Insects as agents of national security: entomological biodiversity loss and ecosystem collapse in agriculture and forestry threaten geopolitical stability

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Abstract

1. In early 2026, the UK Government published a report assessing how global biodiversity loss and ecosystem collapse represent systematic threats to UK national security through cascading impacts to food security, land use and climate-related feedbacks.
2. Recontextualising biodiversity and ecosystem health as determinants of national security offers a novel perspective on long observed ecological challenges, many of which are implicitly entomological. Within this entomological context, compromised national security is likely to be driven by pest range expansions, natural enemy losses, pollinator declines, soil

degradation and increased input dependence, particularly in production systems like agriculture and forestry.

3. Here, we explicitly contextualise the report in relation to entomology, aligning the findings with priorities identified already across entomology. In doing so, we hope to bring the report’s findings to the attention of a broader audience, whilst catalysing dialogue on the global efforts required to mitigate impacts to ecosystem, production system and national security.
4. Altered pest ranges and population dynamics will strain production systems, especially alongside strain on natural enemies from agricultural intensification, climate change and trophic cascades. Similar impacts to soil fauna, alongside synthetic input intensity, will reduce soil health, increasing further dependence on synthetic inputs, the availability of which is vulnerable to global supply chain disruptions. These impacts will interactively destabilise ecosystems, reduce yields and food security, and increase vulnerability to geopolitical shocks.
5. The recontextualisation of insects as agents for national security demands consideration of “entomological security” in which the capacity of insect-mediated ecosystem processes to sustain food systems, climate regulation, and socio-economic stability is considered a paramount component of national security.

Keywords: biomonitoring, climate change, food security, integrated pest management, intelligence, policy, supply chains

Introduction

Food security has long been discussed as one of the most urgent challenges of the 21st century. With a projected 10 billion people globally by 2050, it is thought that food production must increase by 70 % in order to feed this population (FAO, 2009). This challenge is, however, typically viewed as a global shortfall in productivity, particularly from the perspective of losses to insect pests in the entomological literature (Riegler, 2018). Agriculture and broader production systems are inherently embedded in expansive networks in which economic, social and management impacts interact (Windsor et al., 2022), ultimately driving and driven by global dynamics, including trade, conflict and, ultimately, national security (Cardinale et al., 2026; Emary et al., 2026).

In January 2026, the UK Government published a report exploring how global biodiversity loss and ecosystem collapse may affect the resilience, national security and prosperity of the UK (Department for Environment, Food & Rural Affairs, 2026a). Rather than a scientific report, this took the form of a national security assessment (The Guardian, 2026), particularly noteworthy given its apparent involvement of the UK Joint Intelligence Committee, which oversees MI5, MI6 and GCHQ, the UK intelligence agencies (Cooke, 2026; Harvey, 2026). The report attracted attention in the press, particularly related to the discrete nature of its abridged publication, apparently triggered by a freedom of information request following a delay to its intended publication date of October 2025 (Cooke, 2026; Monbiot, 2026). The rationale for this delay was supposedly the pessimistic findings of the report and its highlighting of inadequate action by the UK Government (Monbiot, 2026). Ultimately, the report concludes that ecosystem collapse presents a systemic security risk to the UK through cascading impacts including reduced crop yields, loss of arable land, collapse of fisheries, water insecurity, disease spread and climate-related feedbacks (Department for Environment, Food & Rural Affairs, 2026a). These links have been drawn in previous reports (Department for Environment, Food & Rural Affairs, 2024), but, in this case, the impacts are considered multipliers of geopolitical threats such as migration, conflict and resource competition. Some of the focus of the press has been on the implications of increased resource competition for mass migration and populism (Cooke, 2026), but the wider implications for production systems are clear, with significant links to the insect biodiversity and the distribution of invasive, beneficial and pest insects.

A primary emphasis of the report is the vulnerability of food systems, particularly given the dependence of the UK on imports for fertiliser and ~40 % of its food (Department for Environment, Food & Rural Affairs, 2024). Given that it produces ~60 % of the food it consumes, the UK is considered relatively food-secure, but the report stipulates that global ecosystem collapse would drive sharp price increases, supply disruptions and trade breakdowns that would destabilise this (Department for Environment, Food & Rural Affairs, 2026a). Such disruptions have been evidenced in recent years through both the COVID-19 pandemic (Du & Shepotylo, 2022) and the ongoing Russia-Ukraine conflict, which saw a 25.3 % decrease in sunflower oil imports (Department for Environment, Food & Rural Affairs, 2024). The compound shocks and cascading failures resulting from ecosystem collapse would ultimately also threaten the provision of ecosystem services more broadly, including pollination, soil formation, biocontrol and nutrient cycling (Department for Environment, Food & Rural Affairs, 2026a). Given that agriculture is one of the dominant drivers of terrestrial biodiversity loss (Jaureguiberry et al., 2022), the disruption of these services is likely to proliferate through feedback loops in which biodiversity loss drives further agricultural intensification due to the loss of vital services such as pollination and conservation biocontrol.

