



# БИОМИКА/BIOMICS

<http://biomics.ru>



## SUSTAINABLE BEE-FRIENDLY BEEKEEPING WITH THE WARRÉ HIVE

Heaf D.

Gwynedd, Wales, United Kingdom, Beekeeper and researcher.  
E-Mail: david@dheaf.plus.com

### ABSTRACT

I had kept bees in frame hives for four years when I started to experiment with foundationless comb in them. That got me interested in foundationless beekeeping generally and a friend drew my attention to the Warré hive. I built half a dozen of them in 2006 and have since switched most of my production beekeeping to the Warré hive. Here, I share with you what has been for me a particularly enjoyable nine seasons of beekeeping with the hive. This article is in two parts: the first on the principles and the second on the practice.

**Keywords:** beekeeping, Warré hive, foundationless beekeeping, honey.

### INTRODUCTION

I had kept bees in frame hives for four years when I started to experiment with foundationless comb in them. That got me interested in foundationless beekeeping generally and a friend drew my attention to the Warré hive. I built half a dozen of them in 2006 and have since switched most of my production beekeeping to the Warré hive. In 2007, I came across the book of Abbé Émile Warré (1867-1951) entitled "Beekeeping For All" and that summer my wife Pat and I translated it into English and published it free on the Internet [Warré, 2010]. That brought such interest in the hive from round the world that it became necessary to form an e-Group to discuss construction and use of the hive [Warré Yahoo e-group 2015:

<http://uk.groups.yahoo.com/group/warrebeekeeping>]. Since then it has spread to most countries of Europe, Africa, North and South America, Australia and New Zealand. In 2012, Vladimir Belousov translated and published Warré's book in Russian [Bappe, 2012].

Here, I share with you what has been for me a particularly enjoyable nine seasons of beekeeping with the hive. This article is in two parts: the first on the principles and the second on the practice.

### PRINCIPLES OF THE WARRÉ HIVE

In the last few years in the USA and Europe there have been unusually high losses of honey bee colonies. Causes blamed include from pesticides, exotic

diseases and habitat loss. But few ask whether modern artificial beekeeping is partly responsible for the losses. In this article I present a way of natural or apicentric beekeeping that would suit anyone interested in trying it who has access to a modest sized garden, city roof, allotment or any tiny plot of land that is reasonably secluded.

Bees were once kept in logs or skeps - inverted round baskets - both of which copy remarkably well a favourite abode of the wild honey bee, namely a hollow tree. But to harvest honey from these simple hives the bees were generally asphyxiated. Over the course of the last century or so, skeps or logs were replaced almost completely by hives containing wooden frames. Not long afterwards, it became necessary for governments to set up bee disease inspection bureaucracies at public expense.

Beekeepers who witnessed this transition in beekeeping associated the rise in bee epidemics with the introduction of frames and their associated artifices. Among them was Abbé Émile Warré (1867-1951) whose book *Beekeeping For All* ran to twelve editions in the French original. Warré showed how to make and run the hive he developed that includes many of the bee-friendly attributes of the. He made his *People's Hive* so easy to build and run that it could make beekeeping as commonplace as it used to be in the late 19<sup>th</sup> century (figure 1).



Figure 1. A. Exploded view of the Warré. B. Warré hive exploded labelled.

The most important advantage of Warré's hive is that it retains the bee's nest warmth and atmosphere at all times except for a few minutes once or twice a year such as the honey harvest or official inspection. Bees, though cold-blooded, maintain a nest temperature close to that of the human body. Under the roof of a 'Warré' is an insulating 'quilt' filled with straw or wood shavings. Below the quilt is a hessian (jute) cloth that the bees firmly stick down with propolis, a resin gathered from tree buds which the bees use as their antiseptic and draught excluder. In contrast, a frame hive is regularly opened at the top thus chilling the hive and annoying the bees, and the frames, which are supposed to be moveable, can become welded in place with propolis which repeatedly has to be scraped away. Many find non-interventionist Warré beekeeping to result in more docile bees.

Warré hives are frameless but have eight 'top-bars' at the top of each box on which the bees build natural honeycomb. Without frames they can fill the whole cavity width with combs, fixing them in the natural way to its sides, thus creating inverted pockets of warm air where the work of rearing the young takes place. Frames introduce draughty gaps round comb edges and let out heat. The bees then have to work harder to replace the lost heat, and are consequently

more physiologically stressed, hence more disease prone, and use up more of their hard won honey.

