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CABBAGE ROOT FLY – 10 September 2020

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Introduction

The forecasts in the table below are for ‘early-emerging’ cabbage root flies. There are some areas of the UK where a proportion of the cabbage root flies emerge later in the spring than would be expected. We call these ‘late emerging’ flies and they are genetically different from ‘early-emerging’ flies. Relatively large numbers of late-emerging flies occur in some parts of Devon and south-west Lancashire. **The first generation of late-emerging flies was predicted to start laying eggs in Devon in late May (10% 25 May) and to start laying eggs in early July in Lancashire (10% 1 July). The second generation of late-emerging flies was forecast to start laying eggs in Devon in early August (10% 5 August; 50% 20 August).**

The forecast outputs below are based on weather data collected by Plantsystems Limited and funded by Syngenta. The forecasts predict the timing of fly activity. They do not predict the number of insects present in the crop, as this depends on the size of the local fly population. For control purposes, we consider that the pest has become active when 10% of the insects have emerged/laid eggs and that the peak of activity has occurred when 50% have emerged/laid eggs.

Once they have emerged, female cabbage root flies require some time to feed, mate and mature their eggs. This is equivalent to about 80 day-degrees above 6°C.



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Cabbage root fly forecasts 2020 – N.B. the Lancashire forecast looks unusually late. There has been a problem with the soil temperature probe.

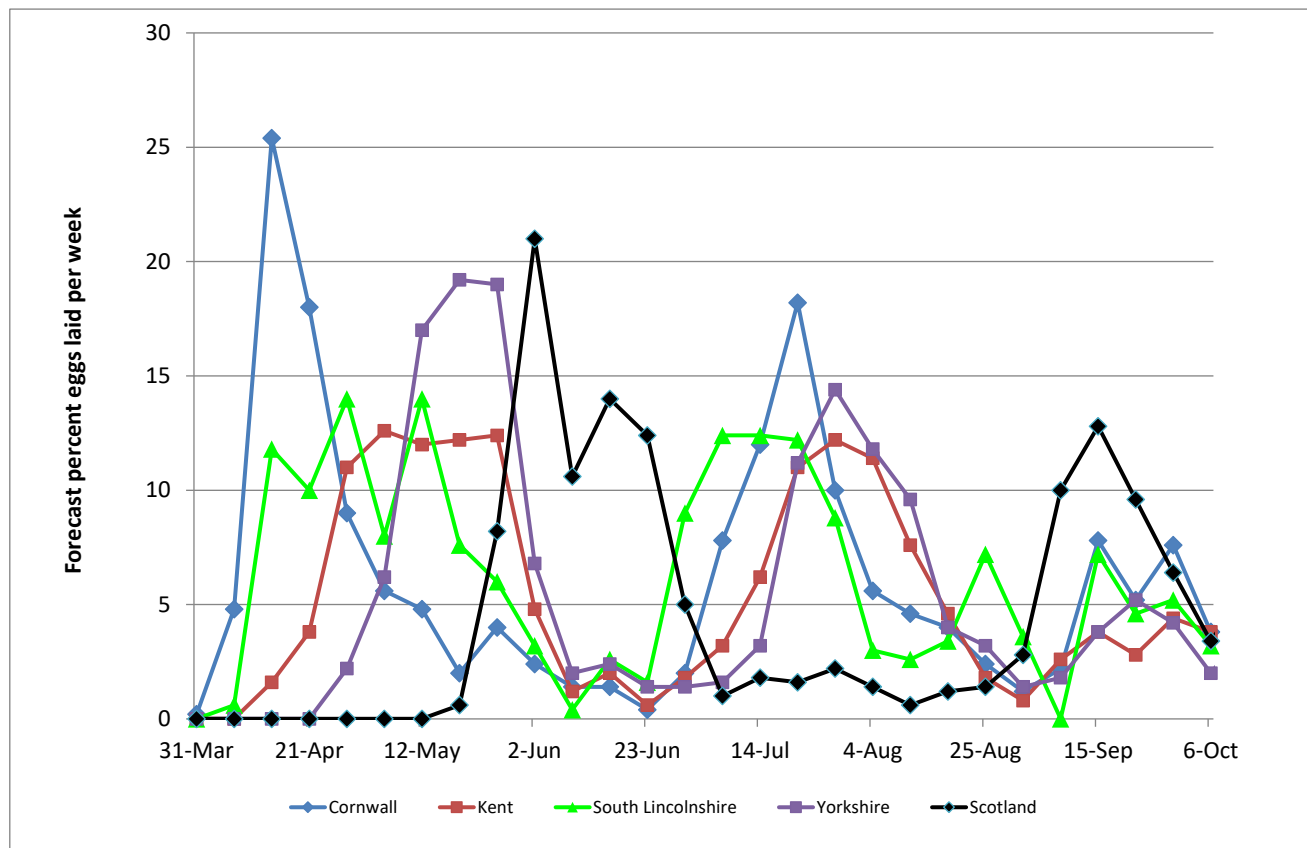
| Region | First generation | First generation | Second generation | Second generation | Third generation |
|-----------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | Forecast 10% egg-laying in 2020 | Forecast 50% egg-laying in 2020 | Forecast 10% egg-laying in 2020 | Forecast 50% egg-laying in 2020 | Forecast 10% egg-laying in 2020 |
| Cornwall (Newquay) | 8 Apr | 20 Apr | 7 Jul | 26 Jul | 8 Sep |
| Kent (Sittingbourne) | 21 Apr | 7 May | 9 Jul | 29 Jul | 12 Sep |
| Suffolk (Woodbridge) | 20 Apr | 6 May | 23 Jun | 14 Jul | 9 Aug |
| Wellesbourne (Warwick) | 17 Apr | 29 Apr | 23 Jun | 12 Jul | 12 Aug |
| Norfolk (Norwich) | 22 Apr | 15 May | 14 Jul | 30 Jul | 3 Sep |
| South Lincolnshire (Boston) | 11 Apr | 1 May | 29 June | 22 Jul | 26 Aug |
| Nottingham (Bilsthorpe) | 27 Apr | 16 May | 17 Jul | 6 Aug | 19 Sep |
| Lancashire (Ormskirk) | 8 May | 21 May | 12 Aug | 25 Aug | - |
| York (Market Weighton) | 6 May | 18 May | 15 Jul | 2 Aug | 13 Sep |
| Scotland (Blairgowrie) | 26 May | 10 Jun | 1 Sep | 10 Sep | - |



