

WILDFLOWERS AND SIDMOUTH'S CHANGING CLIMATE

Sidmouth is said to enjoy a 'Goldilocks' climate, not too cold in winter and not too hot in summer. That is one of the reasons it became a fashionable resort in Regency times, particularly for people seeking convalescence. It is also why we have many plants, wild and cultivated, flowering out of season.

The Sid Valley Biodiversity Group has been surveying herbaceous flowers across the valley during 2021 and they have found several species that defy the textbooks when it comes to their flowering period. The volunteers recorded 103 different species still in flower in October, and more than 40 so far in November when most species should have shut down for the winter.



Meadow Buttercup, Soldiers Hill 14-11-2021



Sea Campion, Millennium Walkway, 10-11-2021



Bush Vetch, Bickwell Lane, 15-02-2021¹



Herb Robert, Cotmaton Road 28-02-2021

Plants have flowers to produce seeds. They stop flowering by October because there are few insects still flying then and so, with no pollinators, it would waste the plants' resources to open new flowers that will not set seed. Sidmouth's milder winters affect insects as well as the plants, some local bees, butterflies, and hover flies carry on flying into at least November.



Red Admiral, Salcombe Regis 20-10-2021.



Drone Fly, Soldier's Hill 14-11-2021.

¹ Thank you to Martin Pratt for the picture.

The table below shows a selection of species that have been in flower for much of the year, including a few garden escapes. The green boxes are the expected flowering months according to the Collins Wild Flower Guide, orange boxes are other months where the plant was recorded in flower. It is likely that some species were flowering in the empty box months, but they were not recorded.

| Latin Name | Common Name | J | F | M | A | M | J | J | A | S | O | N |
|----------------------------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|
| <i>Achillea millefolium</i> | Yarrow | x | | | | x | x | x | X | x | x | x |
| <i>Calendula officinalis</i> | Pot Marigold | x | x | x | x | x | x | x | X | x | x | x |
| <i>Campanula poscharskyana</i> | Trailing Bellflower | x | | x | x | x | x | x | X | x | x | x |
| <i>Centranthus ruber</i> | Red Valerian | | | | x | x | x | x | X | x | x | x |
| <i>Cymbalaria muralis</i> | Ivy-Leaved Toadflax | x | x | x | x | x | x | x | X | x | x | x |
| <i>Euphorbia peplus</i> | Petty Spurge | x | x | x | x | x | x | x | X | x | x | x |
| <i>Geranium robertianum</i> | Herb Robert | x | x | x | x | x | x | x | X | x | x | x |
| <i>Geum urbanum</i> | Wood Avens | | | x | x | x | x | x | X | x | x | |
| <i>Heracleum sphondylium</i> | Hogweed | x | | | | x | x | x | X | x | x | x |
| <i>Lapsana communis</i> | Nipplewort | x | | x | x | x | x | x | X | x | x | x |
| <i>Pentaglottis sempervirens</i> | Green Alkanet | | | x | x | x | x | x | X | | x | x |
| <i>Ranunculus acris</i> | Meadow Buttercup | | | | x | x | x | x | X | x | x | x |
| <i>Ranunculus repens</i> | Creeping Buttercup | | | | x | x | x | x | X | x | x | x |
| <i>Silene dioica</i> | Red Campion | x | x | x | x | x | x | x | X | x | x | x |
| <i>Silene uniflora</i> | Sea Campion | | | | x | x | x | x | X | x | x | x |
| <i>Sonchus oleraceus</i> | Smooth Sowthistle | x | x | x | x | x | x | x | X | x | x | x |
| <i>Trifolium pratense</i> | Red Clover | | | x | x | x | x | x | X | x | x | x |
| <i>Veronica chamaedris</i> | Germander Speedwell | | x | x | x | x | x | x | X | | | x |
| <i>Vicia sepium</i> | Bush Vetch | x | x | x | x | | x | x | X | x | x | x |

