



Trees for Bees NZ Workshop June 21st 2015
newstrom.lloyd@gmail.com

The ABCs of Flowers and Bees

Flowers and their parts

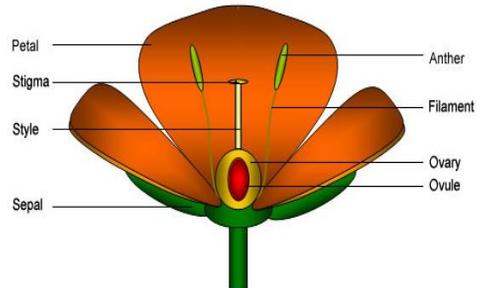
Pistil = Stigma + Style + Ovary + Ovule

The pistil is the central set of female reproductive organs. It is always in the center but it is absent in male flowers.

The *stigma* is the sticky or hairy top part of the pistil. It receives the pollen at pollination. The *style* is the tube that carries the pollen down from the stigma to the ovary for fertilization. Sometimes the stigma is sitting on the ovary with no style between them. The *ovary* houses the *ovules* and will become the fruit after fertilization.

The Stamen = Anther + Filament + Pollen

The *stamens* are the male reproductive part of the flower arranged in a whorl around the pistil or up on the petals. The *filament* is the stalk of the stamen which provides support to the anthers. They can be long or short or absent. The *anther* is a sac at the tip of the filaments where pollen is produced and stored. There can be few to numerous stamens with large or small anthers of various shapes. Buzz pollinated plants have anthers that act like a salt shaker but usually anthers open up with a long slit in the middle to expose the pollen for bees to collect.



Pollen Rewards

To consider the amount of pollen presented on a plant, look at the anthers to see how large they are and how many per flower. Then observe how easy it is for the bees to access the pollen and work the flowers. For example, is there a good landing platform for them to hang on to? Is the next flower close by for quick foraging? What is the density of the flowers per square meter of the plant? The more dense the anthers and the flowers on the plant the more valuable it as a pollen source.

A large tree can provide more pollen than a shrub, or perennial because of the vertical size but this depends on the size and density of the anthers. Prolific pollen producers are oaks, maples, ash trees as well as pears, apples, and other plants in the rose family. Plants like camellia, magnolia and the tulip tree may have fewer flowers per unit area but they have huge amounts of pollen in each flower – so they are “super bowl” flowers.



A good landing platform in aggregated maple flowers

Nectar Rewards

Nectaries produce the nectar and can be hard to see unless there is a distinctive structure like a cushion or little bumps at the base of ovaries or stamens. Some flowers produce nectar on the petals (e.g. magnolia, tulip tree) or outside the flower.

To find out how much nectar is produced put a bag over the flowers for 24 hours to prevent bees from taking the nectar. When you unbag the flower you may see huge amounts of nectar in some types of flowers like in tawari, NZ flax, ivy or pohutakawa. Other flowers have very small amounts like in willows, clover, manuka and kanuka. Nectar can be produced at regular times of day in morning, afternoon or evening or all day long. Bees will be most attracted to plants with the most nectar and the highest sugar concentration.



The ABCs of Flowers and Bees

Blossom classes

Unisexual flowers have either male or female parts. If it is a male flower it will have pollen and can also have nectar. A female flower will not have any pollen but will probably have nectar to attract bees. Male plants have only male flowers and female plants have only female flowers (e.g. willows). If both sexes are present in the flower then it is hermaphrodite.

Size and shape of flowers vary and this influences the ability of the bees to forage efficiently. Large “super bowl” and “brush” flowers have numerous large stamens in many whorls. These provide a lot of pollen very quickly.

Open access dish flowers are easy for bees to work depending on their size and arrangement. Large dish flowers are the easiest if lots of pollen is presented such as in pear and apple flowers. Small dish flowers are often *aggregated* into a close fitting group so the bees can scramble from flower to flower quickly.

Directed access flowers are *tubular* or *funnel* shaped. If the tube is very large the bees don't mind crawling in, but if it is small then they will usually not go into the bottom of the tube unless there is a huge amount of nectar that they can reach. The length of the tube must match the bee tongue length (7 mm) for bees to get the nectar. Short tubular flowers that are aggregated provide good landing platforms.

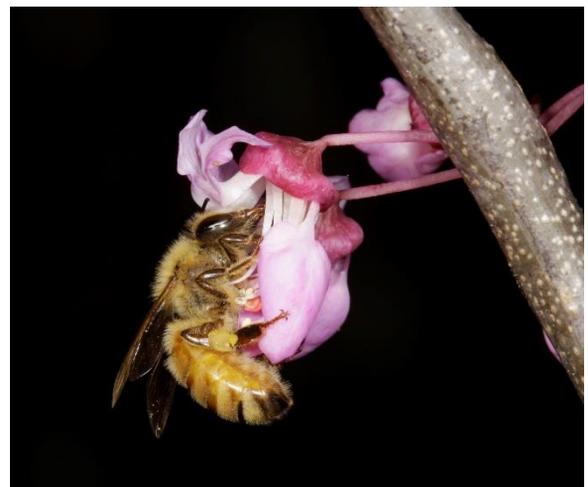
Closed access flowers have complex shapes with petals curved over the reproductive parts to hide the pollen or the nectar. The pea or bean flower are classic examples, as is gorse and broom. Sometimes this type of flower requires stronger bees to trip them open but often honey bees can use the flowers tripped open by bumble bees. Tree Lucerne has a flower that requires a bit of work for bees to get their rewards but when it is the only flower around in winter to early spring it is worth it for the bees.



A single rose is an open access dish flower



A flax flower is a tubular flower with pollen at top



A judas tree flower has a complex pea shaped flower but bees can open it if the flower is the right size.