

SUMMARY ARTICLE

Climate Change Pests and Disease: Arable

Building a successful strategy to safeguard against increasing climate change related threats from pests and disease in arable cropping will be key to maintain future arable yields. It will help to position the arable sector in an optimal position to realise future opportunities for agricultural development. Taking a proactive stance in the face of climate change and considering implementing adaptations now and integrating them into forward planning will benefit the arable sector.

The majority of arable land in the Cheviot Hills area is located on the fringes of the hills. The main crops grown include wheat, barley, oil seed rape and potatoes. These are grown mainly on the more productive land to the south and east of the Cheviots.

Climate change will affect the Cheviots with drier summers, wetter winters and increased temperatures predicted. These climate changes will present challenges for the arable sector in the area.

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Impacts of Climate Change on Pest and Disease Pressure

The table below summarises some of the key existing and new 'Alien' pests and diseases and how they may be affected under changing conditions. This list is by no way exhaustive but trends highlighted by these diseases and pests maybe typical to a range of other pathogens.

Risk	Consequences
Aphid vector	Warmer temperatures will increase Aphid multiplication and therefore populations. This will create more spread of disease both within regions and throughout the country.
Brown Rust	This is likely to increase with milder winters, and become more widespread in the Cheviots. Early sowing will accelerate this further, via the green bridge from previous crops.
Fusariums	Already present in the Cheviots it is likely this will continue, with the possibility of more serious mycotoxins not presently common in the UK.
New 'Alien' pest problems	With warmer winters there will less opportunity for winter kill of harmful pests. For instance the Colorado Beetle could survive in the region by 2050 if temperature predictions are realised.
Grass weeds	The threat of grass weeds in the arable rotation is not a new one, but may increase as a result of earlier crop establishment. The potential reduction in herbicide choice would add to this effect. Weeds such as blackgrass are predicted to spread further northwards.

Potential Adaptations for the Arable Sector

Research has already taken place on how crops will respond to a range of different circumstances. Work has taken place in order to investigate the possibility of breeding crops which can respond well to a host of new challenges. Alongside this is an armoury of other research such as research into further chemical treatments which will help to combat the risk to future yields. There are also many management steps that can be taken to minimise the risks posed from pest and diseases.

The exact extend of such method to limit impacts vary wildly between individual crops and the specific field location. However key potential adaptations include:

1. Alter timing of sowing, harvesting and spraying activities.

The research has highlighted that climate change will enable sowing and harvesting regimes to be altered for example early sowing of crops may be possible. Careful consideration needs to be given to sowing and harvesting dates to ensure risk is minimised or that crop spraying regimes are adjusted accordingly.

2. Use varieties of crop more resilient to pest, weeds and diseases

Crop breeding and genetics is leading to the development of varieties of crops that have resilience to certain diseases and pests.

3. Improve understanding and recognition of crop diseases, pests and weeds.

Farmers should take steps to improve their understanding of, ability to recognise and knowledge of available control methods for different crop diseases, pests and weeds. Early identification of diseases may help to prevent losses as will taking timely and appropriate control steps.

4. Improved pesticide, herbicide and fungicide strategies and application techniques.

Key to controlling disease, pests and weeds will be the appropriate application of herbicides, pesticides and fungicides. Consideration should be given to the correct application rates and timings of applications. Reliance on forecasting and modelling may become more important. New precision techniques may become useful to better target applications.

5. Utilise monitoring and early warning systems.

There is a need to develop more monitoring and early warning programmes for the diseases, pests and weeds likely to flourish under climate change in the Cheviots. Having monitoring and early warning systems in place will allow better use and timings of applications and therefore improved control of pest and diseases in arable crops.

6. Use of Integrated Pest Management Control

The use of biological controls for management of pests, diseases and weeds will become more important. For example Integrated Pest Management (IPM) may become more widely adopted.

7. Consider crop rotations

Crop rotations should be planned to help reduce the risk of transferring crop diseases between crops.

8. Cultivations and Cultural controls

Farmers should aim to utilise cultivations and cultural controls as a means to improve weed control. For example focus should be given to creating a quality stale seedbed through good cultivation, consolidation and appropriate timing of roundup applications.

As research continues into the threats of climate changes there will be no doubt further developments in the range of adaptive measures available. It is likely many commercial companies will develop new products such as chemical sprays to treat crops in order to combat yield losses. Alongside this, crop breeding work is already taking place in order to provide more robust and stress resilient varieties. This is welcomed and needed but there is also a role for more publically funded research initiatives to find further solutions which do not rely on inputs.

In the meanwhile there is already an increasing amount of information available to help guide farmers. Early forecasting of pest and disease hotspots will provide perhaps the most powerful tool in ensuring crops achieve their full potential.