Title: **Research trends in ecosystem services provided by insects**

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Abstract

Insects play a key role in the regulation and dynamics of many ecosystem services (ES). However, this role is often assumed, with limited or no experimental quantification of its real value. We examined publication trends in the research on ES provided by insects, ascertaining which ES and taxa have been more intensively investigated, and which methodologies have been used, with particular emphasis on experimental approaches. We first performed a systematic literature search to identify which ES have been attributed to insects. Then we classified the references retrieved according to the ES, taxonomic group and ecosystem studied, as well as to the method applied to quantify each ES (in four categories: no quantification, proxies, direct quantification and experiments). Pollination, biological control, food provisioning, and recycling organic matter are the most studied ES. However, the majority of papers do not specify the ES under consideration, and from those that do, most do not quantify the ES provided. From the rest, a large number of publications use proxies as indicators for ES, assuming or inferring their provision through indirect measurements such as species abundances, species density, species richness, diversity indices, or the number of functional groups. Pollinators, predators, parasitoids, herbivores, and decomposers are the most commonly studied functional groups, while Hymenoptera, Coleoptera, and Diptera are the most studied taxa. Experimental studies are relatively scarce and they mainly focus on biological control, pollination, and decomposition performed in agroecosystems. These results suggest that our current knowledge on the ES provided by insects is relatively scarce and biased, and show gaps in the least-studied functional and taxonomic groups. An ambitious research agenda to improve the empirical and experimental evidence of the role played by insects in ES provision is essential to fully assess synergies between functional ecology, community ecology, and biodiversity conservation under current global changes.

Keywords: Biological control; Coleoptera; Decomposition; Ecosystem functions; Experimental research; Hymenoptera; Insecta; Nutrient cycling; Pest regulation; Pollination.

Introduction

Understanding, valuing, quantifying, and ensuring the provision of ecosystem services (ES) under current global changes have become increasingly important during the last two decades (Turner et al., 2007, Seppelt et al., 2011 and Díaz et al., 2013). Ecosystem services can be defined as the beneficial functions and goods that humans obtain from ecosystems, that support directly or indirectly their quality of life (Harrington et al., 2010 and Díaz et al., 2015). These services are critical for human welfare (Daily et al., 2000), since they include, amongst others, the provision of food, fiber, and water, the regulation of floods, diseases and climate, the control of organic matter decomposition and nutrient cycling, the suppression of pests, and the cultural services associated with recreation or education (Millennium Ecosystem Assessment, 2003 and Díaz et al., 2015). The definition and interpretation of ES has varied considerably in the literature over the years (De Groot et al., 2002, Harrington et al., 2010 and Spangenberg et al., 2014), and this concept is often confounded with related terms such as "ecosystem functions" and "ecosystem goods" (Millennium Ecosystem Assessment, 2003 and Díaz et al., 2015). Ecosystem functions refer to all biogeochemical characteristics of ecosystems (including the structures and processes that may arise as emergent properties), regardless of whether they have a value, or benefit, for humans (Spangenberg et al., 2014). Whereas ecosystem goods correspond to the products of ecosystem services that can be traded by humans through either perception, expectations, experience, utilitarian use, or consumption (Díaz et al., 2015).

Insects (Arthropoda: Insecta) are the largest and most diverse group within the animal kingdom. They are key components in the provision, regulation, and dynamics of many ecosystem services (referred as insect ES herein; Weisser & Siemann, 2004 and Schowalter, 2013). Insects are potentially involved in the four broad types of services defined by the Millennium Ecosystem Assessment (2003): (i) provisioning services, that correspond to material or energy outputs from the ecosystems; (ii) supporting services, that allow the maintenance of other ES; (iii) regulating services, that regulate the magnitude and directionality of ecosystem processes; and iv) cultural services, that do not provide material benefits but have an educational, spiritual and/or aesthetic value (GEO4, 2007 and Prather et al., 2013). Previous efforts to assign monetary values to several ES provided by insects usually understimated the value of these animals to our economies and quality of life (Beynon et al., 2015). Nevertheless, insects provide ES worth at least $57 billion per year in the United States alone (Losey & Vaughan, 2006), and insect pollination may have an economic value of $235 to 577 billion per year worldwide (IPBES, 2016).

A realistic assessment of the contribution of natural resources and biodiversity for the delivery and maintenance of ES depends on having accurate information and a clear understanding of the processes involved in the provision of those services (Haines-Young & Potschin, 2010). There is a general lack of knowledge on the functional roles played by most species in nature (i.e. the so-called Raunkiaeran Shortfall; Hortal et al., 2015). This is particularly important when assessing the value of insect ES. Despite their enormous diversity, insects are often under-represented in ecosystem studies, so their contribution to ecosystem functioning has been comparatively less investigated than other organisms such as plants (Schowalter, 2016). As a consequence, we often lack a comprehensive understanding of the role of insects in many ecosystem processes that underlie ES. Although many efforts to

quantify insect ES have been developed in the last decade (e.g. Prather et al., 2013 and Boerema et al., 2017), their main focus is on a subset of either functional or iconic taxonomic groups, such as pollinating bees or dung beetles.

Current knowledge on the ES provided by insects has usually been obtained from a variety of methodological approaches, ranging from field observations to manipulative controlled experiments, even though such relationships are often simply assumed (e.g. Philpott & Armbrecht, 2006 and Allsopp et al., 2008). Thus, assessment of insect ES includes a wide variety of approaches such as field observations, expert opinions or estimates, assumptions or inferences made from proxies of several aspects of biodiversity (e.g. species richness, total abundance, morphological traits), estimates inferred from trait values, and empirical data obtained from field and/or microcosm experiments that may or may not have been specifically designed to quantify the real ES provision in the first place. These approaches also differ widely in their replicability, accuracy, and applicability of their outputs, direct relevancy to the ES itself, as well as in their costs in terms of time and resources. Further, while they may allow inferring which insects provide which ES, proxies might not be approriate to reveal the mechanisms linking specific traits to particular ecosystem functions or services. A better quantification of the specific relationship between ES and specific traits provides a potentially useful link to the wide-scale prediction of ES (de Bello et al., 2010), although this information is limited to a few groups and ecosystems (see Hortal et al., 2015). This contrasts with greenhouse and cage experiments performed on individual species or simple communities, which enable either maintaining a tighter control of the environmental conditions or subjecting the object of study to well-defined treatments, or both (Lähteenmäki et al., 2015). This allows establishing –and measuring– direct links between given ES and particular individual(s), trait values, and functional compontents of biodiversity (e.g. Dias et

146 al., 2013 and Bílá et al., 2014), while revealing mechanisms behind the relationship between
147 biodiversity and ES. However, these types of studies present several disadvantages, as they
148 can be expensive and laborious. Further, synergies and/or antagonistic effects are difficult to
149 control, and their findings might not be relevant or realistic when up-scaling to real-world
150 conditions and/or when they are extrapolated to different taxa from the model species.

151 We examine the general trends in published research on ES provided by insects, to
152 provide an overview of the overall quality and extent of the current state-of-the-art on this
153 topic. To do this, we conduct a systematic literature search, identifying which specific ES
154 have been attributed to insects, which methodological approaches have been applied to
155 describe and quantify these ES over time, and whether there are any important gaps in current
156 knowledge. In particular, we seek to answer the following questions: (i) Which insect ES have
157 been studied? (ii) Which methodological approaches have been used to study these ES? (iii)
158 Which functional and taxonomic groups of insects have been investigated in this context? and,
159 (iv) Which ecosystems have been monitored experimentally for examining insect ES?
160

161 **Materials and methods**

162 We performed a literature search using different online platforms to identify articles
163 dealing with insect ES published during the last six decades (1956–2016, time interval
164 preselected by default by many of the online platforms). Firstly, we conducted bibliographic
165 queries in the ISI Web of Knowledge (WOK) and Scopus using the keyword string
166 "(ecosystem* service* OR ecosystem* function* AND insect*)", looking for matches in the
167 title, abstract and/or keywords. In addition, we used the same keywords to retrieve articles
168 from the group associated with "ecosystem services and insects" in ResearchGate
169 (www.researchgate.net, one group: ecosystem service insects) and ACADEMIA

(www.academia.edu, three groups: ecosystem services, ecosystem service and ecosystem functions). Since the terms "ecosystem services" and "ecosystem functions" are often used very loosely in the literature, we widened our search by using both terms separately and thereafter discarded those references that were not clearly related to any insect ES. Therefore, from the initial search (updated on 30th December 2016) we retrieved 8,424 records (WOK: 2,348, Scopus: 2,859, ResearchGate: 200, Academia: 3,017). We then eliminated conference papers, articles in press, duplicate records (i.e. articles that appeared more than once in the different search engines, or in the same platform due to typographical errors) and finally, all those references not related to any ES or insect group. The finally selected records included 913 papers that provided ES estimates.

The following information was collected from each selected publication: author(s); year of publication; journal; method used for quantifying each ES according to four categories: not quantified, proxies, directly quantified, and experiments (Table 1); trophic group(s); taxonomic group(s) (order and superfamily or family); ES studied (specific ES or ES in general); and any relevant additional observation as notes. To keep consistency with the literature, we used the term 'biological control' to refer to the most-adequate term "pest and pathogen suppression" (that includes both human-controlled and 'natural' regulation of pest populations). In addition, the type of ecosystem investigated and the location of the study were recorded for the experimental studies.

This type of literature search has several limitations that we considered when analyzing the data and interpreting the results. Firstly, the search may miss some relevant papers, simply because either the title, the abstract or the keywords did not contain the focal keywords. In fact, our literature search was biased towards publications specifically referring to insect groups (i.e. studies that included the word 'insects' only), which could result in

194 missing some papers that focus on particular species (e.g. *Apis mellifera*), functional groups
195 (e.g. pollinators) or larger groups of invertebrates that also include insects. Secondly, the
196 approach we used might have overlooked publications that refer to a particular ES by its name
197 (e.g. pollination) without quoting the words "ecosystem services" *per se* in their abstract or
198 keywords. These limitations have been previously identified by other authors using similar
199 search approaches (see Prather et al., 2013). Thirdly, the term "ecosystem service" is fairly
200 recent, and its use was not common prior to the 1990s, so some older publications addressing
201 some kind of insect ES may not have been detected by our search. Finally, we may have
202 failed to include some works that were not indexed by the platforms used here. However, and
203 despite these limitations, we believe that the data retrieved gives us enough relevant
204 information to examine general trends in insect ES research and to identify knowledge gaps
205 on the topic that could help us to develop future research strategies to better evaluate the ES
206 provided by insects.
207
208 **Results**
209 Our search retrieved 913 articles, published from 1989 to 2016, with relevant
210 information on the ES provided by insects (see Appendix A). There were no papers before
211 1989 with the specific keyword string used for our search. These articles show an
212 exponentially increasing trend in the number of insect ES studies over time (Fig. 1).
213 Pollination, biological control, food provisioning, and recycling organic matter are the most
214 well studied ES (Fig. 2A), although the role of insects has been investigated for many other
215 services, some of them not previously detected by former reviews on insect ES (Table 2).
216 Remarkably, 20% of the publications (N=184) mention ES in general without referring to any
217 specific service (Fig. 2A), and without clarifying the role that the investigated insect groups or

218 species performed to deliver these services. ES of high socio-economic relevancy, such as
219 pollination and biological control in agricultural ecosystems, are the most commonly studied
220 and those with the highest proportion of experimental data supporting the link between the
221 studied insects and the service provided (Fig. 2B). Indeed, there is a remarkable similarity
222 between the proportions of studies focused on pollination, biological control, and nutrient
223 cycling, and the functional groups performing these services (i.e., pollinators, predators and
224 parasitoids, and decomposers, respectively; compare Figs. 2A and 2C).

225 The majority of insect ES literature does not quantify the actual level or extent of the
226 ES studied: categories not quantified and proxies together comprise 69.6% of all papers
227 (N=635; Fig. 3A). These studies are not restricted to those not specifying the ES under
228 consideration, but rather extend to all types of services (Fig. 2B). Strikingly, almost half of the
229 publications retrieved by our search used proxies as indicators for ES (46.8%, N=427; Fig.
230 3A), particularly for pollination and non-specified biological control services (Fig. 2B). Less
231 than a third of studies actually quantify insect ES either directly or through experiments
232 (N=278, 30.4%), although the proportion of these two kinds of studies together has increased
233 steadily during the last 15 years (Fig. 3B). Interestingly, most of them perform direct
234 measures without any experimental manipulation (N=222, 24.3% of all papers), whereas
235 experimental studies undertaken either in the laboratory or in the field represented only 6.1%
236 (N=56) of the total number of publications (Fig. 3A; see Appendix B). Pollination, biological
237 control and nutrient cycling were the ES most studied using experiments (Fig. 2B).

238 As identified above, insect ES are most commonly studied through proxies. These
239 proxies are typically species abundance, species richness and, to a lesser extent, ecological
240 diversity indices such as Simpson or Shannon, amongst others (sometimes referred to as alpha
241 diversity, but see Magurran, 2004) (Fig. 3C). However, many other proxies have been used in

242 the literature, including species density, the number of functional groups, visitation rates,
243 network complexity and modularity, and some functional traits (e.g. body size/biomass,
244 behavioral traits, colony density, etc.) and associated measures of functional diversity,
245 community mean trait value, species composition, beta diversity, niche overlap or endemicity,
246 amongst others. Very few studies corroborated the existence of a direct link between the
247 investigated proxy and the functional aspect that was intended to represent, at the studied
248 geographical scales and/or for a specific taxonomic or trophic group (exceptions being, e.g.,
249 Arnan et al., 2013 and Rader et al., 2014).

250 Pollinators, predators of pests, parasitoids, herbivores, and decomposers (especially
251 dung beetles) were the most studied functional groups (Fig. 2C), together with some
252 charismatic and/or easy to identify groups such as ground beetles or bumblebees. The order
253 Hymenoptera –that includes many pollinators (particularly bees), parasitoids (commonly used
254 for biological control), predators, and decomposers (such as ants)– has been the most studied
255 taxonomic group, followed by Coleoptera and Diptera (Fig. 4A). In fact, hymenopterans have
256 been comparatively overstudied if we take into account the total number of described species
257 (Fig. 5). At a finer taxonomic level, several superfamilies or families also emerge as being
258 highly studied subjects, including Apoidea (particularly Apidae), Formicidae, and Braconidae
259 belonging to Hymenoptera; Carabidae, Coccinellidae, and Scarabaeidae within Coleoptera;
260 Syrphidae among Diptera, and several families of termites from Blattodea (Fig. 4C).

261 The most studied services using experimental approaches are biological control,
262 pollination and decomposition (see Appendix B). Thus, the links with ES have been more
263 often quantified in experimental studies for Hymenoptera and Coleoptera (Fig. 4B). A great
264 amount of experimental evidence on insect ES comes from USA and Europe – in particular
265 Switzerland, Germany, and Sweden, although a few studies have also been performed in

developing countries such as Costa Rica, Mexico, Philippines, Tanzania, Indonesia, Kenya and Argentina (see Appendix B). The ecosystems most commonly studied experimentally were agroecosytems, which included a long list of different types of crops (e.g. almonds, cabbage, cacao, cereals, coffee, rice, potato, wheat, etc.). The services provided by insects in grasslands and, to a much lesser extent, forests, savannas, wetlands, or lakes have also received some attention (see Appendix B).

Discussion

Research interest on the ecosystem services provided by insects grew during the last decade (Stout & Finn, 2015, and references therein). The increase in the number of papers published on this topic mirrors the pattern described by Hallouin et al. (2016) for ES in general, and reflects the expanding significance of identifying, analyzing, conserving, and managing ES under the global change scenarios that characterize the Anthropocene. This general interest has reached entomological research, resulting in a clear increase in the number of studies focusing on insect ES (compare our Table 2 with the list provided by GEO4, 2007 or Turner et al., 2007). Despite such recent efforts, the services provided by insects still remain relatively understudied compared to other groups. Insects comprise 49.9% of the 1,656,025 accepted species currently included in the Catalogue of Life (accessed on 23rd December 2016; Roskov et al., 2017). However, a quick search in Scopus (using "ecosystem service*" AND [insect* OR coleop* OR hymenop* OR lepidop* OR dipter* OR bees OR beetle*], 26th January 2017) produced 1,102 documents on insect ES out of 16,476 for ES in general. That is, about 6.7% of the total research output on ES is devoted to these invertebrates making up half of known diversity, and containing species and trophic groups with unique roles in ES provision. This comparatively low level of knowledge arises despite

290 the fact that, in many cases, it is likely that the majority of ES are supported by a relatively
291 small number of invertebrate species (e.g. for pollination, Klein et al., 2015).

292 Remarkably, the majority of the studies on insect ES published so far are merely
293 descriptive, either making no quantification of the ES or using proxies to indirectly link
294 species and/or groups to particular ES, even for the better-studied groups such as bees (e.g.
295 Eardley, 2000, Morandin et al., 2007 and Kimoto et al., 2012). Experimental studies and
296 direct ES quantifications have become more common in recent years, but still account for a
297 small proportion of published studies. Experiments are therefore needed to ascertain in detail
298 which species or functional groups provide a particular service, and which mechanisms and
299 aspects of biodiversity are behind the provision of each specific ES (e.g. Slade et al., 2007, de
300 Bello et al., 2010 and Ibanez et al., 2013). A better understanding of the links between insect
301 diversity, insect behavior, and interaction with organisms from different trophic levels in
302 providing ES is also needed (Schmitz, 2008 and Brosi & Briggs, 2013). Considering that most
303 information on insect ES comes from studies using proxies rather than direct quantifications
304 or experiments, it is likely that most current knowledge on these services holds a high degree
305 of uncertainty, for it is based only on estimates rather than quantitative assessments (Boerema
306 et al., 2017). This lack of robust quantitative data can hamper the assessment of global change
307 effects, preventing us from identifying and/or quantifying the impacts of environmental
308 changes on ES, and therefore making it difficult to develop adequate actions to mitigate them.
309

310 *From proxies to experiments*

311 Further analyses are required to evaluate and determine why proxies are preferred to
312 direct service quantifications and/or experiments in ES research, both in general and in the
313 particular case of insects. Some ES, such as nutrient cycling or soil nutrient regulation, are

difficult to quantify and/or require laborious, expensive and time-consuming work, making the use of proxies more attractive (e.g. Hoffman et al., 1996 and Palin et al., 2011). In fact, there are no well-established standardized ways of quantifying the value for some ES, such as provision of nursery habitats, cultural, educational and pharmaceutical services, tourism, and quality of life (see Nallakumar, 2003 and Choosai et al., 2009). Quantifying the value of a number of ES, such as the spatial redistribution and accumulation of soil nutrients, seed dispersal and germination, or soil aireation, presents important methodological difficulties (see Folgarait, 1998, Pringle et al., 2010 and Wu et al., 2010). One big challenge to ES field experimentation is excluding a particular taxon (i.e. the insect-exclusion treatment) to measure the effects of individual taxa on the ES of interest, without having unintentional effects on other organisms. For example, methods to experimentally exclude insects can sometimes alter microbial activity due to changes in microclimate. This has strained efforts to accurately quantify the contribution of insects to the decomposition of both litter (Kampichler & Bruckner, 2009) and wood (Ulyshen & Wagner, 2013), and to nitrogen cycling in grasslands (Risch et al., 2015). Some success has been, however, achieved with dung beetles (e.g. Slade et al., 2007, Beynon et al., 2012, Griffiths et al., 2015, Lähteenmäki et al., 2015, and Slade & Roslin 2016).

The most commonly used proxies for insect ES are species richness and species abundance. However, these two metrics could only provide limited information on service delivery if they do not adequately capture the uneven contributions of different taxa to an ES (e.g. Klein et al., 2015). The relationship between taxonomic diversity and ecosystem function is often context-dependent (Tylianakis et al., 2008), and it is not uncommon for the effects of a single taxon on a particular service to eclipse those of all other species in a community (e.g. Straub & Snyder, 2006 and Klein et al., 2015). Studies addressing the importance of insects

for wood decomposition, for example, have shown termites to consume much more wood than all other insects combined (Ulyshen et al., 2014). Indeed, an increasing number of studies show the importance of considering functional aspects of biodiversity to improve our understanding of the relationships between proxies and ES (Díaz et al., 2013, Lavorel et al., 2013, Moretti et al., 2013, Harrison et al., 2014 and Wood et al., 2015).

Metrics related to functional diversity, functional identity or attributes (i.e. traits) that affect an ES (sensu Violle et al., 2007 and Díaz et al., 2013) may be more informative than those related to total abundance or taxonomic richness and permit to investigate the interactions among organisms from different trophic levels as one of the potentially most important mechanisms behind key ES (e.g. Lavorel et al., 2013 and Gagic et al., 2015). Trait-based metrics can take into consideration that different species (and individuals) have different effects on the ecosystem, and assume that there may also exist some complementarity among species' functioning leading to non-additive effects of the process in focus (Hoehn et al., 2008). Indeed, it has been argued that trait diversity at the community level is one of the key factors governing ecosystem properties (Hooper et al., 2005), sometimes exceeding species richness in importance (Hoehn et al., 2008). However, a proper use of traits to link diversity and ES requires good knowledge on which traits can be associated with a particular ecosystem function and/or service, the intraspecific variability of these traits, under what environmental conditions are those functional traits more important, and which component of the distribution of trait values within communities is most appropriate to account for service provision (i.e. mean or variance; e.g. Ricotta & Moretti, 2011, Dias et al., 2013 and Griffiths et al., 2016a).

Unfortunately, data on traits and knowledge on how these traits translate into ES are limited (Hortal et al., 2015), at least at the spatial scales relevant to the study of ES. This

362 shortfall is even more acute in insects and other soil invertebrates (but see e.g. Ibanez, 2012 or
363 Martins et al., 2015). An adequate selection of traits genuinely related with the studied service
364 can provide a mechanistic understanding of the role of insects in ES provision, and will
365 ultimately have the greatest potential to infer ES delivery (e.g. Woodcock et al., 2013 and
366 Griffiths et al., 2016b). However, often the traits used for ES analyses are chosen based on
367 either readily-available trait data, or on traits used in previous studies, rather than on
368 functional hypotheses linking traits, ecosystem functions, and their associated services. This
369 can result in a consistent bias towards using small subsets of traits, some of which may have
370 little value for particular functions or services. Even in those few studies where the traits were
371 genuinely related to the ES studied, the data was typically limited to a handful of species, and
372 their measurement was often labour intensive. Therefore, to improve the use of trait-based
373 proxies for insect ES research further work is needed to provide experimental evidence on the
374 relationship between trait variation and service provision. Initiatives to provide standardized
375 measures of traits across terrestrial invertebrates and their effect on ecological functioning –
376 such as the invertebrate trait handbook proposed by Moretti et al. (2017)– are key for further
377 advances on insect ES research.
378
379 *Functional and taxonomic biases*
380 The biases in insect ES research are both functional and taxonomic; not only some
381 services are more studied than others, but also some groups are more investigated than others.
382 The most-studied ecosystems are croplands and consequently, the focus is placed on those ES
383 that have a larger impact on the goods we receive from these managed ecosystems, such as
384 pollination and biological control, two services with high economic impacts (Losey &
385 Vaughan, 2006). These two services are also the ones that have been most studied using

386 experimental approaches, together with nutrient cycling. A good example of why biases are
387 often functional rather than taxonomic can be found by looking at the high proportion of
388 papers that have focused on pollination. These often analyze more than one insect group or
389 the whole community of pollinators, including Hymenoptera (predominantly Apoidea and
390 some additional families), Diptera (Syrphidae), and Lepidoptera (e.g. Gardiner et al., 2010,
391 and Lundin et al., 2013). This contrasts with the research on many ES of less obvious and/or
392 indirect economic importance, such as dung removal, seed dispersal, soil aeration, pest control
393 or soil water infiltration. These studies are typically constrained to a single trophic group
394 and/or a single taxonomic group, hence providing very little information on the whole-
395 community responses and/or the interactions between organisms of different trophic levels,
396 the resulting ES and functional and/or taxonomic groups. In addition, there is an evident bias
397 in the literature we reviewed towards those groups that can be easily studied (e.g. towards
398 above- vs. below-ground organisms), have larger body sizes (e.g. butterflies vs. flies), are
399 readily identifiable (e.g. Carabidae are more often studied than the taxonomically complex
400 Staphylinidae), or are more charismatic (e.g. bumblebees compared with flies).

401 The publications that study multiple ES rarely focus on a single group of insects (e.g.
402 Klein et al., 2006 and Campbell et al., 2012; but see Slade & Roslin, 2016). In fact, many
403 recent articles considering several taxonomic groups have investigated how their combined
404 responses to different stressors interact with service provision, such as biological control or
405 pollination (e.g. Mody et al., 2011, Caballero-Lopez et al., 2012 and Stanley & Stout, 2013).
406 However, very few studies have analyzed the possible range of interactions (from synergies to
407 antagonistic or trade-offs) between two or more ES within a specific network or for the whole
408 ecosystem (e.g. multitrophic relationships; see Perovic et al. 2017). A significant exception to
409 this lack of knowledge are those studies investigating the interaction between different groups

410 of pollinators and those describing the regulating services provided by other elements of the
411 ecological network, such as pest control provided by predators and parasitoids, or the effects
412 of herbivores on the pollinated plants (e.g. Morandin et al., 2007 and Hegland et al., 2010).
413 Current knowledge indicates that these regulatory relationships usually affect the network
414 dynamics and hence, the supporting ES provided by insects in a negative way (Badano &
415 Vergara, 2011).

416 There are few quantitative assessments of the ES provided by several functional and
417 taxonomic groups, either from experiments or from indirect quantifications. Our bibliographic
418 search failed to find any information for several key functional groups, such as rhyzophagous
419 insects, some decomposers, and many symbionts and kleptoparasites. Similarly, very few
420 studies were found concerning several small insect Orders, such as Ephemeroptera, Plecoptera
421 or Neuroptera. Therefore, the design of our review, which focused on describing publication
422 trends rather than assessing knowledge gaps in a conceptual map, prevents us from resolving
423 whether these groups are underrepresented in ES research, or if they actually provide few ES
424 of minor importance, or whether the lack of general knowledge on their ecology and
425 systematics is the main cause of their misrepresentation. However, the key ecological roles
426 played by some of them in freshwater ecosystems (e.g. litter decomposition) suggest that
427 many of these groups are likely to have a very significant role in the provision of many ES
428 (Macadam & Stockan, 2015).

429 Our bibliographic survey also pinpoints other biases that are common in biodiversity
430 knowledge, such as the lack of data for many geographical areas and ecosystem types.
431 Knowledge on all aspects of biodiversity is typically concentrated in northern temperate
432 regions, particularly Europe and North America (Hortal et al., 2015). This widespread bias is
433 also evident in the published work on insect ES; very little is known about the services

provided by insects in agroecosystems outside these two regions, with the exception of some limited work in tropical plantations (mostly coffee and trees) or savannas. However, the sheer lack of knowledge on insect ES throughout most of the world's ecosystems makes more developed analyses on geographical and ecological biases premature.

