

Reigate Beekeepers



BeeNews

August 2016



Photo opportunity of the Month



Artwork Enhances Pavilion

A new addition has been made to the Henfold Copse Pavilion which demonstrates the wide range of skills and craftsmanship of our members. **Mike Lowe**, who made the 'Skep Shield' which adorns the front of the Pavilion, has designed, made, and installed this bee themed wind vane. It provides the wind direction, perhaps a land mark for returning foragers, and as a piece of unique artwork confirms that the Pavilion is a special place.

*Got an unusual, topical, or interesting bee related image that could be featured here?
Please send it to the editors today!*

Dates for your Diary

Date	Event / Description	Venue / Contact
Aug, Wed 3 rd	Summer Training Apiary Meeting (18:30 - 20:00) Practical training - learning, mentoring, helping.	Henfold Apiary Andrew Buchanan
Aug, Fri 5 th	Extraction Day Preparation (16:00 - 21:00) Gathering supers and equipment and prepping the hall.	Newdigate Vlg Hall Andrew Cornwall
Aug, Sat 6 th	Extraction Day Event (09:00 - 16:00) Team effort extracting honey from the divisions supers.	Newdigate Vlg Hall Andrew Cornwall
Aug, Sat 6 th	Autumn Bee Health Clinic (10:00 - 14:00) Your bee samples assessed for Adult Bee Diseases	Newdigate Vlg Hall Bob Maurer
Aug, Wed's 10 th & 17 th	Summer Training Apiary Meeting (18:30 - 20:00) Practical training - learning, mentoring, helping.	Henfold Apiary Andrew Buchanan
Aug, Sat 20 th	Capel Summer Show (12:00 - 16:00) Promoting & demonstrating beekeeping & Honey Sales	Capel Mike Hill
Aug, Wed's 24 th & 31 st	Summer Training Apiary Meeting (18:30 - 20:00) Practical training - learning, mentoring, helping.	Henfold Apiary Andrew Buchanan
Aug, Wed 31 st	End of Season Supper (20:00 - last orders) Pub Grub, Team Boules ... and group hugs.	Six Bells, Newdigate Andrew Buchanan
Sep, Sat 3 rd	Newdigate Village Day (12:00 - 16:00) Promoting & demonstrating beekeeping & Honey Sales	Newdigate Vlg. Hall Mike Hill
Sep, Wed 7 th	First Monthly Winter Meeting (19:30 - 21:00) Talk by Celia Perry about the Asian Hornet	Woodhatch Centre Andrew Buchanan
Sep, Sat 10 th	Mickleham Village Fair (12:00 - 16:00) Promoting & demonstrating beekeeping & Honey Sales	Mickleham Vlg Hall Jack Chapman
More dates?	The Members website has the full year's Diary Dates	Click Here

Comments about and contributions for publication in **BeeNews** will be welcomed by the editors.
For inclusion in an edition, contributions are required by the 25th of the preceding month.

Beeing in Touch with Nature

Before you took up beekeeping, was your principle interest in the weather simply about deciding what to wear or in choosing between sun hat and broly when venturing out ?

If so, it is very likely that you are either now, or becoming, very aware of how even the most subtle changes in, or combinations of weather conditions can have significant effects upon your bees. Not just their performance in brood rearing or filling supers, but in their general behaviour and demeanour when going about their business.

And then there is the natural progression to becoming ever more aware of the seasonal changes in sources of nectar and pollen, and the impact that weather plays on its supply. This months **Horticultural News** articles attempt to reveal the relationship our bees have with flowers and where they should be found foraging during August. The **Q&A** section also provides an insight into how they find the flowers.

The month of July certainly transformed what was looking to be a disappointing year, into a more than respectable one in terms of honey harvests. If that is, your colonies were in conditions able to benefit from the sudden, late and seemingly prolific nectar flows. Take the opportunity this month to help the Division harvest its honey crop and experience the various techniques and equipment used. See the **Noticeboard** for more information about the Extraction Day.

And if your any of your colonies have appeared to be a little laid back in their efforts, could they be ailing ? See the **Events News** for info about testing for Nosema at the Bee Health Clinic.

Richard & Graham

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Our website is updated much more regularly than this monthly edition of **BeeNews**, so click on [Members Website](#) for lots more information and, all the latest news and activity updates.

