

Asian Hornet The Beekeepers' Guide - Part 4 - Integrated Control in the Apiary



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Presented by Andrew Durham – Cambridgeshire Beekeeper

Note: This presentation extract is part of a talk “Asian Hornet – The Beekeepers’ Guide” which is delivered to BBKA Associations (see BBKA Speakers List). These notes have been specially prepared, with additional slides, as a resource for BBKA Associations.

Photographs are included in the pdf version in high definition and readers can zoom in for more detail.

Integrated control is all about using a combination of the right measures at the right time. You may not have to use all of them. You must assess the level of threat, carefully observe what is happening in the apiary and be ready to match your response to it.

Asian Hornet – The Beekeepers' Guide

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Section 4. The Five Elements of Integrated Control in the Apiary

Apiary Environment

Reduce the **Stress** of predation

Reduce the **Level** of predation

Defend the Hive

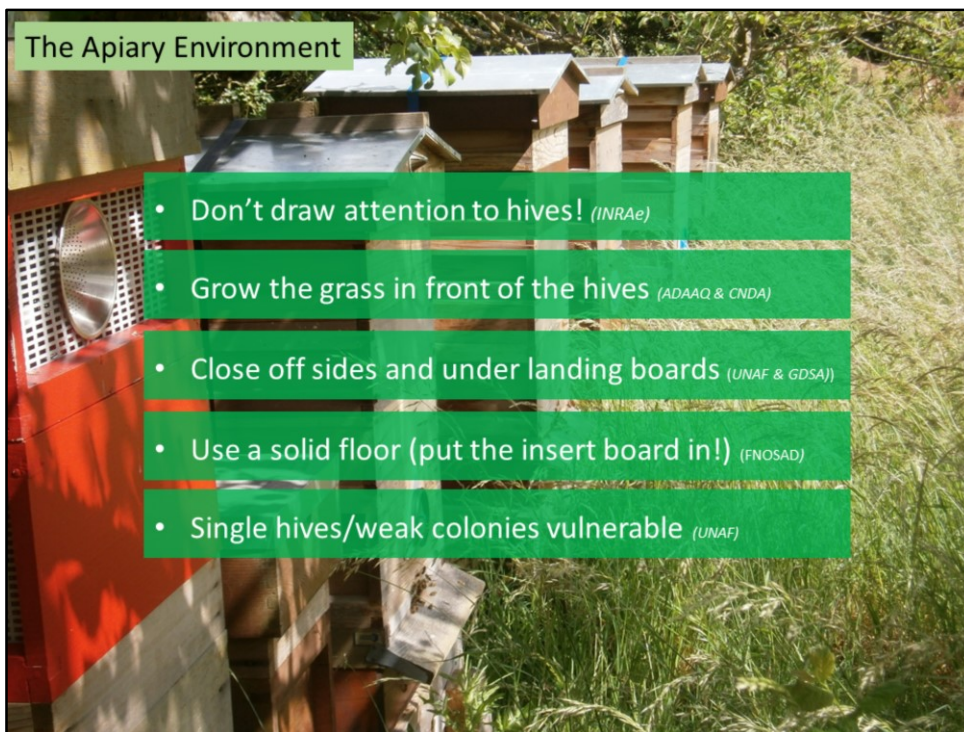
Manage the Situation

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In this 4th and last section – We are going to look at a range of methods developed by the French beekeepers to deal with the hornet.

There are five quite distinct elements to integrated defence in the apiary:

1. The first concerns the apiary environment, making it work for the bee not the hornet
2. You must act to reduce the stress on the bees because it is the hidden killer
3. Remember many hornets are returning to the apiary, so we need to reduce the level of predation
4. There comes a point when the hornets may mount a direct attack on the hive
5. As beekeepers You are going to have to manage the situation if your bees are going to survive



