

Mycological Notes 25: The status of names of powdery mildews in New Zealand.

Jerry Cooper, August 2013

Compiling Mycological Notes 24 on two unusual powdery mildews (PMs) highlighted a significant issue of which I have long been aware and which contributed to me erroneously reporting *Erysiphe platani* as a 'New Organism' when the PM on Plane trees had already been recorded under the misapplied name *Erysiphe alphitoides*. The status of names applied to PMs in New Zealand is currently inadequate due to the absence of a modern New Zealand revision of the group. The names applied to many early collections are misleading when considered in the context of the current global knowledge of the group, and from that evidence it is nearly impossible to say which species are present in New Zealand and which are not. PMs are important plant pathogens and it is important that we know what we have, and what we don't. For example *Blumeria graminis* is considered one of the world's top ten fungal pathogens (Dean et al, 2012) affecting a wide variety of cereal crops. This is one of the few PMs about which there has been consistent agreement on the correct name, although even in this case the name is actually used in a broad sense for many narrowly host-specific races.

During the 1970s and 1980's H.J Boesewinkel contributed significantly to the New Zealand knowledge of PMs, and indeed made significant contributions to the knowledge of the group at the global level (e.g. Boesewinkel, 1976, 1977, 1980). In addition K.R.W. Hammett surveyed the erysipheaceae of New Zealand in 1977.

Earlier in the 20th century it was common to use a very broad species concept for names such as *Erysiphe cichoracearum* and *Erysiphe polygoni*. It was assumed that these names applied to PMs capable of infecting many species of host plant, and the national collection, [PDD](#), still has many collections identified during this period using these old species concepts. In PDD the name *E. cichoracearum* is currently used for the PM affecting 55 genera of plant hosts, and *E. polygoni* affecting 35 genera of plant hosts. The modern species concept are very different with *E. cichoracearum* (now known as *Golovinomyces cichoracearum*) probably correctly applied to just two genera of New Zealand plants, and *E. polygoni* not present in New Zealand at all.

During the 60s and 70s it was realised that many PMs (but not all) are really quite host specific. Detailed morphological studies combined with experiments to determine the host range using deliberate infections led to the recognition of many new species concepts. Some of the collections in PDD identified during this period reflect these altered species concepts.

Since the 1990s the work of Braun (and Cook) and others, together with the application of molecular analysis has revolutionised our understanding of the taxonomy of PMs and their host affinities. Once again the species concepts and the applied names have been shuffled but the collections in PDD have not been revised in the light of this work. The present, relatively stable state of knowledge of the group is summarised by Braun and Cook (2012) and somehow we need to apply this knowledge to the New Zealand situation.

In this analysis I have not looked at any collections in PDD, and it probably wouldn't help very much. Most of our PMs are recorded only as the anamorphic state and it is very difficult to determine species from the morphology of the anamorphic state alone (Boesewinkel, 1976). Only 11% are known to have the morphologically informative teleomorph state present in New Zealand. I have looked at the hosts of the historical records in PDD and I have used this host list in conjunction with Braun & Cook 2012 to arrive at a list of potential PMs for each host. I have then used information on the global distribution of these taxa and hosts, together with the historical New Zealand names, to arrive at a most likely candidate for the identity of the PMs for this host in New Zealand. In some cases I identify

two possibilities, and when there are more possibilities I have given up. These entries have a question mark against them, and the identity of these PMs definitely needs investigation. The PMs associated with some hosts remain taxonomically uncertain (according to the global state of knowledge), and once again these PMs require further investigation. Interestingly, a number of these poorly known taxa are PMs on endemic plant hosts, and some of those hosts are threatened according to the latest data from the Department of Conservation.

Table 1 is derived from data in PDD. I have listed the host species against the identified PM. This list reflects the current stated knowledge of the group according to the unrevised identifications currently applied to specimens in PDD.

Table 1: PDD specimens of powdery mildews showing the recorded fungus and host names

