

Gardens of 2050: January cherry blossom and winter buttercup blooms

Spring will arrive a month earlier in 40 years' time thanks to the warming oceans around British Isles, new study predicts



Cherry blossom. Photograph: Andy Rain/EPA

It is a discovery which should delight Britain's gardeners: by 2050, spring will start before Valentine's day. Cherry and pear trees will blossom in late January, while flower beds will be crowded with blooming buttercups, iris and geraniums long before winter has officially ended.

A new study on the impact of our warming climate has found that across most low-lying, coastal areas of the globe, spring will begin for many [plants](#) at least a month earlier than it does now and will end several weeks later in 40 years time.

The predictions are based on a detailed study of plant records from the Royal Botanic Garden in Edinburgh (RBGE) from 1850 and weather records for Edinburgh dating back to 1775, by two scientists, Malcolm Clark of Monash university in Australia and Roy Thompson, at the University of Edinburgh.

They have confirmed that the "botanical calendar" has changed for scores of plants in the RBGE collection, which for more than 150 years has gathered plants from across the globe, are now flowering earlier as average air temperatures slowly but steadily rise. The most affected are plants such as ornamental cherry, peach and pear trees, anemones, saxifrage, irises and perennials such as three-leaved bittercress.

But Clark and Thompson warn that an ever-earlier spring is likely to create significant problems for the plants affected, for farmers and for many of the bird and insect species which rely on them.

As flowering plants move out of step, or "desynchronise", with normal seasons, serious problems may emerge with the pollination of the plants involved. They may flower before the birds and insects that feed on them, or the mammals that carry their pollen, are at large. Most animal behaviour is guided by the length of the day rather than temperature.

They believe the worst-affected places will be low-lying coastal regions of the world and places with maritime climates like the British Isles and western Europe, the Atlantic coast of north America as far south as Florida, New Zealand, Chile and north Africa.

The true start of spring is already a controversial subject. Traditionally, spring starts with the vernal equinox on about 20 or 21 March and ends with the summer solstice on 21 June, but for statistical and record-keeping purposes, the Met Office officially records spring as starting on 1 March and ending on 31 May.

But with continued global warming, these dates are likely to become even less meaningful.

In maritime areas, for every 1C of warming, flowers will bloom as if spring had begun 16 days earlier and ended 11 days later.

Using widely accepted predictions that the world's climate will warm by at least 2C by 2050, leading to warmer winters, this would mean that spring in the British Isles will no longer start on 1 March, but in late January, and end in late June.

In continental regions, further from the warming effects of the [oceans](#), the impact will be lessened but still significant, with the flowering starting seven days sooner and ending 11 days later for every degree of warming.

"Already there is a great deal of observational evidence of regional changes in climate associated with global warming," said Clark. "We have not only seen an earlier break up of ice on rivers and melting glaciers, but also the early emergence of insects, egg laying by birds and the flowering of plants. This new model allows us to refine predictions of the future impact of warming on plant and animal life across much of the world.

"Although the study is based on plant life in [Scotland](#), our models apply across regions spanning hundreds of thousands of square kilometres," said Clark.

But the full impact this will have on the environment is still very difficult to predict. Some plants are more sensitive to temperature changes than others; in some regions, there will be plants and trees that are not heavily affected growing alongside other plants flowering weeks earlier than normal.

Thompson also fears that the pace of climate warming is faster than the ability of plants – particularly long-lived trees - to adapt and evolve, leaving some at risk of dying out in many areas. "We're predicting very fast rates of change. In the past, plants have kept pace with the climate and after the last ice age thawed had lots of

time to migrate. In the future, that's most unlikely to happen," he said. "It seems to me inevitable that they're going to be many extinctions."

He is also highly pessimistic about how much warming the world faces, which could see temperatures rising by as much as 5C by 2100. By then, some plants will be flowering shortly after Christmas.

"I'm a geophysicist, and I've trained my students to find oil. I think they're going to find every last drop of it, and that the Chinese and Indians will extract all the world's oil (*sic coal*) and that the world's population will increase. If you believe that, the world will continue warming."

Other climate changes

Fish

Cod and haddock are just two of the North Sea fishes that have had to [move scores of miles north](#) in search of cooler waters. Sea temperatures have risen by 1C in the past 25 years and more exotic southern species have entered North Sea waters. Scientists at the University of East Anglia found that 21 species had shifted their distributions in line with the rise in sea temperature, and 18 species had moved much further north.

Trees

As [climate change](#) affects rainfall around the world, many species of trees are not able to adapt quickly enough. The dimb tree in Senegal is struggling to survive the drier and hotter conditions there and, closer to home, scientists have warned that [oak trees will be severely affected](#) if nothing is done to stem temperature rises..

Birds

The British Trust for Ornithology [found that](#), in the period 1971-1995, 51 species of birds tended to nest and lay eggs earlier (around a week or more on average) as background temperatures increased. The species included the wren, nuthatch, starling and also waterbirds such as the oystercatcher, curlew and redshank.

