

# Interpretation of Grafting Photos

by Anthony Boutard

Here is a thumbnail sketch of what happens when you graft. When you sever the parts, all of the plumbing of the plant is disrupted. That includes the phloem and the xylem. The cells that make up these tissues cannot reestablish the connection. This task falls to the cambium, or meristem tissue.

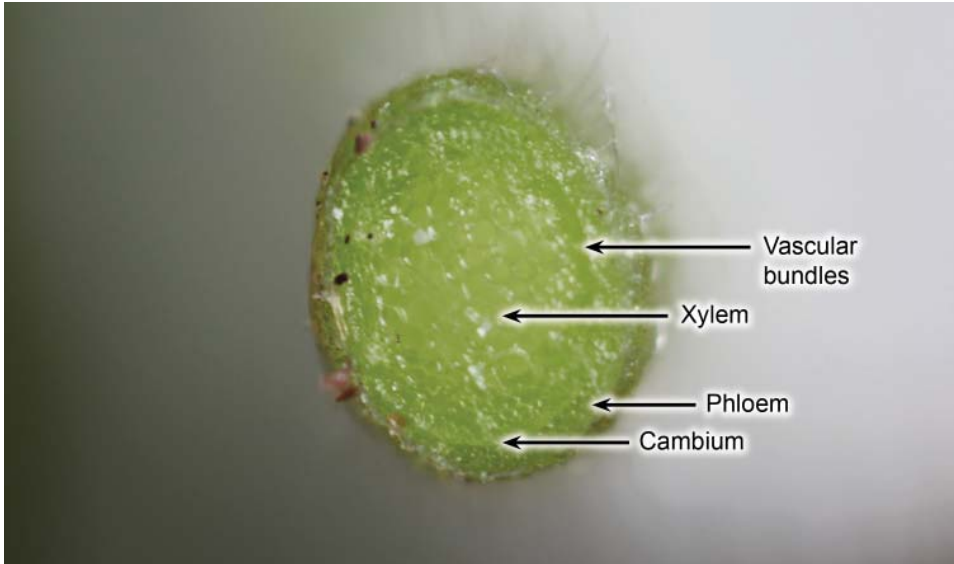


Image 1204 shows the organization of the shoot. There is a light ring of cells visible. That is the cambium layer. As the plant grows, the cambium produces xylem cells on the interior portion and phloem cells outwards. The plant puts on its girth from this layer.

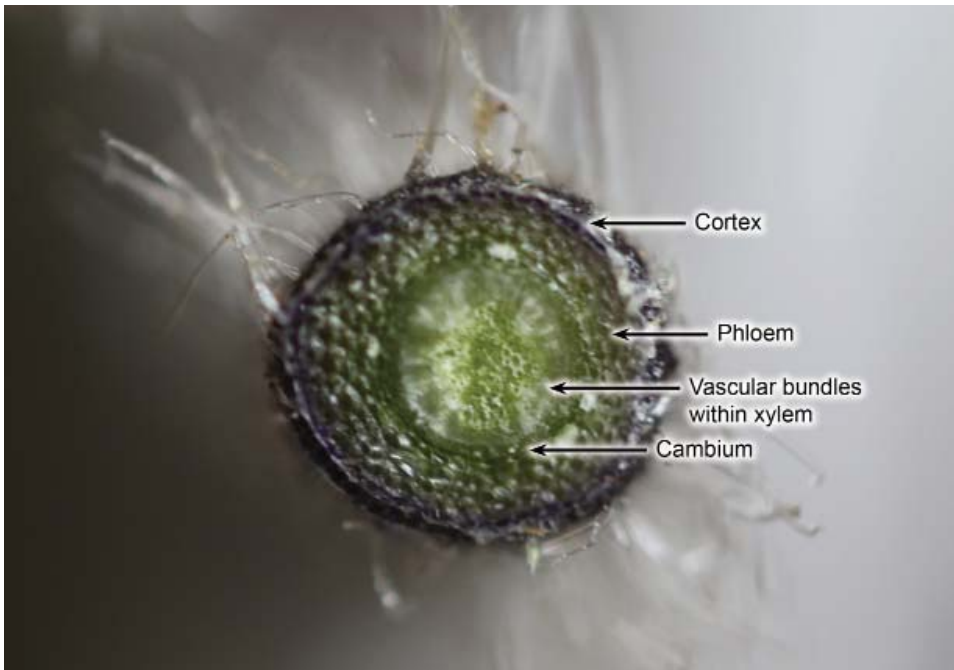


Image 1202 similar look, but a different variety.

