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The yellow legged Asian hornet *Vespa velutina* was first found in the UK in 2016, in Tetbury, Gloucestershire, and over the next few years was found sporadically each year in various places in England, with a maximum of four nests found and destroyed in 2018. In 2023, however, there was a vast increase in sightings, and the evidence shows sadly that the hornet is now reproducing in the south east of the UK. Following trials of a fixed AI based Hornet Camera system (Hornet AITM) in 2022 and 2023 on Jersey and the Scilly Isles, the concept of the NestSweeper was developed. This consists of the NestSweeper device, a hornet attractant vaporiser which lures *V. velutina* in to feed, providing the opportunity for users to capture a photograph of the hornet. The NestSweeper app, designed for use with the vaporiser using any smartphone, is then used to identify *V. velutina* in real time, and then upload sightings on to an interactive map. The AI model was trained using 40,000 images of verified *V. velutina* collected on the island of Jersey during the summer of 2023. The limited field trials that were possible in 2024 clearly showed that: 1. The vaporisers were effective at attracting *V. velutina*; 2. The app is effective at identifying *V. velutina* and distinguishing them from other insects in the field; 3. The app can successfully identify marked hornets on sequential visits; and 3. Analysis of time differences of sequential visits can accurately estimate the distance of the hornet nest from the bait station. By setting up a triangle of bait stations and NestSweeper app smartphones, and noting the flight bearing and direction of *V. velutina* flights, it should be possible to rapidly and accurately pinpoint the position of unknown nests. Further field trials are planned to fully demonstrate the potential of the NestSweeper.

“NestSweeper” – An AI based method to track the yellow-legged Asian hornet *Vespa velutina* in the UK

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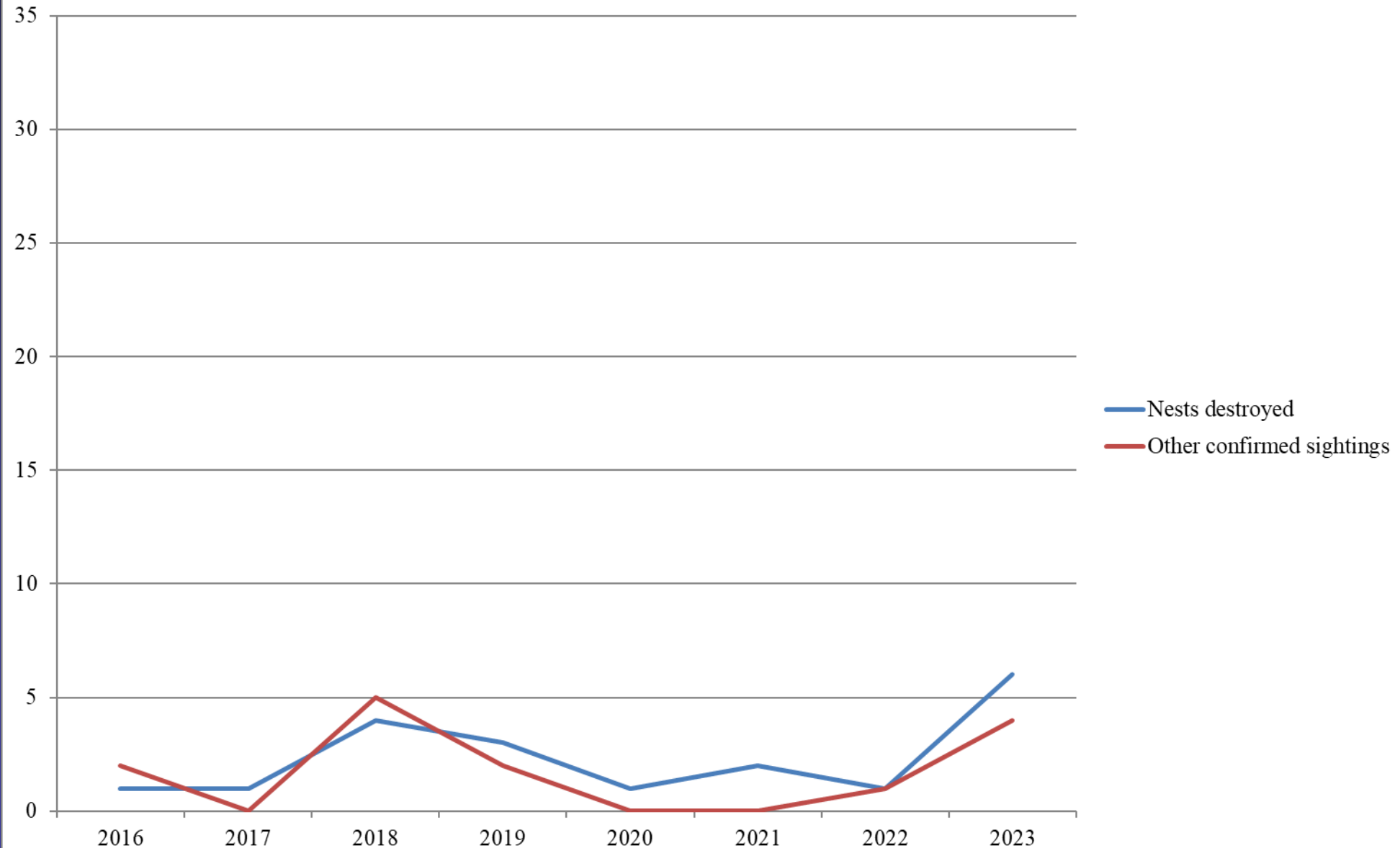
The yellow legged Asian hornet (*Vespa velutina*)



Found in UK, 19 August 2016, Tetbury, Gloucestershire

APHA: Crown Copyright.

Findings of Asian hornets in the UK, 2016-2023 (as at 28/7/23).



Source: Defra



OPEN

Managing incursions of *Vespa velutina nigrithorax* in the UK: an emerging threat to apiculture

Eleanor P. Jones¹  , Chris Conyers¹, Victoria Tomkies¹, Nigel Semmence², David Fouracre², Maureen Wakefield¹ & Kirsty Stainton^{1,3}  

Vespa velutina nigrithorax is an invasive species of hornet accidentally introduced into Europe in 2004. It feeds on invertebrates, including honey bees, and represents a threat to European apiculture. In 2016, the first nest of this hornet was detected and destroyed on mainland UK. A further 8 nests were discovered between 2016 and 2019. Nest dissection was performed on all nests together with microsatellite analyses of different life stages found in the nests to address the reproductive output and success of nests found in the UK. None of the nests had produced the next generation of queens. Follow-up monitoring in those regions detected no new nests in the following years. Diploid males were found in many UK nests, while microsatellite analysis showed that nests had low genetic diversity and the majority of queens had mated with one or two males. All UK nests derived from the European zone of secondary colonisation, rather than from the native range of the species. None of the nests discovered so far have been direct offspring of another UK nest. The evidence suggests that these nests were separate incursions from a continental population rather than belonging to a single established UK population of this pest.

