National Bee Unit

How to make an Asian hornet trap

The Asian Hornet, *Vespa velutina,* is an aggressive predator of honey bees and other beneficial insects. It has recently extended its geographical range from Asia to mainland Europe following an accidental introduction to France, is now also present in Spain and Belgium. Adult hornets are highly mobile; the rate of spread across France is approximately 100 km/year. There is now great concern that this exotic insect will reach the UK, either by hitching a ride on imported goods or simply by flying across the channel. This sheet explains how to make an Asian hornet trap. Hanging this simple device in your apiary will allow you to monitor for pest arrival and, if necessary, help to protect your colonies from attack. These are especially effective if used in spring.

The efficiency of hanging traps

A variety of traps are available for catching adult hornets "on the wing", including Asian hornets. Comparisons of various designs for use against *V. velutina* have shown that funnel traps work best. Although field trials show that these capture considerable numbers of adult hornets (~400 hornets/week/trap), they cannot be expected to reliably eliminate *V. velutina* from an affected apiary. However, they are very useful as a first line of detection, for controlling hornet numbers and limiting damage, so thus have crucial roles in monitoring for arrival and, should Asian hornets arrive in the UK, in reducing impact and spread. Reports from France suggest that in areas where spring trapping has been used, subsequent numbers of Asian hornet nests are reduced by as much as 97% (2 or 3 nests in trapping areas *versus* >70 nests where no traps have been hung).

Trap design

Hornet traps can be purchased over-the-counter, but French beekeepers are frequently resorting to home-made equivalents, like the own shown in the photograph. Most of these share the same basic design: a plastic flask or bottle, containing a food attractant/bait, over which is inverted a funnel; the insects enter the funnel and crawl/drop into a capture chamber from which they are unable to escape. The following design is closely based on that produced and field tested by ADAAQ*

What tools and materials do I need?

- Clear plastic drink bottle with screw cap lid (2 litre) NB. check diameter is as close to 10.5 cm as possible. Most will be 10 cm or less;
- PVC "soil and vent access plug" plumbing fitting (standard diameter 10.5 cm), with removable end cap;
- Disc of wire mesh (diam. 10.5 cm; mesh size ~3 mm)
- A small sheet of wood or plastic (approx 20 cm x 20 cm);
- A piece of wire (e.g. an old coat hanger), (approx 60 cm);
- A small plastic cup or bowl to hold bait mixture;

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- PVC adhesive;
- A pair of scissors;
- A drill with 2 drill-bits, diams. 5.5 mm and 7 mm;
- A sheet of fine sand paper;
- A saw;
- A pair of clippers or pliers.

