The Glasgow Naturalist (2022) Volume 27, Part 4, 1-2

EDITORIAL

Establishing the facts

I.C. Wilkie

Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow, Glasgow G12 8QQ

E-mail: iain.wilkie@glasgow.ac.uk

A notable strength of *The Glasgow Naturalist* is the taxonomic breadth of the submissions received. The articles in this issue, for example, deal with organisms ranging from the familiar – great tits and cockroaches – to groups most of us will never encounter (and may not have heard of) – spiny-headed worms from hedgehog faeces and barnacles that live on the shells of sea turtles. The article on great tits (Maciver, 2022) includes the first report of pellet regurgitation in great tit nestlings, a reminder that there may be new things to discover about the natural history of even the commonest and most intensely studies species. As observed by Staab *et al.* (2014), it is highly likely "that there are very many functionally important life-history traits yet unknown across the tree of life, both in already known species and in species awaiting discovery." In a time when ecosystems are under various threats, the need for basic observational natural history has never been more important.

This issue includes the third and final part of the supplement *On the Wildside Revisited: 200 Years of Wildlife in the Glasgow Botanic Gardens* (hereafter "OtWR"). The whole series comprises 18 articles occupying around 68 pages, which contrasts with the seven articles and 21 pages of the original *On the Wildside* supplement ("OtW") (Hancock, 1998, 1999). Therefore, although not dealing with some of the groups covered in OtW – notably vascular plants and several animal phyla found in freshwater – OtWR provides a more detailed account of the groups that are included. It also incorporates two major groups – bryophytes and lichens - that were omitted from OtW.

According to the most recent data (January 2022; https://www.gnhs.org.uk/biodiversity/GBG_splist.pdf), 1,510 species, subspecies and varieties have been recorded in Glasgow Botanic Gardens. Of these, 580 (38%) are insects, which are by far the most speciose group, second place being occupied by flowering plants with around 400 species, subspecies and varieties. Glasgow Botanic Gardens reflects in miniature the world dominance of insects, which are estimated to account for over 50% of all described species (Tihelka *et al.*, 2021). This statistic partly fuels current fears over an impending "insectageddon" widely promoted in both the popular press (e.g. Carrington, 2019; Goulson, 2021) and scientific literature (Hallmann *et al.*, 2017; Cardoso *et al.*, 2020). Cardoso *et al.* (2020) suggest that half a million insect species face extinction in the coming decades. However, the picture is far from clear-cut. Data from the Rothamsted Insect Survey, collected over the last 30 years, indicate that "severe declines [in insect biomass] are not supported by the world's longest-running insect population database" (Macgregor *et al.*, 2019, 2021). Other independent evidence also contradicts the prevailing concern: the U.K. Bat Index, a measure of the relative abundance of 11 of the U.K.'s 17 bat species, increased by 47% between 1999 and 2019 (JNCC, 2021), which is hard to reconcile with a collapse in insect populations, at least within a U.K. context.

Within the Scottish context, there has been in the last year widespread dissemination of a general "apocalypse now" message. For example, in a press release the CEO of NatureScot (formerly Scottish Natural Heritage) was quoted as saying "Scotland has already lost nearly 25% of its wildlife" (NatureScot, 2021a). In subsequent promotional material, NatureScot asserted "We've already lost nearly 25% of our wildlife in Scotland, with… 11% of our species facing extinction" (NatureScot, 2021b). More recently, the latter statistic was endorsed by the Scottish Wildlife Trust in a donation request mailed out in spring 2022: "1 in 9 species in Scotland faces extinction." These figures imply that Scotland's wildlife is undergoing a catastrophic decline: nearly a quarter of it has disappeared. What are the facts?

The source of these figures is the latest *State of Nature Scotland* report (Walton *et al.*, 2019) in which it is stated that since 1994 there has been an average reduction of 24% in the relative abundance of 352 monitored species. As there are around 60,000 organisms (excluding microbes) in and around Scotland (NatureScot, 2021c), this finding is based on information from 0.6% of Scottish species. Furthermore, the *State of Nature* authors do not claim that these species are representative of the Scottish biota: they are restricted to four iconic groups – moths, butterflies, birds and mammals; no plants, fungi or lichens are included; no marine species;

no beetles or flies, the most species-rich insect orders in Scotland. It is a misrepresentation of the facts to equate an average drop of 24% in the abundance of an unrepresentative 0.6% of Scottish species with the loss of nearly 25% of Scottish wildlife.

On a comparable note, the claim that 11% (1 in 9) of our species are facing extinction is derived from the assessment of 6,413 species using Regional Red List criteria: 11% of these have been formally classified as threatened, i.e. all that can be deduced from the *State of Nature* data is that 642 species – 1.1% of all Scottish species, not 11% - are at risk of extinction. Since only 10% of Scottish species have been assessed, we do not know what proportion of the Scottish biota is threatened; it could be much more than 11% or it could be much less.

