



Strategy for the Sustainability of the Honey Bee

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Department of
**Agriculture and
Rural Development**

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AN ROINN
**Talmhaíochta agus
Forbartha Tuaithe**

MÄNNYSTRIE O
**Fairms an
Kintra Fordèrin**



Strategy for the Sustainability of the Honey Bee



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Strategy for the Sustainability of the Honey Bee



Ministerial Foreword

I am delighted to announce the publication of the Strategy for the Sustainability of the Honey Bee, the aim of which is to achieve a sustainable and healthy population of honey bees for both pollination and honey production in the north of Ireland through strengthened partnership working between Government and Stakeholders.

I value the work of our beekeepers and recognise their environmental importance and contribution to the sustainability of agriculture on the island of Ireland. When I began my term as Minister of Agriculture, I gave a commitment to the Assembly and to the industry, to help to protect and improve the health of honey bees and support the sector in its efforts to sustain and support beekeeping in the north of Ireland, by producing a strategy.

I am encouraged that in order to enhance the sector here, the Ulster Beekeepers Association (UBKA) and the Institute of NI Beekeepers (INIB) have made a commitment to support the strategy intentions.

Our stakeholders both here and in the south of Ireland have been closely involved in the preparation of this document and I look forward to seeing its progress through strengthened partnerships within the island of Ireland, where there is a high level of cooperation on all operational matters around honey bee health.

A handwritten signature in black ink, appearing to read 'Michelle Gildernew'.

Michelle Gildernew MP MLA

Minister of Agriculture and Rural Development

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Focal Ón Aire

Tá lúcháir orm a chur in iúl go bhfuil an Straitéis maidir le hInbhuanaitheacht na mBeach Meala foilsithe. Tá sé mar aidhm ag an straitéis daonra inbhuanaithe agus sláintiúil de bheacha meala a bhaint amach do phailniú agus do tháirgeadh meala araon i dtuaisceart na hÉireann trí níos mó comhoibrithe idir an Rialtas agus na Páirtithe Leasmhara.

Is mór agam an obair a dhéanann ár mbeachairí. Aithním cé chomh tábhachtach agus atá siad don timpeallacht agus tuigim go maith an dóigh a gcuireann siad le hinbhuanaitheacht na talmhaíochta ar oileán na hÉireann. Nuair a thosaigh mé ag feidhmiú mar Aire Talmhaíochta, thug mé gealltanais don Tionól agus do thionscal na beachaireachta go ndéanfainn iarracht sláinte na mbeach meala a chosaint agus a fheabhsú agus go dtacóinn leis an earnáil ina cuid iarrachtaí an bheachaireacht a chothú agus a chur chun cinn i dtuaisceart na hÉireann trí straitéis a chur le chéile.

Tá mé thar a bheith sásta gur thug Cumann Beachairí Uladh (CBU) agus Institiúid Beachairí TÉ (IBTÉ) gealltanais go dtacóidís le cuspóirí na straitéise.

Bhí ár bpáirtithe leasmhara anseo agus i ndeisceart na hÉireann ag comhoibriú lena chéile leis an cháipéis seo a chur le chéile agus tá mé ag súil le dul chun cinn a fheiceáil trí níos mó comhoibrithe ar oileán na hÉireann, áit a bhfuil ardleibhéal comhoibrithe ann cheana i dtaca le gach ábhar a bhaineann le sláinte na beach meala.

A handwritten signature in black ink, appearing to read 'Michelle Gildernew'. The signature is fluid and cursive, written on a white background.

Michelle Gildernew MP CTR

An tAire Talmhaíochta agus Forbartha Tuaithe



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Ingang o tha Männystèr

A'm hert-gled tae gie newins anent tha ootset o tha Roadin fur tha Fennin o tha Skep-Bee, mintit at wunnin tae a weel-daein an poustie hattèrel o skep-bees fur baith pollinatin an makkin hinnie in tha noarth o Airlan, bae wye o heezin tha neeborin aquesht tha Governinn an yins 'at leuks tha gate o tha craturs.

Ah thïnk weel o tha wark o yins 'at haes skep-bees aboot thaim, an Ah jube it recks gyely fur yird-hainin an maks an inpit tae uphaudin fairmin oan tha islan o Airlan. Whanivver Ah stairtit ma while daein Männystèr o Fairmin, Ah waarrantit afore tha Semmlie an tha yins tentin tha skep-bees fur a leevin Ah wud dae ma devoir tae fen an mak a bettèr o tha poust o tha skep-bees an uphaud tha shaidin furtae ettle at giein a heeze tae tha keppin o skep-bees in the noarth o Airlan, wi pittin a roadin thegither.

Ah'm gien a lift sin tha Ulstèr Skep-Bee Tentèrs Societie (USTS) an tha Steid o NA Skep-Bee Tentèrs (SNAST), furtae mak a bettèr o tha shaidin hereawa, haes taen in han wi uphaudin tha ettlins o tha roadin.

Tha yins 'at leuks tha gate o this baith hereawa an in tha sooth o Airlan haes bin weel yokkit til tha graithin o this screevin, an Ah'm leukkin til remairk it bein fordèrt throch mair pairtnerin athin tha islan o Airlan, whar thar's a rowth o marrowin anent aa maittèrs o tha wyes o daein wi an ee tae tha poust o skep-bees.

A handwritten signature in black ink, appearing to read 'Michelle Gildernew'. The signature is fluid and cursive, with a large initial 'M'.

Michelle Gildernew, MP MLA
Männystèr o Fairms an Kintra Fordèrin

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Executive Summary



Background

Managed honey bees contribute directly to local food production and make an important contribution, through pollination, to crop production and maintenance of a healthy environment. In economic terms it is difficult to quantify their contribution but various studies have estimated this to be in the region of £160m on a British and north of Ireland basis. They do however face a growing number of threats from both endemic and exotic bee pests and bee diseases. Varroa is a major risk as is the possible introduction of exotic bee pests such as the Small Hive Beetle (SHB), *Aethina tumida* and *Tropilaelaps*.

