

BBC Springwatch 'End of Term' final report

Temperature in Spring 2005

2005 has been a warm spring, despite the cold snap in late February. Average Jan-Apr temperature has been over 1°C above the 30-year average (1961-1990) across the UK. Central England temperature (CET), a good gauge for the rest of the UK, has actually been 1.4°C above the average over the same period. See Figure 1.

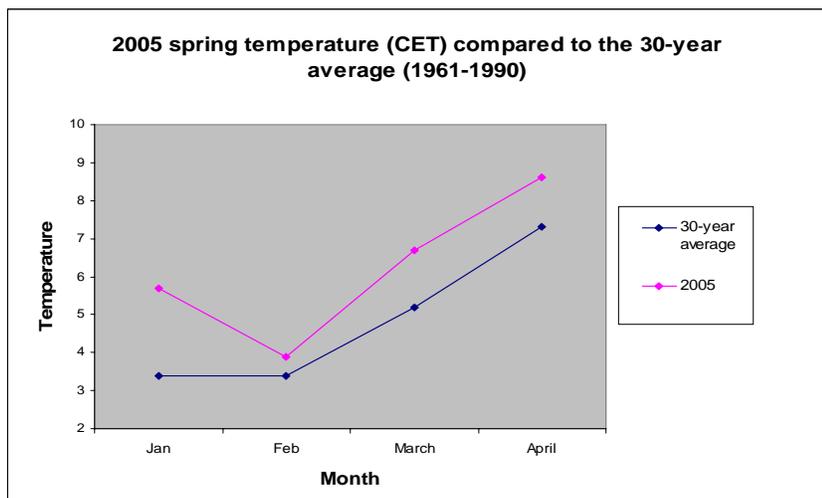


Figure 1: Spring 2005 temperatures compared to the 30-year average

This followed Nov & Dec 2004 temperatures also being approx 1°C above average.

So, from temperate alone, we would expect to see events earlier than normal in 2005, just as we have in other recent warm years when temperatures have been above average. The exception to this was 2001, when average temperature was very close to the 30-year average. Figure 2.

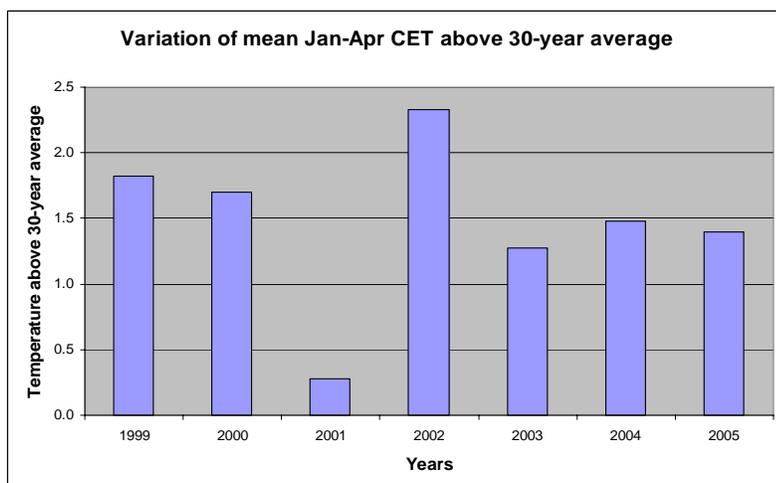


Figure 2: Recent years, except spring 2001, have been well above average temperature

Springwatch record numbers

Total springwatch records, at the time of the first Springwatch programme on Monday 30 May, amount to nearly 150,000. The bulk of these are made up of the first three Springwatch events.