Regency tales of Sidmouth’s balmy climate were questionable because they had little scientific data to back them up, and they may have been exaggerated to encourage the embryonic tourist industry. In 1872, local doctor J. Ingleby Mackenzie decided to test the idea. Doctor Mackenzie was a skilled meteorologist who took careful daily records, including the use of a range of thermometers to ensure accurate temperature measurements. He published detailed weather records for Sidmouth from 1865-71². Figure 1 shows mean temperature data over those 7 years for Sidmouth and Greenwich. Sidmouth did indeed have warmer winters and cooler summers than the home of the Royal Observatory on the south east edge of the city of London. Summer months were, on average 1.9° cooler in Sidmouth while winter months were 2.7° warmer.

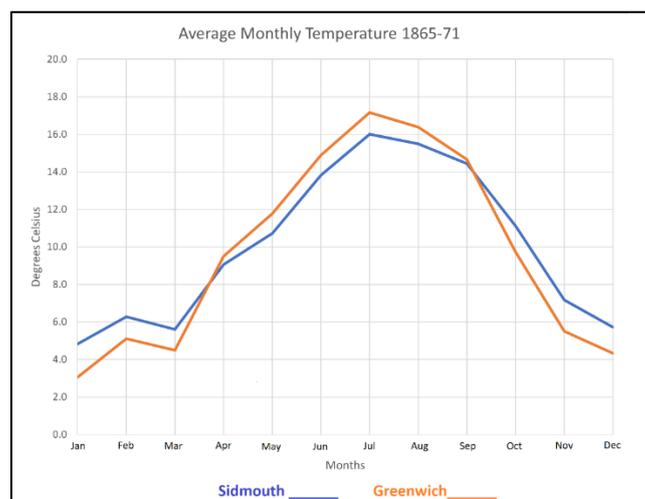


Figure 1. Monthly Temperatures Sidmouth & Greenwich 1865-71

² Ingleby Mackenzie, J. 1872. Seven Years’ Meteorology of Sidmouth, 1865-1871. *Devonshire Association Transactions* 5: 392-403.

Two degrees may not seem much, the weather fluctuates from month to month and year to year but, to be maintained over seven years, it requires a significant shift. It was strong enough for Mackenzie to conclude that it proves Sidmouth's 'equability of temperature.'

Weather changes from day to day, even hour to hour. Climate is weather over a prolonged period and smooths out the daily variations, but it is not constant. It responds to changes in the Earth's orbit, the Sun's output, and changes to the Earth's atmosphere, particularly concentrations of CO₂, methane, and water vapour. Generally, these changes are gradual and make little progress during a human lifespan, but there is evidence that our climate is changing more quickly at present than at any time since the last catastrophic event some sixty million years ago. Some of Mackenzie's other data can be compared to recent records to give us a glimpse into the change.

Figure 2 shows the mean maximum and minimum temperatures and the monthly means for Sidmouth using data from Mackenzie and the Sidmouth Town Council weather station. It shows that mean temperatures for each month are higher now than 150 years ago. The summer mean has risen from 15.1° to 16.5° and the winter mean has risen from 5.6° to 7.1°. The annual mean temperature has risen by 1.5° from 10°c to 11.5°.