A cautionary note on insect disservices

It is important to highlight that we did not include in our analysis papers studying disservices by insects for two main reasons. First, the goal of this paper was to characterize the trends in insect ES research and, in particular, how much current information comes from experimental evidence. Second, the study of insect disservices is a vast topic that would not be easy to embrace only using literature searches, and that definitively requires a separate analysis. However, the line that separates an ES from a disservice is sometimes very thin. In fact, in some cases, the same ecological function can be qualified as service or disservice depending on the perspective. While the effects of many foliage or root feeders might often be considered as disservices, they do provide regulating services by controlling the populations of both weeds and certain pests through herbivory and/or competitive exclusion, respectively, or by helping to maintain populations of generalist predators and parasitoids (e.g. Martin et al., 2010, Evans et al., 2011 and Eckberg et al., 2014). Herbivores also influence nutrient cycles and can contribute to soil fertility and enhance primary production (Belovsky & Slade, 2000). Similarly, bark and wood boring insects, create suitable habitats for other insects (e.g. Zuo et al., 2016), and have been shown to facilitate colonization by fungi, thus indirectly accelerating the decomposition of woody debris (Strid et al., 2014 and Ulyshen et al., 2016). It is therefore important to understand which ecological functions performed by herbivores can in fact result in regulating services, and how they interact with supporting and provisioning

458 services.

459 As a consequence of this, during our bibliographic search we found some articles that
460 evaluated or studied ecosystem disservices, related to three main topics: (i) damage of
461 agricultural crops by herbivores (e.g. Hiltpold et al., 2013 and Dale & Frank, 2014); (ii)
462 damage to wood plantations by xylophagous insects (e.g. DeSantis et al., 2013 and Reich et
463 al., 2014); and (iii) harmful effects on human health by hematophagous insects (e.g.
464 Sommerfeld & Kroeger, 2013 and Muturi et al., 2014). Some of these studies were not
465 discarded from our final list because they refer to ecological functions that can be classified
466 either as services or disservices.

467

468 *Concluding remarks*

469 Knowledge on the ES provided by insects is relatively scarce and biased. This occurs
470 despite their numerical abundance, the ecological functions they perform for the maintenance
471 of ecosystem functioning, and their links to human well-being. Part of the reason behind this
472 poor knowledge on insect ES is partly due to the traditional view of considering insects as
473 mainly providers of disservices to humanity, through pest and parasite outbreaks. However,
474 given the sheer diversity of insects and their key ecological role in all terrestrial and
475 freshwater ecosystems, it is extremely likely that the economic and non-economic benefits
476 provided by this group through many ES may exceed those harmful effects and disservices
477 they cause, even when considering some specific areas such as crop production. Indeed, the
478 value of many ES provided by insects, such as pollination, is widely accepted in financial,
479 food security, and health terms. Valuing these services can therefore be a good way to
480 stimulate and promote future research on them – through increasing financial support and
481 societal engagement.

482 It is therefore essential to gain an increased understanding of the role played by insects
483 in ES delivery. This requires combining the efforts of ES researchers (including ecologists,
484 entomologists, economists, and social scientists) to identify direct links between insect species
485 and the ES they provide, ideally through field observations and experiments. A good map of
486 our current knowledge could help define further needs in insect ES research. Our work
487 provides an insightful review of current knowledge in the area and identifies obvious gaps in
488 the less-studied functional and taxonomic groups. Moreover, we also highlight the existence
489 of knowledge gaps in the research of some ES that either have a lower direct economic value,
490 or their study poses important methodological challenges. However, the nature of our analyses
491 prevents us from obtaining a complete overview of what is actually known and a full
492 distribution of the knowledge gaps, since we have characterized publication trends rather than
493 the level of completeness, accuracy, and usefulness of the knowledge on each ES, ecosystem,
494 and/or insect group.

495 A clear shortfall in current knowledge is the lack of high-quality quantifications of ES
496 delivery (Boerema et al., 2017), either directly in the field or through experiments. Ideally,
497 such information should be obtained by adopting a robust and cohesive common framework
498 for insect ES research, which clearly separates ES from ecological functions, which have been
499 more commonly studied for insects. Many studies use the term ES very loosely; actually,
500 some consider ecological functions of non-human value as services too. A conceptual and
501 methodological framework that clearly links different components of biodiversity, the study
502 of functions and the traits associated to them, and the quantification of the delivery of services
503 can help to increase the research impact of insect ES in general, and for many seldom-studied
504 groups in particular. This framework should consider the interactions and trade-offs among
505 the services provided by different insect groups, allowing us to also identify and measure the

services provided by less diverse insect orders. A first step in the implementation of such framework is certainly to quantify insect ES provision in the field, but in the mean time, it is necessary to design and implement a combination of laboratory and field experiments, as well as the adoption of more mechanistic trait-based approaches that allow to disentangle both the direct and indirect contribution of insect biodiversity mediated by traits and trait-matching between organisms of different trophic levels. While the use of controlled microcosms can provide accurate information, manipulative field experiments are more realistic since they take into account a whole range of the interacting environmental factors. Obtaining accurate and comprehensive information on the ES provided by insects therefore requires joint efforts among ES researchers in implementing such an ambitious research program that combines both empirical and experimental evidence.

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Appendix A and B. Supplementary data

Supplementary data associated with this article can be found, in the online version, at XXXXX.

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FIGURES AND TABLES

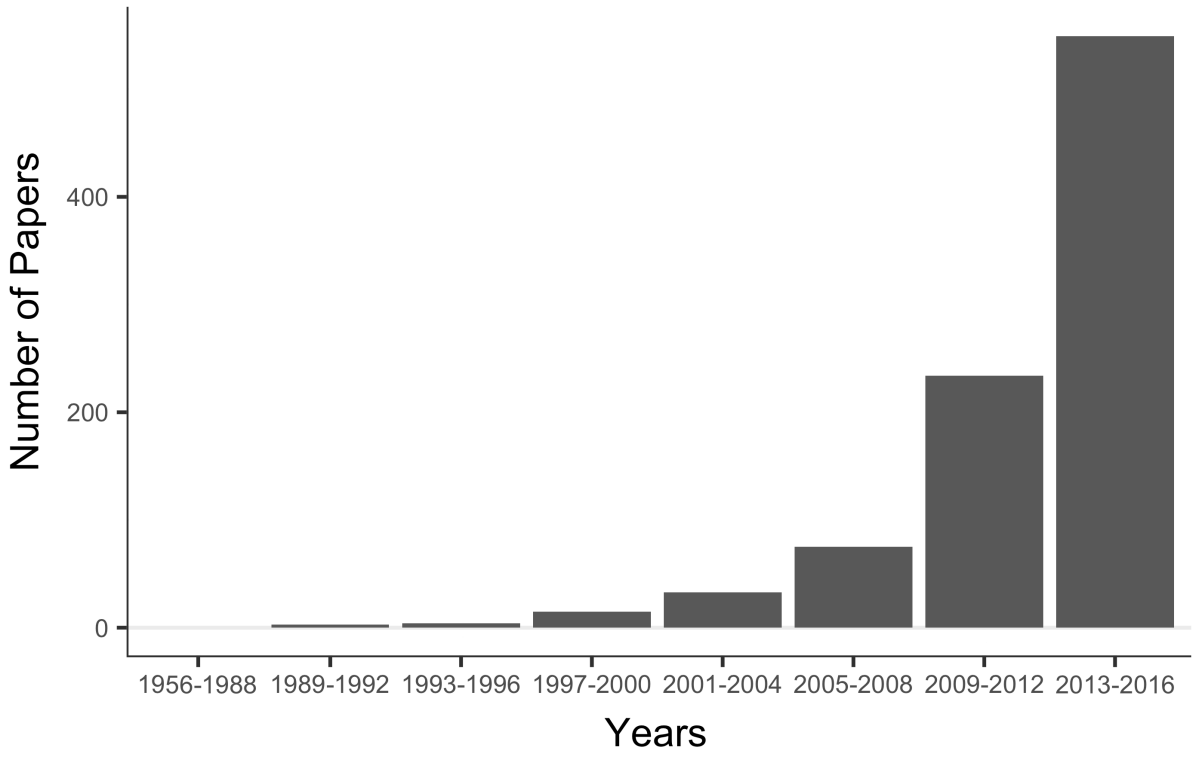


Fig. 1. Temporal trends in the number of published articles dealing with ecosystem services provided by insects across all the literature analyzed from 1956 to 2016 using two search engines (ISI Web of Knowledge and Scopus) and two academic social networks (ResearchGate and ACADEMIA). See methods section for the keyword strings used in this search. Note that no article published before 1989 was retrieved using these search strings.

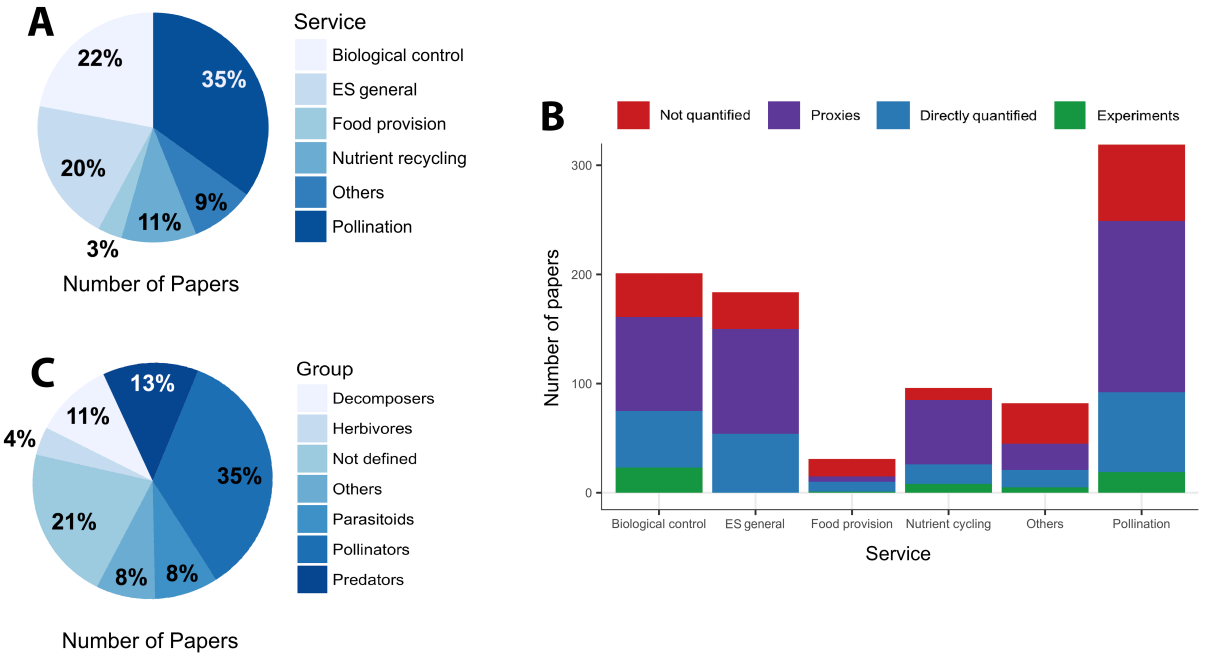
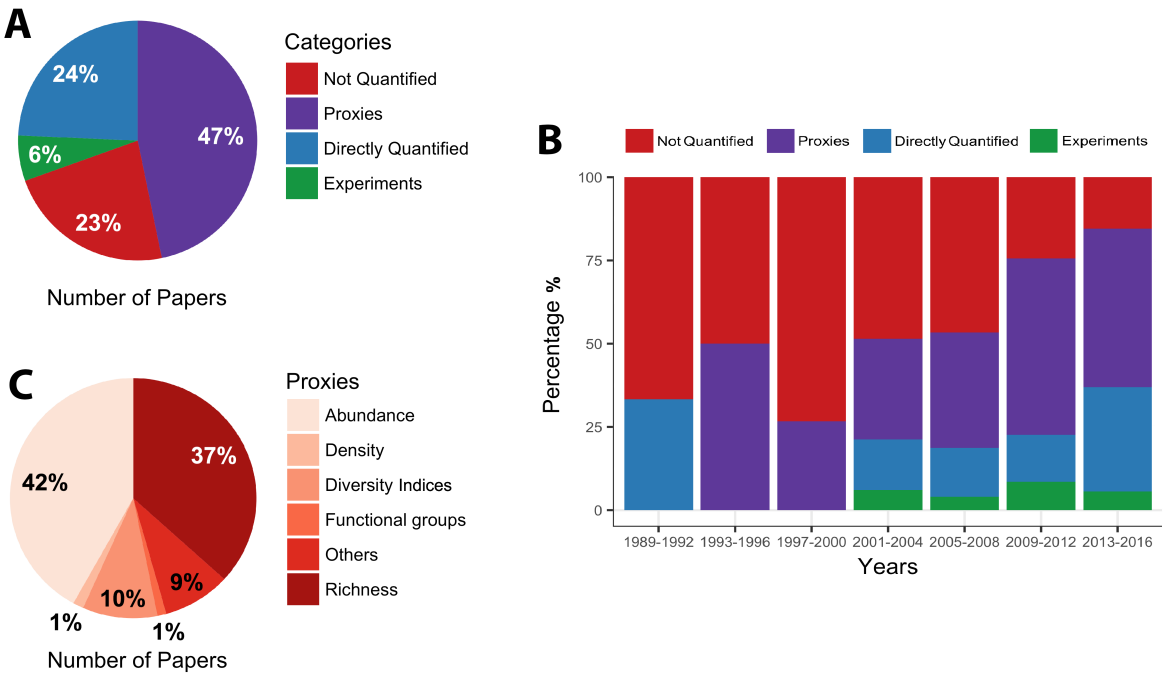


Fig. 2. Percentage and number of articles found in the literature search on ecosystem services provided by insects (1956-2016), examined at three levels: A) main ecosystem service categories; B) cumulative number of articles devoted to studying each one of these services in relation with the four main categories of quantification (not quantified, proxies, directly quantified and experiments) and, C) main functional insect groups studied (trophic groups). ES general refers to ecosystem services in general, with no specification of which type of services were investigated. See main text for more details.



925

926 **Fig. 3**. Percentage of articles retrieved in our literature review on the ecosystem services
927 provided by insects (1956-2016), examined at three levels: A) type of approach used to
928 quantify the ecosystem services provided by insects; B) cumulative percentage of articles over
929 time in relation to the four main categories of quantification (not quantified, proxies, directly
930 quantified and experiments) and, C) main proxies used in the papers that do not quantify
931 directly an ecosystem service.
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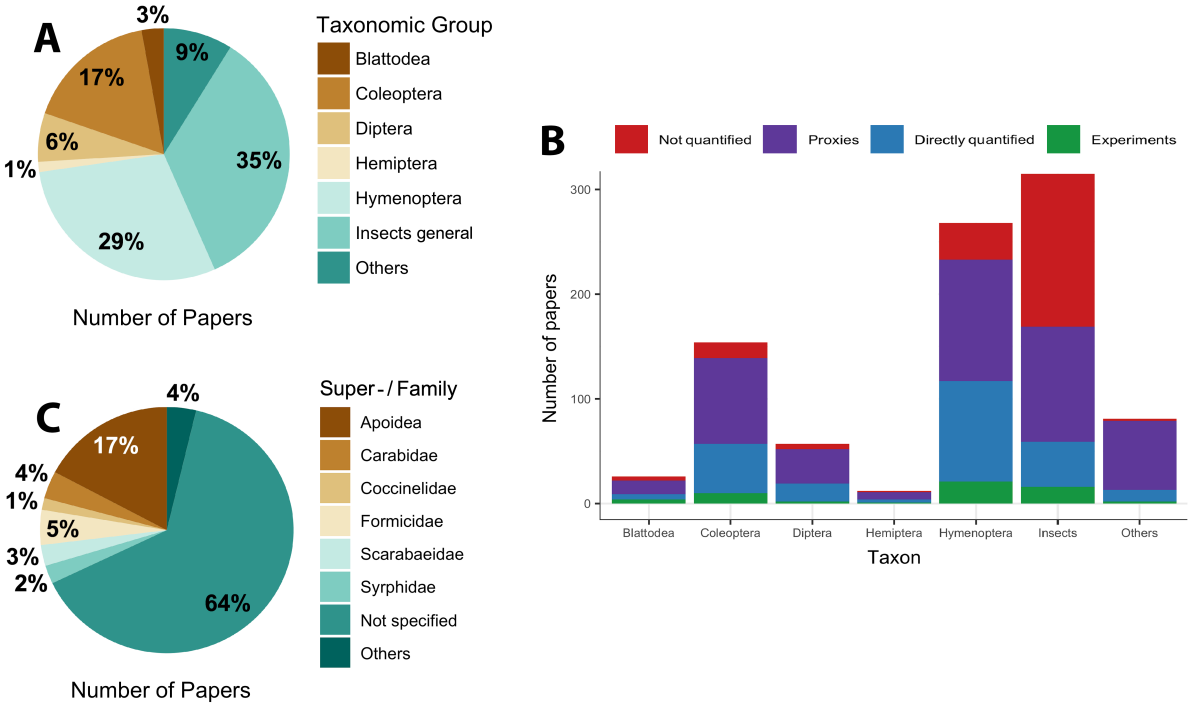

Fig. 4. Percentage and number of articles retrieved in our literature review on ecosystem services provided by insects (1956-2016), examined at three levels: A) higher-level taxonomic groups (i.e. orders); B) cumulative number of articles studying these groups in relation with the four main categories of quantification (not quantified, proxies, directly quantified and experiments); and, C) most studied taxonomic groups at superfamily/family level.

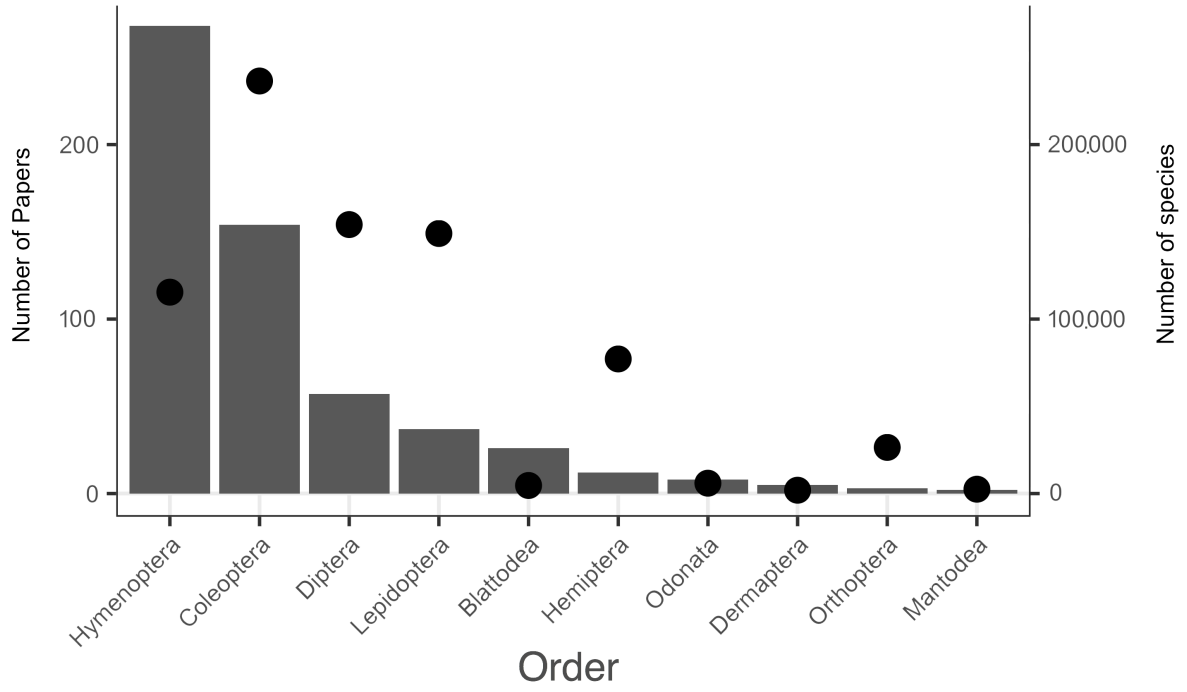

Fig. 5. Comparison of the total number of papers on ecosystem services provided by insects (1956-2016) in each major insect order (grey bars) and the number of described species in these major orders (black dots).

950 **Table 1**. Categories of quantification of the ecosystem services (ES) provided by insects used
951 to classify the studies retrieved by our literature review.

Quantification category	Description	Example
Not quantified	Assume the relationship between ES and the studied taxonomic or functional group following the criteria of experts. There is no attempt to measure the service, neither directly nor indirectly.	Philpott and Armbrecht (2006) discuss the costs and benefits of promoting ants in agroecosystems from their functional role as predators and the known impacts of intensive agriculture practices on their diversity. No direct or indirect quantification of service delivery is either made or inferred.
Proxies	Use of biodiversity aspects –such as species richness or abudance– as proxies for ES provision, instead of quantifying the relationship between ES and insects.	Frank et al. (2008) assess the potential benefits of promoting certain native plants in croplands, assuming that the richness and abundance of natural enemies inhabiting these plants are a good proxy for their effectiveness for biological control.
Direct quantification	Direct quantification in the field of the ES provided by insects, without following any experimental design.	Thies et al. (2005) quantify the increase in aphid mortality by parasitoids in different landscape conditions, as a direct measure of his latter group on biological control.
Experiments	Quantification of the ES through laboratory or field experiments, with one or more environmental and/or biotic factors being controlled for.	Brittain et al. (2010) measure pollinator abundance and richness, flower visitation rates, pollination of experimental potted plants and seed production to quantify pollination in their analysis of the benefits of organic farming in different landscape contexts.

Table 2. List of ecosystem services provided by insects across the literature review (1956-2016) with selected examples of each one.

Ecosystem services	Selected reference
Provisioning services	
Alternative nutrition source	Dzerefos and Witkowski, 2014
Economic services	Rodriguez et al., 2006
Food chain supplementation	Macadam and Stockan, 2015
Industrial production	Sehnal and Sutherland, 2008
Medicine services	Shi and Shofler, 2014
Regulating services	
Below-ground exchange	Folgarait, 1998
Carbon absorption	Metcalfe et al., 2014
Climate regulation	Hammer et al., 2016
Control and suppression of pathogens	Ryan et al., 2011
Counteract climate change	Premalatha et al., 2011
Fungi control	Schrader et al., 2013
Gastrointestinal parasite control	Sands and Wall, 2016
Greenhouse gas emissions	Slade et al., 2016
Habitat genetic diversity	Corbet, 1997
Network services	Hope et al., 2014
Pest control	Aluja et al., 2014
Pollination	Baron et al., 2014
Population regulation	Midega et al., 2015
Soil fertility regulation	Jouquet et al., 2011
Soil nutrient regulation	Shukla et al., 2013
Soil nutrients spatial variability	Wu et al., 2010
Soil erosion prevention	Ganade and Brown, 1997
Supporting services	
Biodiversity protection	Choosai et al., 2009
Decomposition	Mitchel et al., 2014
Dung removal	Gray et al., 2014
Hydrological soil properties	Brown et al., 2010
Mineralization	Palin et al., 2011
Nutrient accumulation	Pringle et al., 2010
Nutrient flow	Bloor et al., 2012
Recycling of matter	Ulyshen et al., 2014
Seed dispersal	Leal et al., 2014
Soil removal	Giraldo et al., 2011
Soil structure	Jouquet et al., 2014
Soil water infiltration	Evans et al., 2011
Cultural services	
Bioindicators tool	Maleque et al., 2009
Conservation tool	Stout and Finn, 2015
Cultural heritage	Vidal et al., 2014
Education	Macadam and Stockan, 2015
Recreation services	Woodger, 2011
Religion and spiritual values	Ayieko and Oriaro, 2008
Tourism services	Nallakumar, 2003
Urban quality life	Morley et al., 2014

Appendix A. Supplementary data. List of references on insect ES selected after the bibliographic search from 1956-2016.

Appendix B. Supplementary data. List of articles that quantified the ecosystem service provided by one or several groups of insects using an experimental approach included in the literature review from 1956-2016. This table provides the ecosystem service, trophic group, order, super/family, country, ecosystem and reference for each article found. Complete information about each reference can be found in Supplementary Appendix A.

Appendix A. Supplementary data. List of references on insect ES selected after the bibliographic search from 1956-2016.

