



ARE WE UNDERGOING AN INSECT APOCALYPSE?

A CAUTIONARY POST ON (DIS)INFORMATION





The "insect apocalypse" refers to the idea of a massive, global decline in insect numbers, leading to ecological disaster, due to modern agricultural practices and chemical use. This concept has sparked fears of losing pollinators, disrupting food chains, and harming ecosystems. But is this truly the case?



Many media outlets have published alarming stories about insect declines [1][2], often citing studies suggesting drastic reductions in specific populations. These reports have created a sense of imminent ecological crisis.



However, properly conducted research presents a more nuanced picture: some populations are declining, others are stable or increasing, and trends vary significantly by region and species.

[1] Kahn, M. (2018, November 27). The Insect Apocalypse. The New York Times Magazine. <https://www.nytimes.com/2018/11/27/magazine/insect-apocalypse.html>

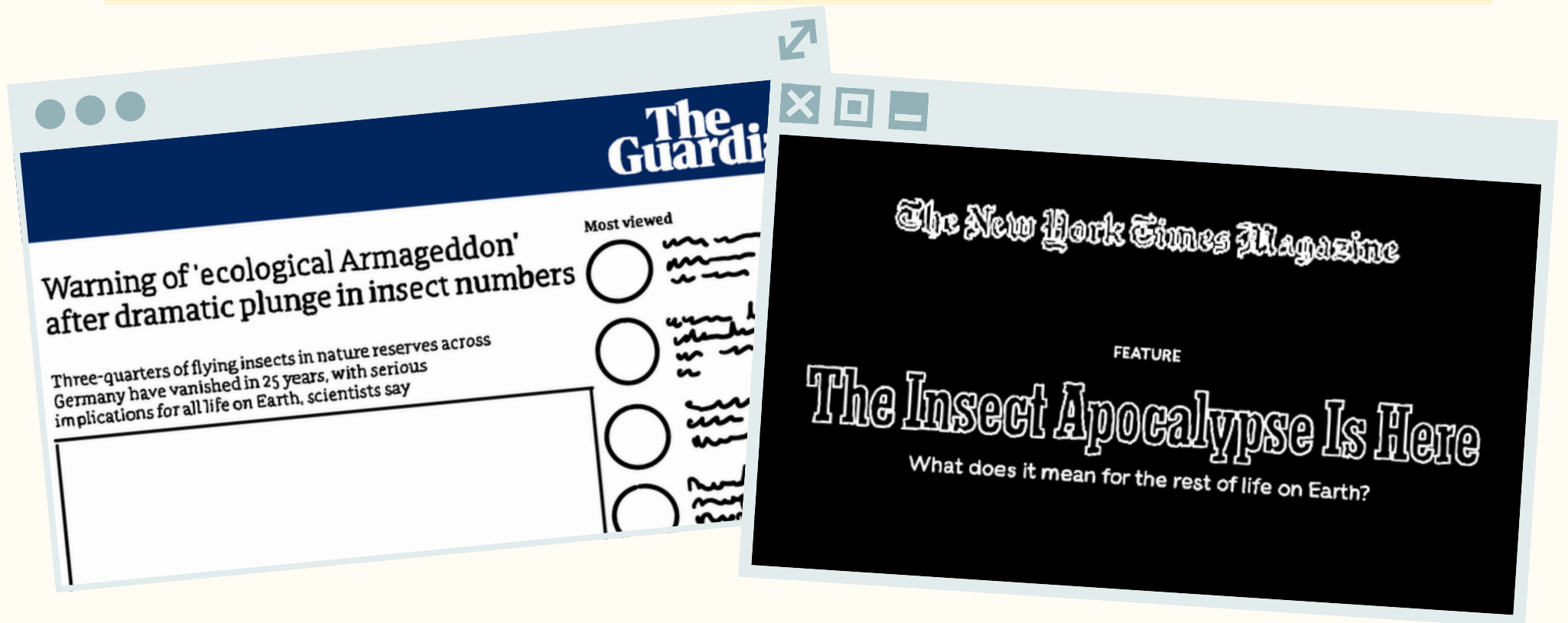
[2] Sample, J. (2017, October 18). Warning of ecological armageddon after dramatic plunge in insect numbers. The Guardian. <https://www.theguardian.com/environment/2017/oct/18/warning-of-ecological-armageddon-after-dramatic-plunge-in-insect-numbers>

ALARMIST FINDINGS

Several high-profile studies have reported dramatic declines in insect populations [3][4], such as a 2017 study from Germany that claimed a 75% decline in flying insects over 27 years in protected areas.