Springwatch summary

- A huge response from Springwatch recorders- nearly 150,000 records to date.
- Springwatch data provides us with the largest ever phenological dataset, gathered in one season, anywhere in the world.
- Springwatch has proved a powerful vehicle for mobilising people to take action for the natural world.
- Spring 2005 has been a warm spring, comparable to recent warm years
- Springwatch results show a high degree of similarity with other UK Phenology Network (UKPN) phenology records gathered in 2005.
- Springwatch data gathered this spring will be used over the forthcoming months to further examine the onset of spring across the UK. The large dataset will highlight differences in timing across counties and regions of the UK. A brief look at frog spawn in southern England and Wales, in this paper (Figure 5), illustrates the sort of work we can use the data for- showing the progression of frog spawn average dates by each county in south England and Wales.
- England accounted for 93% of the total Springwatch records. This compares with England only accounting for about 80% of other UKPN records, for the same 6 events in 2005. Where slight differences in average UK dates do occur they can be explained by Springwatch statistics being slightly more skewed towards south England dates.
- Springwatch provided fairly consistent results with other recent warm years. Those insects with historical data were about three weeks earlier than 30 years ago and frog spawn was about a week earlier than the same period. Hawthorn flowering was about 2½ weeks earlier than 30 years ago.
- Perhaps of biggest surprise is that swift appears to have arrived about a week earlier this year than in recent warm years and 30 years ago. Previous year's data have seen little change in the arrival date of swifts over the last few decades. However both Springwatch and UKPN records in 2005 show it arrived earlier.
- 17th March seems to have been a significant date for peak numbers of insect records. According to the Met Office this date coincides with temperatures starting to increase significantly after the cold snap, as wind direction swung from northerly around to south-westerly on the 15th with temperatures on 16th and 17th then building to 19°C.

- From the Springwatch 6 species, earlier spring events seem to show greater variation in timing across the UK than do later events. This is consistent with UKPN findings that earlier events are more responsive to earlier warm weather.
- Generally, spring starts in the SW England and moves N/ NE. This general trend is more evident in the first three events than the second three, although with 7-spot and bumblebee first sightings tend to occur across S England. This pattern of spring is because warm weather moves up from the south as spring begins. The Gulf Stream has the effect of a warmer south-west and west compared to the relatively cooler east. Figure 7 shows clearly how events are later the further north you travel, with Scotland recording the latest average dates.
- A table (Table 3) is shown at the end of the document, detailing Springwatch and other 2005 UKPN results at a UK level, for the six events.

Ecological issues

- Phenology generally, has helped to identify three major issues for wildlife in the face of climate change:
 - Competition between species, and the fact that this might change as certain species respond more quickly to changing temperatures e.g. oak and ash
 - Synchrony between species, as predator-prey associations are broken due to variations in response to changing temperature e.g. great tit, winter moth and oak leaves
 - Life cycles, as variations in temperature can induce unseasonal activity that is simply stopped or killed off when normal conditions return e.g. frog spawn.
- Springwatch data for 2005 has highlighted potential problems with both synchrony and life cycles.
- Ladybird and greenfly- we have received interesting reports about numbers of ladybirds and greenfly from recorders. The concern is that ladybirds have become active this spring ahead of sufficient numbers of greenfly reproducing. So while many reported ladybirds earlier in the spring, we are now receiving reports of rising numbers of greenfly and little sign of any ladybirds. Climate change is likely to effect these sorts of associations if changes and/or variations in temperature induce relatively different changes in phenology.
- Frog spawn- following the mild November, December and January, Springwatch revealed the high degree of early frog spawn activity. However during the cold snap we received many reports of this early spawn being frozen and killed off. Those species induced to undertake early spring activity during mild spells mid-winter, could face life-cycle problems, such as death of spawn, when temperatures return to more normal winter conditions. This is particularly the case in species that only undertake one breeding attempt each year, such as frogs.
- A further change in life-cycles has also been made clearer by Springwatch recorders. The early sightings of worker bumblebees in late December and very early January strongly suggest that in warm years *Bombus terrestris* is now getting in an extra generation, with the

colony staying active throughout the winter. This is tending to occur in urban areas where exotic garden flowers provide sufficient forage. *B. terrestris* is known to do this around the Mediterranean but this change in life-cycles in response to warmer weather and sufficient forage being available, has only recently been noticed in the UK. This was confirmed for the first time by Mike Edwards at the Bee, Wasp and Ant Recording Society, after we had received extra information, including photographs and detailed identification, from Springwatch recorders.

Species summary

Bumblebee

At the time of writing total records amount to 44,824. Bumblebee records started before Christmas (first record 11th Dec), with many of these relating to over-wintering colonies, a phenomenon that has only recently been recognised, rather than queens out early looking for new nest sites, which is what first sightings in the spring are usually of. Numbers of records built steadily to about 14,000 sightings by mid February, largely across England and south Wales, at which time the cold snap saw a near cessation in recorded observations. Following the cold snap, records began flooding in, reaching a peak on 17th March (Figure 3). Bumblebee records showed a clear spring progression across southern England heading north.

