

Yellow-Legged Asian Hornet Update

By Nigel Semmence, National Bee Unit, Animal and Plant Health Agency

The yellow-legged Asian hornet, *Vespa velutina*, also known simply as the Asian hornet, is an invasive non-native species of hornet accidentally introduced into Europe in 2004, and has spread through France and subsequently into Spain, Portugal, Belgium, Italy and Germany.

The first nest in the UK was discovered in 2016 in Tetbury, Gloucestershire and the details of the background and outbreaks can be found at the end of this article in the further information section. Here, I will focus on the NBU's responses to incursions in 2019 and I have included some of the improvements we have made over the last few years to key parts of the response. Additionally, by popular request, I will cover the role of the Asian Hornet Teams (AHTs), previously known as Asian Hornet Action Teams (AHATs).

Sightings to date

With three nests found in 2019 and two other sightings this brings the UK's total of confirmed sightings to eighteen, with nine nests being detected. In hindsight, we could have calculated the nest count as being seven, because at Fowey (2018) and Christchurch (2020) subsequent genetic analysis has confirmed that in each of these locations the two nests found in close proximity were shown to share the same founder queen, and were thus primary and secondary nests.

Our actions when a sighting is confirmed

In all cases when we have a confirmed sighting, the GOV.UK website is updated, a BeeBase news item is published and available through the RSS News Feed, the local association and AHTs are contacted, and an email is sent to all beekeepers registered on BeeBase with apiaries within twenty kilometres. Only a rough location is given as the key role of beekeepers and AHTs is in providing the wider surveillance. This then allows the NBU's inspectors to focus on 'track and trace' and detect and destroy the nest as quickly as possible. Eradication is the current goal of the response effort and so, currently, only NBU inspectors are licensed to release yellow-legged Asian hornet for the purpose of eradication. For England and Wales the Invasive Alien Species (Enforcing and Permitting) Order 2019, which came into force on 1 October 2019, prohibits the release of invasive alien species except under licence.

2019 outbreak summary

New Milton, Hampshire

At the start of July, an alert was sent in by a member of the public. Shortly afterwards the hornet was caught and confirmed as a queen yellow-legged Asian hornet. Subsequent trapping and monitoring of apiaries and forage sites that could attract hornets either for nectar or for prey items, did not reveal any further yellow-legged Asian hornets. An important point is that if there was an associated primary nest, then without the queen it would have shortly perished. As no workers were observed in the area

there is no evidence that any made it to adulthood.

Drayton Bassett, Staffordshire

At the start of August a member of the public identified and photographed two hornets resting in their garden. When the inspector visited, further hornets were quickly observed; a sample obtained was confirmed as yellow-legged Asian hornet. Track and trace techniques were then deployed and further lines of sight obtained, and the nest was detected in a Spruce tree, approximately twenty metres above ground level. This was destroyed and removed on 6 September 2019.



The nest at Drayton Bassett; inset, bottom left shows a cherry picker being used to remove the high nest. © Crown copyright.

After the nest was removed no further yellow-legged Asian hornets have been trapped or observed in the subsequent surveillance.

Tenterden, near Ashford, Kent.

A member of the public photographed a yellow-legged Asian hornet feeding on fallen pears at a fruit farm (see photo on page 277). The next day a hornet, believed to be the same one, was caught by the bee inspector and this was confirmed in the laboratory to be a worker yellow-legged Asian hornet.

The fruit farm already had a large number of traps around the site and more were placed locally and forage monitored, but there were no more sightings.

Highcliffe, Christchurch, Dorset

This was reported at the end of September by a member of public seeing a hornet catching wasps in their garden. The bee inspector visited and obtained a sample, and yellow-legged Asian hornet was confirmed on 1 October 2019. Track and trace procedures were then followed and the nest was found, fifteen metres above ground level, in an oak tree, in a woodland on a nature reserve on 3 October 2019. This was removed on 4 October 2019.



Asian hornet on a pear at Tenterden. Photo by Tim Nightingale.

Surveillance around the site continued after nest destruction and further yellow-legged Asian hornets were seen and trapped. Subsequently, a line of sight pointed back to very close to where the first nest was detected. A log with a nest in it was approximately ten metres from the nest in the oak tree and subsequent genetic analysis has confirmed that they had the same founder queen. The analysis of life stages in the nests has confirmed that the nest in the log was the primary nest and the nest in the oak tree was the secondary nest.