Aim

The aim of the strategy is to achieve a sustainable and healthy population of honey bees for pollination and honey production in the north of Ireland through strengthened partnership working between Government and stakeholders.

The strategy confirms DARD's ongoing commitment to help protect and improve the health of honey bees and support the sector in its efforts to sustain and support beekeeping in the north of Ireland.

This strategy seeks to address the current challenges facing beekeepers and provides a plan of action aimed at sustaining the health of honey bees and beekeeping in the north of Ireland for the next decade.

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The plan is based on four key outcomes which encapsulate the objectives that stakeholders are looking to achieve, as follows:

- (1) Effective communications and relationships operating at all levels;
- (2) Effective surveillance and monitoring to minimise risks from pests, diseases and undesirable species;
- (3) Competency development in good standards of beekeeping and husbandry to minimise pests and disease risks and contribute to sustaining honey bee populations; and
- (4) Sound science and evidence base to underpin bee health policy and its implementation.

Roles and Responsibilities

The strategy is aimed not only at policy makers but also beekeepers, and importantly, identifies the roles and responsibilities of the different stakeholders in delivering the stated aims and outcomes. Success of the strategy will be dependent on these roles and responsibilities being accepted and acted upon by all concerned. Delivery will be phased and outcomes and priorities reviewed at regular intervals to ensure appropriate actions at any particular time.

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At a Glance view of the Strategy

| Aim | Outcomes | Proposed initiatives and activities |
|--|---|--|
| Sustainable and healthy honey bee population | <ol style="list-style-type: none"> 1. Effective communications and relationships. 2. Effective surveillance and monitoring. 3. Improved and sustained high standards of bee husbandry employed at all levels of bee keeping. 4. Sound science and evidence base for future decision making. | <ul style="list-style-type: none"> • Strengthen communications by annual meetings between UBKA and INIB and DARD, and regular dialogue with bee inspectors. Also annual meetings between DARD and the Department of Agriculture, Fisheries and Food (DAFF) to maximize cross border cooperation. • Issue of routine updates and alerts to beekeepers through UBKA and INIB. • Agree arrangements for more targeted surveillance and monitoring of high risk areas for evidence of new exotic pests and diseases. • Continuation of Bee Husbandry Surveys to provide beekeepers with ongoing data on bee health here. • Promote the competency development to raise awareness of exotic threats, best management practices, disease control methods and home based queen rearing activities. • Keep under review the contingency plan for bee diseases and exotic pests. • Maintain co-ordination and collaboration of research. |

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Part 1 - Background

This part of the strategy sets out the reasons why a strategy for the sustainability of the honey bee is necessary.

1.1 Aim

The overall aim of the strategy is:

To achieve a sustainable and healthy population of honey bees for pollination and honey production in the north of Ireland through strengthened partnership working between Government and stakeholders.

The strategy confirms DARD's ongoing commitment to help protect and improve the health of honey bees and support the sector in its efforts to sustain and support beekeeping in the north of Ireland. It sets out:-

- Key actions for protecting and improving the health of honey bees; and
- the relative roles and responsibilities of Government and other stakeholders

The strategy will be delivered within the relevant domestic and international legislation and any other associated agreements.

There are thought to be around some 800 beekeepers in the north of Ireland, who maintain about 4,000 colonies of honey bees. These are mainly small-scale beekeepers with less than 40 hives - the typical number of hives here is between 3 and 5. Most beekeepers here are members of local beekeeping associations. Although beekeeping is on a small scale and has not the larger scale commercial

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beekeeping units found elsewhere in Britain and Ireland, the overall scale of high quality honey production and investment in beekeeping makes an important contribution to the local economy, environment and community.

In the south of Ireland there are estimated to be approximately 2,200-2,400 beekeepers, around 600 of which are registered with DAFF, and over 2,100 are members of beekeepers' associations. Beekeepers in the south manage around some 24,000 hives, the vast majority own less than 40 hives. The number of commercial beekeepers in the south is very low.

Some 250,000 colonies are managed by 37,000 beekeepers in England and Wales, 17,000 of these beekeepers are registered with the Food and Environment Research Agency (Fera) via BeeBase, many of which are members of the Bee Farmers' Association. Around 200-300 of these beekeepers have more than 40 hives, manage bees on a professional basis and collectively manage around 50,000 hives. The remainder are small-scale producers with less than 40 hives.

In Scotland there are around 1,200 beekeepers that are registered members of the Scottish Beekeepers Association (SBA) and an estimated further 1,000 that are not. The average number of hives kept by Scottish beekeepers is around 8 or less. Despite the limited numbers of hobbyists, the 30 Scottish bee farmers (full time beekeepers) run 25% of the British commercial hives, some managing into the high hundreds and even thousands of hives.

The total British and north of Ireland production of honey is around 6,000 tonnes per year, and the north of Ireland produces around 30 tonnes of this. The south of Ireland produces around 250 tonnes of honey annually. For hobbyist beekeepers the revenue per hive is around £45.50. The total revenue of British and north of Ireland beekeepers from honey, hive products and pollination fees is between £10-30 million and the total fraction from here is estimated at around £220,000 (dependent on honey yields and prices). The crop pollination provided by bees in Britain and the north of Ireland is estimated to be worth between £120-£200 million.



1.2 Legislation

Domestic legislation relevant to managing and controlling the health of managed honey bees in the north of Ireland derives from EU legislation. Legislation sets out to manage the risks to honey bee health associated with international trade and to control notifiable diseases and pests. Much honey bee health legislation falls within the scope of EC animal health legislation as honey bees are regarded as food producing animals in common with other livestock.

