



## Beekeeping Apiary Sites

### *How to Reduce Drifting*

Drifting occurs when flying bees become disorientated and return to the wrong hive. Excessive drifting in an apiary can have a serious effect on the overall profitability of a beekeeping business.

Many beekeepers have seen the effects of drifting within their apiaries, but few realise what it is costing them, and even fewer do anything about it.

#### Effects of Drifting

It is important that the amount of drifting in an apiary is kept to a minimum.

Drifting causes two types of problems in an apiary. One is that some bees end up in the wrong hives, which may spread diseases or result in queen losses.

The second type is more serious, and causes hives to become unequal in strength. This happens when drifting occurs in certain patterns – where hives are placed in straight rows bees drift to the ends of the rows, and where two or more rows are used the front row collects bees at the expense of hives at the rear.

**Confusion between hives:** The following are some of the effects when bees return to the wrong hives:

- If bees drift from a diseased hive, they spread disease to other hives in the apiary.
- Foraging bees that have been contaminated with insecticides may drift into other hives, and so affect those colonies as well.
- If a queen returning from her mating flight enters the wrong hive she may be killed.
- Accurate selection of future breeders on the basis of honey production is impossible in apiaries where excessive drifting has occurred.

**Imbalance between hives:** Other serious effects occur when drifting causes an imbalance between hives:

- Overcrowding of hives caused by excessive drifting can lead to swarming.

- Other hives become so depleted in foraging bees that they are made useless as economic honey-gathering units.
- Canadian studies show that overall honey production can be reduced by up to 11 kg *per hive* in apiaries where excessive drifting occurs.
- A commercial apiary cannot be managed as one unit if a lot of drifting occurs, as each hive must be treated individually during hive manipulations. If, on the other hand, hives are even, apiary visits are much simpler. The amount of stores or number of boxes required on each visit can be accurately assessed, so that time is not wasted loading unnecessary equipment, or by running out of equipment when in the field.
- The beekeeper must spend extra time trying to overcome the imbalances between hives by swapping brood and stores, especially in spring. This practice entails a high risk of spreading any AFB disease that is present.

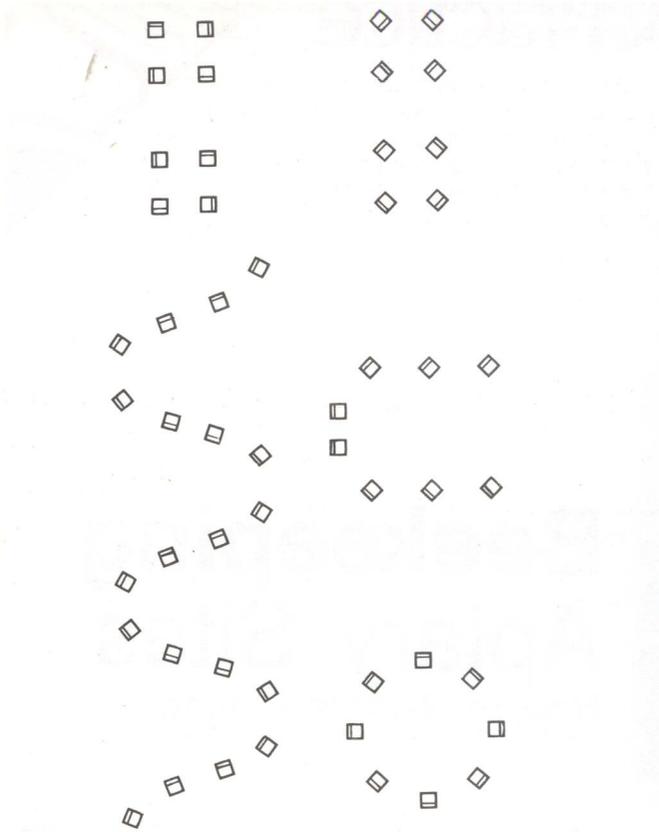


**Fig. 1: Two unbalanced rows showing the effect of drifting to one end. (Only one half of the rows is shown.)**

#### How to Reduce Drifting

Three simple methods are effective in reducing drifting between hives, and can be easily integrated into any apiary management programme. They involve:

- The use of irregular or non-repetitive layouts (patterns) of hives, and the placing of hives within each layout to face different directions.



**Fig. 2: Useful hive layouts to reduce drifting. The double line indicates the hive entrance.**

- The use of different coloured hive bodies (boxes).
- The use of orientation marks on or near hives.

**Hive placement:** This is perhaps the easiest and most effective technique for beekeepers to use. Almost any arrangement is satisfactory, provided the entrances of neighbouring hives (or pairs of hives) do not face the same direction.

Hive entrances do not need to face north; anywhere apart from south (i.e. east through north to west) is generally satisfactory. Hives (or pairs or groups of hives) should be 1–1.5 metres apart so that the beekeeper, and stock, can move easily between them. Most of the layouts work well in unprotected field sites, but drifting is reduced even further if shelter is provided.

The best hive layout to reduce drifting is a complete circle. However, this is seldom practical, so a beekeeper's aim is to find a workable compromise between what is desirable and what is workable. A U-shaped apiary (see fig. 3) may be the best compromise, and is especially useful if a boom loader is used.



**Fig. 3: A U-shaped apiary layout is convenient to work, and reduces the amount of drifting between hives.**

Factors affecting hive layout also include:

- The size of the site that is available for the apiary.
- The location of any windbreaks.
- Ease of colony management.
- Lines of bee flight within the layout.
- Access for any heavy equipment likely to be used (trucks and loaders).
- The need for fencing from stock.
- The personal preferences of the beekeeper.