AND MEDIA AMPLIFICATION

Media reports amplified these findings, warning of an imminent ecological crisis and widespread biodiversity loss.



[3] Hallmann, C. A., Sorg, M., Jongejans, E., Siepel, H., Hof, A. R., Schwan, H., ... & van Turnhout, C. A. M. (2017). More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLOS ONE, 12(10), e0185809. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0185809>

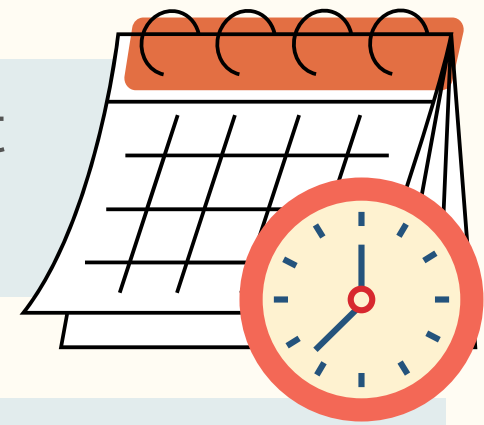
[4] Sánchez-Bayo, F., & Wyckhuys, K. A. G. (2019). Worldwide decline of the entomofauna: A review of its drivers. Biological Conservation, 232, 8-27. <https://doi.org/10.1016/j.biocon.2019.01.022>

HOWEVER, EXPERTS WHO REVIEWED THESE STUDIES POINTED OUT SIGNIFICANT LIMITATIONS...

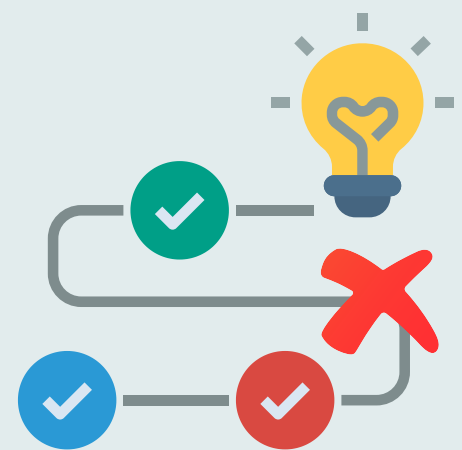


Geographic Scope: Limited to specific areas, often small and not representative of broader trends.

Temporal Scope: Short-term data that might not capture natural fluctuations and long-term trends.

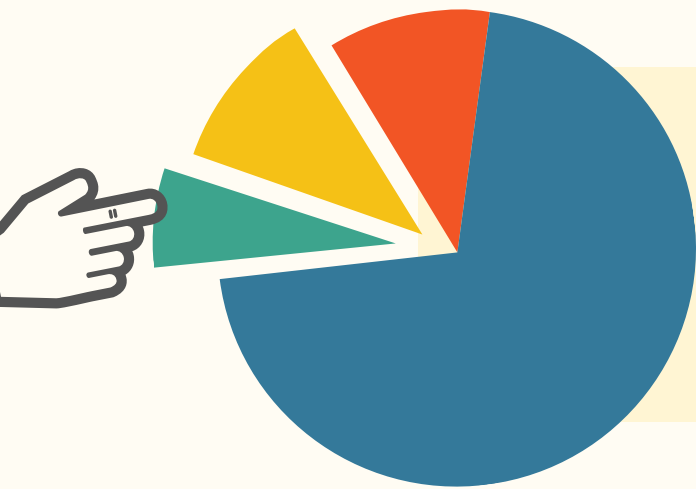


Species Focus: Concentration on a few species, neglecting the vast diversity of insect life.