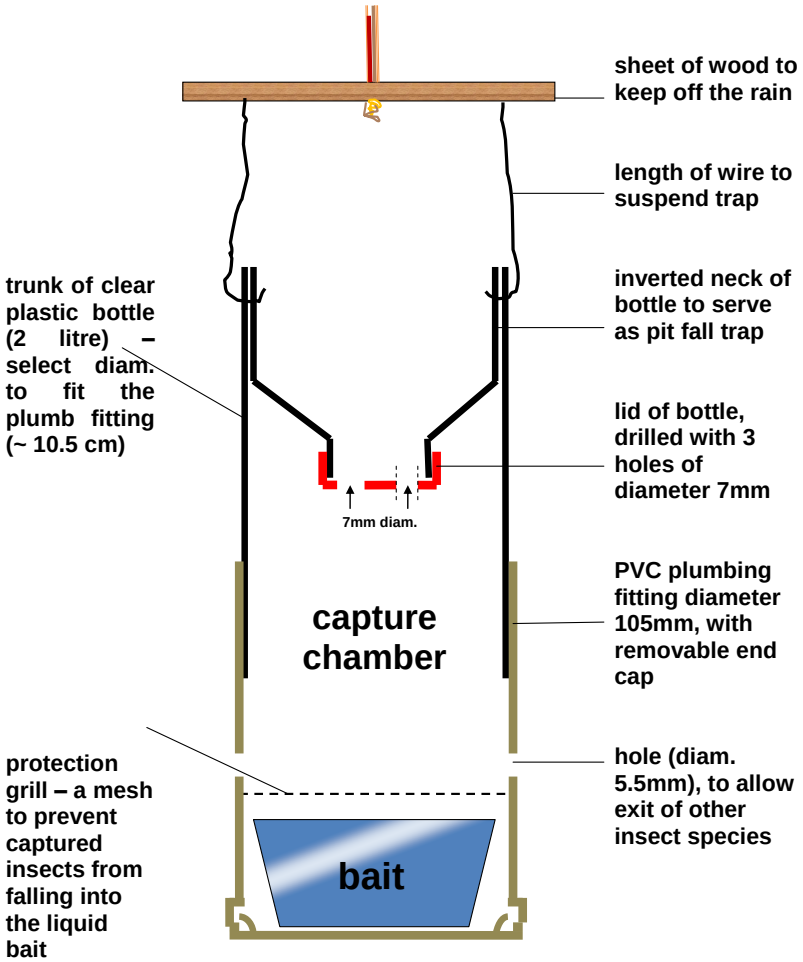
How to make the trap

To make the trap entrance, use the saw to cut the top off the bottle, about 2.5 cm below its shoulder. Using the drill, loaded with the 7 mm drill bit, make three holes into the screw cap of the bottle. Screw the drilled cap back onto the bottle top and fix in place with glue. The size of these entry holes is important as they are just wide enough to permit passage of Asian hornets, but narrow enough to exclude larger native European hornets that may be attracted to the trap's bait.

The capture chamber comprises the body of the plastic bottle and the PVC plumbing fitting. Cut the bottom 3.5 cm off the bottle and discard. Cut the wire mesh into a circular disc (diam.~10.5 cm) and, using a template, place this snugly into the plumbing fitting as shown in the diagram below (protection grill). Glue into place. At 5mm above the grill, drill a ring of smaller holes (diam. 5.5 mm). These will serve as exits for smaller non-target insects accidentally caught in the chamber. Use sandpaper to smooth the inner and outer edges of the holes. Insert the body of the bottle to a depth of 5cm into the plumbing fitting and glue into place. Invert the neck of the bottle, insert into the bottle's body, but **do not** glue into place.

The bait cage consists of the space inside the plumbing fitting formed under the protection grill. The bait cage can be opened and closed by removing/replacing the plumbing fitting's removable cap.

The overhead guard consists of a wooden board or plastic sheet (20 cm x 20 cm), placed 15 cm over the top of the open trap. Suspend the trap itself from the roof using two lengths of the wire, each about 15cm long. Don't forget to make a hole in the centre of the wood through which to put a suspension wire needed to hang up the finished trap.



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Adapting off the shelf designs

Off the shelf hanging traps for wasps and hornets can be purchased from many DIY stores and garden centres. Inexpensive versions may be more cost effective than making your own, but will (i) kill and disfigure all captures without allowing the positive identification needed as we monitor for arrival (remember, Asian hornets are not yet present in the UK); (ii) trap and kill a wider range of (potentially beneficial) insects. Should you chose not to make your own hanging trap from scratch, and would prefer to adapt one that you can buy off-the-shelf, you should make sure that you incorporate the following features:

- Reduced entry hole (7 mm);
- Exit holes (approx. 5 mm) for non target insects;
- Mesh or similar to prevent damage to suspect specimens in bait;
- For ease of observation, capture chamber should be clear & colourless.

What bait should I use?

At the end of hibernation emergent hornets have a raised energy requirement and show a preference for sweet foods. In early spring such food resources are comparatively rare in the environment, so this means that sweet baits are highly attractive for the first captures of Asian hornet queens. French beekeepers often use a mixture of beer and sugar for this purpose. Other effective baits include sweet mixtures of wine, sugar, cassis, and water. You can also by proprietary brands of hornet (wasp) trap bait from many garden centres and DIY stores. At the height of the beekeeping season, when predatory worker hornets are seeking high protein foods, consider adding raw meat or fish to the bait mixture.