Reigate Beekeepers

MEMBERS

End of Season Approaches

by **Andrew Buchanan**

Chairman's Chat

The saying goes that "everything comes to they who wait" and we have waited a long time for the sun this year ! However, our patience has been rewarded and the Summer has arrived at last. My bees have been working hard to bolster their stores of honey and I have taken full advantage with some sunbathing in my garden!

July has been on the quiet side regarding activities, but those that have taken place (Village Shows and the BBKA Basic Assessments) were very successful and enjoyed by all who were involved.

Henfold Copse is looking very good right now especially as **Roy Cottington** has spent many hours tidying up the brambles and grass mowing.

August is the time when thoughts move towards that sticky annual pastime of Honey Extraction. **Andrew Cornwall**, who is very kindly organising and running the extraction of RBKA's honey, will welcome any volunteers to help him on Friday 5th August to collect supers from all our apiaries, and on Saturday 6th August at Newdigate Village Hall to do the extracting. For further details please email Andrew directly by using this [LINK](#).

And do make use of the Bee Health Clinic that will also be being run by **Bob Maurer** in the Village Hall on Saturday, 6th August.

For the honey from your own bees, don't delay making your order for Honey Jars through our Quartermaster **Phil Elwell**.

Contact 01306 711831 or 07802 632324 or phil.elwell@outlook.com

Following honey extraction, it is a good time to investigate in detail the amount of varroa infestation in your colonies and to decide on a plan to control the pest.

Our 'End of Season Supper' is planned for 31st August at the Six Bells pub in Newdigate after the training session. The modest charge of £10 excludes drinks but does include a buffet supper and weather permitting, a round robin of Boules for teams of four.

Please enter your name on the poster in the Pavilion at Henfold Copse or contact me for further information.

Now I'm hoping for even more of this sunny weather !!!!

Andrew Buchanan

01306 712773

07879 552582

andrewb38@btinternet.com

Pop-up-Shop Initiative Seeks Your Support



Last months request for your views about proposals to re-establish a regular Pop-up-Shop outlet facility operated under the umbrella of Reigate Beekeepers, has provided some responses.

However, in undertaking to organise this initiative **Alan Berridge** really does need a few more members to let him know whether this proposal would be of value to them.

It would be Alan's intention to run at least one or two Pop-up-Shop trials later this year, with whatever stocks from members and the division were available at the time and with the aim of providing a diversity of choice for the public.

Could you help in some way ?

No need to answer yes to all, but ...

1. Would you be interested in selling your excess honey at the end of this season through this facility ?
2. Would you like to take part in developing this initiative as it is being established ?
3. Would you be prepared to man a pop-up-shop sales outlet in your locality from time to time ?

Your responses to these three questions would be welcome to establish this project's viability.

Please respond directly to Alan ...

In person: during a club night at Henfold

By email: alan.berridge1@btinternet.com

South of England Show Report

by **Richard Bradfield**

The Bees & Honey Show at the South of England Agricultural Show at Ardingly, is an annual event organised and run by a volunteer committee drawn from a number of southeast England Beekeeping Associations and Divisions. For many years, significant players in that team have been Reigate members **Eddie & Marion Webster** and **Pauline** and the late **Robin Sparkes**. Earlier this year Pauline & Eddie managed to persuade **Maggie Minter** and **Richard Bradfield** to become full members of the committee, along with ex-Reigate and now Croydon member, Bob Barnes; to help fill roles vacated by others who had stood down from the committee.

Due to uncertainties prior to the co-option of the 'newbies' about whether the Honey & Bees event could even take place this year, planning for and publicity about the Show and Displays was a little late in starting.

A full list of placings in the Honey Show Classes is provided on the Members Website, but there were some notable victories for Reigate Members to also include here !



But it all came to together for the three days, of 9th -11th June. With reasonably full show benches, a well stocked sales stall, trade

stands, information displays, two observation hives, frame making and hourly live beekeeping inspection demonstrations ... all providing plenty of interest.



During the three days, over eighty beekeepers served as Stewards in the marquee; helping on the stalls, stands and with the demonstrations. Amongst them were Reigate members **Mollie Bonnard, Alison Payne, Maggie Bourne** and **Janet Jones**.



