

BBC Springwatch 2006
Nick Collinson & Tim Sparks
Report as at 14/06/2006

Temperature in spring 2006

Well, 2006 couldn't have been more different from 2005 (Fig.1). However, having said that the key thing to stress is that climate change science is not about comparing one year with the next. Weather always varies year to year, but in relation to climate change it is the long term trend that is important to consider. Long term trends are undoubtedly showing spring getting warmer. In fact, despite spring 2006 feeling delayed and cold, it was still marginally warmer than the 30-year average (by about $\frac{1}{2}$ a degree C) and not as cold as January-April 2001 (Fig.2) which was almost bang on the 30 year average. However, what this year's "cold" weather allows us to do is show very clearly how timing of events closely reflect temperature. Given that the average temperature for January – April was 1.5°C lower than last year, all events (average dates) were later than the same events in 2005. As these lower temperature patterns developed during the spring, we expected events to take place later. We were not disappointed.

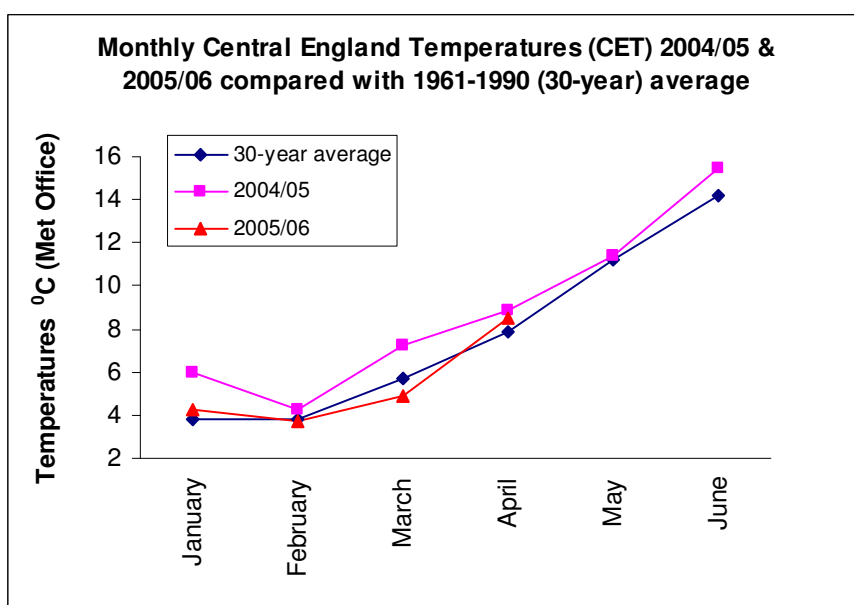


Figure 1: Spring 2005 and 2006 temperatures compared to the 30-year average. On average spring 2006 (January-April) was marginally above the 30-year average, although March was almost a degree below. Central England temperature (CET) is representative of temperatures across much of the UK.

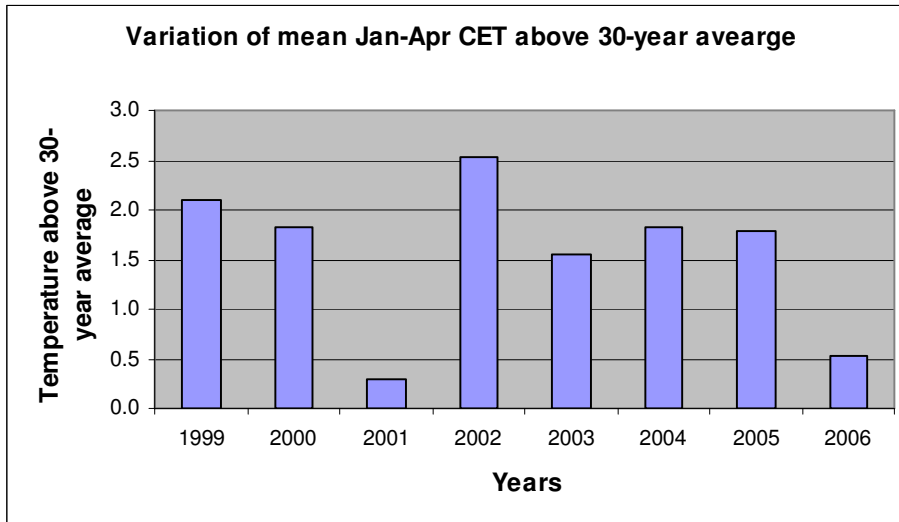


Figure 2: Recent years, except spring 2001 & 2006, have been well above average temperature.

