letters to the editor

BREEDING VARROA RESISTANT BEES

Dear Editor

BRAVO Joe Bleasdale! His article (BQ, No.118, Dec. 2014, pp 40-43) makes several points about beekeepers' coping with varroa for which some of us have been arguing for years. He suggests that mortality of colonies that can be validly attributed to varroa is probably negligible and that losses are instead more likely to be due to the inappropriate actions of their keepers. He is not the only one to have found that honey bees left to their own devices can themselves soon eliminate both varroa mites and associated viruses from their hives.

Richard Ball's letter of 2005 (same ref.) reiterates the common misapprehension that the best we can hope of our bees is tolerance of mites, within a settled symbiotic relationship. A tolerant colony would be a secure breeding ground for the further multiplication of mites; is that something to be encouraged? My bees are far from tolerant; they are aggressively intolerant, as described by the Austrian, Allois Walner in reference to his Carniolans. They make sure mite levels rarely rise above the virtually undetectable. Of the few dead mites I find on the floor at spring inspections, most have lethal injuries such as gashed carapaces and the stumps of severed limbs. Friedrich Ruttner, commenting on Wallner's observations calculated that mite populations cannot hold their own if 60% or more of their members are routinely destroyed (Ruttner, 2000+). This accords with my own observations, although this "grooming" seems to be learned behaviour, not necessarily shown immediately mites are first encountered.

Ball wrote: "If varroa were to be left uncontrolled … the (colony) survival rate … would be negligible, probably less than 1%". Of course, if you maintain exotic bees you should expect problems and susceptibility to mites could be one of them. I work only with Northern British *Apis mellifera mellifera*, of which I have kept 5 or 6 stocks since AD 2000 when varroa arrived. I intended to carry out selection for varroa resistance, but (to my disappointment!) that proved unnecessary as all my stocks showed strong resistance. In other words, the survival rate was well over 90%! I have therefore not treated with any varroacide since 2002, nor carried out any varroa controlling manipulation and some of my neighbours have similar stories to tell. The recent DEFRA Random Apiary Survey revealed that the *A. m. mellifera* genome is still dominant throughout Britain (Jones, 2014), so we might expect this resistant capacity to be widespread.

The basic issue is whether honey bees should be managed according to veterinary principles, with the emphasis on medication; or genetic, with the emphasis on elimination of weakness and retention of inherited strengths. It is the veterinary approach we have to blame for the present reprehensible situation, where, as the COLOSS survey suggests (Büchler, 2012), *Apis mellifera* now survives throughout Europe only by grace of the pharmaceutical industry! Medication can reinforce individual colonies, but in doing so it consolidates weakness at the species level. Isn't it time people of influence recommended approaches aimed at long-term survival of honey bees independently of human intervention?

My experience broadly agrees with Joe Bleasdale's: if you keep only local bees, limit sucrose feeds and avoid chemicals, then you may well find some colonies that impose their own natural controls on varroa. All you then need do is re-queen the poor survivors from the best and you are on your way to a resistant strain. Like me you can then say goodbye to varroa.

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CELL SIZES OF HONEYBEES

Dear Editor

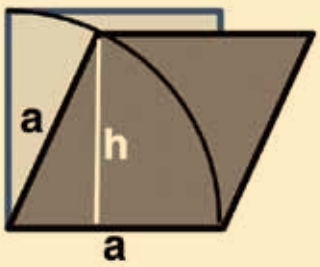
In his article in BKQ No 118 (p. 24-25, Dec 2014) on running a horizontal top-bar hive, David Dawson writes that 'The bees produced good regular combs in the brood nest, but the cells were not the expected 4.9 mm in diameter. […] Measurements of a number of cells showed them to be the standard 5.3 mm.'

Dawson was mentoring someone who apparently believed that when bees were allowed to determine their own cell size, rather than it being determined by commercial foundation, they would make the cells 4.9 mm in diameter.

This misunderstanding began to enter beekeeping circles following publications by some beekeepers in Arizona (1-5). It was stated that before foundation was used, cell sizes used to be smaller, i.e. 4.9 mm, and that a 'fatal error' had occurred around 1930 when the square approach replaced the rhombus approach for measuring the number of cells per unit area of comb.