Treating biodiversity and ecosystem health as a matter of national security in the context of risk assessment and mitigation offers a novel perspective on challenges widely discussed from scientific and ecological perspectives for decades (Cardinale et al., 2026). The stress imposed on many global ecosystems is widely acknowledged to be approaching a tipping point, after which mitigation of biodiversity loss and ecosystem collapse is thought to be futile, as soon as the 2030s in some cases (Lenton, 2011; Lenton et al., 2025). The dependence of Britain on imports of food and feed is central to its predicted vulnerability, with the need for urgent investment in novel infrastructure for food and feed production, including mass-reared produce (e.g., insects for food and feed; Van Huis, 2013). From pest range expansions and natural enemy losses, through pollinator declines, to soil degradation and increased input dependence, the entomological relevance of this report and the described threats to national security are clear (Figure 1). In this article, we discuss the implications of this report for agricultural and forest entomology, and specifically how the problems raised align with challenges acknowledged already within entomology. By contextualising the report in relation to entomology, which is implicitly central to its premise, we hope to bring the report’s findings to the attention of a broader audience, whilst opening dialogue on the global efforts required to mitigate impacts to ecosystem, production system and national security.

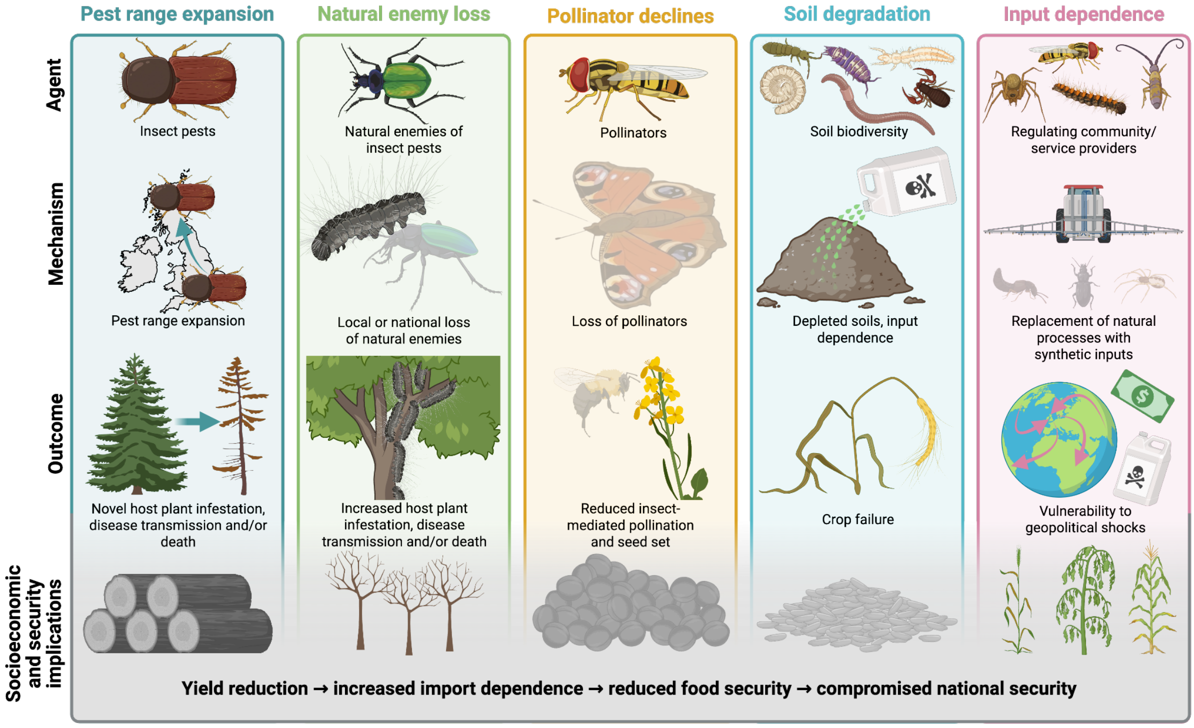

Figure 1: A summary of five key drivers of long-term yield reduction that may compromise national security, including the invertebrate agents affected, the mechanism of impact, the outcome for production systems, and the shared socioeconomic and security implications. According to the 'Global biodiversity loss, ecosystem collapse and national security' report from the UK Government, all five drivers are likely to compromise national security by increasing dependence on imports and threatening food/resource security in the UK. Created in BioRender. https://BioRender.com/1k05dy6

