



Department
for Environment
Food & Rural Affairs

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Bees and other pollinators: their value and health in England

Review of policy & evidence

July 2013

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Overview

The Secretary of State has asked officials to undertake an urgent review of the health and value of bees and other pollinators. We must develop a better understanding of the various factors that threaten populations of these beneficial insects and the changes that government, other organisations and individuals can make to counter their impact. This review will form the basis of a National Pollinator Strategy to bring together all the pollinator-friendly initiatives already underway and to provide an umbrella for new action

Declines in the health and populations of bees and other pollinators are seen globally as posing risks to biodiversity, long-term food security and ultimately human health.

Pollinators are an essential component of England's agriculture and the diversity of its animal and plant life. Many of our agricultural and horticultural crops (such as oilseed rape, orchard fruit, soft fruit and field beans) rely, at least in part, on visits by insect pollinators (bumble bees, honey bees, solitary bees, butterflies, moths, flies, beetles, hoverflies) to produce seeds and fruits. They also contribute to the diversity of wild plant species, habitats and wildlife in England, as well as its resilience and natural beauty.

Our pollinators face many threats and there are growing concerns that these threats are leading to declines in diversity and the geographical ranges of individual species. There is no single threat that seems to be driving this change; intensification in land-use, habitat loss, pests, diseases, invasive species, inappropriate use of agrochemicals and climate change are all thought to be playing a part.

This document reviews current and proposed government-led policies and initiatives across seven policy areas for England and provides an initial assessment of where they are already or could benefit pollinators by reducing these pressures.

It is designed to serve as a starting point for discussions with interested parties in business, academia, environmental groups, government and government agencies over the next six months. The products of these discussions will be

- a review of our current knowledge of the value and health of our pollinators
- a review of policies and initiatives across government and non government organisations that can affect pollinators
- recommendations for the strengthening of future policies to the benefit of these species
- this will form the basis of a National Pollinator strategy to bring together all the pollinator-friendly initiatives already underway and to provide an umbrella for new action

What are pollinators?

Pollinators are animals that transfer pollen from the anthers to the stigma of a flower, enabling the flower to set seed and fruit (fertilisation) and, through cross-fertilisation, they play an important role in maintaining plant diversity. Staple crops that provide the vast majority of our foods are wind or self-pollinated. However, pollinators play a key role in the production of many commercial crops, like orchard fruits, soft fruits and vegetables that provide us with vital nutrients (e.g. vitamins) and add variety to our diets. Pollinators are also important to the reproduction of many wild plants and are therefore key to maintaining a healthy and bio-diverse environment. Globally, many species including insects, birds, bats, lizards and other animals are responsible for pollination. However, the focus of this review is on *insect* pollinators.

A very broad range of wild and managed insect species are responsible for pollination. The UK has 24 species of wild bumblebees and about 230 solitary bee species (these differ from bumblebees and the honeybees by not forming colonies). Bees are just some of the many wild pollinating insect species in the UK, which also include moths, butterflies, flies and wasps.

The well known ‘managed’ pollinator species is the honey bee. The number of honey bee colonies is determined by the number of beekeepers who are willing to set up and manage colonies. In recent years beekeeping associations report resurgence in interest in keeping bees in response to concerns about bee declines. This suggests that at the very least the decline in honey bee numbers may have been halted. Even though this a managed species with its nest/shelter provided by the beekeeper, it still needs access to flowering crops and plants in the local environment for its nectar and pollen requirements to support a healthy and thriving colony. Managed species also include bumble bees. Sub-species of bumblebees which is not native to the UK (*Bombus terrestris terrestris* and *Bombus terrestris dalmatinus*) are used here under licence (Wildlife and Countryside Act 1981) in commercial glasshouses and polytunnels for pollination of crops such as tomatoes. Under the terms of the licence, it is kept in glasshouses and polytunnels and not released into the wild.

Why are pollinators important?

