

Project title	Cutworm forecast: programming into Morph
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Project leader:	Dr Rosemary Collier, University of Warwick
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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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GROWER SUMMARY

Headline

A cutworm forecast has been incorporated into the MORPH decision support software and output from this forecast is available currently on the HDC Pest Bulletin website - <http://www2.warwick.ac.uk/fac/sci/whri/hdcpestbulletin/cutworm/>.

Background and expected deliverables

A paper published in 1983 (Bowden et al. 1983) describes the relationships between insect development, survival and weather variables (temperature and rainfall) that were used subsequently to develop a forecast for cutworm (turnip moth – *Agrotis segetum*) survival in the UK. The model estimates larval survival to third instar based on temperature-rate relationships and on mortality attributed to daily rainfall.

The aim of this project was to use the parameters described in this paper to incorporate a cutworm forecast into the MORPH decision support software. The appropriate equations had already been written for a Defra project at Warwick HRI, to predict the effect of various climate change scenarios on cutworm 'risk' (AC0301 - Vulnerability of UK Agriculture to Extreme Events), but they needed to be coded into the MORPH software so that the model can be run using real time weather data.

Summary of the project and main conclusions

A cutworm forecast based on the paper by Bowden *et al* has been incorporated into the MORPH decision support software. The model requires daily records of the air maximum and minimum temperatures and of rainfall. Output from the cutworm model has been interpreted and published on the HDC Pest Bulletin website during the 2008 season. This 'trial run' of the forecast will lead to some minor modifications of the output to aid interpretation and a more comprehensive 'HELP' document will be produced.

Financial benefits

Cutworms are sporadic but severe pests of a range of crops including lettuce, leek and red beet. Treatment is not essential in every location, every year and the cutworm forecast helps growers to target treatments, thereby making best use of resources.

Action points for growers

- Growers can find the output and interpretation of the cutworm forecasts on the HDC Pest Bulletin website - <http://www2.warwick.ac.uk/fac/sci/whri/hdcpestbulletin/cutworm/>.
- Feedback to Rosemary Collier (rosemary.collier@warwick.ac.uk) is very welcome.

Reference

Bowden J, Cochrane J, Emmett BJ, Minall TE, Sherlock PL (1983) A survey of cutworm attacks in England and Wales, and a descriptive population model for *Agrotis segetum* (Lepidoptera: Noctuidae). *Annals of Applied Biology* 102: 29-47