The yellow-legged Asian hornet (*Vespa velutina nigrithorax*) is an invasive species of hornet which presents a threat to invertebrate populations, in particular to honey bees which constitute a large proportion of the hornet's diet¹. *Vespa velutina nigrithorax* is extremely successful at colonising new areas: the hornet spread through

RESEARCH ARTICLE

Predicting the spatio-temporal dynamics of biological invasions: Have rapid responses in Europe limited the spread of

4. *Synthesis and applications.* By predicting the extent of a biological invasion in the absence of timely interventions and comparing this to the current distribution of the yellow-legged hornet, we found that management measures implemented in these countries appear to have been effective in limiting the spread of the species in Europe. Additionally, the model framework may be useful to inform the

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⁴International Union for Conservation of Nature (IUCN), David Attenborough Building, Cambridge, UK

⁵IUCN/SSC Invasive Species Specialist Group, Rome, Italy

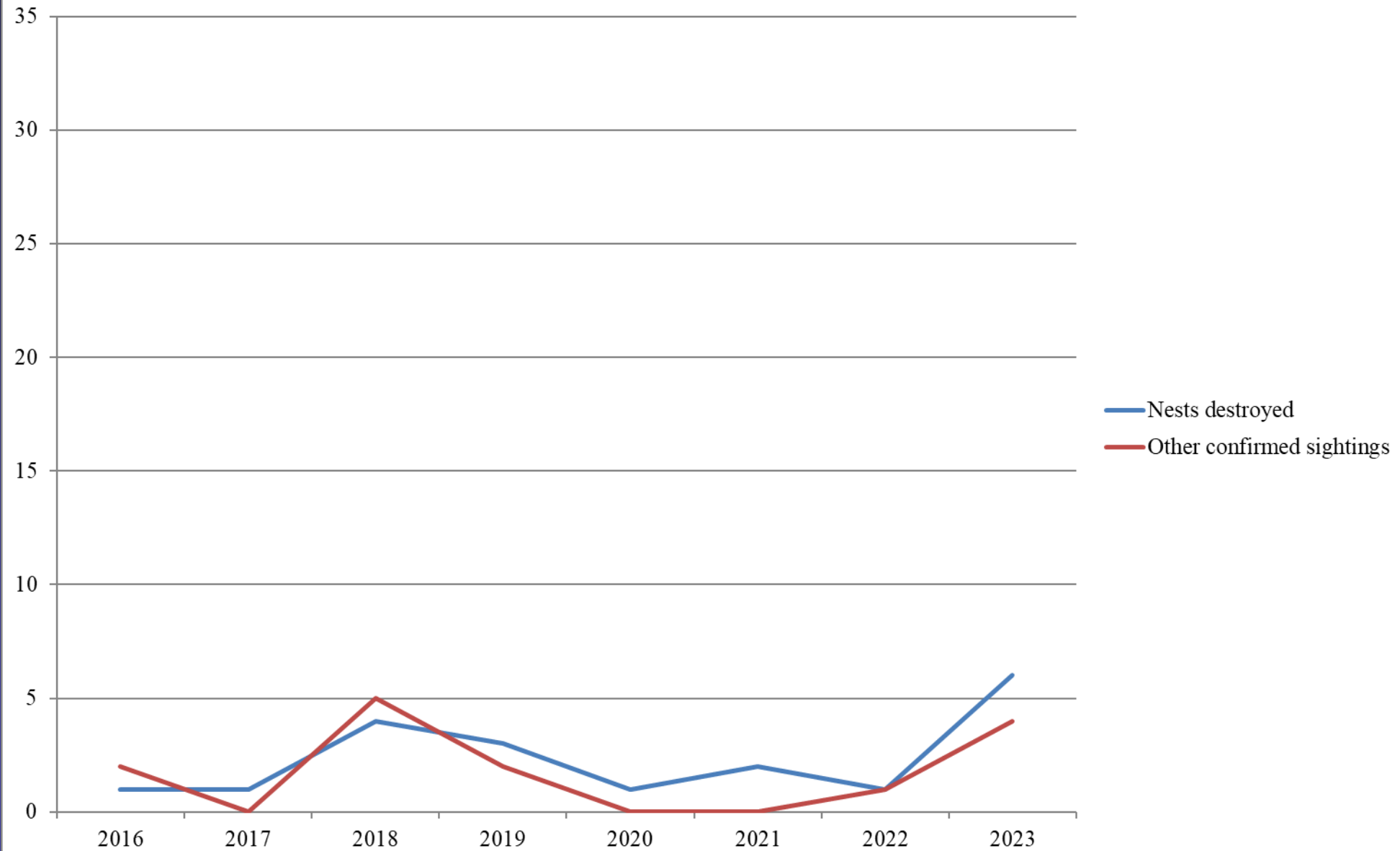
1. Invasive alien species can have severe impacts on biodiversity, economies, and well-being and their long-term management can involve massive costs. There is an increasing policy imperative to determine whether the management of biological invasions is effective, particularly at biological invasion fronts, but this can often be difficult to determine without extensive data collection. Furthermore, risk assessment frameworks are often used to guide decision-making and management, but these can be hampered by a lack of information about the extent and dynamics of a biological invasion following an introduction within a new re-

Research Article

Public reporting is essential for controlling the invasive yellow-
of diploid males, and continued incursions into a freely breeding population. We estimated the number of years before officials tasked with locating and destroying nests became overwhelmed by the number of nests in the landscape. In the absence of reporting, an undetected population would be large enough to overwhelm control efforts after three to seven years (i.e. the person-days required to locate and destroy nests would exceed those available). When nests were reported by members of the public and beekeepers, control efforts could continue for at least 10 years before becoming overwhelmed – depending on the national reporting probability, the abundance of observers in the landscape, and the annual incursion rate.

