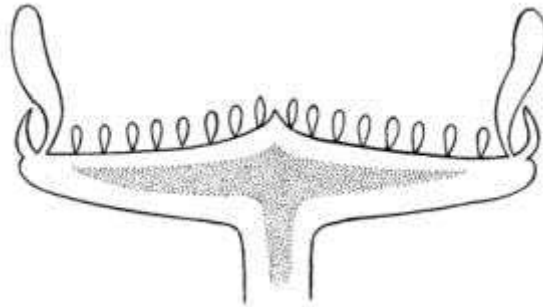
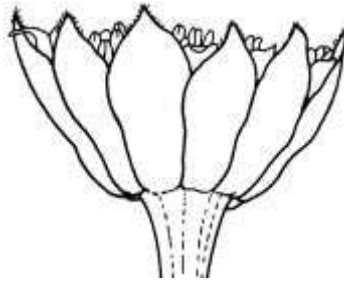


## Flowers of Asteraceae

The 'flower' that you see is actually a head composed of many small florets.



The head (capitulum) is an inflorescence and a number of capitula are often aggregated together to form a secondary inflorescence or synflorescence. The capitulum is surrounded on the outside by one or several layers of involucre bracts resembling the calyx of other flowers.



These bracts are mostly green (herbaceous) but can also be brightly coloured like in everlastings (*Helichrysum* spp.) or can have a thin, dry, membranous texture (scarious). The involucre bracts are mostly free and arranged in one to many rows, overlapping like the tiles of a roof (imbricate). When in one row, they are often fused to different degrees.

The florets in a head consist of one, two or rarely three out of six different kinds of florets.

(1) The most obvious florets are the outer row of ray florets, resembling the petals of other flowering plants.



The ray florets consist of laterally fused, elongated petals with three or four small upper lobes or teeth and are usually brightly coloured: yellow, blue, purple, pink, red or white and sometimes a combination of these colours. The ray florets are either female, which means they have a pistil, or they are neutral meaning that no sex organs are present or, if present, they are sterile.

(2) A slight variation of these are the bilabiate ray florets.



In these ray florets the outer, laterally fused petals are also elongated, but have three small upper lobes or teeth and smaller, laterally fused inner elongated petals with two upper lobes or teeth, almost like the flowers of the sage family (*Lamiaceae*).

(3) The third kind of outer florets have very reduced petals, or the petals are totally absent. They are usually female and are referred to in descriptions as the outer filiform, female florets.



(4) The central florets, resembling the stamens of other flowering plants, are called disc florets and are mostly yellow, but also purple, blue, orange or red, rarely green. In the disc florets the petals are fused into a tube with three to five apical lobes.



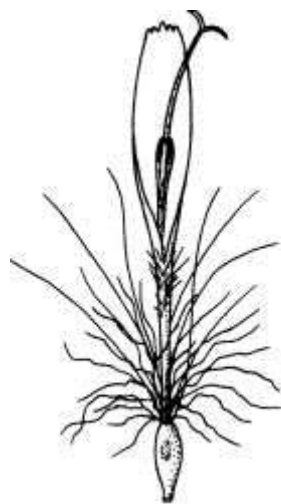
They are either bisexual, containing both fertile anthers and a fertile pistil, or male, containing fertile stamens and mostly a sterile pistil.

(5) In one tribe, the petals of the disc florets are fused into a tube below and are bilabiate apically with three outer and two inner lobes.



They are either bisexual or male.

(6) Another tribe is characterized by all the petals of the florets being fused laterally and elongated with five apical lobes or teeth.



These florets are mostly bisexual, rarely male or female.

Based on the presence or absence of fertile stamens and fertile pistils, the heads can be further classified into heterogamous and homogamous capitula:

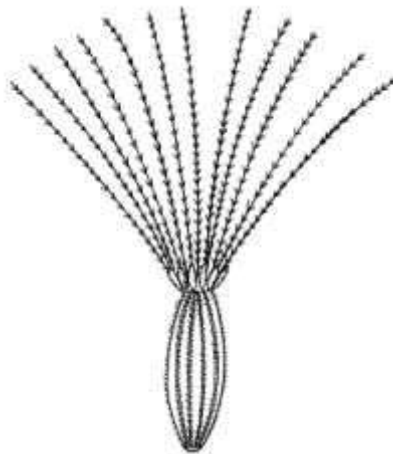
**Heterogamous capitula** are mostly those with female, fertile, outer florets, and bisexual or male inner disc florets.