Mosquitoes

The average temperature in Europe has increased by almost 1C in the past century and could rise by a further few degrees by the end of this century. The World Health Organisation has warned that [malaria-carrying mosquitoes will find their way out of the tropics](#) as the world warms and could even end up in southern England at some point.

Wine

Global warming is threatening to [play havoc](#) with the carefully managed crops in the vineyards of California and France. The warmer temperatures can mean that the grapes make their sugar too early, before the fruit is ready to be picked - this can affect the final taste and alcohol content of the wine.

Alok Jha

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Comments

-  [witsendnj](#)

10 Sep 09, 11:13am

The lede in this story is ridiculously overoptimistic and inaccurate. Happy Gardeners? Climate change is always followed by mass extinctions, especially at the pace humans have already made inevitable. Ecosystems are balanced from millennia of natural selection. Alter a basic element of the environment - temperature, or precipitation - and all the species that are interconnected cannot survive. There is no way for long-lived trees to adapt or migrate, and the plants and animals that depend upon them for food and shelter will perish too. This is basic evolutionary theory.

It's all very painful but we're not going to be able to get about the business of figuring out how humans can adjust until we stop pretending it will be just lovely to have cherry blossoms in January.

-  [cannaman](#)

10 Sep 09, 11:25am

As a keen gardener who lives in the South of France (the wetter bit) I can certainly confirm that the local conditions and weather patterns are visibly changing. The seasons are changing shape, winter is shrinking, spring is expanding, summer is shortening (but weather extremes are becoming a problem) and autumn is getting to be both longer and the best time of the year.

Where I am we get about 50% more rain than the UK average but we get it in massive doses rather than the steady trickle that I remember from my earlier years in the UK. This means that many of the plants get smashed by the storms and crops that require steady water burst their skins if you don't help out nature and water additionally (I have a well so I am not facing a problem despite the falling water table during the extreme canicules that we seem to get). We now only get a couple of light frosts each year despite being near the foothills of the Pyrenees. This means that generally if I avoid December, January, July and August, I can be productively growing for the rest of the year.

Those of you who say you are looking forward to the changes the UK is facing are correct in one sense, if your weather becomes like mine it is much nicer than you have at present, but remember the change does not come on it's own and you will probably face a language barrier as well ?

The billions of people around the world who are already facing the limits of human climate tolerance will be looking for a new home and I do not think they will learn the language first, they will probably just use their last 50 dollars to buy an AK47, some stout boots and an up to date climate atlas.

-  [realinformation](#)

10 Sep 09, 5:43pm

I would conclude the only words that **MeFinney2** understands are NO NO. I find it very surprising that at least 5 or 6 Sun readers regularly check the guardian, though they must be disappointed to find too few pictures for those unable to read. We are all sick of climate change deniers and their fatuous arguments, or often just bile and a blind refusal to consider evidence, just as we are all sick of the gutter press.

-  [nefastus](#)

10 Sep 09, 6:23pm

Thompson also fears that the pace of climate warming is faster than the ability of plants – particularly long-lived trees - to adapt and evolve, leaving some at risk of dying out in many areas.

This is one of the key concerns, some species will adapt in time others will not, and that will seriously affect the ecosystem as the proportion of r and K species changes.

-  [CentennialGarb](#)

10 Sep 09, 7:29pm

The global climate is warming. Period.

-  [Barmbyrover](#)

10 Sep 09, 11:43pm

I would dispute the bloom in January though, it is surely more likely that the "conveyor belt" across the Atlantic will be driven down early by the extra freshwater from the Arctic region and that the British Isles might well get colder in winter as a consequence. Equally as possible I would have thought,

and I don't think there is evidence either way yet. What is certain is that species will become extinct or will change with the conditions.

-  [MeFinny2](#)

11 Sep 09, 8:31am

As for the article in question, only a fool could deny the content, based as it is on records going back up to 250 years. If you've been conscious and aware for at least 20 years, you will have seen the changes for yourself. Only the most blinkered would still deny the obvious.

-  [shaunnixon](#)

11 Sep 09, 10:06am

With its [nature's calendar](#) survey, the [Woodland Trust](#) has been gathering records of seasonal change from tens of thousands of UK locations for a decade. There is data going back to the 1600s on how the changing climate is already:

- causing spring events to start earlier and autumn last longer
- giving competitive advantage to certain species
- disrupting the lifecycles of things like frogs and birds
- mismatching the members of food chains that rely on each other to survive
- changing the range of plants and animals

All of these factors threaten our remaining ancient woodland - *the UK's equivalent of the rainforests* - our richest habitat and the one least able to adapt to the SPEED of climate change (bluebells, ancient trees and the many members of this fragile habitat simply cannot uproot and move north quick enough). So this national charity is:

- planting new trees around existing woods to make them bigger and more resilient to change (a larger wood has more diversity is more able to adapt and survive).
- pressuring government to properly protect what's left
- researching how changing *phenology* - the timing of the seasons - affects water supplies, leaf fall (think of leaves on the line), health (hayfever season getting longer) and food supply, among others.

