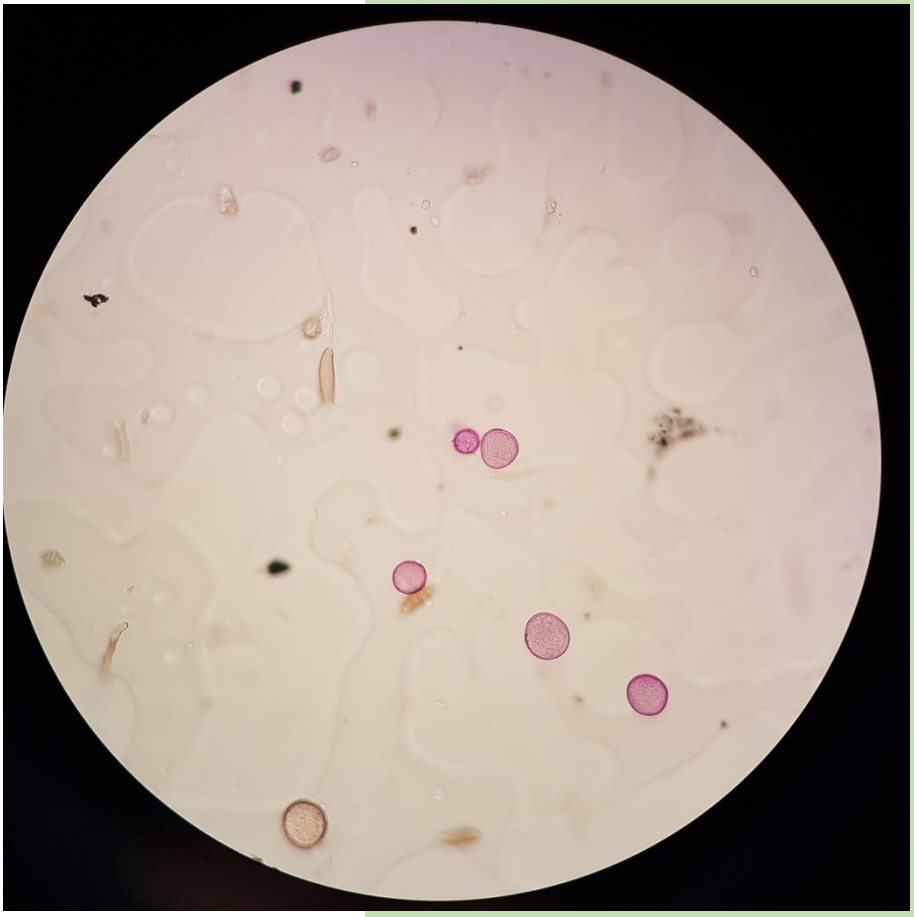
Identifying Pollen



In collaboration with the Allergy Research group at the Queensland University of Technology, AusPollen and the Queensland Herbarium

Introduction

This module is brought to you in collaboration with Queensland University of Technology's Allergy Research Group led by Professor Janet Davies. This group aims to research better ways to diagnose and treat allergies, and some of their research activities involve collecting samples near the paddocks of our School. The purpose of this module is to introduce you to the concept of pollen monitoring and why it is an important tool for the community.

What is pollen?

