

## COMMENTARY

**Institutional vertebratism hampers insect conservation generally; not just saproxylic beetle conservation**

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The mismatch between conservation priorities and protected area designation and the actual conservation of animal biodiversity in general is admirably summarized by D'Amen *et al.* (2013). Despite the regional and taxonomic bias of their paper, D'Amen *et al.* (2013) address a global issue; the mismatch between conservation priorities and protected area designation and the actual conservation of animal biodiversity in general. In other words, they highlight the fact that conservation priorities, despite many being based on the widely praised International Union for Conservation of Nature Red List, operate in a taxonomically biased environment relying on knowledge of a tiny proportion of the animal world, that is, the vertebrates. This bias, well known for many years (Clark & May, 2002), does not just impinge on insect conservation (Shardlow, 2012) but also on food security (Leather, 2009a).

Although it has been widely recognized for some time that biodiversity hotspots for one taxon frequently do not map on to others (Prendergast *et al.*, 1993; Prendergast, Quinn & Lawton, 1999) and genetic diversity is not necessarily well represented in large collections (Rauch & Bar-Yam, 2004), hotspots are still assigned a high conservation value (Vellend & Kharouba, 2013) and protected areas are based on the bigger the better approach, without taking into account the varied needs of invertebrates which could more easily be accommodated in smaller areas (Kirby, 1992).

Even more importantly, D'Amen *et al.* (2013) highlight the often ignored fact that less than 0.5% of invertebrates have been assessed for the Red List compared with 42% of vertebrates (Clausnitzer *et al.*, 2009). Thus with the best will in the world, even when set on habitat requirements as within the Natura 2000 network, conservation priorities cannot hope to come anywhere near meeting the task of avoiding the loss of not just those invertebrate species that have been identified as being at risk, but of the untold millions that as yet remain identified. We can begin to address what at first seems an insurmountable problem by adopting, as D'Amen *et al.* (2013) have done, a functional group approach, and devise and adopt suitable management

options as has been done recently for saproxylic invertebrates (Müller & Büttler, 2010).

To do this however, we need a suitable cohort of entomologists skilled in field work and another with specialist taxonomic training (Cardoso *et al.*, 2011). This then raises another problem, the imbalance between researchers and organizations working on vertebrates and invertebrates (Didham, Basset & Leather, 2010; Cardoso *et al.*, 2011). Although the majority of vertebrate species worldwide have been identified and classified, the situation for invertebrates is very much the opposite (Basset, Hawkins & Leather, 2009), yet funding is heavily biased towards the former (Leather, 2007, 2009a; Collen *et al.*, 2012) and despite recent successes, there appears to be institutional resistance to the establishment of organizations dedicated to invertebrate conservation (Cardoso *et al.*, 2011; Shardlow, 2012). Overall, this has led to a perception that zoology and animal biology is the study of vertebrates (in fact UK research councils do not count insects as animals where ethics are concerned) and journals with the word animal in their titles also appear to share this opinion (Leather, 2009b). As a result, students of all ages, but particularly as undergraduates, have little exposure to invertebrates, despite their ubiquity in the real world. This of course leads to a shortage of academics with expertise in invertebrate zoology to inspire and produce the next generation. There is thus a grave shortage of professional entomologists not just in the UK, but in many other parts of the world too, although the UK appears to be among the worst for undergraduate training opportunities (Leather, 2007) and in producing the next generation of natural historians in all areas (Leather & Quicke, 2009, 2010).

D'Amen *et al.* (2013) have, even if unintentionally, highlighted the fact that when it comes to conservation, one size does not fit all and that in conservation; it is the small things that matter and deserve our attention. Even more importantly, although insects may be small in comparison with the large charismatic megafauna, upon which much conservation effort has been and is expended, the scale of the problems of their conservation and identification of the number

of species at risk dwarfs that of vertebrates by at least an order of magnitude (Cardoso *et al.*, 2011; Collen *et al.*, 2012). We desperately need to recognize not only the enormity of the task ahead of us, but the necessity to engender a perception shift in national governments (Collen *et al.*, 2012) and the population as a whole. It is perhaps apposite to suggest that the word insect in the title of this article could and should be replaced with the word animal. Too little change too late, will spell disaster for all our ecosystems sooner than we think.

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