Springwatch numbers of records

Records	2006	2005
Number of recordings so far	69,481	
Number of records via mobile (text):	1,007	
Number of Page Impressions on bbc.co.uk/springwatch (monthly)	Jan 285,552 Feb 326,208 March 413,219 April 273,771	
Comparing this year's page impressions to last year's	Jan 2006 285,552 Feb 2006 326,208 March 2006 413,219	Jan 2005 98,563 Feb 2005 142,330 March 2005 515,862
Springwatch WAP site	Jan 23,803 Feb 37,910 March 58,290 April 43,060	

Total Springwatch records, at the time of writing, amount to nearly 70,000 substantially down on last year's total, including over a 1000 submitted for the first time by mobile phone. Web traffic is substantially up on last year- about 40% higher, but unfortunately this hasn't been translated in to records. Is it possible that the later spring meant people missed the recording moment? Changing the bee to one with the requirement to be more specific in species identification might have cost us, and of course records are still coming in so we don't yet have the final 06 total.

As in spring 2005 the bulk of the records are made up by the earliest three Springwatch events, frog spawn first seen, red-tailed bumblebee first seen and 7-spot ladybird first seen.

By far the majority of records came from England c. 92%, with Scotland and Wales both providing about 3.5 - 4%, and Northern Ireland less than 1%. In 2005 the proportions were almost exactly the same with England scoring 93%, Scotland and Wales 3.5% and Northern Ireland 1% of the records.

Again, England had more Springwatch records per capita and Scotland, Wales and NI all had lower per capita records. (i.e. higher proportion of records came from England than population splits would expect)

Springwatch summary

- Another good response from Springwatch recorders- nearly 70,000 records to date.
- Springwatch 2006 data provides us with another huge phenological dataset, gathered in one season.
- Springwatch has again proved a powerful vehicle for mobilising people to take action for the natural world.
- Spring 2006 has been a cold spring compared to recent years. It was similar in temperature to the 30 year (1961-1990) average temperatures. 2001 was the last time we had a spring that was similar to the 30-year average. Colder years like 2001 & 2006 help us to compare what we consider 'normal' phenological timing with much warmer years which are the current norm, and how wildlife is affected.
- Springwatch 2006 has highlighted how much temperature affects the timing of spring events. Spring 2006 was much colder than spring 2005 and as a result all events were later.
- This analysis of the first three events suggests that in early springs the south-north progression of spring is more pronounced than in cooler springs. In 2006 the timing of events across the UK was more compact. This means that across the UK we all experienced spring at pretty much the same time.
- England accounted for 92% of the total Springwatch records.
- Springwatch provided fairly consistent results with UKPN data from 2001, for example average date for frog spawn in 2006 was 14th March, and in 2001 it was 12th March.
- We would express some caution about the red-tailed bumblebee (*Bombus lapidarius*) records. We are confident data contains a large number of records of other species that would have been active earlier (i.e. buff-tailed bumblebee *Bombus terrestris*), since dates are earlier than our experts (BWARS) themselves saw red-tailed bumblebee. This gives rise to concern about the validity of the data for the species we were hoping to record. However this was the first year of recording one species and with continued and improved information people will hopefully get their eye in. Anecdotally we know that people were very excited to be able to ID a specific bumblebee for the first time.
- In 2006 we continued to receive a number of inaccurate hawthorn records (blackthorn mistakenly identified as hawthorn). We improved the website information to try and get over this problem.
- For both bumblebee and hawthorn data we may look to imposing a cut off on the data when we come to further analysis, removing data before this date. This will ensure we have

stripped out different bumblebees from *B.lapidarius*, and also ensure blackthorn is not altering the hawthorn results.

- 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 is twice as responsive as 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.
- Our experts received several reports of dead frogs during the breeding period. It seems that breeding can be a hazardous time for frogs. Not only does their increased activity expose them to predators, but some frogs may be killed by the rigours of mating. It is possible that the cool spring prolonged the time that frogs were in the water prior to spawning, and that this increased the chances of mortality.

Species summary

Red-tailed bumblebee

At the time of writing total records amount to nearly 14,500. Red-tailed bumblebee (R-TBB) records started mid January (first record 19/01), although as already stated, these records may not be uniquely of the R-TBB. Bumblebees seen in silhouette appear very dark and it is easy to misidentify them. Our experts at BWARS advise waiting until a bee comes to rest before attempting to identify it.