A bee inspector was stung while searching for the second nest and suffered a reaction. He was taken to hospital and released the next day. He has fully recovered and is inspecting bees again this year. Further surveillance did not reveal any more yellow-legged Asian hornets.

Flight distances from home nests

So far, worker hornets from nests in the UK (established by genetic analysis) have always been found within two kilometres of the nest, and the vast majority have been observed foraging within 500 metres, of the subsequently detected nest. In all cases where nests have been found, surveillance continues for the rest of the season and the next year. Wherever possible, traps are left with beekeepers or landowners and only put up in likely flight periods.

In summary, the nest and genetic analyses have confirmed that all the yellow-legged Asian hornets detected in the UK have derived from queens from the European zone of colonisation, rather than their native range. None of the nests detected in the UK had reached the stage of producing the next generation of queens and none of the nests discovered, so far, have been the direct offspring of another UK-discovered nest. This suggests that these nests were separate incursions from a continental population rather than belonging to a single established UK population. Further details of the nest analysis and genetics carried out by Fera Science Limited will be released in a paper which will be published this autumn.



The Track and trace map of Highcliffe, showing the lines of sight used to triangulate onto the rough location of the nest, and the actual location of the nest. © Crown copyright.

Awareness

Awareness of the yellow-legged Asian hornet with the general public has dramatically increased in the UK over the past few years, due in part to the many press articles and mentions on radio and TV programmes. Although the increase in awareness is welcome, the inaccuracy of some articles has created issues for the Defra communications team.

Last year, work continued with the National Pest Advisory Panel (NPAP) to increase awareness among pest controllers in the UK. To that end the *Asian hornet awareness and identification* leaflet was published (available on BeeBase at the bottom of the Asian hornet page) and a talk was given at PestTech 2019 in November 2019 at Milton Keynes Arena. We have also recently released two new presentations by Fera Science Limited, on YouTube, one covering the biology of the yellow-legged Asian hornet and the second covering the nest analysis and genetics of the outbreaks in the UK. Links to these can be found on the Asian hornet pages on BeeBase.

Continuous improvement

We follow the APHA's contingency plan division's methodology of gathering lessons identified both during and after the response. These are collated and actioned as appropriate. They cover a diverse range and I will focus on some key areas below.

Jersey

One of the conundrums about many exotic pests is that until you see one for the first time, you do not believe you can spot them. The reality is that yellow-legged Asian hornets are very distinctive, so to counter this natural instinct and at the kind

invitation of the Jersey Government, six inspectors were sent to Jersey in teams of two, for one week each per team, from the middle of August. They were met by the Asian hornet coordinator, Alastair Christie, and joined the volunteers doing track and trace and seeing nest destructions. All are now confident at spotting yellow-legged Asian hornets and their experience is being incorporated into our working practices.

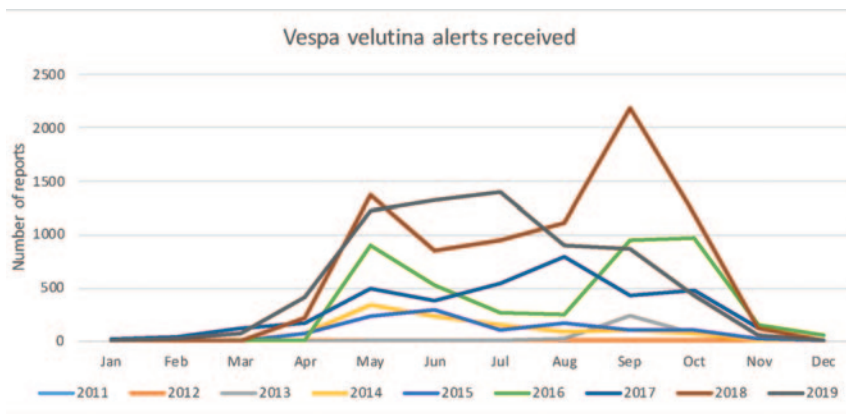
To aid our responses, and again at the kind invitation of the Jersey authorities, our team of wildlife officers, who treat the nests also went across to Jersey to see the approach they use. Our thanks go to Alastair Christie and the volunteers of the Jersey Asian hornet teams for their kind support and all they taught our inspectors and wildlife officers.