Crop dependencies on pollinators and annual value of pollination

Insects are pollinators of 80% of all plant species in Europe, including most fruits, many vegetables and some biofuel crops. The economic value of pollination services in the UK is uncertain due to the small number of existing studies. Current estimates of the economic value of pollinator services are in the order of hundreds of £millions, however these estimates rely heavily on incomplete scientific information linking pollinator services and productivity impacts. Economic impacts may vary according to geographical, climatic conditions, the intensity of land use etc. Pollinators also provide wider functions in maintaining our natural ecosystems and have a cultural and social value which needs to

be recognised. Further evidence is required to improve economic estimates, including to capture the value of marginal changes in pollination services.

Biodiversity dependencies on pollinators and annual value of pollination to natural ecosystem

Bees have great intrinsic value to people across the UK and were widely regarded as a key symbol of the natural world by respondents in a survey of attitudes towards nature conducted by Defra (2011). Pollination by insects is thought to be the main reproductive mechanism in 78% of temperate flowering plants and is essential to maintaining plant genetic diversity.

Insect-pollinated plants and their fruits or seeds are also important to non-market benefits such as landscape, wider biodiversity, providing food, shelter and other resources to mammals, birds and other insects.

On a longer time-scale, pollination can also affect the spread of rare habitats such as heathland which has unique biodiversity, cultural and economic value itself.

Pollinator populations in England

Managed Pollinators

The number of honey bee colonies in the UK has declined since the end of the 2nd World War when there were around 400,000 colonies and about 80,000 beekeepers. This decline was due to the end of sugar rationing, increasing urbanisation and lower levels of public interest and involvement in producing honey. As there is currently no compulsory requirement for beekeepers to register their interests, numbers of the bees in the UK can only be estimated and published numbers of beekeepers range from 40-46,000 keeping between 210-275,000 colonies. In population terms, there are around 5 billion honey bees in winter (20,000 per colony), rising to some 16 billion in the summer (60,000 per colony).

Numbers of beekeepers and bees are recently thought to have grown in response to media coverage of bee decline over recent years. Over 27,000 beekeepers managing around 130,000 colonies (England and Wales) are currently registered on the National Bee Unit's voluntary register (BeeBase) compared with 15,000 beekeepers in 2008. Similarly, the British Beekeepers' Association (BBKA) membership has increased from 16,500 in 2009 to 25,000 in 2013.

Against this background, beekeepers do experience loss of colonies during the year. Colony loss is not a new phenomenon and is usually associated with severe weather (eg over-winter colony losses of around 10% can be expected). From 2001 to 2007/08 an increase in colony losses was observed largely due to the parasitic *Varroa* mite, which has become endemic in the UK since it arrived in 1992. The peak of 30% losses in 2007/08 was also due to a poor summer in 2007 leading to weakened colonies going into the winter. Subsequent data indicated an improved situation (ie lower losses) for honey bees - 20% overwinter losses in 2008/09, 16% in 2009/10, 21% in 2010/11 and 16% 2011/12,

thought to be due to summers and winters which were more favourable for bees. However, the poor summer of 2012 and the prolonged cold spring this year have resulted in significant losses of honey bee colonies across the UK. The BBKA have reported 2012/13 colony losses of 33.8%. The National Bee Unit is carrying out its annual survey across England and Wales and will provide additional data on these losses and other measures of the health of the honey bees later this summer.

Wild Pollinators

There has been no national or regional monitoring scheme specifically designed to detect changes in pollinator populations as a whole. Trends in wild pollinator populations have to be derived from existing insect surveillance schemes. Trends in abundance can be derived from systematic monitoring of butterflies and moths. Trends in distribution and diversity of other wild pollinators have to be derived from analysis of occurrence data (biological records), often collected by volunteer societies, and supplemented by analysis of proxy data such as changes in habitat size or their forage plant abundance, where the relationship between insects and their habitat is known.