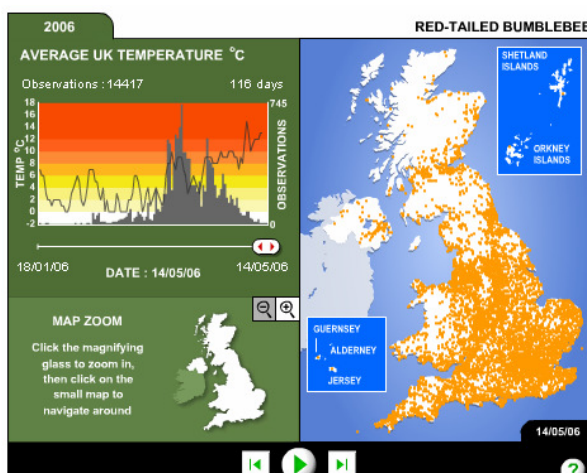


Figure 3: Bumblebee records peaked towards the end of March. It maybe that the 2nd peak on 14th April is the true R-TBB first seen peak. Both major peaks were associated with periods of rising temperatures.

Average dates

The average date for R-TBB first seen across the UK was 4th April. Whilst country averages ranged from 4th - 13th April, by far the majority of data was recorded in England (92.5%) so the UK average reflects the England date (4th April).

UK comparison with mild 2005 (see figure 2)

Whilst it may not be appropriate to compare 2006 R-TBB records with the general bumblebee records from 2005, 2006 records were later by over a month on average. We would have expected this given R-TBB appears later, but also, given the data contains records of other bumblebee species, it may simply reflect that fact that the weather was colder. Current understanding of *B.lapidarius* first appearance is of emergence being March in the south, April in midlands and May in north. The earliest Springwatch record was 19th January, so this is unlikely to have been *B.lapidarius*. Similarly average dates for Scotland, Wales and Northern Ireland range from 4th April – 13th April, so again this suggests non *B.lapidarius* records. However this was the first year of recording one species and with continued and improved information people will hopefully get their eye in. Anecdotally we know that people were very excited to be able to ID a specific bumblebee for the first time.'

Frog spawn

At the time of writing total records amount to just over 19,000. Frog spawn records started well before Christmas again, with the first records being from SW England on 2nd December (a month later than the first records from the south west in 2005). Appropriately, the first small peak took place on Valentine's Day, corresponding to a rise in temperature. The first main peak took place around the 9th of March, following a slight increase in temperature and some wet weather. With frogs there tends to be a few days delay after warm weather before spawning begins, whereas in contrast insects respond almost instantly to warm weather. This rise in temperature was short lived and snowy weather that followed in the north of England and Scotland may have proved fatal for much of the northern spawn laid during that week. Frogs only breed once a year and freezing can kill spawn so this colder weather, after spawning, does have serious implications for them.

Spawning then all but ceased until later in March (around the 25th) when a second peak was triggered by the sudden increase in temperatures. (Figure 4).

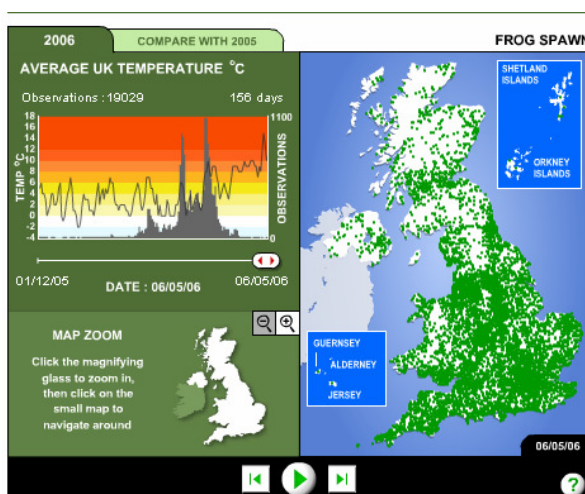


Figure 4: The first main peak of frog spawn took place around the 9th March (3 weeks later than last year) with a second peak coming a couple of weeks later around 25th March.