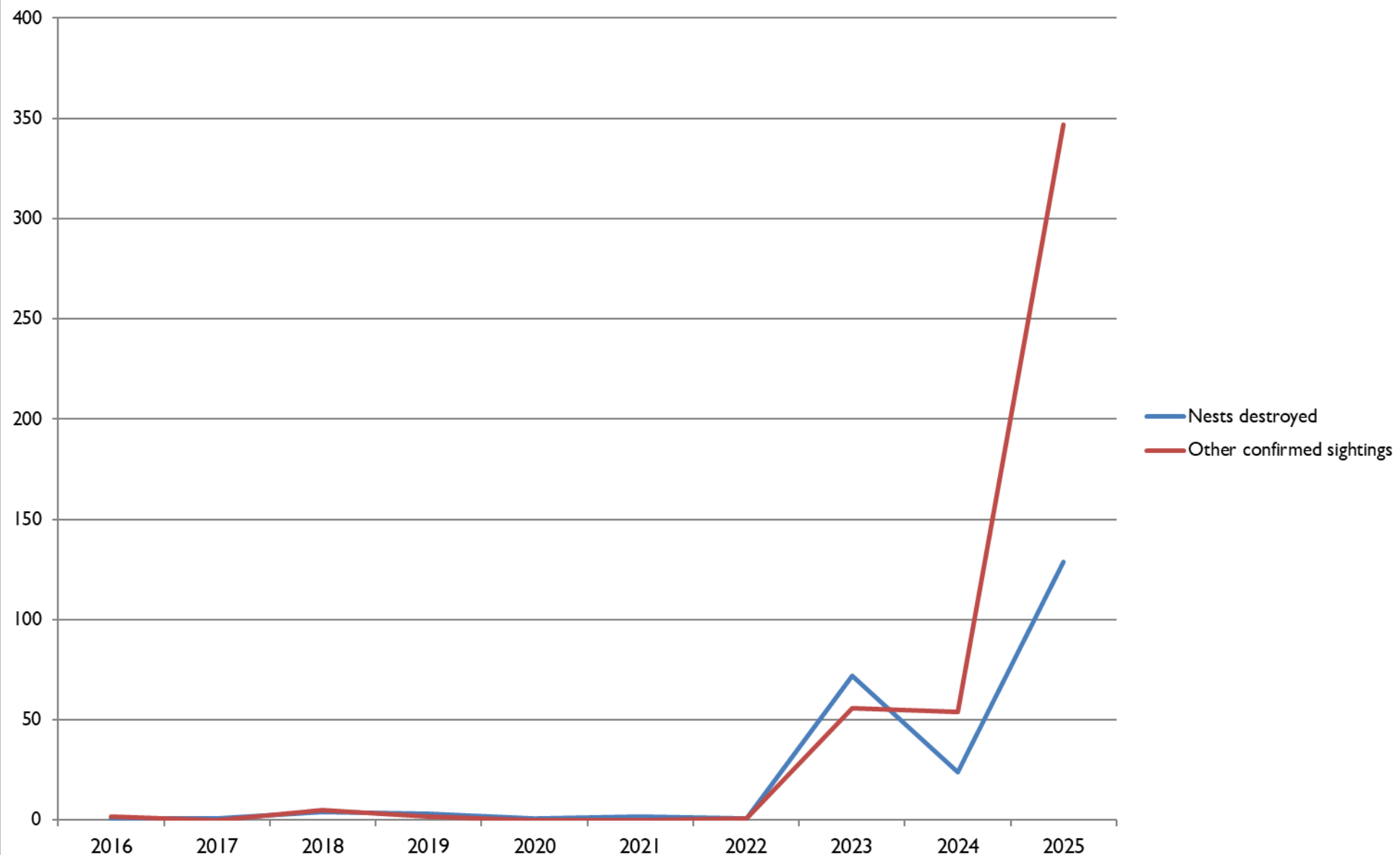
2022, 13 *V. velutina nigrithorax* nests were sporadically found and destroyed in England. In 2023, 72 nests were found and destroyed by the Animal and Plant Health Agency's National Bee Unit (NBU) inspectors across southern and northern England. In 2024, 24 nests were found and destroyed. To better understand the potential establishment of *V. velutina nigrithorax* in Great Britain, a model was developed to simulate its dispersal and the associated control efforts. We simulated public reporting based on the realistic distribution of observers in the landscape, the genetic load due to the presence of diploid males, and continued incursions into a freely breeding population. We estimated the

Findings of Asian hornets in the UK, 2016-2023 (as at 28/7/23).



Source: Defra

Findings of Asian hornets in the UK, 2016-2025 (as at 25/9/25).



Source: Defra

Southampton,
24/9/24



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Yellow legged Asian hornet findings 2019-2025



Source: British Beekeepers Association



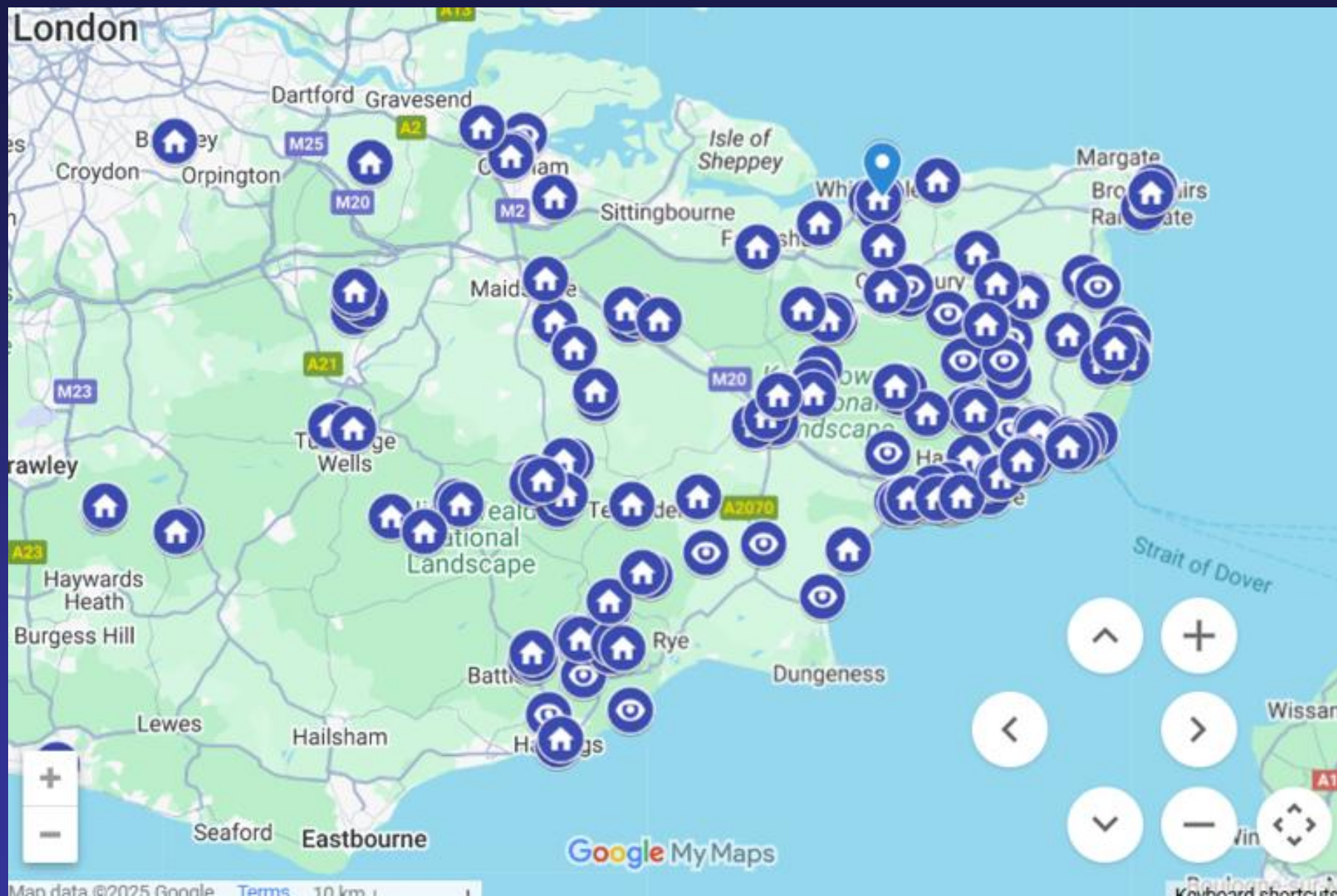
Yellow legged Asian hornet findings 2025



