

## Looking into 16<sup>th</sup>-century botanical history to understand the complex taxonomy of *Tulipa sylvestris* in Europe

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*Tulipa sylvestris* is a small yellow tulip that was introduced to northern Europe in the 16<sup>th</sup> century. Unlike the tulips that came from the Ottoman empire and gave birth to modern cultivars, *T. sylvestris* came from the Mediterranean and became a garden escapee that successfully naturalized across Europe. Its taxonomy is complex due to morphological diversity, polyploidy and naturalization of cultivated plants. Two subspecies are provisionally accepted in Europe: subsp. *australis*, a diploid native in the Mediterranean (up to Central Asia) that grows on mountainous rocky grasslands, on poor soils; and subsp. *sylvestris* a tetraploid that is naturalized across Europe and grows in rich soils at low altitudes, mainly at field margins, vineyards and gardens. Sometimes these two subspecies are regarded as distinct species, but their taxonomic delimitation is unclear.

In an article recently published in Scientific Reports (Stefanaki et al. 2022), we looked into the introduction history of *T. sylvestris* attempting to elucidate this species' complex taxonomy. By reviewing original 16<sup>th</sup>-century botanical literature, specimens, illustrations, mail correspondence and archives we identified the areas in the Mediterranean where this tulip came from, when and who spread it across Europe.

The first seeds of *T. sylvestris* that crossed the Alps came to Zurich. The Swiss naturalist Conrad Gessner is known as the first who scientifically described a (red) tulip in 1561, but his interest in this exotic flower was triggered years before, when he saw a watercolor illustration of *T. sylvestris* in a manuscript known as the Codex Kentmanus. This image was drawn after a tulip grown in the botanical garden of Padua in northern Italy, originating from material that most likely came from Bologna. Gessner requested seeds of this tulip from the prefecture of the Padua garden, Melchior Wieland, and received them between 1554 and 1559. He kept a copy of Kentmann's illustration (Fig. 1), drew the seeds he received from Padua on the sheet, but probably did not further distribute this material in his network, because he died a few years later, in 1565.

Around that same year, the Flemish botanist Matthias De Lobel dug out bulbs of *T. sylvestris* from the Cevennes mountains, north of Montpellier in southern France, and sent them to Antwerp. He was acknowledged by his contemporaries as the first to bring this tulip to northern Europe. De Lobel's tulips eventually reached the garden of the Flemish nobleman Charles de Saint Omer near Bruges and survive today

### Keywords

Conrad Gessner, Matthias De Lobel, Tulip history, *Tulipa australis*, Wild tulip

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### Accepted

18. 1. 2023

### DOI

<https://doi.org/10.12685/bauhinia.1369>



**Fig. 1.** Gessner's personal copy of the oldest surviving illustration of *Tulipa sylvestris* originally contained in the manuscript Codex Kentmanus from 1549. Image credit: University of Tartu, Mscr 55, f. 3v.



**Fig. 2.** *Tulipa sylvestris* from Montpellier depicted in a watercolor contained in the Libri Picturati collection. Image credit: Jagiellonian Library Krakow, A30.056v.

in a watercolor illustration contained in the famous Libri Picturati collection (Fig. 2). This illustration served as a model for the woodcut that accompanied the first scientific description of *T. sylvestris* published by the Flemish botanist Rembert Dodoens in 1568.

In the 1570s, another important Flemish botanist, Carolus Clusius, based at that time in Vienna, received bulbs of *T. sylvestris* from Montpellier, Bologna and the Apennines from several influential men of his network, including the Italian naturalist Ulisse Aldrovandi and Clusius' patron Jean de Brancion, a rich man from Mechelen.

The tulips that came from Montpellier, Bologna, and the Apennines further circulated among 16<sup>th</sup>-century European naturalists, started escaping their gardens and spread in the wild. The first written evidence of *T. sylvestris* turning wild comes from a letter of Clusius from 1577. With this letter, Clusius sent bulbs of the „Tulipas Bononieses” and „Mompelianas” to his friend Camerarius in Nurnberg, instructing him to plant them apart from other tulips and restrict them with tiles or bricks, because they have the tendency to spread and conquer the whole garden.

Linking these historical findings with the taxonomy of *T. sylvestris* gives interesting insights. Among the three places of origin of the first bulbs that reached northern Europe (Bologna, Montpellier, Apennines), subsp. *sylvestris*, i.e. the subspecies that is naturalized across Europe as commonly believed, grows only in Bologna. The plants growing in the Cevennes and the Apennines belong to subsp. *australis*. It is thus evident that the currently accepted subspecific classification of *T. sylvestris* is not supported by the introduction history of the species, because both subspecies were introduced to northern Europe.

Our research group is currently working on genomic repeat profiling of *T. sylvestris* to further elucidate this species' complex taxonomic status.

## References

- Stefanaki A, Walter T & van Andel T (2022) Tracing the introduction history of the tulip that went wild (*Tulipa sylvestris*) in sixteenth-century Europe. Scientific Reports 12: 9786 <https://doi.org/10.1038/s41598-022-13378-9>

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Zeitschrift/Journal: [Bauhinia](#)

Jahr/Year: 2023

Band/Volume: [29](#)

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