There are things you can do in the apiary to help your bees

- The hornet is attracted to the apiary by olfactory clues. Do not draw attention to the apiary by leaving hives open, leaving out frames, extracting honey nearby you will attract the hornets
- You can spoil the hornet's hawking in front of the hive and give the bees a better chance of making it back to the hive by giving them somewhere to hide. Let the grass grow a metre away from the front of the hives.
- Remove some of the hiding places in front of and at the sides of the hive that the hornet likes to use to ambush bees returning to the hive
- Use solid floors or put in the insert board on OMF's during the period of predation and close off any gap. It helps to reduce the olfactory clues and you don't want hornets immediately under an OMF, it stresses the bees.
- It pays to group hives and spread the pressure from predation – 5 is considered to be a minimum grouping

Reduce the Stress of predation

Attributed to André Lavingotte

La Museliere (muzzle)



Use a 10mm –
12mm mesh
size



Use of the “museliere” is endorsed by INRA & UNAF.
Journal of Pest Science paper 2019 –
>40% reduction in foraging paralysis

Photographs by kind permission of Kourosh & Amelia
“A French Garden” (Beekeepers – Loire)

This is one of the most important defences against the hornet, La museliere or the muzzle is proven to reduce the stress on the bees and helps maintain foraging

The original 6mm square mesh first used by beekeeper Andre Lavingotte, it's inventor, was good at keeping the hornet out but it takes the bees too long to get through, they can get picked off on the mesh and the mesh itself restricts foraging. Bees under predation fly in to the landing board at high speed, they need to get to the safety of the guard bees as quickly as possible.

The minimum mesh gauge is now considered to be 10 mm sq and even up to 25mm sq works. It is much easier for the bees to get through and does not pose the same restriction.

The hornet can get through the larger gauge meshes but in practice it doesn't; not until much later in the season when the museliere's job is largely done



Easy to make – if you want plans – go on-line search Frelon Asiatique Museliere, look at “images” and you’ll find lots of plans

The Shield – “Bouclier – Stop-It”
(BBKA News February 2019)

Frédérique Ripet -
Beekeeper (Agen)



www.icko-apiculture.com
www.stop-it.fr

Photographs provided by Frédérique ...

There are lots of variations on the museliere idea, such as this one called the Stop-It shield

Frederique came up with the idea. I really like it but I have found it does take time for the bees to get used to it so put them on early.

Frederique tells me that she only does spring trapping and puts her bouclier stop-it's on her hives.

Even in the heart of hornet country, beekeeping goes on.



Just some thoughts on the Stop-IT. If you put one on a national hive with a landing board you will create a sharp angle corner that confuses the bees (see top-left photo). Pin the bottom bar off a frame under the Stop-It so the bees don't get stuck and climb up to the hive entrance (see bottom-left photograph)

Reduce the Level of predation in the Apiary

The museliere does not of course stop the bees from being predated as they return to the hive so you need to reduce the hornet numbers in the apiary and the way to do that is to trap them in the apiary. This is not the same as Spring trapping, in the main predation period the apiary becomes a killing ground for the hornets and it's hornets that you get in the traps



Don't start summer trapping prematurely, you do not want the bait you use to attract the hornets until they have found the apiary. Remember from Part 1 of the talk that predation starts in July and slowly builds, with a rapid increase in September onwards.

Trapping may limit hornet nest size early on and of course every hornet trapped is reducing hawking losses in the apiary

What bait should you use?

Baiting traps with live hornets caught in a shrimp net is an INRA recommendation. Nothing beats hornet pheromone as a lure

Some pay a lot for commercial hornet baits, but many beekeepers just use pressed apple juice (must be pressed)

In any event, Beekeepers have a very effective bait available just to them – wax cappings and fermented honey works really well but make sure the honey has fermented



Here we have the prize-winning selective trap funnel invented by Denis Jaffre, the Brittany beekeeper, it has become the selective trap to use in the apiary

You can buy just the funnel or they now make the whole trap – they have sold over 44,000 of their Jaberprode traps and they now have 6 people building them full time

Make your own or buy it and have it shipped over.

Denis's advice to me - Place them with the prevailing wind in mind so the hornet following the olfactory clues finds them first



You can incorporate Denis's funnel into a brood box and put it over a dead hive that still has its combs in it



You can make your own version using a national brood box

From the bottom-left clockwise

Make up the brood box but cut down the inner side panels and fix them to the front/back panels to form slots just behind the two side rails. You'll slide the OMF cut-down sheets into those slots.