Frame beekeepers also use foundation in their frames, partly intending thereby to save work for the bees. These sheets of recycled beeswax, which often contains pesticide traces, are embossed with a hexagonal pattern that predetermines the size of the honeycomb cells. But natural comb, as in a Warré, has cell sizes the bees themselves choose and they construct the comb as they do in nature, i.e. not starting on a wax sheet. Allowing natural comb removes another artificial stressor as a colony instinctively determines how many drones (males), to rear in the larger cells they occupy. A natural colony even varies the cell size of worker brood. The biology of this is subtle and as yet little understood. In my Warrés, cells in the worker brood area range from 4.7 to 5.6 mm between wall centres. By contrast, commercial foundation used in UK frame hives ranges from 5.4 to 5.7 mm.

Like modern hives, a Warré is a stack of wooden boxes, but the box internal dimensions not only better match the size of a bee swarm or cluster but also more closely approximate to tree hollow proportions by being taller and narrower than heat-dissipating frame hives. Install a swarm in a Warré and it starts building comb from the top downwards. After filling the top box

with comb, brood, pollen and honey it moves to the top-bars of the box below, and so on. Empty boxes are added always *at the bottom* without letting out the warm air that is enclosed as in a hot air balloon. We call this procedure *nadiring*, as opposed to *supering* which is adding boxes at the top. Usually four or five boxes are needed in a UK season. They sit on a simple wooden floor with a notch for the entrance and an alighting board. The floor rests on any kind of improvised stand.

In contrast, frame beekeepers add honey boxes on top of the hive, thus letting out the heat each time. And to stop the queen from going into these honey boxes to lay eggs a queen excluder, a metal or plastic grid, is inserted that only the workers can pass through as they are smaller. In a Warré, the queen's access to the comb is unrestricted as in a natural honeybee nest.

Nadiring, the most unusual feature of Warré beekeeping is found amongst Warré's precursors. Two of them in France were brought to his attention after he published his book. Since his book was translated into English, other precursors have come to light [<http://warre.biobees.com/precursors.htm>]. Here I shall mention only Nikolay Vitvitsky (1764-1853) whose tiered top-bar hive had wider boxes, almost in pyramidal form, as each fresh box was nadired. Like Warré's hive, the harvest was taken from the top. We should also not forget the hive of Viktor Shapkin, a Russian beekeeper who practises relatively natural beekeeping with a hive similar in principle to that of Warré only with round sections made from hollowed out logs (figure 2) [Шапкин, 2005].



Figure 2. Warré exhibition hive (acrylic sheet) (Photos: Marc Gatineau).

If we switch from frame to Warré beekeeping we have to take a smaller crop of honey than we are used to with frames. The main reason is that the bees should winter on their own honey. This ends the practice of robbing colonies of most of their valuable nutritional reserves and replacing them with sugar syrup, which lacks the minerals, nutrients and many other bee health-promoting substances of honey. If Warré beekeepers have to feed their bees, say after a wet summer or when settling-in a new swarm in bad weather, they try to do so with their own honey. Only as a last resort to prevent colony starvation do they turn to sugar.

To harvest a Warré, the top box is removed in the autumn, checked to ensure it has no brood, and taken

indoors to crush the comb and drain its honey. There is no need for expensive centrifugal extractors, thus further lowering the ecological footprint of this beekeeping method. Just ordinary kitchen utensils, such as a strainer and bowls will suffice. In the UK, if it has been a good summer then a second box of honey can be taken provided it does not contain part of the brood nest and there is at least 12 kilograms of honey left in the remaining boxes for the bees overwintering usually in two boxes. A Warré box yields up to 14 kg honey. In exceptionally melliferous localities, such as in New South Wales Australia or Alberta Canada, harvesting more than two boxes of honey is not unusual (figure 3).



Figure 3. Part-built Warré box of natural combs.

Notice in the description so far, there is no reuse of comb, unlike in frame beekeeping where combs are routinely centrifuged and reused. This is the second reason why honey harvests from Warré hives are lower than in frame beekeeping. About 8 kg honey is needed to make 1 kg comb. When comb is not reused, that 8 kg is effectively deducted from the overall surplus honey. However, it should be pointed out that in very mellifluous localities, as well as nading, some Warré beekeepers also super their hives with an empty box containing one 'ladder comb' in the middle.