Existing PDD host/PM data	
Recorded Host	Recorded PM
Acaena	Sphaerotheca aphanis
Acanthus mollis	Phyllactinia guttata
Acer negundo	Oidium
Acer negundo	Sawadaea bicornis
Acer negundo	Uncinula bicornis
Acer pseudoplatanus	Uncinula bicornis
Achillea millefolium	Erysiphe cichoracearum
Ailanthus altissima	Microsphaera alphitoides
Ajuga reptans	Golovinomyces biocellatus
Alectryon excelsus	Oidium
Alectryon grandis	Sawadaea bicornis
Alseuosmia quercifolia	Erysiphe cichoracearum
Alseuosmia quercifolia	Microsphaera euonumi-japonici
Anethum graveolens	Erysiphe heraclei
Anthemis tinctoria	Oidium
Aquilegia vulgaris	Erysiphe aquilegiae var. aquilegiae
Aquilegia vulgaris	Erysiphe polygoni
Aquilegia vulgaris	Erysiphe ranunculi
Aquilegia vulgaris	Oidium
Araujia sericifera	Oidium
Arctium lappa	Erysiphe
Aristotelia	Erysiphe densa
Aristotelia fruticosa	Erysiphe polygoni
Aristotelia racemosa	Erysiphe densa
Aristotelia serrata	Erysiphe densa
Aristotelia serrata	Erysiphe polygoni
Aster	Erysiphe cichoracearum
Aster ericoides	Erysiphe cichoracearum
Aster subulatus	Erysiphe cichoracearum
Begonia	Erysiphe cichoracearum
Begonia coccinea	Erysiphe
Begonia coccinea	Microsphaera begoniae
Begonia masoniana	Erysiphe cichoracearum
Begonia masoniana	Microsphaera begoniae
Begonia rex	Microsphaera begoniae
Begonia rex-cultorum	Erysiphe cichoracearum
Begonia semperflorens	Erysiphe cichoracearum
Begonia semperflorens	Oidium
Begonia tuberhybrida	Erysiphe cichoracearum
Beta vulgaris	Erysiphe betae
Beta vulgaris	Oidium
Borago officinalis	Erysiphe cichoracearum
Borago officinalis	Oidium
Brachyglottis repanda	Erysiphe cichoracearum
Brassica	Erysiphe pisi
Brassica	Erysiphe polygoni
Brassica campestris	Oidium
Brassica juncea var. crispifolia	Erysiphe cruciferarum
Brassica napo-brassica	Erysiphe polygoni
Brassica napus var. napo-brassica	Erysiphe polygoni
Brassica oleracea var. capitata	Erysiphe cruciferarum
Brassica oleracea var. ramosa	Erysiphe polygoni
Brassica rapa	Erysiphe polygoni
Bromus mollis	Blumeria graminis
Bupthalmum speciosum	Erysiphe cichoracearum
Calendula officinalis	Oidium
Calendula officinalis	Sphaerotheca fuliginea
Capsicum annuum	Leveillula taurica
Cardamine	Oidium
Cardamine debilis	Erysiphe cichoracearum
Cardamine flexuosa	Erysiphe cichoracearum
Cardamine hirsuta	Erysiphe cichoracearum
Cardamine hirsuta	Erysiphe mougeotii
Carica xheilbornii	Erysiphe cichoracearum
Carica microcarpa	Sphaerotheca fuliginea
Carica papaya	Erysiphe cichoracearum
Carica papaya	Oidium caricae
Carica papaya	Sphaerotheca fuliginea
Carica pubescens	Erysiphe cichoracearum
Carica pubescens	Oidium caricae
Carica pubescens	Sphaerotheca fuliginea
Carica pubescens x stipulata	Oidium caricae
Carica pubescens x stipulata	Sphaerotheca fuliginea
Castanea	Microsphaera penicillata
Castanea crenata	Microsphaera alphitoides
Castanea sativa	Microsphaera

Castanea sativa	Microsphaera alphitoides
Castanea sativa	Oidium
Ceropegia haygarthii	Oidium
Chrysanthemum indicum	Erysiphe
Chrysanthemum indicum	Oidium chrysanthemi
Chrysanthemum morifolium	Oidium chrysanthemi
Cirsium arvense	Golovinomyces cichoracearum
Citrullus lanatus	Sphaerotheca fuliginea
Clematis	Erysiphe polygoni
Clematis australis var. rutaefolia	Erysiphe polygoni
Clematis forsteri	Erysiphe aquilegiae var. ranunculi
Clematis jackmanni	Erysiphe polygoni
Clematis paniculata	Erysiphe aquilegiae
Clematis paniculata	Erysiphe ranunculi
Clematis recta	Erysiphe polygoni
Clematis stans	Erysiphe polygoni
Clematis vitalba	Erysiphe aquilegiae var. ranunculi
Cleome	Erysiphe pisi
Cleome hassleriana	Erysiphe cichoracearum
Cleome hassleriana	Oidium
Clianthus puniceus	Oidium
Coriaria angustissima	Sphaerotheca fuliginea
Coriaria arborea	Sphaerotheca fuliginea
Coriaria lurida	Sphaerotheca fuliginea
Cosmos atrosanguineus	Oidium
Cosmos bipinnatus	Erysiphe
Cosmos bipinnatus	Erysiphe cichoracearum
Cotinus coggygria	Microsphaera euonumi-japonici
Crataegus monogyna	Podosphaera oxycanthae
Cucumis melo var. cantalupensis	Erysiphe cichoracearum
Cucumis melo var. cantalupensis	Sphaerotheca fuliginea
Cucumis metuliferus	Sphaerotheca fuliginea
Cucumis sativus	Erysiphe cichoracearum
Cucumis sativus	Golovinomyces orontii
Cucumis sativus	Sphaerotheca fuliginea
Cucurbita maxima	Erysiphe cichoracearum
Cucurbita maxima	Sphaerotheca fuliginea
Cucurbita moschata	Sphaerotheca fuliginea
Cucurbita pepo	Erysiphe cichoracearum
Cucurbita pepo	Oidium
Cucurbita pepo	Sphaerotheca fuliginea
Cucurbita pepo var. melopepo	Erysiphe cichoracearum
Cydonia vulgaris	Podosphaera leucotricha
Cynara cardunculus	Leveillula taurica
Cynara scolymus	Erysiphe cichoracearum
Cynara scolymus	Leveillula taurica
Cyphomandra	Erysiphe cichoracearum
Cyphomandra	Oidium
Cyphomandra betacea	Erysiphe
Cyphomandra betacea	Erysiphe cichoracearum