Domestic

Bees (NI) Order 1980. This legislation empowers DARD to make orders to control diseases and pests affecting honey bees and provides powers of entry for authorized persons.

Under article 3 of the Bees (NI) Order 1980, the Department may by order make such provision as it thinks fit for the purpose of preventing the introduction into and spreading within the north of Ireland of pests or diseases affecting bees.

The Bee Diseases and Pests Control Order (NI) 2007, which came into operation on 21 May 2007, gives effect to article 3 of the Bees (NI) Order 1980. This Order requires beekeepers and others to notify DARD of the suspicion of the presence of the notifiable diseases, American Foul Brood (AFB) and European Foul Brood (EFB) and the notifiable pests, Small Hive Beetle and *Tropilaelaps* mites.

At European level, the 'Balai Directive', 92/65/EEC on animal health requirements for trade in honey bees lists American Foul Brood (AFB), the Small Hive Beetle (SHB), (*Aethina tumida*) and *Tropilaelaps* mites as notifiable pests and diseases throughout the EU. The directive lays down the provisions for intra-community trade in honey bees, and requires consignments of honey bees moved between Member States to be accompanied by an original health certificate confirming that the consignment comes from an area free from AFB,

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SHB and *Tropilaelaps* mites and is free from the listed pests and disease.

In December 2003, the Commission introduced new legislation to strengthen the controls and certification requirements for importation of honey bees (and bumblebees) from outside the EU. Commission Decision 2003/881/EC sets out the requirements for export certification of bees destined for the European Community (covering honey bees and bumblebees used for commercial pollination). The Annex to Council Decision 79/542 refers to the list of countries from which bees may be imported if, in addition, these countries can make various statements about the status of the notifiable pests and disease and that the bees have been inspected and found free of pests and diseases prior to export.

Agri-environment Schemes

Agri-environment schemes have been set up to meet clear and specific bio-diversity, water quality, landscape and climate change objectives. Whilst none of these are aimed directly at honey bees, it is considered that a wide range of insects, particularly bumblebees, will benefit from options such as pollen and nectar mixtures in these schemes.

Agri-environment schemes are underpinned by a number of pieces of European legislation and enabling national legislation. The Mourne and Slieve Croob Environmentally Sensitive Area was launched under EEC 797/85 and subsequently the Countryside Management Scheme was launched under EEC 2078/92 as part of the Rural Development Regulation 2000-2006. The recent NI Countryside Management Scheme (NICMS) is an integral part of the NI Rural Development Programme 2007-2013 (NIRDP). This programme is part financed by the European Agricultural Fund for Rural Development (EAFRD) with co-funding provided by DARD.

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1.3 Scope

This strategy is concerned with protecting and improving the health of honey bees which are managed for honey production and/or for pollination of food and non-food crops.

The health of bees, in the context of the strategy is concerned with anything that potentially harms honey bees, including bacteria, viruses, mites, insects, fungi and other pathogens which cause disease or feed on bees, as well as adverse effects caused by other threats such as undesirable species that prey on colonies, pesticides and habitat loss.

The strategy does not cover the broader stewardship of other species of bees and specific policies and initiatives on conservation and biodiversity but there is an overlap with agri-environment schemes.

Other policy areas relevant to managing the health of honey bees include food safety controls (regulations on residues in honey from pesticides and medications) and veterinary medicines controls. While these areas are outside the scope of the strategy itself, liaison and close co-operation with the relevant lead agencies is necessary to achieve the outcomes.

1.4 Island Dimension

Given that Ireland is an island there is an acute awareness of the need to co-operate closely with DAFF on bee health matters and to ensure that this co-operation is maximised in the best interests of maintaining bee health on the island of Ireland.

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1.5 Contribution to DARD's Strategic Objectives

The strategy will contribute to three of DARD's strategic objectives:

- To improve performance in the market place;
- To strengthen the social and economic infrastructure of rural areas; and
- To develop a more sustainable environment.



Part 2 - Roles And Responsibilities Of Stakeholders

2.1 Department of Agriculture and Rural Development

DARD contributes by intervening in honey bee health and guiding beekeeping where necessary in the public interest:

- To protect the health and welfare of the honey bees through inspection of hives and import controls;
- To promote the health and welfare of the honey bees through ensuring compliance with existing legislation;
- To protect the wider interests of crop production, the environment and society; in particular, through agri-environment schemes;
- To support the development, promotion and implementation of good practice through competency development programmes, co-ordinated with national and local associations and aimed at helping beekeepers to become more self reliant in controlling pests and disease and to aspire to higher standards of beekeeping;
- To provide quality assured diagnostic services on outbreaks of pests and diseases;
- To develop and implement a policy framework including regulations either in pursuit of national policies or EU and international obligations that are implemented in the most appropriate way;
- To work with stakeholders to achieve common aims, including effective communications with beekeepers;
- To use the most up to date evidence base for decision making and for informing policy and operations; and
- To provide contingency planning for the possible arrival of exotic pests and diseases and other emerging threats.

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2.2 Beekeepers

Beekeepers are responsible for the health and welfare of their bees and in the first instance for the management of pests and diseases. This duty of care includes understanding that pests and diseases in their bees could spread to other apiaries nearby and/or further afield. They contribute by:

- Recognising pests and diseases;
- Being vigilant and, in line with their legal obligations, reporting any suspicion of notifiable pests to their local Bee Inspector/DARD;
- Maintaining good husbandry and health practices to prevent and control the spread of diseases;
- Complying with legislation on controlling pests and diseases, including detention notices and import requirements;
- Using medications and treatments appropriately, including responsible storage, safe administration and recording;
- Ensuring that their skills and competence levels are appropriate to the above, and updating them through further training as necessary;
- Maintaining records on the movement and location of their colonies and making records available to inspectors on request; and
- Seeking advice from their local beekeeping association or from their Bee Inspector as available and necessary to help discharge these responsibilities.