When I first came across this several years ago, I was sceptical that some distinguished apiologists could have made such a 'fatal error'. I came across a paper by Eric Zeissloff showing that, provided that local differences in measuring units were taken into account, apiologists were finding the same average cell sizes in the past as we do today (6). I was able to corroborate Zeissloff's literature research, and added several more notable apiologists to his list of cell-size researchers, including Swammerdam,1737 (7).

This left me puzzled as to how the Arizona group came to think that natural cell sizes were once 4.9 mm when all the literature research pointed to an average of 5.3 mm. I thought possibly a failure to account properly for differences in units of measurement used in antiquity might be behind it. But it was Francis Saucy who discovered the real cause of the discrepancy. He explained it in depth in a paper published in 2014 in the Journal of Apicultural Research (8). He summarised that paper in a letter to the editor of the American Bee Journal (9), where some of the small cell claims originally appeared (3-5). The following figure and paragraph are quoted from that letter:



The 'fatal error' explained.

Saucy found that the fatal error was not one committed by beekeepers in the

1930s, but was the error of Dee Lusby, a member of the aforementioned Arizona group. While a square of sides *a* has an area of a^2 (i.e. 1 dm^2 if a = 1 dm), a rhombus of sides *a* and height *h* has an area of *a*h*, obviously smaller than the area of the square. If a = 1 dm and the oblique sides of the rhombus are at 60 degrees, i.e. follow the alignment of the rows of cells on the comb, the area of the rhombus would be only 0.866 dm2 compared to the square's 1 dm^2. By erroneously considering that the area of both geometrical figures are identical (i.e. 1 dm^2), Lusby (10) incorrectly transformed cell measurements reported from the 17th, 18th and 19th centuries. This results in average cell widths reduced by approximately 0.4 mm. For instance, a cell width of 5.3 mm, which corresponds to a cell density of 830 cells/dm^2, would erroneously result in a cell density of 962 cells/dm^2 and a cell width of 4.9 mm.

When my doubts first surfaced about the veracity of Lusby's claim that bees once made smaller cells, I began also to measure cell sizes in all the feral colony comb and foundationless hive combs that I could get my hands on. This continued for a few years. The measurements were made across the parallel sides of 10 cells in a row. My conclusion was that although some patches of cells in some colonies were as small as 4.9 mm, some even only 4.7 mm, the overall average worker cell size of natural comb was 5.3 mm (11). And I am pleased to read that Dawson, working on the opposite side of the Atlantic from myself has been able to corroborate that figure with his top-bar hive comb.

Small cells have been linked to good bee health, particularly in relation to mite control (5). This has led to a number of studies by apiologists in several countries. So far, after several years research, there is no convincing evidence that so-called 'regressing' European bees to raise brood in 4.9 mm worker cells by the use of small-cell foundation or plastic comb helps them cope better with Varroa (12). Furthermore, as there has been no detectable change in worker natural cell size over the centuries, the term 'regression' is inappropriate in this context.

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UNWANTED VISITORS TO HOUSES AND GARDENS - A HUMANE APPROACH

Dear Editor

During winter time, we should be aware that wild animals may search for warmth and sustenance within our homes. And, if they can get easy access and find sufficient food for the winter months, who could blame them? Animal Aid would encourage people who do find a squirrel in their attic or a mouse in their kitchen not to panic and call in pest controllers. The traps and poisons they use can cause prolonged agony to animals and do nothing to solve

Grey Squirrel and Mole: Unwelcome visitors should be dealt with in a humane way . .

the underlying reasons why that animal moved in. Instead, we ask people who have an unwanted house guest to take a few practical steps to encourage that animal to move on. To that end, Animal Aid has produced a series of free fact sheets to help local residents deter squirrels and rodents from their homes, as well as foxes, moles and birds from their gardens. The fact sheets can be ordered free of charge from info@animalaid.org.uk or by calling 01732 364546; please state if there is a specific species you require information about.

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