Where should I hang traps?

Traps can be hung in trees and on hive stands, in and around affected apiaries, at the height of a person.

When is the best time of year to use hanging traps?

This will vary from one region to another depending on local climate. **The critical life stage to capture is hornet queens as they emerge from hibernation, which is likely to be in late February - March**. **Spring trapping is a very effective means of reducing (>90%) the number of Asian hornet nests in an affected area**. However, adult hornets will be on the wing throughout the beekeeping season, so trapping will still have an effect on hornet numbers right into the autumn. If Asian hornets are ever found in your area, then in early spring you should place an array of traps near the nests of last season to try and catch emerging queens. All beekeepers should consider hanging traps in and around their apiaries in springtime, as well as during the season. In the autumn, it is a good idea to hang traps near favourable hibernation sites, such as wood piles, stones, tiles etc.

How to empty the trap

Before you empty a homemade trap of the design described above, you will need to have with you a transparent plastic bag and a square of thick cloth such as a tea towel. To empty your homemade trap, remove the plastic funnel and quickly place the plastic bag over the open capture chamber. Wrap the cloth around the body of the trap. Any live insects present in the capture chamber will then migrate up towards the light. Any specimens of Asian hornet should be immediately killed, but try to maintain it sufficiently intact to allow expert identification. How to report sightings is described below. Release all other live insects. In order to preserve as many non-target species as possible traps should be visited and emptied regularly; ideally daily. If your trap is adapted from an off the shelf design and you think you have caught an Asian hornet, then you may find it helpful to place the whole trap, unopened, into a freezer bag that you can seal tightly; place the bag containing the trap into a domestic freezer for 12 hours before opening, to avoid losing your suspect specimen.

How do I know if I have caught an Asian hornet?

The Asian hornet is not easily confused with any other species. Superficially similar to our native European hornet (*Vespa crabro*), it has a characteristically brown or black velvety body with a dark abdomen and yellow tipped legs. Only the fourth abdominal segment is yellow. In spite of its fearsome reputation, the Asian hornet is smaller than *V. crabro*. For further guidance on identification, there is an ID sheet for the Asian hornet: https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47 and/or you can visit the NBUs BeeBase website: www.nationalbeeunit.com

How do I report captures?

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You need to alert the relevant authorities as soon as possible. It is important to note the location as accurately as possible as well as obtain a photograph to allow experts to confirm its ID. Please report it (sending a photograph if possible) to: alert_nonnative@ceh.ac.uk

Other husbandry techniques

Another helpful husbandry practice includes allowing vegetation to grow around apiaries; tall grass in front of hives hinders the Asian hornets' prey-capture behaviours, limiting their ability to "hawk" for honey bee workers on the wing. Of course, taking sensible precautions such as not leaving wet frames in the open after honey extraction, will avoid attracting hornets (Asian or European) to the apiary. The latest guidance given to beekeepers by to French beekeepers is that hive entrances need to be reduced, using entrance blocks, to a height of 5.5 mm to prevent Asian hornets from entering. It is the experience of French beekeepers that traditional metal entrance strips are ineffective at excluding *V. velutina*.

Useful contacts

You can download this Guidance Note, and others relating to the Asian hornet, from:
https://secure.fera.defra.gov.uk/beebase/index.cfm?pageid=208
The NBUs BeeBase website: www.nationalbeeunit.com
An ID sheet for the Asian hornet: https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47
Non Native Species Secretariat https://secure.fera.defra.gov.uk/nonnativespecies/alerts/index.cfm?id=4
ADAAQ* The Association de développement de l'apiculture en Aquitaine http://www.apiculteurs-en-aquitaine.fr
The basic trap design can be found at http://www.apiculteurs-en-aquitaine.fr/pdf/frelon-piege.pdf

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