Also busying themselves were Roger Paterson (Live Bee Demo's), Norman Carrick (Frame Making) and Diane Roberts - BBKA Press Officer (doing a turn by an Observation Hive)



The marquee proved to be a very popular attraction throughout the three days. And the frequent demonstrations were particularly well attended; always with members of the public eager to be kitted up in a bee suit, wellies and gloves for a close-up and personal hands-on experience, under the careful guidance of the demonstrators.



For one newbie committee member, an unexpected consequence of taking on the role of Information Officer was to be volunteered to do a live interview with Redhill Radio. Whoever said beekeeping was a gentle leisure pursuit ?

D H Wilkins Perpetual Challenge Cup

to **Maggie Minter & Celia Perry** for their winning joint entry in Class 1 - Bounty from the Hive.

South of England Honey Perpetual Challenge Cup

to **Maggie Minter** for most points in the Honey Classes.

Class placings for Reigate member entrants:

- Class 1 Bounty of the Hive
1st **Maggie Minter & Celia Perry**
2nd Jenny & **Pauline Sparkes**
- Class 3 Two 1 lb Jars, Medium Honey
1st **Maggie Minter**
- Class 10 Photograph related to Beekeeping
1st **Bob Maurer**
2nd **Richard Bradfield**
- Class 11 Cake of Beeswax
1st **Bob Maurer**
- Class 12 Novice: One 1 lb Jar of any Honey
1st **Maggie Minter**
- Class 13 One Bottle of Dry Mead
1st **Maggie Minter**
- Class 14 One Bottle of Sweet Mead
1st **Maggie Minter**
- Class 17 One Pair of Beeswax Candles
1st **Maggie Minter**
- Class 22 Three Pieces of Beeswax
1st **Bob Maurer**
- Class 23 Honey Biscuits
1st **Ray Turner**
2nd **Liz Diprose**

Thanks to **Pauline** for the inspiration and encouragement to organisers and participants alike to keep the show going - as Robin would have wished.



End of Season Supper & Boule Bash

Our last regular evening summer meeting at Henfold Copse for this season will be on ...

Wednesday the 31st August.

After that meeting, to mark the occasion an 'End of Season Supper' of a buffet meal will be awaiting us at ...



The Six Bells in Newdigate from 8 pm.

This year, subject to weather, the sporting diversion from beekeeping will be team participation in a Boules competition.

To book a buffet meal and your place on a Boules team, enter your name(s) on the End of Season poster displayed at Henfold or contact **Andrew Buchanan** direct by email or phone. (See Chairman's Chat).

You will also need to cross Andrew's palm with £10 before the day to cover the cost of each meal booked (drinks not included).

Want to know what Boules (or Pentanque) is about, and how it at least should be played ?

[Click here for some basic rules.](#)



There is of course no guarantee that these will bear any resemblance to the rules we actually attempt to follow, or end up using, during the evening !

Book soon to avoid disappointment.

Reigate Beekeepers Honey Show

Our Show is on **Saturday 9th October.**

The **2016 Honey Show Schedule** with full details of classes, rules, recipes and entry instructions has been finalised by Show Secretary **Celia Perry**. It is circulated with the email notification of this **BeeNews** edition and can also be [downloaded](#) from the Members website.

To register your Show Class entries, use the simple on-line system via our website ... or:

<http://tinyurl.com/ReigateHoneyShow2016>

This year, the Microscopy class (22) sets the challenge to prepare and provide a slide with the subject: 'Honey Bee Anatomy'. But you will need to get a waggle on. The entry closing date for this class is the 27th of this month (August).

An entirely new Class this year (23) is 'A Skep of any size made by the exhibitor'. So let's at least be seeing all the finished articles from the June Skep Making workshop being entered.

For the children, Class 24 is looking for creativity in making a model of a Queen Bee ...

... and the Queen Bee just happens to be an overall theme for this years public show. Displays, information and stalls are being masterminded by our other Show Secretary **Maggie Minter** who will be looking for volunteers to help produce another excellent show this year.

See the website posts for more information.

The National Honey Show

Another opportunity to enter into County, National and even International Honey Show competition.

The NHS runs from **Thursday 27th to Saturday 29th October** and also provides a broad spectrum of excellent lectures and workshops.

The Trade Hall (with free entry) also has many of the major equipment suppliers represented, providing an excellent opportunity to start to get ready for the 2017 season.

This year the show is setting up in an entirely new venue ... Sandown Park Racecourse, Esher and promises to be bigger and better than ever.