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The graph below shows the forecast pattern of egg-laying for 2020 at 5 of the sites in the table above.



Cabbage root fly monitoring data 2020

The table below shows the numbers of cabbage root flies recovered from plots at Wellesbourne 2020.

| Date | Adult cabbage root flies - total in 3 traps near swedes. Traps were set up on 19 th May. | | Numbers of eggs laid on 15 cauliflower plants. Set up on 22 May. |
|------------------------|---|--------|--|
| | Male | Female | |
| 22 nd May | 8 | 3 | - |
| 26 th May | 4 | 1 | 1 |
| 29 th May | 3 | 2 | 0 |
| 2 nd June | 12 | 1 | 0 |
| 5 th June | 4 | 2 | 6 |
| 9 th June | 4 | 3 | 7 |
| 12 th June | 8 | 5 | 44 |
| 16 th June | 20 | 8 | 32 |
| 19 th June | 11 | 4 | 19 |
| 23 rd June | 6 | 9 | 24 |
| 26 th June | 7 | 4 | 43 |
| 30 th June | 8 | 12 | 55 |
| 3 rd July | 31 | 25 | 53 |
| 7 th July | 30 | 18 | 58 |
| 10 th July | 15 | 11 | 16 |
| 14 th July | 64 | 10 | 40 |
| 17 th July | 20 | 7 | 5 |
| 21 st July | 27 | 5 | 0 |
| 24 th July | 21 | 8 | 3/0 (old/new plants) |
| 28 th July | 25 | 8 | 4 (new plants) |
| 31 st July | 21 | 10 | 5 |
| 4 th August | 21 | 13 | 6 |



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| Date | Adult cabbage root flies - total in 3 traps near swedes. Traps were set up on 19 th May. | | Numbers of eggs laid on 15 cauliflower plants. |
|---------------------------|---|--------|--|
| | Male | Female | |
| 7th August | 19 | 11 | 21 |
| 11th August | 20 | 12 | 9 |
| 14 th August | 8 | 8 | 16 |
| 18 th August | 14 | 15 | 10 |
| 21 st August | 24 | 7 | 10 |
| 25 th August | 23 | 15 | 4 |
| 28 th August | 11 | 4 | 3 |
| 1 st September | 6 | 7 | 2 |
| 4 th September | 22 | 2 | 5 |
| 8 th September | 29 | 12 | 1 |