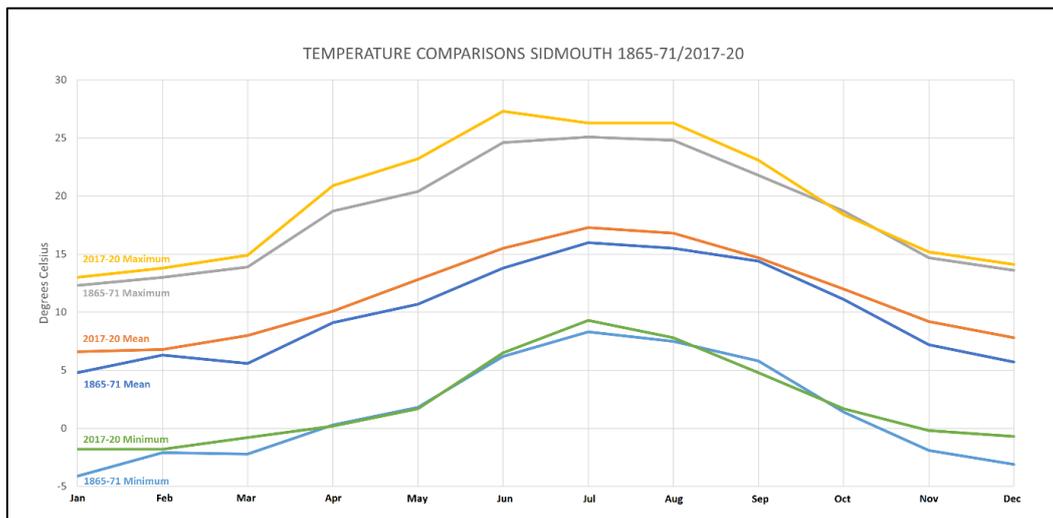


Figure 2. Monthly Temperatures for Sidmouth 1865-71 & 2017-20

If you aggregate the monthly data to the seasonal level, the increase across the year has been remarkably uniform.

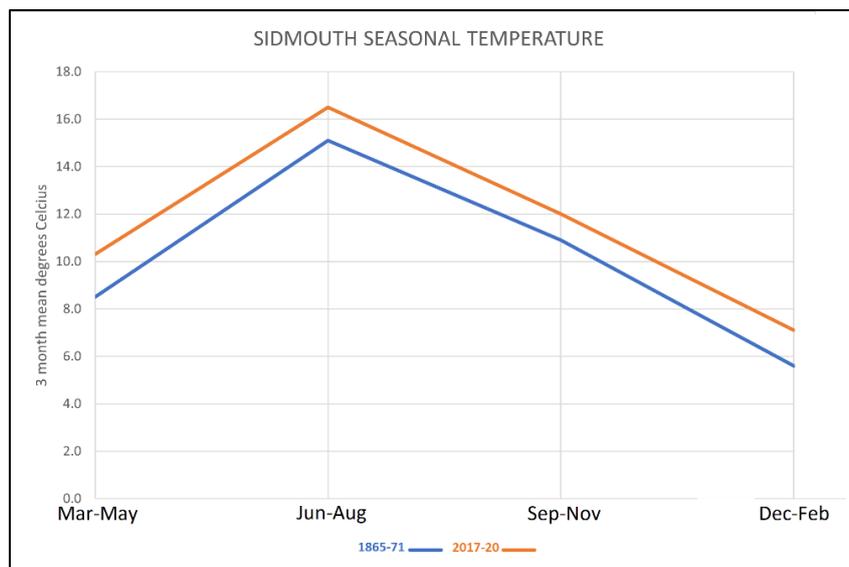


Figure 3. Seasonal Temperature Increase

Using data from worldweatheronline.com and the Sidmouth weather station, Figure 4 shows that Sidmouth’s winter advantage over Greenwich has decreased but the summer difference has widened from 1.9° in 1871 to 3.3° today. The most likely cause is that Greenwich is now in the middle of a large city. If you want to escape city heat, Sidmouth is now even more attractive, and the trend of climate change is likely to make the difference even greater as years pass.

