Comparison of herbaria collected by botanists over centuries shows impact of climate change

November 8 2023, by Bob Yirka

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A team of botanists and biologists affiliated with several institutions in Italy has found it is possible to trace changes to plant life in some parts

of the world by studying herbaria created by plant enthusiasts. In their study, reported in the journal *Royal Society Open Science*, the group compared plant samples in herbaria created by Ulisse Aldrovandi, Girolamo Cocconi and Emilia-Romagna, who made their collections centuries apart.

Herbaria are collections of dried plants that that have been pressed onto the pages of a book to preserve them—such pages also include information about the plant that has been pressed, including its name. Botanists, naturalists, and amateur plant enthusiasts have been preserving plants in herbaria for centuries. In this new study, the research team has shown that by comparing such collections made over long time spans in a single area it is possible to track changes to plant life due to changes in climate.

In their work, the research team looked at an herbarium made by Ulisse Aldrovandi, which contained plant samples from 1551 to 1586, another by Girolamo Cocconi, which included plant samples from the year 1883, and one by Emilia-Romagna, with samples from the years 1965 to 2021. Importantly, all three were made by collecting plant samples from the same area—the hillsides of Bologna, Italy.

The researchers were able to see changes in plant populations and diversity, and the disappearance of some. Motherwort, for example, was once prevalent in the area, but no longer grows in the region. They note also that the total number of species growing in the area has increased over the centuries, but the quality has declined. Many of the rarer species, they note, are slowly disappearing.

The research team also notes that large numbers of non-native species now grow in the area—they estimate there has been a 1,000% increase in flowers alone. They suggest such plants have made the journey from other lands due to trading. They also found that they were able to see

changes in plant life due to climate events, such as the Little Ice Age—silver cranesbill, for example, were seen at lower elevations during cold periods in the mid-1800s.

More information: Fabrizio Buldrini et al, Botanical memory: five centuries of floristic changes revealed by a Renaissance herbarium (Ulisse Aldrovandi, 1551–1586), *Royal Society Open Science* (2023). DOI: 10.1098/rsos.230866

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