Cyphomandra betacea	Erysiphe polygoni
Cyphomandra betacea	Oidium
Cyphomandra fragrans	Erysiphe cichoracearum
Cytisus scoparius	Oidium
Dactylis glomerata	Erysiphe graminis
Dahlia	Erysiphe
Dahlia	Erysiphe cichoracearum
Dahlia	Oidium
Delphinium	Erysiphe polygoni
Delphinium ajacis	Erysiphe aquilegiae var. ranunculi
Delphinium ajacis	Erysiphe polygoni
Delphinium ajacis	Erysiphe ranunculi
Delphinium ajacis	Oidium
Delphinium cultorum	Erysiphe polygoni
Dodonaea viscosa	Oidium
Dodonaea viscosa	Uncinula bicornis
Echium vulgare	Erysiphe cichoracearum
Epilobium ciliatum	Oidium
Epilobium melanocaulon	Sphaerotheca epilobii
Epilobium pubens	Oidium
Erica	Erysiphe
Erica	Erysiphe polygoni
Erodium moschatum	Erysiphe cichoracearum
Erodium moschatum	Oidium
Erodium moschatum	Sphaerotheca fugax
Eucalyptus	Oidium
Eucalyptus albens	Sphaerotheca alchemillae
Eucalyptus diversifolia	Oidium
Eucalyptus eremophila	Sphaerotheca
Eucalyptus grossa	Sphaerotheca alchemillae
Eucalyptus megacarpa	Oidium
Eucalyptus moluccana	Sphaerotheca pannosa
Eucalyptus nutans	Oidium
Eucalyptus pannosa	Sphaerotheca pannosa
Eucalyptus torquata	Oidium
Euonymus europaeus	Oidium
Euonymus japonicus	Microsphaera euonumi-japonici
Euonymus japonicus	Oidium
Euonymus japonicus var. aureomarginatus	Microsphaera euonumi-japonici
Euphorbia	Oidium
Euphorbia peplus	Sphaerotheca euphorbiae
Festuca arundinacea	Blumeria graminis
Fragaria	Sphaerotheca alchemillae
Fumaria bastardii	Erysiphe mougeotii
Fumaria bastardii	Erysiphe polygoni
Fumaria muralis	Erysiphe cruciferarum
Fumaria officinalis	Erysiphe mougeotii
Gazania	Leveillula taurica
Gazania rigens	Leveillula taurica
Geranium homeanum	Erysiphe
Geranium homeanum	Erysiphe cichoracearum
Geranium solanderi	Neoerysiphe geranii
Gerbera	Erysiphe
Gerbera jamesonii	Erysiphe cichoracearum

Hardenbergia monophylla	Oidium hardenbergiae
Hardenbergia monophylla var. osea	Erysiphe polygoni
Hebe	Erysiphe polygoni
Hebe	Golovinomyces orontii
Hebe speciosa	Erysiphe cichoracearum
Hebe speciosa	Erysiphe pisi
Helianthus	Oidium
Helianthus annuus	Erysiphe cichoracearum
Helianthus annuus	Erysiphe polygoni
Helianthus annuus	Oidium
Helianthus annuus	Sphaerotheca fuliginea
Helichrysum bracteatum	Erysiphe cichoracearum
Helichrysum bracteatum	Oidium helichrysi
Hibiscus syriacus	Oidium
Hoheria glabrata	Oidium
Hoheria lyallii	Erysiphe
Hoheria populnea	Erysiphe
Hoheria populnea	Sphaerotheca fuliginea
Hordeum vulgare	Erysiphe graminis
Huernia macrocarpo	Sphaerotheca fuliginea
Hydrangea	Oidium
Hydrangea	Oidium hortensiae
Hydrangea hortensis	Oidium hortensiae
Hydrangea macrophylla	Oidium hortensiae
Hydrangea macrophylla	Sphaerotheca alchemillae
Hypericum gramineum	Oidium
Iberis umbellata	Erysiphe cruciferarum
Impatiens	Oidium
Impatiens balsamina	Leveillula taurica
Kalanchoe	Erysiphe cichoracearum
Lactuca serriola	Oidium
Lagenaria siceraria	Sphaerotheca fuliginea
Lagerstroemia indica	Oidium
Lagerstroemia indica	Uncinula australiana
Lamium amplexicaule	Oidium
Lathyrus articulatus	Erysiphe polygoni
Lathyrus inconspicuus	Erysiphe polygoni
Lathyrus latifolius	Erysiphe pisi
Lathyrus latifolius	Erysiphe polygoni
Lathyrus latifolius	Microsphaera trifolii var. trifolii
Lathyrus montanus	Erysiphe polygoni
Lathyrus odoratus	Erysiphe pisi
Lathyrus odoratus	Erysiphe polygoni
Lathyrus odoratus	Microsphaera trifolii var. trifolii
Lathyrus odoratus	Oidium
Lathyrus tuberosus	Erysiphe polygoni
Limosella lineata	Oidium
Linaria	Oidium
Lolium multiflorum x Festuca arundinacea	Blumeria graminis
Lolium perenne	Blumeria graminis
Lonicera japonica	Oidium
Lupinus polyphyllus	Erysiphe polygoni
Lycium chinense	Erysiphe mougeotii
Lycopersicon esculentum	Erysiphe cichoracearum
Lycopersicon esculentum	Erysiphe orontii