**Homogamous capitula** contain florets that are either bisexual or unisexual.

The different florets are grouped together in different combinations. On the grounds of these combinations, the following capitula can be recognized:

- a) Radiate capitula are usually heterogamous, containing ray florets (1 or 2 described above) and disc florets (4 or 5 described above).
- b) Disciform capitula are usually heterogamous containing filiform, outer female florets (3 described above) and disc florets (4 described above).
- c) Discoid capitula are usually homogamous containing only disc florets (4 described above).
- d) Ligulate capitula are also homogamous containing only florets as described in 6 above.

The calyx is not green and leafy as in other flowering plants, but is represented by a pappus at the base of each floret. The pappus consists of hairs, bristles, awns or scales or the pappus elements are more or less fused to form an annular or cup-shaped corona, borne apically on the fruit.

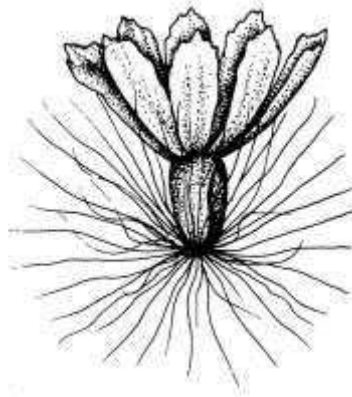


Sometimes the pappus is absent. The pappus is an adaptation for wind dispersal of the fruit. Sometimes the pappus contains hooks, which help with animal dispersal of the fruit.

Three to five stamens are present in the disc florets. The filaments arise from the corolla tube. The anthers are usually laterally connate to form a cylinder around the style. The anthers often have an apical appendage. The pollen is released to the inside of the floret and is then pushed out by the elongating style. The pollen is either blown away by the wind, collected by insects, or the style arms of the floret curl backwards and pollen is collected for self-fertilization.

The style of bisexual or female florets is usually divided into two style arms or branches. Stigmatic areas are found on the inner sides of the style arms. In the bisexual florets, the style arms are often decorated with various hairs or papillae. The style arms separate from each other only once the style has emerged from the corolla tube. The style of pistils in male florets are undivided or shallowly divided.

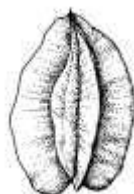
The ovary is produced by two united carpels to form a unilocular fruit and contains only one ovule. The fruit is called a cypsela or achene. It is a unilocular, mostly dry, indehiscent fruit with a single seed.



The fruit wall and the seed coat are so tightly fused or lying so close together that the two units cannot be separated. In the bush-tick berry bush (*Chrysanthemoides* species), the fruit is fleshy and is called a drupe. The fruit is often apically crowned with the pappus. The pappus is an adaptation for dispersal, but sometimes the cypsela is covered with glandular (sticky) hairs or hooks, which also help with dispersal by animals.



When the pappus is absent, the fruits often have wings, which help with wind dispersal.



Sometimes there is a small, extra scarious bract, known as the palea (plural: paleae), at the base of the disc florets. The presence or absence of these bracts is also mentioned when the capitulum is described, e.g. heterogamous radiate, paleate or homogamous, epaleate. Sometimes these paleae harden and remain in the capitula after the florets and fruits have been dispersed.

List of figures above:

Figure 1. Diagram of Asteraceae inflorescence (capitulum). First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 66, 67 (2000).

Figure 2. Involucral bracts surrounding capitulum. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 118-121 (2000).

Figure 4. Ray floret. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 118-121 (2000).

Figure 5. Bilabiate ray floret showing inner lip. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 118-121 (2000).

Figure 6. Filiform female floret. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 118-121 (2000).

Figure 7. Disc floret. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 118-121 (2000).

Figure 8. Bilabiate disc floret with two lips. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 118-121 (2000).

Figure 9. Florets with five apical teeth. Artist: G. Condy.

Figure 10. Diagram of cypsela with pappus scales and hairs. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 19: 66, 67 (2000).

Figure 11. Cypsela with pappus scales. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 21: 19-21 (2002).

Figure 12. Cypsela with hooks and no pappus. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 21: 19-21 (2002).

Figure 13. Cypsela with wings and no pappus. First published in Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie 21: 19-21 (2002).