As usual frog spawn records show a clear spring progression from south west England and Wales travelling north/north east coinciding with the arrival of warmer temperatures. East Anglia tends to be one of the last areas of the UK for frog spawning; indeed we noted at the end of March that records in E Anglia coincided with our first sightings in Shetlands and the Orkneys

Our experts, at the Herpetological Conservation Trust, received several reports of dead frogs during the breeding period. It seems that breeding can be a hazardous time for frogs. Not only does their increased activity expose them to predators, but some frogs may be killed by the rigours of mating. It is possible that the cool spring prolonged the time that frogs were in the water prior to spawning, and that this increased the chances of mortality.

However, the common frog is an adaptable creature, the timing of its breeding varying with latitude and altitude across a large natural range, spanning northern Europe and running across Asia. So, a late start to the breeding season is something that this species, as a whole, should be able to take in its stride.

Average dates

The average date for frog spawn first seen across the UK was 15th March, over a week later than last year. Whilst country averages ranged from 2nd -18th March, by far the majority of data was recorded in England (90%), so the UK average reflects the England date (15th March).

UK comparison with past years

Historical data: frog spawn records for 2006 show that activity is similar to 30 years ago and a few days later than in the 1940s. In warmer spring spawning is earlier and the general trend over time is for earlier spawn.

7-spot Ladybird

At the time of writing total records amount to over 19,000. Again ladybird records started before Christmas, but in very low numbers and given the temperatures, many of these records are likely to be of individuals that were disturbed by gardeners or where they were located in sheltered sunny locations, where micro-habitat temperatures may have risen sufficiently. Numbers of records for 7-spot built to a peak around the end of March as temperatures started to rise, with a good spread of records across the UK.

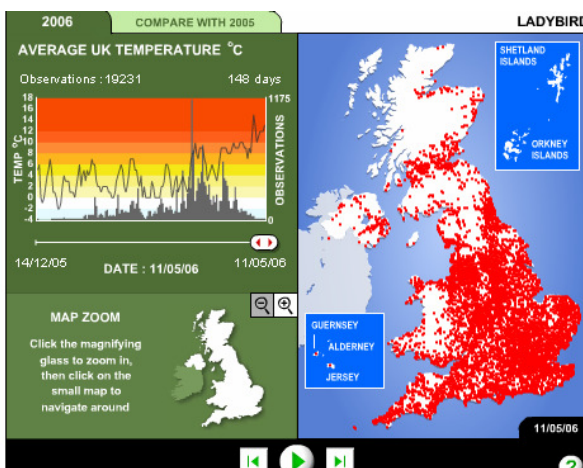


Figure 5: 7-spot Ladybird records also peaked around the end of March.

Our ladybird expert, Paul Mabbot, has told us that most early activity came later than usual (end of March, beginning of April) with very few winter records. Certainly, over the winter he saw absolutely no active 7-spots in places where they are seen most winters.

Ladybirds actually hibernate (diapause) in the winter, only emerging in the spring when temperatures increase. In recent warm years records have been received almost throughout the winter of active ladybirds. Indeed in 2005 there were large numbers of ladybird records in January. However 2006, being a more normal spring, showed fewer records of early activity. Later on there were also reports of large numbers in some places (hundreds or thousands) - numbers not reported for many years.

As with all animals that hibernate, insects need to ensure they have enough fat stores to survive the winter. Short warm periods in mid-winter can be problematic if the insect cannot find food when it wakes up, and uses up valuable fat reserves when it becomes active. A return to cold weather means a return to hibernation, but if fat reserves used when the insect was active haven't been replenished a stop-start winter can be a problem. While records do show that there was some ladybird activity in the earlier spring, this was not akin to last year's stop-start when large numbers had been seen in January 2005, before the cold snap in late February/ early March.