Is this nit-picking? Does it matter if NatureScot and the Scottish Wildlife Trust "extrapolate beyond the data" in their mission to heighten awareness of the biodiversity crisis? The truth surely does matter. What is known with certainty, e.g. that over 640 species are at risk, is alarming enough without having to be exaggerated. The limitations of current knowledge that are exposed in the *State of Nature* report should be an incentive to all naturalists to get out into the field and find out what is really going on. This further emphasises the importance of observational natural history. To quote Staab *et al.* (2014) again: "Accurate and holistic data on species, traits, and communities will be vitally important to predict response of species and ecosystems to global change…". We all have a duty to establish the facts.

ACKNOWLEDGEMENTS

The comments above on "insectageddon" owe much to the clear and considered explication of this issue in McIntosh (2020). I am very grateful to Chris McInerny, Ruth Maclachlan and Richard Weddle for their assistance in the editing, assembly and website presentation of the journal, and to the external experts whose critical evaluation of submitted manuscripts is crucial in maintaining the journal's scientific standards. The external reviewers for this issue were (in alphabetical order): K. Alexander, M. Culshaw, J. Dodd, E.G. Hancock, N. Hand, S.A. Hinsley, A. Lavery, I. MacDonald, C. Poirier, G.P. Rotheroe, N. Simpson, M. Wayland, R.B. Weddle, N.A. Welden, A. Whiffin and J.D. Zardus.

REFERENCES

Cardoso, P., Barton, P.S., Birkhofer, K., Chichorro, F., Deacon, C., Fartmann, T. *et al.* (2020). Scientists' warning to humanity on insect extinctions. *Biological Conservation* 242, 108426. https://doi.org/10.1016/j.biocon.2020.108426

Carrington, D. (2019). 'Insect apocalypse' poses risk to all life on Earth, conservationists warn. *The Guardian* 13/11/19. https://www.theguardian.com/environment/2019/nov/13/insect-apocalypse-poses-risk-to-all-life-on-earth-conservationists-warn Accessed 13th April 2022.

Goulson, D. (2021). Insects are vanishing from our planet at an alarming rate. But there are ways to help them. *The Guardian* 21/9/21. https://www.theguardian.com/commentisfree/2021/sep/21/insects-vanishing-alarming-help Accessed 13th April 2022.

Hallmann, C.A., Sorg, M., Jongejans, E., Siepel, H., Hofland, N., Schwan, H. *et al.* (2017). More than 75 percent decline over 27 years in total flying insect biomass in protected areas. *PLoS ONE* 12(10): e0185809. https://doi.org/10.1371/journal.pone.0185809

Hancock, E.G. (Editor) (1998). On the wildside: the natural history of the Glasgow Botanic Gardens. *The Glasgow Naturalist* 23(3), 40-56.

Hancock, E.G. (Editor) (1999). On the wildside: the natural history of the Glasgow Botanic Gardens. *The Glasgow Naturalist* 23(4), 59-64.

JNCC (2021). *Biodiversity Indicators 2021. C8. Mammals of the Wider Countryside*. https://.gov.uk/our-work/ukbi-c8-mammals-of-the-wider-countryside/

Maciver, S.K. (2022). The production of regurgitation pellets in the great tit (*Parus major*). *The Glasgow Naturalist* 27(4), 7-12. https://doi.org/10.37208/tgn27405

McIntosh, A. (2020). *Riders on the Storm*. Birlinn, Edinburgh.

NatureScot (2021a). Nature agency calls on Scots to put water out for wildlife this summer. News Release 5/7/21. https://presscentre.nature.scot/news/nature-agency-calls-on-scots-to-put-water-out-for-wildlife-this-summer Accessed 13th April 2022.

NatureScot (2021b). Promotional cover: Climate needs nature. *The Herald* 6/11/21.

NatureScot (2021c). *Marine and Terrestrial Species Indicators: Experimental Statistic*. NatureScot, Inverness. https://nature.scot/doc/marine-and-terrestrial-species-indicators-experimental-statistic Accessed 12th April 2022.

Staab, M., Ohl, M., Zhu, C.D. & Klein, A.M. (2014). Observational natural history and morphological taxonomy are indispensable for future challenges in biodiversity and conservation. *Communicative & Integrative Biology* 8:1, e992745. https://doi.org/10.4161/19420889.2014.992745

Tihelka, E., Cai, C., Giacomelli, M., Lozano-Fernandez, J., Rota-Stabelli, O., Huang, D. *et al.* (2021). The evolution of insect biodiversity. *Current Biology* 31, R1299–R1311. https://doi.org/10.1016/j.cub.2021.08.057

Walton, P., Eaton, M., Stanbury, A., Hayhow, D., Brand, A., Brooks, S. *et al.* (2019). *The State of Nature Scotland 2019*. The State of Nature partnership. https://www.nature.scot/doc/state-nature-scotland-report-2019 Accessed 12th April 2022.