Hives are often placed in pairs or groups. This gives the hives mutual support against wind and stock, and increases the warmth on inner walls. Hives mounted on pallets for easy shifting are almost always in groups of four.

Groups of four hives can have their entrances facing four different directions – in which case one will be facing south – or two different directions. Sometimes all entrances are placed into the middle – an arrangement in which the bees probably drift, but in which the drift is equalised.



**Fig. 4: Placing hives in straight rows and painting them the same colour causes drifting.**

**Hive colour:** Another cause of drifting is the preference of many beekeepers for having all their hives the same colour. This may look pretty (to humans), but disorients bees badly by removing the visual cues of a varied colour pattern.

Painting hive boxes in a variety of colours is very effective in reducing drift. When painting boxes, it is a simple matter to use different batches of paint. This is also more economical, as it allows the beekeeper to take advantage of specials and job lots. By sheer chance, any hive will have a different combination of colours from its neighbour.

Using a different colour each year is also useful in providing information about the age of boxes, and effectiveness of timber preservation methods.

Bees perceive a similar colour spectrum to humans – red, orange, yellow, green, blue, indigo and violet. The differences are that bees cannot see red (it will appear neutral or grey), but can see ultra-violet, a colour which is invisible to humans (see fig. 5).

The most practical colours to use for hives are a variety of pastel shades (which last longer in the field). The colours most distinctive to bees are white, blue/green, yellow and black, although other colours will be seen as different tones.

**Orientation marks:** Queen breeders always ensure that landmarks are left in mating yards, where drifting is extremely costly. Rather than being "cleaned up", apiary sites can be left with a reasonable number of shrubs, rocks, and other features to assist with the bees' orientation. Although this may not be entirely practical in a honey production yard, it should be borne in mind when preparing apiary sites.

Queen breeders often take this one step further by painting orientation symbols on the lids or fronts of mating units. This aids orientation by queens as they return from mating flights.

Beekeepers who place a nucleus or "top" on a division board above an existing colony find mating percentages for queens are increased if different coloured pieces of tin (75 mm x 50 mm) are inserted under the division board

entrance. The pieces of tin act as alighting areas for the queen bees as well as providing orientation cues.

When choosing symbols, remember that bees often cannot distinguish between shapes that look very different to humans. The critical factor for bees is the extent to which a shape is broken up – whether it is a relatively "open" or an unbroken pattern. See fig. 6 and fig. 7 for examples.

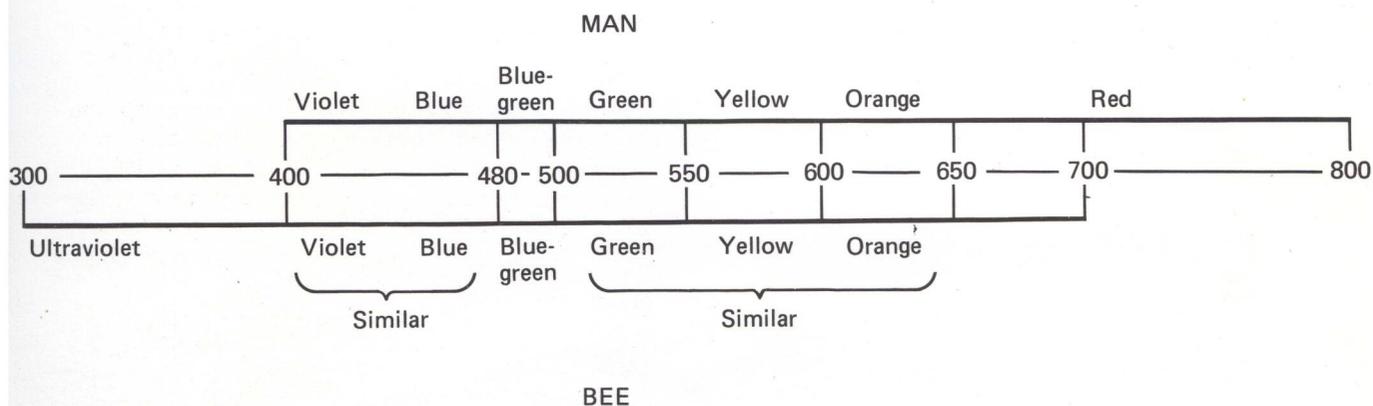


Fig. 5: The colour spectra of honey bees and humans (scale in nm).

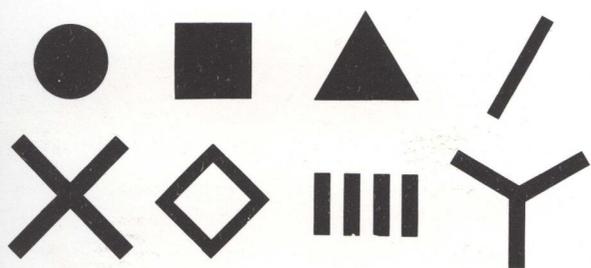


Fig. 6: Bees cannot distinguish between the shapes in the top row, nor between those in the bottom row, but they can distinguish those in the top from those in the bottom.

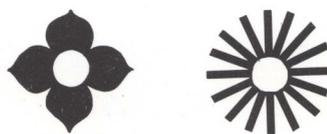


Fig. 7: Two examples of shapes that can be distinguished easily by honey bees.

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