Year	Authors	Title	Journal	Volume	Pages
1989	Addison	Monitoring the health of a forest: A canadian approach	ENVIRONMENTAL MONITORING AND ASSESSMENT	12	39-48
1990	Eggleton & Gaston	Parasitoid Species And Assemblages - Convenient Definitions Or Misleading Compromises	OIKOS	59	417-421
1991	Richardson & Mackay	Lake Outlets And The Distribution Of Filter Feeders - An Assessment Of Hypotheses	OIKOS	62	370-380
1992	Palmer & Okeeffe	Feeding Patterns Of 4 Macroinvertebrate Taxa In The Headwaters Of The Buffalo River, Eastern Cape	HYDROBIOLOGIA	228	157-173
1993	Irons et al.	Ecological Adaptations Of Aquatic Macroinvertebrates To Overwintering In Interior Alaska (Usa) Sub-Arctic Streams	CANADIAN J. OF ZOOLOGY-REVUE CANADIENNE DE ZOOLOGIE	71	98-108
1993	Petanidou & Vokou	Pollination Ecology Of Labiatae In A Phryganic (East Mediterranean) Ecosystem	AMERICAN JOURNAL OF BOTANY	80	892-899
1994	Andersen	Are Cicadas (Diceroprocta-Apache) Both A Keystone And A Critical-Link Species In Lower Colorado River Riparian Communities	SOUTHWESTERN NATURALIST	39	26-33
1994	Axelsen	Host Parasitoid Interactions In An Agricultural Ecosystem - A Computer-Simulation	ECOLOGICAL MODELLING	73	189-203
1994	Petranka et al.	Effects Of Timber Harvesting On Low Elevation Populations Of Southern Appalachian Salamanders	FOREST ECOLOGY AND MANAGEMENT	67	135-147
1995	Holl	Nectar Resources And Their Influence On Butterfly Communities On Reclaimed Coal Surface Mines	RESTORATION ECOLOGY	3	76-85
1996	Wallace & Webster	The role of macroinvertebrates in stream ecosystem function	ANNUAL REVIEW OF ENTOMOLOGY	41	115-139
1997	Paradise & Dunson	Insect species interactions and resource effects in treeholes: Are helodid beetles bottomup facilitators of midge populations?	OECOLOGIA	109	303-312
1997	Winchester	The arboreal superhighway: Arthropods and landscape dynamics	CANADIAN ENTOMOLOGIST	129	595-599
1998	Belaoussoff & Kevan	Toward an ecological approach for the assessment of ecosystem health	ECOSYSTEM HEALTH	4	42951
1998	Hammond & Miller	Comparison of the biodiversity of Lepidoptera within three forested ecosystems	ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA	91	323-328
1998	Siemann et al.	Experimental tests of the dependence of arthropod diversity on plant diversity	AMERICAN NATURALIST	152	738-750
1998	Zimmer & Parmenter	Harvester ants and fire in a desert grassland: Ecological responses of Pogonomyrmex rugosus (Hymenoptera : Formicidae) to experimental wildfires in central New Mexico	ENVIRONMENTAL ENTOMOLOGY	27	282-287
1999	Brewer & Atchison	The effects of chlorpyrifos on cholinesterase activity and foraging behavior in the dragonfly, Anax junius (Odonata)	HYDROBIOLOGIA	394	201-208
1999	Coulson et al.	Heterogeneity of forest landscapes and the distribution and abundance of the southern pine beetle	FOREST ECOLOGY AND MANAGEMENT	114	471-485
1999	Duelli et al.	Biodiversity evaluation in agricultural landscapes: above-ground insects	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	74	33-64
1999	Grove & Stork	The conservation of saproxylic insects in tropical forests: a research agenda	JOURNAL OF INSECT CONSERVATION	3	67-74
1999	Hutcheson & Kimberley	A pragmatic approach to characterising insect communities in New Zealand: Malaise trapped beetles	NEW ZEALAND JOURNAL OF ECOLOGY	23	69-79
1999	Schowalter et al.	Diversity of arthropod responses to host-plant water stress in a desert ecosystem in southern New Mexico	AMERICAN MIDLAND NATURALIST	142	281-290
1999	Zamora	Conditional outcomes of interactions: The pollinator-prey conflict of an insectivorous plant	ECOLOGY	80	786-795
2000	Andersen & Muller	Arthropod responses to experimental fire regimes in an Australian tropical savannah: ordinal-level analysis	AUSTRAL ECOLOGY	25	199-209
2000	Ayres & Lombardero	Assessing the consequences of global change for forest disturbance from herbivores and pathogens	SCIENCE OF THE TOTAL ENVIRONMENT	262	263-286
2000	Brooks	Annual and seasonal variation and the effects of hydroperiod on benthic macroinvertebrates of seasonal forest ("vernal") ponds in central Massachusetts, USA	WETLANDS	20	707-715
2000	Eshleman	A linear model of the effects of disturbance on dissolved nitrogen leakage from forested watersheds	WATER RESOURCES RESEARCH	36	3325-3335
2000	Jung & Lunderstadt	Effect of feces from pine-fed larvae of Dendrolimus pini L. (Lep., Lasiocampidae) on the germination and development of pine, birch and oak seeds	J. OF APPLIED ENTOMOLOGY-ZEITSCHRIFT	124	253-258
2000	Lockwood & Sergeev	Comparative biogeography of grasshoppers (Orthoptera: Acrididae) in North America and Siberia: Applications to the conservation of biodiversity	JOURNAL OF INSECT CONSERVATION	4	161-172
2000	Raghu et al.	Impact of habitat modification on the distribution and abundance of fruit flies (Diptera : Tephritidae) in Southeast Queensland	POPULATION ECOLOGY	42	153-160
2000	Saiz et al.	Biodiversity of the canopy arthropods associated to vegetation of the north of Chile, II region	REVISTA CHILENA DE HISTORIA NATURAL	73	671-692
2000	Volney & Fleming	Climate change and impacts of boreal forest insects	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	82	283-294
2001	Bellocq et al.	Short-term effects of harvest technique and mechanical site preparation on arthropod communities in jack pine plantations	JOURNAL OF INSECT CONSERVATION	5	187-196
2001	Cane & Tepedino	Causes and extent of declines among native North American invertebrate pollinators: Detection, evidence, and consequences	CONSERVATION ECOLOGY	5	1
2001	Chovanec & Waringer	Ecological integrity of river-floodplain systems-assessment by dragonfly surveys (Insecta : Odonata)	REGULATED RIVERS-RESEARCH & MANAGEMENT	17	493-507
2001	Drechsler & Settele	Predator-prey interactions in rice ecosystems: effects of guild composition, trophic relationships, and land use changes - a model study exemplified for Philippine rice terraces	ECOLOGICAL MODELLING	137	135-159
2001	Haddad et al.	Contrasting effects of plant richness and composition on insect communities: A field experiment	AMERICAN NATURALIST	158	17-35
2001	Jourdan et al.	Little fire ant invasion (Wasmannia auropunctata) as a threat to New Caledonian lizards: Evidences from a sclerophyll forest (Hymenoptera: Formicidae)	SOCIOBIOLOGY	38	283-301
2001	Santoro et al.	Interactions between fire and bark beetles in an old growth pine forest	FOREST ECOLOGY AND MANAGEMENT	144	245-254
2001	Spira	Plant-pollinator interactions: A threatened mutualism with implications for the ecology and management of rare plants	NATURAL AREAS JOURNAL	21	78-88
2002	Cardinale et al.	Species diversity enhances ecosystem functioning through interspecific facilitation	NATURE	415	426-429
2002	del Rosario et al.	Cow manure in headwater streams: tracing aquatic insect responses to organic enrichment	JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY	21	278-289
2002	Floren et al.	Arboreal ants as key predators in tropical lowland rainforest trees	OECOLOGIA	131	137-144
2002	Klein et al.	Effects of land-use intensity in tropical agroforestry systems on coffee flower-visiting and trap-nesting bees and wasps	CONSERVATION BIOLOGY	16	1003-1014
2002	Klein et al.	Predator-prey ratios on cocoa along a land-use gradient in Indonesia	BIODIVERSITY AND CONSERVATION	11	683-693
2002	Laurance et al.	Ecosystem decay of Amazonian forest fragments: A 22-year investigation	CONSERVATION BIOLOGY	16	605-618
2002	Malmqvist	Aquatic invertebrates in riverine landscapes	FRESHWATER BIOLOGY	47	679-694
2002	Memmott & Waser	Integration of alien plants into a native flower-pollinator visitation web	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	269	2395-2399
2002	Merritt et al.	Development and application of a macroinvertebrate functional-group approach in the bioassessment of remnant river oxbows in southwest Florida	JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY	21	290-310
2002	Richardson et al.	How do nutrients and warming impact on plant communities and their insect herbivores? A 9-year study from a sub-Arctic heath	JOURNAL OF ECOLOGY	90	544-556
2002	Vulinec	Dung beetle communities and seed dispersal in primary forest and disturbed land in Amazonia	BIOTROPICA	34	297-309
2002	Wardle et al.	Linkages between plant litter decomposition, litter quality, and vegetation responses to herbivores	FUNCTIONAL ECOLOGY	16	585-595
2002	Wilsey & Polley	Reductions in grassland species evenness increase dicot seedling invasion and spittle bug infestation	ECOLOGY LETTERS	5	676-684
2002	Xu et al.	System-level responses of lake ecosystems to chemical stresses using exergy and structural exergy as ecological indicators	CHEMOSPHERE	46	173-185
2003	Benstead et al.	Relationships of stream invertebrate communities to deforestation in eastern Madagascar	ECOLOGICAL APPLICATIONS	13	1473-1490
2003	Chapman et al.	Insect herbivory increases litter quality and decomposition: An extension of the acceleration hypothesis	ECOLOGY	84	2867-2876
2003	Gurung	Insects - a mistake in God's creation? Tharu farmers' perception and knowledge of insects: A case study of Gobardiha village development committee, Dang-deukhuri, Nepal	AGRICULTURE AND HUMAN VALUES	20	337-370
2003	Hulle et al.	Aphids of sub-Antarctic Iles Crozet and Kerguelen: species diversity, host range and spatial distribution	ANTARCTIC SCIENCE	15	203-209
2003	Jonsson & Malmqvist	Mechanisms behind positive diversity effects on ecosystem functioning: testing the facilitation and interference hypotheses	OECOLOGIA	134	554-559
2003	Latty et al.	Beech bark disease in northern hardwood forests: the importance of nitrogen dynamics and forest history for disease severity	CANADIAN J. OF FOREST RESEARCH-REVUE	33	257-268
2003	Matlock & de la Cruz	Ants as indicators of pesticide impacts in banana	ENVIRONMENTAL ENTOMOLOGY	32	816-829
2003	Ostman et al.	Yield increase attributable to aphid predation by ground-living polyphagous natural enemies in spring barley in Sweden	ECOLOGICAL ECONOMICS	45	149-158
2003	Reynolds et al.	Response of soil invertebrates to forest canopy inputs along a productivity gradient	PEDOBIOLOGIA	47	127-139

2003	Schadler et al.	Palatability, decomposition and insect herbivory: patterns in a successional old-field plant community	OIKOS	103	121-132
2003	Schmidt et al.	Relative importance of predators and parasitoids for cereal aphid control	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	270	1905-1909
2004	Arditi et al.	Does mutual interference always stabilize predator-prey dynamics? A comparison of models	COMPTES RENDUS BIOLOGIES	327	1037-1057
2004	Bianchi & van der Werf	Model evaluation of the function of prey in non-crop habitats for biological control by ladybeetles in agricultural landscapes	ECOLOGICAL MODELLING	171	177-193
2004	Bustamante-Sanchez et al.	Dung decomposition and associated beetles in a fragmented temperate forest	REVISTA CHILENA DE HISTORIA NATURAL	77	107-120
2004	Davis et al.	Reliability characteristics of natural functional group interaction webs	EVOLUTIONARY ECOLOGY RESEARCH	6	1145-1166
2004	Kremen et al.	The area requirements of an ecosystem service: crop pollination by native bee communities in California	ECOLOGY LETTERS	7	1109-1119
2004	Leal et al.	Distribution of Chironomidae larvae in an Amazonian flood-plain lake impacted by bauxite tailings (Brazil)	AMAZONIANA-LIMNOLOGIA ET OECOLOGIA REGIONALIS	18	109-123
2004	Majer et al.	Australian ant research: fabulous fauna, functional groups, pharmaceuticals, and the Fatherhood	AUSTRALIAN JOURNAL OF ENTOMOLOGY	43	235-247
2004	Throop et al.	Effects of nitrogen deposition and insect herbivory on patterns of ecosystem-level carbon and nitrogen dynamics: results from the CENTURY model	GLOBAL CHANGE BIOLOGY	10	1092-1105
2004	Werner et al.	Comparison of methods for sampling Thysanoptera on basswood (Tilia americana L.) trees in mixed northern hardwood deciduous forests	FOREST ECOLOGY AND MANAGEMENT	201	327-334
2004	Woodcock & Huryn	Effects of roadway crossings on leaf litter processing and invertebrate assemblages in small streams	ENVIRONMENTAL MONITORING AND ASSESSMENT	93	229-250
2005	Aquilino et al.	Reciprocal effects of host plant and natural enemy diversity on herbivore suppression: an empirical study of a model tritrophic system	OIKOS	108	275-282
2005	Blanche & Cunningham	Rain forest provides pollinating beetles for atemoya crops	JOURNAL OF ECONOMIC ENTOMOLOGY	98	1193-1201
2005	Carlisle & Clements	Leaf litter breakdown, microbial respiration and shredder production in metal-polluted streams	FRESHWATER BIOLOGY	50	380-390
2005	Hierro et al.	A biogeographical approach to plant invasions: the importance of studying exotics in their introduced and native range	JOURNAL OF ECOLOGY	93	42125
2005	Kaspari	Global energy gradients and size in colonial organisms: Worker mass and worker number in ant colonies	P. OF THE NATIONAL ACADEMY OF SCIENCES OF THE USA	102	5079-5083
2005	Landis et al.	Manipulating plant resources to enhance beneficial arthropods in agricultural landscapes	WEED SCIENCE	53	902-908
2005	Mysterud et al.	The short-term effect of sheep grazing on selected invertebrates (Diptera and Hemiptera) relative to other environmental factors in an alpine ecosystem	JOURNAL OF ZOOLOGY	266	411-418
2005	Quintero & Roslin	Rapid recovery of dung beetle communities following habitat fragmentation in central Amazonia	ECOLOGY	86	3303-3311
2005	Stadler et al.	Hemlock woolly adelgid in new england forests: Canopy impacts transforming ecosystem processes and landscapes	ECOSYSTEMS	8	233-247
2005	Stone et al.	Macroinvertebrate communities in agriculturally impacted southern Illinois streams: Patterns with riparian vegetation, water quality, and in-stream habitat quality	JOURNAL OF ENVIRONMENTAL QUALITY	34	907-917
2005	Terblanche et al.	The effects of acclimation on thermal tolerance, desiccation resistance and metabolic rate in Chirodica chalcoptera (Coleoptera : Chrysomelidae)	JOURNAL OF INSECT PHYSIOLOGY	51	1013-1023
2005	Tscharntke et al.	Landscape perspectives on agricultural intensification and biodiversity - ecosystem service management	ECOLOGY LETTERS	8	857-874
2006	Baptista et al.	Functional feeding groups of Brazilian Ephemeroptera nymphs: ultrastructure of mouthparts	A. DE LIMNOLOGIE-INTERNATIONAL J. OF LIMNOLOGY	42	87-96
2006	Blanche et al.	Proximity to rainforest enhances pollination and fruit set in orchards	JOURNAL OF APPLIED ECOLOGY	43	1182-1187
2006	Branson et al.	Sustainable management of insect herbivores in grassland ecosystems: New perspectives in grasshopper control	BIOSCIENCE	56	743-755
2006	Brin & Brustel	Saproxylic beetles response to cork-oak forests heterogeneity in the Massif des Maures (France)	REVUE D ECOLOGIE-LA TERRE ET LA VIE	61	327-342
2006	Classen et al.	Impacts of herbivorous insects on decomposer communities during the early stages of primary succession in a semi-arid woodland	SOIL BIOLOGY & BIOCHEMISTRY	38	972-982
2006	Coelho & Ribeiro	Environment heterogeneity and seasonal effects in ground-dwelling ant (Hymenoptera : formicidae) assemblages in the Parque Estadual do Rio Doce, MG, Brazil	NEOTROPICAL ENTOMOLOGY	35	19-29
2006	Gathmann Williams	Insect emergence in Canadian coldwater springs: spatial and temporal patterns, and species-environment relationships	A. DE LIMNOLOGIE-INTERNATIONAL J. OF LIMNOLOGY	42	143-156
2006	Kuhn et al.	Relating geographical variation in pollination types to environmental and spatial factors using novel statistical methods	NEW PHYTOLOGIST	172	127-139
2006	Logan et al.	Temperature-dependent phenology and predation in arthropod systems	ECOLOGICAL MODELLING	196	471-482
2006	Maleque et al.	The use of arthropods as indicators of ecosystem integrity in forest management	JOURNAL OF FORESTRY	104	113-117
2006	McKie et al.	Mitigation or disturbance? Effects of liming on macroinvertebrate assemblage structure and leaf-litter decomposition in the humic streams of northern Sweden	JOURNAL OF APPLIED ECOLOGY	43	780-791
2006	Moore	Animal ecosystem engineers in streams	BIOSCIENCE	56	237-246
2006	Noss et al.	Recommendations for integrating restoration ecology and conservation biology in ponderosa pine forests of the southwestern United States	RESTORATION ECOLOGY	14	43012
2006	Park & Lee	Arthropod trophic relationships in a temperate rice ecosystem: A stable isotope analysis with delta C-13 and delta N-15	ENVIRONMENTAL ENTOMOLOGY	35	684-693
2006	Scherber et al.	The effects of plant diversity and insect herbivory on performance of individual plant species in experimental grassland	JOURNAL OF ECOLOGY	94	922-931
2006	Snyder & Johnson	Macroinvertebrate assemblage recovery following a catastrophic flood and debris flows in an Appalachian mountain stream	JOURNAL OF THE NORTH AMERICAN BENTHOLOGICAL SOCIETY	25	825-840
2006	Srivastava	Habitat structure, trophic structure and ecosystem function: interactive effects in a bromeliad-insect community	OECOLOGIA	149	493-504
2006	Tylianakis et al.	Diversity, ecosystem function, and stability of parasitoid host interactions across a tropical habitat gradient	ECOLOGY	87	3047-3057
2006	Venette & Gould	A pest risk assessment for Copitarsia spp., Insects associated with importation of commodities into the United States	EUPHYTICA	148	165-183
2006	Wardhaugh & Didham	Preliminary evidence suggests that beech scale insect honeydew has a negative effect on terrestrial litter decomposition rates in Nothofagus forests of New Zealand	NEW ZEALAND JOURNAL OF ECOLOGY	30	279-284
2006	Wilby et al.	Arthropod diversity and community structure in relation to land use in the mekong delta, vietnam	ECOSYSTEMS	9	538-549
2007	Albrecht et al.	Interaction diversity within quantified insect food webs in restored and adjacent intensively managed meadows	JOURNAL OF ANIMAL ECOLOGY	76	1015-1025
2007	Andersson et al.	Measuring social-ecological dynamics behind the generation of ecosystem services	ECOLOGICAL APPLICATIONS	17	1267-1278
2007	Araujo et al.	Neotropical termite species (Isoptera) richness declining as resource amount rises: Food or enemy-free space constraints?	SOCIOBIOLOGY	49	93-106
2007	Brague-Bouragba et al.	Comparison of coleopteran and spider communities between a reforested area and a still steppe area in a pre-Saharan region of Algeria	COMPTES RENDUS BIOLOGIES	330	923-939
2007	Classen et al.	Season mediates herbivore effects on litter and soil microbial abundance and activity in a semi-arid woodland	PLANT AND SOIL	295	217-227
2007	Crawford et al.	Host-plant genotypic diversity mediates the distribution of an ecosystem engineer	ECOLOGY	88	2114-2120
2007	Dasgupta et al.	Is environmentally friendly agriculture less profitable for farmers? Evidence on integrated pest management in Bangladesh	REVIEW OF AGRICULTURAL ECONOMICS	29	103-118
2007	Durance & Ormerod	Climate change effects on upland stream macroinvertebrates over a 25-year period	GLOBAL CHANGE BIOLOGY	13	942-957
2007	Fettig et al.	The effectiveness of vegetation management practices for prevention and control of bark beetle infestations in coniferous forests of the western and southern United States	FOREST ECOLOGY AND MANAGEMENT	238	24-53
2007	Hatfield & LeBuhn	Patch and landscape factors shape community assemblage of bumble bees, Bombus spp. (Hymenoptera : Apidae), in montane meadows	BIOLOGICAL CONSERVATION	139	150-158
2007	Haynes et al.	Resource complementation and the response of an insect herbivore to habitat area and fragmentation	OECOLOGIA	153	511-520
2007	Houghton	The effects of landscape-level disturbance on the composition of Minnesota caddisfly (Insecta : Trichoptera) trophic functional groups: evidence for ecosystem homogenization	ENVIRONMENTAL MONITORING AND ASSESSMENT	135	253-264
2007	Jacobs et al.	Influence of boreal forest succession and dead wood qualities on saproxylic beetles	AGRICULTURAL AND FOREST ENTOMOLOGY	9	42430
2007	Jactel & Brockerhoff	Tree diversity reduces herbivory by forest insects	ECOLOGY LETTERS	10	835-848
2007	Johansson et al.	Variable response of different functional groups of saproxylic beetles to substrate manipulation and forest management: Implications for conservation strategies	FOREST ECOLOGY AND MANAGEMENT	242	496-510
2007	Kohler et al.	Indirect effects of grassland extensification schemes on pollinators in two contrasting European countries	BIOLOGICAL CONSERVATION	135	302-307
2007	Lach	A mutualism with a native membracid facilitates pollinator displacement by Argentine ants	ECOLOGY	88	1994-2004
2007	Larsson & Franzen	Critical resource levels of pollen for the declining bee Andrena hattorfiana (Hymenoptera, Andrenidae)	BIOLOGICAL CONSERVATION	134	405-414
2007	Long et al.	Asymmetric competition via induced resistance: Specialist herbivores indirectly suppress generalist preference and populations	ECOLOGY	88	1232-1240
2007	Majer et al.	Invertebrates and the restoration of a forest ecosystem: 30 years of research following bauxite mining in Western Australia	RESTORATION ECOLOGY	15	104-115
2007	Makino et al.	Degradation of longicorn beetle fauna caused by conversion from broad-leaved to man-made conifer stands of Cryptomeria japonica in central Japan	ECOLOGICAL RESEARCH	22	372-381
2007	Maleque et al.	Line thinning fosters the abundance and diversity of understory Hymenoptera (Insecta) in Japanese cedar (Cryptomeria japonica D. Don) plantations	JOURNAL OF FOREST RESEARCH	12	14-23
2007	Morandin et al.	Can pastureland increase wild bee abundance in agriculturally intense areas?	BASIC AND APPLIED ECOLOGY	8	117-124

2007	Nichols et al.	Global dung beetle response to tropical forest modification and fragmentation: A quantitative literature review and meta-analysis	BIOLOGICAL CONSERVATION	137	43466
2007	Nielsen	Deforestation and biodiversity: effects of bushland cultivation on dung beetles in semi-arid Tanzania	BIODIVERSITY AND CONSERVATION	16	2753-2769
2007	Pringle et al.	Herbivore-initiated interaction cascades and their modulation by productivity in an African savanna	P. OF THE NATIONAL ACADEMY OF SCIENCES OF THE USA	104	193-197
2007	Saint-Germain et al.	Host-use patterns of saproxylic phloeophagous and xylophagous Coleoptera adults and larvae along the decay gradient in standing dead black spruce and aspen	ECOGRAPHY	30	737-748
2007	Slabber et al.	Acclimation effects on thermal tolerances of springtails from sub-Antarctic Marion Island: Indigenous and invasive species	JOURNAL OF INSECT PHYSIOLOGY	53	113-125
2007	Taki & Kevan	Does habitat loss affect the communities of plants and insects equally in plant-pollinator interactions? Preliminary findings	BIODIVERSITY AND CONSERVATION	16	33-35
2007	Tylianakis et al.	Habitat modification alters the structure of tropical host-parasitoid food webs	NATURE	445	202-205
2008	Allsopp et al.	Valuing Insect Pollination Services with Cost of Replacement	PLOS ONE	3	e3128
2008	Arellano et al.	Patterns of abundance and movement in relation to landscape structure: a study of a common scarab (Canthon cyanellus cyanellus) in Southern Mexico	LANDSCAPE ECOLOGY	23	69-78
2008	Bouchard & Pothier	Simulations of the effects of changes in mean fire return intervals on balsam fir abundance, and implications for spruce budworm outbreaks	ECOLOGICAL MODELLING	218	207-218
2008	Buse et al.	An endangered longhorn beetle associated with old oaks and its possible role as an ecosystem engineer	CONSERVATION BIOLOGY	22	329-337
2008	Cole et al.	Does foraging activity affect foraging success in the western harvester ant (Hymenoptera : formicidae)?	ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA	101	272-276
2008	Davis et al.	Effects of an Alien Ant Invasion on Abundance, Behavior, and Reproductive Success of Endemic Island Birds	CONSERVATION BIOLOGY	22	1165-1176
2008	De la Mora et al.	Arboreal Ant Abundance and Leaf Miner Damage in Coffee Agroecosystems in Mexico	BIOTROPICA	40	742-746
2008	de Moor & Ivanov	Global diversity of caddisflies (Trichoptera: Insecta) in freshwater	HYDROBIOLOGIA	595	393-407
2008	Devaux et al.	Environmental and landscape effects on cross-pollination rates observed at long distance among French oilseed rape Brassica napus commercial fields	JOURNAL OF APPLIED ECOLOGY	45	803-812
2008	Forup et al.	The restoration of ecological interactions: plant-pollinator networks on ancient and restored heathlands	JOURNAL OF APPLIED ECOLOGY	45	742-752
2008	Franzen & Nilsson	How can we preserve and restore species richness of pollinating insects on agricultural land?	ECOGRAPHY	31	698-708
2008	Freymann et al.	The importance of termites (Isoptera) for the recycling of herbivore dung in tropical ecosystems: a review	EUROPEAN JOURNAL OF ENTOMOLOGY	105	165-173
2008	Heino	Patterns of functional biodiversity and function-environment relationships in lake littoral macroinvertebrates	LIMNOLOGY AND OCEANOGRAPHY	53	1446-1455
2008	Kaiser et al.	Exotic pest insects: another perspective on coffee and conservation	ORYX	42	143-146
2008	Klein et al.	Advances in pollination ecology from tropical plantation crops	ECOLOGY	89	935-943
2008	Landis et al.	Increasing corn for biofuel production reduces biocontrol services in agricultural landscapes	P. OF THE NATIONAL ACADEMY OF SCIENCES OF THE USA	105	20552-20557
2008	Larsen **et al.**	Understanding Trait-Dependent Community Disassembly: Dung Beetles, Density Functions, and Forest Fragmentation	CONSERVATION BIOLOGY	22	1288-1298
2008	Lau	Beyond the ecological: Biological invasions alter natural selection on a native plant species	ECOLOGY	89	1023-1031
2008	Lewis & Gripenberg	Insect seed predators and environmental change	JOURNAL OF APPLIED ECOLOGY	45	1593-1599
2008	Munoz & Cavieres	The presence of a showy invasive plant disrupts pollinator service and reproductive output in native alpine species only at high densities	JOURNAL OF ECOLOGY	96	459-467
2008	Nash et al.	Effect of remnant vegetation, pesticides, and farm management on abundance of the beneficial predator Notonomus gravis (Chaudoir) (Coleoptera : Carabidae)	BIOLOGICAL CONTROL	46	83-93
2008	Otterstatter & Thomson	Does Pathogen Spillover from Commercially Reared Bumble Bees Threaten Wild Pollinators?	PLOS ONE	3	e2771
2008	Pe'er & Settele	The rare butterfly Tomares nesimachus (Lycaenidae) as a bioindicator for pollination services and ecosystem functioning in northern Israel	ISRAEL JOURNAL OF ECOLOGY & EVOLUTION	54	11-136
2008	Pringle & Fox-Dobbs	Coupling of canopy and understory food webs by ground-dwelling predators	ECOLOGY LETTERS	11	1328-1337
2008	Proches et al.	Herbivores, but not other insects, are scarce on alien plants	AUSTRAL ECOLOGY	33	691-700
2008	Raffa et al.	Cross-scale drivers of natural disturbances prone to anthropogenic amplification: The dynamics of bark beetle eruptions	BIOSCIENCE	58	501-517
2008	Tscharntke et al.	Landscape constraints on functional diversity of birds and insects in tropical agroecosystems	ECOLOGY	89	944-951
2008	Tylianakis et al.	Resource heterogeneity moderates the biodiversity-function relationship in real world ecosystems	PLOS BIOLOGY	6	947-956
2008	Vandermeer et al.	Clusters of ant colonies and robust criticality in a tropical agroecosystem	NATURE	451	457-459
2008	Wade et al.	Influence of food supplementation on the fitness of two biological control agents: a predatory nabid bug and a bollworm pupal parasitoid	JOURNAL OF PEST SCIENCE	81	99-107
2008	Woodcock & Huryn	The effect of an interstate highway on macroinvertebrate production in headwater streams	FUNDAMENTAL AND APPLIED LIMNOLOGY	171	199-218
2009	Ackerman et al.	Termite (Insecta: Isoptera) Species Composition in a Primary Rain Forest and Agroforests in Central Amazonia	BIOTROPICA	41	226-233
2009	Aizen et al.	How much does agriculture depend on pollinators? Lessons from long-term trends in crop production	ANNALS OF BOTANY	103	1579-1588
2009	Brosi et al.	Detecting changes in habitat-scale bee foraging in a tropical fragmented landscape using stable isotopes	FOREST ECOLOGY AND MANAGEMENT	258	1846-1855
2009	Christie & Hochuli	Responses of wasp communities to urbanization: effects on community resilience and species diversity	JOURNAL OF INSECT CONSERVATION	13	213-221
2009	Coops et al.	Prediction and assessment of bark beetle-induced mortality of lodgepole pine using estimates of stand vigor derived from remotely sensed data	REMOTE SENSING OF ENVIRONMENT	113	1058-1066
2009	Creed et al.	Dominant species can produce a negative relationship between species diversity and ecosystem function	OIKOS	118	723-732
2009	Dangles et al.	Crop damage increases with pest species diversity: evidence from potato tuber moths in the tropical Andes	JOURNAL OF APPLIED ECOLOGY	46	1115-1121
2009	Eilers & Klein	Landscape context and management effects on an important insect pest and its natural enemies in almond	BIOLOGICAL CONTROL	51	388-394
2009	Exeler et al.	Restoration of riverine inland sand dune complexes: implications for the conservation of wild bees	JOURNAL OF APPLIED ECOLOGY	46	1097-1105
2009	Farwig et al.	Isolation from forest reduces pollination, seed predation and insect scavenging in Swiss farmland	LANDSCAPE ECOLOGY	24	919-927
2009	Gallai et al.	Economic valuation of the vulnerability of world agriculture confronted with pollinator decline	ECOLOGICAL ECONOMICS	68	810-821
2009	Gardiner et al.	Landscape diversity enhances biological control of an introduced crop pest in the north-central USA	ECOLOGICAL APPLICATIONS	19	143-154
2009	Isaacs et al.	Maximizing arthropod-mediated ecosystem services in agricultural landscapes: the role of native plants	FRONTIERS IN ECOLOGY AND THE ENVIRONMENT	7	196-203
2009	Johnson et al.	Effects of shade and bird exclusion on arthropods and leaf damage on coffee farms in Jamaica's Blue Mountains	AGROFORESTRY SYSTEMS	76	139-148
2009	Lagauzere et al.	Effects of uranium-contaminated sediments on the bioturbation activity of Chironomus riparius larvae (Insecta, Diptera) and Tubifex tubifex worms (Annelida, Tubificidae)	CHEMOSPHERE	76	324-334
2009	Lindsay & Cunningham	Livestock grazing exclusion and microhabitat variation affect invertebrates and litter decomposition rates in woodland remnants	FOREST ECOLOGY AND MANAGEMENT	258	178-187
2009	Maleque et al.	Arthropods as bioindicators of sustainable forest management, with a focus on plantation forests	APPLIED ENTOMOLOGY AND ZOOLOGY	44	43040
2009	Mandelik & Roll	Diversity patterns of wild bees in almond orchards and their surrounding landscape	ISRAEL JOURNAL OF PLANT SCIENCES	57	185-191
2009	Moretti & Legg	Combining plant and animal traits to assess community functional responses to disturbance	ECOGRAPHY	32	299-309
2009	Murray et al.	Conservation ecology of bees: populations, species and communities	APIDOLOGIE	40	211-236
2009	Palmer et al.	The role of crop-pollinator relationships in breeding for pollinator-friendly legumes: from a breeding perspective	EUPHYTICA	170	35-52
2009	Parmenter & MacMahon	Carrion decomposition and nutrient cycling in a semiarid shrub-steppe ecosystem	ECOLOGICAL MONOGRAPHS	79	637-661
2009	Pei et al.	Dynamics of an impulsive control system which prey species share a common predator	CHAOS SOLITONS & FRACTALS	41	2429-2436
2009	Philpott et al.	Functional richness and ecosystem services: bird predation on arthropods in tropical agroecosystems	ECOLOGICAL APPLICATIONS	19	1858-1867
2009	Plischuk et al.	South American native bumblebees (Hymenoptera: Apidae) infected by Nosema ceranae (Microsporidia), an emerging pathogen of honeybees (Apis mellifera)	ENVIRONMENTAL MICROBIOLOGY REPORTS	1	131-135
2009	Rohr et al.	Response of arthropod biodiversity to foundation species declines: The case of the eastern hemlock	FOREST ECOLOGY AND MANAGEMENT	258	1503-1510
2009	Schmera et al.	A measure for assessing functional diversity in ecological communities	AQUATIC ECOLOGY	43	157-167
2009	Schuldt & Assmann	Environmental and historical effects on richness and endemism patterns of carabid beetles in the western Palaearctic	ECOGRAPHY	32	705-714
2009	Stout & Morales	Ecological impacts of invasive alien species on bees	APIDOLOGIE	40	388-409
2009	Villalpando et al.	Elevated air temperature alters an old-field insect community in a multifactor climate change experiment	GLOBAL CHANGE BIOLOGY	15	930-942