Another important feature of the Warré's geometry is that the winter stores are situated above the bee cluster which has a compact football or rugby ball outline and over several months eats its way upwards into the honey. In contrast, UK frame hives are broader, flatter, and it can happen that the cluster eats its way to the top and, in a cold snap, the benumbed bees cannot travel sideways onto the hard-to-reach honey frames at the edges. Consequently they die of isolation starvation even though the box contains ample food.

In the spring of the second, say late March or early April in the UK, one or more boxes, new or emptied at last year's harvest, are placed underneath the colony. The colony expands down into these and the boxes at the top become the honey harvest later the same year. Thus, there is a constant renewal of comb built-in to the management of a Warré. Comb renewal is considered to be important for maintaining the health of the bees and is less easily achieved in frame hives which

can have blackened combs at least five years old.

Frame beekeepers say they need comb in frames to control swarming and disease. The idea is that one can read the hive like a book to see if it is about to swarm or whether there are diseased larvae. But swarming is an essential part of the natural reproductive cycle of a honeybee colony. Suppressing the complex sequence of behaviours that are associated with swarming and essential to the survival of this wild species risks gradual weakening of the genetic stock of the bees. Furthermore, colony reproduction by vertical as opposed to horizontal pathogen transfer helps reduce pathogen virulence. Also it has been shown recently in as yet unpublished work that colonies that swarm more frequently have better survival in relation to *Varroa*. A Warré beekeeper aims to work with the power of the swarm and does not use artificially bred queens. We shall see in the next section under what circumstances this is possible.

As for monitoring disease, as already indicated, frames and the excessive interventions that go with them cause physiological and psychological - yes, bees have minds! - stress for the colony. Stressed organisms are usually more prone to disease. Bees like seclusion. Opening up their home and moving their furniture about every week, as is common practice, goes against their nature. Stopping using frames thereby reduces the need to monitor disease. On the rare occasions when comb inspection is unavoidable, Warré beekeepers use a comb knife to free side attachments and a holder on which to rest the top bar (see picture) (figure 4).



Figure 4. Government bee inspector at work on a Warré hive (photo John Haverson).

Here it was possible to cover apicentric husbandry only briefly. I treat it in more detail in my book *The Bee-friendly Beekeeper* [Heaf, 2010; 2011].

#### **BUILDING AND MANAGING THE WARRÉ HIVE**

Beginners are advised first of all to read Warré's *Beekeeping For All*<sup>1</sup> and as much bee biology as you've time for, e.g. Jürgen Tautz's beautiful book which among other things evidences the importance of natural comb for the health and life of the colony [Tautz, 2008]. My own book *Natural Beekeeping with the Warré Hive - A manual* puts the making and use of the hive into a contemporary setting [Heaf, 2013]. Join a local beekeepers' association and even learn about frame beekeeping. There is much of value in it. Associates who are up-to-date on bee biology and behaviour, not just after 'honey money', will be interested in your venture and several often willingly help.

Many make their own Warrés as it's so simple [Warré, 2010]. Plans are in Warré's book, or downloadable from the net [<http://warre.biobees.com/plans.htm>]. One site shows those new to woodworking how to do it [<http://thebeespace.net>]. But if it's too complicated, buy a ready-made hive from one of Europe's manufacturers including Britain's biggest [<http://warre.biobees.com/links.htm>]. I made most of mine out of recycled wood and driftwood. Avoid treated

wood and plywood. The latter does not 'breathe' and contains artificial adhesives. Planing is unnecessary.

Make at least 4 boxes per hive. Provided internal dimensions are 300 x 300 mm (plan) x 210 mm (high), wood of 20 mm or more thickness suffices. 10 x 10 mm rebates in two opposite top rims support the top-bars. Butt joint the box corners using seven 65 x 2.65 mm galvanised nails or a smaller number of screws. Fill outside cracks wider than 1 mm with linseed oil putty, leaving the bees to seal the inside with propolis, their universal sealant and antiseptic. Fix handles on two sides. Optionally, the box can be painted outside with two or three coats of raw linseed oil. Beginners like boxes with windows to watch colony progress [<http://warre.biobees.com/windows.htm> OR <http://warre.biobees.com/plans.htm>].

Warré beekeepers in northern climates such as Canada use thicker wood (e.g. 50 mm) for the boxes, while keeping internal dimensions the same. Also in Canada, it has been found beneficial to have a very small upper entrance, about 12 x 7 mm, because of deep snow on the ground for long periods. Beekeepers from the northern parts of USA northwards also wrap their Warrés to give further winter protection.