Source: British Beekeepers Association

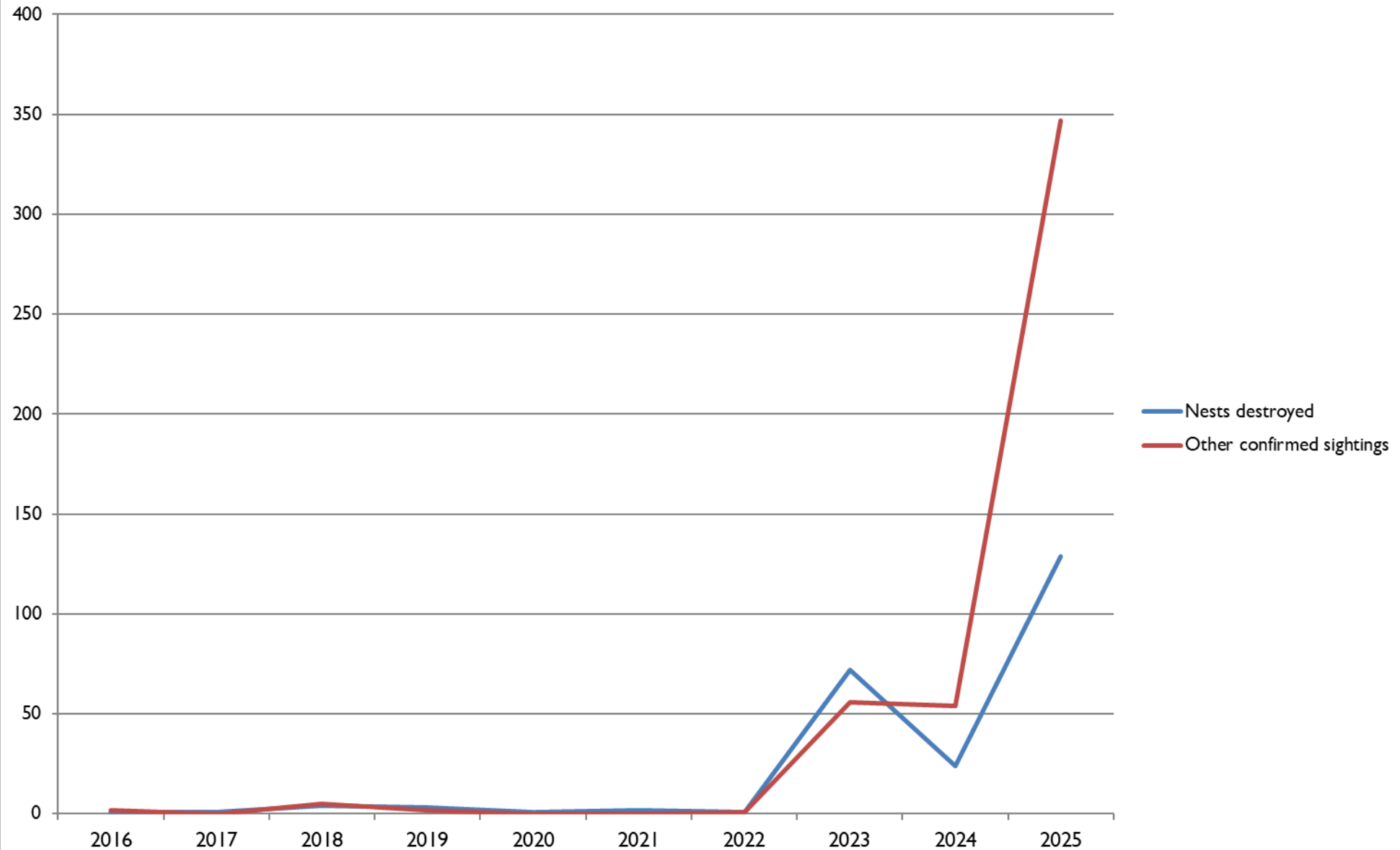


Yellow legged Asian hornet findings 2025



Source: British Beekeepers Association

Findings of Asian hornets in the UK, 2016-2025 (as at 25/9/25).



Invasive species

Helena Horton
Environment reporter

Mon 4 Sep 2023 13.00 BST



Asian hornet likely to have become established in UK, say experts

Sharp rise in sightings of the invasive species this year prompts fears for native bees on which they prey



📷 The Asian hornet. The vast majority of the sightings have been in Kent. Photograph: Guillaume Souvant/AFP/Getty Images

It is likely the Asian hornet has become established in the UK, conservationists fear, as a record number of nests have been found.

There has been a **sharp rise** in sightings of the invasive species in the UK this year; the previous two years only had two sightings each, whereas there have been 22 confirmed so far in 2023. In total there have been 45 sightings since

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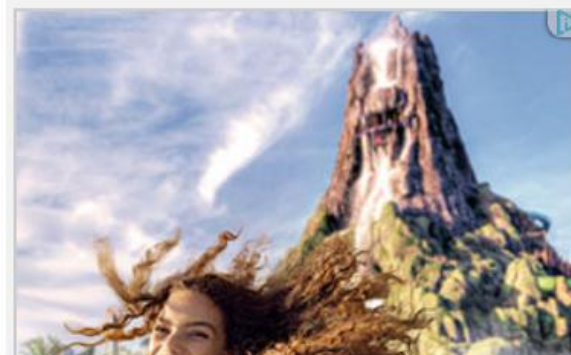
MailOnline

Invasion of the killer Asian hornets: Beekeeper's business is wiped out after foreign insects massacred thousands of his bees

- Peter Down, 40, said he watched in horror as invading pests massacred his hives
- So far 42 Asian hornet nests have been found in the UK - with almost all in Kent
- Have YOU been hit by Asian hornets? Email gemma.parry@mailonline.co.uk