The overlapping challenges in entomology and national security

Pest movement and dynamics

Insect pests present one of the greatest challenges to production systems, reducing global crop yields by 13-16 % (Culliney, 2014), and bark beetles alone cause lumber losses of $2 billion in the USA annually and €260 million in one year in Czechia (Gandhi & Hofstetter, 2022). With 904 invertebrate species on the UK Plant Health Risk Register at the time of writing (62.6 % of the register; Department for Environment, Food & Rural Affairs, 2026b), the projected impact to UK yields, food security and, by extension, national security, presents an unpredictable risk due to variable outbreak scenarios. Biodiversity loss, climate change, and agricultural intensification directly heighten this risk. As highlighted by the report, the UK’s high dependence on imports, especially if agricultural and forest ecosystems continue to degrade, may increase susceptibility to invasive pests (Berry & Brown, 2021). The emerald ash borer *Agrilus planipennis* Fairmaire, 1888 and Colorado potato beetle *Leptinotarsa decemlineata* (Say, 1824) could, for example, both cause great natural and economic damage to the UK through their impacts to trees and crops, respectively (Baker et al., 1996; Webb et al., 2021). The introduction of novel species restructures ecological networks through direct and indirect interactions (Tu et al., 2026), changing how ecosystems function, requiring stringent biosecurity, early detection, and monitoring to mitigate catastrophic damage to production systems.

Alongside imports, climate change is also catalysing range expansion of many insect species, particularly altitudinal or poleward shifts (Bebber et al., 2013). This includes agricultural and forest pests, increasing pressure on biosecurity and biomonitoring (Berry & Brown, 2021). Simultaneously, range expansions of invertebrate disease vectors increase the transmission range for crop and tree pathogens across borders (e.g. tobacco whitefly, *Bemisia tabaci* (Gennadius, 1889); Bradshaw et al., 2019). Once introduced, these pathogens may also indirectly increase risk to native invertebrates through resource loss or quality reduction, further perpetuating ecosystem collapse.

Climate change may exacerbate risks posed by pests through multiple mechanisms. Just through its effects on insect pest metabolism and population growth rates, temperature is predicted to decrease global yields of rice, maize and wheat by 10-25% per degree Celsius of warming (Deutsch et al., 2018). This estimate does not even account for increased overwinter survival of pests (e.g., diamondback moth *Plutella* *xylostella* (Linnaeus, 1758); Wainwright et al., 2020) and a greater number of generations per year due to voltinism shifts (Szyniszewska et al., 2024), potentially concentrating populations of pests. Current control strategies, typically reliant on synthetic pesticides, will also become less effective under climate change due to reduced generation times and expedited evolution of pesticide resistance (Maino et al., 2018; Matzrafi, 2019; Pu et al., 2020). Since current simplified monocultural production systems already present an unnatural resource density for pests, often enriched by nutrient input through synthetic fertilisers, pest densities are likely to increase, further compounding the threat to yields, food security, and national security.

It must not be overlooked that invertebrate pests themselves remain important components of ecosystems despite opportunistically becoming pests in simplified monocultural production systems. They are vital for sustaining populations of natural enemies of other crop pests, the maintenance of which can be compromised under agricultural intensification (Begg et al., 2017; Cortez-Madrigal & Gutiérrez-Cárdenas, 2023). The intensive application of systemic pesticides to mitigate heightened pest densities elicits bottom-up impacts to natural enemy populations, resulting in overall loosened pest suppression (Guedes et al., 2026). Integrated pest management (IPM) is one viable solution to this pesticide-dependence feedback loop whilst safeguarding beneficial insects, but often also requires active management of beneficial insects (Pecenka et al., 2021; Picanço et al., 2007).