Fit an OMF floor sheet to the bottom

Cut down a plastic E H Thorne queen excluder as shown and cut/flatten a catering funnel or similar to form a slot 7mm high (be very careful the edges will be razor sharp).

Insert the excluder as shown



Finish in a nice pillar box red, add a Perspex cover (B&Q)

Place over super or eke with a tray of cappings and fermented honey



The harpe électrique another device invented by beekeepers. Correctly placed, these traps are very effective indeed.

It is a grid of fine wires electrified by a high voltage, the hornet is stunned and falls into a waterbath where it drowns, bees usually just pass straight through.



The Spanish picked up on the harpe électrique and have improved it – they are half the price of the French commercial versions

Dr. Sandra Rojas of the University of Vigo, whom you may have heard at the BBKA AH conference last year, reported on her field trial on the arpa..... And I have recently read a paper by researchers studying the use of the arpa in SE Spain over two years that confirms Sandra's observations

It is a very useful and selective defence in the apiary but it has to be built correctly. The electrical connections need to be good. A high resistance connection can render the harpe useless.



Harpes produced in France are expensive



You can build one yourself but note:

Frame can be made from plastic waste pipe and fittings (B&Q) but that will not be strong enough to support tensioned wires. You need threaded rods (circa 10mm dia). Do not try to use the rods as electrical conductors – it doesn't work well enough.

Stainless steel wire from Amazon 0.5mm dia (allow plenty of extra length for connections – see next slide)

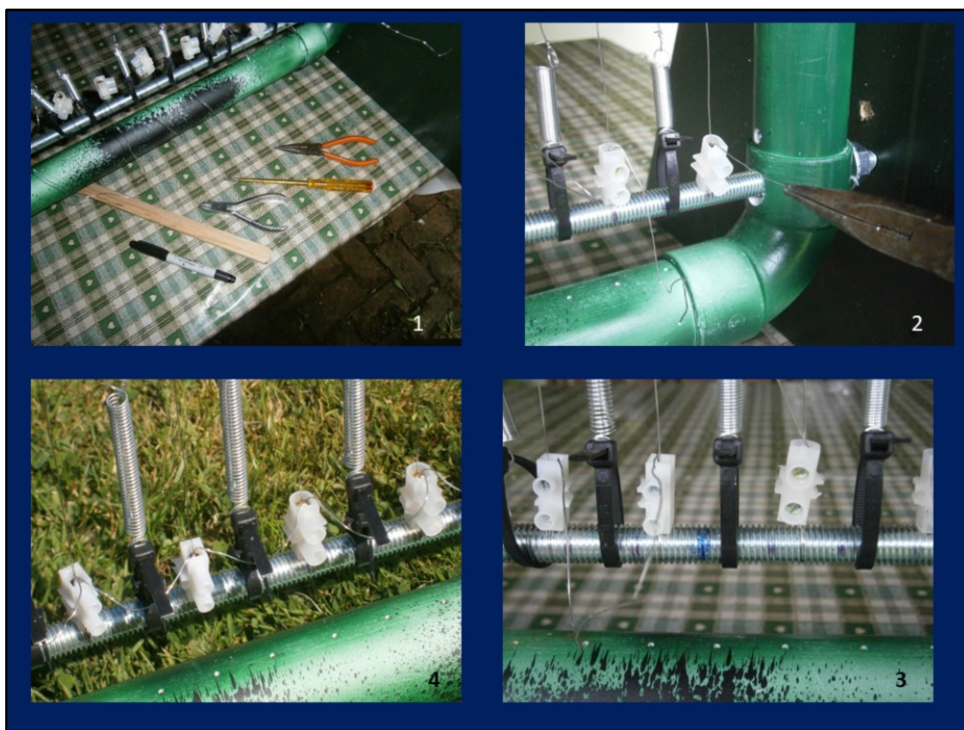
Cable and Springs from Halfords, electrical connection blocks and tie-wraps from B&Q.

