



Analysis of the Number of Scientific Publications on the Oriental Wasp (*Vespa orientalis*) in Southern Spain

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Keywords: Oriental wasp, biological invasion, beekeeping, scientific publications, biodiversity, pest management

BACKGROUND / PURPOSE

The oriental hornet (*V. orientalis*) has become a growing threat to ecosystems and apiculture in Southern Spain. Native to warmer regions, this invasive predator targets *Apis mellifera*, contributing to colony losses and reduced pollination. This study aims to quantify and analyze the scientific response to *V. orientalis* from 2012 to 2025 through a literature review, focusing on the Andalusian region and placing it in a global context. Understanding the scientific attention devoted to this species is essential for guiding future management strategies and mitigating its impacts.

METHODOLOGY

A literature review was conducted in Google Scholar; articles were found using the keyword "*Vespa orientalis*" for the global study, whereas keywords related to southern Spain were added for the localized version. A large number of studies were manually reviewed to ensure that only those describing *V. orientalis* as a threat to public health or beekeeping were identified, mostly in its invasive role, were represented in the final data. Purely taxonomical studies and those discussing the hornet in its native ecological niche without causing harm were excluded. Publications were then classified by year and region.

PROBLEM DESCRIPTION

The first detection of *Vespa orientalis* in Spain dates back to 2012, highlighting that its presence in the Iberian Peninsula is not recent. The species poses serious risks to apiculture and agriculture by aggressively preying on honeybee colonies and damaging fruit crops. Its presence in urban areas also raises public health concerns due to the potential for allergic reactions to stings.

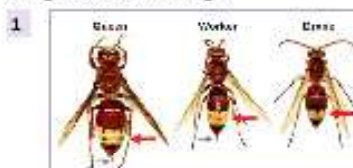


Figure 1. *V. orientalis* exhibits yellow abdominal bands (red arrows) that stop short of the tip of the abdomen. Coloration, body size, and structural traits vary depending on the individual's sex and caste within the colony. Only females have stingers (grey arrows). Photos are Courtesy of Joseph Dvorak, www.biolb.cz. Figure 2. *Vespa orientalis* attacks on one's own hives, causing stress and weakening of the bees (photograph taken by the author).

RESULTS AND CONCLUSIONS

Data shows a significant rise in global publications in 2019 and its following years, with moderate growth in Southern Spain.

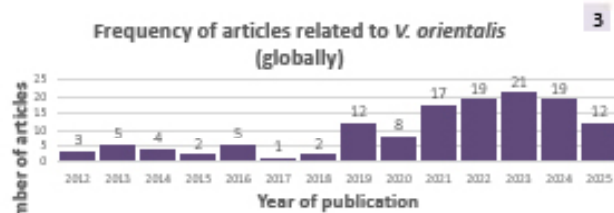


Figure 3 & 4. Global frequency of articles related to *V. orientalis* threat since 2012, globally and in Southern Spain, respectively.

In both cases, a sudden spike in research interest in 2019 marks the start of a trend that continued to this day. Although moderate in Spain, the increase in scientific literature surrounding the recently introduced invasive species highlights rising concern. This increase is very likely linked to the rapid expansion and danger posed by the hornet, as its impacts start to become more noticeable in the apicultural and agricultural world.

Although the rise in scientific literature is a result of the worsening situation, it also indicates that more coordinated efforts are being carried through, bringing new knowledge that will potentially help in the application of future measures. However, gaps remain in understanding long-term impacts and management strategies. Institutional and scientific collaboration is needed, as there is limited research on effective control strategies. Early and unified action is urgently needed to mitigate its ecological and economic impact.

Advances in research into pheromones and specific traps are needed to improve the detection and control of these species. At the same time, the government must urgently strengthen port surveillance and curb massive maritime import traffic, often involving agricultural products below production costs in Spain. This uncontrolled entry of products increases the risk of invasive species entering the country. Furthermore, these food products, transported over long distances, cause pollution by having a larger carbon footprint.

PRACTICAL IMPLICATIONS FOR BEEKEEPERS

V. orientalis predation on honeybee colonies leads to reduced honey production and crop pollination. Its impact also extends to fruit agriculture, damaging crops like grapes. Beekeepers should implement evidence-based mitigation strategies such as narrowing hive entrances and deploying baited traps (including hive entrance traps and light-based funnel traps). Active collaboration with researchers and authorities is essential for outbreak monitoring and targeted control, as well as the implementation of science-based practices to reduce colony vulnerability. Engagement in public awareness and policy advocacy is also critical to ensure this threat's recognition and to promote coordinated response measures.

ACKNOWLEDGMENT

We would like to thank Leo Martos for his collaboration on this poster, as well as all those who support bees and those who continue to research solutions to the serious problems faced by beekeeping.

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Background/PURPOSE: The oriental wasp (*Vespa orientalis*), as invasive species, has garnered growing scientific attention due to its negative impact on local ecosystems and apiculture in southern Spain. This study aims to analyze the evolution of the number of scientific publications on this issue to understand the extent of research and predominant areas of focus.

Problem Description: The expansion of the oriental wasp has raised concerns among beekeepers and ecologists due to its predation on honeybees (*Apis mellifera*), which are crucial for pollination and honey production. Insufficient research could hinder the implementation of effective control and mitigation measures.

METHODOLOGY: An exhaustive review of academic databases and specialized publications was conducted to identify relevant studies on the oriental wasp in the Andalusia region. Temporal and thematic trends of the published articles were analyzed. This review allowed us to identify the main research focuses and evaluate the scientific response to the invasion of this species.

Results and CONCLUSIONS: The results reveal an increase in the number of publications in recent years, reflecting greater concern and effort by the scientific community to address this threat. However, gaps in current knowledge were identified, particularly concerning effective control methods and the long-term impact on local biodiversity. It is imperative that more research is conducted to develop sustainable management strategies. Additionally, it is crucial that local and national administrations implement more rigorous measures to control the spread of this invasive species and protect both honeybee colonies and regional biodiversity.

Practical Implications for Beekeepers: Beekeepers need to stay informed about research trends to adopt evidence-based practices and collaborate with researchers and local authorities in developing sustainable management strategies. Continued research is essential to provide effective solutions and protect honeybee colonies.