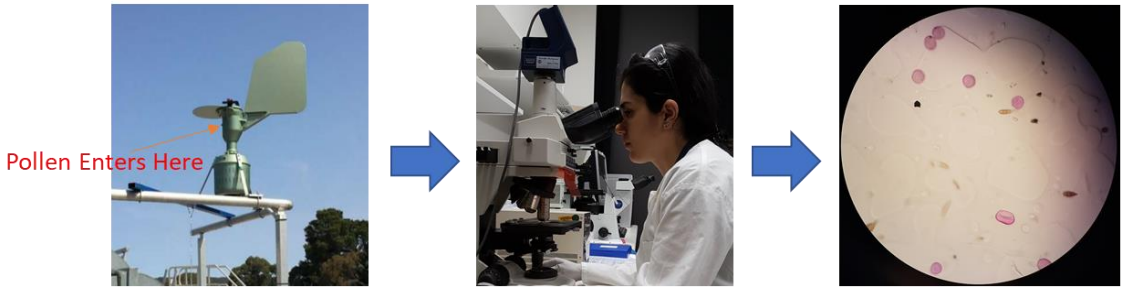
Pollens are fine, powdery grains released from the flowers of plants to help fertilize other plants. Once fertilised, these plants can generate seeds that allow them to produce new plants (More details look at: https://www.youtube.com/watch?v=djPVgip_bdU). Each type of plant makes its own pollen, and they pollinate during different times of the year. For example, grass found in Brisbane release pollen in the summer. Pollen can be transported to other flowers by pollinators which are animals that move pollen from one plant to the other. These pollinators can include bees, butterflies and moths. Another way that pollen can be transported to other flowers is by wind. This means that the plant's flower releases the pollen into the air and the wind transports it to other nearby flowers to pollinate.

However, when lots of pollen is released into the air it can cause some people to have an allergic reaction when they breath the pollen in. This reaction is known as hay fever and causes people to sneeze, have a stuffy nose and itchy eyes. In severe cases high amounts of pollen in the air can cause asthma attacks in asthmatic people. About 20% of Australian people have hay fever. (How many in your class get hay fever?)

It is because of the effects that pollen in the air can have on people's health, that our research group monitors pollen in the air throughout the year. The purpose of this is so that we can inform people in the community so they can manage their hay fever better by staying inside on high pollen days or taking antihistamines.

How do we monitor pollen?

To monitor pollen in the air in Brisbane, we use a machine called the Burkard Manufacturing Pollen Trap (See image below). This machine sucks pollen from the air inside the machine through a small hole and onto a sticky piece of tape that we place inside. Every morning we collect this piece of tape and stain it with a pink coloured dye, which turns pollen purple. We then look through a microscope and identify what plant the pollen comes from and how many there are in in the air that day. This module will teach you about the different pollen that our research group sees in the air you breath and let you identify some unknown pollen grains yourself!



Pollen is stained PURPLE!

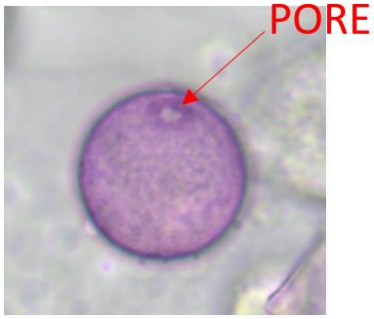
What pollen taxa do we count?

Grass (Poaceae)

Pollen from the grass family (scientific name: Poaceae) is one of the most common pollen types that we count and is the one main causes of hayfever in Australia. Even important agricultural crops produced in Australia are from the grass family, for example wheat, corn (maize) and rye. Grasses flower in Brisbane many times between October and May which result in a lot of pollen being collected by the pollen trap during that time.

A common example of plant within this family is sorghum (Sourced from: Atlas of Living Australia)

The pollen produced by grasses are circular in shape and has single pore on the surface.

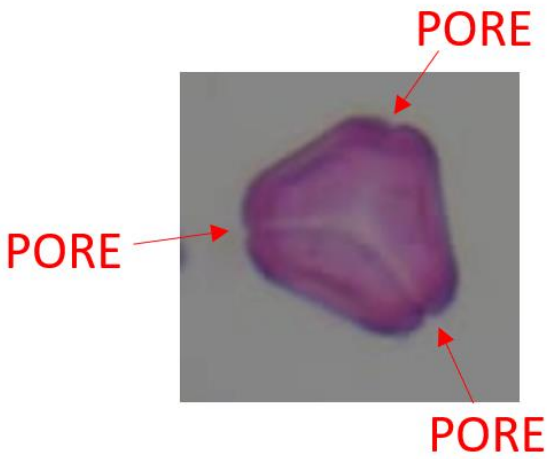


Myrtle (Myrtaceae)

The Myrtle family (scientific name: Myrtaceae) is a group of woody shrubs and tall trees that have aromatic leaves. A common group of plants in this family that you will see around everywhere is Eucalyptus trees! You might know some of these as gum trees.