The NHS Competition Schedule is due to be published during August and also has a new class for 2016: 'Skep'.

So in addition to entering all your RBKA entries of Honey etc. into the National ... those skeps can have a second airing in the same month.

There are also opportunities to help directly as a Steward during the event.

The latest [NHS Newsletter](#) (published in June) provides more information, and the NHS website www.honeyshow.co.uk will be the place to go during August for the show schedule and entry forms as well as for the full lecture program and booking details.

Summer BBQ Party Report

A very pleasant time was enjoyed by a good number of members, partners, family ... and pets down at Henfold Copse during the evening of 30th July at the Summer BBQ event.

An array of BBQ's were fuelled up, fired up and smokin' well by 7 pm. They provided ample room for everyone to be cooking their burgers, bangers, steaks or chops, either to their personal taste, or their ability !

An assortment of prepared salad dishes that had been brought to share were served from within the pavilion, as also was a dangerously delectable range of deserts.

All of which was washed down by beverages of choice, with tea and coffee also being readily to hand from the pavilion kitchen.

But perhaps the two most significant elements of the evening had to be the tranquillity of the copse itself and the jolly good company we all found ourselves in.

Thanks are due to **Andrew Buchanan** for organising it ... and us.



Adult Bee Disease Clinic - Saturday 6th August

This will be in operation at Newdigate Village Hall, alongside the Extraction Day team.

Bob Maurer's team of sample preparers (bee grinders) and microscopists will be on hand to examine sets of samples of bees from your own hives, as well as from all of the Divisions hives, for *Nosema* sp.

Time permitting, testing for acarine may also be undertaken, so members can see how it is done.

[Click here](#) for advice about how to take samples of your bees.

The testing charge is £1 per colony for the first five colonies and 50p per colony after that.

Volunteers will be welcome and needed on the day to prepare samples for testing.

Get your samples to the clinic by ...

1. Delivering them directly to the clinic in Newdigate Village Hall on the day, 5th August from 10 am (until 2 pm).
2. Bringing them to the Henfold Copse meeting on Wednesday 3rd August.
3. Supplying them to a willing member who will be delivering their own samples somehow.

If you are able to assist, and learn, please advise Bob either at a Henfold meeting, or
mob: 07740 707500
email: bob@maurer.uk.com

Apiary News

Henfold Winter Team Recruiting

We are seeking volunteers willing to be put on the Winter Team mailing list. The Winter Team will meet at Henfold every few weeks at weekends during the winter months.

Come and see what happens in the apiary in the Winter and maybe get some useful tips on managing your own hives through to the Spring.

Hive hefting, woodpecker protection, mouse guards, feeding and varroa treatments were some of the essential tasks that previous years Henfold Winter Teams deployed to bring the hives through the Winter ready for a Summer of educational beekeeping.

by Simon and Karen Ford

We will be meeting on Saturday or Sunday mornings, depending on your availability and the weather. Don't worry - there is no obligation. All we want is your email address so that we can tell you when we are next meeting and you can then decide if you want to come along.

You can email us about any of the above activities, or about any other Henfold Apiary matter using the following address:

hamt3612@gmail.com

Karen and Simon,
Henfold Apiary Managers.



2016/17 Winter Programme of Talks

A range of talks and presentations have been arranged for this coming Winter's Meetings at the Woodhatch Centre.

Held on the 1st Wednesday of the month (except for November when it's the 2nd Wednesday), doors open at 7pm and all meetings commence at 7:30pm, concluding by approximately 9pm with tea, coffee, biscuits.

September 7th	Celia Perry	-	The Asian Hornet	
October 5th	Pam Hunter	-	Pheromones	
November 9th	AGM and Awarding of Trophies and Certificates			
December 7th	Geoff Blay	-	Henfold Honey	
January 4th	Celia Rudland	-	Communication in Honey Bees	
February 1st	Adam Leitch	-	Bee Anatomy	
March 1st	Fun Event	-	Details to be Finalised	

Woodhatch Community Centre, Whitebeam Drive, Woodhatch, Reigate, Surrey, RH2 7LS

Extraction Day 2016



Extraction of honey from the club's supers is planned to be undertaken during **Saturday 6th August** in Newdigate Village Hall.

