

Plants

Plant Wonder



The digital microscope can be used outdoors with a laptop.



Fix the microscope horizontally for time-lapse of pot plants.



Fragments of cork cut with a cutting-knife 10x magnified.



The lower section at 60x gives a clue to its cellular structure.



200x magnification shows us the resilient cork cell walls.

Plants are some of the best subjects for your digital microscope. Their cells are larger than animal cells, and they have strong cell walls so they show up better. Take the laptop and the microscope outside to make time-lapse video movies of buds opening and seeds germinating. Remove the microscope from its stand, lay it down and study the growth and development of pot plants indoors. You can grow seeds on a layer of blotting-paper on a dish or inside a jar containing a few centimetres of water, or put seeds against the inside of a glass container and fill the jar with compost so that the seeds remain visible through the glass. A time-lapse video speeds up the action as the roots, and then the leaves, emerge and expand. You can try carefully cutting sections of plant stems, using a very sharp razor blade, the idea being to section the plant tissues rather than the human finger. Lay down the sections on a drop of water on a microscope slide and add a cover-slip (see page 18). Many of the specimens photographed on this page are permanent microscope slides, which I made by staining and mounting the sections. Stem and root



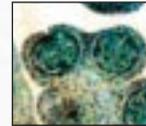
Using the stage without clips aids positioning a slide.



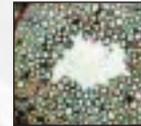
Water-plant *Lymnathemum* stem at 60x shows air spaces.



Note the large xylem vessels in bracken stem at 200x.



Sexual cell division within developing lily stamens.



Xylem vessels in the Carboniferous fossil *Lepidodendron*.



Reproductive organs of a pear flower at 10x.



Pear stamen under 60x magnification.



60x shows the hairs on a *Stachys* leaf.



Tissue one cell thick peeled from a fresh onion 10x.



The onion cells show up well with the 60x lens.



200x magnification displays the cell walls.



Watch plant development with time-lapse at 1 frame per 30 minutes.

sections show the thick-walled vessels through which sap rises from the roots. These are the plant's primary plumbing system. Around these large vessels are smaller tubes through which the foodstuffs, elaborated in the leaves, are passed back down to nourish the roots. These are the xylem and phloem tissues, and the digital microscope gives you a good view of the remarkable patterns they make. You could try standing a sprig of a plant in a jar of water containing a dye, and make a 10x time-lapse video to show how the colours spread through the xylem vessels throughout the tissues. This works particularly well on pale-coloured flowers. Remember that a time-lapse rate of 30 minutes or more will switch off the microscope lamp between the shooting of each frames; a setting 20 minutes or less leaves the lamp on continuously. You may find that the warmth is helpful for germinating seeds inside a glass jar, but it will dry out wet blotting paper in a very short time. Fossil plants are a fascinating field of study. Most of the fossils you see in museums and fossil shops are casts of leaves and stems, but sometimes plant tissues are so well preserved that you can still see the cells. Amazing.