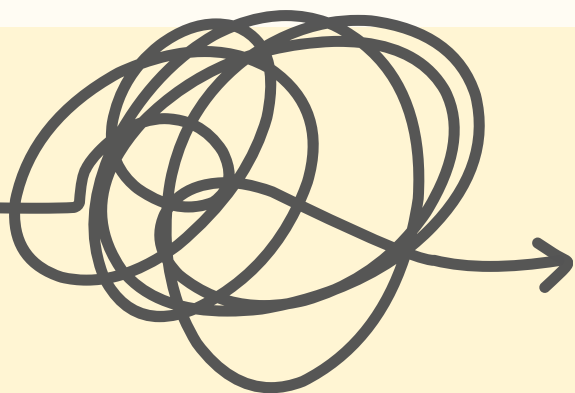
Methodological Issues: Inconsistent methodologies and potential biases in data collection and interpretation. For example, some researchers of these studies, claimed that industrial-scale, intensive farming and pesticides were to blame, although their studies were not designed to determine the cause of the insect declines.

ALSO, INSECT SCIENTISTS AKA ENTOMOLOGISTS HAVE RAISED SEVERAL CONCERNS ABOUT THE 'INSECT APOCALYPSE' NARRATIVE...



Selective Data Use: Highlighting declines in specific regions while ignoring stable or increasing populations elsewhere.

Exaggeration and Misinterpretation: Media and some researchers have overstated findings, leading to public panic.



Complex Realities: Insect populations are influenced by multiple factors, including climate change, habitat loss, and pollution, which vary greatly by region and species.

One of the major studies [see 4] that helped promote the apocalypse narrative, was later criticised by other scientists.

“

From a scientific perspective, there is so much wrong with the paper [4], it really shouldn't have been published in its current form: the biased search method, the cherry-picked studies [...]. And it was presented as a 'comprehensive review' and a 'meta-analysis', even though it is neither.

- Manu Sanders, Jasmine Janes and James O'Hanlon [5]

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Biases in publishing were also blamed...

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publication bias ... more dramatic results are more publishable. Reviewers and journals are more likely to be interested in species that are disappearing than in species that show no change over time.

- Matthew D. Moran [6]

”

[5] Manu Sanders, Jasmine Janes and James O'Hanlon (2019). Moving on from the insect apocalypse to evidence-based conservation. Ecology is not a dirty word.

[6] Matthew D. Moran (2020). No signs of large-scale insect apocalypse in North America yet, study says. Washington Post.

SO WHAT DOES COMPREHENSIVE RESEARCH SHOW ABOUT THE 'INSECT APOCALYPSE'?



When examining data from 166 long-term surveys performed at 1,676 sites worldwide, between 1925 and 2018, the picture that emerges is a more nuanced one [7]

1 The analysis revealed a high variation in trends - sometimes, in nearby sites, one experienced declines while another indicated no changes or even increases.

2 But when all trends across the world were combined, the researchers were able to estimate how total insect abundances were changing on average over time.

3 They found that for terrestrial insects, there was an average decrease of 0.92% per year. On the other hand, insects that live part of their lives under water, showed an annual average increase of 1.08%.



One limitation of this review, is that despite being comprehensive it draws more extensively on studies from North America and Europe.

[7] Roel van Klink et al. (2020). Meta-analysis reveals declines in terrestrial but increases in freshwater insect abundances. Science 368, 417-420. <https://doi.org/10.1126/science.aax9931>

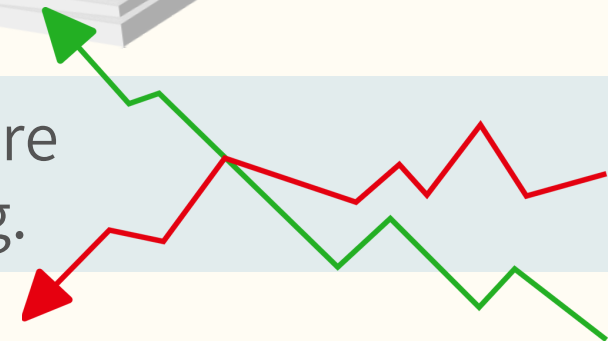


The review concluded that the only clear factor linked to insect declines was urbanisation, likely due to habitat destruction, while cropland was found to be associated with insect abundance.

ALL IN ALL, WHAT A WIDER ARRAY OF WELL PERFORMED STUDIES SHOW IS...



Mixed Trends: Some insect populations are declining, but others are stable or even increasing.



Long-Term Data: Longer-term studies reveal that natural fluctuations are common, and some perceived declines might be part of normal cyclical patterns.

