 5-hydroxymethylfurfural (HMF) levels with older honey are toxic to bees and is a carrier of disease pathogens – American foulbrood (AFB), European foulbrood (EFB), chalkbrood and nosema.

Feeding methods: There are two suitable feeding methods

**A. In hive**

- Higher labour component requires a feeder per hive
- Failure of the colony to take up the syrup usually indicates a problem with the queen
- Weak hives are given more sugar per bee than strong colonies (tailor quantities of syrup per hive), i.e. individual hive management
- Each feeder must be cleaned after each use.

**B. External**

- The syrup collected by colonies is in proportion to the number of field bees in the colony. More bees = more syrup
- Bees drown in open feeder (like water, floaties are also important for feeders and this also applies to in-hive open feeders)
- It is quicker to feed more bees with a single large external feeder per apiary, rather than providing syrup on a per colony basis
- Make syrup available to ‘all’ bees in flying distance of the feeder. This may not be a suitable method in urban environments or where there are high numbers of feral bee colonies or other apiaries in close proximity
- It is important to prevent livestock from drinking syrup in open feeders as this could be fatal to the livestock

NOTE: There is no evidence that communal feeders spread bee diseases

Figure 2
Feeding sugar syrup into a frame feeder

Figure 1
Flowchart for determining the need for syrup feeding and the type of syrup to use.
3. Pollen

- Drought has a particularly big impact on fresh pollen available to colonies with the elimination of flowering herbs, pasture and weeds. Colonies will continue to breed while ever nectar and or syrup (1:1) is available to stimulate the colony.
- Fresh pollen is consumed first by the colony. A reduction or elimination of fresh pollen will cause the colony to consume previously stored pollen.
- Once the pollen stores are depleted, the colony will decline in population and eventually die.
- Subtle effects can be experienced by a single pollen source being deficient in one or more nutritionally essential elements.
- Fresh pollen is best. Otherwise stored is second best.

Supplementary protein or pollen feeding

It’s important to note that supplementary protein or pollen feeding is usually expensive and there are a multitude of formulations. However, the full nutritional requirements of bees are scientifically unknown. If you are providing supplementary protein or pollen feeding, feed either in hive (usually patties) or open feeder.

A. In hive

- Place patties (pre-made) directly on top of brood combs and under queen excluder.
- Check every week to see if they have been consumed.
- There is some debate about bees removing patties because of the location they have been placed in the hive.
- Patties are usually made with a protein source, other ingredients and either irradiated honey or sugar syrup (some debate if bees consume the patties for their carbohydrate rather than protein).
- Colonies that fail to consume patties usually are queenless or have a poor performing queen.
- Small hive beetles can be a problem with larvae sliming the pattie.

B. Open feeder

- Place in an open container.
- A crust often forms over the powder.
- Keep livestock and wildlife away by placing a wire grid guard over the feeder.

Figure 3
Examples of external/open feeder. Note the use of straw to prevent drowning.

Figure 4
Supplementary in hive pollen feeding. Pre-made patties and sugar.
Bees usually perform for two generations (six weeks) on supplement alone and then may decline. Bee-collected pollen (if nutritionally balanced) does not have this negative effect.

- Fresh ingredients are important, fats oxidise, vitamins deteriorate and protein degrades.
- Would you eat it?
  Yes, feed to bees.
  No, throw it away!
- Volumes to feed are dictated by bees
- Attractiveness of supplement to bees is very important.

Questions to ask yourself?

- What is the current condition of my bees; population, stored honey and pollen, availability of flowering plants to collect nectar and/or pollen and closeness to water source?
- Do I want to build populations, hold populations or reduce the number of bees in a colony?
- Am I prepared for the expense of buying individual feeders or bulk feeders?
- How available are sugar (dry or syrup) and pollen/protein supplements/substitutes and what is their cost?
- Is your strategy going to be cost effective?
- What is your objective short, medium and long term?