2009	Winkler et al.	Nectar exploitation by herbivores and their parasitoids is a function of flower species and relative humidity	BIOLOGICAL CONTROL	50	299-306
2010	Albrecht et al.	Effects of ecological compensation meadows on arthropod diversity in adjacent intensively managed grassland	BIOLOGICAL CONSERVATION	143	642-649
2010	Amarillo-Suarez	Top-down, bottom-up, and horizontal mortality variation in a generalist seed beetle	REVISTA COLOMBIANA DE ENTOMOLOGIA	36	269-276
2010	Babin-Fenske & Anand	Terrestrial Insect Communities and the Restoration of an Industrially Perturbed Landscape: Assessing Success and Surrogacy	RESTORATION ECOLOGY	18	73-84
2010	Barberi et al.	Functional biodiversity in the agricultural landscape: relationships between weeds and arthropod fauna	WEED RESEARCH	50	388-401
2010	Batary et al.	Effect of conservation management on bees and insect-pollinated grassland plant communities in three European countries	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	136	35-39
2010	Beyer & Schultz	Oviposition selection by a rare grass skipper Polites mardon in montane habitats: Advancing ecological understanding to develop conservation strategies	BIOLOGICAL CONSERVATION	143	862-872
2010	Bianchi et al.	Spatial variability in ecosystem services: simple rules for predator-mediated pest suppression	ECOLOGICAL APPLICATIONS	20	2322-233
2010	Brittain et al.	Organic farming in isolated landscapes does not benefit flower-visiting insects and pollination	BIOLOGICAL CONSERVATION	143	1860-1867
2010	Carvalheiro et al.	Pollination services decline with distance from natural habitat even in biodiversity-rich areas	JOURNAL OF APPLIED ECOLOGY	47	810-820
2010	Cereghino et al.	Ants mediate the structure of phytotelm communities in an ant-garden bromeliad	ECOLOGY	91	1549-1556
2010	Convey et al.	The establishment of a new ecological guild of pollinating insects on sub-Antarctic South Georgia	ANTARCTIC SCIENCE	22	508-512
2010	Eisenhauer et al.	Soil arthropods beneficially rather than detrimentally impact plant performance in experimental grassland systems of different diversity	SOIL BIOLOGY & BIOCHEMISTRY	42	1418-1424
2010	Ellison et al.	Experimentally testing the role of foundation species in forests: the Harvard Forest Hemlock Removal Experiment	METHODS IN ECOLOGY AND EVOLUTION	1	168-179
2010	Fagan et al.	Are Ants Useful Indicators of Restoration Success in Temperate Grasslands?	RESTORATION ECOLOGY	18	373-379
2010	Furlong & Zalucki	Exploiting predators for pest management: the need for sound ecological assessment	ENTOMOLOGIA EXPERIMENTALIS ET APPLICATA	135	225-236
2010	Gaigher & Samways	Surface-active arthropods in organic vineyards, integrated vineyards and natural habitat in the Cape Floristic Region	JOURNAL OF INSECT CONSERVATION	14	595-605
2010	Gardiner et al.	Implications of Three Biofuel Crops for Beneficial Arthropods in Agricultural Landscapes	BIOENERGY RESEARCH	3	43617
2010	Grunewald	Is Pollination at Risk? Current Threats to and Conservation of Bees	GAIA-ECOLOGICAL PERSPECTIVES FOR SCIENCE AND SOCIETY	19	61-67
2010	Harvey et al.	Interactions between invasive plants and insect herbivores: A plea for a multitrophic perspective	BIOLOGICAL CONSERVATION	143	2251-2259
2010	Hegland et al.	How to monitor ecological communities cost-efficiently: The example of plant-pollinator networks	BIOLOGICAL CONSERVATION	143	2092-2101
2010	Hjalten et al.	How will low-intensity burning after clear-felling affect mid-boreal insect assemblages?	BASIC AND APPLIED ECOLOGY	11	363-372
2010	Isaacs & Kirk	Pollination services provided to small and large highbush blueberry fields by wild and managed bees	JOURNAL OF APPLIED ECOLOGY	47	841-849
2010	Johnson et al.	Pest reduction services by birds in shade and sun coffee in Jamaica	ANIMAL CONSERVATION	13	140-147
2010	Jonsson et al.	Habitat manipulation to mitigate the impacts of invasive arthropod pests	BIOLOGICAL INVASIONS	12	2933-2945
2010	Kardol & Wardle	How understanding aboveground-belowground linkages can assist restoration ecology	TRENDS IN ECOLOGY & EVOLUTION	25	670-679
2010	Landis & Werling	Arthropods and biofuel production systems in North America	INSECT SCIENCE	17	220-236
2010	Latham & Mills	Quantifying aphid predation: the mealy plum aphid Hyalopterus pruni in California as a case study	JOURNAL OF APPLIED ECOLOGY	47	200-208
2010	Leberfinger et al.	Drought impact on stream detritivores: experimental effects on leaf litter breakdown and life cycles	HYDROBIOLOGIA	652	247-254
2010	Lemperiere & Marage	The influence of forest management and habitat on insect communities associated with dead wood: a case study in forests of the southern French Alps	INSECT CONSERVATION AND DIVERSITY	3	236-245
2010	Litt & Steidl	Insect assemblages change along a gradient of invasion by a nonnative grass	BIOLOGICAL INVASIONS	12	3449-3463
2010	Lomov et al.	Pollination and plant reproductive success in restored urban landscapes dominated by a pervasive exotic pollinator	LANDSCAPE AND URBAN PLANNING	96	232-239
2010	Maleque et al.	Seasonal prevalence of arthropods after line thinning of overstocked Japanese cedar (Cryptomeria japonica D. Don) plantations in central Japan	LANDSCAPE AND ECOLOGICAL ENGINEERING	6	43-52
2010	Marquis & Lill	Impact of plant architecture versus leaf quality on attack by leaf-tying caterpillars on five oak species	OECOLOGIA	163	203-213
2010	Martin et al.	Interactions of biological and herbicidal management of Melaleuca quinquenervia with fire: Consequences for ecosystem services	BIOLOGICAL CONTROL	54	307-315
2010	Nash et al.	Identifying signature of chemical applications on indigenous and invasive nontarget arthropod communities in vineyards	ECOLOGICAL APPLICATIONS	20	1693-1703
2010	Parker et al.	Herbivory enhances positive effects of plant genotypic diversity	ECOLOGY LETTERS	13	553-563
2010	Pearson	Trait- and Density-Mediated Indirect Interactions Initiated by an Exotic Invasive Plant Autogenic Ecosystem Engineer	AMERICAN NATURALIST	176	394-403
2010	Penvern et al.	Peach orchard protection strategies and aphid communities: Towards an integrated agroecosystem approach	CROP PROTECTION	29	1148-1156
2010	Persiani et al.	Linking taxonomical and functional biodiversity of saproxylic fungi and beetles in broad-leaved forests in southern Italy with varying management histories	PLANT BIOSYSTEMS	144	250-261
2010	Quintero et al.	Effects of anthropogenic habitat disturbance on local pollinator diversity and species turnover across a precipitation gradient	BIODIVERSITY AND CONSERVATION	19	257-274
2010	Sattler et al.	Response of arthropod species richness and functional groups to urban habitat structure and management	LANDSCAPE ECOLOGY	25	941-954
2010	Scherber et al.	Functional identity versus species richness: herbivory resistance in plant communities	OECOLOGIA	163	707-717
2010	Scherr et al.	Effects of Temperature on Growth Rate and Behavior of Epeorus albertae (Ephemeroptera: Heptageniidae) Nymphs	ENVIRONMENTAL ENTOMOLOGY	39	2017-2024
2010	Sharanowski et al.	Expressed sequence tags reveal Proctotrupomorpha (minus Chalcidoidea) as sister to Aculeata (Hymenoptera: Insecta)	MOLECULAR PHYLOGENETICS AND EVOLUTION	57	101-112
2010	Starzomski et al.	Predation and facilitation determine chironomid emergence in a bromeliad-insect food web	ECOLOGICAL ENTOMOLOGY	35	53-60
2010	Stein et al.	Impact of invertebrate herbivory in grasslands depends on plant species diversity	ECOLOGY	91	1639-1650
2010	Steingrover et al.	Designing agricultural landscapes for natural pest control: a transdisciplinary approach in the Hoeksche Waard (The Netherlands)	LANDSCAPE ECOLOGY	25	825-838
2010	Taki et al.	Effects of landscape metrics on Apis and non-Apis pollinators and seed set in common buckwheat	BASIC AND APPLIED ECOLOGY	11	594-602
2010	Tylianakis & Romo	Natural enemy diversity and biological control: Making sense of the context-dependency	BASIC AND APPLIED ECOLOGY	11	657-668
2010	Van Driesche et al.	Classical biological control for the protection of natural ecosystems	BIOLOGICAL CONTROL	54	12086
2010	Vandewalle et al.	Functional traits as indicators of biodiversity response to land use changes across ecosystems and organisms	BIODIVERSITY AND CONSERVATION	19	2921-2947
2010	Vasconcellos et al.	Seasonality of insects in the semi-arid Caatinga of northeastern Brazil	REVISTA BRASILEIRA DE ENTOMOLOGIA	54	471-476
2010	Winfree	The conservation and restoration of wild bees	Annals of the New York Academy of Sciences	1195	169-197
2011	Aukema et al.	Economic Impacts of Non-Native Forest Insects in the Continental United States	PLOS ONE	6	1041-1046
2011	Axelsson et al.	Leaf litter from insect-resistant transgenic trees causes changes in aquatic insect community composition	JOURNAL OF APPLIED ECOLOGY	48	1472-1479
2011	Badano & Vergara	Potential negative effects of exotic honey bees on the diversity of native pollinators and yield of highland coffee plantations	AGRICULTURAL AND FOREST ENTOMOLOGY	13	365-372
2011	Beggs et al.	Ecological effects and management of invasive alien Vespidae	BIOCONTROL	56	505-526
2011	Bluthgen & Klein	Functional complementarity and specialisation: The role of biodiversity in plant-pollinator interactions	BASIC AND APPLIED ECOLOGY	12	282-291
2011	Breeze et al.	Pollination services in the UK: How important are honeybees?	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	142	137-143
2011	Brittain & Potts	The potential impacts of insecticides on the life-history traits of bees and the consequences for pollination	BASIC AND APPLIED ECOLOGY	12	321-331
2011	Dalling et al.	Seed survival in soil: interacting effects of predation, dormancy and the soil microbial community	JOURNAL OF ECOLOGY	99	89-95
2011	Devoto et al.	The 'night shift': nocturnal pollen-transport networks in a boreal pine forest	ECOLOGICAL ENTOMOLOGY	36	25-35
2011	Eisenhauer et al.	Impact of above- and below-ground invertebrates on temporal and spatial stability of grassland of different diversity	JOURNAL OF ECOLOGY	99	572-582
2011	Evans et al.	Seeds in farmland food-webs: Resource importance, distribution and the impacts of farm management	BIOLOGICAL CONSERVATION	144	2941-2950
2011	Fox et al.	Moths count: recording moths for conservation in the UK	JOURNAL OF INSECT CONSERVATION	15	55-68
2011	Garibaldi et al.	Stability of pollination services decreases with isolation from natural areas despite honey bee visits	ECOLOGY LETTERS	14	1062-1072
2011	Gatehouse et al.	Insect-resistant biotech crops and their impacts on beneficial arthropods	PHILOSOPHICAL T. OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCE	366	1438-1452

2011	Geerts & Pauw	Farming with native bees (Apis mellifera subsp. capensis Esch.) has varied effects on nectar-feeding bird communities in South African fynbos vegetation	POPULATION ECOLOGY	53	333-339
2011	Giraldo et al.	The adoption of silvopastoral systems promotes the recovery of ecological processes regulated by dung beetles in the Colombian Andes	INSECT CONSERVATION AND DIVERSITY	4	115-122
2011	Gunton	Integrating associational resistance into arable weed management	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	142	129-136
2011	Hanley et al.	Increased bumblebee abundance along the margins of a mass flowering crop: evidence for pollinator spill-over	OIKOS	120	1618-1624
2011	Hill et al.	Ecological impacts of tropical forest fragmentation: how consistent are patterns in species richness and nestedness?	PHILOSOPHICAL T. OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCE	366	3265-3276
2011	Hogg & Daane	Diversity and invasion within a predator community: impacts on herbivore suppression	JOURNAL OF APPLIED ECOLOGY	48	453-461
2011	Hyodo et al.	Feeding habits of Hymenoptera and Isoptera in a tropical rain forest as revealed by nitrogen and carbon isotope ratios	INSECTES SOCIAUX	58	417-426
2011	Kovacs-Hostyanszki et al.	Local and landscape effects on bee communities of Hungarian winter cereal fields	AGRICULTURAL AND FOREST ENTOMOLOGY	13	59-66
2011	Krauss et al.	Decreased Functional Diversity and Biological Pest Control in Conventional Compared to Organic Crop Fields	PLOS ONE	6	e19502
2011	Ledger et al.	Impact of simulated drought on ecosystem biomass production: an experimental test in stream mesocosms	GLOBAL CHANGE BIOLOGY	17	2288-2297
2011	Lundgren & Fergen	Enhancing predation of a subterranean insect pest: A conservation benefit of winter vegetation in agroecosystems	APPLIED SOIL ECOLOGY	51	42614
2011	McGeoch et al.	Conservation and monitoring of invertebrates in terrestrial protected areas	KOEDOE	53	131-143
2011	Michel et al.	The effect of tree dimension on the diversity of bark microhabitat structures and bark use in Douglas-fir (Pseudotsuga menziesii var. menziesii)	CANADIAN JOURNAL OF FOREST RESEARCH-REVUE	41	300-308
2011	Mody et al.	Within-orchard variability of the ecosystem service 'parasitism': Effects of cultivars, ants and tree location	BASIC AND APPLIED ECOLOGY	12	456-465
2011	Moretti et al.	Determining the season of death from the family composition of insects infesting carrion	EUROPEAN JOURNAL OF ENTOMOLOGY	108	211-218
2011	Negro et al.	The Impact of Overgrazing on Dung Beetle Diversity in the Italian Maritime Alps	ENVIRONMENTAL ENTOMOLOGY	40	1081-1092
2011	Nuttle et al.	Legacy of top-down herbivore pressure ricochets back up multiple trophic levels in forest canopies over 30 years	ECOSPHERE	2	43040
2011	Ollerton et al.	How many flowering plants are pollinated by animals?	OIKOS	120	321-326
2011	Otieno et al.	Local management and landscape drivers of pollination and biological control services in a Kenyan agro-ecosystem	BIOLOGICAL CONSERVATION	144	2424-2431
2011	Parsche et al.	Experimental environmental change and mutualistic vs. antagonistic plant flower-visitor interactions	PERSPECTIVES IN PLANT ECOLOGY EVOLUTION AND SYSTEMATICS	13	27-35
2011	Potts et al.	Developing European conservation and mitigation tools for pollination services: approaches of the STEP (Status and Trends of European Pollinators) project	JOURNAL OF APICULTURAL RESEARCH	50	152-164
2011	Rastogi	Provisioning services from ants: food and pharmaceuticals	ASIAN MYRMECOLOGY	4	103-120
2011	Rose et al.	Integral projection model of insect herbivore effects on Cirsium altissimum populations along productivity gradients	ECOSPHERE	2	43466
2011	Saint-Germain & Drapeau	Response of saprophagous wood-boring beetles (Coleoptera: Cerambycidae) to severe habitat loss due to logging in an aspen-dominated boreal landscape	LANDSCAPE ECOLOGY	26	573-586
2011	Samnegard et al.	Gardens benefit bees and enhance pollination in intensively managed farmland	BIOLOGICAL CONSERVATION	144	2602-2606
2011	Santos & Stevenson	Comparison of Macroinvertebrate Diversity and Community Structure among Perennial and Non-Perennial Headwater Streams	NORTHEASTERN NATURALIST	18	46204
2011	Silva & Moulton	Ecosystem Functioning and Community Structure as Indicators for Assessing Environmental Impacts: Leaf Processing and Macroinvertebrates in Atlantic Forest Streams	INTERNATIONAL REVIEW OF HYDROBIOLOGY	96	656-666
2011	Stange et al.	Concordant population dynamics of Lepidoptera herbivores in a forest ecosystem	ECOGRAPHY	34	772-779
2011	Steinbauer & Peveling	The impact of the locust control insecticide fipronil on termites and ants in two contrasting habitats in northern Australia	CROP PROTECTION	30	814-825
2011	Stutz & Entling	Effects of the landscape context on aphid-ant-predator interactions on cherry trees	BIOLOGICAL CONTROL	57	37-43
2011	Sullivan et al.	Bioenergy or biodiversity? Woody debris structures and maintenance of red-backed voles on clearcuts	BIOMASS & BIOENERGY	35	4390-4398
2011	Tscharntke et al.	Set-aside management: How do succession, sowing patterns and landscape context affect biodiversity?	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	143	37-44
2011	Verdu et al.	The influence of landscape structure on ants and dung beetles diversity in a Mediterranean savanna-Forest ecosystem	ECOLOGICAL INDICATORS	11	831-839
2011	Walton & Isaacs	Influence of Native Flowering Plant Strips on Natural Enemies and Herbivores in Adjacent Blueberry Fields	ENVIRONMENTAL ENTOMOLOGY	40	697-705
2011	Weiner et al.	Land use intensity in grasslands: Changes in biodiversity, species composition and specialisation in flower visitor networks	BASIC AND APPLIED ECOLOGY	12	292-299
2011	Winfree et al.	Valuing pollination services to agriculture	ECOLOGICAL ECONOMICS	71	80-88
2011	Yeo et al.	Impacts of land use types on ant communities in a tropical forest margin (Oume - Cote d'Ivoire)	AFRICAN JOURNAL OF AGRICULTURAL RESEARCH	6	260-274
2011	Youngblood	Ecological lessons from long-term studies in experimental forests: Ponderosa pine silviculture at Pringle Falls Experimental Forest, central Oregon	FOREST ECOLOGY AND MANAGEMENT	261	937-947
2012	Anderson et al.	Highly similar microbial communities are shared among related and trophically similar ant species	MOLECULAR ECOLOGY	21	2282-2296
2012	Andersson et al.	Organic Farming Improves Pollination Success in Strawberries	PLOS ONE	7	e31599
2012	Avelino et al.	Landscape context and scale differentially impact coffee leaf rust, coffee berry borer, and coffee root-knot nematodes	ECOLOGICAL APPLICATIONS	22	584-596
2012	Bennett & Gratton	Measuring Natural Pest Suppression at Different Spatial Scales Affects the Importance of Local Variables	ENVIRONMENTAL ENTOMOLOGY	41	1077-1085
2012	Beynon et al.	Consequences of alternative and conventional endoparasite control in cattle for dung-associated invertebrates and ecosystem functioning	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	162	36-44
2012	Bloor et al.	Dung of domestic grazing animals: characteristics and role for grassland function	INRA PRODUCTIONS ANIMALES	25	45-55
2012	Bommarco et al.	Drastic historic shifts in bumble-bee community composition in Sweden	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	279	309-315
2012	Borer et al.	Plant diversity controls arthropod biomass and temporal stability	ECOLOGY LETTERS	15	1457-1464
2012	Braga et al.	Are Dung Beetles Driving Dung-Fly Abundance in Traditional Agricultural Areas in the Amazon?	ECOSYSTEMS	15	1173-1181
2012	Brooks et al.	Large carabid beetle declines in a United Kingdom monitoring network increases evidence for a widespread loss in insect biodiversity	JOURNAL OF APPLIED ECOLOGY	49	1009-1019
2012	Brooks et al.	Trophic links between functional groups of arable plants and beetles are stable at a national scale	JOURNAL OF ANIMAL ECOLOGY	81	41365
2012	Brouard et al.	Understorey environments influence functional diversity in tank-bromeliad ecosystems	FRESHWATER BIOLOGY	57	815-823
2012	Brown	Role of biodiversity in integrated fruit production in eastern North American orchards	AGRICULTURAL AND FOREST ENTOMOLOGY	14	89-99
2012	Campbell et al.	Realising multiple ecosystem services based on the response of three beneficial insect groups to floral traits and trait diversity	BASIC AND APPLIED ECOLOGY	13	363-370
2012	Carvalheiro et al.	Creating patches of native flowers facilitates crop pollination in large agricultural fields: mango as a case study	JOURNAL OF APPLIED ECOLOGY	49	1373-1383
2012	Cooper et al.	Edge effects on abiotic conditions, zooplankton, macroinvertebrates, and larval fishes in Great Lakes fringing marshes	JOURNAL OF GREAT LAKES RESEARCH	38	142-151
2012	Darvill et al.	Triploid bumblebees indicate a direct cost of inbreeding in fragmented populations	MOLECULAR ECOLOGY	21	3988-3995
2012	Davies et al.	The pyrodiversity-biodiversity hypothesis: a test with savanna termite assemblages	JOURNAL OF APPLIED ECOLOGY	49	422-430
2012	Davila et al.	Ecosystem services of pollinator diversity: a review of the relationship with pollen limitation of plant reproduction	BOTANY-BOTANIQUE	90	535-543
2012	Deel et al.	Relationship of a Landsat cumulative disturbance index to canopy nitrogen and forest structure	REMOTE SENSING OF ENVIRONMENT	118	40-49
2012	Dinnage et al.	Diversity of plant evolutionary lineages promotes arthropod diversity	ECOLOGY LETTERS	15	1308-1317
2012	Dolny et al.	Aquatic insects indicate terrestrial habitat degradation: changes in taxonomical structure and functional diversity of dragonflies in tropical rainforest of East Kalimantan	TROPICAL ZOOLOGY	25	141-157
2012	Eisenhauer	Aboveground-belowground interactions as a source of complementarity effects in biodiversity experiments	PLANT AND SOIL	351	44562
2012	Farwig & Berens	Imagine a world without seed dispersers: A review of threats, consequences and future directions	BASIC AND APPLIED ECOLOGY	13	109-115
2012	Fenoglio et al.	Forest fragmentation reduces parasitism via species loss at multiple trophic levels	ECOLOGY	93	2407-2420
2012	Goncalves & Pereira	Abundance and diversity of soil arthropods in the olive grove ecosystem	JOURNAL OF INSECT SCIENCE	12	41640
2012	Graham et al.	Floral Host Plants of Adult Beetles in Central Illinois: An Historical Perspective	ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA	105	287-297
2012	Hadley & Betts	The effects of landscape fragmentation on pollination dynamics: absence of evidence not evidence of absence	BIOLOGICAL REVIEWS	87	526-544
2012	Hladun et al.	Selenium Toxicity to Honey Bee (Apis mellifera L.) Pollinators: Effects on Behaviors and Survival	PLOS ONE	7	e34137
2012	Hochkirch et al.	Conspecific flowers of Sinapis arvensis are stronger competitors for pollinators than those of the invasive weed Bunias orientalis	NATURWISSENSCHAFTEN	99	217-224