Cut eight 24 x 9 mm top-bars per box. To guide bees to make parallel combs to ease later inspection, form wax starter strips under each top-bar by pouring molten beeswax onto it against a pre-wetted wooden

former

[[http://www.dheaf.plus.com/warrebeekeeping/waxing\\_to\\_pbars.htm](http://www.dheaf.plus.com/warrebeekeeping/waxing_to_pbars.htm)]. Fix the bars at 36 mm centres to the rebates either with 20 x 1 mm Japanned gimp pins with the heads cut off; or, for ease of later removal, simply rest the bars in the rebates, or use castellated spacers.

The floor comprises 15 mm boards nailed to battens. For the entrance, cut a 120 mm wide notch extending 40 mm inwards (for a 20 mm box wall). As

with Vitvitsky's hive, the bees enter under the rim of the bottom box. Nail an alighting board 160 mm wide under the notch, projecting 70 mm.

The top-bar cloth is hessian (e.g. peanut/coffee sacks, USA English: burlap). Warré advises stiffening (sizing) the cloth with flour paste to stop the bees fraying it [Шапкин, 2005]. They coat the exposed underside with propolis (figure 5).

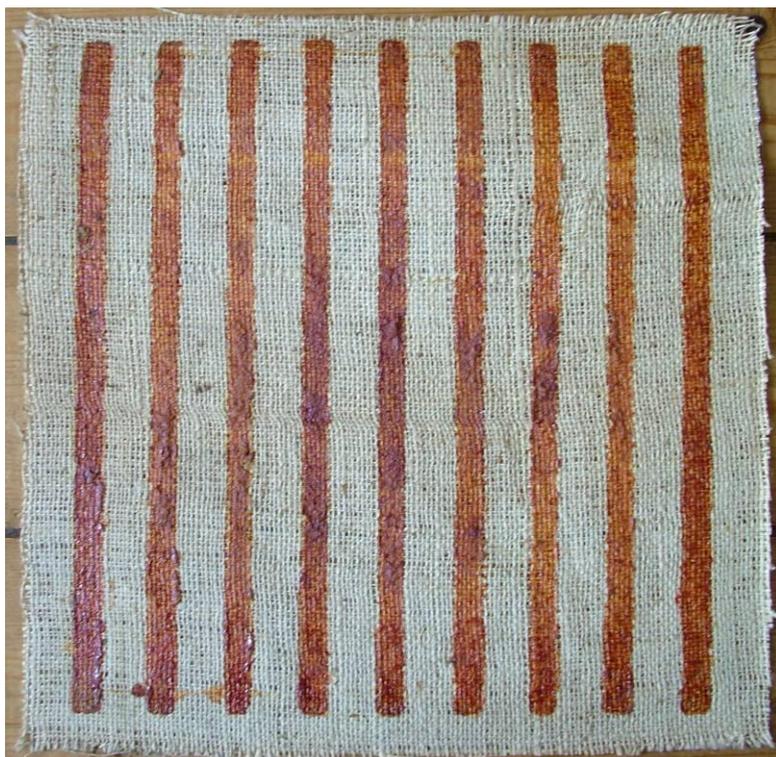


Figure 5. Used top-bar cloth showing propolis deposits.

The 'quilt', 5 mm narrower than the boxes, comprises four 100 mm wide pieces of wood nailed into a square frame. Fix hessian underneath and fill the tray with chopped straw or wood shavings etc.

Roof construction is more flexible. It is waterproof, has about a 10 mm clearance all round to ease removal, covers the quilt/box junction, excludes mice, can be flat and covered with a metal sheet or sloping like Warré's with its ventilated cavity to shield the hive from the sun [Шапкин, 2005]. I make Warré's roof from wood scraps and then paint it. Important: there is no up-draught via the quilt (and roof). The bees control ventilation via the entrance.

The hive floor should stand *level* at least 150

mm above ground. Blocks, a sturdy crate or a wooden stand made of scrap all suffice. Mine are 300 mm high with legs just outside the four corners of the hive to maximise stability.

Common apiary sites include gardens, city rooftops, allotments, field margins (livestock fenced), wasteland etc. Walls, fences, hedges and/or screening nets (windbreak) guide air traffic. The flight path near the hive entrance should not point over thoroughfares or any place where people pass. Ideally face the entrance anywhere between east and south to encourage early foraging. Unless forage is exceptional, limit each site to three hives to avoid stressing the bees through competition for food (figure 6).