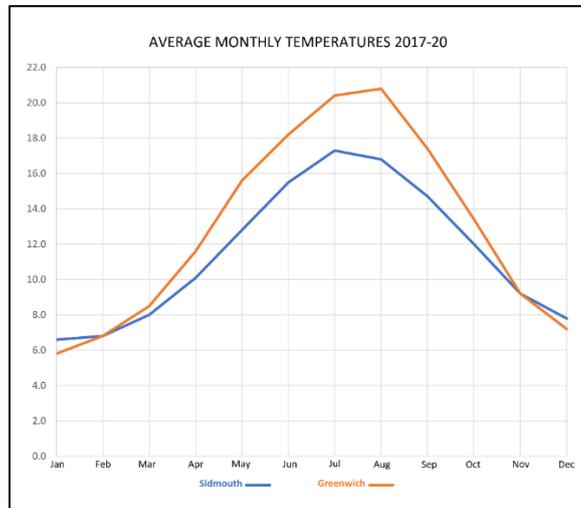


Figure 4. Monthly Mean Temperatures Sidmouth & Greenwich 2017-20

Temperature is only one climate component that affects the valley’s plants, another is rainfall. The Mackenzie and Town Council data show a slight drop in the mean annual rainfall over the 150 years, but this is not part of a consistent trend. Sidmouth resident John Tindall kept a record of the shingle levels on the beach during the 1920s. In his diaries, his data was linked to weather observations including rainfall data provided by another local resident, Miss Radford. The 1920s included some very wet and stormy periods which were linked to an increase in the frequency of cliff falls.

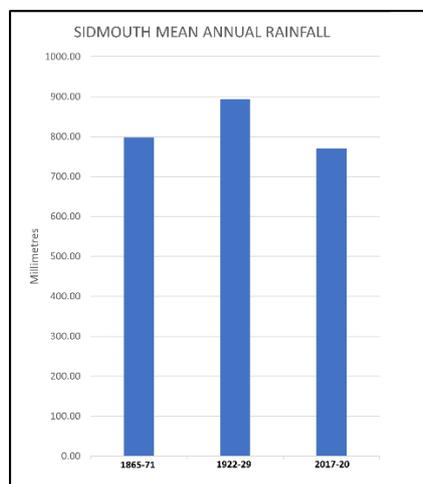


Figure 5. Annual Rainfall

The rainfall pattern across the year has a profound effect on wildflowers. Too dry in the germination season and seeds will not sprout, too wet in the growing season and plants drown in waterlogged ground. In Sidmouth, the pattern is one of rather wet winters and drier summers, but there can be long periods of dry weather interspersed with occasional very heavy storms at any time of year. The data is too erratic from month to month and year to year to make it easy to see clear trends, Figures 6, 7 & 8. In November 2018 there was only 22.4mm of rain, while 102.0mm fell in December. There was no rainfall at all in September 1865 but more than 220mm in September 1866. To make sensible conclusions, it is essential to take average data across several years.

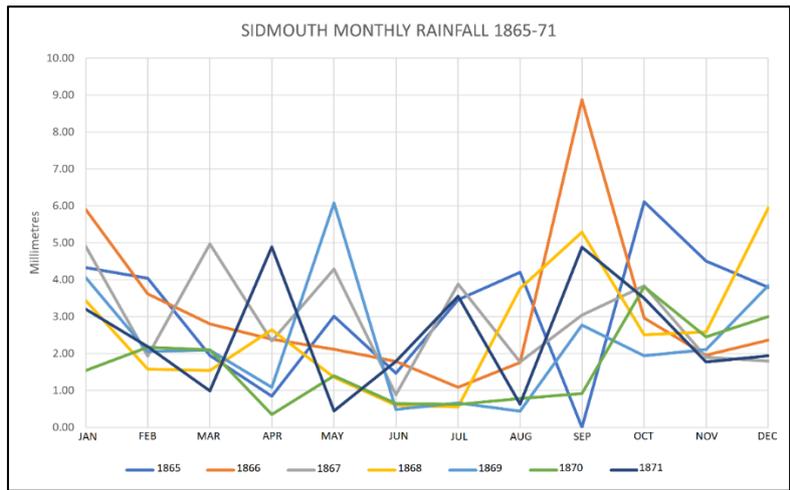


Figure 6. Monthly Rainfall 1860s.