You need a couple of 12 volt car batteries – one in use, one re-charging.

You need a 12 volt timer from Amazon

The high voltage generator shown is no longer available and the French ones are very expensive.

See <http://adsa33.over-blog.com/2019/12/plan-d-une-harpe-ou-museliere-electrique-anti-frelon.html> for more ideas but do not try to wire a harpe using one continuous length of wire for either positive or negative – you cannot get the wires tensioned correctly.



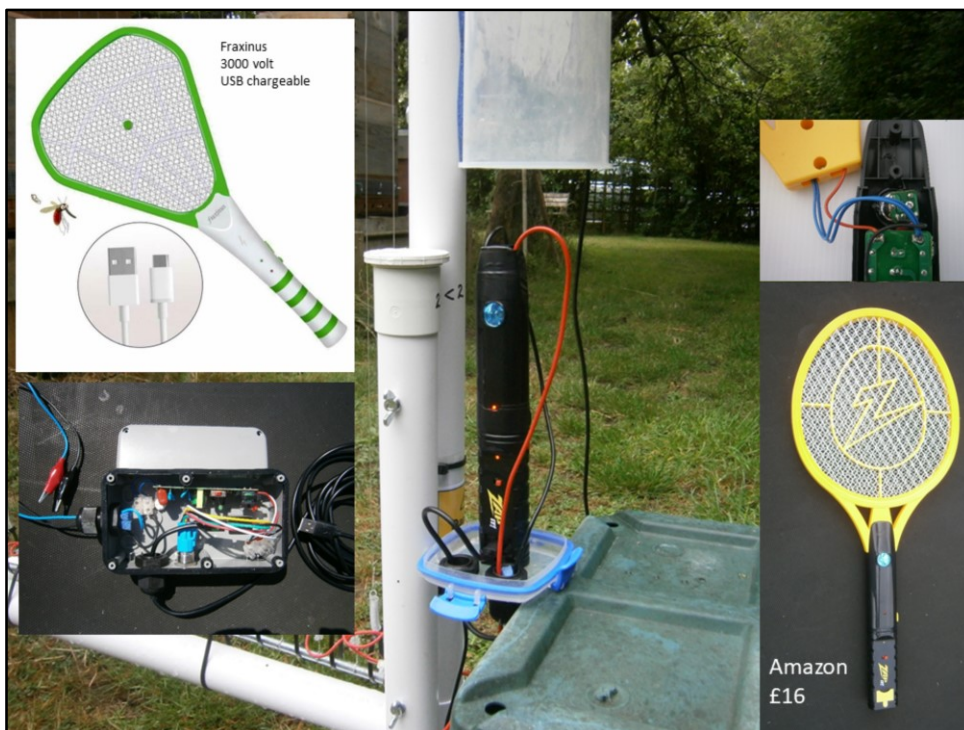
Mark out the rods at 22mm centres (for a 21mm gap) you are going to wire it positive wire, negative wire, positive wire, negative etc

All the positives to the top and all the negatives to the bottom. The tie-wraps are insulators and allow for stretching of the wires, the springs should be extended for 50% of their length – don't over-tension springs. Re-tension using the tie-wrap if the springs close up.

From the bar (alternating top or bottom as appropriate), put the tie-wrap through one end of a spring and then fix tie-wrap to threaded bar (leave enough slack in the tie-wrap loop to tighten it later if the wire stretches and the spring closes up), fix the wire to spring (make sure knot will not slip), bring the wire down or up to the other bar and pass through the connection block, down round bottom/top bar and back up through connection block (leave the loop of wire so that you can move the wire along the bar if necessary), pull wire out at 90 degrees using pliers and hold the tension whilst you tighten the bottom screw (only) in connection block (top right photo) do not cut wire yet and make sure you have 100mm of tail. Do the other wires on this polarity.

