A practical guide for assessing camellia petal blight resistance in your own garden

Matthew Denton-Giles

As part of my PhD research I assessed many Camellia species and hybrids for resistance to camellia petal blight. After spending some time with the avid camellia breeder Daniel Charvet, I realized that it would be useful if all camellia breeders were able to assess their own plants for resistance to petal blight. Here I describe a simple method for testing your own hybrids for camellia petal blight resistance.

This method is based on the petal lesion analysis work I carried out during my PhD research. It requires the inclusion of two camellias that have been previously tested for flower blight resistance. The test works by comparing the hybrid(s) of interest with petals from the highly sensitive Camellia ‘Nicky Crisp’ and highly resistant Camellia lutchuensis plants (Figure 1A). A hybrid that is highly sensitive to flower blight infection will develop petal blight at a similar rate to Camellia ‘Nicky Crisp’. A hybrid that is resistant will not develop blight and should be comparable to the petals of Camellia lutchuensis. Hybrids that are partially resistant will develop blight, but not as quickly as Camellia ‘Nicky Crisp’.

**Equipment**

3 - 10 apothecia of Ciborinia camelliae

A small container

Damp tissue paper

3 - 4 petals of Camellia ‘Nicky Crisp’

3 - 4 petals of Camellia lutchuensis

A 50 ml atomizer

A tray

A plastic bag

**Step One - The fungal harvest**

Camellia petal blight is caused by a fungus that specifically infects and grows in camellia petal tissue. The scientific name of this fungus is Ciborinia camelliae. Every year this fungus releases billions of small microscopic spores into the air that land on camellia petals and induce blight.

The first step requires the collection of Ciborinia camelliae fungal apothecia (mushrooms). In New Zealand, apothecia begin to emerge at the beginning of June and are most abundant during late winter (August). Apothecia develop from small, hard, woody structures called sclerotia. Figure 1B shows a 2 - 3 cm long dark brown sclerotia with five small apothecia emerging from it. I find that the blooms of large multi-whorled Camellia japonica and Camellia reticulata hybrids tend to produce large sclerotia, which in turn, produce many apothecia. Humidity also appears to be important, so limit your search to camellia shrubs that are in shaded, damp areas. Try to collect apothecia that are light brown as these are younger and less likely to have released all of their spores. To have a look at some typical apothecia go to www.youtube.com and search for Ciborinia camelliae apothecia.

See if you can see the cloud of infectious spores being released from the apothecia. Once you find an apothecium, wrap its stem in damp tissue paper and place it upside down in a small, clean container (Figure 1C). Collect several apothecia in order to maximize the number of spores in the inoculation solution. Leave the apothecia to release their spores into the container over a period of 2 days.

**Step Two - The bloom harvest**

Blooms should be collected the same day that you intend to perform the test. Use blooms that are fully open but have not yet lost all of their pollen. Make sure to also collect blooms of Camellia ‘Nicky Crisp’ and Camellia lutchuensis, as these are an integral part of the test. Choose blooms that are not damaged or already infected.

**Step Three - Infection**

To prepare the spores for inoculation, remove the apothecia from the container and add a few drops of water. Often the change in humidity created when removing the apothecia from the container can cause a plume of spores to be released. Swirl the water in the container to increase the number of spores in solution. Transfer the solution to a 50 ml atomizer like the one pictured in Figure 1D. A few milliliters of spore solution will be sufficient for the assay.
Carefully dismantle the blooms by detaching the individual petals from the base of the bloom. Cover a shallow tray with slightly damp paper towels. Place the petals on the damp towels so that the upper surface of the petal faces upwards. Make sure you keep track of which petal belongs to which hybrid, as it is easy to mix things up at this point. Once the petals are all in position, spray the spore solution over the petals. It is important to spray as evenly as possible and to make sure that each petal receives some spray. Once all of the solution has been sprayed onto the petals, place the tray into a plastic bag and seal the bag shut. Try not to disturb the position of the petals as you place them in the plastic bag. It is important to have high humidity in the bag so that the petals don’t dry out. Petals that dry out will often turn brown, which can complicate the results of the assay. You can add extra damp tissue paper to the bag to help keep the humidity high. Place the petals in a warm (around 20°C/68°F), low light environment.

**Step Four - Lesion development**

If everything goes to plan, *Camellia ‘Nicky Crisp’* should start to develop lesions around 2 days after inoculation. If lesions develop earlier than this it is likely that they were infected before they were harvested from the plant. Once you start to see browning of the *Camellia ‘Nicky Crisp’* petals check the other petals once or twice a day. *Camellia lutchuensis* petals should not develop lesions, although small brown spots may be visible (Figure 1E). The test will be complete after 4 to 5 days, as petals will start to shrivel as a result of being detached from the plant.

**Notes**

I suggest performing the assay on *Camellia ‘Nicky Crisp’* and *Camellia lutchuensis* first. This will give you a chance to optimize your technique for subsequent assays. It is a good idea to repeat the assay if you think you have found something interesting. A second positive result will be easier to believe. Do not forget to take photos as proof of your result.