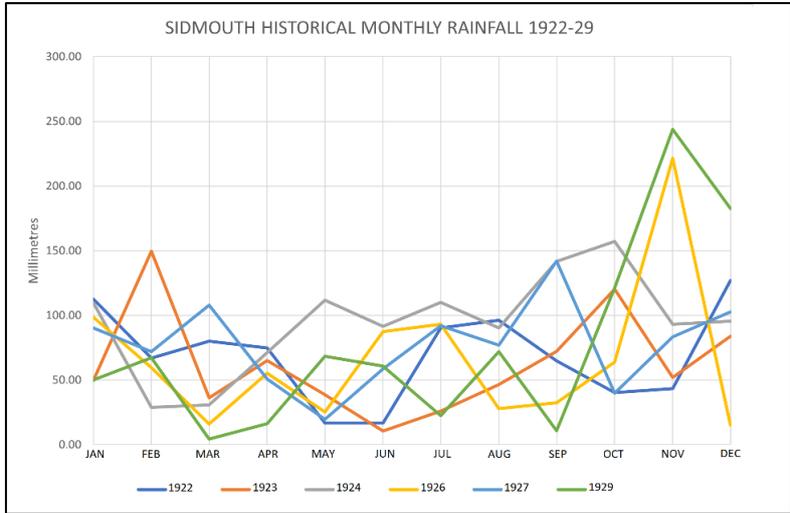


Figure 7. Monthly Rainfall 1920s (1925 & 28 not available).

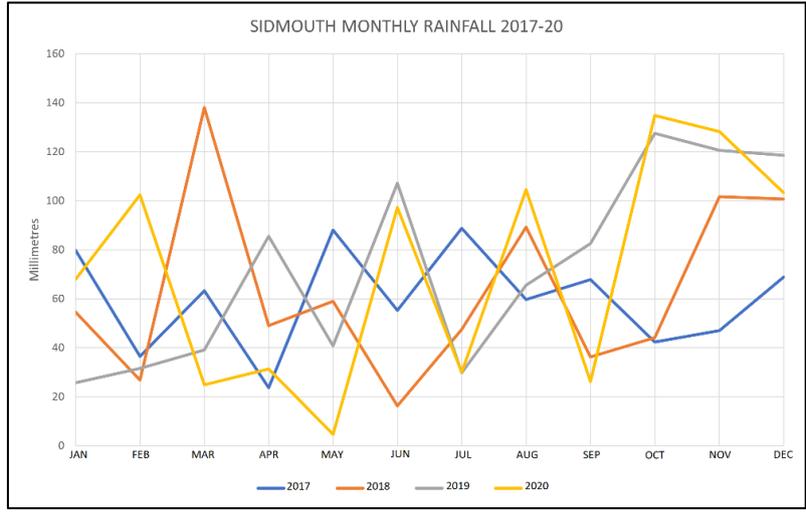


Figure 8. Monthly Rainfall 2010s

Aggregating the years into monthly mean data, Figure 9, does show a clear pattern of drier summers and wetter winters, but it still leaves historical variations difficult to determine. The data can be aggregated to another level, that of three-month seasons as defined by the Meteorological Office, spring comprising March to May, summer being June, July and August, September to November being autumn, and the winter months of December, January and February.