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We first set up the traps in some overwintered swedes at Wellesbourne but because of COVID-19 the traps were moved to the village allotments and a garden at Tysoe in south Warwickshire. No cabbage root flies were captured before the traps were moved. The traps were moved back to Wellesbourne on 19th May.

| Date | Male cabbage root flies | Female cabbage root flies | Number of traps |
|------------------------|-------------------------|---------------------------|-----------------|
| 26 th March | 0 | 0 | 3 |
| 27 th March | 0 | 0 | 3 |
| 28 th March | 0 | 0 | 3 |
| 29 th March | 0 | 0 | 3 |
| 30 th March | 0 | 1 | 8 |
| 31 st March | 0 | 0 | 9 |
| 1 st April | 0 | 1 | 9 |
| 2 nd April | 0 | 3 | 9 |
| 3 rd April | 0 | 3 | 9 |
| 4 th April | 0 | 0 | 9 |
| 5 th April | 0 | 0 | 9 |
| 6 th April | 1 | 0 | 9 |
| 7 th April | 0 | 0 | 9 |
| 8 th April | 1 | 0 | 9 |
| 9 th April | 5 | 1 | 9 |
| 10 th April | 16 | 3 | 9 |
| 11 th April | 6 | 3 | 9 |
| 12 th April | 7 | 7 | 9 |
| 13 th April | 1 | 2 | 9 |
| 14 th April | 13 | 5 | 9 |
| 15 th April | 32 | 6 | 9 |
| 16 th April | 49 | 19 | 9 |
| 17 th April | 24 | 14 | 9 |
| 18 th April | 4 | 0 | 9 |
| 19 th April | 65 | 9 | 9 |
| 20 th April | 65 | 15 | 9 |



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| Date | Male cabbage root flies | Female cabbage root flies | Number of traps |
|-------------------------|-------------------------|---------------------------|-----------------|
| 21st April | 71 | 12 | 9 |
| 22nd April | 50 | 10 | 9 |
| 23 rd April | 34 | 11 | 9 |
| 24 th April | 26 | 3 | 9 |
| 25 th April | 42 | 6 | 9 |
| 26 th April | 33 | 2 | 9 |
| 27 th April | 52 | 20 | 9 |
| 28 th April | 0 | 3 | 9 |
| 29 th April | 12 | 10 | 9 |
| 30 th April | 12 | 10 | 9 |
| 1 st May | 5 | 2 | 9 |
| 2 nd May | 17 | 17 | 9 |
| 3 rd May | 14 | 3 | 9 |
| 4 th May | 26 | 5 | 9 |
| 5 th May | 20 | 2 | 9 |
| 6 th May | 18 | 7 | 9 |
| 7 th May | 2 | 2 | 9 |
| 8-9 th May | 11 | 2 | 9 |
| 10-11 th May | 6 | 3 | 9 |
| 12 th May | 7 | 2 | 9 |
| 13 th May | 3 | 5 | 9 |
| 14 th May | 7 | 3 | 9 |
| 15 th May | 2 | 1 | 9 |
| 16 th May | 3 | 0 | 9 |
| 17 th May | 0 | 2 | 9 |
| 18 th May | 1 | 2 | 9 |
| 19 th May | 3 | 0 | 9 |
| 20 th May | 0 | 0 | 9 |
| 21 st May | 1 | 1 | 9 |
| 22 nd May | 0 | 0 | 9 |



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Cabbage root fly egg-laying

Some monitoring plants (cauliflower) have been set up in the garden in Tysoe, Warwickshire on 18th April.