There is published evidence showing significant declines in diversity of wild bees and hoverflies over the last 30 years, driven by range contractions, particularly for species with more specialised habitat or forage requirements. Trends in abundance from structured surveillance show significant change in abundance for butterflies and moths, with a greater number of species decreasing in abundance, compared to the number increasing, although there are uncertainties associated with deriving representative national trends in abundance from these sample surveys because the sampling sites are not located randomly.

Wild Bees

There is evidence that reductions in the geographical ranges, particularly for those species associated with semi-natural habitats or with more specialised foraging requirements, is driving a decline in wild bee diversity, although some species that have been expanding their range.

Studies of trends in distribution and diversity show a general reduction in the geographical range of many bumblebee species in Britain since 1960, particularly those with more specialised requirements and a localised distribution. The same studies also show the loss of at least two bumblebee species from Great Britain since 1940.

A study of over one million occurrence records for all bee species in Great Britain – bumblebees, cuckoo bees and solitary bees - was published in 2006. Significantly greater areas of Britain showed declines in diversity compared to the areas showing an increase since 1980. In addition, significantly greater declines were observed for specialist species – those with greater habitat or forage specificity or with fewer generations per year – compared to non-specialists.

Flies (including hoverflies)

Globally, flies are considered to be the second most important insect order for both flower visiting and pollination. Certainly many of the 280 UK species of hoverfly visit flowers, with some species, such as *Episyrphus balteatus*, the Marmalade fly, having its populations greatly enhanced by near continental invasions. A number of diptera (flies) are used commercially around the world as pollinators for specific crops, including the use of *Eristalis* hoverflies on peppers, and calliphorid flies on canola, sunflower, buckwheat, garlic, lettuce and peppers, and other crops. Though often not as abundant as, for example, the bumblebees, the flies nevertheless form a significant part of the background pollinator load.

There is evidence that reduction in the geographical ranges of hoverflies is driving declines in their diversity, although, again, some species are expanding in range. There is also some limited evidence that suggests a change in abundance, with a greater number of species declining, compared to those that are increasing.

There have been several studies of changes in hoverfly abundance and diversity in Great Britain. Results have not always been consistent. Some studies have found no directional change in hoverfly abundance, although one major study found a significant, negative trend at a range of geographical scales, suggesting as with bees, that there was a general decline in hoverfly diversity. This had been masked to some extent by gaps in the data.

The latest hoverfly atlas for Great Britain contains a preliminary analysis of frequency of records, as a proxy for abundance. Although care is required in interpreting this kind of assessment, because of the acknowledged bias in the sampling, the assessment suggests that of 257 species recorded, 86 showed a significant decrease and 22 a significant increase (with the remainder showing no significant trends).

Butterflies and moths

There is evidence suggesting significant long-term change in abundance for butterflies and moths, although there are uncertainties associated with deriving representative national trends from these sample surveys.

Butterflies are the best studied group of terrestrial insects. Evidence on status and trends is available from both occurrence data and the more systematic UK Butterfly Monitoring Scheme (BMS).

Analysis of butterfly occurrence records shows range declines in several species strongly associated with semi-natural habitats, coupled with an expansion in range, northwards, of a number of more mobile generalist species. Analysis of abundance data over the last 30 years from the UK BMS shows more extensive declines with 21 of 60 species recorded showing significant declines, and only 4 showing significant increases, and the remainder showing no overall trend. The UK BMS is biased towards high value sites, and so there is some uncertainty over how representative the data are of changes in the wider countryside. A wider countryside butterfly survey scheme has now been introduced by Butterfly Conservation, based on a structured sampling framework, which will provide more representative trends in the future.

Moths have been recorded since the early 1960s at a series of around 100 sites known as the Rothamsted light traps. Analysis of this data shows a significant change in annual capture rates with two-thirds of the 337 species assessed showing a decline, with the biggest declines in the south.

What are the main threats to pollinator populations in England?