Lycopersicon esculentum	Oidium
Magnolia liliflora	Microsphaera
Malus xdomestica	Podosphaera leucotricha
Malus sylvestris	Podosphaera leucotricha
Matricaria discoidea	Erysiphe cichoracearum
Medicago lupulina	Erysiphe pisi
Melilotus indica	Erysiphe polygoni
Mentha	Erysiphe biocellata
Mentha	Erysiphe cichoracearum
Mentha	Oidium
Mida salicifolia	Erysiphe mougeotii
Mida salicifolia	Erysiphe polygoni
Mimulus guttatus	Oidium
Modiola caroliniana	Erysiphe cichoracearum
Monarda didyma	Golovinomyces biocellatus
Mondara	Oidium
Myosotis arvensis	Erysiphe cynoglossi
Myosotis sylvatica	Erysiphe cichoracearum
Myriophyllum	Oidium
Myriophyllum aquaticum	Microsphaera alphitoides
Myriophyllum aquaticum	Oidium
Nemesia	Oidium
Nemesia strumosa	Erysiphe cichoracearum
Nemesia strumosa	Erysiphe polygoni
Nicotiana affinis	Erysiphe cichoracearum
Nicotiana alata	Erysiphe cichoracearum
Nicotiana tabacum	Erysiphe cichoracearum
Nigella damascena	Erysiphe polygoni
Oenothera biennis	Oidium
Oenothera glazioviana	Erysiphe heraclei
Olearia furfuracea	Podosphaera
Olearia furfuracea	Sphaerotheca
Olearia nummularifolia	Sphaerotheca
Olearia rani	Sphaerotheca
Oxalis corniculata	Erysiphe polygoni
Oxalis corniculata	Oidium oxalidis
Oxalis exilis	Erysiphe polygoni
Oxalis exilis	Microsphaera russellii
Papaver dubium	Oidium
Papaver nudicaule	Erysiphe cichoracearum
Papaver nudicaule	Erysiphe mougeotii
Papaver nudicaule	Erysiphe pisi
Papaver nudicaule	Oidium
Papaver somniferum	Erysiphe cichoracearum
Papaver somniferum	Erysiphe polygoni
Parietaria judaica	Oidium
Parietaria judaica	Oidium
Pastinaca sativa	Erysiphe heraclei
Pastinaca sativa	Erysiphe polygoni
Pedilanthus tithymaloides	Oidium
Penstemon hartwegii	Erysiphe cichoracearum
Penstemon strictus	Oidium
Petunia	Erysiphe cichoracearum
Petunia	Oidium
Petunia hybrida	Erysiphe cichoracearum
Phalaris minor	Blumeria graminis
Phalaris tuberosa	Erysiphe graminis

Phaseolus caracalla	Erysiphe polygoni
Phaseolus coccineus	Erysiphe polygoni
Phaseolus coccineus	Sphaerotheca fuliginea
Phaseolus vulgaris	Erysiphe polygoni
Phebalium	Leveillula taurica
Phebalium	Oidium
Phlox paniculata	Erysiphe
Phlox paniculata	Erysiphe magnicellulata
Photinia glabra	Podosphaera leucotricha
Photinia serrulata	Podosphaera
Photinia serrulata	Podosphaera leucotricha
Photinia serrulata	Sphaerotheca pannosa
Picris echioides	Erysiphe cichoracearum
Picris echioides	Oidium
Pisum sativum	Erysiphe pisi
Pisum sativum	Erysiphe polygoni
Plagianthus betulinus	Oidium
Plagianthus regius	Erysiphe
Plagianthus regius	Erysiphe polygoni
Plagianthus regius	Oidium
Plagianthus regius	Sphaerotheca jac9830
Plantago	Erysiphe cichoracearum
Plantago lanceolata	Erysiphe cichoracearum
Plantago major	Erysiphe cichoracearum
Plantago major	Erysiphe polygoni
Plantago major	Erysiphe sordida
Plantago major	Oidium
Plantago raoulii	Oidium
Plantago triandra subsp. triandra	Podosphaera
Platanus	Microsphaera alni
Platanus	Microsphaera platani
Platanus xacerfolia	Microsphaera alphitoides
Platanus xacerifolia	Erysiphe platani
Platanus hispanica	Erysiphe platani
Platanus orientalis	Microsphaera alphitoides
Poa trivialis	Blumeria graminis
Poa trivialis	Erysiphe graminis
Prunus armeniaca	Sphaerotheca pannosa
Prunus laurocerasus	Podosphaera oxycanthae
Prunus laurocerasus	Podosphaera tridactyla
Prunus persica	Sphaerotheca fuliginea
Prunus persica	Sphaerotheca pannosa
Pyrus communis	Podosphaera leucotricha
Pyrus pyrifolia	Podosphaera leucotricha
Quercus	Microsphaera penicillata
Quercus canariensis	Microsphaera alphitoides
Quercus robur	Microsphaera alphitoides
Quercus robur	Microsphaera penicillata
Quercus robur	Oidium
Ranunculus acris	Erysiphe cichoracearum
Ranunculus asiaticus	Erysiphe polygoni
Ranunculus asiaticus	Oidium
Ranunculus bulbosus	Erysiphe ranunculi
Ranunculus parviflorus	Erysiphe polygoni
Ranunculus repens	Erysiphe aquilegiae var. ranunculi

Ranunculus repens	Erysiphe polygoni
Ranunculus repens	Erysiphe ranunculi
Ranunculus sardous	Erysiphe polygoni
Raphanus maritimus	Erysiphe cruciferarum
Rhododendron	Erysiphe polygoni
Rhododendron	Microsphaera
Rhododendron	Oidium
Rhododendron xfragrantissimum	Oidium ericinum
Rhododendron aurigeranum x R. macgregoriae	Oidium
Rhododendron indicum	Oidium
Rhododendron occidentale	Erysiphe cruciferarum
Rhododendron vireya	Microsphaera
Ribes grossularia	Sphaerotheca mors-uvae
Ribes uva-crispa	Sphaerotheca mors-uvae
Robinia pseudoacacia	Erysiphe trifolii
Robinia pseudoacacia	Oidium
Rosa	Sphaerotheca pannosa
Rosa xrehdaxana	Sphaerotheca pannosa
Rosa chinensis x multiflora	Sphaerotheca pannosa
Rosa eglanteria	Sphaerotheca pannosa
Rosa multiflora	Sphaerotheca pannosa
Rosa rubiginosa	Sphaerotheca pannosa
Rosmarinus officinalis	Oidium
Rubus australis	Erysiphe carpophila var. rubicola
Rubus australis	Sphaerotheca alchemillae
Rubus cissioides	Sphaerotheca aphanis
Rubus cissoides	Erysiphe rubicola
Rubus cissoides	Sphaerotheca alchemillae
Saintpaulia ionantha	Erysiphe cichoracearum
Salvia hydrangea	Oidium
Salvia judaica	Oidium
Salvia officinalis	Erysiphe cichoracearum
Salvia officinalis	Golovinomyces biocellatus
Sanvitalia procumbens	Erysiphe cichoracearum
Scolymus	Leveillula taurica
Sechium edule	Sphaerotheca fuliginea
Sedum praealtum	Erysiphe polygoni
Sedum spectabilis	Oidium
Senecio cruentus	Oidium
Senecio cruentus	Sphaerotheca fuliginea
Senecio glomeratus	Sphaerotheca fuliginea
Senecio jacobaea	Sphaerotheca alchemillae
Senecio rufigliandulosus	Sphaerotheca fuliginea
Senecio vulgaris	Oidium
Sinningia	Erysiphe cichoracearum
Sisymbrium irio	Erysiphe cruciferarum
Sisymbrium officinale	Erysiphe cruciferarum
Sisymbrium officinale	Erysiphe polygoni
Solanum	Oidium
Solanum aviculare	Erysiphe cichoracearum
Solanum aviculare	Erysiphe polygoni
Solanum aviculare	Oidium
Solanum integrifolium	Erysiphe cichoracearum
Solanum laciniatum	Erysiphe cichoracearum