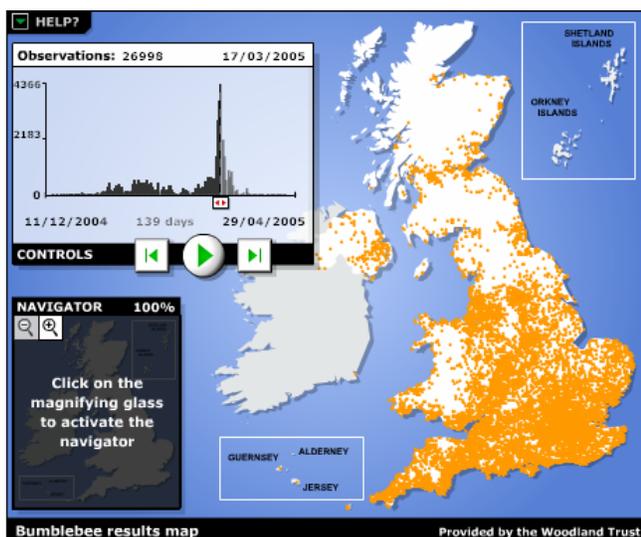


Figure 3: Bumblebee records peaked on 17th March

Average dates

The average date for bumblebee first seen across the UK was 1st March. This breaks down across the UK as follows: England 28th February, Wales 4th March, NI 10th March and Scotland on 17th March. Clearly the much higher numbers of recorders in England (bumblebee = 41,064, 92% of records) means the UK average is largely skewed by the England average.

UK comparison with past years

Recent warm years- Springwatch records show that bumblebee first seen in 2005 was 5 days earlier than in recent warm years. However other UKPN data for 2005 shows spring 2005 is directly comparable with recent warm years. The reason for the 5 day discrepancy between Springwatch and other UK data for 2005 can be explained by heavy bias in the Springwatch data to recorders in southern England.

Historical data- bumblebee records for 2005 show that activity is over 3 weeks earlier than 30 years ago and over 5 weeks earlier than in the 1920s

Frog spawn

At the time of writing total records amount to 27,408. Frog spawn records started well before Christmas, with the first records being in SW England on 1st November. With the very mild November, December & January (Figure 1- January 2005 was over 2°C above average) spawning started early, with an initial peak on the 10th February. This peak was doubtless building up to a very early year for frog spawn and is likely to have continued upwards, had the cold snap not stopped spawning in its tracks. The live map graph shows how abruptly recorded spawning activity ceased in the latter part of February (Figure 4)

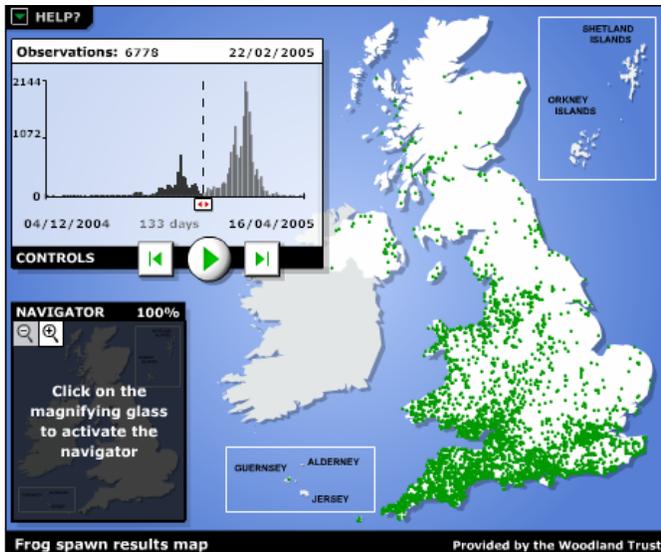


Figure 4: Recorded frog spawn activity all but stopped around the 22nd February during the cold snap. 6,778 records existed to this date.

At this point records were clearly biased to south west England and south Wales. Frog spawn records show a clear spring progression from south west England and Wales travelling north/north west. Many Emails were received of frozen frog spawn and the map in figure 4 shows those areas mostly likely affected by frozen and dead spawn at this time.

