Watlington Environment Group - October 2018

Where have all the insects gone? By Dr Nick Issac

Nick Isaac's informative talk was squarely addressed at this question. Dr Isaac is a macroecologist at the Centre for Ecology and Hydrology in Wallingford and his main research interest is how we can measure the change in biodiversity and what that can tell us about the reason's behind it. His talk was full of statistical information on changes in the insect population and how that points to the drivers for these changes. He started with a German study that has been running since 1990 that trapped flying insects in 64 different nature reserves. The study found a 75% decline in flying insect numbers over the 25 year period to 2015. Is this evidence of insect Armageddon?

The answer, as is so often the case, is yes and no. No there has not been such a large decline in overall insect numbers but there has been a significant fall in some species but not in others. For butterflies the total number has been indeed declined but the decline is much larger for the rarer species than the more common species. For moths some species, such as the Garden Tiger moth, the decline has been huge (92% since 1965 in a UK study) while the same survey found increases in other species of moth, especially lichen feeding moths.

There are many problems with these comparisons. Examples of these include the initial years of surveys looking at only the more favourable sites while additional sites added in later years could be less favourable; a lack of continuity in the locations sampled; inconsistency of the reporting or uncertainty about the weather conditions when samples are collected. For butterflies, for example, the number of sampling records available has increased by a factor of 40 over a 40-year period, so that more recent studies may be showing a more realistic picture of the national abundance than the earlier ones. Much of the work of researchers such as Dr Isaac is devoted to finding ways of getting around these sampling problems, such as developing occupancy models to provide measures for whether particular species are found in different cells (such as the familiar 5km squares).

Going into the detail of these models was clearly beyond the scope of a single short presentation, so Dr Isaac concentrated instead on what they could show about the possible drivers for the fall in the insect population. These drivers include:

- Agricultural intensification leading to loss of natural habitats especially for pollinating insects
- Invasive species such as the harlequin ladybird leading to loss of indigenous species
- Climate change showing up as a general northward shift of the range of many insects
- Extreme climate events such as severe droughts giving a step fall in numbers of some species followed a slow recovery over the following years
- Increasing use of pesticides like neonicotinoids applied to oilseed rape are shown as contributing up to a quarter of the fall in populations of some bee species that forage on oilseed rape crops.

The conclusion? Yes, there is a decline in the insect population, but it is not universal, with some groups increasing. It is not yet an insect Armageddon. Biological records, including those provided by amateur observers are useful and informative, and provide the means for modelling the causes of the losses.

I.H.