The health of insect pollinators is determined by many factors which interact to influence their population size and resilience:

- land use (ie the availability of suitable habitats for nesting, shelter and feeding, in particular adequate supplies of nectar and pollen, and food plants for different life stages such as caterpillars); as well as changes in agricultural land use which have had negative impacts on pollinator and other wildlife species, inappropriate plantings of flowers in high streets, car parks, municipal parks and gardens which are devoid of nectar and pollen. This creates extensive areas where our wild pollinators cannot survive. For example, 97% of flower-rich meadows have been lost since the 1930s.
- local environmental impacts such as flooding, wild fires and impacts from the misuse of pesticides and other agrochemicals;
- weather leading to short term negative and positive impacts on insect populations, and climate change leading to changes in species numbers and distribution (as some species spread to other areas and countries);
- pests and diseases although this is only well understood for honey bees, given they are a managed species and accessible to monitoring and pest and disease control measures.
- in addition for honey bees, the number of beekeepers and their husbandry skills are also important in determining the number and health of colonies.

The intensification of agriculture over the last 50 years as well as development of commercial forestry and urbanisation has led to the loss of wildflower meadows, mixed grasslands and hedgerows. These changes have led to widespread loss of suitable habitats for insect pollinators (and other wildlife species), which rely on nectar and pollen from local crops and plants.

English policy and pollinators

Government has been working for many years to improve the health status of insect pollinators and a number of government departments, agencies, local authorities and non-government organisations play a part in developing and implementing these policies.

Recent Government- led policies and initiatives that can affect pollinator populations include:

Agricultural Production

Common Agricultural Policy - Pillar I

Negotiations on reform of the Common Agricultural Policy (CAP) are ongoing. The UK is pressing for a greener, simpler and smaller CAP – one which moves away from direct subsidy to rewarding farmers and land managers for the public goods they provide, including environmental public goods.

As part of the negotiations, the UK is also pressing for greater flexibility in the way Member States might deliver the European Commission's proposed 'Greening' measures. Whilst no decision has yet been made on how 'Greening' might be delivered in the UK, it has the potential to enable the UK to deliver more ambitious agri-environment schemes that are likely to be of benefit to pollinators.

The UK wants a simplified, more proportionate system for cross-compliance that also delivers environmental objectives. The UK remains opposed to calls during the negotiations to exempt small farmers from cross-compliance.

Pesticide Policy

Authorisation, Application, Monitoring and Alternatives

Pesticides are tightly regulated under EU law and may only be sold and used if they have been authorised. Authorisation is only given where a full risk assessment based on scientific data establishes that there will be no unacceptable effects on non-target species. Authorisations are subject to regular routine review and can be reviewed at any time if there are indications that the requirements for authorisation may no longer be met. If a review finds that authorisation requirements are not met, those authorisations will be amended or withdrawn. A review is currently underway for neonicotinoids, a class of insecticide for which concerns have been raised about effects on bees.

At present, the assessment process directly considers impacts on honeybees and on two other arthropod species – *Aphidius rhopalosiphi* (a parasitic wasp) and *Typhlodromus pyri* (a predatory mite). The European Food Safety Authority, the independent risk assessment body in the EU process, is currently updating the risk assessment process for bees and the new process will include separate assessments for honey bees and for bumble bees and solitary bees.

Where pesticides are authorised, this is subject to conditions to ensure that risks from use are minimised. For products of high toxicity to bees, these conditions will include restrictions so that the pesticide is not applied when the crop is in flower, when flowering weeds are present or where bees are actively foraging.

There is a range of post-authorisation monitoring of pesticides, including a survey of pesticide usage, monitoring of pesticide residues in food and investigation of reported incidents of wildlife poisoning.

There are also general rules on the use of pesticides and these are being partly harmonised across the EU under the Directive on the sustainable use of pesticides. The rules cover issues such as the training of pesticide users and the testing of equipment used to apply pesticides. The UK approach to this issue is set out in a National Action Plan published in February 2013, which is under continuous development. Among several priorities in the Plan there is a commitment to consider what more might be done to help and encourage pesticide users to adopt Integrated Pest Management (IPM) techniques. IPM does not prohibit pesticide use but draws on a full range of tools and techniques to control pests, weeds and diseases so as to minimise pesticide use.