The phloem transports sugars and nutrients around the plant. The xylem is a water transport system, and the flow is from the roots through the leaves. It is a one-way system. In phloem, different molecules will move in different directions, depending on where they are needed.

The cambium is a sheath of master cells that envelope plants from the tip of the root to the tip of the shoot. The cambium can produce roots or shoots. The capacity varies among plants. As you know, some cuttings root easily, and other grudgingly or not at all. (Grasses, lilies, palms and other monocot do not have a cambium, and have a different form of growth.)

When you take a cutting or a scion, the plant initiates the process of repairing itself by producing a mass of tissue called callous. The callous is white and may be produced in abundance, or just a bit. Depending upon its location, the callous will turn into a root, or into vascular tissue in the case of a graft. Warm, dark and moist conditions promote callous growth. In your tomatoes, the repair is accomplished in days, whereas in an orchard it takes weeks.

Ideally, the cambium of the scion and the understock should be in close proximity, though the callous can bridge small differences.

Looking through the photos, I notice there are differences between the root stock and scion vascular bundles.



Image 1213 shows how the callous forms new tissue between the scion and the understock, pushing them apart slightly. If I recall, this was on a 48 or 72 hour graft.

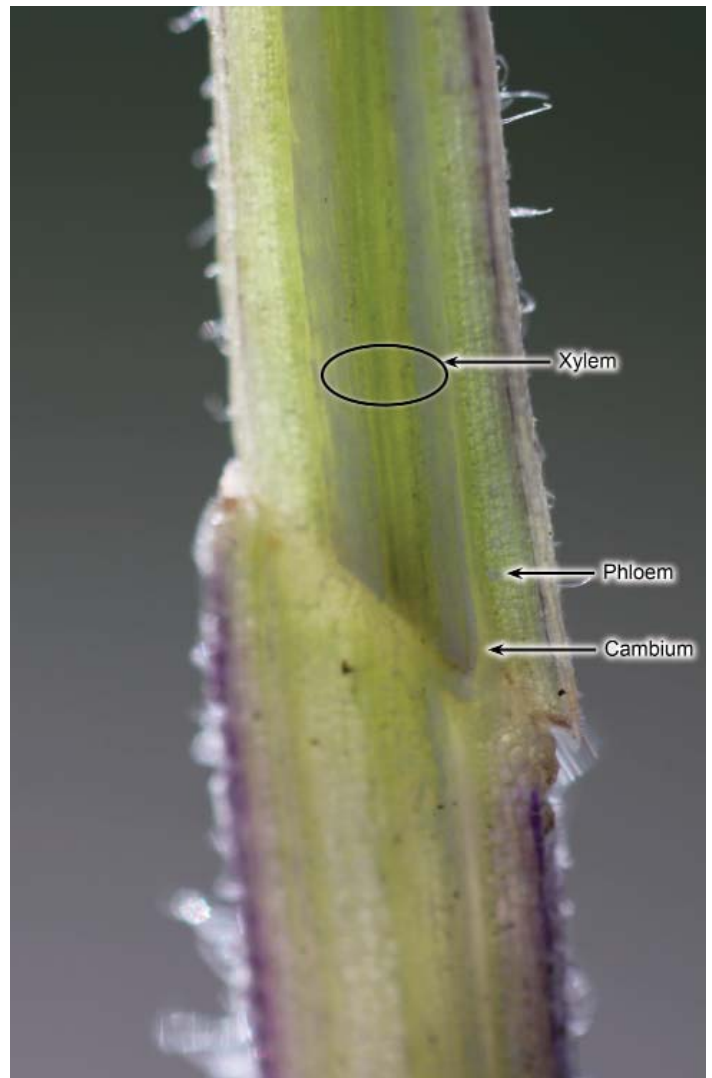


Image 1270 shows how rebuilding effort just 48 hours after grafting. These longitudinal sections are harder to interpret. The two wide light colored bands are vascular bundles. Between the vascular bundles and the phloem, there is a thin light green layer that is the cambium, and you can see how it thickens around the graft union.