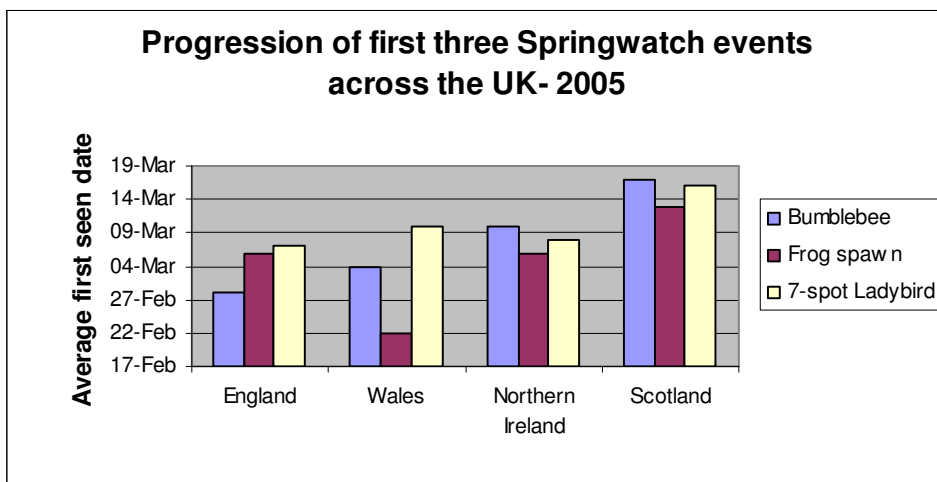
Average dates

The average date for 7-spot first seen across the UK was 19th March, 12 days later than last year. Whilst country averages ranged from 19th-26th March, by far the majority of data was recorded in England (93.5%), so the UK average reflects the England date (19th March).

UK comparison with past years

We have no historical data for ladybirds, but 2006 was 12 days later than 2005, indicating that temperature has a substantial effect.

Summary data- first group of species



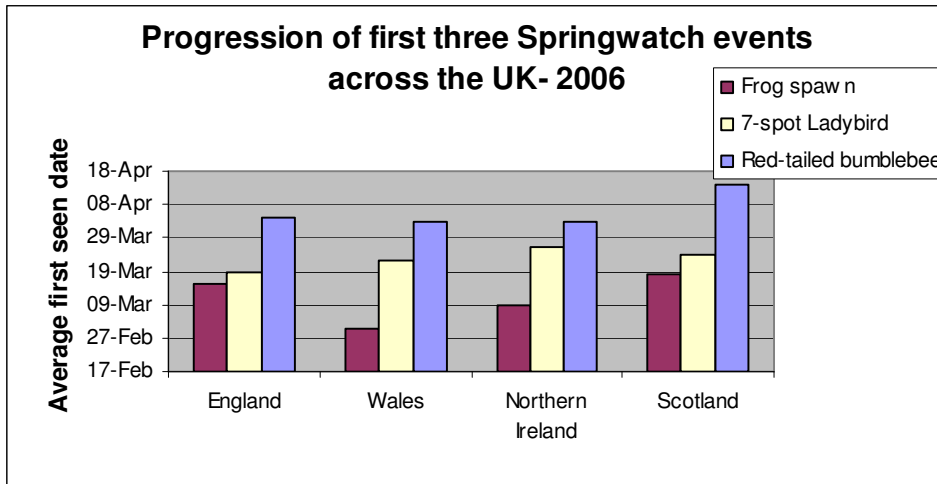


Figure 6: Timing across the UK was later and there was less of a variation between countries in 2006 compared with 2005. Perhaps in cooler years spring happens much quicker across the whole of the UK when the weather finally warms up. Wales seems much earlier than the rest of the UK because most records are from South Wales, which along with SW England is one of the earliest areas of the UK for frog spawn.

Species/event	UK Average date for 2006 (Springwatch)	England Average date for 2006 (Springwatch)	Wales Average date for 2006 (Springwatch)	Northern Ireland Average date for 2006 (Springwatch)	Scotland Average date for 2006 (Springwatch)
Bumblebee- first seen	04-Apr	04-Apr	03-Apr	03-Apr	14-Apr
Frog spawn- first seen	15-Mar	15-Mar	02-Mar	09-Mar	18-Mar
7-spot Ladybird- first seen	19-Mar	19-Mar	22-Mar	26-Mar	24-Mar

Table 1: Average Springwatch dates across the UK for the first three events. Timing seems much more consistent across the UK in 2006

Peacock butterfly

At the time of writing total records amount to over 7,000. Records started slowly and as with 7-spot ladybird we suspect early records were of disturbed individuals or ones in sheltered sunny micro-habitats. Records didn't start to build until towards the end of March with the peak taking place in mid April. Analysis of Springwatch records with temperature suggests that activity of peacock butterflies only really began in earnest once the temperature rose above about 8°C. This is an anecdotal observation, but large numbers were not recorded when temperature remained below this point. Peacock butterfly continue to expand their range into northern Britain, perhaps as a result of warming climate.