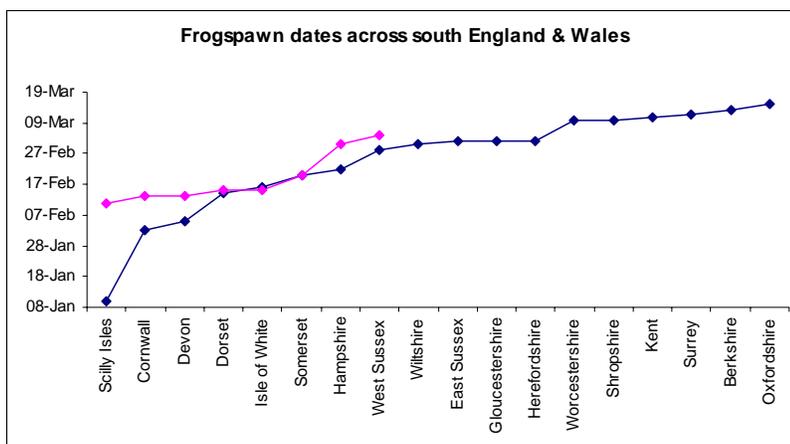


Figure 5: Average dates for frog spawn in south England counties (blue). All Welsh counties (in pink and not named) are also shown for comparison of timing.

Figure 5 shows an interesting illustration of the progression of average frog spawn dates across southern England and Wales. The Scilly Isles, Cornwall and Devon are the front runners in terms of average timing, with Welsh spawning beginning at about the same time as in Dorset. It is striking how much earlier the Scilly Isles are than the mainland, but also how much earlier Cornwall and Devon are than the rest of the UK. This adds to UKPN supposition that while the change in timing of frog spawn across the UK is only now one week earlier than it was thirty years ago, the change in timing in SW England may be far greater than that. Figure 5 contains all Welsh counties, showing that on average, spawning in Wales has all but finished when in England activity has only reached as far north as an imaginary line from Worcestershire across to Kent.

Following the cold snap records began flooding in, with a second, and main peak on 16th March. This is not to suggest that frog spawn normally takes place in two waves. There is no research to suggest this is the case. Rather it was the disruption of the cold snap that induced the break in spawning activity. Had the mild weather continued it seems fair to suggest the peak in spawning activity would have been in late February.

Average dates

The average date for frog spawn first seen across the UK was 6th March. This breaks down across the UK as follows: England 6th March, Wales 22nd February, NI 6th March and Scotland on 13th March. Clearly the much higher numbers of recorders in England (frog spawn = 25,170, 92% of records) means the UK average is largely skewed by the England average.

UK comparison with past years

Recent warm years- Springwatch records show that frog spawn first seen in 2005 is comparable with recent warm years and also comparable with other 2005 data.

Historical data- frog spawn records for 2005 show that activity is about a week earlier than 30 years ago. However analysis of the average dates in south west England suggests that the change in timing may be greater in areas where spawning starts first.

7-spot Ladybird

At the time of writing total records amount to 31,878. As with bumblebee, 7-spot records started before Christmas. Numbers of records for 7-spot built to about 7,000 by mid February, with a good spread of records across England, at which time the cold snap saw an almost cessation in recorded observations. Following the cold snap records began flooding in, reaching a peak on 17th March, just as with bumblebee (Figure 6). 7-spot records showed a clear spring progression from across southern England heading north, again as with bumblebee.

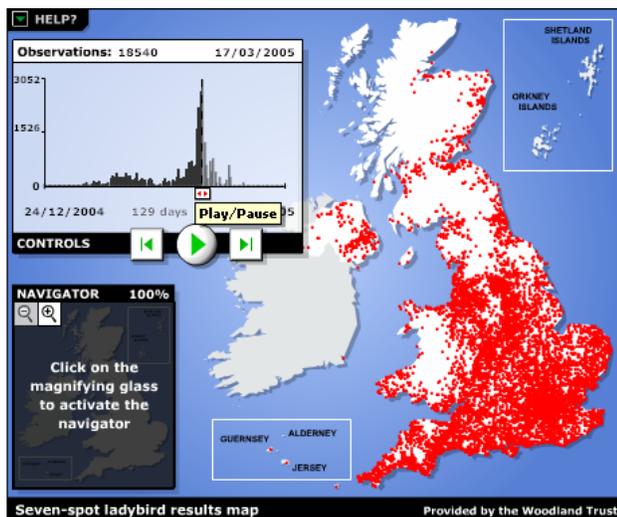


Figure 6: 7-spot Ladybird records also peaked on 17th March.