Agri-Environment Schemes

Common Agricultural Policy - Pillar II

Conservation of wild pollinators is promoted through Environmental Stewardship, funded under Pillar II of the Common Agricultural Policy. This encourages farmers and other land managers to manage their land to provide suitable habitats for a range of wildlife including pollinators.

Entry Level Stewardship (ELS) provides payments for the establishment of nectar flower mixes which are intended to provide large quantities of nectar from small areas to mimic the nectar-bearing crops that once featured in traditional agricultural systems, and to limit genetic impact on native wildflower species from the widespread sowing of commercial seed. These nectar mixes can be rotated around the farm to provide nectar sources at key times for pollinators. Higher Level Stewardship also has a range of options that benefit pollinating insects. These include floristically enhanced grass margins and conservation headlands.

Uptake of ELS options is promoted by the scheme deliverers, Natural England in conjunction with the Campaign for the Farmed Environment. It includes free training and advice on choice and management of relevant options particularly beneficial to pollinators. However, uptake of relevant options has been relatively low. Total Environmental Stewardship spend on options of benefit to pollinators is approximately £3.5 million per year with £1.65 million of this from Entry Level Stewardship (ELS).

Following a recent review of evidence from research, monitoring, and experience of scheme operation, several new ELS options were introduced from 1 January 2013 to provide improved habitat and food for invertebrates including pollinators. These are: a supplement to add wildflowers to buffer strips and field corners, plus options for legume-rich and herb-rich swards. This latter option is applicable to a wide range of lowland livestock farms, including dairy and more intensive beef/sheep businesses for which the existing suite of in-field options had very limited applicability. Its introduction therefore addresses concerns that ELS offers fewer opportunities for farmers in pastoral rather than arable areas

We are currently working with Natural England and key stakeholders to see what new elements could be introduced to enhance the effectiveness of Environmental Stewardship to provide forage and nesting habitat for bees. We will then consider how we might carry these forward in a successor scheme to Environmental Stewardship as part of our work to develop the next Rural Development Programme from 2015.

Habitat & Species Conservation

Priority Habitats, Designations, Reintroductions and Impacts

Biodiversity 2020, the Biodiversity Strategy for England has a mission to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. It sets out a series of high-level outcomes for both habitats and species. This includes:

- 90% of priority habitats in favourable or recovering condition;
- At least 50% of Sites of Special Scientific Interest (SSSIs) in favourable condition whilst maintaining at least 95% in favourable or recovering condition;
- more, bigger and less fragmented areas for wildlife;
- no net loss of priority habitat;
- an increase in the overall extent of priority habitats by at least 200,000 ha;
- a commitment to preventing further human-induced extinctions of known species.

A number of the actions we are taking to address these outcomes will benefit bees and wild pollinators:

- We have awarded £7.5m to twelve Nature Improvement Areas (NIAs) to become better places for wildlife, creating more and better-connected habitats helping wildlife to thrive and adapt to climate change, and enhancing ecosystem services, including pollination; ecological networks. NIAs have been recognised in the National Planning Policy Framework.
- Flower-rich grasslands, including lowland and upland meadows are recognised on the list of habitats of principal importance for the conservation of biological diversity in England, published by the Secretary of State under s41 of the NERC Act 2006. The National Planning Policy Framework, published in 2012, requires planning authorities to promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations.
- In addition, almost 100,000 ha of grassland types that are likely to support bees and other pollinators are already protected as SSSIs. Natural England is currently reviewing coverage of its SSSI series, and this will include key pollinator habitats such as lowland meadows.
- 17 species of bee, together with many other pollinators, are considered 'priority' species for conservation action in England (these are listed as species of principal

importance for biological diversity under the Natural Environment and Rural Communities Act 2006). The Terrestrial Biodiversity Group, led by Natural England, is working with partners to identify and prioritise the action required to promote the recovery of priority species.