Working from one end of the bar, take a tail and routing it under the adjacent tie-wrap (as shown – zoom in to see it close-up), take the tail to the next connection block, doubling it back to form a tight "U" and insert the "U" in the connection block. Now you can tighten the top screw in that block and make sure the screw has gripped the "U" shaped tail. Trim off the spare tail. Continue working along the rod until you have done all the wires in that polarity. Leave the last tail as a "U" and fix a connector block to take the positive or negative wire from the HV power pack.

Use a wooden spacer of 21mm width to check the spacing and adjust tie-wraps / connectors along the rods as required to get the correct gap.



If you want to economise BUT only if you have the necessary electrical skills, you can save money by buying an insect zapper bat from Amazon for less than £20, strip off the paddle, put it in a weather proof container and make your own HV unit. It needs to be one that can be recharged from a 5 volt USB supply that is in turn connected to a 12 volt battery.

Note: I cut the connections to the bat's internal lithium battery so that I know the only power to the unit is from the external supply and what is in the unit's capacitor (that you always discharge before touching any wires by shorting them out with an insulated pair of pliers).

Tap down any push button and switch on the bat. Connect the high voltage feed wires to the harpe and connect the USB lead to the timer and battery. The harpe is now electrically live.

WARNING OF DEATH – THESE WIRES CAN HAVE 3000 VOLTS RUNNING THROUGH THEM. ALWAYS MAKE SURE THE BAT IS OFF AND THE CHARGE IN THE BAT HAS BEEN DISCHARGED BEFORE TOUCHING ANY HIGH VOLTAGE FEED WIRES OR THE HARPE. NEVER HAVE BOTH HANDS IN CONTACT WITH ANY WIRES – AN ELECTRICAL SHOCK PASSING FROM ONE HAND TO THE OTHER CAN ROUTE THE CURRENT ACROSS YOUR HEART AND KILL YOU!

I have had three such units on test last year and the year before, in my apiary – they are powerful and I to say, electrically, very robust.

The USB charging lead needs to go to a “12 volt to 5v USB converter” such as is commonly available on Amazon. You can buy a converter to plug into car cigarette lighter sockets. You will then need to buy a 12 volt car socket of the “cigarette lighter” type and wire it to a 12 volt timer (see next slide) and then via a fused connection to a 12 volt car battery.

Always use a timer, it saves battery power and it protects bats that could fly into the harpe at night.



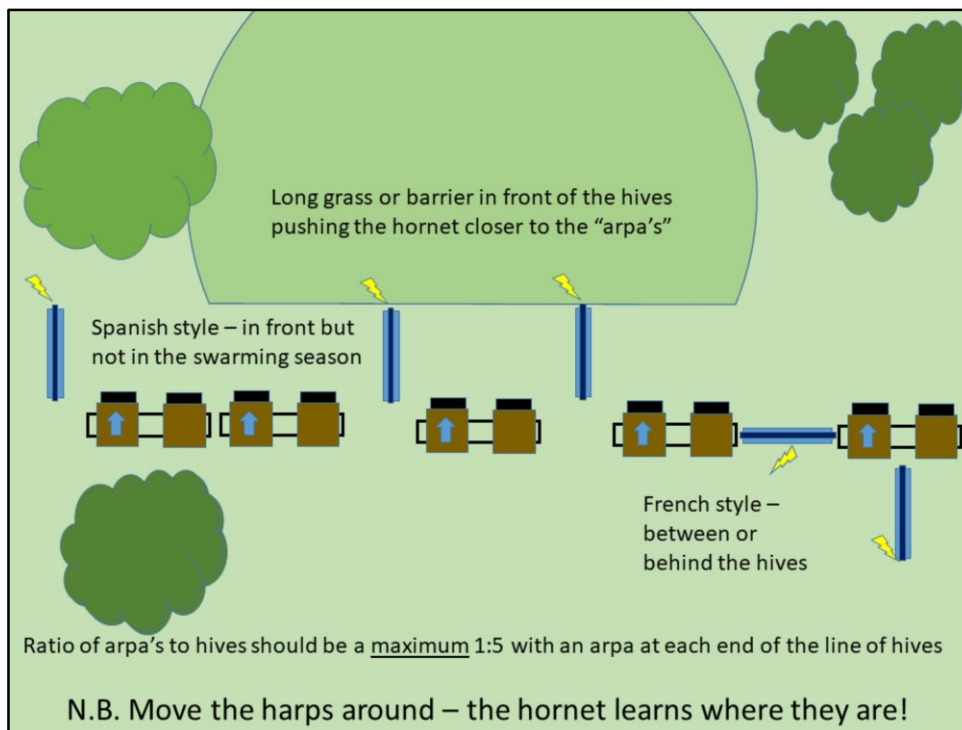
If you have a large apiary, you can use solar power to re-charge the 12 volt battery and run several harpes. You cannot just use solar panels – it does not work with the UK weather.