Average dates

The average date for 7-spot first seen across the UK was 7th March. This breaks down across the UK as follows: England 7th March, Wales 10th March, NI 8th March and Scotland on 16th March. Clearly the much higher numbers of recorders in England (7-spot = 29,896, 94% of records) means the UK average is largely skewed by the England average.

UK comparison with past years

Recent warm years- Springwatch records show that 7-spot first seen in 2005 was two weeks earlier than data for recent warm years. UKPN data for 2005 shows spring 2005 is about a week earlier than recent warm years. As with bumblebee, the reason for the discrepancy between Springwatch and the UKPN data is likely to be due to heavy recorder bias in south England.

Historical data- no historical data exists for 7-spot Ladybird.

Summary data- first half.

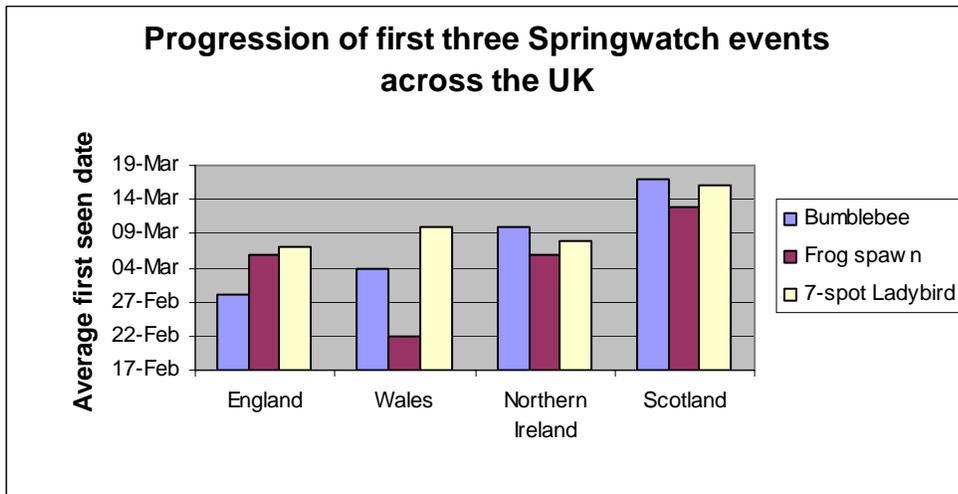


Figure 7: Phenological timing varies across the UK.

	UK	England	Wales	Northern Ireland	Scotland
Species/event	Average date for 2005 (Springwatch)				
Bumblebee- first seen	01-Mar	28-Feb	04-Mar	10-Mar	17-Mar
Frog spawn- first seen	06-Mar	06-Mar	22-Feb	06-Mar	13-Mar
7-spot Ladybird- first seen	07-Mar	07-Mar	10-Mar	08-Mar	16-Mar

Table 1: Average Springwatch dates across the UK for the first three events. On average, events occurred last in Scotland as we would expect.

Peacock butterfly

At the time of writing total records amount to 14,676. Peacock records started before the New Year (first record 26th Dec). A steady trickle of records, of active individuals on warm days, came in until 13th March when it appears the main emergence of overwintered adults began. Peak numbers of sightings were seen on 17th March and 1st April (Figure 8). The 17th March peak is exactly the same day as the bumblebee and 7-spot peak date, as temperatures climbed to 19°C. After the second peak on 1st April numbers of first sightings reduced quickly.

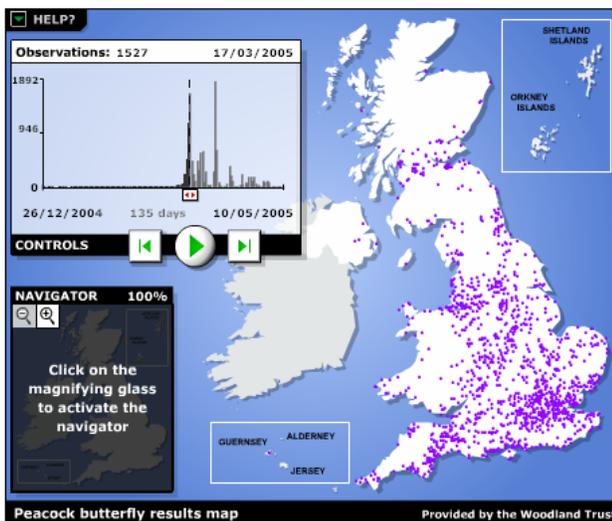


Figure 8: A large peak in peacock records occurred on 17th March, as with bumblebee and 7-spot Ladybird