Members are needed to help during the preceding Friday afternoon/evening (5th) with 'set-up tasks' that include:

- Remove supers at Henfold.
- Deliver supers and equipment from Henfold and our other apiaries to the hall.
- Prepare and set-up equipment in the hall.

During the Saturday, experienced hands are needed to run each work station in the hall and lots of help with numerous other tasks.

We also encourage new members to come along and learn how to extract honey.

All offers of help and participate to **Andrew Cornwall** please.

Either [send an email message](#) or add your name and contact details to an 'Extraction Event' booking sheet at Henfold.

Surrey Training Day

The Practical Side of Beekeeping Saturday 3rd September 2016

Demonstrations of some of the common beekeeping manipulations by **Bob Smith** and **Phil Shepherd**.

Including

- Artificial swarm control (Pagden). This is the basis of all swarm control techniques and once mastered can be adapted to suit personal preferences.
- Uniting two colonies. Following an artificial swarm it is often necessary to unit the two colonies back into the original hive.
- How to introduce a new queen into a queen-less colony.

Lunch break - a light lunch will be provided

- Shook Swarm. A great technique for replacing old comb, disease control and for swarm prevention.
- Bailey Comb Change. A gentler alternative to the Shook swarm.
- Fun Quiz (with mystery prize) followed by Q&A.

The first part of each slot will be spent explaining why and when the technique is appropriate and the second half on the 'practical' demonstrations. Many Beekeepers are overwhelmed with conflicting advice. Our aim is not to discuss all the different options available, but to offer simple solutions that members can take home and use next season. We will email out some simple notes (step by step guide) for each topic following the session.

All the equipment required will be on show.

To book your place, please see below.

£15 for Surrey members, £20 non-Surrey - under 18 free

- Venue - Ashley Primary School, Ashley Road, Walton-on-Thames. KT12 1HX.
- Time - 10am doors open - 10.30am start. Close 4pm
- Bookings - contact Sandra Rickwood at [rickwoodsba@gmail.com](mailto:r Rickwoods@rickwoodsba@gmail.com) or telephone 01932 244326.

Education News

Basic Assessment - Results (so far)

Congratulations to those who took their BBKA Basic Assessments during July, and for whom results have been confirmed by the BBKA.

(A mark of 50% or more is a Pass and 75% or more is a Pass with Credit)

Andrew Carne	Pass
Jennifer MacDonald	Pass
Jim Tadd	Pass
Richard Bradfield	Pass with Credit
Fiona Scott	Pass with Credit
Peter Scroggs	Pass with Credit
Sophie Turner	Pass with Credit

Jennifer adds her achievement this year to the Junior Assessment earned last year.

There is one remaining result awaited from the BBKA.

BBKA Microscopy Certificate Exam

The last day of August is the closing date for registering to take the BBKA Microscopy Certificate Exam this year on or around the 19/20th November.

Completed entry forms need to be with **Celia Perry** by the **24th August 2016** please.

Fees need to also be either paid by cheque supplied with the entry form, or have been paid direct to BBKA and a receipt number quoted on the entry form.

P.S.

Budding Microscopists ... note that the deadline for Honey Show entries into Class 22 (One microscope slide 3" x 1" prepared by the exhibitor subject honey bee anatomy) is the 27th August.

Equipment News

Jars, Lids & Varroa Treatments + Extractor Hire

Your supers have hopefully been filling up with honey, and winter treatments and feeding of your colonies should be being planned.

So ... do not hesitate to place orders with our Quartermaster, **Phil Elwell** as soon as possible for:

- Honey Jars
- Lids
- Booking the Hire of one of our Extractors
- Varroa Control Treatments, eg:
 - Apiguard
 - Oxalic Crystals
 - Acetic acid
- Fondant
- Pollen Substitute

Orders placed via RBKA, delivered to Henfold in bulk for collection from Henfold by yourself avoids any shipping charges ... a BIG factor when buying glass jars.

ALSO, don't forget to be planning what jars and lids you need for entering your honey into our Honey Show in October AND the National Honey Show in November.

A full list of items able to be ordered can be found on the Members website [here](#).

To take advantage of this service, please either

- collect an order form from Henfold Copse apiary on a Wednesday evening
- download a form from the web site [click here](#)
- or use the online form [here](#).

Completed order forms need to be returned or submitted with full payment to **Phil** by no later than Wednesday 10th August.