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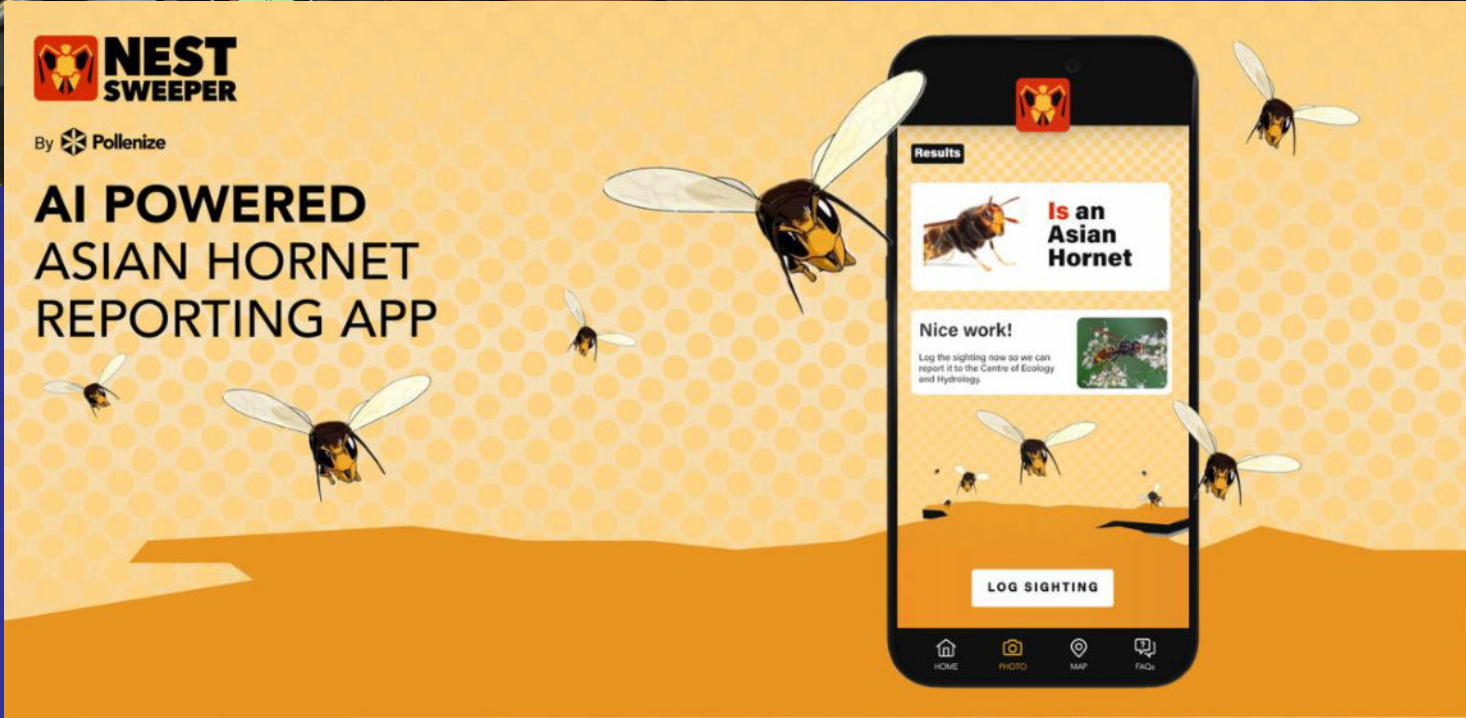
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So a need for better detection / monitoring methods...



Google Cloud - Data Processing Pipeline

Vertex Colab Enterprise

1. Data Format Alignment and Merging

1. Data Segmentation
Segmentation

1. Data Augmentation

Cloud Storage (Data)

Albumentations (Py)

Google Cloud - Model Training

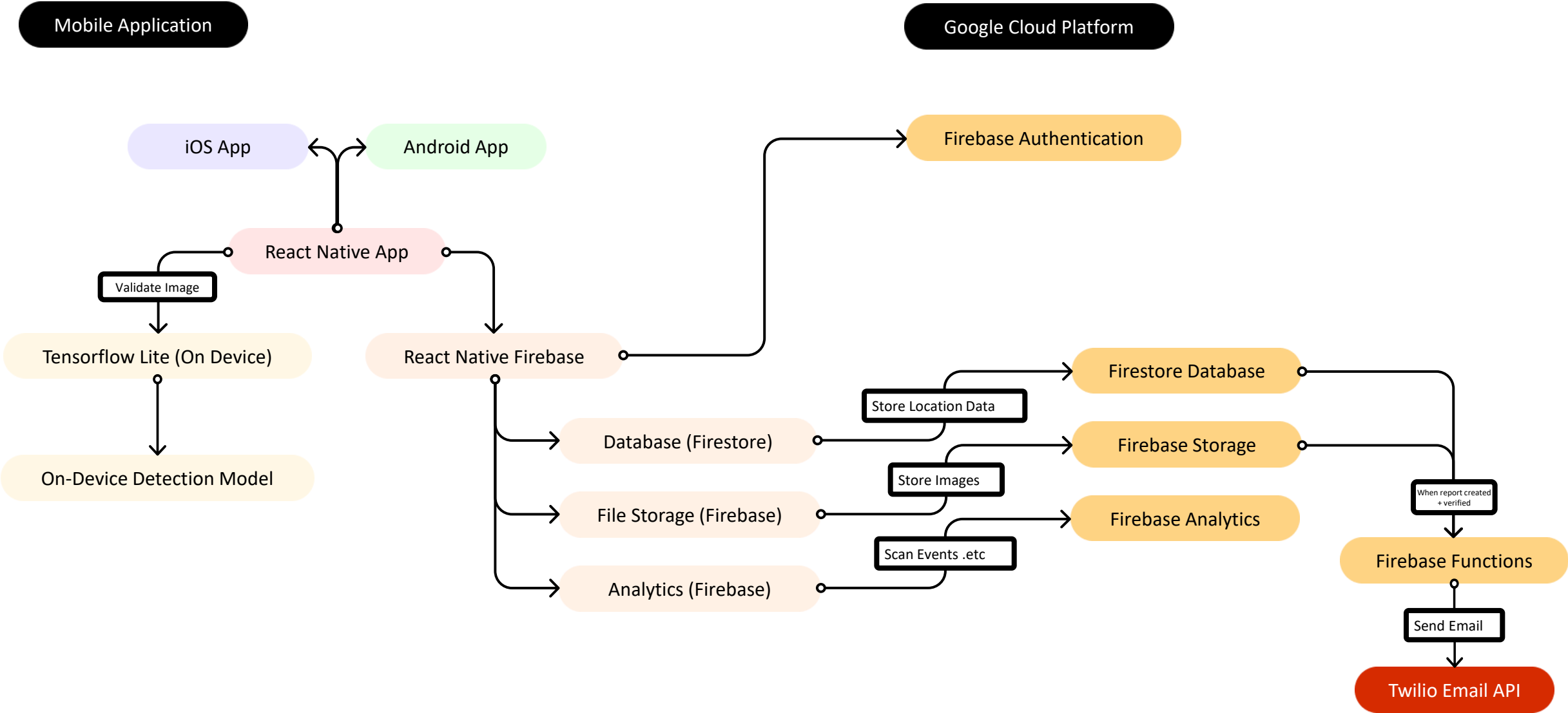
Cloud Storage (Data)