Average dates

The average date for peacock first seen across the UK was 29th March. This breaks down across the UK as follows: England 29th March, Wales 29th March, NI 5th April and Scotland on 26th March. The much higher numbers of recorders in England (Peacock = 13,390, 91% of records) means the UK average is largely skewed by the England average. It is interesting that average first seen date in Scotland preceded that the average first seen date in England and Wales.

UK comparison with past years

Recent warm years- Springwatch records show that peacock first seen dates in 2005 was comparable to recent warm years. Springwatch peacock data for 2005 is also comparable to other peacock phenology records for 2005.

Historical data- peacock records for 2005 show that activity is over two weeks earlier than 30 years ago.

Hawthorn flowering

At the time of writing total records amount to 10,631. Some issues existed with incorrectly identified blackthorn flowering records. These were rejected from the data.

Records began on 25th March- which is early and may be the result of a few midland hawthorn and early flowering varieties. However a peak in record numbers is evident on the live map graphs on 30th April (Figure 9), which is a better looking date.

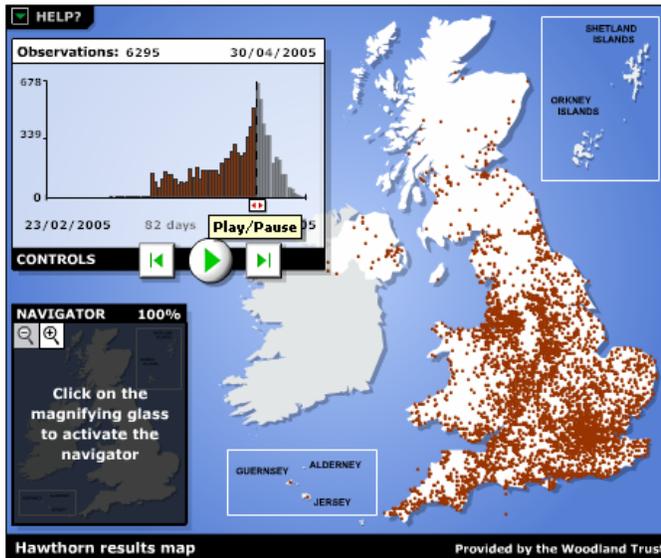


Figure 9: Thus far hawthorn first flowering records seem to have peaked on 30th April.

Average dates

The average date for hawthorn first flowering across the UK was 24th April and is comparable to other hawthorn flowering records for 2005, collected by the UKPN. Springwatch averages break down across the UK as follows: England 24th April, Wales 22nd April, NI 25th April and finally Scotland on 29th April.

UK comparison with past years

Recent warm years- Springwatch records show hawthorn first flowering three days earlier than in recent warm years. Other UKPN data for 2005 is consistent with recent warm years, so again England data bias may be important. (England records = 9,856, 93% of records)

Historical data- Springwatch hawthorn records for 2005 currently show that flowering is about two and a half weeks earlier than 30 years ago and the last 100 years. Generally UKPN data suggests first flowering dates in recent warm years are about a fortnight earlier than 30 years ago.

Swift

At the time of writing total records amount to 9,362. Records began on 10th April- which seems rather early, although British Trust for Ornithology's *Bird Track* had recorded a few early arrivals at this stage. A discernable peak in records does not occur until the 30th April – a Saturday (Figure 10), which sounds about right and would tie in with *Bird Track* data.