Part 3 - Strategic Outcomes

This section describes the four strategic outcomes we, as stakeholders, are seeking to achieve in order to secure a healthy and sustainable population of honey bees. These outcomes are statements which look ahead and their main purpose is to provide a focus for our work.

3.1 Outcome 1 – Effective communications and relationships operate at all levels

Purpose

Effective communications and relationships are necessary in order to allow Government, beekeepers and their associations to share information, disseminate best practice, ensure optimum compliance with legislation, recognise pest and disease risk assessments and implement ideas for effective health controls. This will provide the opportunity to review priorities in partnership.

Current Actions

The College of Agriculture, Food and Rural Enterprise (CAFRE), Greenmount Campus formally meets with the Ulster Beekeepers (UBKA) on an annual basis to discuss strategic issues relating to provision of beekeeping training. This meeting is chaired by CAFRE Senior Management, usually the Director or Deputy Director. CAFRE, usually the Course and Senior Course Manager, also meets informally with the UBKA as required to discuss operational issues.

Beekeeping associations meet regularly with officials from Farm Policy Branch, Quality Assurance Branch and Agri-Food and Biosciences Institute (AFBI) as appropriate to discuss a range of issues.



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On a local basis there is regular contact between officials north and south at Inspector level to maintain communication links and to share information on bee health matters relevant to the border areas. This is particularly important in relation to any disease outbreaks which might occur and follow up actions in relation to location of hives and establishing surveillance zones.

Future potential actions:

DARD working with beekeeping associations and other stakeholders will review and as necessary strengthen existing liaison arrangements between all stakeholders.

DARD will continue and strengthen current liaison arrangements with other Departments and agencies such as Department for Environment, Food and Rural Affairs (Defra) and DAFF on honey bee health matters.

All partners to this strategy will develop and implement a co-ordinated communications strategy to support honey bee health and other related issues.

3.2 Outcome 2 – Effective surveillance and monitoring to minimise risks from pests, diseases and undesirable species

Purpose

The implementation of more effective surveillance and monitoring to minimise manageable risks from pests diseases and undesirable species is desirable but will only contribute to improved beehealth if all beekeeping stakeholder organisations and individual beekeepers take action in support of common objectives.

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Current Actions

Bee Inspectors in tandem with colleagues in AFBI, other Devolved Administrations and Fera continue to take measures to prevent the inadvertent import of pests and undesirable species and spread of these in the managed bee population. Bee Inspectors from Quality Assurance Branch (QAB), DARD carry out checks at individual apiaries. Current actions are complemented by an increased risk based assessment of bee health threats which result in focused inspections on risk areas, greater random inspections to cover problem notifiable diseases such as AFB, in addition to monitoring of entry point information on import of bees.

Minimising risk from pests, diseases and undesirable species is vitally important. DARD and AFBI continue to take measures to prevent the inadvertent imports of pests and undesirable species. DARD provides a competent and independent inspectorate. QAB Bee Inspectors are the authorised officers who carry out the required surveillance, inspection and certification required under the legislation. QAB Inspectors are appointed as authorised persons under the Bees (NI) Order 1980 and are independent of beekeepers and bee farmers and others who trade in bees and bee products.

3.2.1 Notifiable pests and diseases

Goal 3 of the DARD strategic Plan 2006-2011 is to enhance animal, fish and plant health and welfare. Bee Inspectors support DARD's goals through the implementation of Agri-food legislation and undertaking certification, inspection and enforcement duties. QAB Inspectors also provide technical support to policy in addition to providing guidance to the bee sector in relation to compliance with legislation. The QAB Business Plan has a target to complete 150 inspections and submit 110 samples to AFBI for diagnostics and confirmation of pests and diseases per year. With approximately 800 active beekeepers in the north of Ireland, this represents approx 20 inspections per 100 beekeepers. In England the target is around 32 inspections per 100 beekeepers and the figure is about 48 per 100 in Wales.



3.2.2 Varroa

The varroa mite (*Varroa destructor*) is a natural parasite of the Asian honey bee in South East Asia. It has since spread worldwide, except for Australia and New Zealand South Island, and causes major problems when it attacks the Western honey bee. It was first detected in Britain in 1992 and then on the island of Ireland in 1998. It is now endemic across much of Britain and the whole of Ireland. In view of its endemic status, varroa has been deregulated as a notifiable disease in Britain and the whole of Ireland in 2006, and is now managed as a part of normal beekeeping practice.

The mite is a comparatively large ectoparasite and feeds directly on the larval, pupal and adult bee's haemolymph (blood). Damage is caused by the weakening and death of bees, particularly in the brood cell, as well as the impact of bee viruses which are vectored by this parasite. If varroa is not controlled, colonies collapse within 1-3 years. In the north of Ireland, varroa remains the predominant problem within apiculture, with 97% of the north's beekeepers treating against the parasite. Varroa is treated by several methods; most commonly the synthetic pyrethroids, flumethrin (Bayvarol) and tau-fluvalinate (Apistan). Thymol and organic acids are also used as fumigants, although there are issues over the official approval of home-produced products. Use of open mesh floors in hives means that any live varroa mites falling from the colony cannot re-infest. Also removal of capped drone broods can aid in preventing a build-up of the parasites within the hive.

Of particular concern in Britain and the north of Ireland, is the development of varroacide resistant mites. Resistance to pyrethroids is now widespread in England and Wales and in many areas these products can no longer be used to treat varroa. Pyrethroid resistant varroa have not been detected in the north of Ireland, to date.





