A Day in the Life of a Chicory Flower

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When you walk along roadsides in the early morning in summertime, you may be lucky enough to encounter the radiant blue flowers of chicory (*Cichorium intybus*). It's almost as if the deep blue sky that you only see in the clear air on a high mountain has been spirited into the plant and shines at you in its many flowers.

Chicory is of European origin and followed European travelers and settlers to virtually all parts of the world. It inhabits the disturbed soils of roadsides, and in the summertime its blue flowers provide a kind of counterpoint to the many white- and yellow-flowering plants that also inhabit such transitional areas. What draws your attention are the blue flowers. Amidst the green vegetation of all the other species, you hardly see the whole chicory plant with its long, narrow and almost leafless branches. These branches carry the flowers, which are dispersed on the plant in no apparent pattern. On any given day a plant might have five to twenty flowers. If you are very lucky, you may see a rare plant with white flowers.

But "flower" is not the correct term. What you are looking at when you recognize a chicory "flower" is, botanically speaking, an inflorescence, that is, a group of flowers (what I'll call a flower head). This means that the twenty or so "petals" of the apparent flower are actually parts of individual small flowers that are called florets. Each floret is a complete flower that consists of five fused petals (note the five "teeth" at the outer margin), a stamen tube and a pistil (see diagram). So a chicory flower head is a kind of "super flower"— an enhancement of flowering in which individual flowers become the parts of a larger integrated whole.

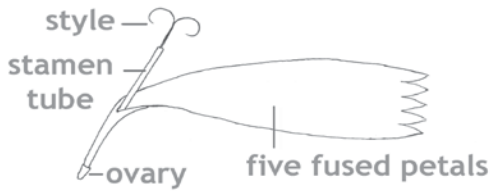

Diagram of a chicory floret ("ray flower"). Each flower head consists of many florets.

All members of the Aster family, to which chicory belongs, have such "super flowers"; a close relative is the common dandelion.

One special feature of the chicory is that typically each individual flower head opens only for part of one day, while the

Flowering chicory plant in its surroundings next to a roadside in July.

Top part of a chicory plant with flower head buds, one open flower head and wilted heads.

whole plant opens new flower heads each day for many weeks from midsummer into early fall. It is not a plant with one burst of flowering. Rather, it produces many little daily bursts of blue over a long period of time. It brings about a fascinating synthesis of short-lived individual flowers and longevity in the flowering process of the whole plant.

In mid-July I decided to follow one flower head near The Nature Institute over the course of a single day. You have to go out before sunrise (which occurs at around 5:30 am) to see the bud begin to open in which the flower head lies hidden. In the dim dawn light I could already see the tip of the flower head in the opening bud. It is a deep and intense blue-violet color. The outside of the florets is covered with fine hairs that sparkle with dew drops. As it became bright enough right around the time the sun rose, I began taking photos (I didn't want to use a flash).

Over the course of the next few hours the flower head opens. First the florets extend upward and each one begins to unfurl at the tip and along its margins. As the florets are unfolding, the flower head as a whole opens out toward the horizontal plane. The deep violet blue color lightens in this process and becomes a radiant lavender blue. The transformation of color in the florets in a way mirrors what happens in the sky. As the clear dawn sky is dark and almost violet and lightens through shades of dark blue to the lighter "sky blue" of full daylight, so does the color of the chicory flower first brighten and then lighten during the course of the morning.

The outermost florets open first and are then joined by the remaining florets to form a slightly concave surface consisting of the fused petals of the florets. The radiating quality of the resulting flower head is enhanced by the presence of the five teeth at the tip of each floret. As the petals unfold, the stamen tubes become visible in the center of the flower head. Each floret has one stamen tube. As a group, the stamen tubes radiate up and outward from the center of the flower head. The stamen tubes are at first light blue and quickly become dark blue and keep that color as they later fade.

5:27 am

5:43 am

6:58 am

6:59 am

7:35 am

7:33 am

However, they remain white at their base, and the petals are also lighter at the base, so that the center of the flower head is brighter than the rest and provides a beautiful contrast to the surrounding blue tones.

8:07 am

8:07 am

8:41 am

8:41 am

9:35 am

9:35 am

The flowering process continues with a further development that shows itself on and around the stamen tubes. Out of the tip of each stamen, fine, paired filaments grow. These are the two branches of the style. They carry with them a whitish powder. This is the flower's pollen. It is not yellow or orange as in most flowers, but white. The pollen is generated inside the stamen tube and as the style grows up through it, it collects pollen and brings it out into the light of day.

It is now 8:30 in the morning. Some of the pollen gathers at the tip of the stamens and some of it remains on the style branches. The styles themselves are blue, but one hardly sees this when they emerge covered with the white pollen. The

The insects arrive. 10:30 am

12:38 pm

1:32 pm

1:32 pm

2:26 pm

pollen gathered at the stamen tube tips and the style ends mirrors, color-wise, the white at the base of the stamens.

Very soon after the pollen appears, the first insects arrive at the flower head—little flies, wasps, and native bees. This is something remarkable when you think about it: these insects, which are dispersed who knows where in the larger environment, gather at the chicory just when the pollen makes its appearance. Are they drawn through smell, vision, or in some other way? Having landed on the flower head, they crawl around on the stamen tubes and gather and eat the white pollen.

The insects also pollinate the flowers. Much later in the season, small hard fruits will develop at the base of the florets, and in contrast to the fruits of dandelions, which sail off into the wind, chicory fruits either fall to the ground in fall and winter or are carried off by birds.

The styles continue to grow out of the pollen tubes, and around 10:30 am the flower head has reached its maximal unfolding. It does not stay in this state for long. By 12:30 pm the flower head is decidedly paler and in the process of closing. The insects are gone. On this day the sun reached the highest point in its arc through the sky—true midday—at about 1pm. So already before midday the chicory flower head begins to wilt and close. Chicory has flowers of the early morning that fade as daylight reaches its greatest intensity. (On overcast days, the flowers can remain open into the afternoon.)

Within a few hours the petals lose most of their color, begin to wilt, and the flower head closes by midafternoon. A pale violet, slightly browning remnant of the flower head remains attached to the stem overnight. In the case of the flower head I was observing, it remained all day the next day as well and then fell off.

Day in and day out something similar happens with every chicory flower head. Each plant shows us its past in the wilted flower heads, its future potential in the yet unopened buds, and its present in the radiant and fleeting life of its blue flower heads.

3:31 pm

6:02 pm

4:54 pm the next day.