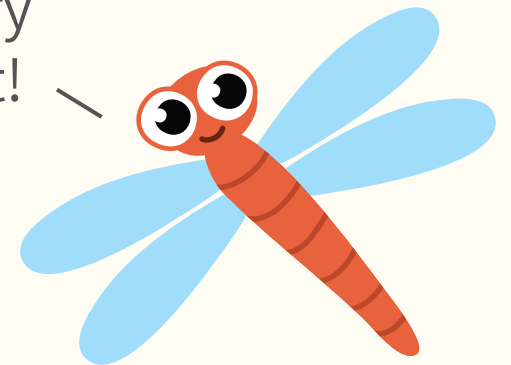
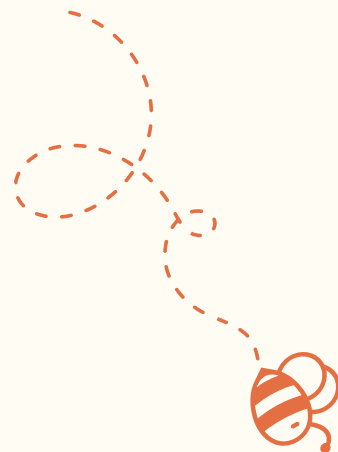
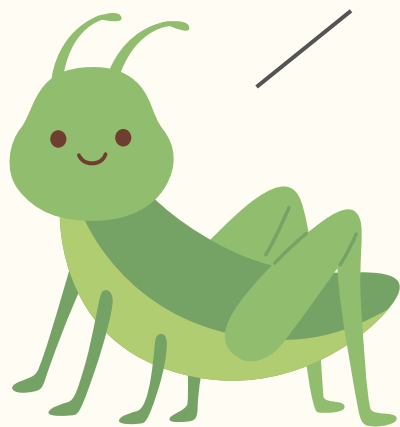
Regional Variations: Declines are more pronounced in certain areas (e.g., urbanised areas), while others (e.g., conservation areas) show resilience.



OF COURSE, ALL OF THAT DOESN'T MEAN THERE ARE NO ISSUES OR THAT HUMAN ACTIVITIES HAVE NO EFFECT ON INSECT POPULATIONS

Yeah, we are VIPs
- very important
insects

We are very
important!




THEY CLEARLY DO, MAKING EFFORTS TO REDUCE THIS IMPACT CRUCIAL.

HOWEVER, THERE IS STILL MUCH WE DON'T KNOW, AND RESEARCHERS EMPHASISE THAT THE FIRST STEP IN HELPING INSECTS IS TO CONDUCT MORE COMPREHENSIVE RESEARCH.

SOME OF THE THINGS THAT WE DON'T KNOW...

Only about **one-fifth** of the estimated insect species on Earth are known to science.



Comprehensive knowledge of ecology, life history, and distribution, as well as long-term data, is largely **limited to a few charismatic or economically-important species**, such as bees, butterflies, moths, and dung beetles.

Most published **long-term insect surveys** are **are from the UK and Europe**, with limited data from other regions.



Why are some species declining and some increasing? Why do declines/increases happen periodically? Why do some species decline from identified drivers, and then recover? How do invasive species impact native insects?

RESEARCHERS ARGUE THAT IF WE WANT TO SAVE INSECTS, WE NEED TO ANSWER THESE QUESTIONS



SO ALL IN ALL... THIS IS THE KEY TAKEAWAY:

We disagree with the catastrophic decline narrative, not the concept of population declines or that individual studies have shown declines in some places. Declines are probably happening elsewhere too, but we have no data to prove it. Yet other insects are not declining, and some are increasing in population size or range distribution. New species are being named every year, most of which we still know nothing about.

Presenting the global decline narrative as consensus or fact is simply misrepresentation of science. By continuing to promote the narrative, we may suffer from confirmation bias, potentially encouraging scientists to look for evidence of declines in their data where they may be none.

- Manu Sanders, Jasmine Janes and James O'Hanlon [5]

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Moving on from the insect apocalypse to evidence-based conservation - Ecology is not a dirty word - Manu Saunders

Media hype has missed the biggest concern that ecologists and entomologists have about six-legged life: how little we know about it. - Manu E. Saunders - American Scientist

Saunders, M. E., Janes, J. K., & O'Hanlon, J. C. (2020). Moving On from the Insect Apocalypse Narrative: Engaging with Evidence-Based Insect Conservation. BioScience, 70(1), 80–89. <https://doi.org/10.1093/biosci/biz143>