3.2.3 Brood diseases

Brood diseases, American and European Foul Brood (*Paenibacillus larvae* and *Melissococcus plutonius*) are notifiable diseases under the The Bee Diseases and Pests Control Order (NI) 2007. These are contagious bacterial diseases that kill the bee larvae within the hive. In the north of Ireland, AFB is the more common disease and is more severe. AFB spores germinate in the larval midgut and penetrate the body cavity. Infection results in death of the larva which degrades to brown goo. All colonies found to be infected with AFB are compulsorily destroyed as infectious spores can remain viable for at least 50 years. For European foulbrood (EFB) the bacterium resides in the larva's gut and competes with it for food. EFB does not form spores. Application of antibiotics (oxytetracycline) can be applied to control EFB outbreaks after the serving of a notice by DARD Inspectors. Alternatively shook swarming can be used to manage light infections of EFB.

3.2.4 Nosema

Nosema apis and *Nosema ceranae* are spore-forming intracellular microsporidian parasites. Adult bees are infected by ingesting spores, which germinate in the gut and infect the ventricular cells. The ability of the bees to absorb nutrition, particularly protein, is impaired. The disease causes increased mortality, poor honey yields, colony dwindling and is associated with bee dysentery. Although *N. apis* is a serious disease, *N. ceranae* is considered more virulent, as it is a newly emergent pathogen of the Western honey bee. *Nosema ceranae* has been found in Britain and the whole of Ireland in recent years. Treatment is by use of fumagillin (trade name Fumidil-B), which is effective against the vegetative stage but not the spores. Approximately 20% of northern Irish beekeepers treat with Fumidil-B.



3.2.5 Acarine

Acarine disease is caused by the tracheal mite *Acarapis woodi*, which infests the thoracic tracheae of adult bees. Mites puncture the tracheal walls and suck haemolymph. Infestation effectively blocks the bee's breathing, reducing activity and ultimately shortening the bee's lifespan. Infected bees are typically found crawling next to the hive unable to fly. Widespread mortality of honey bees in England in the early 1900's, thought to have been caused by tracheal mites, became known as the 'Isle of Wight disease'. Approximately, 6% of northern Irish beekeepers had problems with acarine in 2008/2009. Treatments which require veterinary practitioner approval can include the use of menthol, thymol or formic acid vapours, similar to those used for varroa, although again official approval for some products is problematic.

3.2.6 Viruses

Honey bee viruses are becoming an increasing problem. This may be due to better diagnoses of viral diseases using PCR and/or increased transmission of viruses by varroa. Eighteen different viruses infect honey bees. Amongst these are: sacbrood disease, acute paralysis virus, deformed wing virus, black queen cell virus, slow paralysis virus and Kashmir bee virus. Most are single-stranded RNA viruses belonging to Dicistroviridae or Iflaviridae families.

The presence of multiple viral infections is associated with Colony Collapse Disorder.



3.2.7 Colony Collapse Disorder

Colony Collapse Disorder (CCD) is a phenomenon in which worker bees from a beehive or honey bee colony abruptly disappear. While such appearances have occurred throughout the history of apiculture, the term CCD was first applied to a drastic rise in the number of disappearances of Western honey bee colonies in North America in late 2006.

Colony collapse was also widely reported in Europe in 2007, but it was considered that many of the examples were likely caused by high levels of the parasite *Nosema ceranae*.

The cause or causes of CCD are not yet fully understood, although many authorities attribute the problem to factors such as *Varroa* mites and insect diseases (i.e. pathogens). Other proposed causes include environmental change-related stresses, malnutrition and pesticides (e.g. neonicotinoids), and migratory beekeeping.

Recent research has found an association between multiple infection with picorna-like viruses (e.g. Israeli acute paralysis virus and deformed wing virus) and CCD. Whether this relationship is causal or symptomatic remains to be seen.

3.2.8 Imports of Queen Bees

ADAS research for Defra has concluded that importing bees and bee products is the activity which generates the greatest risk to the health of bees, since both Britain and Ireland have island ecosystems. Some level of importation of bees is desirable for breeding purposes and research. ADAS has suggested that banning imports or the introduction of punitive fees for imports would discourage honesty on the part of importers. EU legislation would prohibit this approach.

Under the legislation DARD has a responsibility to inspect 20% of imported bees.



3.2.9 Import responsibilities

Where honey bees have been imported from third countries, the beekeeper must comply with the post-import controls laid down in the Bee Diseases and Pests Control (Amendment) Order (NI) 2010. There is no official Border Inspection Post for bees within the north of Ireland. It is not possible to import from third countries directly with the result that imports come through Britain.

When the honey bees arrive at the apiary of destination (as indicated on the health certificate accompanying the honey bees), the consignee (named on health certificate) shall transfer the queen honey bees to new cages before they are introduced to any local colonies of honey bees; and send the cages in which the bees were transported from the country of origin, the attendant bees and other material that accompanied the queen bees from their country of origin to the AFBI lab for laboratory examination for the presence of a notifiable pest.

With no official Border Inspection Post for bees here, there are concerns that imports, especially from third countries, can exploit this situation, and it is intended that DARD will work strenuously with Defra and DAFF in achieving harmonisation in this area, and investigate both existing and potential legislation to control imports.

3.2.10 Native Bees

There are two issues of importance in relation to native bees. First, is the conservation of bees of direct relevance to agricultural production, namely honey bees and bumblebees. Second, is the conservation of bee species on agricultural land.

There is value in preserving locally adapted populations or ecotypes that have evolved traits that are advantageous within specific regions. Importation of queens and movement of colonies can result in introgressive hybridisation, leading to the loss of genetic

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diversity. The European ‘black bee’, *Apis mellifera mellifera*, has been present in the British Isles for at least 4,000 years. The Irish ‘black bee’ is a locally-adapted strain of *A. m. mellifera*.