Beneficial insect dynamics

Beneficial insects constitute a critical component of national natural capital by stabilising agricultural and forest productivity through pollination, biological control and nutrient cycling (King et al., 2025; Kremen et al., 2002; Losey & Vaughan, 2006). Beneficial insects enhance production resilience by reducing input dependence, circumventing perturbations from supply-chain disruption and wider biosecurity threats. The capacity of systems to absorb shocks depends on the functional diversity and redundancy of beneficial invertebrates, whereby multiple taxa can partially compensate for the loss or decline of others (Yachi & Loreau, 1999).

Biodiversity loss threatens the stability of insect-mediated ecosystem services, increasing the risk of service destabilisation and localised functional collapse (Cardinale et al., 2012). Such declines may occur directly through reductions in beneficial insect populations, or indirectly through loss of habitat, floral resources and trophic interactions. As populations shrink, associated losses in genetic diversity may further reduce adaptive capacity and increase vulnerability to stochastic climatic events, creating feedback loops that heighten systemic ecological risk.

Pollinator decline presents a particular threat to agricultural resilience. Many insect-pollinated crops, including fruit, oilseeds and legumes, depend on diverse wild pollinator communities whose complementary functional traits stabilise yields under environmental uncertainty and climatic variability (Klein et al., 2007). Continued pollinator decline will therefore increase production volatility and deepen dependence on commercially managed pollinators, creating conditions that increase the risk of pathogen spillover to wild pollinators and further ecological homogenisation (Garibaldi et al., 2013). Managed honeybees and, increasingly, bumblebees, cannot fully replace this functional diversity, as different pollinator taxa vary in crop specificity, phenology and resilience to climatic extremes, and commercially reared insects can increase disease spillover to natural populations (Graystock et al., 2013; Murray et al., 2013). Although artificial pollination technologies are increasingly discussed as substitutes for natural pollination services, their scalability, economic feasibility and technological readiness remain insufficient to replace natural pollination at the scale required to sustain national food systems.

The erosion of natural enemy communities similarly weakens top-down regulation of pest populations and increases vulnerability to biological invasions. Globally, biocontrol of pests, such as top-down regulation by parasitoids and predators, is worth an estimated $50-196 billion globally (Cardinale et al., 2026; Costanza et al., 2014), but biocontrol agents are themselves vulnerable to biodiversity loss and ecological disruption (Landis et al., 2000). For example, oak processionary moth, *Thaumetopoea processionea* (Linnaeus 1758), populations are currently regulated primarily by parasitoids (Miller, Evans, et al., 2026), while the nationally extinct forest caterpillar hunter, *Calosoma sycophanta* (Linnaeus 1758), may have provided additional predatory control if not for its likely national extinction (Miller, Cuff, et al., 2026). The weakening of natural enemy networks may therefore exacerbate pest outbreaks and increase dependence on synthetic pesticides.

Collectively, these processes may generate systemic fragility within food and forestry systems, as declining ecological regulation increases reliance on external inputs whilst simultaneously eroding the natural capital upon which long term resilience depends. These interacting pressures create cascading risks by increasing critical dependencies on imports, managed pollination services and synthetic pesticides alongside reducing adaptive capacity for future climatic uncertainty. The destabilisation of beneficial insect communities also extends beyond pollination and biological control. Soil-associated invertebrates contribute to nutrient turnover and soil structure, linking the stability of beneficial invertebrate communities to long-term soil resilience and extending biodiversity risk from above-ground ecosystem processes into below-ground function (Bardgett & Van Der Putten, 2014).

Soil degradation

Soil regulates the resources responsible for almost all terrestrial life, not least humanity (Wall et al., 2015). Soil health is integral for agriculture and crop productivity, providing nutrients, drainage, and anchorage (Bünemann et al., 2018; Wall et al., 2015). Productivity, therefore, depends on below-ground biodiversity (Romero et al., 2024), yet agricultural intensification often instead maximises outputs through synthetic inputs, such as intensive fertiliser or pesticide application, which negatively impact soil fauna (Beaumelle et al., 2023; Lindberg & Persson, 2004). This conflicts with sustainable management, disregarding the balance required to maintain healthy soils. Given that agricultural soils compromise ~13 % of non-ice covered land masses (Shukla et al., 2019), the potential biodiversity impacts of its management are substantial. Maintaining extractive agriculture demands the bypass of natural processes delivered by invertebrates; for example, using synthetic fertilisers readily uptaken by crops circumvents biological cycling of organic matter (Atira & Kakouli-Duarte, 2025). This disrupts ecological processes and the biodiversity naturally underpinning them, leading to input-dependent production systems. The report focused on in this article highlights that the depletion of soils and the impact to crop yield is now consequently a threat to national security (Department for Environment, Food & Rural Affairs, 2026a).