Orders received after this date or without payment will not be processed.

All orders will be delivered to Henfold and will be available for collection from the apiary by Wednesday 24th/31st August.

Honey Extractors

The Division has four extractors - (two 9 frame electric, one 9 frame manual and one 2 frame manual). They are available for weekly hire at a cost of £10.

Contact Phil to book on a first come first served basis -

Tel: 01306 711831
Mob: 07802 632324
Email: phil.elwell@outlook.com

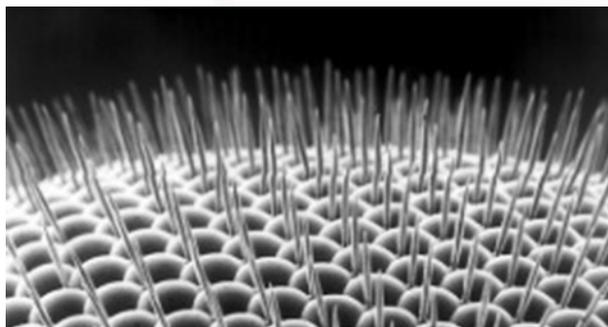
Question - How Do Bees See and What Do They See ?

The honey bee has two compound eyes and three simple eyes. They need all of them to achieve their tasks. And they see images very differently to humans.

Compound Eyes

Like most other insects, the honey bee has compound eyes. Their compound eye is not called that because it is complex (although it is). It is 'compound' because it is comprised of many single eye units synthesized to make one composite eye. (The word 'compound' comes from the Latin word 'componere', which means 'to put together'.)

The hundreds of single eyes (called ommatidia) are arranged next to each other, each with its own lens and each looking in a different direction. This does not mean that the bee sees lots of little pictures, because each ommatidium sees only one intensity, contributing a 'pixel' to the overall image perceived by the compound eye, just like a single photoreceptor in the retina of our own eye.



In the picture above, each round hump is a separate eye unit (photoreceptor cell). Each unit sends its view of the image to the brain of the bee. The brain combines all the images of thousands of eye units, and forms a detailed picture of its subject.

Notice the hair strands between each of the plates of the eye. These hairs aid in determining wind direction and flight speed of the bee.

But there are differences between the bee's view of the world and ours. The bee has a lot fewer ommatidia than we have photoreceptors, and they are not evenly spaced.

Another aspect of the honey bee's eye compared to the compound eyes of other insects is the ability of the bee to see colour.

Simple Eyes

The honey bee also has three simple eyes called 'ocelli', which comes from the Latin word 'ocellus' which means 'little eye'.

Calling them 'simple' does not imply that they are not complex, they are far from that. The ocelli of the honey bee is similar in design to the human eye due to its single lens.

They are used for navigation and for maintaining stability in flight.

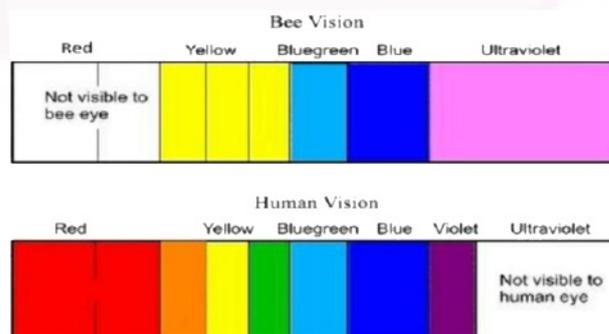
It is interesting to note that they are laid out on top of the head in a triangle pattern. Whether this feature helps them to navigate by triangulating their position against the sun is not known.



The ocelli are light-gathering phenomenon that can see ultraviolet light. (Seeing UV light has great benefits because it penetrates cloud cover.)

Honey Bees' Vision Range

The vision range of the honey bee is very different to that of our own, as indicated by the chart below.



As already mentioned they are able to see UV light, but unlike us do not see the colour red.

This alters the images that they see compared to how they would appear to us, as indicated by the photo simulation below.



Human's Image

Bee's Image

It is believed that honey bees can see images in extreme detail when closer than 3-4 feet.

They see colours differently, and rely more on image motion than on shapes, but have additional vision capabilities.

Research has shown that bees estimate the speed of motion, or optic flow, of the visual world around them and use this to control their flight. Honey bees are excellent navigators and explorers and use vision extensively in these tasks, despite having a brain of only one million neurons (human brain's have 100 billion).