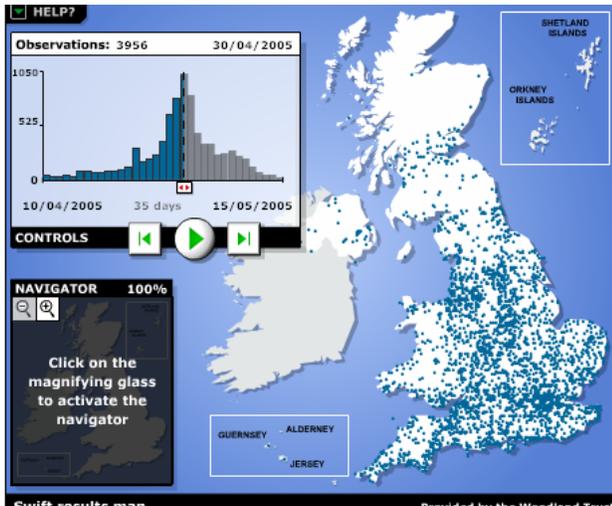


Figure 10: Springwatch data shows a peak of swift first seen records on 30th April

Average dates

The average date for swift first seen across the UK was 30th April. This breaks down across the UK as follows: England 30th April, Wales 29th April, NI 28th April and Scotland on 1st May.

UK comparison with past years

Recent warm years- Springwatch records currently show swift first seen in 2005 about a week earlier than in recent warm years. Springwatch data for 2005 is comparable to other UKPN 2005 data for swift.

Historical data- swift records for 2005 show arrival is about a week and half earlier than 30 years ago. Generally UKPN data suggests swift arrival dates in recent warm years show little change from the past. So presently the data is suggesting that swifts arrived early this year.

Summary data- second half.

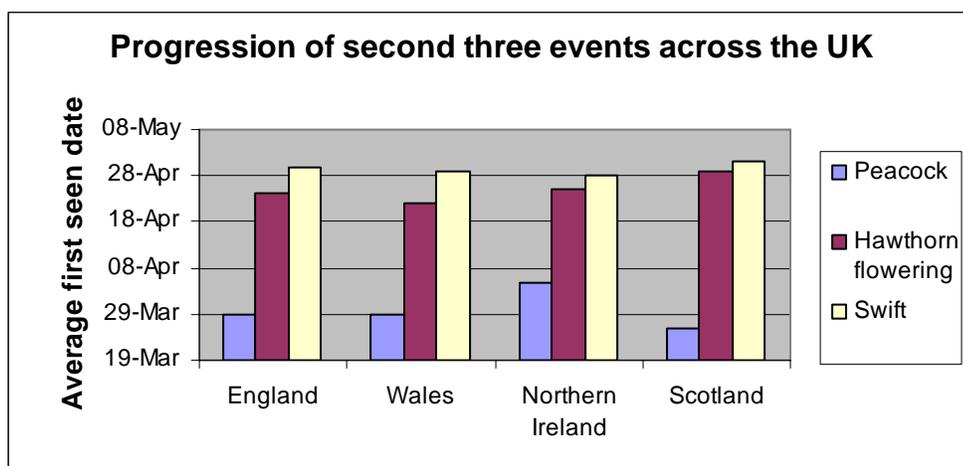


Figure 11: Later events show much less variation in phenological timing than the earlier events.

	UK	England	Wales	Northern Ireland	Scotland
Species/event	Average date for 2005 (Springwatch)				
Peacock butterfly- first seen	29-Mar	29-Mar	29-Mar	05-Apr	26-Mar
Hawthorn- flowering	24-Apr	24-Apr	22-Apr	25-Apr	29-Apr
Swift- first seen	30-Apr	30-Apr	29-Apr	28-Apr	01-May

Table 2: Average Springwatch dates across the UK for the second three events.

Overall Springwatch summary data

Species / event	Historical average (where data available)	1961-1990 average (where data available or 2001 as surrogate) "30 years ago"	Average of "recent warm springs" (1997-2004) excl. 2001	Average date for 2005 (Springwatch)	Springwatch numbers	Average date for 2005 with recorder numbers (UKPN)
Bumblebee- first seen	8th April (1920-1928)	26th March	7th March	01-Mar	44,824	6 Mar (1,466)
Frogspawn- first seen	9th Mar (1938-1947)	12th March	4th March	06-Mar	27,408	7 Mar (785)
7-spot Ladybird- first seen	—	—	21st March	07-Mar	31,878	13 Mar (1029)
Hawthorn- flowering	13th May (1891-1947)	11th May	27th April	24-Apr	10,631	26 Apr (416)
Peacock butterfly- first seen	—	14th April	30th March	29-Mar	14,676	28 Mar (767)
Swift- first seen	5th May (1916-1947)	10th May	8th May	30-Apr	9,362	1 May (417)

Table 3: Overall summary data from Springwatch