Triaging

We work closely with the team at the UK Centre for Ecology and Hydrology (UKCEH) who run the alert system along with volunteer experts from the biological community who triage suspect sightings from the Asian hornet App within iRecord. Plausible sightings are sent to the NBU for follow-up. A lot of work has gone into refining the triaging and this is a continuous process.

For 2019, the alert records for yellow-legged Asian hornet totalled 6,702 and comprised 1,785 that had come in via the app, 1,918 via the online form and 2,999 by email. Of all of these together, approximately 50% had photos and, of these, five were confirmed as positive and resulted in the responses outlined above.

The main species confused with yellow-legged Asian hornet are, in order of greatest numbers: the European hornet,



Vespa velutina alerts received. UKCEH.

Vespa crabro; the hornet mimic hoverfly, *Volucella zonaria*; and the wood wasp, *Urocerus gigas*.

As can be seen from the alert numbers above, there is only a very small percentage

of correct reports. Most of this originates from a lack of familiarity with the species that are confused with yellow-legged Asian hornet and a degree of fear of wasps and hornets. Also, I feel sure that the press activity could result in a perception that

every big insect is a non-native species.

All replies to sightings not identified as native species from UKCEH contain reference to the AHTs and a link to the BBKA website, so that the reporter can request assistance from a local AHT member to help ascertain the correct identification and obtain a photograph or sample as appropriate.

Season extension

The normal season for the Seasonal Bee Inspectors runs from the start of April through to the end of September, but as our response extends into October, we have been allowed to extend the contracts of those that are happy to do so, until the end of October. This also gives the Regional Bee Inspectors time to manage the normal end of year activities for their teams, such as meetings and gathering in equipment.

Contingency equipment

To speed up the ability of each region to launch a contingency response simultaneously if necessary, each region has local contingency boxes and these contain traps and bait, stationery, binoculars, walkie talkies and tough boxes for transporting nests. There are three further sets of contingency equipment in APHA offices, in the South, Midlands and the North, with more equipment in case the response increases. These sets contain whiteboards, additional stationery, BBWear Ultra Asian hornet suits, more traps and bait, and large tough boxes for transporting larger nests.

Investigation and track and trace phases

There are two key parts to the response that have grown in importance. The first is the investigation phase where the nearest Seasonal Bee Inspector responds to the plausible sighting and collects information from the reporter. The key need here is to determine the nature of the lead to see if we are dealing with an individual hornet that has come in via movement of goods or vehicles from Europe or the offspring from an established nest. Many bits of information help build this picture including; the time of year, the sex and caste of the hornet, its behaviour (such as hawking for insects) or a likely explanation of its route of entry, e.g. a hornet that falls out of luggage from someone who has just returned from holiday.

The second part is the initial response once we have confirmed the sighting and have worker hornets returning to and from a food source; this is the track and trace work to locate the nest. We use line of sight of hornets returning from bait stations to establish flight lines. This normally lasts up to about a week; our best has been one day

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and the average is about four days before the nest is triangulated and detected.

Asian hornet team responsibilities

AHTs have been formed by the British and Welsh BKAs. The AHT responsibilities are detailed on BeeBase and mirrored on the BBKA webpage. They are fairly straightforward and include:

- Raising awareness with the public and beekeepers.
- Monitoring and trapping.
- Following up leads and reporting sightings.

We get a lot of questions on the role of AHTs during a contingency response. This is not very different to the above, but some crucial points are worth expanding upon, including:

Raising awareness. Once an AHT is contacted by the local Regional Bee Inspector, alerting them to a response in their vicinity, assistance from the AHTs will be discussed. This could include things like raising awareness in areas where hornets may be attracted, like fruit and veg, fish or bakery stalls at local markets.

Monitoring and setting up traps in their own apiaries. Fairly straightforward, but it is key that we establish as quickly as possible the extent of the incursion and that we are dealing with only one nest. Surveillance around the outbreak for further activity is, therefore, crucial and if this wider surveillance is taken on by beekeepers it allows the NBU's inspectors to focus on the track and trace, and detect and destroy the nest as quickly as possible.