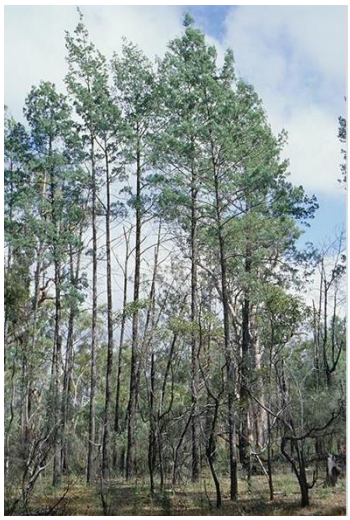
Common examples of a plants within this family are Eucalyptus trees. On the right are the flowers that these trees produce. (Sourced from: Atlas of Living Australia)

The pollen produced by plants within this family have a unique triangular type shape. There are three pores located at each point of the pollen grain.



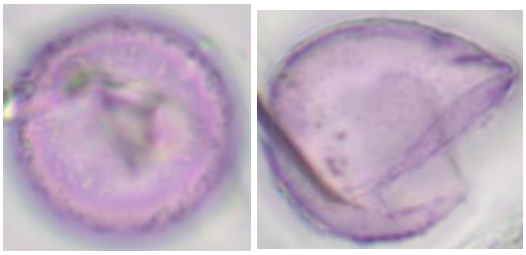
Conifers (Cupressaceae)

The conifer family (scientific name: Cupressaceae) is made up of a range of evergreen ornamental and timber shrubs and trees. Many of the trees in this family are common timber sources and can also be important in horticulture. These large trees can produce massive amounts of pollen.



A common example of plant within this family is Callitris (Sourced from: Atlas of Living Australia)

Conifers produce reasonably big pollen that is circular in shape and has a star-like shape in the centre. On the surface of this pollen you can see little dots which is one of its key features. Sometimes the pollen can be folded which hides that star-like feature. However, when folded they still have the distinct dotted texture on the surface.

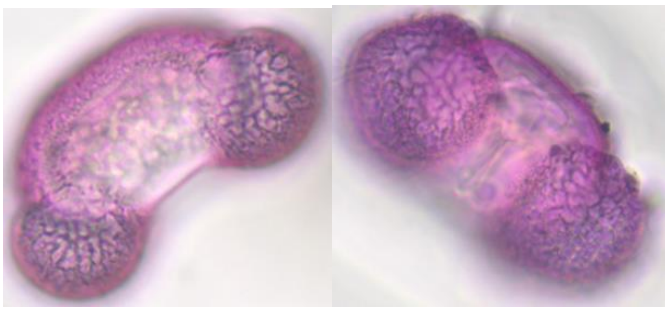


Pine (Pinaceae)

Plants within the Pine family (scientific name: Pinaceae) are mostly trees are produce seeds that are in the shape of cones. Many of the trees are important to communities as they produce a lot of important products, such as timber and essential oils. If you have a look around your house, you may have a wooden piece of furniture that is made from a tree within this family! Pine trees tend to release pollen in Brisbane in late winter or early spring.


A common example of plant within this family is a spruse. One the right is an example of a cone seed produced by pines. (Sourced from: Atlas of Living Australia)

Pollen produced by pine is large for pollen. Pine pollen have a unique 'Mickey Mouse' like shape, with two round circles being attached to an oval base. Depending on how the pollen is placed when looking under the microscope it can look quite different. The pictures below show pine pollen from both the front view (left) and from the bottom view (right).