Since soil biodiversity is vast and poorly understood (Anthony et al., 2023; Cameron et al., 2018; Decaëns, 2010), it is difficult to predict how soil invertebrates will respond to dynamic stressors such as climate change (Meehan et al., 2020). Soil degradation and ecosystem collapse, both above- and below-ground, further threaten soil biodiversity and its contributions to people through services (e.g., nutrient cycling and wider ecosystem functioning; Bardgett & Van Der Putten, 2014; Wall et al., 2015). This includes the indirect contribution of soil taxa to biocontrol of pests as they can be alternative resources for polyphagous predators of targeted pest species (Paoletti et al., 2007). Impacts to soil fauna can elicit top-down impacts that cascade all the way down to the soil microbiome, with severe implications for plant nutrient availability and fitness (Moore et al., 2003; Thakur & Geisen, 2019). Crucially, soil organisms structure soil through bioturbation (Niva et al., 2025), which is crucial for its health and productivity (Bartz et al., 2024; Sheehan et al., 2006). Effective bioturbation relies on a diversity of invertebrate groups across spatial and ecological niches (e.g., functional groups of earthworms operating at different depths and directions; Capowiez et al., 2024). By compromising soil structure, biodiversity loss therefore reduces resilience to extreme weather events (Saco et al., 2021) and reduces nutrient retention, especially at greater depths, further exacerbating input dependency (Jiao et al., 2006; Joshi et al., 2026).

Input dependency

Declining ecological regulation increases reliance on synthetic inputs, reinforcing systemic vulnerability within food and forestry systems. Synthetic fertilisers and pesticides have enabled substantial gains in productivity, but these gains are coupled with the progressive displacement of ecological regulation previously maintained by invertebrate communities (Cardinale et al., 2012; Yachi & Loreau, 1999). As ecosystem degradation intensifies, declining soil function and weakened pest regulation increasingly necessitate dependence on external inputs to maintain productivity. This substitution of insect-mediated ecological function with industrial inputs creates strategic dependencies, making them vulnerable to geopolitical instability, trade disruption and energy price volatility (Folke et al., 2004).

Chronic fertiliser application bypasses biologically mediated nutrient cycling processes driven by detritivores and soil biota, restructuring communities (Evans & Sanderson, 2018). Resultant dependencies on synthetic fertilisers are further amplified by the fossil fuel intensity of industrial nitrogen fertiliser production, which relies on global energy markets and supply chains. Conventional intensive farming systems therefore maximise short-term productivity whilst reducing adaptive resilience to climatic, ecological and economic disturbances. This reflects a broader distinction between mechanisms in natural and intensive production systems: natural systems distribute regulatory functions across diverse biological communities, including invertebrate decomposers and soil arthropods, enabling adaptive responses to environmental variability, whereas intensive production systems often concentrate buffering capacity within external energy and material inputs that are vulnerable to geopolitical and economic shocks (Bardgett & Van Der Putten, 2014; Yachi & Loreau, 1999).

Similarly, dependence on synthetic pesticide use generates reinforcing cycles of ecological fragility and intervention dependence. Repeated pesticide exposure drives resistance evolution within agricultural and forest pest populations, increasing pressure for more frequent applications alongside continual diversification of synthetic compounds (Georghiou & Taylor, 1977). Further, prophylactic and broad-spectrum pesticide applications employed to reduce production uncertainty suppress populations of biological control agents, reducing ecological buffering capacity and reinforcing reliance on chemical interventions through the progressive erosion of biological pest regulation (Landis et al., 2000).

Technologies such as IPM, conservation biocontrol and targeted biopesticide can work to restore ecological resilience by strengthening biologically mediated regulation within agricultural and forest systems (Landis et al., 2000). To support effective implementation under environmental uncertainty, these approaches rely on entomological surveillance, biomonitoring infrastructure and ecological forecasting. In addition, functional regulation of food and farming systems operates across spatial scales, whereby individual producers adopting reduced-input models see limited benefits if neighbouring land remains input-intensive, reducing ecological regulation at the landscape scale (Tscharntke et al., 2007).

Grand challenges

Alongside the challenges outlined in the report intrinsically linking to entomology, many of these challenges have been separately identified within an entomological context before. The expert elicitation approach underpinning the report, detailed in Annex B, demonstrates alignment and convergence of identified priorities with the Royal Entomological Society's 'grand challenges in entomology' (GCE) project (Luke et al., 2023). The GCE project highlighted 61 priority challenges across 11 emergent themes, many of which relate to biodiversity, ecosystem integrity and food security.