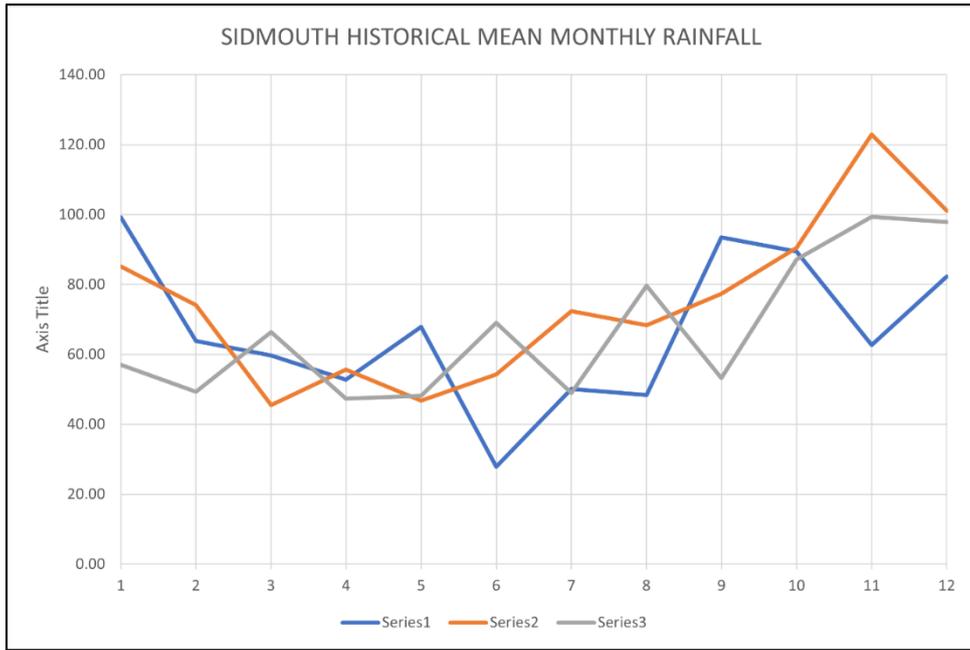


Figure 9. Historical Monthly Rainfall.

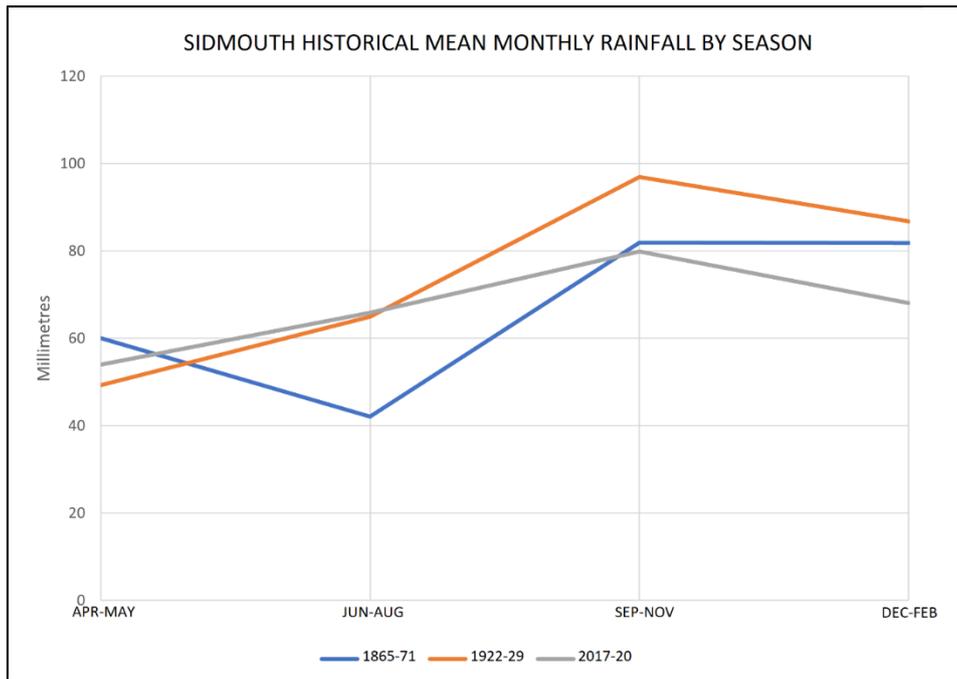


Figure 10. Historical Seasonal Rainfall

Figure 10 shows that summers were much drier in the 1860s. Spring and summer rain in the 1920s was much the same as in recent years, including 2021 which is not included in the above data. Winters have been drier in recent years, and this may be a factor in spring plants making an earlier start because drier ground tends to be warmer. Much of the extra rain in the 1920s fell in the autumn and a possible surprise is that autumn is the wettest season across all three periods.

We do not know how our climate will develop in years to come, nor how our herbaceous flora will respond. For some species, it will be a problem for others it will be an opportunity.

Ed Dolphin