Solanum laciniatum	Erysiphe polygoni
Solanum mauritianum	Erysiphe cichoracearum
Solanum mauritianum	Oidium
Solanum melongena var. esculenta	Erysiphe cichoracearum
Solanum physalifolium	Oidium
Solanum tuberosum	Erysiphe cichoracearum
Solidago altissima	Erysiphe cichoracearum
Solidago canadensis	Erysiphe cichoracearum
Solidago canadensis	Oidium
Sonchus oleraceus	Erysiphe polygoni
Sophora micophylla	Erysiphe polygoni
Sophora micophylla	Erysiphe pisi?
Sophora micophylla	Erysiphe polygoni
Sophora prostrata	Oidium
Spiraea	Oidium
Spiraea japonica	Oidium
Stachys byzantina	Oidium
Streblus banksii	Podosphaera
Streblus smithii	Podosphaera
Streptocarpus	Erysiphe cichoracearum
Tanacetum vulgare	Erysiphe cichoracearum
Taraxacum officinale	Erysiphe cichoracearum
Thunbergia gibsonia	Sphaerotheca fuliginea
Thunbergia gregorii	Sphaerotheca fuliginea
Thymus	Oidium
Thymus serphyllum	Erysiphe cichoracearum
Thymus serphyllum	Oidium
Tragopogon porrifolius	Oidium
Trifolium dubium	Erysiphe
Trifolium dubium	Erysiphe polygoni
Trifolium dubium	Erysiphe trifolii
Trifolium dubium	Oidium
Trifolium micranthum	Erysiphe polygoni
Trifolium micranthum	Oidium
Trifolium striatum	Oidium
Trifolium subterraneum	Erysiphe polygoni
Triticum	Erysiphe graminis
Triticum aestivum	Erysiphe graminis
Triticum vulgare	Erysiphe graminis
Urtica australis	Oidium
Urtica dioica	Erysiphe cichoracearum
Urtica ferox	Erysiphe cichoracearum
Urtica ferox	Sphaerotheca alchemillae
Urtica incisa	Oidium
Urtica incisa	Sphaerotheca alchemillae

Valerianella locusta	Erysiphe cichoracearum
Valerianella locusta	Oidium
Verbascum	Erysiphe cichoracearum
Verbascum thapsus	Erysiphe cichoracearum
Verbascum thapsus	Erysiphe verbasci
Verbascum thapsus	Golovinomyces cichoracearum
Verbascum virgatum	Erysiphe cichoracearum
Verbascum virgatum	Golovinomyces verbasci
Verbena	Oidium
Verbena	Sphaerotheca fuliginea
Verbena bonoriensis	Sphaerotheca fuliginea
Verbena hybrida	Oidium
Verbena hybrida	Sphaerotheca fuliginea
Veronica	Oidium
Veronica arvensis	Erysiphe cichoracearum
Veronica arvensis	Oidium
Veronica persica	Erysiphe cichoracearum
Veronica persica	Oidium
Viburnum japonicum	Microsphaera sparsa
Viburnum opulus	Microsphaera viburni
Viburnum trilobium	Microsphaera viburni
Vigna cariacolla	Sphaerotheca fuliginea
Vigna mungo	Sphaerotheca fuliginea
Viola	Erysiphe cichoracearum
Viola	Sphaerotheca alchemillae
Viola xwittrockiana	Erysiphe cichoracearum
Viola tricolor	Erysiphe cichoracearum
Viola tricolor	Sphaerotheca alchemillae
Viola tricolor var. hortensis	Oidium
Vitex lucens	Phyllactinia guttata
Vitis vinifera	Uncinula necator
Wasabia japonica	Erysiphe polygoni
Weinmannia	Erysiphe polygoni
Weinmannia racemosa	Erysiphe carpophila
Weinmannia racemosa	Erysiphe polygoni
Weinmannia silvicola	Erysiphe carpophila
Weinmannia silvicola	Erysiphe polygoni
Wisteria	Erysiphe polygoni
Wisteria sinensis	Oidium
Zinnia elegans	Erysiphe cichoracearum

It can be seen from this current situation that it is quite difficult to determine the correct name for a mildew associated with a plant.

In Table 2 I list what I consider to be the appropriate current interpretation of names for New Zealand hosts (updating the current name for the host where necessary). The question mark signifies there are multiple possibilities, or that the taxonomy of the associated PM is uncertain.