Naturally, the 'anthropogenic impacts' highlighted by the GCE are inherently linked to the outcomes of the focal report, particularly the need to identify tipping points, which determine irreversible ecosystem collapse. The GCE lists several priority 'conservation options', notably including agricultural landscape management, landscape-scale conservation and the need for habitat corridors, largely aimed at arresting biodiversity loss. Similarly, the ‘ecosystem benefits’ raised by the GCE include ‘insects’ contributions to people’, ‘soil biodiversity’, ‘impacts of insect decline on ecosystem functions’, ‘the role of insects in agroecosystems’, ‘ecosystem service values’ and ‘managing for resilient insect communities’, all of which pertain directly to challenges identified within the focal report. Other themes are also directly relevant, such as ‘pests’, which includes invasive pests and crop herbivores, and ‘climate change’, in which insects are mentioned as a model through which to guide mitigation of climate change. In terms of ‘methods and techniques’, the GCE highlights global monitoring of insects and novel monitoring techniques as grand challenges, which may prove crucial for pre-empting and mitigating ecosystem collapse. Even ‘blue skies’ topics highlighted in the GCE relate to the challenges identified in the focal report, such as understanding ecological functions, which are vital for predicting the functional consequences of ecosystem collapse, and understanding pollinator interactions and ecological networks more broadly, which will help to identify cascading impacts of biodiversity loss. These shared challenges highlight an opportunity for policymakers and governments to work lock-step with entomologists to arrest ecosystem collapse to safeguard nature, food chains and national security.

Opportunities to avert biodiversity loss and safeguard national security

The report focal to this article frames insects not just as ecosystem service or disservice providers, but as vital components of global food systems. Through this role, and given the importance of food systems in determining vulnerability to geopolitical shocks, insects can effectively be considered agents of national security. Vitally, national security depends not on maximising short-term yields alone, but on sustaining longer term productivity, which is compromised by many current management actions focused on agricultural intensification. These actions catalyse processes including biodiversity loss, ecosystem collapse, ecological dysfunction and input intensification, which directly, indirectly and interactively reduce long-term productivity and compromise national security (Figure 2). Whilst the focal report presents a stark projection for the future of ecosystem health, food chain stability and national security, there is an opportunity to avert these impacts through monitoring, management and policy change.

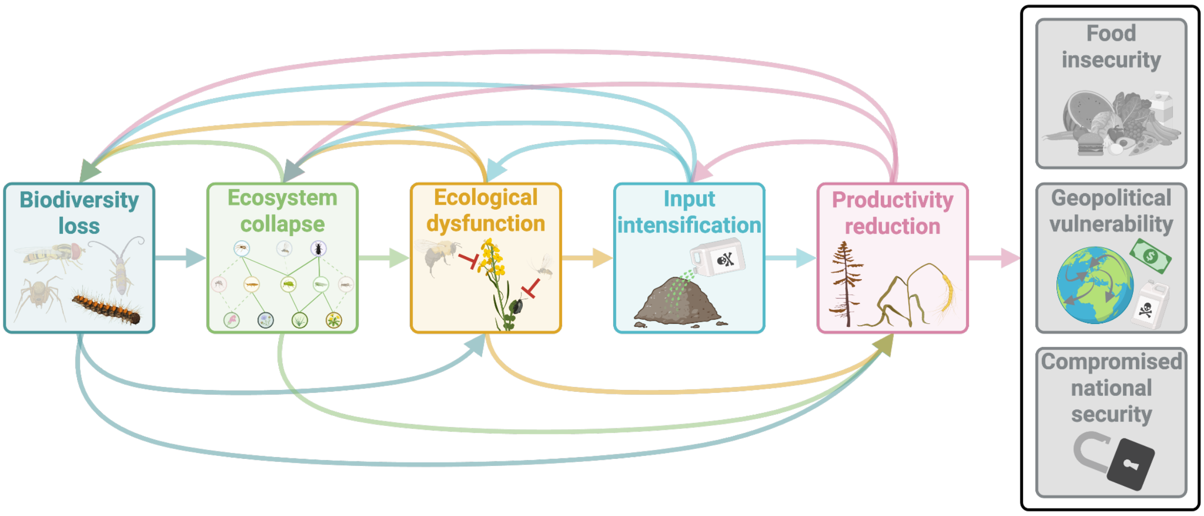

Figure 2: Feedback loops that link biodiversity loss, ecosystem collapse, food security and national security. Whilst there is a clear link between biodiversity loss and food insecurity, various interactions and feedback loops are likely to intensify and complicate this progression, confounding prediction and mitigation. Arrows represent direct links between processes. Created in BioRender. https://BioRender.com/1k05dy6