- Under its species recovery programme, NE funds conservation projects to support priority species, including pollinators such as bumble bees. For example the short haired bumble bee, extinct in the UK since the 1980s, is being reintroduced from Sweden.

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF) came in to force on 27 March 2012 with immediate effect for plan and decision making. In line with the Natural Environment White Paper, the NPPF gives clear recognition to the intrinsic value and character of the wider countryside, aiming to enhance and protect both the natural and historic environment for the future. The NPPF states that the planning system should contribute to and enhance the natural and local environment - including minimising impacts on biodiversity and providing net gains in biodiversity where possible, thereby contributing to the Government's commitment to halt the overall decline in biodiversity.

The NPPF states that every local planning authority in England should have a clear, up to date Local Plan, which conforms to the framework, meets local development needs, and reflects local people's views of how they wish their community to develop.

The Local Plan for an area sets the framework for how the area will develop over time. The Local Plan, along with any neighbourhood plans, form the overall development plan for the local area. Local plans should have a clear strategy for enhancing the natural, built and historic environment and supporting wider biodiversity networks, including Nature Improvement Areas where they have been identified. Planning decisions must normally be taken in accordance with the development plan.

The NPPF also requires that developments that could result in significant harm to biodiversity should be refused planning permission, unless that harm is fully addressed by offsetting measures. The Government has pilots underway in 6 areas for biodiversity offsetting. Offsetting provides a transparent and quantifiable approach to development, whereby developments that cause unavoidable harm to one habitat, are matched by quantifiable improvements in habitat elsewhere.

Green Infrastructure

There are also substantial opportunities for the conservation of pollinating insects within urban landscapes and the Government aims to deliver Green Infrastructure as a key component of its planning and development policy.

Launched in 2011 to meet a Natural Environment White Paper commitment, the Green Infrastructure Partnership (GIP) supports development of Green Infrastructure (GI) in

England, identifying and developing solutions to help enhance GI to strengthen ecological networks and improve communities' health, quality of life and resilience to climate change.

The programme supports decision-makers in creating better places for people and wildlife, including pollinators, through increased integration of living networks of green spaces, water and other environmental features, particularly in urban built environments (provided by trees, parks, green roofs, road verges, gardens, allotments, cemeteries, woodlands, rivers and wetlands).

It has brought together collective expertise from over 300 member organisations to encourage better dialogue on GI, share good practice, and develop evidence, tools and ideas. Through member-led complementary workstrands it is working to ensure that relevant decision-makers see GI as a key part of delivering better places and have the tools and knowledge that will help them to implement it.

Current activity includes projects which will help demonstrate the environmental benefits that well designed GI can provide and to help quantify the costs of investing in GI and make the case for new projects. GIP also part funds and supports high profile urban GI pilots such as Birmingham City Council's Natural Capital City Model, and provides sectorial training by way of webinars and multi-disciplinary workshops across the UK.

Honey Bee Health Policy

Control of pests and diseases in managed honey bees

Honey bees are susceptible to a variety of pests and diseases that cause major losses of colonies across England. The control of notifiable pests and diseases is carried out by the National Bee Unit (NBU) who provide free apiary inspection and diagnostic service for statutory diseases and pests, and a free training and education programme to enable beekeepers to become more self-reliant in combating disease through improved bee husbandry. Last year the NBU inspected nearly 36,000 colonies. The inspection programme aims to control the spread of endemic notifiable diseases of honey bees and to identify and manage the risk associated with new exotic pests and diseases that may be introduced. Overall this statutory programme has been effective as the number of recorded cases of the foulbrood diseases remain within the relatively low range of 3-7 cases per 1,000 hives. These efforts are further supported by Defra and the Welsh Government's Healthy Bees Plan which aims to achieve a sustainable and healthy population of honey bees for pollination and honey production. It provides a fresh impetus for government, beekeepers and other stakeholders to work together to respond effectively to pest and disease threats and to sustain honey bees and beekeeping for the future. A key priority of the Healthy Bees Plan is to deliver an enhanced training and education programme for beekeepers, driving up husbandry standards and the management of pests and diseases. Defra has so far co-funded education and training initiatives with beekeeping associations (e.g., 400 new beekeeper trainers and a suite of new training materials and courses). Jointly funded programmes are a key feature of the current phase of the plan (2012-2015). One of the actions under the plan is the development of an apprenticeship scheme to encourage young people to become bee farmers and funding is being provided to the Bee