Bees use optic flow to navigate and fly down a corridor. How a bee moves determines what features in the world it sees. This explains why bees are confused by windows - since they are transparent, they generate little optic flow as bees approach them.

(Understanding their use of optic flow and how bees avoid walls, and what information they can use to navigate, is being used by researchers and designers to greatly enhance the performance of autonomous flying robots.)

Their compound eyes are especially adept at 'locking on' to anything that is moving quickly.

Like a heat-seeking missile, when a honey bee sees a fast-moving object, its attention is 'caught' and an alarm goes off triggering the honey bees' colony protective instincts.

We often hear experienced beekeepers hark on about the importance of slow and careful movements in the apiary. Their two large eyes see your every move, so remember..... Slow and Careful when handling your bees!

courtesy of various sources

Question - How Do Bees Learn ?

Inheritance plays a major role.

Where bees differ from humans - (actually, where most animals differ from humans) - is that we are capable of very little without learning, while animals are capable of quite a lot. Bees perform many activities by instincts, they are 'hard-wired' to do so. These instincts developed in bees through evolution.

Bees have a complex social structure and behaviours. Their roles vary with their age (house bee, nursing bee, queen attendant, guard bee, forager - for nectar, for pollen, for water or for propolis). They make decisions as a collective (e.g. 'let's make a new queen' or 'we think we should swarm'), and know how these decisions affect their individual behaviour (e.g. 'I need to take this young egg and put it in a queen cell'). And they learn by communicating with one another (e.g. 'there's a source of amazing nectar flow about half a mile, 30 degrees left of the sun').

Many of these behaviours are not learned by a bee, they are encoded into the bee, the bee is born with the knowledge.

Bees do obtain further knowledge in several ways - learning from experience (trial and error), and through communication with others.

A bee's sense organs provide the essential link to the environment for both learning and communication. The sensory world of the bee is adapted to make use of the signals transmitted by flowers (colour, shape, and smell). They collect information through taste, touch, sound, temperature, speed, magnetism, humidity, and even carbon dioxide.

Bees learn how to find their hive when they come back from foraging. Bees transitioning into foraging bees go out on short 'orientation flights', where they scout the area of the hive to make sure they recognise it and will be able to come back to it later. Bees learn the unique smell or pheromone composition of their hive, which they use to find their hive and identify their fellow hive-mates, and to forbid foreign bees entering, when they act as guard bees.

These are things bees are hard-wired to be able to 'soft-learn', but the social behaviours are completely set.

courtesy of Tal Reichert

Bees and Flowers - An Intimate Relationship

As an introduction to a new series featuring 'Bee Friendly Plants' we consider the relationship between bees and flowering plants.

Flowering plants have been around for a very long time: they evolved in the Cretaceous period, some 140 million years ago and became widespread about 100 million years ago.

They are a very successful and diverse group, dominant throughout the world and colonising virtually every habitat from deserts to mountain tops, arctic wastes and tropical forests, lakes and rivers, and even a few species in the oceans.

Bees appeared, in the evolutionary scheme of things, a little later than the flowering plants and, although not many fossils of bees remain, the earliest one found so far has been dated at about 100 million years old. Although it still had some wasp characteristics, it also had plumose (branched) hairs, which are specific to bees.

The earliest bees were solitary and it took some time for sociality to develop. The essential fact is that just about the time that the flowering plants began their bid for world domination, bees also were developing and this led to the formation of a very intimate relationship which persists to the present time.

The Role of Pollen

The huge advantage that flowering plants, (and conifers incidentally) have over other groups of plants, was the evolution of the pollen grain as a means of transporting the male sex cells (gametes).

This structure protects the important tiny cells with a hard coat, so that they can be transported over sometimes, huge distances and hostile environments and still retain their viability. This frees the plants from a dependence on moisture at some stage in their life-cycle.

At this point it is important to consider a little simple genetics. Most flowers have male and female structures. The male structures are anthers and produce pollen grains containing the male gametes, the female structures are ovaries, containing the female gametes, and stigmas which are receptive to the pollen.

Such a flower can produce seed, (from the female gametes) using its own pollen or pollen from another flower on the same plant. This is called self-pollination and is very common.