2012	Holzschuh et al.	Landscapes with wild bee habitats enhance pollination, fruit set and yield of sweet cherry	BIOLOGICAL CONSERVATION	153	101-107
2012	House et al.	Agricultural matrix provides modest habitat value for ants on mixed farms in eastern Australia	JOURNAL OF INSECT CONSERVATION	16	43070
2012	Hudewenz et al.	Herbivore and pollinator responses to grassland management intensity along experimental changes in plant species richness	BIOLOGICAL CONSERVATION	150	42-52
2012	Jacobs & Work	Linking deadwood-associated beetles and fungi with wood decomposition rates in managed black spruce forests	CANADIAN JOURNAL OF FOREST RESEARCH-REVUE	42	1477-1490
2012	Jauker et al.	Early reproductive benefits of mass-flowering crops to the solitary bee Osmia rufa outbalance post-flowering disadvantages	BASIC AND APPLIED ECOLOGY	13	268-276
2012	Jonsson et al.	Agricultural intensification drives landscape-context effects on host-parasitoid interactions in agroecosystems	JOURNAL OF APPLIED ECOLOGY	49	706-714
2012	Kaspari & Weiser	Energy, taxonomic aggregation, and the geography of ant abundance	ECOGRAPHY	35	65-72
2012	Kefford et al.	Risk assessment of salinity and turbidity in Victoria (Australia) to stream insects' community structure does not always protect functional traits	SCIENCE OF THE TOTAL ENVIRONMENT	415	61-68
2012	Klein et al.	Wild pollination services to California almond rely on semi-natural habitat	JOURNAL OF APPLIED ECOLOGY	49	723-732
2012	Letourneau et al.	Perennial habitat fragments, parasitoid diversity and parasitism in ephemeral crops	JOURNAL OF APPLIED ECOLOGY	49	1405-1416
2012	Littlewood et al.	Science into practice - how can fundamental science contribute to better management of grasslands for invertebrates?	INSECT CONSERVATION AND DIVERSITY	5	42948
2012	Lowenstein et al.	Response of Wild Bees (Hymenoptera: Apoidea: Anthophila) to Surrounding Land Cover in Wisconsin Pickling Cucumber	ENVIRONMENTAL ENTOMOLOGY	41	532-540
2012	Lutz et al.	Ecological Importance of Large-Diameter Trees in a Temperate Mixed-Conifer Forest	PLOS ONE	7	e36131
2012	MacLeod et al.	Reduced pesticide toxicity and increased woody vegetation cover account for enhanced native bird densities in organic orchards	JOURNAL OF APPLIED ECOLOGY	49	652-660
2012	Mazia et al.	Seasonal patterns of herbivory, leaf traits and productivity consumption in dry and wet Patagonian forests	ECOLOGICAL ENTOMOLOGY	37	193-203
2012	Mazzi & Dorn	Movement of insect pests in agricultural landscapes	ANNALS OF APPLIED BIOLOGY	160	97-113
2012	Mcart et al.	Relationships between arthropod richness, evenness, and diversity are altered by complementarity among plant genotypes	OECOLOGIA	168	1013-1021
2012	McCall & Pennings	Disturbance and Recovery of Salt Marsh Arthropod Communities following BP Deepwater Horizon Oil Spill	PLOS ONE	7	e32735
2012	McKiernan et al.	Stability of Plant Defensive Traits Among Populations in Two Eucalyptus Species Under Elevated Carbon Dioxide	JOURNAL OF CHEMICAL ECOLOGY	38	204-212
2012	Medvigy et al.	Simulated impacts of insect defoliation on forest carbon dynamics	ENVIRONMENTAL RESEARCH LETTERS	7	45703
2012	Moller et al.	Ecosystems effects 25 years after Chernobyl: pollinators, fruit set and recruitment	OECOLOGIA	170	1155-1165
2012	Montagna et al.	Insect community structure and insect biodiversity conservation in an Alpine wetland subjected to an intermediate diversified management regime	ECOLOGICAL ENGINEERING	47	242-246
2012	Montero-Castano & Vila	Impact of landscape alteration and invasions on pollinators: a meta-analysis	JOURNAL OF ECOLOGY	100	884-893
2012	Mudri-Stojnic et al.	Pollinator Diversity (Hymenoptera And Diptera) In Semi-Natural Habitats In Serbia During Summer	ARCHIVES OF BIOLOGICAL SCIENCES	64	777-786
2012	Mwangangi et al.	Mosquito species abundance and diversity in Malindi, Kenya and their potential implication in pathogen transmission	PARASITOLOGY RESEARCH	110	61-71
2012	Neita & Escobar	The potential value of agroforestry to dung beetle diversity in the wet tropical forests of the Pacific lowlands of Colombia	AGROFORESTRY SYSTEMS	85	121-131
2012	Norfolk et al.	Rainwater harvesting and arthropod biodiversity within an arid agro-ecosystem	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	162	41852
2012	Ouyang et al.	Maize Benefits the Predatory Beetle, Propylea japonica (Thunberg), to Provide Potential to Enhance Biological Control for Aphids in Cotton	PLOS ONE	7	e44379
2012	Parisi et al.	Consequences of grazing on the vertical transmission of a fungal Neotyphodium symbiont in an annual grass population	AUSTRAL ECOLOGY	37	620-628
2012	Parolin et al.	Functional characteristics of secondary plants for increased pest management	INTERNATIONAL JOURNAL OF PEST MANAGEMENT	58	368-376
2012	Pequeño & Pantoja	Negative Effects of Azteca Ants on the Distribution of the Termite Neocapritermes braziliensis in Central Amazonia	SOCIOBIOLOGY	59	893-902
2012	Perez-Espona et al.	Landscape genetics of a top neotropical predator	MOLECULAR ECOLOGY	21	5969-5985
2012	Picazo et al.	Are patterns in the taxonomic, biological and ecological traits of water beetles congruent in Mediterranean ecosystems?	FRESHWATER BIOLOGY	57	2192-2210
2012	Poulsen & Sapountzis	Behind every great ant, there is a great gut	MOLECULAR ECOLOGY	21	2054-2057
2012	Rader et al.	Spatial and temporal variation in pollinator effectiveness: do unmanaged insects provide consistent pollination services to mass flowering crops?	JOURNAL OF APPLIED ECOLOGY	49	126-134
2012	Rand & Louda	Exotic weevil invasion increases floral herbivore community density, function, and impact on a native plant	OIKOS	121	85-94
2012	Randolph & Dobson	Pangloss revisited: a critique of the dilution effect and the biodiversity-buffers-disease paradigm	PARASITOLOGY	139	847-863
2012	Reiskind et al.	Effects of combination of leaf resources on competition in container mosquito larvae	BULLETIN OF ENTOMOLOGICAL RESEARCH	102	424-434
2012	Robertson et al.	Agroenergy Crops Influence the Diversity, Biomass, and Guild Structure of Terrestrial Arthropod Communities	BIOENERGY RESEARCH	5	179-188
2012	Rosales et al.	Effect of ivermectin on the survival and fecundity of Euoniticellus intermedius (Coleoptera: Scarabaeidae)	REVISTA DE BIOLOGIA TROPICAL	60	333-345
2012	Rusch et al.	Using landscape indicators to predict high pest infestations and successful natural pest control at the regional scale	LANDSCAPE AND URBAN PLANNING	105	62-73
2012	Rzanny & Voigt	Complexity of multitrophic interactions in a grassland ecosystem depends on plant species diversity	JOURNAL OF ANIMAL ECOLOGY	81	614-627
2012	Schmera et al.	Does functional redundancy of communities provide insurance against human disturbances? An analysis using regional-scale stream invertebrate data	HYDROBIOLOGIA	693	183-194
2012	Schuepp et al.	High Bee and Wasp Diversity in a Heterogeneous Tropical Farming System Compared to Protected Forest	PLOS ONE	7	e52109
2012	Schuldt et al.	Predator Assemblage Structure and Temporal Variability of Species Richness and Abundance in Forests of High Tree Diversity	BIOTROPICA	44	793-800
2012	Sepulveda-Zuniga et al.	State of vegetational naturalism and heterogeneity in pond wetlands and their effect on Macrolepidoptera diversity (Insecta: Lepidoptera)	SHILAP-REVISTA DE LEPIDOPTEROLOGIA	40	155-170
2012	Soler et al.	Root Herbivore Effects on Aboveground Multitrophic Interactions: Patterns, Processes and Mechanisms	JOURNAL OF CHEMICAL ECOLOGY	38	755-767
2012	Sullivan et al.	Influence of repeated fertilization and cattle grazing on forest ecosystems: Abundance and diversity of forest-floor small mammals	FOREST ECOLOGY AND MANAGEMENT	277	180-195
2012	Takada et al.	Multiple spatial scale factors affecting mirid bug abundance and damage level in organic rice paddies	BIOLOGICAL CONTROL	60	169-174
2012	Templer et al.	Impact of a reduced winter snowpack on litter arthropod abundance and diversity in a northern hardwood forest ecosystem	BIOLOGY AND FERTILITY OF SOILS	48	413-424
2012	Thanee & Phalaraksh	Diversity of Aquatic Insects and Their Functional Feeding Group from Anthropogenically Disturbed Streams in Mae Sot District, Tak Province, Thailand	CHIANG MAI JOURNAL OF SCIENCE	39	399-409
2012	Trivellone et al.	Management pressure drives leafhopper communities in vineyards in Southern Switzerland	INSECT CONSERVATION AND DIVERSITY	5	75-85
2012	Tschinkel et al.	Ant distribution in relation to ground water in north Florida pine flatwoods	JOURNAL OF INSECT SCIENCE	12	43831
2012	van Driesche	The role of biological control in wildlands	BIOCONTROL	57	131-137
2012	Vinatier et al.	A tool for testing integrated pest management strategies on a tritrophic system involving pollen beetle, its parasitoid and oilseed rape at the landscape scale	LANDSCAPE ECOLOGY	27	1421-1433
2012	Wall & Beynon	Area-wide impact of macrocyclic lactone parasiticides in cattle dung	MEDICAL AND VETERINARY ENTOMOLOGY	26	42948
2012	Werling et al.	Influence of native North American prairie grasses on predation of an insect herbivore of potato	BIOLOGICAL CONTROL	61	15-25
2012	Wesner	Predator diversity effects cascade across an ecosystem boundary	OIKOS	121	53-60
2012	Woltz et al.	Landscape structure and habitat management differentially influence insect natural enemies in an agricultural landscape	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	152	40-49
2012	Yadav et al.	Habitat structure influences below ground biocontrol services: A comparison between urban gardens and vacant lots	LANDSCAPE AND URBAN PLANNING	104	238-244
2012	Zhang et al.	Ecosystem service tradeoff between traditional and modern agriculture: a case study in Congjiang County, Guizhou Province, China	FRONTIERS OF ENVIRONMENTAL SCIENCE & ENGINEERING	6	743-752
2012	Zhang & Swinton	Optimal control of soybean aphid in the presence of natural enemies and the implied value of their ecosystem services	JOURNAL OF ENVIRONMENTAL MANAGEMENT	96	42552
2012	Zhu et al.	The effects of large herbivore grazing on meadow steppe plant and insect diversity	JOURNAL OF APPLIED ECOLOGY	49	1075-1083
2012	Zytynska et al.	Genetic effects of tank-forming bromeliads on the associated invertebrate community in a tropical forest ecosystem	OECOLOGIA	170	467-475
2013	Addison et al.	An Initial Investigation of the Effects of Mulch Layers on Soil-Dwelling Arthropod Assemblages in Vineyards	SOUTH AFRICAN JOURNAL OF ENOLOGY AND VITICULTURE	34	266-271
2013	Alvarez et al.	Occurrence of the Carabid Beetle, Pterostichus melanarius (Illiger), in Potato Ecosystems of Idaho and its Predatory Potential on the Colorado Potato Beetle and Aphids	AMERICAN JOURNAL OF POTATO RESEARCH	90	83-92
2013	Anderson et al.	The influence of conservation field margins in intensively managed grazing land on communities of five arthropod trophic groups	INSECT CONSERVATION AND DIVERSITY	6	201-211
2013	Andersson et al.	Landscape heterogeneity and farming practice alter the species composition and taxonomic breadth of pollinator communities	BASIC AND APPLIED ECOLOGY	14	540-546

2013	Arnan et al.	Response of ant functional composition to fire	ECOGRAPHY	36	1182-1192
2013	Augustine & Baker	Associations of Grassland Bird Communities with Black-Tailed Prairie Dogs in the North American Great Plains	CONSERVATION BIOLOGY	27	324-334
2013	Bagella et al.	Effects of plant community composition and flowering phenology on honeybee foraging in Mediterranean sylvo-pastoral systems	APPLIED VEGETATION SCIENCE	16	689-697
2013	Balzan & Wackers	Flowers to selectively enhance the fitness of a host-feeding parasitoid: Adult feeding by Tuta absoluta and its parasitoid Necremnus artynes	BIOLOGICAL CONTROL	67	21-31
2013	Barbaro et al.	Winter bird numerical responses to a key defoliator in mountain pine forests	FOREST ECOLOGY AND MANAGEMENT	296	90-97
2013	Barton et al.	Grassland area determines beetle assemblage dissimilarity from surrounding floodplain forest	JOURNAL OF INSECT CONSERVATION	17	1209-1219
2013	Barton et al.	Species Traits Predict Assemblage Dynamics at Ephemeral Resource Patches Created by Carrion	PLOS ONE	8	e53961
2013	Bisseleua et al.	Shade Tree Diversity, Cocoa Pest Damage, Yield Compensating Inputs and Farmers' Net Returns in West Africa	PLOS ONE	8	e56115
2013	Brandt et al.	An introduction to Canada's boreal zone: ecosystem processes, health, sustainability, and environmental issues	ENVIRONMENTAL REVIEWS	21	207-226
2013	Brasil et al.	Effects of environmental factors on community structure of Leptophlebiidae (Insecta, Ephemeroptera) in Cerrado streams, Brazil	IHERINGIA SERIE ZOOLOGIA	103	260-265
2013	Brousseau et al.	Short-term effects of reduced white-tailed deer density on insect communities in a strongly overbrowsed boreal forest ecosystem	BIODIVERSITY AND CONSERVATION	22	77-92
2013	Buma et al.	Effect of the current major insect outbreaks on decadal phenological and LAI trends in southern Rocky Mountain forests	INTERNATIONAL JOURNAL OF REMOTE SENSING	34	7249-7274
2013	Burk & Kennedy	Invertebrate communities of groundwater-dependent refugia with varying hydrology and riparian cover during a supraseasonal drought	JOURNAL OF FRESHWATER ECOLOGY	28	251-270
2013	Campos & Hernandez	Dung beetle assemblages (Coleoptera, Scarabaeinae) in Atlantic forest fragments in southern Brazil	REVISTA BRASILEIRA DE ENTOMOLOGIA	57	47-54
2013	Castagneyrol et al.	Plant apparency, an overlooked driver of associational resistance to insect herbivory	JOURNAL OF ECOLOGY	101	418-429
2013	Chaplin-Kramer et al.	Detecting pest control services across spatial and temporal scales	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	181	206-212
2013	Churchill et al.	Restoring forest resilience: From reference spatial patterns to silvicultural prescriptions and monitoring	FOREST ECOLOGY AND MANAGEMENT	291	442-457
2013	Clavijo & Amarillo	Taxonomic and functional variation in arthropod fauna associated with plant to vegetal communities on high-Andean wetlands (Colombia)	REVISTA COLOMBIANA DE ENTOMOLOGIA	39	155-163
2013	Cornelisse et al.	The Implications of Habitat Management on the Population Viability of the Endangered Ohlone Tiger Beetle (Cicindela ohlone) Metapopulation	PLOS ONE	8	e71005
2013	Correa et al.	Omorgus suberosus and Polynoncus bifurcatus (Coleoptera: Scarabaeoidea: Trogidae) in exotic and native environments of Brazil	ZOOLOGIA	30	238-241
2013	Davis et al.	Microbial Volatile Emissions as Insect Semiochemicals	JOURNAL OF CHEMICAL ECOLOGY	39	840-859
2013	Dicks et al.	Identifying key knowledge needs for evidence-based conservation of wild insect pollinators: a collaborative cross-sectoral exercise	INSECT CONSERVATION AND DIVERSITY	6	435-446
2013	Diekotter & Crist	Quantifying habitat-specific contributions to insect diversity in agricultural mosaic landscapes	INSECT CONSERVATION AND DIVERSITY	6	607-618
2013	Dinnage	Phylogenetic diversity of plants alters the effect of species richness on invertebrate herbivory	PEERJ	1	e93
2013	Dollar et al.	Effects of managing semi-natural grassland buffers on butterflies	JOURNAL OF INSECT CONSERVATION	17	577-590
2013	Domisch et al.	Modelling distribution in European stream macroinvertebrates under future climates	GLOBAL CHANGE BIOLOGY	19	752-762
2013	Dumont et al.	Prospects from agroecology and industrial ecology for animal production in the 21st century	ANIMAL	7	1028-1043
2013	Eady et al.	Relationship between water temperature predictability and aquatic macroinvertebrate assemblages in two South African streams	AFRICAN JOURNAL OF AQUATIC SCIENCE	38	163-174
2013	Ebeling et al.	The impact of plant diversity and fertilization on fitness of a generalist grasshopper	BASIC AND APPLIED ECOLOGY	14	246-254
2013	Emery & Doran	Presence and management of the invasive plant Gypsophila paniculata (baby's breath) on sand dunes alters arthropod abundance and community structure	BIOLOGICAL CONSERVATION	161	174-181
2013	Fabian et al.	The importance of landscape and spatial structure for hymenopteran-based food webs in an agro-ecosystem	JOURNAL OF ANIMAL ECOLOGY	82	1203-1214
2013	Fitzpatrick et al.	An Herbivore's Thermal Tolerance is Higher Than That of the Ant Defenders in a Desert Protection Mutualism	SOCIOBIOLOGY	60	252-258
2013	Ford et al.	Grazing management in saltmarsh ecosystems drives invertebrate diversity, abundance and functional group structure	INSECT CONSERVATION AND DIVERSITY	6	189-200
2013	Fox	The decline of moths in Great Britain: a review of possible causes	INSECT CONSERVATION AND DIVERSITY	6	43586
2013	Frossard et al.	Chironomid assemblages in cores from multiple water depths reflect oxygen-driven changes in a deep French lake over the last 150 years	JOURNAL OF PALEOLIMNOLOGY	50	257-273
2013	Gaigher et al.	Saving a tropical ecosystem from a destructive ant-scale (Pheidole megacephala, Pulvinaria urbicola) mutualism with support from a diverse natural enemy assemblage	BIOLOGICAL INVASIONS	15	2115-2125
2013	Garcia-Tejero et al.	Land use changes and ground dwelling beetle conservation in extensive grazing dehesa systems of north-west Spain	BIOLOGICAL CONSERVATION	161	58-66
2013	Gardiner et al.	The Value of Urban Vacant Land to Support Arthropod Biodiversity and Ecosystem Services	ENVIRONMENTAL ENTOMOLOGY	42	1123-1136
2013	Garibaldi et al.	Wild Pollinators Enhance Fruit Set of Crops Regardless of Honey Bee Abundance	SCIENCE	339	1608-1611
2013	Gossner et al.	Effect of dead wood enrichment in the canopy and on the forest floor on beetle guild composition	FOREST ECOLOGY AND MANAGEMENT	302	404-413
2013	Graeber et al.	Cascading effects of flow reduction on the benthic invertebrate community in a lowland river	HYDROBIOLOGIA	717	147-159
2013	Hagler & Blackmer	Identifying inter- and intra-guild feeding activity of an arthropod predator assemblage	ECOLOGICAL ENTOMOLOGY	38	258-271
2013	Hendriks et al.	Temporal-Spatial Dynamics in Orthoptera in Relation to Nutrient Availability and Plant Species Richness	PLOS ONE	8	e71736
2013	Hobbelen et al.	Modeling the impacts of global warming on predation and biotic resistance: mosquitoes, damselflies and avian malaria in Hawaii	THEORETICAL ECOLOGY	6	31-44
2013	Horak et al.	Changing roles of propagule, climate, and land use during extralimital colonization of a rose chafer beetle	NATURWISSENSCHAFTEN	100	327-336
2013	Jaramillo et al.	Climate Change or Urbanization? Impacts on a Traditional Coffee Production System in East Africa over the Last 80 Years	PLOS ONE	8	e51815
2013	Jeffs & Lewis	Effects of climate warming on hostparasitoid interactions	ECOLOGICAL ENTOMOLOGY	38	209-218
2013	Jepsen et al.	Ecosystem Impacts of a Range Expanding Forest Defoliator at the Forest-Tundra Ecotone	ECOSYSTEMS	16	561-575
2013	Joern & Laws	Ecological Mechanisms Underlying Arthropod Species Diversity in Grasslands	ANNUAL REVIEW OF ENTOMOLOGY	58	19-36
2013	Johnson et al.	Estimating benthic secondary production from aquatic insect emergence in streams affected by mountaintop removal coal mining, West Virginia, USA	FUNDAMENTAL AND APPLIED LIMNOLOGY	182	191-204
2013	Karaus et al.	The contribution of lateral aquatic habitats to insect diversity along river corridors in the Alps	LANDSCAPE ECOLOGY	28	1755-1767
2013	Kim et al.	The community structures of the coniferous and deciduous dead wood-dwelling arthropods in Korea	ENTOMOLOGICAL RESEARCH	43	288-298
2013	King et al.	Social Insects Dominate Eastern US Temperate Hardwood Forest Macroinvertebrate Communities in Warmer Regions	PLOS ONE	8	e75843
2013	Lebuhn et al.	Detecting Insect Pollinator Declines on Regional and Global Scales	CONSERVATION BIOLOGY	27	113-120
2013	Leonhardt et al.	Economic gain, stability of pollination and bee diversity decrease from southern to northern Europe	BASIC AND APPLIED ECOLOGY	14	461-471
2013	Li et al.	Long-distance dispersal and habitat use of the butterfly Byasa impediens in a fragmented subtropical forest	INSECT CONSERVATION AND DIVERSITY	6	170-178
2013	Lindgren & Raffa	Evolution of tree killing in bark beetles (Coleoptera: Curculionidae): trade-offs between the maddening crowds and a sticky situation	CANADIAN ENTOMOLOGIST	145	471-495
2013	Little et al.	A burning issue: Fire overrides grazing as a disturbance driver for South African grassland bird and arthropod assemblage structure and diversity	BIOLOGICAL CONSERVATION	158	258-270
2013	Loranger et al.	Predicting invertebrate herbivory from plant traits: Polycultures show strong nonadditive effects	ECOLOGY	94	1499-1509
2013	Lovett et al.	Effects of introduced insects and diseases on forest ecosystems in the Catskill Mountains of New York	ANNALS OF THE NEW YORK ACADEMY OF SCIENCES	1298	66-77
2013	Lundin et al.	When ecosystem services interact: crop pollination benefits depend on the level of pest control	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	280	20122243
2013	Manhaes et al.	Meso- and macrofauna in the soil and litter of leguminous trees in a degraded pasture in Brazil	AGROFORESTRY SYSTEMS	87	993-1004
2013	Matos et al.	Contrasting Patterns of Species Richness and Composition of Solitary Wasps and Bees (Insecta: Hymenoptera) According to Land-use	BIOTROPICA	45	73-79
2013	Matsumoto & Yamazaki	Distance from migratory honey bee apiary effects on community of insects visiting flowers of pumpkin	BULLETIN OF INSECTOLOGY	66	103-108
2013	Minarro & Prida	Hedgerows surrounding organic apple orchards in north-west Spain: potential to conserve beneficial insects	AGRICULTURAL AND FOREST ENTOMOLOGY	15	382-390
2013	Moran et al.	Effects of plant genotype and insect dispersal rate on the population dynamics of a forest pest	ECOLOGY	94	2792-2802
2013	Motzke et al.	Ant seed predation, pesticide applications and farmers' income from tropical multi-cropping gardens	AGRICULTURAL AND FOREST ENTOMOLOGY	15	245-254
2013	Neill & Puettmann	Managing for adaptive capacity: thinning improves food availability for wildlife and insect pollinators under climate change conditions	CANADIAN JOURNAL OF FOREST RESEARCH-REVUE	43	428-440