Figure 6. A Warré hive apiary.

Ideally, populate the hive with a natural prime swarm of 2 kg or more. Many have done it successfully with bought packages, sometimes as small as 1 kg. Tell your local association, police, pest control department and fire station that you will take swarms. At your first hiving consider asking an experienced beekeeper to help. Just before a main nectar flow, ideally in May (UK), run the swarm into a prepared 2-box Warré up a board sloping up to the entrance, or simply dump the swarm in the top of the hive using a Warré box without top-bars as a funnel. With a mature package of bees (artificial swarm), i.e. one that has been in transit for a few days, release the queen from her cage onto the floor by tilting the boxes then *immediately* dump the bees in the top. If the package has only recently been given its queen, remove the protective plug over the candy and hang the cage from the top-bars of the top box. Check in a few days that the bees have released the queen and remove her cage. If there is no nectar flow, feed with syrup made from honey produced in your own apiary or from a known disease-free apiary (2:1 honey:water by weight), or with syrup comprising 1 kg sugar in 500 ml water. Put it in an open container loosely filled with straw (to stop the bees drowning) on the hive floor or in a contact feeder on the top-bars.

Observe your hive. Sight, sound, touch, smell

all help. Storch details what can be learnt from entrance activity [Storch, 1985]. All is well if, on rainless days, traffic is purposeful. Pollen should be coming in within 48 h. The first box can fill with comb in a fortnight, occasionally in less than a week in warm, mellifluous localities. In another fortnight consider adding a third box. If you do not have an assistant, a Warré hive 'Gatineau' lift can be made using scrap materials [<http://warre.biobees.com/lift.htm>]. If the boxes are windowless, to check how comb building has progressed, slide the hive slightly sideways on the floor to make a satisfactory opening and look upwards with a torch, or use a mirror/camera. Do not do this often as an aim of Warré beekeeping is to leave the bees undisturbed (figure 7).



Figure 7. Gatineau lift for a Warré hive.

Under NW European conditions, if you have hived mid-spring, had an average summer, and are free of *Varroa* or other serious pests, you should get at a box

of honey in early autumn when nectar flow largely ends. Remove the roof and quilt. Peel back the top-bar cloth and smoke bees down into the second box. Loosen the box with a hive tool, and, if necessary, with a gentle twist each way. Check there is no brood by looking underneath the box into the combs. If there is brood, replace the box and close up. Put harvested boxes aside in a covered container such as a plastic sack. Check the next box has at least the equivalent of six combs of honey (about 12 kg.) for winter stores. If there are still bees in a box to be harvested, use a clearer board overnight [<http://warre.biobeas.com/clearing.htm>].

The lightest coloured comb at the top corners of

the box may be suitable for consumption as cut honeycomb. The rest is crushed or chopped, and drained through a sieve. To recover residual honey, either press the drained comb in a cloth [<http://warre.biobeas.com/pressing.htm>], or wash it with lukewarm water, and either feed the honey syrup back to the bees or make it into mead [[http://www.dheaf.plus.com/warrebeekeeping/solar\\_extractor.htm](http://www.dheaf.plus.com/warrebeekeeping/solar_extractor.htm)]. Wax, a valuable commodity, is most sustainably recovered in a solar extractor. This inbuilt renewal of comb is a bee health enhancing feature of the hive which is recognised by all beekeepers (figure 8).



Figure 8. Warré box with honey (Photo: Steve Ham, Spain).

Theory predicts that suppressing swarming, part of the natural reproduction of the honey bee, risks compromising the long term fitness of the bee population. You could let your bees swarm and catch swarms to start new colonies, if necessary by using bait hives

[[http://www.dheaf.plus.com/warrebeekeeping/bait\\_hives.htm](http://www.dheaf.plus.com/warrebeekeeping/bait_hives.htm)]. But this is unfeasible if there is a real risk of annoying neighbours; in which case, time in the second and later years, you could split the hive before swarming or do more complicated artificial swarm manipulations as Warré describes [Warré, 2010].