Efforts to maintain the genetic diversity of native honey bee populations have been conducted elsewhere in the European Union. Most notably in Denmark, the island of Læsø, was used to develop a conservation breeding programme for the Danish brown honey bee. However, there was some resistance from a few beekeepers, who objected to the ban on importation of alternative strains.

DAFF continues to fund a number of genetics research projects including a number of bee-related projects under the ‘Scheme for the Conservation of Genetic Resources’. DARD will monitor the outcomes of these projects and review results appropriately.

3.2.11 Registration of Beekeepers

The USA, Belgium, France, New Zealand and South Africa, amongst others, have made the registration of beekeepers and/or their individual hive locations compulsory.

The BeeBase database in Defra, which went live in 1992, holds data on some 17,500 active beekeepers (out of around a total 33,000), including data on inspections and laboratory samples submitted by beekeepers. The database was revised and a website set up in 2005, and is developed and maintained in conjunction with the National Bee Unit (NBU). It allows beekeepers to access their own apiary, diagnostic histories and details over the web. Beekeepers can request a free apiary visit from a local inspector via the service. However this does not cover the north of Ireland. QAB have made efforts to maintain a database from inspections and local knowledge. There is, however, no resource committed to assist with the development of the database or the additional administrative burden associated with the operation and modification of the database. It is strongly recommended that adequate resources are made available and committed to assist with the development, administration, updating and sharing of such a database and that this database should

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be made available for education, husbandry development and disease control use by Bee Keeping Associations. The development of an accurate database of local beekeepers would also assist in the dissemination of guidance and allow for the tracing of bees in the event of serious disease outbreaks.

The NBU provides valuable services, training and publications through QAB staff to local beekeepers and would wish to see this continuing with the training aspect also being made available for programmes of training for course teachers.

In Scotland, the SBA also strongly supports the development of a database of beekeepers and believes that the compulsory registration of all beekeepers is required for development of any meaningful record. The SBA feels that registration should not involve costs to beekeepers and should come with practical incentives.

QAB Inspectors are maintaining a database of beekeepers following inspections combined with existing knowledge of locations.

At the time of writing there are around 13,000 participants in agri-environment schemes (see Section 3.4 Outcome 4 for more details of agri-environment schemes) covering 42% of the agricultural land area in the north of Ireland.

Future potential actions

- Continue to raise awareness among beekeepers of notifiable pests and exotic pests;
- Develop a risk based assessment of disease entry risk and focus inspection activity on these areas;
- Strengthen the enforcement of and compliance with existing regulations on disease control and on the importation of queens and honey bees especially when imported through Britain from other member states;
- Monitor and investigate the causes of serious colony loss where initial screening indicates a significant need exists;

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- Contribute to the development and spread of sound bee husbandry guidelines and standards of bee husbandry;
- Strengthen and improve the education of beekeepers and husbandry standards by co-ordination of competency programmes and industry awareness initiatives; and
- Encourage local breeding of robust strains of bees to improve health and minimise the impact of disease on the local bee population.

3.3 Outcome 3 – Competency development in good standards of beekeeping and husbandry to minimise pests and disease risks and contribute to sustaining honey bee populations

Purpose

In order to promote and improve bee health, it is important that beekeepers establish their competence in honey bee husbandry and health management, and continue to develop their skills and knowledge.

Competency development activities aimed at improving the standards of beekeeping and husbandry are essential towards delivering the strategy's aim and outcomes. Minimising disease through good husbandry should help maximise honey production and income.

Current Actions

The College of Agriculture, Food and Rural Enterprise (CAFRE) delivers and assesses accredited Preliminary and Intermediate Beekeeping Courses (Federation of Irish Beekeepers Association-approved). This training and assessment has been part-financed through the 3-year UK National programme for improving the production and marketing of apiculture products in accordance with Council Regulation (EC) No 797/2004: 2011 to 2013.

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The Apiculture Programme focuses on improving the ability of beekeepers to detect and control notifiable pests and diseases of bees. DARD, through CAFRE, Greenmount Campus is tasked with organising courses at various centres to meet this need for information and advice on disease recognition and control. It is anticipated that during the 3 year period of the programme that there will be 3-4 Preliminary and 1 Intermediate Beekeeping Courses delivered each year, subject to demand and available resources.

The Preliminary Course is a practical and informative course delivered over 10 evenings providing the necessary knowledge and skills to get established in beekeeping. It is applicable to anyone new to or interested in keeping bees who wants to learn more about the craft. The course is both theoretical and practical and covers the following areas:

- Manipulation of a colony of honey bees;
- Understanding the construction and siting of hives and colonies;
- Natural history of the honey bee and colony structure;
- Examination of the colonies cyclical calendar;
- Examination of colony diseases and signs of poisoning; and
- Harvesting the colony.

The Intermediate Course builds significantly on the knowledge acquired on the Preliminary course and aims to improve the understanding a beekeeper has of both the practical and scientific aspects of beekeeping. This course is for applicants who have achieved the Federation of Irish Beekeepers Association (FIBKA) Preliminary Beekeeping Certificate. The course is delivered over 30 sessions (15 practical and 15 scientific sessions).

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The course covers practical and scientific sessions:

Practical sessions:

- Migratory Beekeeping;
- Queen rearing;
- Management of nuclei;
- Disease and pest control;
- Equipment;
- Preparation of honey and wax for show; and
- Legislation and Starting up in Beekeeping.

Scientific sessions:

- The external and internal features of the honey bee, its life cycle, and the work done;
- methods of communication;
- reproduction;
- brood and adult bee diseases;
- pollination; and
- honey and swarming.

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Out-turn

To date, CAFRE has delivered on the targets as specified in the current Apiculture Programme. In 2008, 3 Preliminary Courses were delivered to 56 participants. One Intermediate Course was delivered to 19 participants. In 2009, 3 Preliminary Courses were delivered to 59 participants and one Intermediate course to 27 participants. In 2010, 3 Preliminary Courses were delivered to 72 participants and one Intermediate Course to 26 participants.