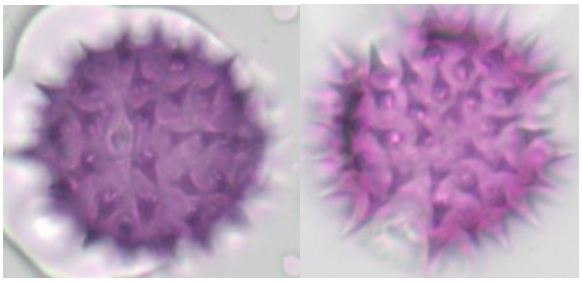


Aster (Asteraceae)

The Aster family (scientific name: Asteraceae) are a group of flowering herbs or shrubs. Some common plants that you may know within this family include sunflowers and dandelions. Although it might look like the plants have big flowers, these flowers are actually made up of many smaller flowers. If you look closely at the flowers, then you can see that there are many little flowers growing in the middle part of the flower. You might know some of Aster family as sunflowers, daisy and dandelions. These tend to release pollen in late summer and autumn.

A common example of plants within this family are sunflowers (left) and dandelions (right) (Sourced from: Atlas of Living Australia)

The pollen produced by plants in the Aster family are quite small compared to the other pollen shown. They also are covered in spikes, which is one of their key features. From the images below, there are two Aster pollen grains that have slight differences (one is perfectly circular and the other has three groves), however you can see that they are from the same family from their spikes!



<u>Plantain (Plantaginaceae)</u>

The plantain family (scientific name: Plantaginaceae) is made up of flowering herbs and shrubs. The plants within this family are mostly weeds. One weed in particular is very common in Australia and you probably have one or two in your yard, this is Plantago (see picture below).

A common example of a plant within this family is Plantago lanceolate (Sourced from: Atlas of Living Australia)

Plantain pollen is circular in shape and although looks very similar to grass pollen but is a bit smaller. Plantain pollen has multiple pores, usually five, unlike grass that has only one, so make sure you look carefully! The surface of plantian pollen looks bumpy or pitted.

Pollen Identification Activity

Now it is your turn to identify what plant family this pollen is from!

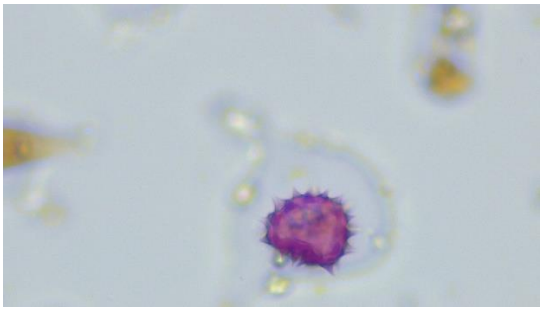
Have a look at these images and try to identify what plant family they are from.

- **ANSWERS IN BRACKETS**

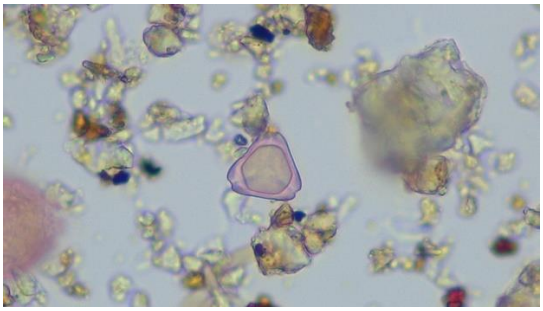
1. (Myrtle)

2. (Pine)

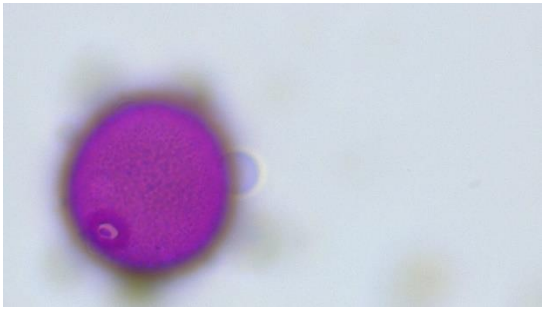
3. (Aster)



4. (Myrtle)



5. (Grass)



To make it trickier, try and identify multiple pollen grains in this video. Sometimes you cannot see all of the features of the pollen straight away, so you have to then use your microscope to move up and down the pollen grain.

- Videos attached in 'Identifying Pollen Activity Videos' folder
- **ANSWERS IN BRACKETS**

1. (Conifer)
2. (Grass)
3. (Myrtle)
4. (Grass)
5. (Aster)