

## Fluctuations in annual numbers of flowering bee orchids (*Ophrys apifera*) in South Ayrshire, Scotland

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The bee orchid (*Ophrys apifera*) has a wide range across Europe, the Middle East and North Africa (Harrap & Harrap, 2009). It is present locally throughout England, Wales and Ireland, but is extremely rare in Scotland, having been recorded in only southern areas of the country at about ten locations in Argyll and Bute, Dumfries and Galloway, East Ayrshire, Glasgow, East Lothian and Berwickshire (Laney & Stanley, 2004a, 2004b; Allan & Woods, 1993; Anon., 2017; NBN, 2020; BSBI, 2020).

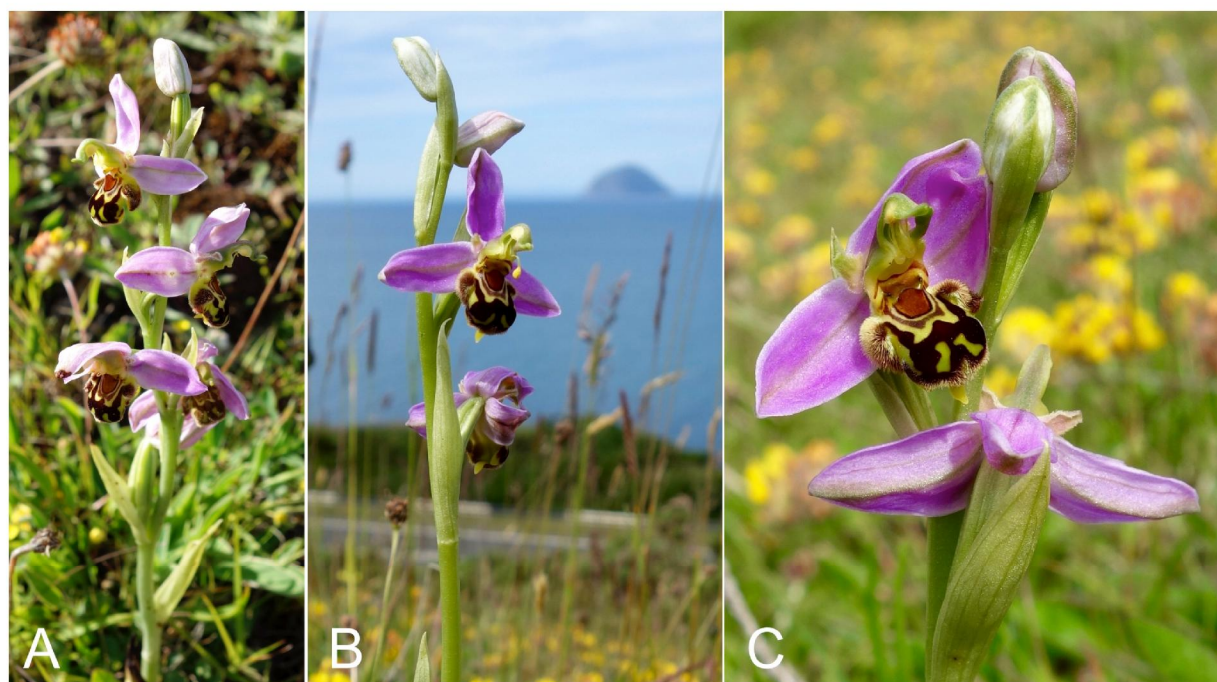
On 29th June 2014, Darren O'Brien and I discovered bee orchids at a new location in South Ayrshire at Bennane Head Grasslands (NX10508796) (Fig. 1A). This site is an embankment of the A77 road at a coastal location, with large numbers of other orchid species present including green-winged orchid (*Anacamptis morio*), early-purple orchid (*Orchis mascula*), heath

fragrant-orchid (*Gymnadenia borealis*) and common spotted-orchid (*Dactylorhiza fuchsii*). The bee orchid site is within Bennane Head Grasslands Site of Special Scientific Interest (SSSI) notified for both its lowland neutral grassland and its population of green-winged orchids (Registers of Scotland, 2020).

On this day we counted 110 flowering spikes of bee orchid on an area of the slope that was particularly bare, little colonised by other vegetation, typical habitat for bee orchids, which are usually found on poor and disturbed ground (Harrap & Harrap, 2009). This is one of the largest counts of bee orchids ever recorded at a site in Scotland. Each subsequent year to 2019, I have returned to Bennane Head and made counts of the flowering spikes, which have fluctuated in numbers (Table 1). Every year the slope where they grew has remained similarly bare, with much open ground and little vegetation growth (Fig. 1B,C).

Year	Number of flower spikes	Date counted
2014	110	29/06
2015	60	01/07
2016	85	03/07
2017	40	01/07
2018	55	30/06
2019	25	22/06

**Table 1.** Number of bee orchid (*Ophrys apifera*) flower spikes, Bennane Head, South Ayrshire, Scotland, 2014-2019.



**Fig. 1.** Bee orchids (*Ophrys apifera*), Bennane Head, South Ayrshire, Scotland. A, 29th June 2014. B,C, 22nd June 2019. (Photos: C.J. McNerny)