You can see the maps, historic data and add your own sightings at naturescalendar.org.uk

You can help protect what little native woodland we have left and plant new trees for wildlife and people at woodlandtrust.org.uk

-  [DavidStewart17](#)

11 Sep 09, 9:09pm

I think that at best we can only classify this article as a "MAYBE" Have a look at this National Geographic article here: [Sea Levels Rise Two Feet This Summer in U.S. East](#)

Although they do not get into any reasons for the slowdown in the Gulf Stream, there is one factor that has been discussed a great deal in the face of Global Warming. As the relatively salt free cooler water comes of the the Arctic and Greenland glaciers at an increasing pace, the motor of the Gulf Stream will idle down.

Some have speculated that it may even stop. Think in terms of a UK climate that is the equivalent of Canada's Labrador . . .

Global warming may really mean a much colder climate for the UK. Although given a choice between pondering February cherry blossoms on the one hand, or -40 degrees Celsius February s on the other . . . well I can't blame the Botanical Society for dreaming . . .

-  [ProfRoyThompson](#)

11 Sep 09, 3:52pm

Prof. Roy Thompson's responses to comments in chronological order

witsendnj 10 Sep 09, 11:13am

(Alter a basic element of the environment - temperature, or precipitation - and all the species that are interconnected cannot survive.)

Agreed. That is exactly the main point that our article in IJC was trying to make. Ecosystems are going to become unbalanced. Our map

<http://www.geos.ed.ac.uk/homes/thompson/Map.jpg>

shows which regions of the world will be affected most. Our main phenological map is produced by combining four others maps

<http://www.geos.ed.ac.uk/homes/thompson/Spring.html>

Four key remaining grand challenges are listed here,

<http://www.geos.ed.ac.uk/homes/thompson/Grand.html>

cannaman 10 Sep 09, 11:25am

(As a keen gardener who lives in the South of France)

Yes, the climate in Edinburgh by 2080 will indeed resemble that of France (actually more like that around Nantes than the South of France). Such geographical comparisons provide an excellent way for helping the man-in-the-street understand how large the predicted changes in climate are going to be. Yes, huge numbers of people are close to the limits of climate tolerance. A prime example is the densely populated Ganges Plain where pronounced

summer warming is expected by 2080 and large numbers can be expected to die because of global warming.

realinformation 10 Sep 09, 5:43pm

(We are all sick of climate change deniers and their fatuous arguments.)

Agreed.

nefastus 10 Sep 09, 6:23pm

(Back on topic. - This is one of the key concerns)

Exactly, many plants and animals will suffer from climate changes. However, r-strategist taxa (e.g. weeds) that have adopted the strategy of having as many offspring as possible, and that tend to have short life spans will do well.

Whereas K-strategist species that have evolved to keep a stable population close to carrying capacity will do very badly.

CentennialGarb 10 Sep 09, 7:29pm

(The global climate is warming. Period.)

Yes, but one has to demonstrate that the consequences will actually be of practical significance and the rate at which they will occur.

Barmbyrover 10 Sep 09, 11:43pm

(What is certain is that species will become extinct.)

Largely agreed. It is much easier to convince people that global warming has already led to physical changes such as in the volume of sea-ice or the retreat of glaciers. Demonstrating impacts on plants and animals is more difficult.

The problem is that the year-by-year variations caused by changes in the weather obscure the climate change signal which so far has only been rather minor. That is the year-by-year noise is greater than the climate signal. The 'cleaver trick in our methodology is to put the noise to use. We achieve this by calibrating our phenological equations using the inter-annual variations. Then we use the equations to predict the future impacts.

MeFinny2

(If you've been ... aware for at least 20 years, you will have seen the changes for yourself.)

No. It really is not that easy to detect changes on plants and animals, even over a 20 year period, and to show that they are obvious. You need somehow to extract the climate signal from the much stronger noise produced by changes in the weather.

shaunnixon 11 Sep 09, 10:06am

(woodlandtrust.org.uk)

Yes, totally agreed. If you are concerned about climate change and its effects then helping the Woodland Trust is a really worthwhile activity. Phenological observation is one of the few areas of science today where ordinary individuals can engage and make a really worthwhile contribution. There is no need for expensive or complex equipment.

DavidStewart17 11 Sep 09, 9:09pm

(National Geographic article)

While glossy magazines (like National Geographic) continue to be concerned about a possible future slowdown in the Gulf Stream, a slowdown is only of minor concern to climate scientists because the slowdown is only seen in lower complexity (sometimes called ‘toy’) models. It has never been observed in full GCMs (fully coupled climate models). By far the best summary of the current state-of-the-art of climate research is, as always, the most recent IPCC reports, and not in glossy magazines, nor in Hollywood films.