Welsh Study Finds London’s Toxic Air Linked to Honeybee Colony Collapse

The study, Evaluating Honeybee Viability in Urban and Rural Environments: A Comparative Study of London and West Wales Hives, tracked the health and survival of four identical honeybee colonies established in Spring 2024.


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Swansea, Wales May 7, 2026 (Issuewire.com) - New research from Welsh-based environmental research and apiculture specialist Bee1 has found compelling evidence that urban air pollution is significantly reducing the survival of honeybee colonies, following a year-long comparative study between London and rural West Wales.

The study, Evaluating Honeybee Viability in Urban and Rural Environments: A Comparative Study of London and West Wales Hives, tracked the health and survival of four identical honeybee colonies established in Spring 2024 — two in central London and two in rural West Wales — alongside continuous air-quality monitoring.

Each site hosted one hive headed by a London-reared queen and one headed by a Wales-reared queen, allowing researchers to assess both environmental and genetic factors influencing hive survival. The biological analysis and study design were supported on a voluntary basis by Dr Rhys Tancock-Jones PhD CBiol MRSP, a Chartered Biologist and geneticist.

City Hives Failed While Rural Colonies Thrived

The contrast between the two locations was clear.

One London hive, led by a London-reared queen, collapsed within six months. The second London colony, led by a Wales-reared queen, survived longer but also failed after approximately 12 months. In contrast, both West Wales colonies remained healthy and viable throughout the entire study period.

Air-quality sensors showed consistently higher levels of harmful pollutants in London, including volatile organic compounds (VOCs), nitrogen dioxide (NO_2), carbon dioxide (CO_2) and fine particulate matter (PM2.5), compared with the rural Welsh site.

Microscopic examination of bees recovered from the London hives revealed particulate matter coating their exoskeletons — physical evidence of prolonged exposure to polluted air — a finding not observed in bees from West Wales.

Pollution Identified as a Major Stressor

The data showed a strong association between air pollution and colony failure.

“Everything about these hives was the same except the air they were exposed to,” said Mark Douglas, Founder and CEO of Bee1. “What we saw was two stable rural colonies and two city colonies that ultimately collapsed. That points strongly to pollution as a key factor.”

Dr Tancock-Jones added:

“This was not an air-quality study but a biological one. However, the consistency between high pollution readings and hive decline aligns with growing scientific evidence that airborne pollutants impair bee navigation, weaken immune responses and reduce foraging efficiency.”

What This Means for Urban Beekeeping

The findings raise serious questions about the long-term sustainability of beekeeping in polluted city environments.

Despite one London hive using locally bred bees, both urban colonies ultimately failed, suggesting that genetic adaptation alone may not be sufficient to overcome pollution-related stress.

With honeybees playing a vital role in food production and biodiversity, the implications for cities are significant.

Next Steps

Bee1 is now calling for:

- Expanded research into urban-specific breeding programmes
- Collaboration with local authorities to identify low-pollution areas for apiaries
- Air-quality monitoring to become standard practice in urban beekeeping
- Policy action to reduce emissions that harm pollinators

The study will now be expanded to include a third location, and further analysis will be undertaken with entomologists to identify the sources and biological impact of the particulate matter found on London bees.

About Bee1

Bee1 is a UK-based environmental and apiculture research organisation focused on understanding how pollution, habitat and climate pressures affect pollinators and ecosystems through real-world field studies.

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