

DROUGHT TOLERANT PEONY SPECIES

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As climate change slowly sets in over the years, with temperatures rising and more extreme conditions, we have again experienced some rather inhospitable weather this year. Whereas early Spring was characterised by a prolonged wet period, by the time the peonies started flowering mid-May, this totally turned for the reverse: a long very sunny and warm period resulting in dry soils.

This may well be the average future weather, meaning that we will be irrigating our peonies to help them grow well or we should look for more drought resistant peonies. Peonies not able to cope well with it, tend to die off early in Summer above ground, which can be an unpleasant sight. Some commercial cultivars are better able to cope with this, but this short review will have a look at their wild ancestors, the peony species. My own small peony hybridizing efforts have one line of interest that involves incorporating less used species, thus therefore I do grow quite a number of different species.

Most of these paeonia species are grown under a shading cloth that filters the direct sunlight in an effort to replicate the natural conditions where most peonies grow. Surprisingly, as opposed to most cultivated varieties, which derive (at least partly) from *P. lactiflora* - a sun-loving species -, most species do actually prefer dappled shade. Underneath that shading cloth they are grown in potting soil which was placed on top of the original soil, resulting in a planting bed some 50-60 cm (2 feet) above the surrounding soil. This potting soil is very airy, with some 20% coarse river sand mixed in. It tends to drain rainwater very fast, which was our goal as many species can't take a lot of water during Summer.

The shading net and elevated soil

Last year we lost several paeonia species ourselves. During the hot and dry Summer months, we irrigated too often and some species didn't survive this. Even though they seemed to grow healthy and had green leaflets all Summer long, apparently rot had started to appear on the roots and *P. clusii*, *P. parnassica*, *P. mascula ssp hellenica* and *P. sterniana* were all goners by the onset of Autumn. Clearly, if in doubt, it's better to leave your peony species too dry than too wet. That being said, we have noted some remarkable differences between the paeonia species we grow here after one month and a half without noticeable rain and high temperatures.

Following is a list of the species as they stand now. Each species plant was visually observed and then placed into one of three categories (1/ growing perfectly; 2/ some damage showing; 3/ poor growing and turning brown). We have received the remark that the pale green yellowish leaflets with the darker veins might also be a result of magnesium deficiency. Possibly, but all plants are grown next to one another in the same soil and some species show this whilst others totally not whereas the difference has also only recently come to be, so we currently don't think this is the cause. We don't have all species and observations are made

Excellent tolerance of drought:

P. arietina
P. broteri
P. cambessedesii
P. corsica
P. daurica ssp daurica
P. hybrida
P. mascula ssp hellenica
P. mascula ssp russoi
P. morisii

on only one or a few plants at most. Some may be wrongly labelled and there will be differences between individual plants within a given species or population. There are also differences between seedlings and mature plants, the latter able to cope longer with drought. We also have some species growing outside in our normal fields, which receive full sun but where the soil is less dry, those have not been taken into account as the comparison here is for drought tolerance. So there are many remarks and possibilities for errors, but we do hope it can still be of interest for those wanting to grow peony species. And for us it is interesting in that it gives us some guidance as to what species to use in hybridizing.

As could be expected the species that naturally grow in places that experience dry and hot weather in Summer seem to cope better than the others. Those are many of the Mediterranean ones: *P. cambessedesii*, *P. corsica*, *P. morisii*, *P. sandrae* and *P. broteri* for example. Those species are growing perfectly fine despite the dry conditions.

The reverse is also true of course, peonies that grow further North, seem to have more difficulty, *P. anomala* is a good example.

Then there are the peony species that grow in areas that receive less rain, the so-called 'steppe' peonies like *P. tenuifolia* or *P. hybrida*, they are obviously well adapted to these circumstances.

Peony species that grow high in the mountains in nature seem to have more problems: all species in the wittmanniana group are in this case. *P. tomentosa*, *P. wittmanniana* and *P. macrophylla* are all showing lack of vigour and are slowly turning paler green and yellow. The best of these three seems to be *P. tomentosa*.

Between some closely related (or close by growing) species there are sometimes differences as well. The *P. officinalis* group, which is spread over a huge territory from Portugal over Spain, France, Switzerland, Italy and former Yugoslavia has representatives coping better than others. *P. officinalis ssp microcarpa* (aka *P. villosa*) copes very well, whilst the same can be said of subspecies *italica* and *officinalis*. The Southern France subspecies *huthii* and more Eastern subspecies *banatica* seem less tolerant of drought. Another difference exists in the so-called 'daurica' group. Whereas the Crimean *P. daurica ssp daurica* grows fine, the more Southernly growing *P. caucasica* has more difficulty. Of course *P. daurica ssp daurica* has more upfacing leaflets that direct the rainwater on the leaves towards the base of the stems and thus the roots. *P. caucasica* on the other hand has more flat or downwards facing leaflets that drain that rainwater away from the base of the stems. That difference is probably an adaptation to the the regions they are growing naturally with Crimea receiving far less rain than the Eastern Black Sea region. Two other close species are *P. obovata* and *P. japonica*, here at least it can be seen that *P. obovata* copes better with drought than *P. japonica*, although it would be unfair to classify even the former as drought tolerant. Another duo: *P. peregrina* also seems more tolerant than *P. saueri*. And within that other widely spread *P. mascula* species, it turns out that subspecies *russoi* and *hellenica* are far better than *bodurii* and *mascula*. Here it must be stressed however that *bodurii* is far easier to grow than *hellenica*, the latter not able to cope with wet circumstances, which is obviously the other side of the medal and which is probably also true for the species we lost last year.

Some that are perhaps a little bit unexpectedly doing poor are *P. coriacea*, *P. mascula ssp mascula* and *P. turcica*. Those are already turning brown. It doesn't necessarily mean they can't handle dry circumstances as they may simply be genetically inclined to do that this early. But it is obviously not a very pretty sight and if the leaflets are not green, then the roots will not increase during Summer also. *P. wendelboi*, despite it growing in a very dry location naturally is another one which was unexpected. It could of course be that I have a hybrid between *P. mlokosewitschii* and *P. wendelboi*, which could explain this as *P. mlokosewitschii* does not grow in such an arid climate. On the other hand I have several plants from a controlled cross, if the mother plant were a hybrid, then the seedlings should show much more difference (in height for example), which they don't,

- P. officinalis ssp italica*
- P. officinalis ssp microcarpa*
- P. officinalis ssp officinalis*
- P. peregrina*
- P. sandrae*
- P. tenuifolia*
- P. velebitensis*

Able to cope with it, but foliage turning paler green:

- P. emodi*
- P. flavescens*
- P. mascula ssp bodurii*
- P. officinalis ssp banatica*
- P. officinalis ssp huthii*
- P. officinalis ssp mollis* (garden species)
- P. obovata f alba*
- P. obovata ssp willmottiae*
- P. saueri*
- P. turcica*
- P. wendelboi* (hybrid?)

Poor resistance to drought (pale green to yellowish leaflets, sometimes with greener veins):

- P. caucasica*
- P. coriacea*
- P. japonica*
- P. kesrouanensis*
- P. lactiflora*
- P. x litvinskajae*
- P. macrophylla* (garden hybrid)
- P. mascula ssp mascula*
- P. ruprechtiana*
- P. tomentosa*
- P. turcica*
- P. wittmanniana*

so this actually points to it being true-to-name.

With the limitations mentioned above we would welcome any additional comments on your experiences with peony species and drought tolerance (or the reverse, how do they cope with wet Summers). We can then add those remarks to the table. The comments section below is for you ;-)