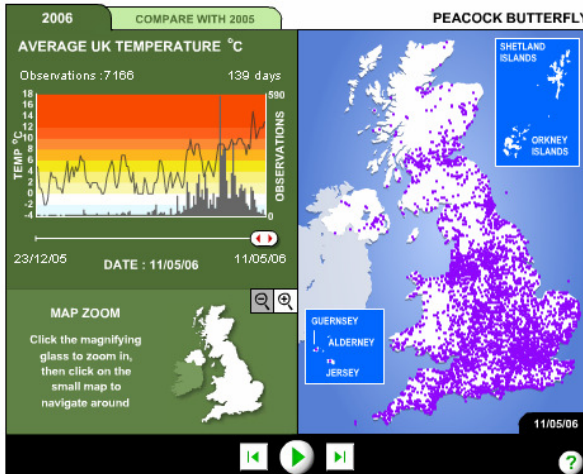


Figure 7: A large peak in peacock records occurred in mid April, some time later than the other Springwatch insects

Average dates

The average date for peacock first seen across the UK was 8th April, eight days after the 2005 average. Whilst country averages ranged from 8th -14th April, by far the majority of data was recorded in England (90%), so the UK average reflects the England date (8th April).

UK comparison with past years

Whilst eight days later than the warm spring of 2005, the average UK date was still a week earlier than what we consider the 30-year average date of 15th April.

Hawthorn flowering

Total records for Hawthorn amount to over 11,300. However we know that this data contains wrongly identified blackthorn records. Hawthorn started flowering in early May, so records before this are most likely to be blackthorn. Hawthorn flowering peaked on the 11th and 12th of May.

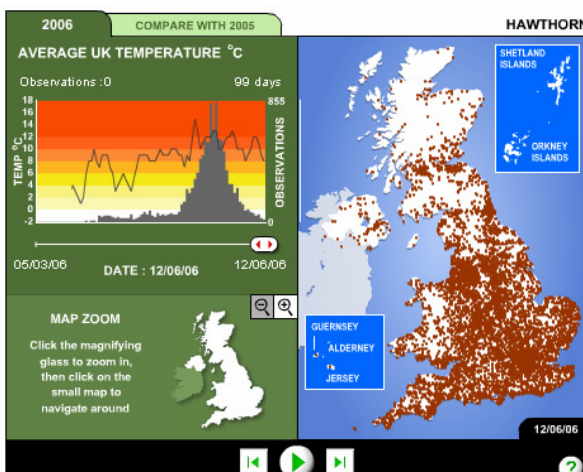


Figure 8: Much of the earlier records, that date back to 28th March are undoubtedly blackthorn. Hawthorn only started flowering in the first week of May and peaked on the 11th & 12th.

Average dates

The average date for hawthorn first seen flowering across the UK was 3rd May (this date will be skewed by the blackthorn records in the data), nine days after the 2005 average. As with other events by far the majority of data was recorded in England (90%), so the UK average reflects the England date.

UK comparison with past years

Whilst nine days later than the warm spring of 2005, the average UK date was still ten days earlier than historical (RMS) records and eight days earlier than what we consider the 30-year average date of 11th May.

Swift

Total record numbers amount to over 14,600 records. Records began in mid April and BTO's Bird Track had also recorded a few early arrivals at this stage. Many of these early records come from water bodies rather than from breeding grounds in villages and towns. When swifts first arrive they tend to head for lakes and reservoirs to feed up, and it can be a week or so later before they are seen around breeding areas.

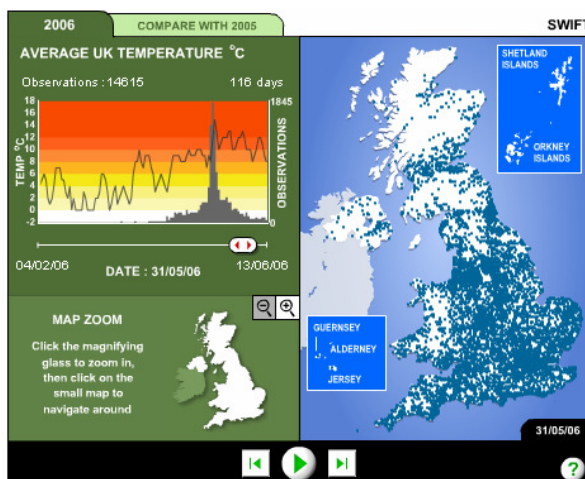


Figure 9: Peak observation of first swift occurred on 2nd May on a rising temperature, although some early arrivals had been seen a week or two before,

Average dates

The average date for swift first seen across the UK was 1st May, only one day later than the 2005 date of 30th April. Whilst country averages vary, by far the majority of data was recorded in England (91%), so the UK average reflects the England date (1st May).