Vertex ML Dataset

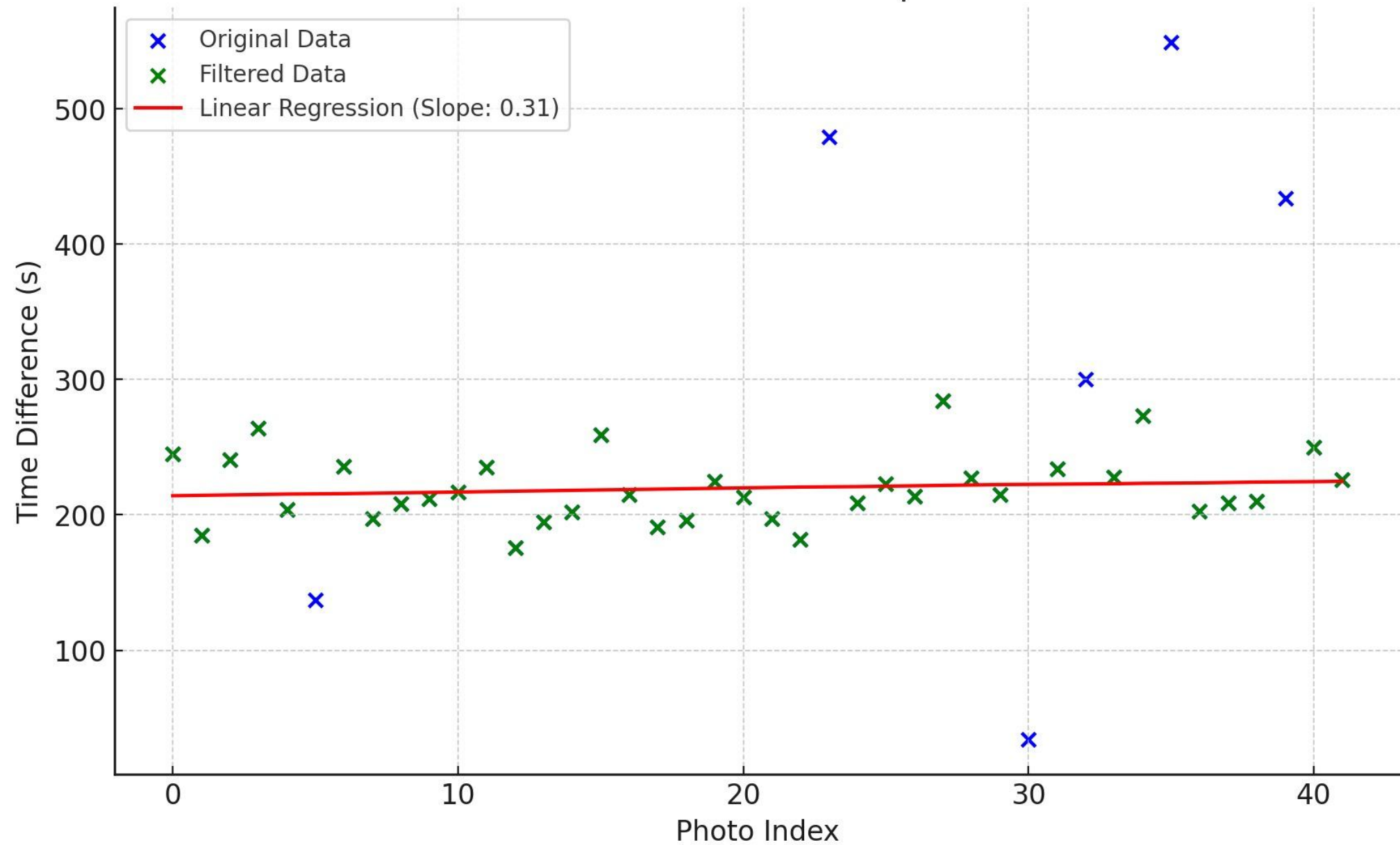
Vertex ML Training Pipeline (Object Detection
Detection)

