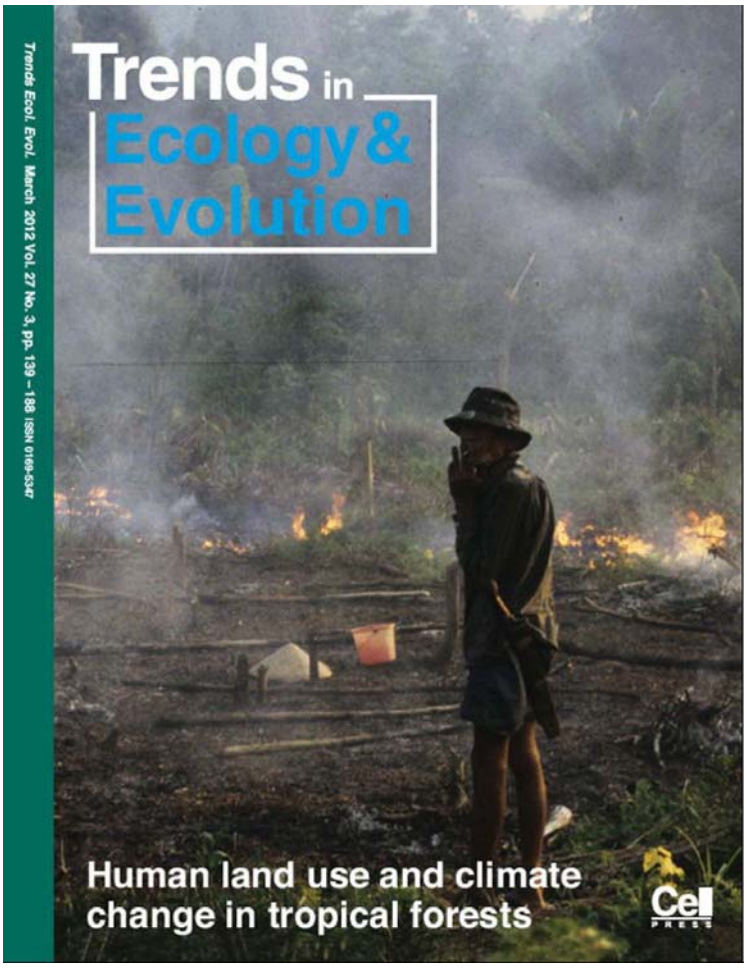

and native plants in the UK, and under much greater threat of extinction. We are concerned that this cycle of scientists advancing questionable arguments for the importance of their work and the media accepting these arguments without scrutiny could result in a skewing of public attention and research funding in favour of honey bee diseases to the detriment of awareness and research on native pollinator declines and extinctions that would have a much greater effect on plant biodiversity. Twenty-three species of bees and 18 species of butterfly have been lost from England during the past 200 years and a reduction in numbers of wild bees and hoverflies in parts of Europe has been mirrored by declines in the plants they pollinate [11]. Maintenance of the terrestrial flora of the world is indeed critically dependant on animal pollinators [12]. By conflating problems in the honey bee industry with the much more acute conservation issue of losses of native pollinators, honey bee researchers do damage to the whole community of researchers working on bee biology and pollination more generally.

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Back to the future: *Apis* versus non-*Apis* pollination

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Twenty years after the exchange between Sarah Corbet and Roger Morse in TREE considering the relative importance of pollinating honey bees, *Apis mellifera*, versus other species [1], this debate continues. Ollerton *et al.* [2] disregarded the main issue of our article about endosymbionts [3], although pathogen prevalence can predict native bee decline [4] and endosymbionts may play a role [3]. Instead, they took issue with our first sentence because it extolled honey bees. We claimed honey bees are essential pollinators for crops and wild plants but Ollerton and colleagues maintained that 'By conflating problems in the honey bee industry with the much more acute conservation issue of losses of native pollinators, honey bee researchers do damage to the whole community of researchers working on bee biology and pollination more generally' [2].

We believe arguments presented to support their critique are weak. Many consist of unpublished data or focus on the UK with little thought to the rest of the world. Thus, the conclusions of Tom Breeze *et al.* [5] did not take into account certain prominent changes in the dependence of UK crops on insect pollination, for example the development of self-fertile true hybrids in oilseed rape *Brassica napus* (http://www.nk.com/fmt/colza/syngenta-winter-oilseed-rape-breeding). Indeed, their subtitle might as well have been 'How important are bumble bees?' because these pollinators are also in decline [6] although yields of pollinator-dependent crops have, nonetheless, increased [5]. Regarding almond yields in California since 2006, production did increase as new orchards came into bearing and such young orchards are more productive than older plantings (Joe Connell, personal communication). Furthermore, more honey bee colonies are shipped to California for almond pollination as pollination fees increased 50% over that period [7],

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thus the stocking rate of colonies per unit area of orchard has not changed. Farmers would simply not pay for their introduction in almonds, apples, blueberries, cranberries, hybrid seed of oilseed rape and sunflower, watermelons and a host of other crops if colonies did not add value to their production. Perhaps, unlike in the UK, pollination of many crops in most parts of the world relies on *A. mellifera* [8]. Analyzed carefully in the field, this is not surprising because their pollinating activity can be greater than that of alternative species, although their individual visits may not be more effective [9].

In the UK, as elsewhere, there are no adequate long-term studies (>4 years) of wild bee population dynamics [10]. Yet evidence of synergism within newly formed plant-pollinator communities (those including exotic members) suggests that within such networks, the addition of plant or pollinator species stabilizes or enhances mutualisms [11]. New competitors facilitate mutualisms and promulgate resource partitioning, leading to shifts in foraging specialties. However, they do not necessarily cause population decline of native bees [11].

We agree with Ollerton *et al.* [2] that there is lack of research on animal pollination. However, more importantly, we feel that it is high time for a more collaborative approach focusing on improving pollination rather than recriminating or advocating one pollinator species or another. Indeed, it has been demonstrated that interactions between *Apis* and non-*Apis* bees can have a large positive impact on overall pollination effectiveness [12]. This provides the rationale for a new integrative paradigm: agricultural pollination should integrate wild species, which provide pollination as an ecosystem service, and managed pollinator introduction as crop management practices. We propose that this new paradigm should replace the '[honey bee] pollination by brute force' approach favored in 1991 [1]. The demonstrated positive interactions between managed and wild pollinators [12] imply that it is fruitless to emphasize pollinating activity of a single species or group of species as if it were foraging alone, whether to emphasize the value of honey bees, as has been done far too often in the past, or the value of wild species, as is attempted far too often recently (e.g. [5]). Indeed, managed and wild pollinating species face many common threats (e.g. pathogens [3,4]) and both are subject to significant declines [3,4]. The public and scientific communities are in favor of pollinator conservation, and the active specialists within the scientific realm should cooperate to ensure sustainable pollination services by 'all' pollinators.

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