Beekeepers in the UK generally use chemicals against *Varroa* mites. This is not sustainable and adversely affects bee health. Honeybees will eventually

co-adapt, co-evolve with the mite. Treating hampers this. I do not treat. Warré hives create the ideal conditions (warmth, humidity, cell size) that help the bees themselves to control mites. However, I do risk losing some colonies. My average winter losses over eight winters of Warré beekeeping are 20% on average. I run about 20 hives so can sustain such losses by replacing with swarms. My average colony age at the time of writing (November 2015) is 43 months. In my locality most beekeepers have stopped treating for *Varroa* with chemicals. Annual local surveys on winter losses show that there is no great advantage to be gained by treating [[http://www.dheaf.plus.com/beekeeping\\_photos/gwynedd\\_winter\\_losses.jpg](http://www.dheaf.plus.com/beekeeping_photos/gwynedd_winter_losses.jpg)].

In spring, check your colonies survived. Clean

the floors and add one or two boxes. In year two and beyond you might harvest two boxes of honey. But remember that Warré beekeeping means not over-exploiting bees, so they should always be left an adequate amount of their own honey. Golden rule: keep it simple.

#### REFERENCES

1. Шапкин В.Ф. Бесконтактное пчеловодство. 2005.
2. Heaf D. J. Natural Beekeeping with the Warré Hive - A Manual. Northern Bee Books, Mytholmroyd. 2013.
3. Heaf D. J. The Bee-Friendly Beekeeper. Northern Bee Books, Mytholmroyd. 2010, 2011.
4. <http://thebeespace.net/>
5. <http://warre.biobees.com/clearing.htm>
6. <http://warre.biobees.com/lift.htm>
7. <http://warre.biobees.com/links.htm>  
(Lists of Warré hive suppliers)
8. <http://warre.biobees.com/plans.htm>
9. <http://warre.biobees.com/precursors.htm>
10. <http://warre.biobees.com/pressing.htm>
11. <http://warre.biobees.com/windows.htm>  
OR <http://warre.biobees.com/plans.htm>
12. [http://www.dheaf.plus.com/beekeeping\\_photos/gwynedd\\_winter\\_losses.jpg](http://www.dheaf.plus.com/beekeeping_photos/gwynedd_winter_losses.jpg)
13. [http://www.dheaf.plus.com/warrebeekeeping/bait\\_hives.htm](http://www.dheaf.plus.com/warrebeekeeping/bait_hives.htm)
14. [http://www.dheaf.plus.com/warrebeekeeping/solar\\_extractor.htm](http://www.dheaf.plus.com/warrebeekeeping/solar_extractor.htm)
15. [http://www.dheaf.plus.com/warrebeekeeping/waxing\\_topbars.htm](http://www.dheaf.plus.com/warrebeekeeping/waxing_topbars.htm)
16. Storch H. At the Hive Entrance. European Agricultural Editions. 1985.
17. Tautz J. Buzz About Bees. Springer. 2008
18. Warré É. Beekeeping For All. D. J. Heaf & P. A. Heaf (transl.). Northern Bee Books. 2010. <http://warre.biobees.com/bfa.htm>
19. Warré Yahoo e-group 2015: <http://uk.groups.yahoo.com/group/warrebeekeeping>
20. Вappe E. Пчеловодство для всех. 2012. Перевод: Белоусов В. ([http://natur.ucoz.ru/publ/narodnyj\\_ulej\\_ulej\\_abbata\\_eh\\_milja\\_varre/kniga\\_abbata\\_varre\\_quot\\_pchelovodstvo\\_dlja\\_vsekh\\_quot/2-1-0-6](http://natur.ucoz.ru/publ/narodnyj_ulej_ulej_abbata_eh_milja_varre/kniga_abbata_varre_quot_pchelovodstvo_dlja_vsekh_quot/2-1-0-6)).

#### УСТОЙЧИВОЕ ДРУЖЕЛЮБНОЕ ПЧЕЛОВОДСТВО В УЛЬЯХ ВАРРЕ

Хиф Д.

Гвинедд, Уэльс, Великобритания, Пчеловод и исследователь.  
E-Mail: david@dheaf.plus.com

#### АННОТАЦИЯ

Я содержал пчел в рамочных ульях в течение четырех лет, когда я начал экспериментировать с сотами без основания. Мой интерес к ульям Варре начался с интереса к сотам, не имеющим основания. Я построил полдюжины ульев Варре в 2006 и с тех пор большая часть моего пчеловодного производства перешла на ульи Варре. Я хочу поделиться с вами девятилетним опытом пчеловодства в ульях Варре. Эта статья состоит из двух частей: первая часть описывает принципы, а вторая - практику.

**Ключевые слова:** разведение пчел, ульи Варре, соты, мед