Monitoring

Insect biomonitoring represents a critical component of national security biosurveillance infrastructure by providing early warning of ecological destabilisation threatening food security, forestry resilience and wider national security. Insects respond rapidly to environmental perturbation and are highly sensitive indicators of ecosystem condition, exhibiting measurable changes in abundance, diversity and community composition before broader ecological consequences become apparent (McGeoch, 1998; Ramola et al., 2024). As different functional groups of insects directly underpin pollination, biological control, decomposition and nutrient cycling, monitoring diverse insect communities provides insight not only into biodiversity status but also into the stability of ecosystem functions upon which agricultural and forest productivity depend (Department for Environment, Food & Rural Affairs, 2025). Recent advances in automated trapping, computer vision, acoustic sensing and molecular approaches have increased the feasibility of continuous, scalable and standardised monitoring, providing opportunities to establish national-scale biosurveillance systems capable of detecting ecological change before it manifests as disruption to ecosystems (Van Klink et al., 2022). This could therefore also generate ecological intelligence to inform national risk assessment, preparedness and strategic decision making.

Multimodal biomonitoring approaches that integrate taxonomic, functional and interaction data across both above- and below-ground communities can provide increasingly sophisticated assessments of ecosystem resilience and ecological risk (Cuff et al., 2023). These approaches create opportunities to monitor ecological networks at scale, enabling assessment of not only biodiversity change but also of the interactions that underpin ecosystem resilience and adaptive capacity (Derocles et al., 2018; Landi et al., 2018). By capturing changes in species composition alongside trophic interactions and ecological network structure, monitoring systems can move beyond the detection of ecological disturbance and toward the forecasting of ecological risk, supporting the development of predictive early warning tools for pollinator decline, pest emergence, ecological invasions and trophic cascades. Such capabilities shift monitoring from passive biodiversity recording toward active ecological forecasting, enabling more proactive risk management under environmental uncertainty. Long-term, standardised datasets are essential to distinguish ecological change from natural variability and to improve confidence in national risk assessments relating to ecosystem collapse pathways (Department for Environment, Food & Rural Affairs, 2026a). As ecosystems, the services they provide and the threats to their functioning transcend national borders, effective biosurveillance will also require international collaboration, data sharing and the development of monitoring capacity, particularly in regions where current evidence gaps limit confidence in global risk assessments.

Management

Alongside understanding the status of biodiversity, monitoring is important to guide and refine intervention and management practices. Anthropogenic climate change is approaching a tipping point which threatens biodiversity's capacity to naturally respond (Lenton, 2011); therefore, resilient ecosystems require proactive maintenance of a diversity of taxa, functional groups and nature's contributions to people. Maintaining this diversity will also safeguard insects that may mitigate some of the projected challenges highlighted by the report, including the emergence and range expansion of pests, which can be controlled by natural enemies, for example. This security would build ecosystems robust to secondary extinctions, and therefore ecosystem collapse.

Management informed by monitoring can address synthetic input dependency for example with precision approaches to IPM (Ortega-Ramos et al., 2022). Furthermore, existing monitoring schemes like RIS provide data to allow context-specific (e.g., landscape-specific) management of pests and biodiversity more broadly. This is important for implementing policies like agri-environment schemes (e.g. England's Environmental Land Management scheme, Scotland's Agri-Environment Climate Scheme, Wales' Sustainable Farming Scheme, N. Ireland's Environmental Farming Scheme), which partly aim to conserve and enhance biodiversity, as their placement can be informed by biomonitoring data to ensure the right action in the right location. Importantly, whilst management should be informed by monitoring, the process should be cyclical monitoring to understand invertebrate responses to management, evolving to maintain national security in a changing world.