Farmers' Association to take this initiative forward. The delivery of the Plan is overseen by the Bee Health Advisory Forum which also provides input and advice to policy development. The Forum provides an opportunity for early discussion with key stakeholders on emerging issues as well as increasing transparency and understanding for all participants of positions across the range of interests.

In 2009, Defra commissioned the National Bee Unit (NBU) to undertake a survey of honey bee pests and diseases, probably one of the biggest surveys of its kind undertaken, with the aim of using the results to inform a review of current policies on managing these risks. As the results became available in the second half of 2011, Defra started a review of its pest and disease control policy. The review considered how best to manage pests and diseases in the future so that the optimum policies and interventions are in place; priorities for future collective action (partnership working) by government and beekeepers are clear; and to ensure we are making the best use of current public funding/resources in sustaining a healthy honey bee population for pollination. A consultation seeking stakeholders' views on the proposals which emerged from the review closed recently and the responses to the consultation are currently being considered to help inform development of future policies.

Policy on Veterinary Medicines for Pollinators

The Veterinary Medicines Directorate continues to work to improve the availability of medicines for bee diseases and have developed an Action Plan involving manufacturers, bee keepers and bee inspectors. Since the launch of the Action Plan in 2009, three new bee products have been authorised in the UK for the treatment of *Varroa*. Alongside the products authorised, details of bee medicines which veterinarians can import from other Member States are also available. The Action Plan, along with the veterinary medicines available in the UK and other Member states, is available on the VMD website.

Insect Pollinators Initiative

This initiative is just one of a number of national and international research programmes funded by the UK taxpayer that will provide evidence to support the future development of pollinator-friendly policies. The Insect Pollinators Initiative (IPI) funds research into the causes and consequences of insect pollinator decline and will inform our efforts to do something about it. Defra is providing £2.5 million over five years (from 2010/11) towards the £10 million Insect Pollinators Initiative which is being jointly funded with the Scottish Government, Biotechnology and Biological Sciences Research Council (BBSRC), Natural Environment Research Council (NERC) and Wellcome Trust. Nine projects have been funded, entitled:

- Sustainable pollination services for UK crops
- Modelling systems for managing bee disease: the epidemiology of European foulbrood
- Investigating the impact of habitat structure on queen and worker bumblebees in the field
- An investigation into the synergistic impact of sublethal exposure to industrial chemicals on the learning capacity and performance of bees

- Unravelling the impact of the mite *Varroa destructor* on the interaction between the honeybee and its viruses
- Linking agriculture and land use change to pollinator populations
- Urban pollinators: their ecology and conservation
- Impact and mitigation of emergent diseases on major UK insect pollinators
- Can bees meet their nutritional needs in the current UK landscape?

These are looking at different aspects of the declines of insect pollinators, and bring together researchers from many disciplines including ecology, molecular biology, mathematics, and computing. Some are focusing on specific species and/or diseases; others are looking more broadly at factors affecting the health and survival of pollinating insects more generally. Twenty-one scientific journal publications and numerous public engagements activities have already been delivered under this initiative. The full project findings will start to emerge from 2014.

What's next for English policy and pollinators?

Insect pollinators of crops and wild plants are threatened by land-use intensification (including habitat destruction and pesticide use), the spread of pests and diseases and climate change. However, evidence on individual and combined effects of these pressures on insect pollination and their implications for policies on long-term food security, human health and ecology are complex and difficult to analyse.

Evidence

There is a general lack of long-term population monitoring studies for pollinators that encompass both a range of geographic regions and pollinator as a whole. Our knowledge on the magnitude of threats to pollinators has thus been inferred from the combined evidence of indirect studies, often snap shots of particular pollinators at a certain time or place, supported by a small number of longer-term studies.