The problem with this system is that the offspring show very little variation and the ability of the plant to evolve, and eventually form new species to be produced is reduced. So many flowers will not accept pollen from the same plant, but need to get it from another plant of the same species and we call this cross-pollination. Here the offspring will show variation, the fitter specimens will survive and the species may gradually evolve.

Pollen Movement

The plant's problem now becomes a logistical one of getting pollen from one plant to another. The early plants, and many alive today, used air currents (anemophily) to waft enormous amounts of light pollen about, in the hope that some of it would land on the right stigmas. However, using an insect visitor to transport the pollen (entomophily) works even better, with less wastage of pollen and more targeted recipients and many plants developed this method. Some flowers e.g. *Salix caprea* and *Tilia spp* employ both methods (ambophily).

Insect-pollinated flowers have to advertise themselves so they are large, brightly coloured and/or scented. Small flowers may be built into inflorescences, and occasionally other attractants may be used. Orchids of the genus *Ophrys* attract males of specific species of wasp or bee to them by their resemblance to the females of the species and their pheromone-mimicking scents. Such dependence on one species is efficient but can lead to disaster if the population of the insect crashes. In general, once attracted the insect must be rewarded with food: pollen and, in some cases, nectar, a sugar rich secretion which is given in exchange for pollinating services.

Bees and Plants

Bees have two great advantages over other insects regarding pollination:

1. All bees are covered with plumose hairs which trap pollen grains.

2. Bees (almost without exception) feed entirely in larval and adult stages, on the products of flowers: pollen and nectar. The nectar provides energy while pollen gives them protein, fats, vitamins and minerals. All of which are essential, particularly for the growth of larvae.

Honey bees have even more advantages:

- There are a lot of them and their colonies are perennial. Compare this to small bumblebee colonies and to the solitary bees which are about for usually only a small part of the year and where numbers are limited.
- The bees in a colony can communicate with one another and, once a good source of pollen or nectar is found, others will be recruited rapidly and the bees will stay with

this one type of flower until something better appears. This is clearly a big advantage for the plant.

- They are generalist pollinators and will use any flower from which they can get nectar and / or pollen.

Honey bees cannot however, use all flowers and there is some division amongst the various types of bee, (and other insects), much of which is based on tongue length. So some bumble bees have longer tongues and can reach into deeper flowers, such as comfrey, whereas our honey bees are limited by a tongue length of about 7.5 mm.

courtesy of Celia Davis Warwickshire BKA

August Forage

Trees

- Sweet chestnut, they've started dropping their flowers but some are still flowering.

Shrubs

- Buddleias, although commonly known as the butterfly bush, bees love it too. There are several varieties which include White Bouquet, Pink Delight, B. weyeriana Sungold and Golden Glow. Buddleia Davidii is now classified as an invasive alien!
- Californian lilacs, ceanothus Autumn Blue and Gloire de Versailles
- Hebes, again there are several varieties.
- Hydrangea paniculata Pink Diamond and many other varieties, those with heads of flat flowers being the easiest for bees to access.
- Mallows, these occur as Lavateras and Malvas, again of many varieties existing as annuals, biennials, perennials, sub shrubs and shrubs.

Annuals and Biennials

- Campanulas
- Dianthus chinensis, Baby Doll Series
- Pelargonium, Orbit Series
- Petunias
- Salvias

Perennials

- Asters, many varieties which attract bees.

- Dahlias with open centres such as Clair de Lune, Curiosity, Preston Park and Bishop of Llandaff.
- Echinops, both blue and white varieties attract bees, but the blue varieties seem hardier.
- Erysimums or perennial wallflowers Bowles Mauve and the yellow Fragrant Sunshine
- Geraniums, cut back when their first blooms are dying and they will usually flower again.
- Heleniums, many varieties, amongst them Bressingham Gold, Butterpat and Wyndley Inula magnifica.
- Oregano
- Sedums
- Solidago, commonly known as golden rod.
- Veronicas
- Veronicastrums

Wild Flowers

- Birdsfoot trefoil attracts bees but invasive.
- Evening primrose
- Great willow herb (epilobium hirsutum), much more attractive and easier to control than the common willow herb variety (epilobium angustifolium).
- Himalayan balsam, bees enjoy this, but it is now recognised as an invasive non-native plant, (eradication methods are ineffective).

courtesy of Ann Jones Farnham BKA