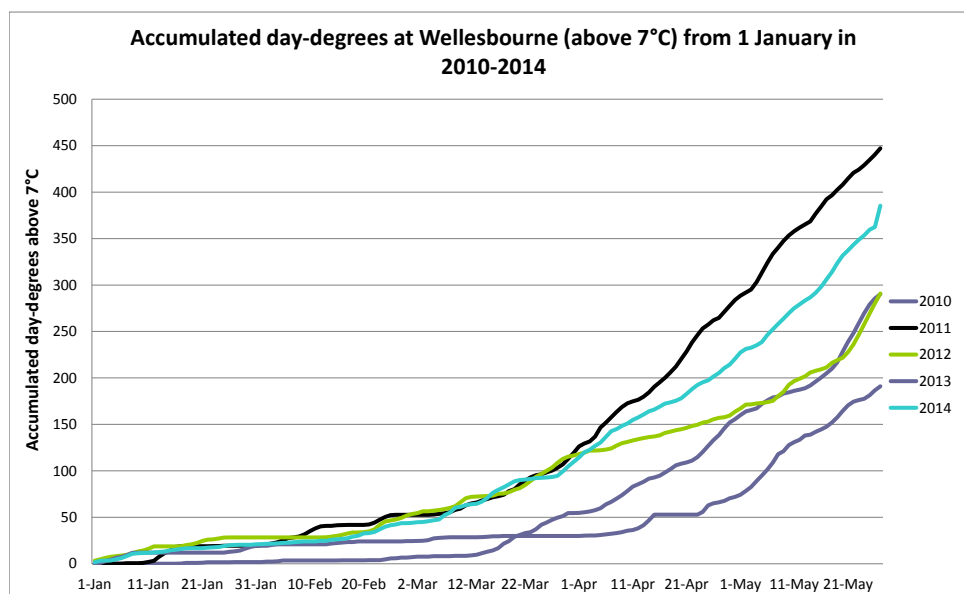


CUTWORMS

CUTWORM (TURNIP MOTH) UPDATE – 30th JUNE 2014

See the HDC pest blog for monitoring updates <http://blogs.warwick.ac.uk/rosemarycollier/>.

We captured our first male turnip moth in our pheromone traps at Wellesbourne between 20th and 23rd May. Several years ago, data on trap captures in 2005-7 were used to estimate a day-degree (D°) sum for the start of flight activity. This was 340 D° above a base of 7°C. The graph below shows accumulated day-degrees for 2010-14. The day-degree sum on 23rd May 2014 was 348 – so very close to the 340 D° sum.



Moth captures in our pheromone traps at Wellesbourne (2 traps) are shown below:

	Turnip moth
13 May	0
16 May	0
20 May	0
23 May	1
27 May	10
30 May	2
3 June	1
6 June	0
10 June	1
13 June	0
17 June	1
20 June	5
24 June	5
27 June	13

The 'Cutworm Risk Model'

The cutworm model is a computer program that uses weather data to predict the rate of development of turnip moth eggs and caterpillars. It also predicts the level of rain-induced mortality among the early-instar caterpillars. The cutworm model published by Bowden *et al* (1983) has been programmed into the MORPH decision-support software. This version will be used to produce cutworm forecasts in 2014, with the weather data used to produce the cabbage root fly and carrot fly forecasts.

The model will be run from 23rd May, when moths were first caught at Wellesbourne. Once eggs start to hatch then rainfall becomes important for the forecast. **The cutworm forecast indicates that eggs laid on 23rd May have hatched between 9 and 14 June at the sites used to produce the forecasts (Table 1 below). From then onwards, the amount of rainfall will determine the risk of cutworm damage and updates will be provided at intervals.** Rainfall events of 10 mm or more have major effects on the survival of young cutworms (from when they hatch until they reach the third instar (third larval stage –

achieved through moults)) and this forms the basis of the forecast i.e. if a heavy rainfall event occurs when a particular cohort of young cutworms is present then it is assumed that they will be killed. **The forecast indicates currently that newly-hatched caterpillars will remain susceptible to rainfall (and insecticides) for about 3 weeks before entering the third instar.**

Table 1 Predicted dates when eggs laid on 23 May will hatch and when the caterpillars will enter the third instar.

Region	Predicted date when eggs laid on 23 May will hatch	Predicted date when eggs laid on 23 May will enter 3 rd instar
Cornwall (Newquay)	13 June	5 July
Kent (Sittingbourne)	9 June	30 June
Suffolk (Woodbridge)	9 June	29 June
Wellesbourne, Warwick	10 June	1 July
Norfolk (Norwich)	10 June	4 July
South Lincolnshire (Boston)	10 June	28 June
Nottingham	11 June	2 July
Lancashire (Ormskirk)	11 June	5 July
York (Market Weighton)	11 June	1 July
Scotland (Blairgowrie)	14 June	6 July



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Table 2 below shows predicted survival (as a percentage) of the caterpillars likely to enter the third instar on each date (the first date shown for each site is the date on which eggs laid on 23 May were predicted to enter the third instar (Table 1)). **These forecasts used weather data collected up to noon on 30th June. The forecasts indicate that the recent rainfall in many areas has reduced the imminent risk of cutworm damage to susceptible crops in these areas.**

Reference: Bowden, J., Cochrane, J., Emmett, B. J., Minall, T. E. & Sherlock, P. L. (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.

Background

“Cutworm” is the name given to caterpillars of certain Noctuid moths, in particular those of the turnip moth *Agrotis segetum*. The name derives from the habit of the older caterpillars of feeding underground, damaging plant roots and stems (including the storage organs that we use for food), sometimes so badly that the plant topples.

The adult moths lay eggs on plants or on pieces of litter and debris in the soil, usually from the end of May or early June. These hatch in around 8-24 days, depending on temperature. The young caterpillars seek out and feed on the aerial parts of plants. In a further 10-20 days, again depending on temperature, the caterpillars go through their second moult, becoming “third instar” caterpillars. It is at this point that they adopt the cutworm habit, becoming subterranean and feeding on roots etc.

Unhatched turnip moth eggs and the older, subterranean cutworms are largely invulnerable to the effects of the weather and insecticides. The two early caterpillar instars differ, however. If there is substantial rainfall (defined as 10 mm or more of rain falling in showers of moderate intensity over a 24-hour period) whilst these caterpillars are feeding above ground then this causes high mortality among them. They are also vulnerable to insecticides and irrigation whilst feeding on the foliage.

Crop Susceptibility

Crops differ in their susceptibility to cutworm damage. The most vulnerable are lettuce, leek and red beet. Young lettuce and leek plants are easily bitten through by cutworms, and though beet plants may survive an attack the bulbous root is rendered unmarketable by cutworm feeding. Moderately-susceptible crops include brassicas, carrot, celery, parsnip and sugar beet. The least susceptible of those vulnerable to damage are onion, potato, swede and turnip.



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If you have any comments or information about pests that you would be willing to share then please e-mail: rosemary.collier@warwick.ac.uk.