Table 2: Probable names for New Zealand powdery mildews, and their hosts

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
Acaena	Rosaceae	Erysiphe acaenae	
Acanthus mollis	Acanthaceae	Neoerysiphe galeopsidis	Boesewinkel finding disputed
Acer negundo	Sapindaceae	Sawadaea bicornis	
Acer pseudoplatanus	Sapindaceae	Sawadaea bicornis	
Achillea millefolium	Compositae	Golovinomyces macrocarpus	
Ailanthus altissima	Simaroubaceae	Erysiphe delavayi	
Ajuga reptans	Labiatae	Neoerysiphe galeopsidis	
Alectryon excelsus	Sapindaceae	Sawadaea bicornis	endemic host
Alectryon excelsus subsp. grandis	Sapindaceae	Sawadaea bicornis	endemic host
Alseuosmia quercifolia	Alseuosmiaceae	?	endemic host
Anethum graveolens	Umbelliferae	Erysiphe heraclei	
Aquilegia vulgaris	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Araujia sericifera	Apocynaceae	?	
Arctium lappa	Compositae	Golovinomyces depressus	
Aristotelia	Elaeocarpaceae	Erysiphe densa	endemic host
Aristotelia fruticosa	Elaeocarpaceae	Erysiphe densa	endemic host
Aristotelia serrate	Elaeocarpaceae	Erysiphe densa	endemic host
Aster	Compositae	Golovinomyces asterum	
Aster ericoides	Compositae	Golovinomyces asterum	
Begonia	Begoniaceae	Erysiphe begoniicola?	
Begonia xsemperflorens	Begoniaceae	Erysiphe begoniicola?	
Begonia xtuberhybrida	Begoniaceae	Erysiphe begoniicola?	
Begonia coccinea	Begoniaceae	Erysiphe begoniicola?	
Begonia masoniana	Begoniaceae	Erysiphe begoniicola?	
Begonia rex	Begoniaceae	Erysiphe begoniicola?	
Beta vulgaris	Amaranthaceae	Erysiphe betae	
Borago officinalis	Boraginaceae	Golovinomyces cynoglossi	
Brachyglottis repanda var. fragrans	Compositae	?	endemic host
Brassica	Cruciferae	Erysiphe cruciferarum	
Brassica juncea var. crispifolia	Cruciferae	Erysiphe cruciferarum	
Brassica napobrassica	Cruciferae	Erysiphe cruciferarum	
Brassica oleracea var. capitata	Cruciferae	Erysiphe cruciferarum	
Brassica oleracea var. ramosa	Cruciferae	Erysiphe cruciferarum	
Brassica rapa	Cruciferae	Erysiphe cruciferarum	
Bromus hordeaceus	Gramineae	Blumeria graminis	
Buphthalmum speciosum	compositae	?	
Calendula officinalis	Compositae	Podosphaera xanthii	
Capsicum annuum	Solanaceae	Leveillula taurica	
Cardamine	Cruciferae	Erysiphe cruciferarum	
Cardamine debilis	Cruciferae	Erysiphe cruciferarum	endemic host
Cardamine flexuosa	Cruciferae	Erysiphe cruciferarum	
Cardamine hirsuta	Cruciferae	Erysiphe cruciferarum	
Carica xheilbornii	Caricaceae	Podosphaera xanthii	
Carica papaya	Caricaceae	?	
Carica pubescens	Caricaceae	?	
Carica pubescens x stipulata	Caricaceae	?	
Castanea	Fagaceae	Erysiphe castaneae	
Castanea crenata	Fagaceae	Erysiphe castaneae	
Castanea sativa	Fagaceae	Erysiphe castaneae	
Ceropegia haygarthii	Apocynaceae	?	
Chrysanthemum indicum	Compositae	Golovinomyces oronti	

