

Supplementing Calcicolous Paphs

AnTec Laboratory - Bob & Lynn Wellenstein

A very common question is "I've heard Paphs like lime, do I need to add it to my pots or mix?" Like so many 'simple' questions, there is no one simple answer.

People often tend to look at Paphs as a homogeneous group of plants, but the fact of the matter is they come from a vast range of habitats, and it is difficult to make generalities as to culture. In the case of Paphs, many grow on or in close proximity to calcareous rock, but at least an equal number do not, and many of these would actually do poorly with a higher pH and calcium/magnesium supplement, so it is important first to know which Paphs tend to have a calcareous substrate in nature. How strongly calcicolous a Paph may be can be inferred to a certain degree from the nature of its relationship with the calcareous rock. Some may be found with their roots in direct contact. Others may grow in accumulated detritus or soils derived from the erosion of the rock, and others, while growing in leaf litter or humus, may still be greatly influenced if they are growing in cracks or crevasses in the calcareous rock, especially those growing below the summit on steep slopes and cliffs, with the water washing down over the stone and into the litter or humus. Plants growing in rapidly accumulating leaf litter on a level forest floor may not be significantly affected by an underlayment of limestone far below. Others are only occasionally associated with limestone (such as *Paph. lowii*, which is typically epiphytic), and in culture we do not treat these as calcicolous. We have not determined whether the requirements are for increased calcium and magnesium, or simply the higher pH that results, or all of these factors, but do believe from experience that for the strongly calcicolous species dolomitic limestone supplementation is needed for the long term health of the plant. A few species are also associated with serpentine, which is a basic silicate of magnesium, iron, aluminum, nickel, zinc, and manganese, and a more basic pH is also a consideration for these species.

Secondly, whether to supplement or not depends on the nature of your water and fertilizer. If you already are dealing with high pH hard water, further supplementation would probably be counterproductive. The nature of your potting medium also comes into play. We have always preferred at least a part of the mix to be fir bark for the mixed Paph collection, providing a somewhat acidic base. We feel the ideal situation for the mixed Paph collection is to water with a pure water source supplemented with balanced fertilizer program containing about 40 ppm calcium and 20 to 30 ppm magnesium and a pH in the 6.2 to 6.6 range. This will satisfy the needs of the noncalcicolous Paphs (note there are a few species that will need to have even lower calcium levels, but these are less common). For the calcareous species you would then add, preferably as a top dress to the pot, either crushed oyster shell, pelletized Dolomitic limestone, or Dolomitic limestone chunks. Finer grades of Dolomitic lime or micronized dolomitic limestone are useful for quick corrections, but must be reapplied frequently if not followed by an appropriate supplement. We also prefer to top dress rather than incorporate it into the mix so that we can see when the supply has been depleted and reapply.

You will often hear conflicting views on addition of calcareous materials, but if you explore them they are usually formed based on improper or inappropriate use. On one internet forum recently one person posted that her *Paph. delenatii* did poorly until she added limestone, and another posted that he saw a bunch of *delenatii* plants that were covered in limestone and doing very poorly at a nursery. Well, even though a *parvisepalum*, *Paph. delenatii* is not a calcareous associated Paph. The first person who saw improvement may have been watering with extremely acid irrigation water, or very low calcium or magnesium levels, and in these cases of poor culture it may have given a boost. In the second case, I'll bet the plants were in poor shape before the lime was added, and it is very unlikely that the lime helped them, except to a faster demise.

One note on making bark mixes slightly alkaline, they will tend to break down quite a bit faster.

Paph. species substrate Chart

Species	calcicolous	Substrate Habit	Measured Substrate pH	Habitat Substrate Comments
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Subgenus *Parvisepalum*

<i>armeniicum</i>	yes	lithophytic, "humus/detritus epiphyte"	7.48 – 7.86	North facing steep limestone slopes
<i>delenatii</i>	no	"humus/detritus epiphyte"	"acidic"	South or southeastern facing mossy crevasses in steep granite cliffs

malipoense	yes	"humus/detritus epiphyte"	7.47	North facing near vertical karst limestonecliffs and steep hills in thin soil and leaf litter
micranthum	yes	"humus/detritus epiphyte"	6.99 – 7.05	North facing near the summit of steep karst limestone ridges, in crevasses in thin soil, mosses and leaf litter
emersonii	yes	"humus/detritus epiphyte", lithophytic		Crevasses in northeast facing limestone cliffs, in clay, sand, calcareous soil and humus, or on limestone rocks

Subgenus Brachypetalum

bellatulum	yes	"humus/detritus epiphyte"		Cracks and crevasses of limestone outcrops in thin layer of leaf mold and moss
concolor	yes	"humus/detritus epiphyte", lithophytic	7.2 – 8.0	In cracks and crevasses of limestone rock in light humus
godefroyae	yes	"humus/detritus epiphyte", lithophytic		In hollows and crevasses in limestone filled with humus and leaf litter
niveum	yes	"humus/detritus epiphyte"		Fissures in vertical limestone where humus has gathered

