

New Project Summary Report for FV 426: Review of the costs of woodpigeon damage to brassicas, salad crops and oilseed rape and effectiveness of management activities.

Project Number	31304260
Title	A review of the costs of woodpigeon damage to Brassicas, salad crops and oilseed rape and the effectiveness of management activities.
Short Title	FV 426
Lead Contractor	AHVLA
Other Contractors	
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Industry Representative	Mr Matthew Rawson
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AHDB Contribution	£26,585

The Problem

The woodpigeon population in the UK has grown by 80% over the last 25 years. The population was estimated at 5.4 million pairs in 2009. As an herbivorous species that is capable of breeding through much of the year, wood pigeons have a substantial impact on agricultural crops. There is a requirement for the extent of the damage and possible mitigation measures to be reassessed as this was last carried out a number of years ago and has mostly focused on the impacts on cereal crops and oilseed rape. The potential risks posed to brassicas and salads, where any crop damage stays with the plant through its life reducing yield and appearance is as yet not fully understood.

The project proposed here aims to review and quantify the range and extent of damage caused by wood pigeons to brassicas, oilseed rape and salads, through a review of the published and grey literature and through consultation with growers. A second review will be carried out concurrently, looking at management techniques for woodpigeons and other avian pests, both within the agricultural industry and in other industries such as bird management on airfields. As a component of this, investigations will be carried out to identify any novel or emerging technologies that could be applied to the problem of woodpigeon damage to crops. The information from the two reviews will be synthesised in order to assess the cost-effectiveness of potentially suitable management measures on a financially sustainable basis.

There will be a number of outcomes from this research, including:

- A comprehensive quantitative review and assessment of the damage caused by woodpigeons to the selected crops.
- An assessment of avian pest management techniques in the agricultural industry and in other industries that could be applied to this problem.
- The development of best practice guidelines for woodpigeon management. This will include an economic assessment which will inform the most cost-effective deployment of management measures.
- An assessment of novel and emerging technologies that could potentially be applied to the problem.
- Identification of further research requirements necessary to realise practical management techniques, including field trials of the most promising management measures.

The results produced from this study will facilitate discussion and debate through a national woodpigeon forum proposed by HDC for 2014.

Benefits to industry

Understanding the status quo: Estimates of the damage and resultant financial losses caused by woodpigeons will provide a baseline against which management activities can be measured.

Effective decision making: The costs of damage versus the costs of control (and the effectiveness of that control at reducing damage) will allow crop growers to best decide how and when to apply control techniques, thus maximising the cost-effectiveness of management measures.

Best practise: There may be techniques that are currently used within agriculture that are not being deployed in a manner consistent with best practice identified from the literature. In the event of such circumstances, modification to the mode of deployment (e.g. timing, intensity and duration) of existing management measures may enhance their cost-effectiveness. Outputs from the project will summarise and make more likely the utilisation of best management practises within the scope of management techniques currently available to date.

Technique adaptations: Techniques currently not used within the industries but used in agriculture or avian pest management generally, both within and outside the UK may be identified as potential candidates for mitigating woodpigeon damage. For example, the use of lasers is unexplored in agricultural pest management, but is used widely in reducing birdstrike risk in aerodromes. Similarly, many airports deploy gas cannons and pyrotechnics whenever problem birds come into view. From a cost-benefit perspective, each airport will assess the risk and develop a management programme to reduce their liability by ensuring a safe operating environment. Within agriculture, a similar process might facilitate the understanding of what level of control might be possible.

Communication: The project outputs will inform a national woodpigeon management forum proposed by HDC. Even beyond the lifespan of this project, this will allow healthy debate, the development of shared management strategies for this and perhaps other pests, and the advancement of woodpigeon management techniques.

Aims and Objectives

The overarching project aims are:

- To review evidence for the extent and magnitude to which woodpigeons *Columba palumbus* cause serious damage to agricultural crops - specifically brassicas, salad and oilseed rape.
- To review evidence regarding the cost-effectiveness of management measures to mitigate the impact of woodpigeon damage to agricultural crops – specifically brassicas, salad and oilseed rape.

Objectives:

- To review and summarize the current knowledge, both from peer reviewed and grey literature on the impacts of woodpigeons on brassicas, salad and oilseed rape.

- To undertake a consultation with growers to collate information on the magnitude and extent of crop damage as perceived by the industry.
- To review and evaluate the current techniques available to mitigate avian pest damage to agricultural crops.
- To undertake a cost-benefit analysis on the basis of the data collated in the reviews of damage and management measures.
- Identify requirements for any further research necessary to realise practical management strategies for woodpigeons. For example, to identify the most promising techniques that could be evaluated in future field trials (such field trials are outside the scope of the present study).

Approach

Review of crop damage

Research

Information for both reviews will be obtained by a comprehensive literature search. This will incorporate a search of the peer reviewed academic literature using standardised search engines such as the ISI Web of Knowledge. In addition AHVLA also has access to a wide range of literature databases such as Biosis and SciSearch.

Internet search engines will be used to locate further, unpublished articles relating to woodpigeon impacts; links to relevant web-sites listed in sourced articles will also be visited. AHVLA's Wildlife Team also has an extensive collection of information relating to bird damage and control and links to overseas experts, which will be exploited.