2013	Neuschulz et al.	Persistence of flower visitors and pollination services of a generalist tree in modified forests	AUSTRAL ECOLOGY	38	374-382
2013	Neves et al.	Ants of Three Adjacent Habitats of a Transition Region Between the Cerrado and Caatinga Biomes: The Effects of Heterogeneity and Variation in Canopy Cover	NEOTROPICAL ENTOMOLOGY	42	258-268
2013	Norris et al.	Insect outbreaks increase populations and facilitate reproduction in a cavity-dependent songbird, the Mountain Chickadee Poecile gambeli	IBIS	155	165-176
2013	O'Callaghan et al.	Responses to River Inundation Pressures Control Prey Selection of Riparian Beetles	PLOS ONE	8	e61866
2013	Okabe	Ecological characteristics of insects that affect symbiotic relationships with mites	ENTOMOLOGICAL SCIENCE	16	363-378
2013	Orwig et al.	Foundation species loss affects vegetation structure more than ecosystem function in a northeastern USA forest	PEERJ	1	e41
2013	Patrick	The effect of shredder community composition on the production and quality of fine particulate organic matter	FRESHWATER SCIENCE	32	1026-1035
2013	Penone et al.	Use of Large-Scale Acoustic Monitoring to Assess Anthropogenic Pressures on Orthoptera Communities	CONSERVATION BIOLOGY	27	979-987
2013	Petanidou et al.	Investigating plant-pollinator relationships in the Aegean: the approaches of the project POL-AEGIS (The pollinators of the Aegean archipelago: diversity and threats)	JOURNAL OF APICULTURAL RESEARCH	52	106-117
2013	Petrin et al.	Mayfly and stonefly species traits and species composition reflect hydrological regulation: a meta-analysis	FRESHWATER SCIENCE	32	425-437
2013	Poch & Simonetti	Ecosystem services in human-dominated landscapes: insectivory in agroforestry systems	AGROFORESTRY SYSTEMS	87	871-879
2013	Poch & Simonetti	Insectivory in Pinus radiata plantations with different degree of structural complexity	FOREST ECOLOGY AND MANAGEMENT	304	132-136
2013	Prather et al.	Invertebrates, ecosystem services and climate change	BIOLOGICAL REVIEWS	88	327-348
2013	Pryke et al.	Importance of habitat heterogeneity in remnant patches for conserving dung beetles	BIODIVERSITY AND CONSERVATION	22	2857-2873
2013	Rader et al.	Diurnal effectiveness of pollination by bees and flies in agricultural Brassica rapa: Implications for ecosystem resilience	BASIC AND APPLIED ECOLOGY	14	20-27
2013	Rader et al.	Native bees buffer the negative impact of climate warming on honey bee pollination of watermelon crops	GLOBAL CHANGE BIOLOGY	19	3103-3110
2013	Raymond et al.	Migration and dispersal may drive to high genetic variation and significant genetic mixing: the case of two agriculturally important, continental hoverflies	MOLECULAR ECOLOGY	22	5329-5339
2013	Renkema et al.	Predation of lowbush blueberry insect pests by ground beetles (Coleoptera: Carabidae) in the laboratory	JOURNAL OF PEST SCIENCE	86	525-532
2013	Robinson & Barrows	Namibian and North American sand-diving lizards	JOURNAL OF ARID ENVIRONMENTS	93	116-125
2013	Romo & Tylianakis	Elevated Temperature and Drought Interact to Reduce Parasitoid Effectiveness in Suppressing Hosts	PLOS ONE	8	e58136
2013	Rossetti et al.	Forest remnants contribute to parasitoid conservation: experimental evaluation of parasitism on a leafminer host	JOURNAL OF INSECT CONSERVATION	17	1137-1144
2013	Sabatier et al.	Non-linear effects of pesticide application on biodiversity-driven ecosystem services and disservices in a cacao agroecosystem: A modeling study	BASIC AND APPLIED ECOLOGY	14	115-125
2013	Sabatier et al.	Production and Robustness of a Cacao Agroecosystem: Effects of Two Contrasting Types of Management Strategies	PLOS ONE	8	e80352
2013	Saska et al.	Temperature effects on pitfall catches of epigeal arthropods: a model and method for bias correction	JOURNAL OF APPLIED ECOLOGY	50	181-189
2013	Saunders et al.	Almond orchards with living ground cover host more wild insect pollinators	JOURNAL OF INSECT CONSERVATION	17	1011-1025
2013	Scaven & Rafferty	Physiological effects of climate warming on flowering plants and insect pollinators and potential consequences for their interactions	CURRENT ZOOLOGY	59	418-426
2013	Shanker et al.	Functional significance of Micraspis discolor (F.) (Coccinellidae: Coleoptera) in rice ecosystem	JOURNAL OF APPLIED ENTOMOLOGY	137	601-609
2013	Shukla et al.	Impact of abundant Pheidole ant species on soil nutrients in relation to the food biology of the species	APPLIED SOIL ECOLOGY	71	15-23
2013	Sims et al.	How Ecosystem Service Provision Can Increase Forest Mortality from Insect Outbreaks	LAND ECONOMICS	89	154-176
2013	Six	The Bark Beetle Holobiont: Why Microbes Matter	JOURNAL OF CHEMICAL ECOLOGY	39	989-1002
2013	Smith et al.	Pathogens, Pests, and Economics: Drivers of Honey Bee Colony Declines and Losses	ECOHEALTH	10	434-445
2013	Souza et al.	Community-Level Patterns of Insect Herbivory in a Fragmented Atlantic Forest Landscape	ENVIRONMENTAL ENTOMOLOGY	42	430-437
2013	Stanley et al.	Pollinators and pollination of oilseed rape crops (Brassica napus L.) in Ireland: ecological and economic incentives for pollinator conservation	JOURNAL OF INSECT CONSERVATION	17	1181-1189
2013	Stanley & Stout	Quantifying the impacts of bioenergy crops on pollinating insect abundance and diversity: a field-scale evaluation reveals taxon-specific responses	JOURNAL OF APPLIED ECOLOGY	50	335-344
2013	Stodola et al.	Indirect effects of an invasive exotic species on a long-distance migratory songbird	BIOLOGICAL INVASIONS	15	1947-1959
2013	Takada et al.	Facilitation of ground-dwelling wolf spider predation on mind bugs by horizontal webs built by Tetragnatha spiders in organic paddy fields	JOURNAL OF ARACHNOLOGY	41	31-35
2013	Taki et al.	Influences of the seminatural and natural matrix surrounding crop fields on aphid presence and aphid predator abundance within a complex landscape	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	179	87-93
2013	Timms et al.	Assessing five decades of change in a high Arctic parasitoid community	ECOGRAPHY	36	1227-1235
2013	Torretta & Poggio	Species diversity of entomophilous plants and flower-visiting insects is sustained in the field margins of sunflower crops	JOURNAL OF NATURAL HISTORY	47	139-165
2013	Tovar-Sanchez et al.	Association between individual genetic diversity of two oak host species and canopy arthropod community structure	EUROPEAN JOURNAL OF FOREST RESEARCH	132	165-179
2013	Truong, VX et al.	Optimizing an Environmental Surveillance Network with Gaussian Process Entropy - An Optimization Approach by Agent-based Simulation	Frontiers in Artificial Intelligence and Applications	252	102-111
2013	Tscheulin & Petanidou	The presence of the invasive plant Solanum elaeagnifolium deters honeybees and increases pollen limitation in the native co-flowering species Glaucium flavum	BIOLOGICAL INVASIONS	15	385-393
2013	Turner et al.	Consequences of spatial heterogeneity for ecosystem services in changing forest landscapes: priorities for future research	LANDSCAPE ECOLOGY	28	1081-1097
2013	Ulyshen	Strengthening the case for saproxylic arthropod conservation: a call for ecosystem services research	INSECT CONSERVATION AND DIVERSITY	6	385-393
2013	Ulyshen & Wagner	Quantifying arthropod contributions to wood decay	METHODS IN ECOLOGY AND EVOLUTION	4	345-352
2013	van Veen & Sanders	Herbivore identity mediates the strength of trophic cascades on individual plants	ECOSPHERE	4	43070
2013	Vanbergen et al.	Threats to an ecosystem service: pressures on pollinators	FRONTIERS IN ECOLOGY AND THE ENVIRONMENT	11	251-259
2013	Vieira & Romero	Ecosystem engineers on plants: indirect facilitation of arthropod communities by leaf-rollers at different scales	ECOLOGY	94	1510-1518
2013	Vockenhuber et al.	Plant-animal interactions in two forest herbs along a tree and herb diversity gradient	PLANT ECOLOGY & DIVERSITY	6	205-216
2013	Woodcock et al.	Crop flower visitation by honeybees, bumblebees and solitary bees: Behavioural differences and diversity responses to landscape	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	171	42948
2013	Xi et al.	Grasshoppers amensalistically suppress caterpillar performance and enhance plant biomass in an alpine meadow	OIKOS	122	1049-1057
2013	Zangerl et al.	Role of arthropod communities in bioenergy crop litter decomposition	INSECT SCIENCE	20	671-678
2014	Abbas et al.	Plant diversity effects on pollinating and herbivorous insects can be linked to plant stoichiometry	BASIC AND APPLIED ECOLOGY	15	169-178
2014	Andersson et al.	Effects of farming intensity, crop rotation and landscape heterogeneity on field bean pollination	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	184	145-148
2014	Astudillo et al.	Leaf litter decomposition in six Cloud Forest streams of the upper La Antigua watershed, Veracruz, Mexico.	REVISTA DE BIOLOGIA TROPICAL	62	111-127
2014	Balzan et al.	Augmenting flower trait diversity in wildflower strips to optimise the conservation of arthropod functional groups for multiple agroecosystem services	JOURNAL OF INSECT CONSERVATION	18	713-728
2014	Barbosa et al.	Predatory Behavior And Life History Of Tenuisvalvae Notata (Coleoptera: Coccinellidae) Under Variable Prey Availability Conditions	FLORIDA ENTOMOLOGIST	97	1026-1034
2014	Boersma et al.	Invertebrate assemblages of pools in arid-land streams have high functional redundancy and are resistant to severe drying	FRESHWATER BIOLOGY	59	491-501
2014	Calcaterra et al.	Fire effect on ground-foraging ant assemblages in northeastern Argentina	JOURNAL OF INSECT CONSERVATION	18	339-352
2014	Clark, KL et al.	Contrasting effects of invasive insects and fire on ecosystem water use efficiency	BIOGEOSCIENCES	11	6509-6523
2014	Conti et al.	A trait-based approach to assess the vulnerability of European aquatic insects to climate change	HYDROBIOLOGIA	721	297-315
2014	Cox et al.	The Impact of Prairie Strips on Aphidophagous Predator Abundance and Soybean Aphid Predation in Agricultural Catchments	ENVIRONMENTAL ENTOMOLOGY	43	1185-1197
2014	de Andrade et al.	Tropical forest fires and biodiversity: dung beetle community and biomass responses in a northern Brazilian Amazon forest	JOURNAL OF INSECT CONSERVATION	18	1097-1104
2014	Dietze & Matthes	A general ecophysiological framework for modelling the impact of pests and pathogens on forest ecosystems	ECOLOGY LETTERS	17	1418-1426
2014	Ebeling et al.	Plant Diversity Impacts Decomposition and Herbivory via Changes in Aboveground Arthropods	PLOS ONE	9	e106529
2014	Eubanks & Finke	Interaction webs in agroecosystems: beyond who eats whom	CURRENT OPINION IN INSECT SCIENCE	2	42887
2014	Ferrante et al.	Quantifying predation pressure along an urbanisation gradient in Denmark using artificial caterpillars	EUROPEAN JOURNAL OF ENTOMOLOGY	111	649-654
2014	Frainer et al.	When does diversity matter? Species functional diversity and ecosystem functioning across habitats and seasons in a field experiment	JOURNAL OF ANIMAL ECOLOGY	83	460-469

2014	Gao et al.	No correlation between the diversity and productivity of assemblages: evidence from the phytophage and predator assemblages in various cotton agroecosystems	SCIENCE CHINA-LIFE SCIENCES	57	936-943
2014	Garibaldi et al.	From research to action: enhancing crop yield through wild pollinators	FRONTIERS IN ECOLOGY AND THE ENVIRONMENT	12	439-447
2014	Gillette et al.	The Once and Future Forest: Consequences of Mountain Pine Beetle Treatment Decisions	FOREST SCIENCE	60	527-538
2014	Gonzalez et al.	Detrital nutrient content determines growth rate and elemental composition of bromeliad-dwelling insects	FRESHWATER BIOLOGY	59	737-747
2014	Heino & Peckarsky	Integrating behavioral, population and large-scale approaches for understanding stream insect communities	CURRENT OPINION IN INSECT SCIENCE	2	41456
2014	Hillstrom et al.	Elevated carbon dioxide and ozone have weak, idiosyncratic effects on herbivorous forest insect abundance, species richness, and community composition	INSECT CONSERVATION AND DIVERSITY	7	553-562
2014	Holmquist et al.	Efficacy of Low and High Complexity Vegetation Treatments for Reestablishing Terrestrial Arthropod Assemblages during Montane Wetland Restoration	RESTORATION ECOLOGY	22	649-656
2014	Imura et al.	Landscape diversity of pasture dung beetle communities in the central region of mainland Japan and implications for conservation management	BIODIVERSITY AND CONSERVATION	23	597-616
2014	Jardine	Organic matter sources and size structuring in stream invertebrate food webs across a tropical to temperate gradient	FRESHWATER BIOLOGY	59	1509-1521
2014	Jones et al.	The Pollination of Hexastylis naniflora in Cleveland County, North Carolina	CASTANEA	79	74-77
2014	Kehinde & Samways	Insect-flower interactions: network structure in organic versus conventional vineyards	ANIMAL CONSERVATION	17	401-409
2014	Kendrick & Huryn	The Plecoptera And Trichoptera Of The Arctic North Slope Of Alaska	WESTERN NORTH AMERICAN NATURALIST	74	275-285
2014	LeCraw et al.	Metacommunity size influences aquatic community composition in a natural mesocosm landscape	OIKOS	123	903-911
2014	Loranger et al.	Invertebrate herbivory increases along an experimental gradient of grassland plant diversity	OECOLOGIA	174	183-193
2014	Maher et al.	Atlantic floodplain meadows: influence of hydrological gradients and management on sciomyzid (Diptera) assemblages	JOURNAL OF INSECT CONSERVATION	18	267-282
2014	Marquez-Hernandez et al.	Entomofaunistic Diversity in a Transgenic Cotton (Gossypium hirsutum L.) Agroecosystem in Coahuila, Mexico	SOUTHWESTERN ENTOMOLOGIST	39	317-326
2014	Masloski et al.	Evidence for Diet-Driven Habitat Partitioning of Melanoplinae and Gomphocerinae (Orthoptera: Acrididae) Along a Vegetation Gradient in a Western Oklahoma Grassland	ENVIRONMENTAL ENTOMOLOGY	43	1209-1214
2014	Mata et al.	Conserving insect assemblages in urban landscapes: accounting for species-specific responses and imperfect detection	JOURNAL OF INSECT CONSERVATION	18	885-894
2014	Melathopoulos et al.	Contextualising pollination benefits: effect of insecticide and fungicide use on fruit set and weight from bee pollination in lowbush blueberry	ANNALS OF APPLIED BIOLOGY	165	387-394
2014	Melin et al.	Pollination ecosystem services in South African agricultural systems	SOUTH AFRICAN JOURNAL OF SCIENCE	110	42979
2014	Merten et al.	Microhabitat influences on stream insect emergence	AQUATIC SCIENCES	76	165-172
2014	Metcalfe et al.	Herbivory makes major contributions to ecosystem carbon and nutrient cycling in tropical forests	ECOLOGY LETTERS	17	324-332
2014	Nikbin et al.	Age-specific Functional Response of Trichogramma brassicae (Hymenoptera: Trichogrammatidae) Parasitizing Different Egg Densities of Ephestia kuehniella	JOURNAL OF AGRICULTURAL SCIENCE AND TECHNOLOGY	16	1205-1216
2014	Northfield et al.	Pairwise interactions between functional groups improve biological control	BIOLOGICAL CONTROL	78	49-54
2014	Olivier et al.	Effects Of Environmental Heterogeneity On The Composition Of Insect Trophic Guilds	APPLIED ECOLOGY AND ENVIRONMENTAL RESEARCH	12	209-220
2014	Ouyang et al.	Weakening density dependence from climate change and agricultural intensification triggers pest outbreaks: a 37-year observation of cotton bollworms	ECOLOGY AND EVOLUTION	4	3362-3374
2014	Pechal et al.	Delayed insect access alters carrion decomposition and necrophagous insect community assembly	ECOSPHERE	5	44197
2014	Pedley et al.	Commercial spruce plantations support a limited. canopy fauna: Evidence from a multi taxa comparison of native and plantation forests	FOREST ECOLOGY AND MANAGEMENT	314	172-182
2014	Peter et al.	Effects of Local Tree Diversity on Herbivore Communities Diminish with Increasing Forest Fragmentation on the Landscape Scale	PLOS ONE	9	e95551
2014	Peters et al.	Variation in nutrient use in ant assemblages along an extensive elevational gradient on Mt Kilimanjaro	JOURNAL OF BIOGEOGRAPHY	41	2245-2255
2014	Robbirt et al.	Potential Disruption of Pollination in a Sexually Deceptive Orchid by Climatic Change	CURRENT BIOLOGY	24	2845-2849
2014	Rowntree et al.	The effect of multiple host species on a keystone parasitic plant and its aphid herbivores	FUNCTIONAL ECOLOGY	28	829-836
2014	Safarzoda et al.	The Role of Natural Enemy Foraging Guilds in Controlling Cereal Aphids in Michigan Wheat	PLOS ONE	9	e114230
2014	Schriever et al.	How hydroperiod and species richness affect the balance of resource flows across aquatic-terrestrial habitats	AQUATIC SCIENCES	76	131-143
2014	Schuldt et al.	Woody plant phylogenetic diversity mediates bottom-up control of arthropod biomass in species-rich forests	OECOLOGIA	176	171-182
2014	Stiers et al.	The invasive aquatic plant Ludwigia grandiflora affects pollinator visitants to a native plant at high abundances	AQUATIC INVASIONS	9	357367
2014	Stursova et al.	When the forest dies: the response of forest soil fungi to a bark beetle-induced tree dieback	ISME JOURNAL	8	1920-1931
2014	Suarez-Esteban et al.	Unpaved roads disrupt the effect of herbivores and pollinators on the reproduction of a dominant shrub	BASIC AND APPLIED ECOLOGY	15	524-533
2014	Sussky & Elkinton	Density-Dependent Survival and Fecundity of Hemlock Woolly Adelgid (Hemiptera: Adelgidae)	ENVIRONMENTAL ENTOMOLOGY	43	1157-1167
2014	Torres-Garcia et al.	Effects of environmental factors over aquatic hemimetabola and Coleoptera diversity in the Xichu's basin, Guanajuato, Mexico.	REVISTA DE BIOLOGIA TROPICAL	62	69-80
2014	Uchida & Ushimaru	Biodiversity declines due to abandonment and intensification of agricultural lands: patterns and mechanisms	ECOLOGICAL MONOGRAPHS	84	637-658
2014	van der Plas & Olff	Mesoherbivores affect grasshopper communities in a megaherbivore-dominated South African savannah	OECOLOGIA	175	639-649
2014	Vanbergen	Landscape alteration and habitat modification: impacts on plant-pollinator systems	CURRENT OPINION IN INSECT SCIENCE	5	44-49
2014	Winqvist et al.	Species' traits influence ground beetle responses to farm and landscape level agricultural intensification in Europe	JOURNAL OF INSECT CONSERVATION	18	837-846
2014	Woltz & Landis	Coccinellid response to landscape composition and configuration	AGRICULTURAL AND FOREST ENTOMOLOGY	16	341-349
2014	Wright et al.	The effects of insects, nutrients, and plant invasion on community structure and function above- and belowground	ECOLOGY AND EVOLUTION	4	732-742
2014	Zhu et al.	Effects of altered precipitation on insect community composition and structure in a meadow steppe	ECOLOGICAL ENTOMOLOGY	39	453-461
2015	Aadland et al.	Spatial Dynamics of Optimal Management in Bioeconomic Systems	COMPUTATIONAL ECONOMICS	45	545-577
2015	Abella-Medrano et al.	Spatiotemporal variation of mosquito diversity (Diptera: Culicidae) at places with different land-use types within a neotropical montane cloud forest matrix	PARASITES & VECTORS	8	487
2015	Astegiano et al.	Persistence of Plants and Pollinators in the Face of Habitat Loss: Insights from Trait-Based Metacommunity Models	ADVANCES IN ECOLOGICAL RESEARCH	53	201-257
2015	Baldock et al.	Where is the UK's pollinator biodiversity? The importance of urban areas for flower-visiting insects	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	282	20142849
2015	Barbir et al.	The attractiveness of flowering herbaceous plants to bees (Hymenoptera: Apoidea) and hoverflies (Diptera: Syrphidae) in agro-ecosystems of Central Spain	AGRICULTURAL AND FOREST ENTOMOLOGY	17	20-28
2015	Berlanga	Functional symbiosis and communication in microbial ecosystems. The case of wood-eating termites and cockroaches	INTERNATIONAL MICROBIOLOGY	18	159-169
2015	Berthe et al.	Simulated climate-warming increases Coleoptera activity-densities and reduces community diversity in a cereal crop	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	210	41944
2015	Beudert et al.	Bark Beetles Increase Biodiversity While Maintaining Drinking Water Quality	CONSERVATION LETTERS	8	272-281
2015	Beynon et al.	The application of an ecosystem services framework to estimate the economic value of dung beetles to the UK cattle industry	ECOLOGICAL ENTOMOLOGY	40	124-135
2015	Birkin & Goulson	Using citizen science to monitor pollination services	ECOLOGICAL ENTOMOLOGY	40	43042
2015	Blaauw & Isaacs	Wildflower plantings enhance the abundance of natural enemies and their services in adjacent blueberry fields	BIOLOGICAL CONTROL	91	94-103
2015	Blubaugh & Kaplan	Tillage compromises weed seed predator activity across developmental stages	BIOLOGICAL CONTROL	81	76-82
2015	Bogan et al.	Resistance and resilience of invertebrate communities to seasonal and supraseasonal drought in arid-land headwater streams	FRESHWATER BIOLOGY	60	2547-2558
2015	Borer et al.	Food-web composition and plant diversity control foliar nutrient content and stoichiometry	JOURNAL OF ECOLOGY	103	1432-1441
2015	Branco et al.	A review of invasive alien species impacts on eucalypt stands and citrus orchards ecosystem services: Towards an integrated management approach	JOURNAL OF ENVIRONMENTAL MANAGEMENT	149	17-26
2015	Bravo-Monroy et al.	Ecological and social drivers of coffee pollination in Santander, Colombia	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	211	145-154
2015	Bujan et al.	Progressive vegetation succession of fen habitats promotes the lack of habitat specialist ants	INSECTES SOCIAUX	62	415-422
2015	Callejas-Chavero et al.	Soil Microarthropods and Their Relationship to Higher Trophic Levels in the Pedregal de San Angel Ecological Reserve, Mexico	JOURNAL OF INSECT SCIENCE	15	59
2015	Chaplygina et al.	Arthropods in trophic-cenosis structure of collared flycatcher consortium in conditions of forest ecosystems of North-Eastern Ukraine	VISNYK OF DNIPROPETROVSK UNIVERSITY-BIOLOGY ECOLOGY	23	74-85
2015	Chenchouni et al.	Spatiotemporal diversity, structure and trophic guilds of insect assemblages in a semi-arid Sabkha ecosystem	PEERJ	3	e860
2015	Cigan et al.	Influence of bark beetle outbreaks on nutrient cycling in native pine stands in western Canada	PLANT AND SOIL	390	29-47

2015	Cole et al.	Riparian buffer strips: Their role in the conservation of insect pollinators in intensive grassland systems	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	211	207-220
2015	Compson et al.	Closely Related Tree Species Differentially Influence the Transfer of Carbon and Nitrogen from Leaf Litter Up the Aquatic Food Web	ECOSYSTEMS	18	186-201
2015	Couture et al.	Insect herbivory alters impact of atmospheric change on northern temperate forests	NATURE PLANTS	1	15016
2015	Cross et al.	Arthropod ecosystem services in apple orchards and their economic benefits	ECOLOGICAL ENTOMOLOGY	40	82-96
2015	Cuartas & Gomez	Effect of Biotic and Abiotic Factors on Diversity Patterns of Anthophyllous Insect Communities in a Tropical Mountain Forest	NEOTROPICAL ENTOMOLOGY	44	214-223
2015	da Silva et al.	Temporal variation of phytophilous Chironomidae over a 11-year period in a shallow Neotropical lake in southern Brazil	HYDROBIOLOGIA	742	129-140
2015	Day et al.	Predatory hoverflies increase oviposition in response to colour stimuli offering no reward: Implications for biological control	BASIC AND APPLIED ECOLOGY	16	544-552
2015	de Brito et al.	Biomass estimation of Triplectides egleri Sattler (Trichoptera, Leptoceridae) in a stream at Ducke Reserve, Central Amazonia	REVISTA BRASILEIRA DE ENTOMOLOGIA	59	332-336
2015	De Farias et al.	Response of the copro-necrophagous beetle (Coleoptera: Scarabaeinae) assemblage to a range of soil characteristics and livestock management in a tropical landscape	JOURNAL OF INSECT CONSERVATION	19	947-960
2015	Denisow & Wrzesien	The habitat effect on the diversity of pollen resources in several Campanula spp. - an implication for pollinator conservation	JOURNAL OF APICULTURAL RESEARCH	54	62-71
2015	Deraison et al.	Herbivore effect traits and their impact on plant community biomass: an experimental test using grasshoppers	FUNCTIONAL ECOLOGY	29	650-661
2015	Deraison et al.	Functional trait diversity across trophic levels determines herbivore impact on plant community biomass	ECOLOGY LETTERS	18	1346-1355
2015	do Amaral et al.	Influence of Habitat and Land Use on the Assemblages of Ephemeroptera, Plecoptera, and Trichoptera in Neotropical Streams	JOURNAL OF INSECT SCIENCE	15	60
2015	Dreyer et al.	Quantifying aquatic insect deposition from lake to land	ECOLOGY	96	499-509
2015	Ellis & Barbercheck	Management of Overwintering Cover Crops Influences Floral Resources and Visitation by Native Bees	ENVIRONMENTAL ENTOMOLOGY	44	999-1010
2015	Enriquez et al.	Alpha and beta diversity of bees and their pollination role on Cucurbita pepo L. (Cucurbitaceae) in the Guatemalan cloud forest	PAN-PACIFIC ENTOMOLOGIST	91	211-222
2015	Ewald et al.	Influences of extreme weather, climate and pesticide use on invertebrates in cereal fields over 42 years	GLOBAL CHANGE BIOLOGY	21	3931-3950
2015	Ewers et al.	Logging cuts the functional importance of invertebrates in tropical rainforest	NATURE COMMUNICATIONS	6	6
2015	Feltham et al.	Experimental evidence that wildflower strips increase pollinator visits to crops	ECOLOGY AND EVOLUTION	5	3523-3530
2015	Figueroa & Bergey	Bumble Bees (Hymenoptera: Apidae) of Oklahoma: Past and Present Biodiversity	JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY	88	418-429
2015	Fleury et al.	Seedling fate across different habitats: The effects of herbivory and soil fertility	BASIC AND APPLIED ECOLOGY	16	141-151
2015	Gaigher et al.	High parasitoid diversity in remnant natural vegetation, but limited spillover into the agricultural matrix in South African vineyard agroecosystems	BIOLOGICAL CONSERVATION	186	69-74
2015	Garbuzov et al.	Eating locally: dance decoding demonstrates that urban honey bees in Brighton, UK, forage mainly in the surrounding urban area	URBAN ECOSYSTEMS	18	411-418
2015	Gardner et al.	Asymmetric effects of native and exotic invasive shrubs on ecology of the West Nile virus vector Culex pipiens (Diptera: Culicidae)	PARASITES & VECTORS	8	329
2015	Garibaldi et al.	Trait matching of flower visitors and crops predicts fruit set better than trait diversity	JOURNAL OF APPLIED ECOLOGY	52	1436-1444
2015	Gillespie et al.	Indirect Effects of Field Management on Pollination Service and Seed Set in Hybrid Onion Seed Production	JOURNAL OF ECONOMIC ENTOMOLOGY	108	2511-2517
2015	Gomez & Novelo	A case of successful restoration of a tropical wetland evaluated through its Odonata (Insecta) larval assemblage	REVISTA DE BIOLOGIA TROPICAL	63	1043-1058
2015	Hahn et al.	The effects of agrochemicals on Lepidoptera, with a focus on moths, and their pollination service in field margin habitats	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	207	153-162
2015	Hall et al.	Altitudinal variation of parasitic Hymenoptera assemblages in Australian subtropical rainforest	AUSTRAL ENTOMOLOGY	54	246-258
2015	Hanson et al.	Agricultural management reduces emergence of pollen beetle parasitoids	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	205	41883
2015	Harvey & MacDougall	Spatially Heterogeneous Perturbations Homogenize the Regulation of Insect Herbivores	AMERICAN NATURALIST	186	623-633
2015	Henri et al.	Natural vegetation benefits synergistic control of the three main insect and pathogen pests of a fruit crop in southern Africa	JOURNAL OF APPLIED ECOLOGY	52	1092-1101
2015	Henriksen et al.	The Search Rate of the African Weaver Ant in Cashew	SOCIOBIOLOGY	62	519-526
2015	Holland et al.	Managing habitats on English farmland for insect pollinator conservation	BIOLOGICAL CONSERVATION	182	215-222
2015	Horsak et al.	Drivers of aquatic macroinvertebrate richness in spring fens in relation to habitat specialization and dispersal mode	JOURNAL OF BIOGEOGRAPHY	42	2112-2121
2015	Houadria et al.	Dietary and Temporal Niche Differentiation in Tropical Ants-Can They Explain Local Ant Coexistence?	BIOTROPICA	47	208-217
2015	Howe et al.	Predation pressure in Ugandan cotton fields measured by a sentinel prey method	ENTOMOLOGIA EXPERIMENTALIS ET APPLICATA	154	161-170
2015	Hulber et al.	Insect herbivory in alpine grasslands is constrained by community and host traits	JOURNAL OF VEGETATION SCIENCE	26	663-673
2015	Hyodo	Use of stable carbon and nitrogen isotopes in insect trophic ecology	ENTOMOLOGICAL SCIENCE	18	295-312
2015	Ichihara et al.	Creation of paddy levees to enhance the ecosystem service of weed seed predation by crickets	LANDSCAPE AND ECOLOGICAL ENGINEERING	11	227-233
2015	Jacobsen et al.	Priority effects of early successional insects influence late successional fungi in dead wood	ECOLOGY AND EVOLUTION	5	4896-4905
2015	Jonsson et al.	Experimental evidence that the effectiveness of conservation biological control depends on landscape complexity	JOURNAL OF APPLIED ECOLOGY	52	1274-1282
2015	Jordani et al.	Natural enemies depend on remnant habitat size in agricultural landscapes	JOURNAL OF FORESTRY RESEARCH	26	469-477
2015	Kalda et al.	Multi-scale ecology of insectivorous bats in agricultural landscapes	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	199	105-113
2015	Kalinkat et al.	Body size and the behavioral ecology of insects: linking individuals to ecological communities	CURRENT OPINION IN INSECT SCIENCE	9	24-30
2015	Kaser & Heimpel	Linking risk and efficacy in biological control host-parasitoid models	BIOLOGICAL CONTROL	90	49-60
2015	Keenan & Richardson	The timing of autumn senescence is affected by the timing of spring phenology: implications for predictive models	GLOBAL CHANGE BIOLOGY	21	2634-2641
2015	Keret et al.	Large Roads Disrupt Insect Movement: A Case Study of the Spodoptera littoralis (Lepidoptera: Noctuidae)	JOURNAL OF INSECT BEHAVIOR	28	544-554
2015	Klop et al.	Impact of nitrogen deposition on larval habitats: the case of the Wall Brown butterfly Lasiommata megera	JOURNAL OF INSECT CONSERVATION	19	393-402
2015	Koh & Holland	Grassland plantings and landscape natural areas both influence insect natural enemies	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	199	190-199
2015	Korpela et al.	Logging in boreal field-forest ecotones promotes flower-visiting insect diversity and modifies insect community composition	INSECT CONSERVATION AND DIVERSITY	8	152-162
2015	Kosolapov & Chesnokov	Possible environmental risks at commercial growing transgenic forage crops	RUSSIAN JOURNAL OF PLANT PHYSIOLOGY	62	143-152
2015	Kozlov	Changes in ladybird (Coleoptera: Coccinellidae) communities along a steep pollution gradient in subarctic forests of European Russia	EUROPEAN JOURNAL OF ENTOMOLOGY	112	728-733
2015	Kozlov et al.	Abrupt changes in invertebrate herbivory on woody plants at the forest-tundra ecotone	POLAR BIOLOGY	38	967-974
2015	Kozlov et al.	Sap-feeding insects on forest trees along latitudinal gradients in northern Europe: a climate-driven patterns	GLOBAL CHANGE BIOLOGY	21	106-116
2015	Krauel et al.	Weather-driven dynamics in a dual-migrant system: moths and bats	JOURNAL OF ANIMAL ECOLOGY	84	604-614
2015	Lampert & Morgan	Bugs on Bugs: An Inquiry-Based, Collaborative Activity to Learn Arthropod & Microbial Biodiversity	AMERICAN BIOLOGY TEACHER	77	323-331
2015	Landry & Ramankutty	Carbon Cycling, Climate Regulation, and Disturbances in Canadian Forests: Scientific Principles for Management	LAND	4	83-118
2015	Larsen et al.	Spatiotemporal variation in the relationship between landscape simplification and insecticide use	ECOLOGICAL APPLICATIONS	25	1976-1983
2015	Larsen et al.	Scale dependent biodiversity patterns in Mediterranean river catchments: a multi taxa approach	AQUATIC SCIENCES	77	455-463
2015	Leather	Influential entomology: a short review of the scientific, societal, economic and educational services provided by entomology	ECOLOGICAL ENTOMOLOGY	40	36-44
2015	Lemessa et al.	The effect of local and landscape level land-use composition on predatory arthropods in a tropical agricultural landscape	LANDSCAPE ECOLOGY	30	167-180
2015	Letourneau et al.	Simple-but-sound methods for estimating the value of changes in biodiversity for biological pest control in agriculture	ECOLOGICAL ECONOMICS	120	215-225
2015	Levi et al.	Threshold levels of generalist predation determine consumer response to resource pulses	OIKOS	124	1436-1443
2015	Lichtsteiner & Oehen	Beekeeping and farming dependence and contradiction	AGRARFORSCHUNG SCHWEIZ	6	278
2015	Liere et al.	Trophic cascades in agricultural landscapes: indirect effects of landscape composition on crop yield	ECOLOGICAL APPLICATIONS	25	652-661
2015	Lindenmayer et al.	Richness is not all: how changes in avian functional diversity reflect major landscape modification caused by pine plantations	DIVERSITY AND DISTRIBUTIONS	21	836-847
2015	Looney et al.	Overstory treatment and planting season affect survival of replacement tree species in emerald ash borer threatened Fraxinus nigra forests in Minnesota, USA	CANADIAN JOURNAL OF FOREST RESEARCH	45	1728-1738