Subgenus Paphiopedilum

Section Coryopetalum

philippinense	yes	"humus epiphyte", lithophytic		Open situations on limestone cliffs, hills and outcrops, piles of limestone rubble
randsii	no	"humus epiphyte", epiphyte		Decaying leaves at the base of trees, possibly also epiphytically
sanderianum	yes	"humus/detritus epiphyte", lithophytic		Vertical northeast or east facing limestone cliffs
kolopakingii		"humus/detritus epiphyte", lithophytic		In moss on rocks
stonei	yes	lithophytic		On sheer limestone cliffs
adductum		"humus epiphyte"		
glanduliferum	yes	"humus epiphyte", epiphyte		Roots in surface humus and soil derived from weathered limestone, rarely epiphytic
wilhelminae	yes	"humus epiphyte", lithophyte		Grassy hillsides in clay soil over limestone or on limestone rubble

rothschildianum	no, but ultrabasic	"humus/detritus epiphyte", lithophytic		Ledges on steep slopes of ultra basic (serpentine) rock
supardii	yes	"humus/detritus epiphyte"		On limestone rocks in leaf mold filled hollows

Subgenus Paphiopedilum

Section Pardalopetalum

haynaldianum	rarely	"humus/detritus epiphyte", lithophytic, rarely epiphytic		In humus amongst rocks on serpentine cliffs, occasionally an epiphyte – Fowlie On granite boulders and limestone hills - Birk
lowii	rarely	epiphyte, rarely lithophyte		On tree branches and trunks, or in moss or humus filled hollows of rock, especially limestone
parishii	no	epiphyte		On moss covered branches
dianthum	yes	"humus/detritus epiphyte", lithophyte		North facing small cliffs and rocks, limestone bluffs

Subgenus Paphiopedilum

Section Cochlopetalum

Glaucophyllum	yes	lithophyte	8	Steep limestone cliffs dripping with water
liemianum	yes	lithophyte		On the roots of trees growing on limestone
primulinum	yes	"humus epiphyte", lithophyte		Humus on limestone hills On corraline limestone facing the sea
victoria-mariae	no	lithophyte	4.5	Steep wet cliffs of andesite lava
victoria-reginae	yes	lithophyte		Limestone cliff faces with mosses

Sungenus Paphiopedilum

Section Paphiopedilum

hirsutissimum	yes	lithophyte, epiphyte	7.0 – 7.86	Vertical to near vertical, north to east facing limestone cliffs
charlesworthii	yes	"humus epiphyte", lithophyte		On limestone hills and cliffs, roots clinging to rocks
insigne	yes	"humus/detritus epiphyte", lithophyte		Dolomitic limestone outcrops near waterfalls
barbigerum	yes	"humus/detritus epiphyte"		North facing cliff at the foot of a karst limestone mountain
exul	yes	"humus/detritus epiphyte", lithophyte		Attached by its roots to steep limestone cliffs or in pockets filled with humus
henryanum	no	"humus epiphyte"		North facing steep slopes and cliffs
gratrixianum	no	"humus epiphyte"		Vertical riolite bluffs
villosum	no	Epiphyte, lithophyte		Grows in large clumps on branches and trunks of trees, rarely lithophytically
tigrinum	no	"humus/detritus epiphyte"		North facing rocky slopes on steep volcanic mountains
druryi	no	"terrestrial"		Steep south east or south west facing rocky slopes...on weathered rock and poor soils
spicerianum	yes	"humus/detritus epiphyte", lithophyte		On limestone outcrops and cliffs
fairrieianum	yes	"humus/detritus epiphyte"		Steep cliffs, outcrops of crystalline limestone, rocks in oak forest, limestone gravels

Subgenus Paphiopedilum

Section Barbata

appletonianum	no	"humus epiphyte"		Deep leaf litter, mossy boulders in sandstone mountains
bullenianum	no	"humus epiphyte"		Moss, deep leaf litter, mangrove roots
hookerae	sometimes	"humus epiphyte"		Deep leaf litter and crevasses in weathered sandstone hills. Also limestone
sangii	no	"humus epiphyte"		

masterianum	no	"humus epiphyte"		Leaf litter on steep slopes
papuanum	no	"humus epiphyte"		Among granite rocks in loam
bouganvilleanum	no	"humus epiphyte"		At base of granite outcrop
violascens	no	"humus epiphyte", rarely epiphytic		Found growing in varying conditions, from ultrabasic "soils" to acidic volcanic "soils"
wentworthianum	no	"humus epiphyte"		Light fibrous compost, deep leaf litter
tonsum	no	"humus epiphyte"		Deep humus
argus	no	"humus epiphyte"		Thick mosses and deep leaf litter
barbatum	no	"humus epiphyte"		Leaf litter
callosum	no	"humus epiphyte"		Leaf litter and mossy rocks
hennisianum	no	"humus epiphyte"		Deep leaf litter and humus
fowliei	possibly	"humus epiphyte"		Leaf mold and detritus on limestone rock
lawrenceanum	possibly	"humus epiphyte"		Deep leaf litter, less commonly mossy limestone rock
dayanum	no	"humus epiphyte"		Leaf litter, serpentine outcrops
ciliolare	no	"humus epiphyte"		Forest slopes
superbiens	no	"humus epiphyte"		Steep podsolised ridges
acmodontum	unlikely	"humus epiphyte"		
javanicum	no	"humus epiphyte"		Leaf litter among boulders and on banks, leaf litter in cracks between boulders
schoseri	no	"humus/detritus epiphyte", lithophyte		Leafy mold and debris, humus filled rock crevasses, moss covered rocks
urbanianum	no	"humus epiphyte"		Deep leaf litter and humus among rocks

purpuratum	no	"humus epiphyte"		Steep rocky slopes, moss covered banks near streams, deep leaf litter
sukhakulii	no	"humus epiphyte"		Sandy, humus rich loam
wardii	no	"humus epiphyte", lithophyte		On rocks and earth banks
venustum	no	"humus epiphyte"		Cliff ledges above streams, humus rich gullies, steep loamy cliffs, moss covered tree branches

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