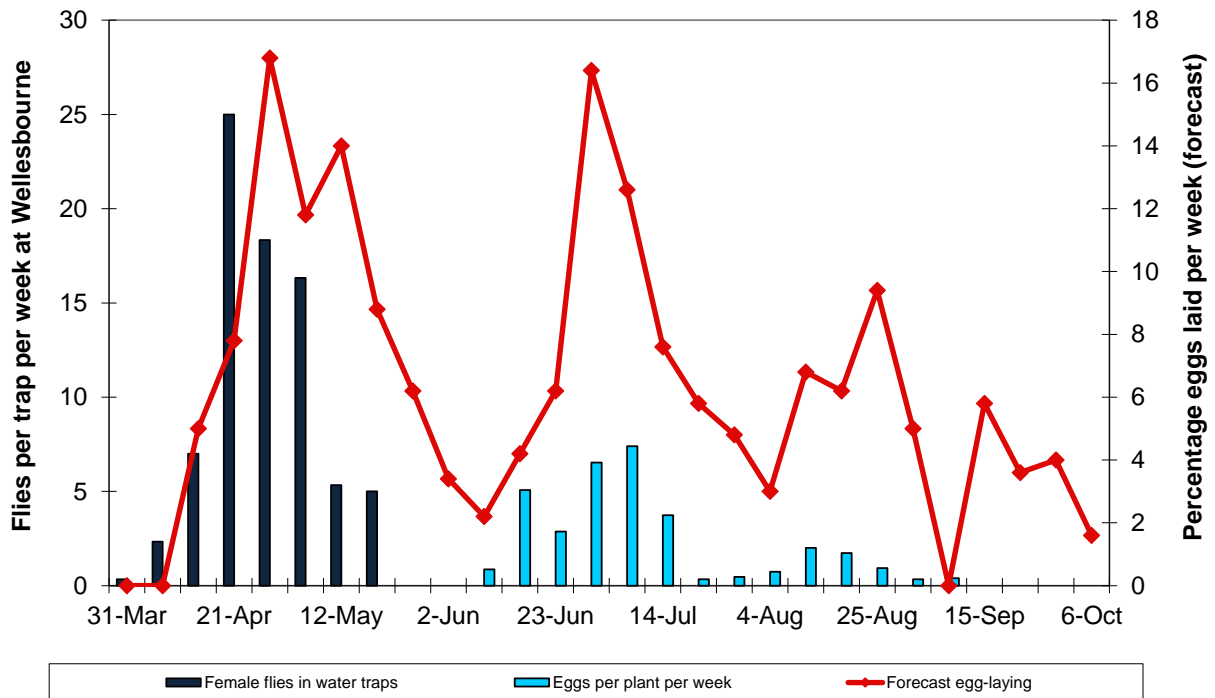
| Date | Number of eggs | Number of plants |
|------------------------|----------------|------------------|
| 23 rd April | 1 | 15 |
| 27 th April | 1 | 15 |
| 3 rd May | 3 | 15 |
| 9 th May | 10 | 15 |
| 13 th May | 6 | 15 |
| 17 th May | 26 | 15 |



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The graph below compares the forecast pattern of egg-laying at Wellesbourne in 2020 with the number of female flies trapped firstly at Tysoe (10 miles away) and then egg-laying at Wellesbourne from 26 May.