2015	Losapio et al.	Structure-dynamic relationship of plant-insect networks along a primary succession gradient on a glacier foreland	ECOLOGICAL MODELLING	314	73-79
2015	Luoto & Nevalainen	Climate-forced patterns in midge feeding guilds	HYDROBIOLOGIA	742	141-152
2015	M'Gonigle et al.	Habitat restoration promotes pollinator persistence and colonization in intensively managed agriculture	ECOLOGICAL APPLICATIONS	25	1557-1565
2015	Maas et al.	Avian species identity drives predation success in tropical cacao agroforestry	JOURNAL OF APPLIED ECOLOGY	52	735-743
2015	Macadam & Stockan	More than just fish food: ecosystem services provided by freshwater insects	ECOLOGICAL ENTOMOLOGY	40	113-123
2015	Macagno et al.	Measuring saproxylic beetle diversity in small and medium diameter dead wood: The "grab-and-go" method	EUROPEAN JOURNAL OF ENTOMOLOGY	112	510-519
2015	Macfadyen et al.	Early-season movement dynamics of phytophagous pest and natural enemies across a native vegetation-crop ecotone	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	200	110-118
2015	MacFarlane et al.	Coupled human-natural regeneration of indigenous coastal dry forest in Kenya	FOREST ECOLOGY AND MANAGEMENT	354	149-159
2015	Macgregor et al.	Pollination by nocturnal Lepidoptera, and the effects of light pollution: a review	ECOLOGICAL ENTOMOLOGY	40	187-198
2015	MacIvor & Ksiazek	Invertebrates on Green Roofs	ECOLOGICAL STUDIES-ANALYSIS AND SYNTHESIS	223	333-355
2015	MacKenzie et al.	Community Structure and Abundance of Benthic Infaunal Invertebrates in Maine Fringing Marsh Ecosystems	ESTUARIES AND COASTS	38	1317-1334
2015	Maebe et al.	Quantitative Trait Loci for Light Sensitivity, Body Weight, Body Size, and Morphological Eye Parameters in the Bumblebee, Bombus terrestris	PLOS ONE	10	e0125011
2015	Maher et al.	Hydroperiod and Traditional Farming Practices Drive Plant Community Composition on Unregulated Atlantic Floodplain Meadows	WETLANDS	35	263-279
2015	Maine & Boyles	Land cover influences dietary specialization of insectivorous bats globally	MAMMAL RESEARCH	60	343-351
2015	Mairota et al.	Very high resolution Earth observation features for monitoring plant and animal community structure across multiple spatial scales in protected areas	I. J. OF APPLIED EARTH OBSERVATION AND GEOINFORMATION	37	100-105
2015	Manley et al.	Emerging viral disease risk to pollinating insects: ecological, evolutionary and anthropogenic factors	JOURNAL OF APPLIED ECOLOGY	52	331-340
2015	Marini et al.	Crop management modifies the benefits of insect pollination in oilseed rape	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	207	61-66
2015	Martin et al.	Pest control of aphids depends on landscape complexity and natural enemy interactions	PEERJ	3	e1095
2015	Martinou & Stavrinides	Effects of Sublethal Concentrations of Insecticides on the Functional Response of Two Mirid Generalist Predators	PLOS ONE	10	e0144413
2015	Mathews et al.	Barriers and benefits: implications of artificial night-lighting for the distribution of common bats in Britain and Ireland	PHILOSOPHICAL OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	370	20140124
2015	Medley et al.	Intense ranchland management tips the balance of regional and local factors affecting wetland community structure	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	212	207-244
2015	Merkley et al.	Introduced Western Mosquitofish (Gambusia affinis) reduce the emergence of aquatic insects in a desert spring	FRESHWATER SCIENCE	34	564-573
2015	Metcalf & Emery	Non-native grass invasion associated with increases in insect diversity in temperate forest understory	ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY	69	105-112
2015	Meziere et al.	Developing a set of simulation-based indicators to assess harmfulness and contribution to biodiversity of weed communities in cropping systems	ECOLOGICAL INDICATORS	48	157-170
2015	Miglecz et al.	Establishment of three cover crop mixtures in vineyards	SCIENTIA HORTICULTURAE	197	117-123
2015	Millar & Stephenson	Temperate forest health in an era of emerging megadisturbance	SCIENCE	349	823-826
2015	Mishra et al.	Ecological turmoil in evolutionary dynamics of plant-insect interactions: defense to offence	PLANTA	242	761-771
2015	Mkenda et al.	Extracts from Field Margin Weeds Provide Economically Viable and Environmentally Benign Pest Control Compared to Synthetic Pesticides	PLOS ONE	10	e0143530
2015	Morante et al.	Birds in Anthropogenic Landscapes: The Responses of Ecological Groups to Forest Loss in the Brazilian Atlantic Forest	PLOS ONE	10	e0128923
2015	Morin et al.	Short-term effect of selection cutting in boreal balsam fir forest on cerambycid and scolytid beetles	JOURNAL OF APPLIED ENTOMOLOGY	139	553-566
2015	Morin & Liebhold	Invasions by two non-native insects alter regional forest species composition and successional trajectories	FOREST ECOLOGY AND MANAGEMENT	341	67-74
2015	Morris et al.	Food web structure changes with elevation but not rainforest stratum	ECOGRAPHY	38	792-802
2015	Motard et al.	How invasion by Ailanthus altissima transforms soil and litter communities in a temperate forest ecosystem	BIOLOGICAL INVASIONS	17	1817-1832
2015	Motzke et al.	Pollination mitigates cucumber yield gaps more than pesticide and fertilizer use in tropical smallholder gardens	JOURNAL OF APPLIED ECOLOGY	52	261-269
2015	Murria et al.	Long-term isolation and endemicity of Neotropical aquatic insects limit the community responses to recent amphibian decline	DIVERSITY AND DISTRIBUTIONS	21	938-949
2015	Nayak et al.	Interactive effect of floral abundance and semi-natural habitats on pollinators in field beans (Vicia faba)	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	199	58-66
2015	Nitschke et al.	Increase of fast nutrient cycling in grassland microcosms through insect herbivory depends on plant functional composition and species diversity	OIKOS	124	161-173
2015	Oliver et al.	Declining resilience of ecosystem functions under biodiversity loss	NATURE COMMUNICATIONS	6	6
2015	Otieno et al.	Local and landscape effects on bee functional guilds in pigeon pea crops in Kenya	JOURNAL OF INSECT CONSERVATION	19	647-658
2015	Paul et al.	Exclusion of soil macrofauna did not affect soil quality but increased crop yields in a sub-humid tropical maize-based system	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	208	75-85
2015	Pequeno et al.	Linking functional trade-offs, population limitation and size structure: Termites under soil heterogeneity	BASIC AND APPLIED ECOLOGY	16	365-374
2015	Petermann et al.	Dominant predators mediate the impact of habitat size on trophic structure in bromeliad invertebrate communities	ECOLOGY	96	428-439
2015	Phillips & Gardiner	Use of video surveillance to measure the influences of habitat management and landscape composition on pollinator visitation and pollen deposition in pumpkin agroecosystems	PEERJ	3	e1342
2015	Pisanty & Mandelik	Profiling crop pollinators: life history traits predict habitat use and crop visitation by Mediterranean wild bees	ECOLOGICAL APPLICATIONS	25	742-752
2015	Ramirez et al.	Seasonal cycles, phylogenetic assembly, and functional diversity of orchid bee communities	ECOLOGY AND EVOLUTION	5	1896-1907
2015	Ramsden et al.	Optimizing field margins for biocontrol services: The relative role of aphid abundance, annual floral resources, and overwinter habitat in enhancing aphid natural enemies	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	199	94-104
2015	Raymond et al.	Temporal variability of aphid biological control in contrasting landscape contexts	BIOLOGICAL CONTROL	90	148-156
2015	Riedinger et al.	Annual dynamics of wild bee densities: attractiveness and productivity effects of oilseed rape	ECOLOGY	96	1351-1360
2015	Rusch et al.	Organic farming and host density affect parasitism rates of tortricid moths in vineyards	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	214	46-53
2015	Saeed et al.	The importance of alternative host plants as reservoirs of the cotton leaf hopper, Amrasca devastans, and its natural enemies	JOURNAL OF PEST SCIENCE	88	517-531
2015	Sakata & Yamasaki	Deer overbrowsing on autumn-flowering plants causes bumblebee decline and impairs pollination service	ECOSPHERE	6	41275
2015	Salisbury et al.	Enhancing gardens as habitats for flower-visiting aerial insects (pollinators): should we plant native or exotic species?	JOURNAL OF APPLIED ECOLOGY	52	1156-1164
2015	Samoilova et al.	Effects of the Vital Activity of Soil Insect Larvae on Microbial Processes in the Soil	BIOLOGY BULLETIN	42	563-569
2015	Saunders et al.	Keystone resources available to wild pollinators in a winter-flowering tree crop plantation	AGRICULTURAL AND FOREST ENTOMOLOGY	17	90-101
2015	Schackermann et al.	Agro-ecosystem services and dis-services in almond orchards are differentially influenced by the surrounding landscape	ECOLOGICAL ENTOMOLOGY	40	44531
2015	Scherber	Insect responses to interacting global change drivers in managed ecosystems	CURRENT OPINION IN INSECT SCIENCE	11	56-62
2015	Schlegel et al.	Local insects as Flagship Species to Promote Nature Conservation? A Survey among Primary School Children on Their Attitudes toward Invertebrates	ANTHROZOOS	28	229-245
2015	Schneider et al.	Biological pest control and yields depend on spatial and temporal crop cover dynamics	JOURNAL OF APPLIED ECOLOGY	52	1283-1292
2015	Schuldt et al.	Early positive effects of tree species richness on herbivory in a large-scale forest biodiversity experiment influence tree growth	JOURNAL OF ECOLOGY	103	563-571
2015	Seibold et al.	Association of extinction risk of saproxylic beetles with ecological degradation of forests in Europe	CONSERVATION BIOLOGY	29	382-390
2015	Senf et al.	Characterizing spectral-temporal patterns of defoliator and bark beetle disturbances using Landsat time series	REMOTE SENSING OF ENVIRONMENT	170	166-177
2015	Singh	Species and genetic diversity in the genus Drosophila inhabiting the Indian subcontinent	JOURNAL OF GENETICS	94	351-361
2015	Singh et al.	Weather parameters influence population and larval parasitization of Helicoverpa armigera (Hubner) in chickpea ecosystem	LEGUME RESEARCH	38	402-406
2015	Smith & Mayfield	Diptera species and functional diversity across tropical Australian countryside landscapes	BIOLOGICAL CONSERVATION	191	436-443
2015	Song et al.	Ecosystem carbon exchange in response to locust outbreaks in a temperate steppe	OECOLOGIA	178	579-590
2015	Steffan et al.	Beneficial or not? Decoding carnivore roles in plant protection	BIOLOGICAL CONTROL	91	34-41
2015	Sunny et al.	Native insects and invasive plants encounters	ARTHROPOD-PLANT INTERACTIONS	9	323-331
2015	Suter & Cormier	Why Care About Aquatic Insects: Uses, Benefits, and Services	INTEGRATED ENVIRONMENTAL ASSESSMENT AND MANAGEMENT	11	188-194

2015	Tchakonte et al.	Impact of urbanization on aquatic insect assemblages in the coastal zone of Cameroon: the use of biotraits and indicator taxa to assess environmental pollution	HYDROBIOLOGIA	755	123-144
2015	Thienpont et al.	Synchronous changes in chironomid assemblages in two Arctic delta lake ecosystems after a major saltwater intrusion event	JOURNAL OF PALEOLIMNOLOGY	53	177-189
2015	Tixier et al.	Contribution of the timing of the successive waves of insect colonisation to dung removal in a grazed agro-ecosystem	EUROPEAN JOURNAL OF SOIL BIOLOGY	69	88-93
2015	Tschumi et al.	High effectiveness of tailored flower strips in reducing pests and crop plant damage	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	282	189-196
2015	Ulyshen	Insect-mediated nitrogen dynamics in decomposing wood	ECOLOGICAL ENTOMOLOGY	40	97-112
2015	Valencia & Tovar	Oak canopy arthropod communities: which factors shape its structure?	REVISTA CHILENA DE HISTORIA NATURAL	88	15
2015	Valente-Neto et al.	The effect of riparian deforestation on macroinvertebrates associated with submerged woody debris	AQUATIC ECOLOGY	49	115-125
2015	van Lierop et al.	Global forest area disturbance from fire, insect pests, diseases and severe weather events	FOREST ECOLOGY AND MANAGEMENT	352	78-88
2015	Vieira et al.	Microhabitat changes induced by edge effects impact velvet ant (Hymenoptera: Mutillidae) communities in southeastern Amazonia, Brazil	JOURNAL OF INSECT CONSERVATION	19	849-861
2015	Voraphab et al.	Insect species recorded in sugarcane fields of Khon Kaen Province, Thailand, over three seasons in 2012	ECOLOGICAL RESEARCH	30	415
2015	Winter et al.	Multi-taxon alpha diversity following bark beetle disturbance: Evaluating multi-decade persistence of a diverse early-seral phase	FOREST ECOLOGY AND MANAGEMENT	338	32-45
2015	Yadamsuren et al.	Declines in diversity of crane flies (Diptera: Tipuloidea) indicate impact from grazing by livestock in the Hovsgol region of Mongolia	JOURNAL OF INSECT CONSERVATION	19	465-477
2015	Yoshioka et al.	Pollinators and Other Flying Insects inside and outside the Fukushima Evacuation Zone	PLOS ONE	10	e0140957
2015	Yule et al.	Urbanization affects food webs and leaf-litter decomposition in a tropical stream in Malaysia	FRESHWATER SCIENCE	34	702-715
2015	Zhao et al.	Effects of agricultural intensification on ability of natural enemies to control aphids	SCIENTIFIC REPORTS	5	8024
2015	Zhu et al.	Responses of community-level plant-insect interactions to climate warming in a meadow steppe	SCIENTIFIC REPORTS	5	5
2016	Allinne et al.	Delicate balance between pest and disease injuries, yield performance, and other ecosystem services in the complex coffee-based systems of Costa Rica	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	222	43070
2016	Amundrud & Srivastava	Trophic interactions determine the effects of drought on an aquatic ecosystem	ECOLOGY	97	1475-1483
2016	Anton-Pardo & Armengol	Influence of biotic variables on invertebrate size structure and diversity in coastal wetlands of Southeastern Spain	ESTUARINE COASTAL AND SHELF SCIENCE	180	41-50
2016	Ardali et al.	Ecological Sustainability in Rangelands: The Contribution of Dung Beetles in Secondary Seed Dispersal (Case study: Chaharmahal and Bakhtiari province, Iran)	EUROPEAN JOURNAL OF SUSTAINABLE DEVELOPMENT	5	133-139
2016	Astudillo et al.	Relationships between land cover, riparian vegetation, stream characteristics, and aquatic insects in cloud forest streams, Mexico	HYDROBIOLOGIA	768	167-181
2016	Bahlai & Landis	Predicting plant attractiveness to pollinators with passive crowdsourcing	ROYAL SOCIETY OPEN SCIENCE	3	150677
2016	Balzan et al.	Utilisation of plant functional diversity in wildflower strips for the delivery of multiple agroecosystem services	ENTOMOLOGIA EXPERIMENTALIS ET APPLICATA	158	304-319
2016	Barbir et al.	Functionality of Selected Aromatic Lamiaceae in Attracting Pollinators in Central Spain	JOURNAL OF ECONOMIC ENTOMOLOGY	109	529-536
2016	Barton et al.	Effects of environmental variation and livestock grazing on ant community structure in temperate eucalypt woodlands	INSECT CONSERVATION AND DIVERSITY	9	124-134
2016	Basto-Estrella et al.	Dung removal by dung beetles (Coleoptera: Scarabaeidae) and macrocyclic lactone use on cattle ranches of Yucatan, Mexico	REVISTA DE BIOLOGIA TROPICAL	64	945-954
2016	Beracko et al.	Community structure, life histories and secondary production of stoneflies in two small mountain streams with different degree of forest cover	JOURNAL OF LIMNOLOGY	75	169-179
2016	Birkhofer et al.	Organic farming affects the biological control of hemipteran pests and yields in spring barley independent of landscape complexity	LANDSCAPE ECOLOGY	31	567-579
2016	Bischoff et al.	Effects of spontaneous field margin vegetation and surrounding landscape on Brassica oleracea crop herbivory	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	223	135-143
2016	Burgio et al.	Habitat management of organic vineyard in Northern Italy: the role of cover plants management on arthropod functional biodiversity	BULLETIN OF ENTOMOLOGICAL RESEARCH	106	759-768
2016	Caballero-Lopez et al.	Herbivores, saprovores and natural enemies respond differently to within-field plant characteristics of wheat fields	JOURNAL OF INSECT CONSERVATION	20	467-476
2016	Cassano et al.	Bat and bird exclusion but not shade cover influence arthropod abundance and cocoa leaf consumption in agroforestry landscape in northeast Brazil	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	232	247-253
2016	Castano-Meneses	Seasonal and altitude effects on the structure of arthropod communities associated with Tillandsia violacea Baker (Bromeliaceae) in a temperate forest of Mexico	ARTHROPOD-PLANT INTERACTIONS	10	403-417
2016	Chen & Forschler	Elemental concentrations in the frass of saproxylic insects suggest a role in micronutrient cycling	ECOSPHERE	7	e01300
2016	Chesnais et al.	Cascading effects of N input on tritrophic (plant-aphid-parasitoid) interactions	ECOLOGY AND EVOLUTION	6	7882-7891
2016	Choe et al.	Benthic macroinvertebrate biodiversity improved with irrigation ponds linked to a rice paddy field	ENTOMOLOGICAL RESEARCH	46	70-79
2016	Collette & Pither	Insect assemblages associated with the exotic riparian shrub Russian olive (Elaeagnaceae), and co-occurring native shrubs in British Columbia, Canada	CANADIAN ENTOMOLOGIST	148	316-328
2016	Coulibaly et al.	Spatial and seasonal distribution of Bee Pollinator Species in a Sudanese Agro-ecological System in Burkina Faso, West Africa	ENTOMOLOGY AND APPLIED SCIENCE LETTERS	3	43040
2016	Cruz-Rodriguez et al.	Autonomous Biological Control of Dactylopius opuntiae (Hemiptera: Dactyliiopidae) in a Prickly Pear Plantation With Ecological Management	ENVIRONMENTAL ENTOMOLOGY	45	642-648
2016	Cummins	Combining taxonomy and function in the study of stream macroinvertebrates	JOURNAL OF LIMNOLOGY	75	235-241
2016	da Silva & Hernandez	Spatial variation of dung beetle assemblages associated with forest structure in remnants of southern Brazilian Atlantic Forest	REVISTA BRASILEIRA DE ENTOMOLOGIA	60	73-81
2016	Dalzochio et al.	How does the management of rice in natural ponds alter aquatic insect community functional structure?	MARINE AND FRESHWATER RESEARCH	67	1644-1654
2016	de Paula et al.	The restoration of termite diversity in different reforestated forests	AGROFORESTRY SYSTEMS	90	395-404
2016	de Rijk et al.	Herbivore species identity rather than diversity of the non-host community determines foraging behaviour of the parasitoid wasp Cotesia glomerata	ENTOMOLOGIA EXPERIMENTALIS ET APPLICATA	161	20-30
2016	Dobbs & Potter	Naturalized habitat on golf courses: source or sink for natural enemies and conservation biological control?	URBAN ECOSYSTEMS	19	899-914
2016	Dodonov et al.	Forest loss increases insect herbivory levels in human-altered landscapes	ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY	77	136-143
2016	Engelkes et al.	Herbivory and dominance shifts among exotic and congeneric native plant species during plant community establishment	OECOLOGIA	180	507-517
2016	Eraso & Amarillo	Arthropods in necromass of two rosette plants species in different successional stages of Andean Paramo	REVISTA COLOMBIANA DE ENTOMOLOGIA	42	81-90
2016	Evans & Gleeson	Direct measurement of ant predation of weed seeds in wheat cropping	JOURNAL OF APPLIED ECOLOGY	53	1177-1185
2016	Eyre et al.	Ground beetles (Coleoptera, Carabidae) as indicators of change and pattern in the agroecosystem: Longer surveys improve understanding	ECOLOGICAL INDICATORS	68	82-88
2016	Fantinato et al.	Does flowering synchrony contribute to the sustainment of dry grassland biodiversity?	FLORA	222	96-103
2016	Fattorini & Galassi	Role of urban green spaces for saproxylic beetle conservation: a case study of tenebrionids in Rome, Italy	JOURNAL OF INSECT CONSERVATION	20	737-745
2016	Feilhauer et al.	Mapping pollination types with remote sensing	JOURNAL OF VEGETATION SCIENCE	27	999-1011
2016	Ferrando et al.	Taxonomic and Functional Resilience of Grasshoppers (Orthoptera, Caelifera) to Fire in South Brazilian Grasslands	NEOTROPICAL ENTOMOLOGY	45	374-381
2016	Foldesi et al.	Relationships between wild bees, hoverflies and pollination success in apple orchards with different landscape contexts	AGRICULTURAL AND FOREST ENTOMOLOGY	18	68-75
2016	Frainer et al.	Variation in functional trait composition of benthic invertebrates across depths and seasons in a subarctic lake	FUNDAMENTAL AND APPLIED LIMNOLOGY	188	103-112
2016	Fugere et al.	Land use changes in an afrotropical biodiversity hotspot affect stream alpha and beta diversity	ECOSPHERE	7	e01355
2016	Garantonakis et al.	Comparative selectivity of pesticides used in greenhouses, on the aphid parasitoid Aphidius colemani (Hymenoptera: Braconidae)	BIOCONTROL SCIENCE AND TECHNOLOGY	26	678-690
2016	Garcia-Martinez et al.	Myrmecofauna (Hymenoptera: Formicidae) response to habitat characteristics of tropical montane cloud forests in central Veracruz, Mexico	FLORIDA ENTOMOLOGIST	99	248-256
2016	Garratt et al.	Apple Pollination: Demand Depends on Variety and Supply Depends on Pollinator Identity	PLOS ONE	11	e0153889
2016	Gherlenda et al.	Boom and bust: rapid feedback responses between insect outbreak dynamics and canopy leaf area impacted by rainfall and CO2	GLOBAL CHANGE BIOLOGY	22	3632-3641
2016	Gill et al.	Protecting an Ecosystem Service: Approaches to Understanding and Mitigating Threats to Wild Insect Pollinators	Advances in Ecological Research	54	135-206
2016	Gillespie et al.	Beyond nectar provision: the other resource requirements of parasitoid biological control agents	ENTOMOLOGIA EXPERIMENTALIS ET APPLICATA	159	207-221
2016	Godoy et al.	Functional Process Zones Characterizing Aquatic Insect Communities in Streams of the Brazilian Cerrado	NEOTROPICAL ENTOMOLOGY	45	159-169
2016	Gonzalez et al.	Higher longevity and fecundity of Chrysoperla carnea, a predator of olive pests, on some native flowering Mediterranean plants	AGRONOMY FOR SUSTAINABLE DEVELOPMENT	36	43009
2016	Gonzalez et al.	A Moveable Feast: Insects Moving at the Forest-Crop Interface Are Affected by Crop Phenology and the Amount of Forest in the Landscape	PLOS ONE	11	e0158836
2016	Goulson & Nicholls	The canary in the coalmine; bee declines as an indicator of environmental health	SCIENCE PROGRESS	99	312-326
2016	Granados-Martinez et al.	Diets and trophic guilds of aquatic insects in Molino River, La Guajira, Colombia	JOURNAL OF LIMNOLOGY	75	144-150