Policy change

The importance of insect biodiversity for food security and, by extension, national security, is made clear by the focal report (Department for Environment, Food & Rural Affairs, 2026a). The recontextualisation of insects as agents for national security demands broader consideration of "entomological security", in which the capacity of insect-mediated ecosystem processes to sustain food systems, climate regulation, and socio-economic stability is considered a paramount component of national security. The establishment of the 'Bees, Pollinators and Insects' All-Party Parliamentary Group in the UK (Royal Entomological Society, 2026) shows some promise for translating research on insect biodiversity into tangible policy change, although consistent translation into action will be much more challenging. We have highlighted the imperative for parallel monitoring and management to mitigate deterioration of insect biodiversity and the concomitant compromise of national security, but to monitor and manage insect biodiversity effectively, sufficient resources, incentives and support must first be provided by government.

The apparent links between insect biodiversity and national security present a strong argument for the integration of biomonitoring into national security strategy to safeguard natural resources and resource production. This should include the mobilisation of funds to support the expansion of long-term and broad-scale insect monitoring programmes, such as the Rothamsted Insect Survey, which can guide management of biodiversity and assess long-term trends in insect diversity (Harrington & Woiwod, 2007; Petsopoulos et al., 2024). Alongside dedicated monitoring, reporting on biodiversity impacts throughout agricultural supply chains, perhaps including consumer-level certifications (Tscharntke et al., 2015), may further incentivise engagement in data collection for national security and wider biodiversity remits. To ensure robust data generation and standardisation, this will, however, require the establishment of reporting and analytical standards, particularly for emerging monitoring methods, such as DNA metabarcoding, which is currently underway (Rajbhandari et al., 2025; Takahashi et al., 2025; Theroux et al., 2025).

The integration of multiple data sources and types for the monitoring of insects aligns with the concept of next-generation biomonitoring, in which traditional diversity-based metrics can be replaced by more informative functional data, including the construction of ecological networks (Cuff et al., 2023; Derocles et al., 2018). By assessing not just diversity, but the interactions and dependencies of organisms, risk metrics can be developed as tipping point indicators, including ecological network robustness indices (Jiang et al., 2019; Tylianakis & Coux, 2014). Any such metrics must, however, be interpretable and immediate for policymakers, and should be readily translated into policy and management decisions to reduce latency of action (Cuff et al., 2023; Dansereau et al., 2025).

The report focused on in this article is inherently UK-centric, despite considering global impacts and their implications for UK national security. This is not entirely self-serving given that it holds the UK accountable for commitments to international targets such as the Kunming-Montreal Global Biodiversity Framework 2030 action plan, which includes invasive species mitigation, biodiversity conservation and pesticide reduction (UK Government, 2025). The UK is not, however, unique in the vulnerability of its natural security to the effects of biodiversity loss and ecosystem collapse. Global challenges require global solutions and, as each country and continent grapples with these mounting challenges, the UK and other nations can and must play a central role in the stability of ecosystems internationally. Policies encouraging international collaboration in research and monitoring may help to translate national research into global conservation efforts in order to mitigate biodiversity-based threats to national security.

Conclusions

Implicitly or otherwise, the UK Government's "Global biodiversity loss, ecosystem collapse and national security" report recontextualises insects as vital components of the global food system and, consequently, national security. Given the inherent links between insect biodiversity and productivity, this renders insect monitoring and conservation keystone elements of long-term natural security, and the resultant data vital components of national intelligence. Whilst this framing does not alter the practical, theoretical and moral imperative to safeguard insect biodiversity, it may be integral to motivating greater effort in sectors and policies less directly involved in insect monitoring and conservation. Despite taking a global lens to the issues discussed, this report overtly focuses on impacts to the UK as a matter of national security. The UK is relatively food-secure, producing ~60 % of the food it consumes (Department for Environment, Food & Rural Affairs, 2024), so the level of concern voiced in this report is likely to be amplified in nations with lower food security. Regardless, the challenges presented, particularly those relating directly or indirectly to insect biodiversity, are mostly global in their scope. Collaborative international effort is therefore required to mitigate the impacts highlighted in the report, including joint efforts by the entomological community, policymakers, industry, third sector organisations and governments.

Author contributions

Mia Croft: Conceptualization; visualisation; writing – original draft; writing - review and editing. Ben S.J. Hawthorne: Conceptualization; visualisation; writing – original draft; writing - review and editing. Will Dawson: Writing - review and editing. Rosy Christopher: writing - review and editing. Rebecca Wright: writing - review and editing. Jack Longsden: writing - review and editing. Bethan C. Griffiths: writing - review and editing. Lucy Mallard: writing - review and editing. Jordan P. Cuff: Conceptualization; visualisation; supervision; writing – original draft; writing - review and editing.

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Data availability

No data were generated nor used for this manuscript.

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