All relevant references that are identified in these searches will then be reviewed and the following information extracted, as far as possible: the country, the affected crop, surrounding habitat, period over which damage occurs (i.e. seasonal damage), period of day during which damage occurs (i.e. diurnal pattern), spatial pattern of damage (i.e. margins or centre of field), yield loss and/or economic loss and whether loss was inferred or measured.

There will be liaison with Natural England's Wildlife Management and Licensing Service (NEWLMS), which is responsible for assessing licence applications to control 'pest' birds. This will be to ascertain the level of interaction the Service has with growers concerning complaints and/or advice in relation to woodpigeon damage and their management.

As a part of this study, a series of ARCGIS databases will be developed to explore woodpigeon crop damage spatially at a landscape scale. These will be built of a number of layers, incorporating:

- Land-use, in particular agricultural land use
- Woodpigeon distribution
- Actual and perceived levels of damage as elicited from the literature and from consultation with growers (as described below).

Eventually, data permitting, it is hoped that economic hotspots of woodpigeon damage can be identified across the country. Thus any control recommendations can incorporate a landscape scale spatial element.

Consultation

A phone-based consultation exercise will be designed in collaboration with HDC and industry representatives. This will then be carried out with a sample of stakeholders identified by HDC, and will incorporate a range of questions, ranging from quantifiable data, through to qualitative/subjective assessments and personal experience. The questions will cover the following areas:

- Farm location, size and crop type
- Surrounding habitat
- Crop yields

- Crop loss due to woodpigeon damage
- Perceived levels of woodpigeon populations seasonally
- Techniques already used to mitigate damage
- Perceived levels of success with different techniques

It is anticipated that in the first instance consultations will be undertaken with no more than 10 members from each of the three stakeholder groups; brassica growers, oil seed rape growers and salad growers. The form of analysis of the data cannot be confirmed until the extent and nature of this data becomes apparent; enabling an assessment of the relative suitability of quantitative or qualitative descriptions.

Review of mitigation and management techniques

A literature search using the same methodology as for crop damage will be used to identify management techniques which are either currently in use, or have been previously used against woodpigeons in an agricultural context. In this, both deterrent techniques and population control techniques will be included. Deterrent techniques can be categorised into auditory, visual, chemical, exclusion, habitat modification and lethal. The aim of deterrent techniques is to prevent or reduce the utilisation of a vulnerable site or commodity by the target species, with no overt attempt to reduce the size of the overall population. Conversely, population control techniques seek to directly reduce the population, through lethal (e.g. shooting) or non-lethal means (e.g. fertility control).

The information gathered will be collated and summarised. For each study, the following information will be extracted: the category of deterrent, type of treatment/device, the country in which the work was conducted, whether it was a field trial, laboratory study or a review, the degree of effectiveness and whether any cost/benefit analysis had been carried out.

There is a very extensive body of literature relating to the management and control of avian species. Much of this, however, is not directly relevant to the present study as it relates to species and circumstances unrepresentative of the issue of woodpigeon impact on agricultural crops (e.g. bird control at fisheries, land-fill sites and airports). However, to ensure that all potential techniques are considered the review will include studies that have investigated potentially promising control techniques against other avian species in other settings and circumstances that might potentially be adapted to the agricultural context under consideration.

Evaluation of mitigation and management techniques

It is anticipated that investigations into mitigation and management techniques will include a range of types of study, including replicated field trials and pilot studies on free-living populations and cage or pen trials with captive birds. These different types of study provide varying levels of evidence to support (or not) the efficacy of a treatment. The most robust data is provided by controlled, replicated field trials and the least by cage trials on captive birds. The latter trials are designed to maximise expression of the deterrent effect and results are often not repeated when controlled and replicated field trials are carried out.

The evaluation will rate each study in terms of selected parameters, such as context, treatment, experimental design, results and cost/benefit analyses. The *context* will be in terms of the resource affected and the country and habitat in which the study took place; the *treatment* will relate to the rate of application considered in terms of the practicality of use and in relation to existing legislation or codes of practice; *experimental design* will relate to levels of control and replication and confounding factors which may have influenced the findings; *results* will be in terms of the degree of reduction in damage or numbers of birds; and *cost/benefit analysis* will relate to the degree of quantification of cost and benefits.

Future research requirements

Overall, the proposed approach will provide a comprehensive review of the magnitude of crop damage posed by woodpigeons to agriculture in England, and a review and evaluation of potential techniques to mitigate these impacts and manage populations. The evaluation of management measures will inform which techniques are potentially most appropriate for the woodpigeon-agricultural context in England.

However, it is highly likely that field trials would subsequently be necessary to evaluate the effectiveness of the most promising techniques under specific field conditions. Furthermore, the review may also identify opportunities to develop novel tools potentially suitable for mitigation of problems posed by wood pigeons. A key outcome of the project will thus be specifying any further research requirements necessary to realise practical management techniques.

Advisory publication

In addition to the final project report, a separate draft advisory publication will be produced on management measures to mitigate the impact of wood pigeons on agricultural crops. The publication will synthesize the findings from the study in respect to the cost-effectiveness of control techniques in order to facilitate the deployment of best practice amongst stakeholders.

National woodpigeon forum

This project will integrate with a HDC-proposed National Woodpigeon Forum incorporating relevant stakeholders, such as growers, their representative bodies and allied industries. Results from the study will be disseminated to the forum which will be a medium for ongoing discussions into best practise, exchange of ideas and knowledge transfer.