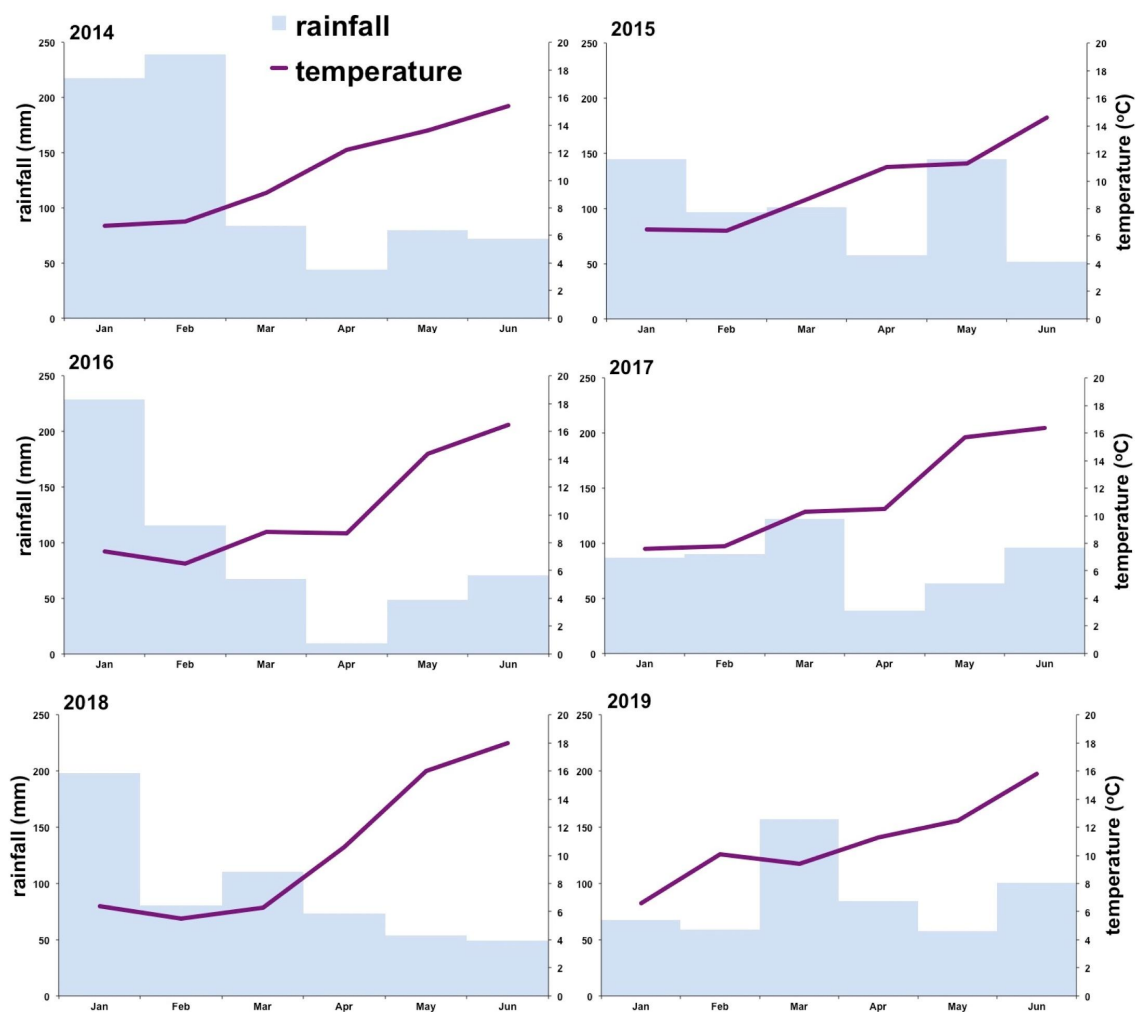
Bee orchids live on average 6.6 years (range 5.8-11.2 years) and, though some individual plants can flower in consecutive years, usually they remain dormant for one to two years before flowering again (Harrap & Harrap, 2009). On years when lower numbers of flowering spikes were counted at Bennane Head it appeared that the ground of the slope was particularly dry, with almost no general sward growth, suggesting that low rainfall earlier in the year might explain the smaller numbers of bee orchids flowering in June.

To explore this possibility I interrogated the temperature and rainfall patterns for the region over the period 2014-2019. Data were obtained from the Met Office for the months January to June for each year, before and during the period when the orchids grow a stalk and flower, with these plotted for each year (Fig. 2).

The change in monthly average temperature from January to June appeared similar each year from 2014 to 2019, increasing from 6-8°C to 16-18°C (Fig. 2). This observation suggests that the differences in numbers of

flowering plants were not influenced by differences in ambient temperature from January to June.

However, differences were apparent in the amount of monthly rainfall between years, with the highest winter rainfall in January and February 2014, the year when the largest numbers of flowering spikes were counted (Fig. 2); larger spike numbers were also seen in 2016 and 2018 when higher winter rainfall was observed. In contrast, lower winter rainfall was recorded in 2015, 2017 and 2019, the years of smaller spike numbers. It is possible therefore that winter rainfall influences the numbers of bee orchids flowering each year. As part of their development plants appear above ground in late winter as single leaves (Harrap & Harrap, 2009), so it is possible that growth during this season is significant in relation to flowering later in the year. I plan to continue monitoring these beautiful flowers at Bennane Head in the future, to further test if the correlation between flowering spike numbers and increased winter rainfall continues.



**Fig. 2.** Monthly rainfall and air temperature for January to June 2014-2019, from Ballypatrick Forest, Northern Ireland (Met Office, 2020). This site is the nearest Met Office meteorological station to Bennane Head, South Ayrshire, for which historic data are readily available, being *ca.* 50 km distant across the Irish Sea.

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