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
Chrysanthemum morifolium	Compositae	Golovinomyces oronti	
Cirsium arvense	Compositae	Golovinomyces magnicellulatus	
Citrullus lanatus	Cucurbitaceae	Golovinomyces cucurbitacearum	
Clematis	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Clematis xjackmanii	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Clematis australis var. rutaefolia	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Clematis forsteri	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	endemic host
Clematis paniculata	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	endemic host
Clematis recta	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Clematis stans	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Clematis vitalba	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Cleome	Cleomaceae	Erysiphe cruciferarum	
Cleome hassleriana	Cleomaceae	Erysiphe cruciferarum	
Clianthus puniceus	Leguminosae	?	endemic host, DOC Critical
Coriaria angustissima	Coriariaceae	?	endemic host
Coriaria arborea	Coriariaceae	?	endemic host
Coriaria lurida	Coriariaceae	?	plant spp complex
Cosmos atrosanguineus	Compositae	Podosphaera xanthii	
Cosmos bipinnatus	Compositae	Podosphaera xanthii	
Cota tinctoria	Compositae	Golovinomyces macrocarpus	
Cotinus coggygria	Anacardiaceae	Erysiphe cotini?	Boesewinkel disputed?
Crataegus monogyna	Rosaceae	?	
Cucumis melo var. cantalupensis	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cucumis metuliferus	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cucumis sativus	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cucurbita maxima	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cucurbita moschata	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cucurbita pepo	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cucurbita pepo var. melopepo	Cucurbitaceae	Golovinomyces cucurbitacearum	
Cydonia oblongata	Rosaceae	Podosphaera leucotricha	
Cynara cardunculus	Compositae	Golovinomyces montagnei or Leveillula lappae	
Cynara scolymus	Compositae	Golovinomyces montagnei or Leveillula lappae	
Cyphomandra fragrans	Solanaceae	Euoidium lycopersici	
Cytisus scoparius	Leguminosae	Erysiphe trifoliorum	
Dactylis glomerata	Gramineae	Blumeria graminis	
Dahlia	Compositae	Golovinomyces orontii	
Delphinium	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Delphinium xcultorum	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Delphinium ajacis	Ranunculaceae	Erysiphe aquilegiae var. aquilegiae	
Dodonaea viscosa	Sapindaceae	Sawadaea bicornis	
Echium vulgare	Boraginaceae	Golovinomyces cynoglossi	
Epilobium ciliatum	Onagraceae	Podosphaera epilobii	
Epilobium melanocaulon	Onagraceae	Podosphaera epilobii	endemic host
Epilobium pubens	Onagraceae	Podosphaera epilobii	endemic host
Erica	Ericaceae	?	
Erodium moschatum	Geraniaceae	Podosphaera erodii?	
Erythranthe guttata	Phrymaceae	Golovinomyces brunneopunctatus	
Eucalyptus	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus albens	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus diversifolia	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
			wrong
Eucalyptus eremophila	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus grossa	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus megacarpa	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus moluccana	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus nutans	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Eucalyptus pannosa?	Myrtaceae	Podosphaera aphanis?	sphalm?
Eucalyptus torquata	Myrtaceae	Podosphaera aphanis?	Boesewinkel may be wrong
Euonymus europaeus	Celastraceae	Erysiphe euonymi	
Euonymus japonicus	Celastraceae	Pseudoidium euonymi-japonici	
Euphorbia	Euphorbiaceae	Podosphaera euphorbiae	
Euphorbia peplus	Euphorbiaceae	Podosphaera euphorbiae	
Euphorbia tithymaloides	Euphorbiaceae	Podosphaera euphorbiae-hirtae	
Fumaria bastardii	Papaveraceae	Erysiphe cruciferarum	
Fumaria officinalis	Papaveraceae	Erysiphe cruciferarum	
Gazania	Compositae	Leveillula lappae	
Gazania rigens	Compositae	Leveillula lappae	
Geranium homeanum	Geraniaceae	Neoerysiphe geranii	
Geranium solanderi	Geraniaceae	Neoerysiphe geranii	
Gerbera	Compositae	?	
Gerbera jamesonii	Compositae	?	
Hardenbergia violacea	Leguminosae	Pseudoidium hardenbergiae	
Helianthus	Compositae	Golovinomyces ambrosiae	
Helianthus annuus	Compositae	Golovinomyces ambrosiae	
Helminthotheca echioides	Compositae	Golovinomyces cichoracearum	
Hibiscus syriacus	Malvaceae	?	
Hoheria glabrata	Malvaceae	Podosphaera xanthii	endemic host
Hoheria lyallii	Malvaceae	Podosphaera xanthii	endemic host
Hoheria populnea	Malvaceae	Podosphaera xanthii	endemic host
Hordeum vulgare	Gramineae	Blumeria graminis	
Huernia macrocarpo	Apocynaceae	?	
Hydrangea	Hydrangeaceae	Pseudoidium hortensiae	
Hydrangea macrophylla	Hydrangeaceae	Pseudoidium hortensiae	
Hylotelephium spectabile	Crassulaceae	?	
Hypericum gramineum	Hypericaceae	Erysiphe hyperici	
Iberis umbellata	Cruciferae	Erysiphe cruciferarum	
Impatiens	Balsaminaceae	Podosphaera xanthii	
Impatiens balsamina	Balsaminaceae	Podosphaera xanthii	
Jacobaea vulgaris	Compositae	?	
Kalanchoe	Crassulaceae	Golovinomyces orontii	
Lactuca serriola	Compositae	Podosphaera xanthii	
Lagenaria siceraria	Cucurbitaceae	Podosphaera xanthii	
Lagerostroemia indica	Lythraceae	Erysiphe australiana	
Lamium amplexicaule	Labiatae	Neoerysiphe galeopsidis	
Lathyrus clymenum	Leguminosae	Erysiphe pisi?	
Lathyrus inconspicuus	Leguminosae	Erysiphe pisi?	
Lathyrus latifolius	Leguminosae	Erysiphe pisi?	
Lathyrus linifolius	Leguminosae	Erysiphe pisi?	
Lathyrus odoratus	Leguminosae	Erysiphe pisi?	
Lathyrus tuberosus	Leguminosae	Erysiphe pisi?	