UK comparison with past years

Whilst only one day later than the warm spring of 2005, the average UK date was also 9 days earlier than what we consider the 30-year average date of 10th May.

Summary data- second group of species.

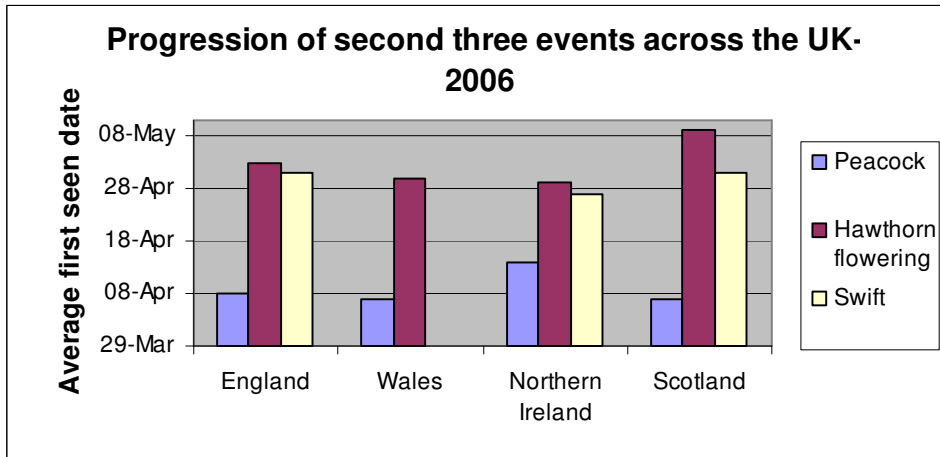


Figure 10: Timing of later events in both 2005 & 2006, with hawthorn records yet to come.

	UK	England	Wales	Northern Ireland	Scotland
Species/event	Average date for 2006 (Springwatch)	Average date for 2006 (Springwatch)	Average date for 2006 (Springwatch)	Average date for 2006 (Springwatch)	Average date for 2006 (Springwatch)
Peacock butterfly- first seen	08-Apr	08-Apr	07-Apr	14-Apr	07-Apr
Hawthorn- flowering	03-May	03-May	30-Apr	29-Apr	09-May
Swift- first seen	01-May	01-May	29-Apr	27-Apr	01-May

Table 2: Average Springwatch dates across the UK for the second group of species.

Springwatch CBBC Horse chestnut

To date, horse chestnut records total 500, 160 and 46, for budburst, first leaf and first flower (till underway) respectively. Insufficient records exist in Scotland and Wales to warrant separate country analysis and England records total over 93%. While these figures may at first seem disappointing, web traffic has been good and we know from UKPN recording that people find buds difficult to identify, particularly as trees in winter can be confusing. Thought could be given to an event for CBBC which is more likely to capture children's imagination and which is less difficult to identify, for example frog spawn or 7-spot ladybird. While CBBC were keen to have an event that wasn't included as part of the main Springwatch six, it might actually be interesting to compare CBBC data with Springwatch data, for the same event, in future years.

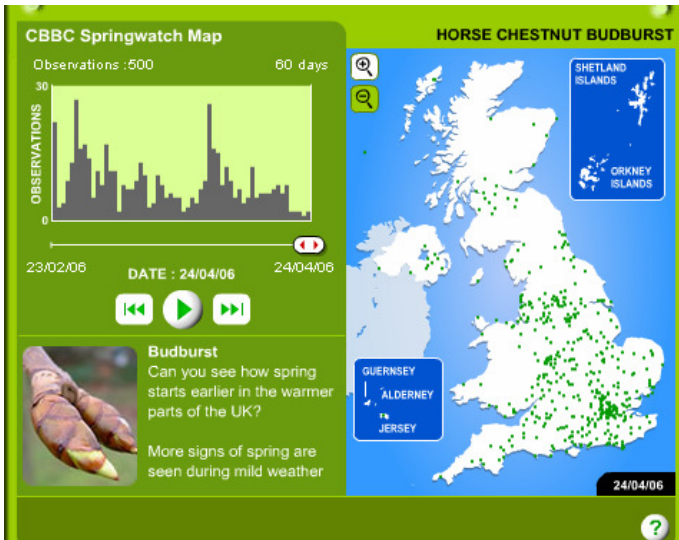


Figure 11: Several peaks from mid February to early April suggest the stop-start nature of spring in certain areas.