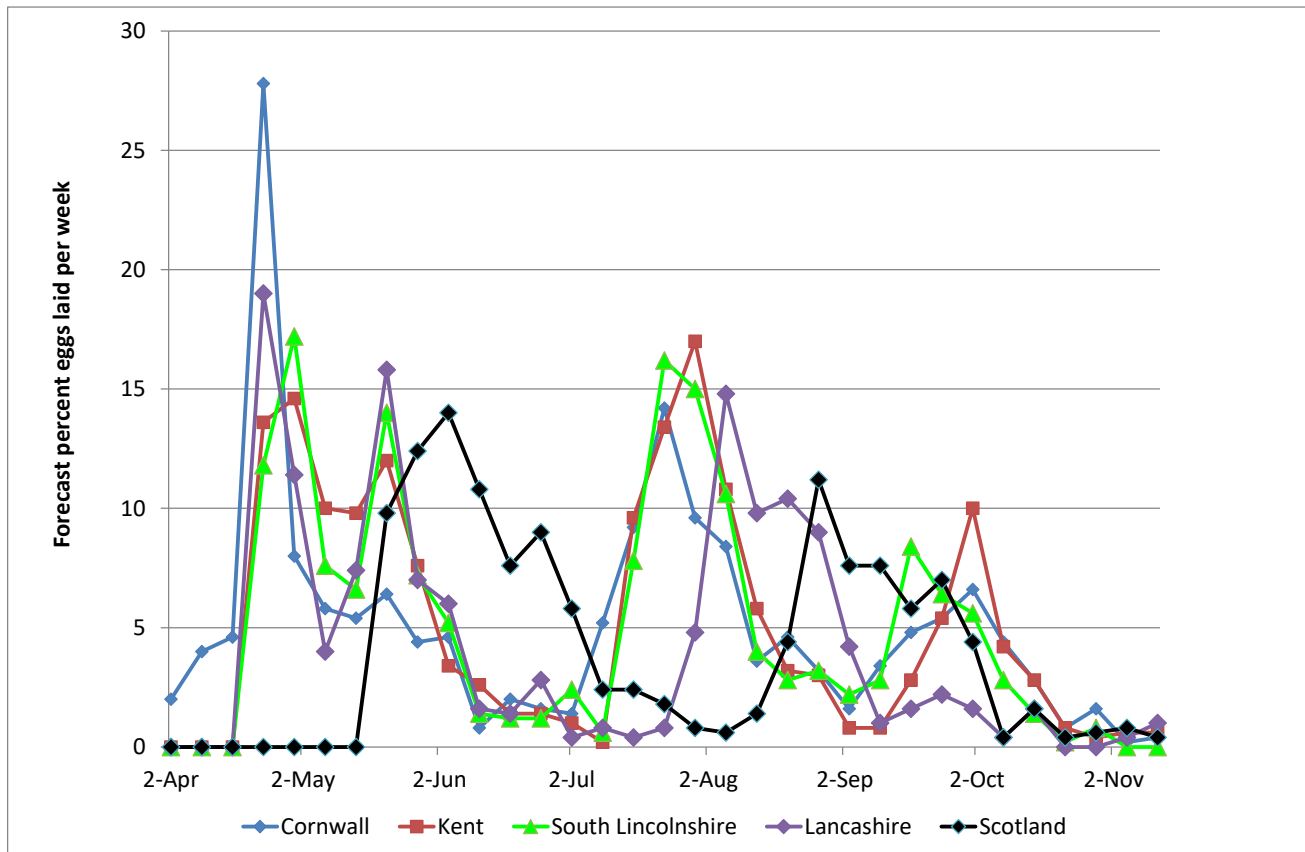


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Historical information from 2019

The graph below shows the forecast pattern of egg-laying in 2019 for 5 sites from the table above.

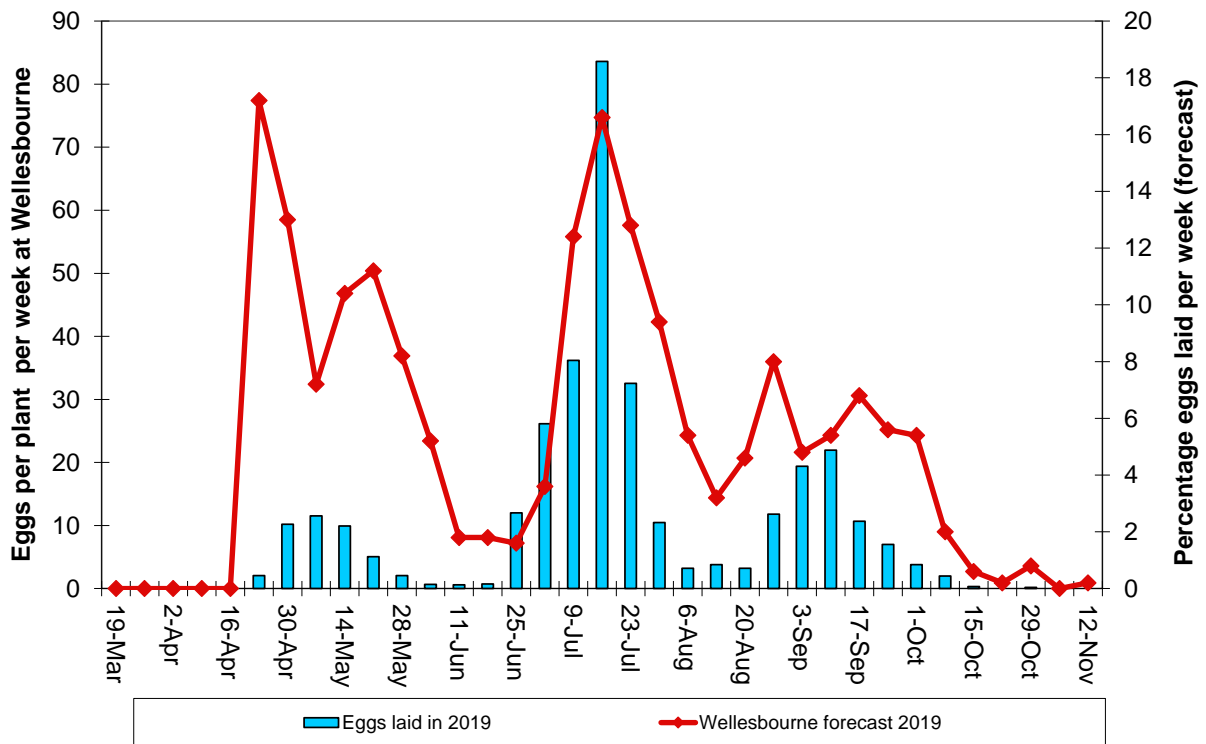




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The graph below shows the forecast pattern of egg-laying in 2019 at Wellesbourne compared with egg-laying in a plot of brassica plants in 2019.