Due to limited availability of suitably qualified supply instructors and an increased demand for training, CAFRE, in association with the UBKA, launched an 'Innovative Pilot exercise' whereby UBKA provided trainers and venues and CAFRE provided administrative and educational support for delivery. In 2009 this allowed a further 3 Preliminary Courses to be delivered to a further 55 participants and in 2010 allowed a further 5 Preliminary Courses to be delivered to 105 participants and a further 2 Intermediate Courses to 30 participants.

Future Potential Actions

It is anticipated that during the 2011-2013 Apiculture Programme there will be a further 3 Preliminary and one Intermediate Courses organised and delivered by CAFRE each year. As there is still increasing demand for these courses and CAFRE does not have the resources to recruit further supply instructors, it has been agreed that the 'Innovation Pilot exercise' will also continue.

CAFRE continues to work with UBKA to develop higher level courses and an education and training programme that encourages and enables more beekeepers holding a Preliminary Certificate to continue studying and developing their beekeeping knowledge and skills. This higher level of study is considered to be the necessary competence envisaged in references throughout this document.



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The next three year Apiculture Programme has been finalised by the European Commission, with £56,454 allocated to Northern Ireland over the 3 year period.

3.4 Outcome 4 – Sound science and evidence base underpins bee health policy and its implementation

Purpose

A well-developed science and evidence base, drawing on all potential sources of information, will improve our understanding of pest and disease risks and produce effective response and management methods for serious honey bee health threats.

Current Actions

Applied entomological research in the north of Ireland is conducted by AFBI, Queen's University Belfast and the University of Ulster, along with several charities (e.g. Butterfly Conservation) and the NI Environment Agency. Given the size of the north of Ireland, to prevent duplication, there is a natural division of labour between those working in agricultural entomology.

AFBI is the statutory laboratory for bee health in the north of Ireland, providing free of charge diagnostic support to DARD's bee health inspectorate and beekeepers. This mainly involves identification of American and European Foul Brood, acarine disease, nosema and varroa mite pyrethroid resistance testing. AFBI maintains a diagnostic capability for amoeba disease, some viruses (sac brood and Acute Paralysis Virus) and fungal diseases (chalkbrood and stonebrood) but these are rarely submitted. AFBI's work in this area is predominantly diagnostic. AFBI's entomological research expertise lies in integrated pest management, invasive species, vectors of animal diseases and pesticide usage.

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The School of Biological Sciences at Queen's University Belfast maintains a specialist bee research group. This group is active in social insect molecular genetics, pollination, genetics of bee diseases and bee conservation in Ireland. For example, the group developed the genetic markers that differentiate between *Nosema apis* and *Nosema ceranae*, revealing that *N. ceranae* is a relatively recent 'emergent pathogen' of the honey bee. The group has also been heavily involved in production of the 'Regional Red List of Irish Bees', which provides a checklist of Irish bee species and their conservation status.

The current juxtaposition of University bee researchers and the diagnostic laboratory at AFBI is fit for purpose and cost-effective. The arrangement provides a continuum between academic research, AFBI and DARD Bee Inspectorate. Research is often highly specific and there is a need to translate research findings into applicable practices. There is also considerable worldwide research into honey bees that could be utilised in the north of Ireland. The DARD Evidence and Innovation Strategy 2009-2013 emphasises the cost-effectiveness of utilising research from elsewhere. This, however, should not preclude targeted local research. An example of the latter has been DARD's decision to award a postgraduate studentship to Dr Paxton's laboratory. This PhD project will examine issues surrounding bee conservation with DARD Countryside Management Branch and also research pollination in Bramley apple orchards in conjunction with AFBI.

Agri-Environment Schemes

Agri-environment schemes have clear objectives:

- to maintain and enhance biodiversity in line with the NI Biodiversity Strategy and the NI Programme for Government 2008-2011 by maintaining species diversity through the positive management of farmland habitats and to protect and enhance ASSI/Natura 2000 sites;
- to assist implementation of the Water Framework Directive; and
- to enhance landscape and heritage features by integrating their management into the everyday workings of the farm.

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There are a number of options in DARD's agri-environment schemes that encourage participants to manage habitats which benefit the bee population in general – both honey bees and bumblebees.

These areas of managed habitat are taken out of agricultural production and include:

- Pollen and nectar mixture containing a mix of legumes flowering at different times to provide a habitat with a continuous supply of pollen and nectar for bees, butterflies and other insects. This is a new option and is only available to participants in the new NICMS which was launched in June 2008;
- Rough grass margins where minimal disturbance benefits ground nesting bees – 300ha at June 2009;
- Conservation cereals with reduced pesticide and herbicide input – 370ha at June 2009;
- Tree planting and planting of traditional orchards where apple trees, rowan, whitebeam, hazel and holly are pollinated by bees – 70ha of traditional orchards planted and 600ha of grass margins planted with trees at June 2009;
- Wild bird cover which contains kale and weeds of arable land which may be pollinated by bees – 1,700ha at June 2009;
- Hedgerow restoration where hawthorn, gorse and blackthorn are all pollinated by bees – around 500km per year of hedgerows restored at June 2009; and
- Responsible management of field boundaries, in particular, cutting on a rotational basis to encourage flowering and berry production.

Future Potential Actions

Determining research needs specific to the north of Ireland would initially be a desk-based exercise and would involve a degree of consultation with the beekeeping associations/institute and other stakeholders such as the top fruit industry. It is important that research is focused and that there are clear mechanisms for implementation. It is likely, initially, that studies would seek to collect base-line data on bee health and pollinator efficacy. Other aspects would be to produce guidelines on best practice with regard to pest

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and disease management. It should be borne in mind that there is much research published worldwide on honey bees, which could be adapted for use in the north of Ireland.