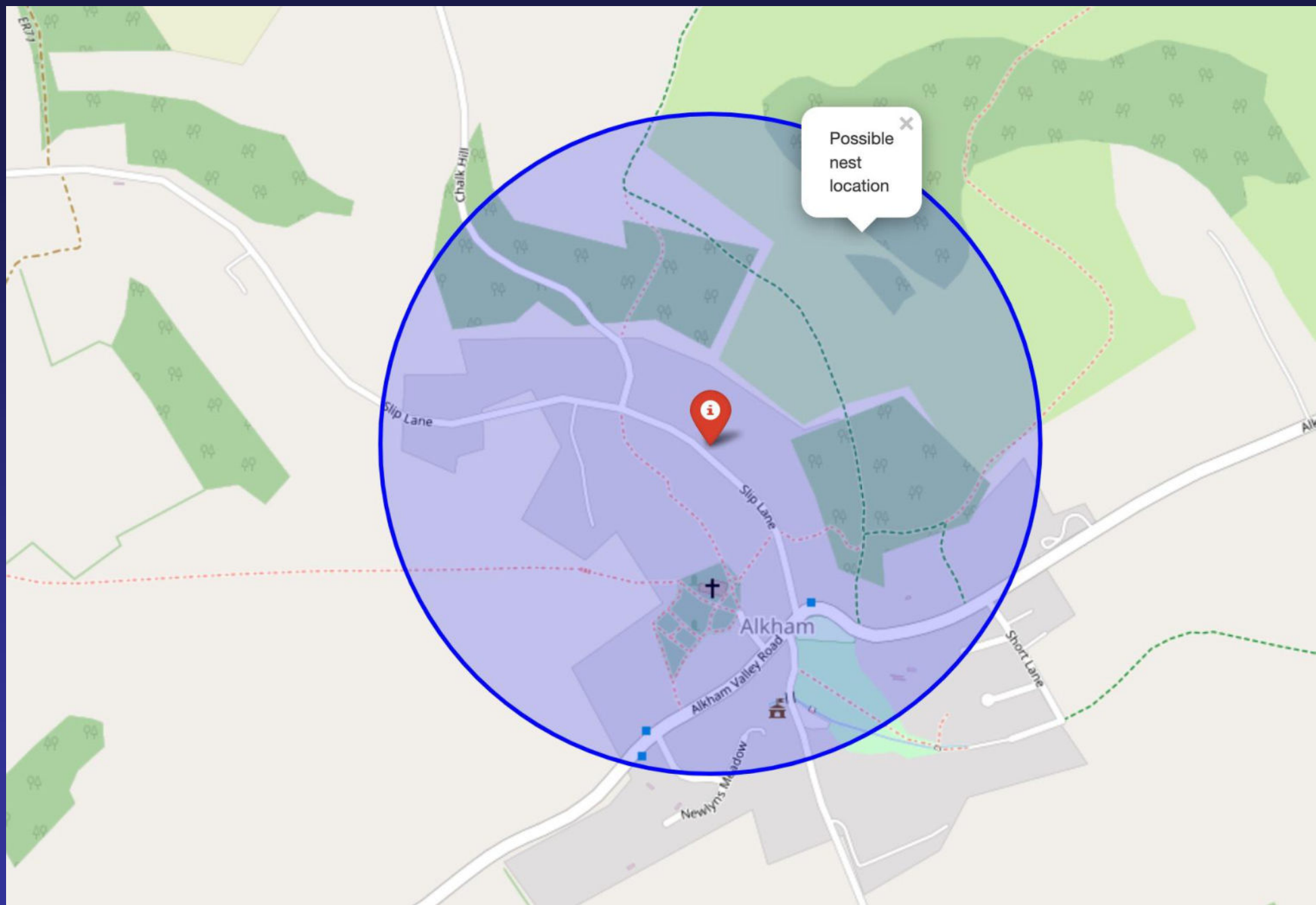
Tensorflow Lite Conversion

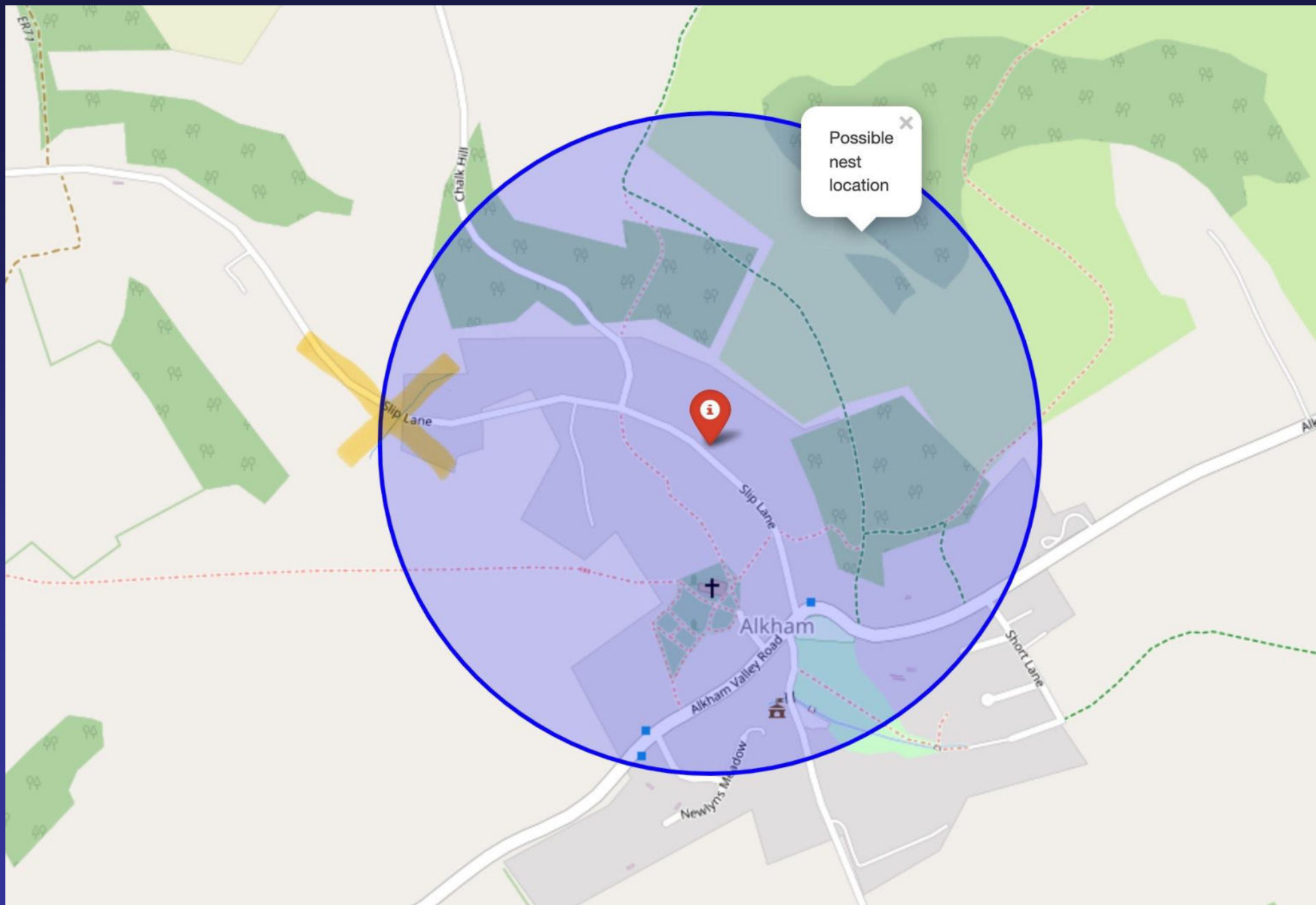
Cloud Storage (Model Weights)



Time Differences Between Sequential Photos









Android Version of Nest Sweeper App

<https://play.google.com/store/apps/details?id=uk.org.pollenize.nestsweeper.android>

Apple Version of Nest Sweeper App

<https://apps.apple.com/gb/app/nest-sweeper-asian-hornet-ai/id6504289081>

How to Video

<https://www.youtube.com/watch?v=b-Zrb7u0OVk>

But then...

The Isles of Scilly – a microcosm for European honey bee conservation.