Note in the photograph, the white 12 volt timer unit – always have your harpes/arpa's on a timer. Note the fuse to the battery. The two units on the left with silver labels are 12 volt to 5 volts converters (from Amazon - from which 4 HV power units are powered for 4 harpes – you can see them plugged in on the far right)

The central unit is a solar panel control unit.

Note the ventilation holes in the rear of the case.

Although you can power multiple harpes off one power unit, it is not a good idea because you get power losses on long cable runs and if a harpe get shorted out, all the others are useless.



How you deploy the harpe (or arpa) is important. The choice is between

Spanish style

- Placed in front of the hives, is more effective but with an increased risk of trapping bees so don't have them out during the swarming season

- French style, puts the harp between or behind the hives – less efficient but safer for the bees

A tip from the Spanish – move the harpes/arpa's around – the hornets learn to avoid them

and Two tips from me – make sure it is on a timer so it is only on during the day and keep the HV power unit away from the hive – not the harp itself but the HV power source



So this is French style with the harpes behind and between



From the back, notice how the power unit on that far green harpe is positioned away from the hives. The power unit for the middle harpe is in a metal box under an empty hive)

The hive just beyond the white harpe is an empty spare hive or I would never position the white harpe's power unit (blue arrow) that close to a hive

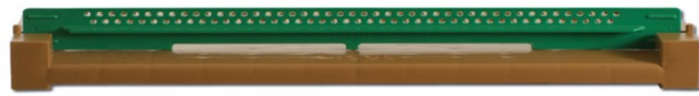
Do NOT put the HV units on or near the hives, the harpes are fine but the "electrical noise" from power units can upset the bees.



This is Spanish style. Notice the long grass creates a zone into which the hornets are channelled towards the hapre/arpa

Defend the hive

0.90€



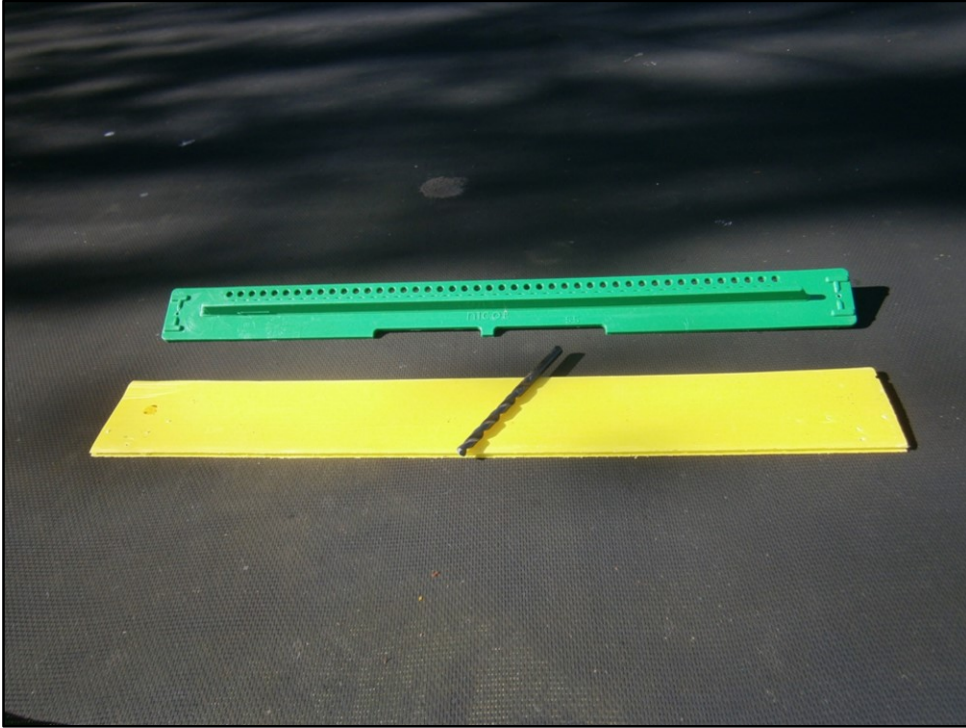
Nicot Hornet Guard 5.5mm entrance restrictor