Assisting other beekeepers, who request it, in monitoring their apiaries and setting up traps. For the same reason as in the point above, but bearing in mind that some people might not be able to visit their apiaries during a response and might welcome some assistance.

Recording the use of traps in apiaries on BeeBase in their apiary record. This allows us to monitor the surveillance done in an area, but is limited to apiaries only.

By observing local forage and reporting all sightings of yellow-legged Asian hornet as described at the end of this article.

In February, the BBKA hosted an Asian hornet action conference as previously covered in *BBKA News*. This was attended by NBU and Defra representatives; the National Bee Inspector, Sandra Gray, and the Bee Health Policy Lead, Belinda Phillipson, who both gave presentations and answered questions.

Coronavirus

Any article this year would be remiss not to mention the COVID-19 pandemic. NBU Inspectors are key workers and the majority have been conducting high-priority inspections as usual, with the added conditions as outlined in the 'COVID-19 and Beekeeping' guidelines released earlier this year as a BeeBase news item. Those inspectors who have been isolating at home have been busy updating beekeepers' records, as well as supporting the NBU office with a range of tasks. The number of education and training events such as national shows, bee health days, apiary safaris and talks have obviously reduced dramatically and we were unable to run the start of season technical training event for inspectors at Sand Hutton. However, training and management meetings have continued by the use of a range of meeting apps and tools.

So far there does not seem to have been a negative effect on the total number of inspections done and working from home is 'business as usual' for bee inspectors, so the increase in this has not had too much of an impact. Although initially delayed, the recruitment of Seasonal Bee Inspectors for some vacant posts has now progressed. In the event of a yellow-legged Asian hornet response this year, social distancing may well impact on how we run our forward operating bases. However, there should not be any significant impact on our ability to do track and trace and destroy and remove nests.

What to do

Please could we encourage all beekeepers to become familiar with the identification features of the yellow-legged Asian hornet and the species that it is most likely to be confused with. A poster and identification sheet are available from BeeBase and NNSS web pages listed below and yellow-legged Asian hornets in acrylic are available commercially. Also, please can you keep an eye out this summer and autumn especially around your beehives and on anything that attracts wasps, flies or hoverflies as these, along with honey bees, are caught by adult yellow-legged Asian hornets to feed to their young. Examples of good places to look are flowering plants such as ivy, fruit (both on the tree and fallen), carrion, and stalls (with fish, fruit and veg, or cakes) at market places.

There are two other things that we should all do to help and that is firstly to download the Asian Hornet Watch App onto our mobile phones and secondly to ensure our BeeBase records are up-to-date. Having the app on our mobile phones, means that we can report a suspect sighting with a photograph in the field when we see it, and keeping our BeeBase records (email address and apiary locations are key) up-to-date ensures we receive any alerts of confirmed sightings close by. In addition, if you wish you can join your association's AHT and join them in their activities increasing awareness and monitoring for yellow-legged Asian hornet.

Thank you

Our thanks go to all beekeepers, AHTs, scientists, inspectors and volunteers from all agencies and associations involved in the responses to yellow-legged Asian hornet incursions. It really is a team effort as we all are keen to do our utmost to prevent or at least delay its establishment in the UK.

Online information sources

Gov.UK rolling news page:

<http://www.nationalbeeunit.com/index.cfm?sectionid=117>

NNSS Asian hornet pages:

<http://www.nonnativespecies.org/alerts/index.cfm?id=4>

BeeBase: www.nationalbeeunit.com

NBU Asian hornet page:

<http://www.nationalbeeunit.com/index.cfm?pageid=208>

NBU RBI reports:

<http://www.nationalbeeunit.com/index.cfm?pageid=168>

BBKA Asian hornet pages:

<https://www.bbka.org.uk/Pages/FAQs/Category/asian-hornet-faqs>

NBU Asian hornet teams page:

<http://www.nationalbeeunit.com/index.cfm?sectionid=119>

Publications

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Pdfs of all publications can be found on BeeBase in the publications section at <http://www.nationalbeeunit.com/index.cfm?pageid=167>