Norman L Carreck^{1,2}, Mark Barnett³, Andrew G L Brown⁴, Matthew Elmes⁵, Stephen Fleming⁶, Jilly Halliday⁷, David Wragg³, Matthew Richardson³, Nick Bentham-Green⁴

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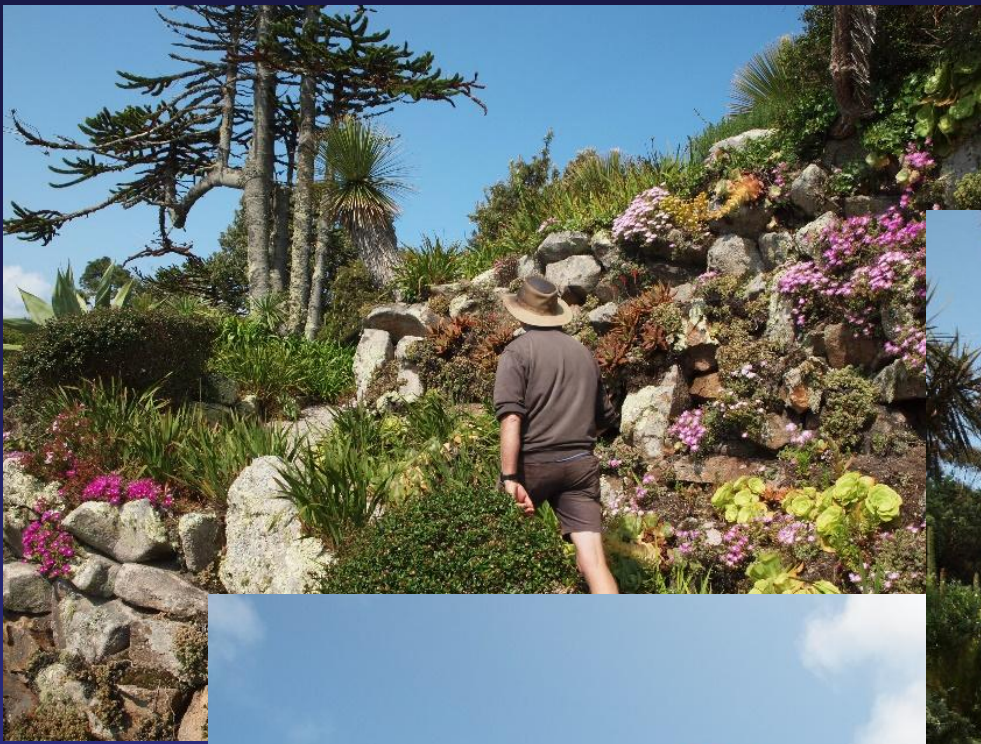
Isles of Scilly

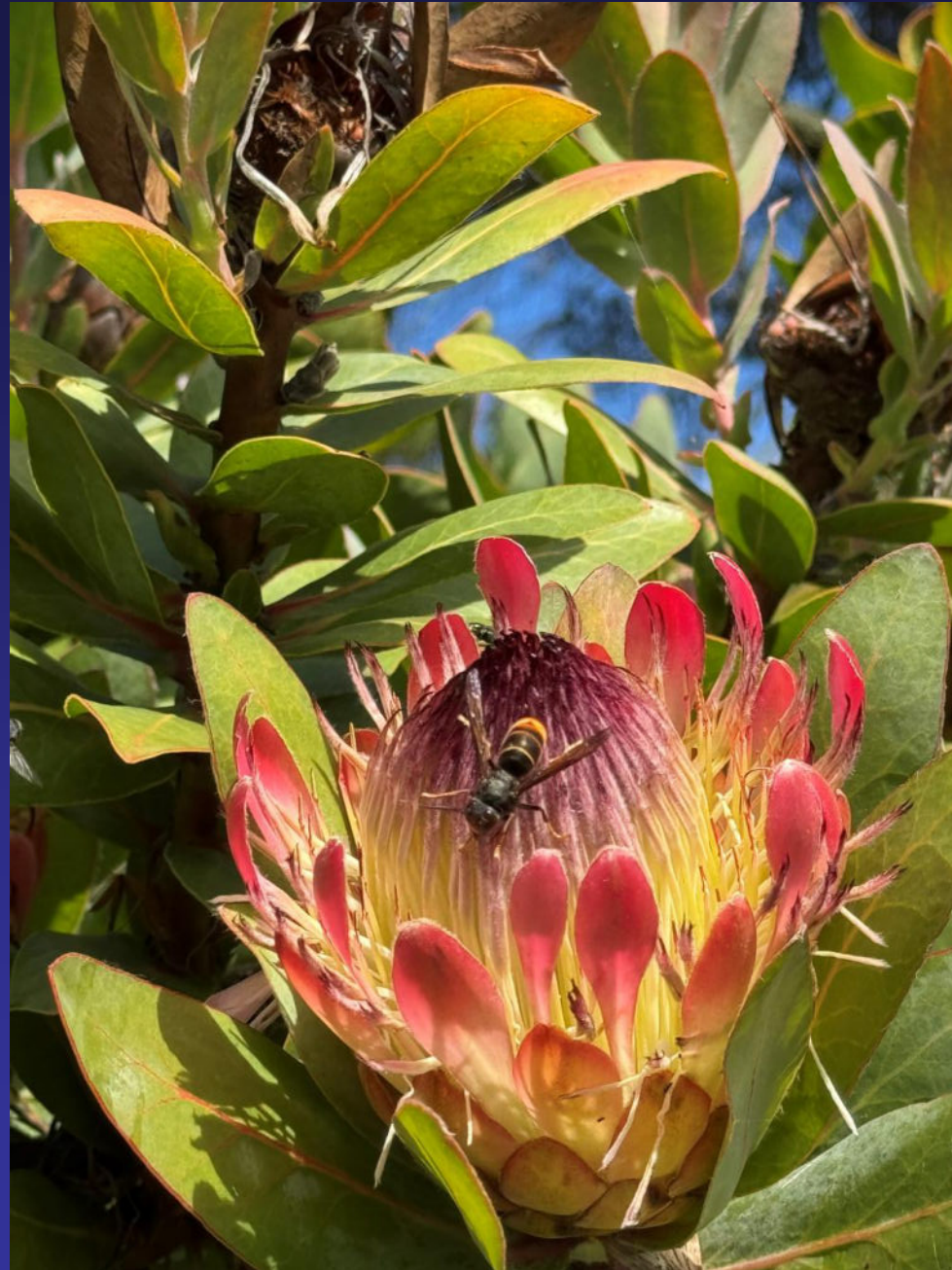












Suspected invasive hornet spotted in Scilly

1 day ago

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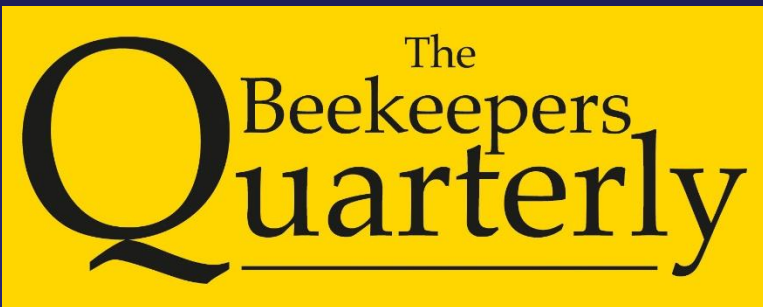
Jonathan Morris South West



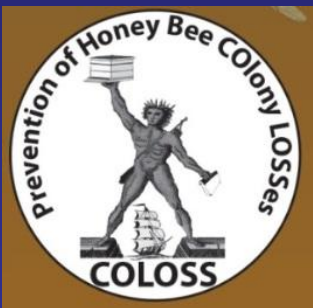




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