Remember that in Part 1 I talked about the risk of the hornets making a mass direct attack on the hives any time from September onwards as other prey dies off and they get desperate

A direct attack is foiled by restricting the entrance to the hive to 5.5mm and you need it on the hive even if you are using the museliere

But remember (Part 1 again) that most losses are caused by hawking and the hidden effect of stress on the bees so you cannot just rely on the entrance restrictor alone, which some ill-informed beekeepers still try to do. Get these on as soon as the drones are out or sacrifice the drones and put it on anyway.



If you cannot get a bulk order in for Nicot hornet guards then use some plastic insert board and set the gap using a 5.5mm drill (found in every drill set).

Vita-Europe Api-shield



- Build-quality is an issue
- Hiding places for Wax-moth
- Ventilation is an issue
- Canadian cone escapes need to be regularly cleared of spider webs

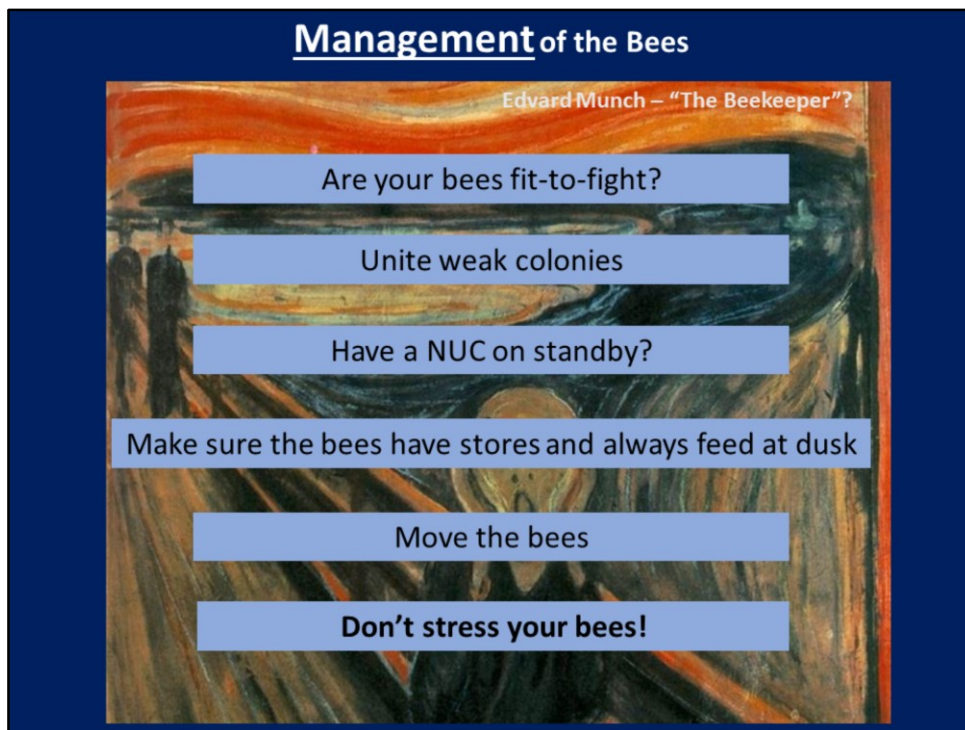
French beekeepers concerned about stress to bees caused by the close proximity of the hornets

Beekeepers ask me about the Vita Europe Apishield. I have five of these and

After 5 years of use in this country, I can certainly vouch for the Apishield's effectiveness against wasps

but there are some problems associated with it. I have had to re-inforce mine. I do not use it directly under the hive, it has too many hiding places for wax moth and if you pull out the top mesh tray you'll never get it back in. I don't think enough ventilation gets in to the hive – do not leave them on over winter. Lastly, the Canadian cone escapes work but quickly get clogged up with spiders' webs.

