Science

Insect population and species decline a 'wake-up call', scientists say

ABC Science By Kylie Andrews and Carl Smith

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Insects are an essential element in the food chain that supports life on our planet. (Flickr: Christian Guthier)

If you're old enough you may remember having to wipe the squished remains of moths, grasshoppers and other insects from your windscreen when driving through regional Australia.

According to Francisco Sanchez-Bayo that's a great Australian tradition gone.

"When I started doing studies we had to stop every time we filled up petrol to clean the windscreen, because it was full of moths and crickets and insects of all kinds. And now there are none," he said.

It's anecdotal evidence, but it's backed up by the first global review of studies of insect decline across the world and the reasons for it, undertaken by Dr Sanchez-Bayo, an honorary associate at the University of Sydney and published recently in **Biological Conservation**.

Key points:

- Scientists looked at 73 longitudinal studies of insect populations from around the world
- On average, 41 per cent of known insect species in the studies were in population decline
- Losses were reported across all insect groups, but some species were increasing in number

"Among those, a third of all the species are going into extinction. They're in danger right now. The rate of extinction in insects is about eight times higher than the rate of extinction of vertebrates."

Dr Sanchez-Bayo and his colleague Kris Whyckhuys analysed all the long-term studies of insect populations they could find. The majority of the 73 studies were from Western Europe and the US, with only a handful of studies from other parts of the world and only one from Australia.

One study, in Germany, saw a 75 per cent decline in insect biomass over 27 years. Another study in Puerto Rico reported losses of between 78 and 98 per cent over 36 years.

The rates of decline are so dramatic — up to 2.5 per cent a year — that Dr Sanchez-Bayo claims that at current rates there may be no insects in those regions within 10 years.

Losses were reported across all insect groups, although some species were increasing in number, he said.

"The ones that are going extinct are the specialist species, which require very specific conditions to live on," Dr Sanchez-Bayo said.

Insect decline claims 'not backed up'

That's the reason that Manu Saunders, a research fellow in ecosystem services, believes that the claims of catastrophic decline made by Dr Sanchez-Bayo are overstated.

"It's an important wake-up call that insect populations are changing in some places."

"But to claim worldwide decline of all insects is not backed up by what data is actually available."

Many insect species on Earth haven't been described yet, so we don't know anything about them — where they live, how they live, what their life cycle is, what impacts them.

"A lot of insects could be affected worse, or they could not be as bad, but the point is that we don't actually know," said Dr Saunders.

In Australia, most of our native insect species haven't yet been identified. The only study suitable to be included in Dr Sanchez-Bayo's analysis was on commercial honey bees in Queensland.

So what's causing declines?

There were many different causes for the declines in the reviewed studies.

However, Dr Sanchez-Bayo found that there were four significant factors: habitat loss; pollution, especially pesticides and fertilisers; biological factors, including pathogens and introduced species; and climate change.

The dramatic loss of insect biomass in Puerto Rico was attributed largely to climate change, with a strong correlation with the frequency of severe cyclones and subsequent forest destruction.

More research needs to be done before we begin to understand what's happening with Australian insects
(Richard Foster: User submitted)

In Germany, the reduction in insects was attributed to the introduction and increasing use of systemic pesticides, applied as a prophylactic against insect pests.

"If you live in the tropics it's most likely to be deforestation and climate change [that are responsible for declining insect populations], but in Europe — where deforestation is no longer a problem — it's use of chemical fertilisers and pesticides, and the reduction of other elements that used to be present in the agricultural landscape, such as hedge rows, trees, flowers, weeds."

However, Dr Saunders points out that we can't necessarily extrapolate the information to Australia, or other areas not covered by the review.

"It's OK to speculate that these drivers are likely to be having the same affect in areas where we have no data, but we can't say that unequivocally."

When the insects go, the animals go

Dr Sanchez-Bayo is aware that his claims are dramatic, but believes it's an important to draw attention to this issue.

"We try to ring the alarm bells very loudly so everyone listens," he said.

Besides all the important functions that insects play in our ecosystems — such as pollination, or recycling nutrients — they are also an essential element in the food chain that supports life on our planet. When the insects go, the frogs, birds and mammals don't have food.

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