2016	Gregory et al.	Agroecological and social characteristics of New York city community gardens: contributions to urban food security, ecosystem services, and environmental education	URBAN ECOSYSTEMS	19	763-794
2016	Guiller et al.	How do field margins contribute to the functional connectivity of insect-pollinated plants?	LANDSCAPE ECOLOGY	31	1747-1761
2016	Hall et al.	Changes in function and temporal variation in a guild of gall-parasitoids across a temperature gradient in Australian subtropical rainforest	AUSTRAL ECOLOGY	41	145-153
2016	Haller et al.	Establishing a system with Drosophila melanogaster (Diptera: Drosophilidae) to assess the non-target effects of gut-active insecticidal compounds	ECOTOXICOLOGY	25	1794-1804
2016	Hammer et al.	Treating cattle with antibiotics affects greenhouse gas emissions, and microbiota in dung and dung beetles	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	283	20160150
2016	Hardman et al.	Delivery of floral resources and pollination services on farmland under three different wildlife-friendly schemes	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	220	142-151
2016	Harris et al.	Influence of Plant Taxa on Pollinator, Butterfly, and Beneficial Insect Visitation	HORTSCIENCE	51	1016-1019
2016	Harvey et al.	Short-term seasonal habitat facilitation mediated by an insect herbivore	BASIC AND APPLIED ECOLOGY	17	447-454
2016	Haverkamp et al.	Hawkmoths evaluate scenting flowers with the tip of their proboscis	ELIFE	5	e15039
2016	Houghton et al.	Pathways of alien invertebrate transfer to the Antarctic region	POLAR BIOLOGY	39	23-33
2016	Hu et al.	Mass seasonal bioflows of high-flying insect migrants	SCIENCE	354	1584-1587
2016	Arnold et al.	Forest defoliator pests alter carbon and nitrogen cycles	ROYAL SOCIETY OPEN SCIENCE	3	160361
2016	Iida et al.	Life history traits predict insect species responses to large herbivore overabundance: a multitaxonomic approach	JOURNAL OF INSECT CONSERVATION	20	295-304
2016	Jackson et al.	Fine-scale spatial genetic structure of a fungal parasite of coffee scale insects	JOURNAL OF INVERTEBRATE PATHOLOGY	139	34-41
2016	Johann & Schaich	Land ownership affects diversity and abundance of tree microhabitats in deciduous temperate forests	FOREST ECOLOGY AND MANAGEMENT	380	70-81
2016	Johnson et al.	An insect ecosystem engineer alleviates drought stress in plants without increasing plant susceptibility to an above-ground herbivore	FUNCTIONAL ECOLOGY	30	894-902
2016	Jones et al.	Predator- and Scavenger-Mediated Ecosystem Services Determined by Distance to Field-Forest Interface in the Maine Lowbush Blueberry Agroecosystem	ENVIRONMENTAL ENTOMOLOGY	45	1131-1140
2016	Joshi et al.	Population Dynamics and Flight Phenology Model of Codling Moth Differ between Commercial and Abandoned Apple Orchard Ecosystems	FRONTIERS IN PHYSIOLOGY	7	7
2016	King	Where do eusocial insects fit into soil food webs?	SOIL BIOLOGY & BIOCHEMISTRY	102	55-62
2016	Kjellberg & Proffit	Tracking the elusive history of diversification in plant-herbivorous insect-parasitoid food webs: insights from figs and fig wasps	MOLECULAR ECOLOGY	25	843-845
2016	Koch et al.	Range Extension of Two Bumble Bee Species (Hymenoptera: Apidae) into Olympic National Park	NORTHWEST SCIENCE	90	228-234
2016	Kranzfelder & Ferrington	Temporal and spatial variability of Chironomidae (Diptera) species emergence in a Neotropical estuary	FRESHWATER SCIENCE	35	631-643
2016	Krivan et al.	A dynamical model for bark beetle outbreaks	JOURNAL OF THEORETICAL BIOLOGY	407	25-37
2016	Kutt et al.	The quality of flower-based ecosystem services in field margins and road verges from human and insect pollinator perspectives	ECOLOGICAL INDICATORS	70	409-419
2016	La Pierre & Smith	Soil nutrient additions increase invertebrate herbivore abundances, but not herbivory, across three grassland systems	OECOLOGIA	180	485-497
2016	Labruyere et al.	Crop type, crop management and grass margins affect the abundance and the nutritional state of seed-eating carabid species in arable landscapes	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	231	183-192
2016	Lakatos et al.	Resource dependence in a new ecosystem: A host plant and its colonizing community	ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY	73	80-86
2016	Lazaro et al.	Electromagnetic radiation of mobile telecommunication antennas affects the abundance and composition of wild pollinators	JOURNAL OF INSECT CONSERVATION	20	315-324
2016	Lazaro et al.	Effects of grazing intensity on pollinator abundance and diversity, and on pollination services	ECOLOGICAL ENTOMOLOGY	41	400-412
2016	Li et al.	Vertical Distribution of Termites on Trees in Two Forest Landscapes in Taiwan	ENVIRONMENTAL ENTOMOLOGY	45	577-581
2016	Liu et al.	Landscape diversity enhances parasitism of cotton bollworm (Helicoverpa armigera) eggs by Trichogramma chilonis in cotton	BIOLOGICAL CONTROL	93	15-23
2016	Liu et al.	Interactive effects of vegetation and soil determine the composition and diversity of carabid and tenebrionid functional groups in an arid ecosystem	JOURNAL OF ARID ENVIRONMENTS	128	80-90
2016	Losapio et al.	Feedback effects between plant and flower-visiting insect communities along a primary succession gradient	ARTHROPOD-PLANT INTERACTIONS	10	485-495
2016	Madeira et al.	Spillover of arthropods from cropland to protected calcareous grassland - the neighbouring habitat matters	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	235	127-133
2016	Maguire et al.	Within and Among Patch Variability in Patterns of Insect Herbivory Across a Fragmented Forest Landscape	PLOS ONE	11	e0150843
2016	Michalzik et al.	Effects of aphid infestation on the biogeochemistry of the water routed through European beech (Fagus sylvatica L.) saplings	BIOGEOCHEMISTRY	129	197-214
2016	Mikkelson **et al.**	Rare Taxa Maintain Microbial Diversity and Contribute to Terrestrial Community Dynamics throughout Bark Beetle Infestation	APPLIED AND ENVIRONMENTAL MICROBIOLOGY	82	6912-6919
2016	Milesi et al.	Substrate heterogeneity influences the trait composition of stream insect communities: an experimental in situ study	FRESHWATER SCIENCE	35	1321-1329
2016	Milligan et al.	Quantifying pest control services by birds and ants in Kenyan coffee farms	BIOLOGICAL CONSERVATION	194	58-65
2016	Milligan et al.	An invasive ant reduces diversity but does not disrupt a key ecosystem function in an African savanna	ECOSPHERE	7	e01502
2016	Mogren et al.	The Effects of Crop Intensification on the Diversity of Native Pollinator Communities	ENVIRONMENTAL ENTOMOLOGY	45	865-872
2016	Morandin et al.	Pest Control and Pollination Cost-Benefit Analysis of Hedgerow Restoration in a Simplified Agricultural Landscape	JOURNAL OF ECONOMIC ENTOMOLOGY	109	1020-1027
2016	Moreno & Amat	Morphoecology guild in beetles (Coleoptera: Passalidae) along an altitudinal gradient in oak forests of the Eastern Cordillera, Colombia	REVISTA DE BIOLOGIA TROPICAL	64	289-303
2016	Nieto et al.	Spatial patterns in communities of aquatic macroinvertebrates of Argentinean Puna	REVISTA DE BIOLOGIA TROPICAL	64	747-762
2016	Noreika et al.	Specialist butterflies benefit most from the ecological restoration of mires	BIOLOGICAL CONSERVATION	196	103-114
2016	Norfolk et al.	Flowering ground vegetation benefits wild pollinators and fruit set of almond within arid smallholder orchards	INSECT CONSERVATION AND DIVERSITY	9	236-243
2016	Ohta et al.	Detritivore stoichiometric diversity alters litter processing efficiency in a freshwater ecosystem	OIKOS	125	1162-1172
2016	Otto et al.	Land-use change reduces habitat suitability for supporting managed honey bee colonies in the Northern Great Plains	P. OF THE NATIONAL ACADEMY OF SCIENCES OF THE USA	113	10430-10435
2016	Ouyang et al.	Early eclosion of overwintering cotton bollworm moths from warming temperatures accentuates yield loss in wheat	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	217	89-98
2016	Parr et al.	Suppression of savanna ants alters invertebrate composition and influences key ecosystem processes	ECOLOGY	97	1611-1617
2016	Petermann et al.	Forest Management Intensity Affects Aquatic Communities in Artificial Tree Holes	PLOS ONE	11	e0155549
2016	Peters et al.	Ants and plants as indicators of biodiversity, ecosystem services, and conservation value in constructed grasslands	BIODIVERSITY AND CONSERVATION	25	1481-1501
2016	Ramirez & Halffter	Copro-necrophagous beetles (Coleoptera: Scarabaeinae) in urban areas: A global review	URBAN ECOSYSTEMS	19	1179-1195
2016	Ramsfield et al.	Forest health in a changing world: effects of globalization and climate change on forest insect and pathogen impacts	FORESTRY	89	245-252
2016	Riddle & Mizell	Use of crape myrtle, Lagerstroemia (Myrtales: Lythraceae), cultivars as a pollen source by native and non-native bees (Hymenoptera: Apidae) in Quincy, Florida	FLORIDA ENTOMOLOGIST	99	38-46
2016	Rusch et al.	Local and landscape effects of agricultural intensification on Carabid community structure and weed seed predation in a perennial cropping system	LANDSCAPE ECOLOGY	31	2163-2174
2016	Russo et al.	Pollinator floral provisioning by a plant invader: quantifying beneficial effects of detrimental species	DIVERSITY AND DISTRIBUTIONS	22	189-198
2016	Ruttan et al.	Shrub-annual facilitation complexes mediate insect community structure in arid environments	JOURNAL OF ARID ENVIRONMENTS	134	42979
2016	Sandhu et al.	Scarcity of ecosystem services: an experimental manipulation of declining pollination rates and its economic consequences for agriculture	PEERJ	4	e2099
2016	Saunders	Resource connectivity for beneficial insects in landscapes dominated by monoculture tree crop plantations	INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY	14	82-99
2016	Saunders & Luck	Combining Costs and Benefits of Animal Activities to Assess Net Yield Outcomes in Apple Orchards	PLOS ONE	11	e0158618
2016	Schneider et al.	Spillover from adjacent crop and forest habitats shapes carabid beetle assemblages in fragmented semi-natural grasslands	OECOLOGIA	182	1141-1150
2016	Sekar et al.	How much Dillenia indica seed predation occurs from Asian elephant dung?	ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY	70	53-59
2016	Setiawan et al.	Does neighbourhood tree diversity affect the crown arthropod community in saplings?	BIODIVERSITY AND CONSERVATION	25	169-185
2016	Shanahan et al.	Whitebark pine mortality related to white pine blister rust, mountain pine beetle outbreak, and water availability	ECOSPHERE	7	e01610
2016	Shay et al.	Alien Insects Dominate the Plant-Pollinator Network of a Hawaiian Coastal Ecosystem	PACIFIC SCIENCE	70	409-429
2016	Shukla et al.	How effective are disturbance - tolerant, agroecosystem - nesting ant species in improving soil fertility and crop yield?	APPLIED SOIL ECOLOGY	108	156-164
2016	Smith & Saunders	Honey bees: the queens of mass media, despite minority rule among insect pollinators	INSECT CONSERVATION AND DIVERSITY	9	384-390

2016	Soliveres et al.	Biodiversity at multiple trophic levels is needed for ecosystem multifunctionality	NATURE	536	456-459
2016	Sosnovsky	Sucking herbivore assemblage composition on greenhouse Ficus correlates with host plant leaf architecture	ARTHROPOD-PLANT INTERACTIONS	10	55-69
2016	Sprague et al.	Assessing pollinators' use of floral resource subsidies in agri-environment schemes: An illustration using Phacelia tanacetifolia and honeybees	PEERJ	4	e2677
2016	St-Martin & Bommarco	Soil compaction and insect pollination modify impacts of crop rotation on nitrogen fixation and yield	BASIC AND APPLIED ECOLOGY	17	617-626
2016	Stavert et al.	Hairiness: the missing link between pollinators and pollination	PEERJ	4	e2779
2016	Stavi et al.	Soil functions and ecosystem services in conventional, conservation, and integrated agricultural systems. A review	AGRONOMY FOR SUSTAINABLE DEVELOPMENT	36	43070
2016	Stoklosa et al.	Effects of mesh bag enclosure and termites on fine woody debris decomposition in a subtropical forest	BASIC AND APPLIED ECOLOGY	17	463-470
2016	Suheriyanto et al.	Soil Arthropod Diversity On The Forest Floor And Ex-Road In Manggis Gadungan Natural Reserve Kediri Regency, Indonesia	JURNAL TEKNOLOGI	78	399-403
2016	Sutter & Albrecht	Synergistic interactions of ecosystem services: florivorous pest control boosts crop yield increase through insect pollination	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	283	20152529
2016	Szigeti et al.	Measuring floral resource availability for insect pollinators in temperate grasslands - a review	ECOLOGICAL ENTOMOLOGY	41	231-240
2016	Tamburini et al.	Degradation of soil fertility can cancel pollination benefits in sunflower	OECOLOGIA	180	581-587
2016	Theodorou et al.	Pollination services enhanced with urbanization despite increasing pollinator parasitism	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	283	20160561
2016	Thorpe et al.	Review of ecological and conservation perspectives on future options for arthropod management in Cape Floristic Region pome fruit orchards	AFRICAN ENTOMOLOGY	24	279-306
2016	Tiusanen et al.	One fly to rule them all-muscid flies are the key pollinators in the Arctic	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES	283	20161271
2016	Toivonen et al.	Community composition of butterflies and bumblebees in fallows: niche breadth and dispersal capacity modify responses to fallow type and landscape	JOURNAL OF INSECT CONSERVATION	20	23-34
2016	Tougeron et al.	Comparing thermal tolerance across contrasting landscapes: first steps towards understanding how landscape management could modify ectotherm thermal tolerance	INSECT CONSERVATION AND DIVERSITY	9	171-180
2016	Treitler et al.	The effect of local land use and loss of forests on bats and nocturnal insects	ECOLOGY AND EVOLUTION	6	4289-4297
2016	Tschumi et al.	Tailored flower strips promote natural enemy biodiversity and pest control in potato crops	JOURNAL OF APPLIED ECOLOGY	53	1169-1176
2016	Tudoran et al.	Historical experience (1850-1950 and 1961-2014) of insect species responsible for forest damage in Sweden: Influence of climate and land management changes	FOREST ECOLOGY AND MANAGEMENT	381	347-359
2016	Uesugi et al.	Modification of plant-induced responses by an insect ecosystem engineer influences the colonization behaviour of subsequent shelter-users	JOURNAL OF ECOLOGY	104	1096-1105
2016	Ulyshen	Wood decomposition as influenced by invertebrates	BIOLOGICAL REVIEWS	91	70-85
2016	Ulyshen et al.	Bark coverage and insects influence wood decomposition: Direct and indirect effects	APPLIED SOIL ECOLOGY	105	25-30
2016	van Gils et al.	Can above-ground ecosystem services compensate for reduced fertilizer input and soil organic matter in annual crops?	JOURNAL OF APPLIED ECOLOGY	53	1186-1194
2016	van Klink et al.	Effects of grazing management on biodiversity across trophic levels-The importance of livestock species and stocking density in salt marshes	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	235	329-339
2016	van Rijnn & Wackers	Nectar accessibility determines fitness, flower choice and abundance of hoverflies that provide natural pest control	JOURNAL OF APPLIED ECOLOGY	53	925-933
2016	Wang & Foster	Ground-foraging ant communities vary with oil palm age	BASIC AND APPLIED ECOLOGY	17	21-32
2016	Wang et al.	Bees eavesdrop upon informative and persistent signal compounds in alarm pheromones	SCIENTIFIC REPORTS	6	25693
2016	Warzecha et al.	Intraspecific body size increases with habitat fragmentation in wild bee pollinators	LANDSCAPE ECOLOGY	31	1449-1455
2016	Wheelock et al.	Defining the Insect Pollinator Community Found in Iowa Corn and Soybean Fields: Implications for Pollinator Conservation	ENVIRONMENTAL ENTOMOLOGY	45	1099-1106
2016	Whitney et al.	Explicit modeling of abiotic and landscape factors reveals precipitation and forests associated with aphid abundance	ECOLOGICAL APPLICATIONS	26	2598-2608
2016	Wood et al.	Organic-matter Retention and Macroinvertebrate Utilization of Seasonally Inundated Bryophytes in a Mid-order Piedmont River	SOUTHEASTERN NATURALIST	15	403-414
2016	Woodcock et al.	Spill-over of pest control and pollination services into arable crops	AGRICULTURE ECOSYSTEMS & ENVIRONMENT	231	15-23
2016	Zhao et al.	Landscape changes have greater effects than climate changes on six insect pests in China	SCIENCE CHINA-LIFE SCIENCES	59	627-633

Appendix B. Supplementary data. List of articles that quantified the ecosystem service provided by one or several groups of insects using an experimental approach included in the literature review from 1956-2016. This table provides the ecosystem service, trophic group, order, super/family, country, ecosystem and reference for each article found. Complete information about each reference can be found in Supplementary Appendix A.

Ecosystem Service (s)	Trophic Group (s)	Order (s)	Superfamily/Family	Country	Ecosystem	Reference
Biological Control	Herbivors	Insects	-	USA	Grassland	Eckberg et al. 2014
Biological Control	Parasitoids	Hymenoptera	-	Argentina	Chaco Serrano Forests	Rossetti et al. 2013
Biological Control	Parasitoids	Hymenoptera	Braconidae	Switzerland	Agroecosystem (flowers and cabbage)	Geneau et al. 2012
Biological Control	Parasitoids	Hymenoptera	Trichogrammatidae	China	Agroecosystem (cotton)	Liu et al. 2016
Biological Control	Parasitoids/Predators	Coleoptera/Hemiptera/Hymenoptera	-	USA	Agroecosystem (alfalfa)	Cardinale et al. 2003
Biological Control	Parasitoids/Predators	Coleoptera/Hymenoptera	Carabidae/Coccinelidae	Sweden	Agroecosystem (cereals)	Caballero-Lopez et al. 2012
Biological Control	Parasitoids/Predators	Coleoptera/Insects	Coccinelidae/several families	USA	Agroecosystem (soybean)	Gardiner et al. 2009
Biological Control	Parasitoids/Predators	Insects	-	England	Organic farms	Macfadyen et al. 2009
Biological Control	Parasitoids/Predators	Insects	-	Europe	Agroecosystem (cereals)	Thies et al. 2011
Biological Control	Parasitoids/Predators	Insects	-	USA	Urban to rural gradient	Bennett and Gratton 2012
Biological Control	Parasitoids/Predators	Insects	-	USA	Agroecosystem (broccoli)	Chaplin-Kramer and Kremen 2012
Biological Control	Parasitoids/Predators	Insects	-	South Korea	Agroecosystem (cabbage)	Martin et al. 2013
Biological Control	Parasitoids/Predators	Insects	-	Sweden	Arable and semi-natural habitats	Rusch et al. 2013
Biological Control	Predators	Coleoptera	Carabidae	USA	Agroecosystem (blueberries)	Renkema et al. 2013
Biological Control	Predators	Coleoptera	Carabidae	USA	Agroecosystem and natural habitats	Birthisel et al. 2014
Biological Control	Predators	Hymenoptera	Formicidae	Mexico	Agroecosystem (coffe)	Larsen and Philpott 2010
Biological Control	Predators	Insects	-	Philippines	Agroecosystem (rice)	Wilby et al. 2005
Biological Control	Predators	Insects	-	USA	Agroecosystem (potato)	Straub and Snyder 2006
Biological Control	Predators	Insects	-	Costa Rica	Agroecosystem (coffe)	Karp and Daily 2014
Biological Control	Predators	Insects	several families	Switzerland	Agroecosystem (cherry)	Stutz and Entling 2011
Biological Control	Predators	Insects	several families	USA	Agroecosystem (cabbage)	Northfield et al. 2014
Biological Control	Predators/Parasitoids	Insects	several families	USA	Agroecosystem (wheat)	Safarzoda et al. 2014
Biological Control	Predators/Parasitoids	Insects	several families	USA	Agroecosystem (soybean)	Liere et al. 2015
Biological Control/Pollination	Herbivors/Pollinators	Coleoptera/Hymenoptera	Curculionidae/Apoidea	Sweden	Agroecosystem (clover)	Lundin et al. 2013
Biological Control/Pollination	Parasitoids/Pollinators	Diptera/Hymenoptera/Insects	Syrphidae/Apoidea/ several families	England	Agroecosystem (potato and wheat)	Campbell et al. 2012
Biological Control/Pollination	Parasitoids/Pollinators	Insects	-	Tanzania	Agroecosystem (coffe)	Classen et al. 2014
Control/Pollination	Pollinators/Predators	Hymenoptera	Formicidae	Indonesia	Agroecosystem (cacao)	Wielgoss et al. 2014
Dung removal	Coprophagous	Coleoptera	Scarabaeidae	UK	Grassland	Beynon et al. 2015
Dung removal	Coprophagous	Coleoptera	Scarabaeidae	France	Grassland	Tixier et al. 2015
Dung removal	Decomposers	Hymenoptera	Formicidae	Kenya	Savanna	Milligan et al. 2016
ES general	several groups	Insects	several families	USA	Lakes	McEwen and Butler 2010
Food provision/Network	Herbivors	Lepidoptera	-	USA	Agroecosystem (vineyards)	Jedlicka et al. 2011
Hydrological soil properties	Coprophagous	Coleoptera	Scarabaeidae	South Africa	Grassland	Brown et al. 2010
Network control	Predators	Hymenoptera	Formicidae	South Africa	Savanna	Parr et al. 2016
Nutrient acumulation	Decomposers	Blattodea	-	Kenya	Savanna	Pringle et al. 2010
Nutrient cycling	Necrophagous	Insects	several families	USA	Temperate forest	Pechal et al. 2014
Nutrient cycling	Xilophagous	Coleoptera/Isoptera	Cerambycidae/Rhinotermitidae	USA	Pine forests	Ulyshen et al. 2016

Pollination	Pollinators	Diptera/Hymenoptera/Insects	Syrphidae/Apoidea/ several families	Switzerland	Agroecosystem (radish)	Albrecht et al. 2012
Pollination	Pollinators	Hymenoptera	Apidae	New Zealand	Agroecosystem (cabbage)	Sandhu et al. 2016
Pollination	Pollinators	Hymenoptera	Apidae	Sweden	Agroecosystem (faba bean)	St-Martin and Bommarco 2016
Pollination	Pollinators	Hymenoptera	Apoidea	Australia	Eucaliptus forests	Celebrezze and Paton 2004
Pollination	Pollinators	Hymenoptera	Apoidea	Germany	Grassland	Ebeling et al. 2011
Pollination	Pollinators	Hymenoptera	Apoidea	USA	Agroecosystem (almond)	Brittain et al. 2013
Pollination	Pollinators	Hymenoptera	Apoidea	Germany	Flowering plants	Frund et al. 2013
Pollination	Pollinators	Hymenoptera	Apoidea	Switzerland	Grassland	Buri et al. 2014
Pollination	Pollinators	Hymenoptera/Insects	Formicidae/several families	South Africa	Agroecosystem (mango)	Carvalheiro et al. 2010
Pollination	Pollinators	Hymenoptera/Lepidoptera	Apoidea	USA	Prairie fen wetland	Fiedler et al. 2012
Pollination	Pollinators	Insects	-	France	Flowering plants	Fontaine et al. 2006
Pollination	Pollinators	Insects	several families	UK	Flower crops	Carrie et al. 2012
Pollination	Pollinators	Insects	several families	Italy	Agroecosystem (vines)	Brittain et al. 2010
Pollination	Pollinators	Insects	several families	USA	Agroecosystem (almond)	Brittain et al. 2014
Pollination	Pollinators	Insects	several families	Italy	Agroecosystem (oilseed rape)	Marini et al. 2015
Pollination/Biological control	Pollinators/Predators	Insects	several families	Switzerland	Agroecosystem (oilseed rape)	Sutter and Albrecht 2016
Recycling of matter	Decomposers	Collembola	-	Germany	Agroecosystem (wheat)	Wolfarth et al. 2013
Recycling of matter	Sapro/Xilophagous	Blattodea/Coleoptera	several families	USA	Temperate forest	Ulyshen et al. 2014
Seed dispersal	Coprophagous	Coleoptera	Scarabaeidae	Iran	Rangeland	Ardali et al. 2016
Soil-water nutrient regulation/Soil water infiltration	Decomposers/Predators	Blattodea/Hymenoptera	Formicidae	England	Agroecosystem (berries)	Evans et al. 2011