And French beekeepers are concerned about the stress caused by keeping trapped hornets so close under the bees hence the GDSA recommendation to use solid floors



WE come now to the last element of defence against the hornet and one that is very important indeed - the beekeeper –

Remember INRA's caution in Part 1, these various factors are cumulative. Colonies that are sick or carrying high varroa loads are not fit to fight the Asian hornet.

Weak colonies are very vulnerable – so INRA suggests consider uniting weak colonies before predation starts

You may wish to split a colony to get a standby NUC so you have a queen available to requeen – the predation period is not a good time to have a colony decide to supercede

If the beekeeper has taken off the honey and left them short of stores then foraging paralysis is going to hit them even harder. Remember the GDSA advice to feed your bees at dusk, don't overlook that worker hornets like syrup too!

If predation becomes excessive consider moving your bees to a new location

And remember the one word every French beekeeper uses to describe bees predated by the Asian hornet – STRESSED –

Don't do anything that adds to that stress on the bees during the predation period. Think before you open the hive during the predation period.



Let's sum up (the whole talk) and I am using traffic light colours, red is bad, green is good and amber can go either way depending on circumstances

CLICK – First let's recognise that Inaction and lack of knowledge on the part of the beekeeper are two of the Asian Hornet's greatest allies.

Certain factors are going to determine the scale of the problem you face

CLICK – What climatic zone you live in will determine the degree of infestation you are likely to get.

CLICK – If you are an urban or suburban beekeeper you are going to get more hornets than if you are rural

CLICK – by a river, more than in a wood

CLICK – By far the biggest factor affecting nest numbers each year is the weather. Remember if it's a good year for your bees it will be a good year for the hornet.

Integrated defence is all about putting the right measures in place at the right time.

CLICK – sick bees are in no shape to fight off the Asian hornet (CLICK) so practice good apiary hygiene

CLICK – bees with high varroa loads are compromised (CLICK) so treat for varroa but avoid fast

vapour treatments that stress the colony

CLICK – Make sure that you and any poor practices are not part of the problem

CLICK – Emergence of foundress queens should prompt the start of selective trapping in and around the apiary but only until the end of May

CLICK – Make sure your apiary environment is in favour of the bee and not the hornet and

CLICK- avoid single hives

CLICK – consider uniting weak colonies while there is a flow on

CLICK – The start of predation in the apiary should see a museliere on the hive and

CLICK- the commencement of apiary trapping. // If the level of predation warrants it

CLICK – deploy the harpe electrique

CLICK – Don't overlook the danger from direct attack

CLICK- make sure you have your entrance restrictor in place before September

CLICK – your bees should never be short of stores and if predation is severe

CLICK – perhaps you could move them



Acknowledgements



Museum National de la Histoire Naturelle
Institute National de la Recherche Agronomique
Fédération Départementale des Groupements de Défense contre les Organismes
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Fédération Nationale des Organisations Sanitaires Apicoles Départementales
Union Nationale de l'Apiculture Française
Syndicat National D'Apiculture
La Ville de Lorient
University of Vigo
(and many other French Beekeeping and Research Organisations/Associations)

Frederique Ripet, Dennis Jaffre, Kouroush, Eric Le Bervet,
Randy Oliver (USA), Eugenio Pichel (España)

Les Apiculteurs Français

It just remains for me to thank the French institutes and associations that made the information in this briefing available.

I am particularly grateful not only to the beekeepers named here but also to those other beekeepers who gave their time to talk at markets and whose apiaries I called in on.

Whatever you do, don't start reinventing the wheel, the French beekeepers have done that for you.

If you want the full talk – contact me through the Speakers List.