AFBI have already conducted a 'Bee Husbandry Survey', the results of which will inform this strategy as it develops. It is considered that this survey, with the support of DARD, will be conducted on a regular basis, to provide ongoing baseline data on bee health in the north of Ireland. AFBI have also started to test submitted samples for *N. ceranae*.

Queen's University have two collaborative projects submitted to the 'Insect Pollinators Initiative'. In addition, they have recently been notified that they will receive European Union Seventh Framework Programme funding for bee health research, which commenced in April 2010. This project 'Bees in Europe and the Decline of Honeybee Colonies' (BEEDOC) is a partnership of 11 European laboratories and will seek to fill knowledge gaps in honey bee pests and diseases, including the 'colony collapse disorder' and quantify the impact of interactions between parasites, pathogens and pesticides on honey bee mortality.

AFBI, DARD Bee Inspectorate and QUB researchers have been proactive in disseminating scientific information to beekeepers. This has normally been by talks given to local associations and presentations and information stands at conferences.

With regard to agri-environment schemes, since pollen and nectar mixture is a new option, DARD Countryside Management Delivery Branch, in association with a QUB PhD student, will be monitoring a number of plots of pollen and nectar mixture sown in spring and autumn 2009 both at Greenmount Campus, CAFRE, and on farms under the new NICMS. Information gathered will help DARD to provide farmers with advice on pollen and nectar relevant to their locality.

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Emphasis must be placed on the health issues affecting the bees, including funding for research into local implications, but we should ensure that the wider issues of good countryside management of bee foraging strategies, funding systems promoting management practices which support thriving bee populations and recognition of the huge role that honey bees play in the natural environment – as well as the major supportive role that the natural environment provides for bees – are fully recognised as vital components of this strategy.

Part 4 – Proposed Actions

In taking this strategy forward, DARD proposes to work with all stakeholders through a representative working group to ensure delivery on the four identified outcomes, as follows:-

Outcome 1 – Effective communications and relationships operate at all levels

To achieve this outcome DARD will work with beekeeping associations and other stakeholders to strengthen liaison arrangements between stakeholders including agencies such as Defra and DAFF through development and implementation of a communication strategy on honey bee health matters.

It is also intended to hold an annual meeting with DAFF similar to that in place for potatoes and plant health. This will further enhance co-operation between DAFF and DARD/AFBI and will facilitate discussion on both operational and policy matters relevant to both jurisdictions.

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Outcome 2 – Effective surveillance and monitoring to minimise risks from pests, diseases and undesirable species

To achieve this outcome DARD proposes to work towards the implementation of effective surveillance and monitoring to minimise risks from pests diseases and undesirable species, by:

- Continuing to raise awareness among beekeepers of notifiable pests and exotic pests;
- Developing a risk based assessment of disease entry risk and focus inspection activity on these areas;
- Strengthening the enforcement of existing regulations on disease control and the importation of queens and honey bees;
- Monitoring and investigating the causes of serious colony loss where initial screening indicates a significant need exists;
- Contributing to the development and spread of sound bee husbandry guidelines and standards of bee husbandry;
- Strengthening and improving the education of beekeepers and husbandry standards by co-ordination of training programmes and industry awareness initiatives; and
- Encouraging the breeding of local strains of bees to improve health and minimise the risk of disease import.

Outcome 3 – Competency development in good standards of beekeeping and husbandry to minimise pests and disease risks and contribute to sustaining honey bee populations

To achieve this outcome it is proposed that further planned training will be progressed. It is also proposed that the current Innovation Pilot exercise with the UBKA on training delivery will also continue.

As the previous Apiculture Programme ended on 30 August 2010, it is proposed as suggested by the UBKA to change the delivery of beekeeping training. After consultations with CAFRE, it is proposed that all Preliminary and Intermediate beekeeping training will be

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arranged and delivered by the UBKA. The UBKA wish to progress the development and delivery of a Senior Beekeeping Course in the north of Ireland. Subject to the availability of resources, CAFRE will provide educational expertise to support the development of the Senior Course.

In the shorter term successful delivery will also require and benefit from recruiting, at a cost, outside specialists in subjects and course developments.

Outcome 4 – Sound science and evidence base underpins bee health policy and its implementation

In order to achieve this outcome it is considered that determining research needs specific to the north of Ireland will initially be a desk- based exercise and involve consultation with the beekeeping associations/institute and other stakeholders such as the top fruit industry. It is important that research is focused and that there are clear mechanisms for implementation. It is likely, initially, that studies would seek to collect base-line data on bee health and pollinator efficacy. Other aspects would be to produce guidelines on best practice with regard to pest and disease management, it should be borne in mind that there is much research published worldwide on honey bees, which could be adapted for use in the north of Ireland.

CAFRE has vast experience of technology transfer techniques and this should be made available where appropriate in translating research findings into locally applicable practices.

DARD and CAFRE will aim, where resources permit, to fully support and help sustain UBKA's efforts to develop competency.



Glossary of terms

| | |
|-------|--|
| AFB | American Foul Brood |
| AFBI | Agri-Food and Biosciences Institute |
| CAFRE | College of Agriculture Food and Rural Enterprise |
| CCD | Colony Collapse Disorder |
| DAFF | Department of Agriculture, Fisheries and Food |
| DARD | Department of Agriculture and Rural Development |
| DEFRA | Department for Environment, Food and Rural Affairs |
| EFB | European Foul Brood |
| FERA | Food and Environment Research Agency |
| NBU | National Bee Unit |
| NICMS | NI Countryside Management Scheme |
| QAB | Quality Assurance Branch (DARD) |
| SHB | Small Hive Beetle |
| UBKA | Ulster Beekeepers Association |
| INIB | Institute of Northern Ireland Beekeepers |



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