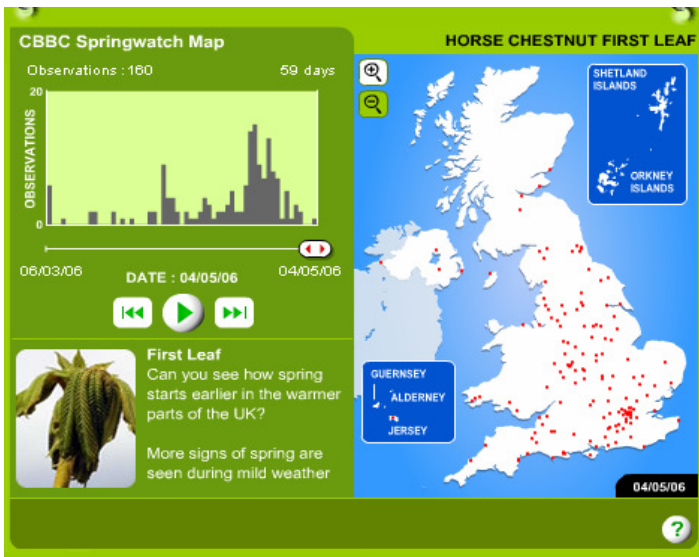


Figure 12: A fairly clear peak in observations of first leaf is seen around 20th April

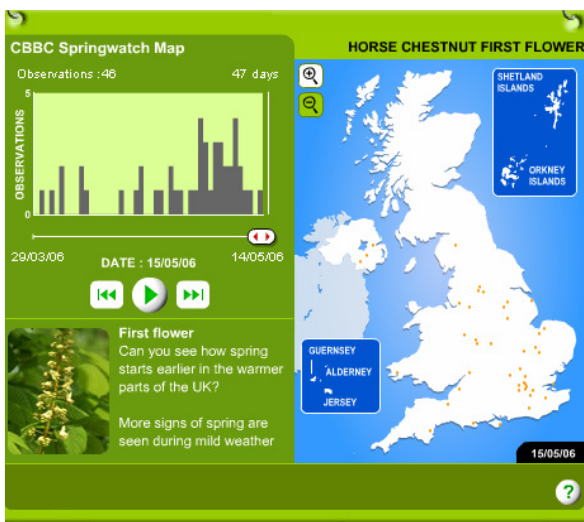


Figure 13: At the time of writing the peak of first flowering appears to be from 1st-9th May, although the provisional UK average is 20th April.

Species/event	CBBC average 2006	"Normal" timing (based on 2001 data)
Bud burst	20-Mar	02-Apr
First leaf	14-Apr	15-Apr
First flower	20-Apr	10-May

Table 3: CBBC average dates compared with normal timing (i.e. 2001- our surrogate for the 30-year average spring). Data is still coming in for first flower and it is likely the CBBC average date will get later

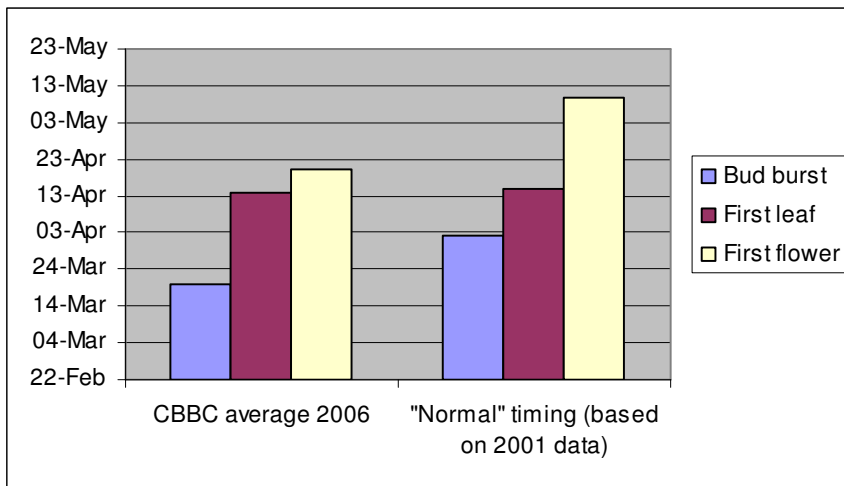


Figure 14: Compares the average timing of events with more normal timing.

As expected both sets of data in figure 14 show the sequence of the different events i.e. budburst, first leaf and first flower. First flower date is likely to get later, as records are still coming in.