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The table below shows the numbers of cabbage root flies recovered from plots at Wellesbourne 2019.

| Date | Adult cabbage root flies - total in 3 traps near overwintered swedes. Set up 26 th February 2019 | | Numbers of eggs laid on 15 cauliflower plants. Set up 9 th April 2019 |
|------------------------|---|--------|--|
| | Male | Female | |
| 5 th March | 0 | 0 | |
| 12 th March | 0 | 0 | |
| 19 th March | 0 | 0 | |
| 26 th March | 0 | 0 | |
| 2 nd April | 0 | 0 | |
| 9 th April | 20 | 5 | |
| 16 th April | 110 | 11 | 0 |
| 23 rd April | 199 | 15 | 31 |
| 26 th April | 88 | 10 | 56 |
| 30 th April | 78 | 4 | 97 |
| 3 rd May | 33/17 (old swedes/new swedes) | 12/2 | 105 |
| 7 th May | 19/21 (old swedes/new swedes) | 12/3 | 68 |
| 10 th May | 15/18 (old swedes/new swedes) | 9/1 | 109 |
| 14 th May | 8/13 (old swedes/new swedes) | 4/1 | 40 |
| 17 th May | 0/4 (old swedes/new swedes) | 2/0 | 45 |
| 21 st May | 0/2 (old swedes/new swedes) | 0/0 | 31 |
| 24 th May | 12 (new swedes only from now onwards) | 2 | 26 |
| 28 th May | 1 | 0 | 5 |
| 31 st May | 1 | 0 | 10 |
| 4 th June | 1 | 3 | 0 |

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| Date | Adult cabbage root flies - total in 3 traps near overwintered swedes. Set up 26 th February 2019 | | Numbers of eggs laid on 15 cauliflower plants. Set up 9 th April 2019 |
|-------------------------|---|--------|--|
| | Male | Female | |
| 7 th June | 0 | 0 | 2 |
| 11 th June | 1 | 0 | 7 |
| 14 th June | 2 | 3 | 0 |
| 18 th June | 2 | 1 | 11 |
| 21 st June | 4 | 3 | 59 |
| 25 th June | 2 | 3 | 121 |
| 28 th June | 7 | 10 | 64 |
| 2 nd July | 14 | 8 | 328 |
| 5 th July | 30 | 8 | 285 |
| 9 th July | 81 | 43 | 258 |
| 12 th July | 139 | 50 | 594 |
| 16 th July | 124 | 62 | 660 |
| 19 th July | 70 | 70 | 371 |
| 23 rd July | 58 | 121 | 117 |
| 26 th July | 10 | 54 | 122 |
| 30 th July | 8 | 61 | 35 |
| 2 nd August | 13 | 29 | 14 |
| 6 th August | 31 | 16 | 34 |
| 9 th August | 24 | 11 | 54 |
| 13 th August | 44 | 14 | 26 |
| 16 th August | 115 | 30 | 8 |
| 20 th August | 189 | 48 | 40 |
| 23 rd August | 221 | 28 | 148 |
| 27 th August | 83 | 17 | 39 |



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| Date | Adult cabbage root flies - total in 3 traps near overwintered swedes. Set up 26 th February 2019 | | Numbers of eggs laid on 15 cauliflower plants. Set up 9 th April 2019 |
|----------------------------|---|--------|--|
| | Male | Female | |
| 30 th August | 176 | 33 | 38 |
| 3 rd September | 527 | 115 | 253 |
| 6 th September | 528 | 98 | 166 |
| 10 th September | 700 | 223 | 163 |
| 13 th September | 207 | 87 | 78 |
| 17 th September | 118 | 50 | 82 |
| 20 th September | 114 | 36 | 59 |
| 24 th September | 328 | 101 | 46 |
| 27 th September | 127 | 101 | 29 |
| 1 st October | 163 | 98 | 28 |
| 4 th October | 24 | 55 | 14 |
| 7 th October | 31 | 60 | 16 |
| 11 th October | 6 | 19 | 5 |
| 15 th October | 5 | 21 | 0 |
| 18 th October | 2 | 12 | 0 |
| 22 nd October | 4 | 9 | 0 |
| 25 th October | 1 | 4 | 0 |
| 29 th October | 2 | 2 | 3 |