The picture is further complicated, as not all species of pollinators respond equally to environmental stresses, with both winners (mostly species that are generalist in their habitat or food needs) as well as losers (often specialists) in the face of environmental changes.

We also need to develop a better understanding of the relationship between pollination success (i.e. quality and yield) and the size, composition and resilience of the pollinator community. Complete loss of specialist pollinators can limit reproduction in dependent plant species but there is no simple relationship between the number of pollinators or diversity of pollinators and limitation on pollination services.

These gaps include the need to improve our economic valuation of the services provided by pollinators to inform future policies. One reason why pollinators may have been under such pressure in the past is that we lack an understanding of their true worth. The

imprecision of current estimates was highlighted in the Environmental Audit Committee's 'Pollinators and Pesticides' report that calls on Defra to prioritise its work on valuing the pollination service provided by these insects.

On 25 May 2013, the European Commission published a regulation restricting the use of three neonicotinoids on a long list of crops from 1 December 2013 (the Environmental Audit Committee's report also made recommendations for restrictions on neonicotinoids). The Government did not vote in favour of this measure because it did not consider that the scientific evidence on the risks to pollinators supported it. The Commission have undertaken to review the restrictions in 2015 and the Government is considering what should be done to ensure that this decision is based on strong science which attracts general support.

Policy

We have a diverse range of policies all with the potential to impact on these insects. The Breeze *et. al.* (2012) paper reports over thirty pieces of legislation that have direct or indirect impact on pollinators and numerous Government initiatives. Many of these initiatives have only recently been implemented and may need time to make a measureable difference. In addition, these policies and initiatives are delivered by many organisations across central government, local government, government agencies and non-government organisations, thereby adding to the complexity.

There is broad recognition of the strong positive steps made by Government and others towards halting declines in wild and managed pollinators in England in recent years. However Defra acknowledges that due to the complexity of pollinator biology, the breadth of policy areas involved and the number of interested parties who play key roles in making changes, we need to co-ordinate our efforts if we are to develop and deliver effective pollinator-friendly national policy.

The implementation of future policy is dependent on the actions of a wide range of players, not just Government. While Government can help by putting in place the right policy framework and investing in science, all those with a role need to continue to play their part if we are to ensure that recent progress is to be maintained, if not accelerated.

Policy & Evidence Review

This review aims to improve our collective understanding of the causes and consequences of insect pollinator declines and the efforts being made by government, non-government organisations and individuals to do something about it.

Two Workshops entitled "Value and Health of Pollinator Populations in England: Towards a Pollinator Health Strategy' will offer national experts from government and non-government organisations the opportunity to for an open debate on the most recent scientific progress made on pollination and the policies that affect pollinators.

The first workshop will be held in September 2013 will assess the evidence for the value and health of pollinators in England.

The meeting will be organised to enable participants to reach conclusions and make recommendations for future work on the basis of 3 key questions:

- What is our current knowledge of the health and value of pollinators in England and what are the key gaps in our understanding?
- What have been the drivers for change in pollinator populations and what may drive changes in future?
- How do we measure the future trends in pollinator populations and the pollination service they provide?

The second workshop will be held in October 2013 will review policies of government and non-government organisations in England that affect pollinators.

The meeting will be organised to enable participants to reach conclusions and make recommendations for future policy making and delivery in England, focussing on 5 key questions for pollinators:

- What efforts are being made by government, non-government organisations to the benefit of pollinators?
- What are the key gaps within current English policy on pollinators?
- How do we support co-operation between business, academics, environmental groups and government in strengthening policy making?
- How do we encourage interactions between stakeholders, communities and individuals in delivering pollinator beneficial initiatives?
- How do we raise awareness of the importance of pollinators to our economy, environment and well-being?

Both workshops will also provide evidence in support of the production of the National Strategy for Pollinators and recommendations for priority actions in its delivery.