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
Limosella lineata	Scrophulariaceae	?	
Linaria	Plantaginaceae	?	
Lolium multiflorum × Festuca arundinacea	Gramineae	Blumeria graminis	
Lolium perenne	Gramineae	Blumeria graminis	
Lonicera japonica	Caprifoliaceae	Erysiphe lonicerae	
Lupinus polyphyllus	Leguminosae	Erysiphe pisi?	
Lycium chinense	Solanaceae	Arthrocladiella mougeotii	
Magnolia liliflora	Magnoliaceae	Erysiphe magnifica?	
Malus xdomestica	Rosaceae	Podosphaera leucotricha	
Malus sylvestris	Rosaceae	Podosphaera leucotricha	
Matricaria discoidea	Compositae	Golovinomyces orontii or Podosphaera erigerontis-canadensis?	
Medicago lupulina	Leguminosae	Erysiphe pisi	
Melilotus indicus	Leguminosae	Erysiphe pisi	
Mentha	Labiatae	Golovinomyces biocellatus	
Mida salicifolia	Nanodeaceae	?	endemic host
Modiola caroliniana	Malvaceae	?	
Monarda didyma	Lamiaceae	Golovinomyces biocellatus	
Mondara	Lamiaceae	Golovinomyces biocellatus	
Myosotis arvensis	Boraginaceae	Golovinomyces cynoglossi	
Myosotis sylvatica	Boraginaceae	Golovinomyces cynoglossi	
Myriophyllum	Haloragaceae	?	
Myriophyllum aquaticum	Haloragaceae	?	
Nemesia	Scrophulariaceae	?	
Nemesia strumosa	Scrophulariaceae	?	
Nicotiana alata	Solanaceae	Golovinomyces orontii	
Nicotiana tabacum	Solanaceae	Golovinomyces orontii	
Nigella damascena	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Oenothera biennis	Onagraceae	Erysiphe howeana	
Oenothera glazioviana	Onagraceae	Erysiphe howeana	
Olearia furfuracea	Compositae	?	endemic host
Olearia nummularifolia	Compositae	?	endemic host
Olearia rani	Compositae	?	endemic host
Oxalis corniculata	Oxalidaceae	Erysiphe russellii	
Oxalis exilis	Oxalidaceae	Erysiphe russellii	
Papaver dubium	Papaveraceae	Golovinomyces orontii	
Papaver nudicaule	Papaveraceae	Golovinomyces orontii	
Papaver somniferum	Papaveraceae	Golovinomyces orontii	
Parietaria judaica	Urticaceae	Oidiopsis parietaria?	
Pastinaca sativa	Umbelliferae	Erysiphe heraclei	
Penstemon hartwegii	Plantaginaceae	Golovinomyces orontii	
Penstemon strictus	Plantaginaceae	Golovinomyces orontii	
Petunia	Solanaceae	Golovinomyces orontii?	
Petunia xhybrida	Solanaceae	Golovinomyces orontii?	
Phalaris aquatica	Gramineae	Blumeria graminis	
Phalaris minor	Gramineae	Blumeria graminis	
Phaseolus coccineus	Leguminosae	?	
Phaseolus vulgaris	Leguminosae	?	
Phebalium	Rutaceae	?	
Phlox paniculata	Polemoniaceae	Golovinomyces magnicellulatus?	
Photinia glabra	Rosaceae	Podosphaera leucotricha	
Photinia serrulata	Rosaceae	Podosphaera leucotricha	
Pisum sativum	Leguminosae	Erysiphe pisi	
Plagianthus regius	Malvaceae	Podosphaera xanthii	endemic host

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
Plantago	Plantaginaceae	Golovinomyces sordidus	
Plantago lanceolata	Plantaginaceae	Golovinomyces sordidus	
Plantago major	Plantaginaceae	Golovinomyces sordidus	
Plantago raoulii	Plantaginaceae	Golovinomyces sordidus	endemic host
Plantago triandra subsp. triandra	Plantaginaceae	Golovinomyces sordidus	endemic host
Platanus	Platanaceae	Erysiphe platani	
Platanus xacerfolia	Platanaceae	Erysiphe platani	
Platanus xhispanica 'Acerifolia'	Platanaceae	Erysiphe platani	
Platanus orientalis	Platanaceae	Erysiphe platani	
Poa trivialis	Gramineae	Blumeria graminis	
Potentilla	Rosaceae	Podosphaera aphanis	
Prunus armeniaca	Rosaceae	Podosphaera tridactyla?	
Prunus laurocerasus	Rosaceae	Podosphaera tridactyla?	
Prunus persica	Rosaceae	Podosphaera tridactyla?	
Pyrus communis	Rosaceae	?	
Pyrus pyrifolia	Rosaceae	?	
Quercus	Fagaceae	Erysiphe alphitoides	
Quercus canariensis	Fagaceae	Erysiphe alphitoides	
Quercus robur	Fagaceae	Erysiphe alphitoides	
Ranunculus acris	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Ranunculus asiaticus	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Ranunculus bulbosus	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Ranunculus parviflorus	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Ranunculus repens	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Ranunculus sardous	Ranunculaceae	Erysiphe aquilegiae var. ranunculi	
Raphanus raphanistrum subsp. maritimus	Cruciferae	Erysiphe cruciferarum	
Rhododendron	Ericaceae	Erysiphe azaleae	
Rhododendron xfragrantissimum	Ericaceae	Erysiphe azaleae	
Rhododendron aurigeranum x macgregoriae	Ericaceae	Erysiphe azaleae	
Rhododendron cv vireya	Ericaceae	Erysiphe azaleae	
Rhododendron indicum	Ericaceae	Erysiphe azaleae	
Rhododendron occidentale	Ericaceae	Erysiphe azaleae	
Ribes grossularia	Grossulariaceae	Podosphaera mors-uvae	
Ribes uva-crispa	Grossulariaceae	Podosphaera mors-uvae	
Robinia pseudoacacia	Leguminosae	?	
Rosa	Rosaceae	Podosphaera pannosa	
Rosa xrehdexasana?	Rosaceae	Podosphaera pannosa	sphalm?
Rosa chinensis x multiflora	Rosaceae	Podosphaera pannosa	
Rosa multiflora	Rosaceae	Podosphaera pannosa	
Rosa rubiginosa	Rosaceae	Podosphaera pannosa	
Rosmarinus officinalis	Labiatae	Neerysiphe galeopsidis or Golovinomyces biocellatus	
Rubus australis	Rosaceae	Erysiphe rubicola	endemic host . = E. carpophila?
Rubus cissoides	Rosaceae	Erysiphe rubicola	endemic host. = E. carpophila?
Saintpaulia ionantha	Gesneriaceae	Golovinomyces orontii or Podosphaera xanthii	
Salvia hydrangea	Labiatae	Golovinomyces biocellatus or Neerysiphe galeopsidis	
Salvia judaica	Labiatae	Golovinomyces biocellatus or Neerysiphe galeopsidis	
Salvia officinalis	Labiatae	Golovinomyces biocellatus or Neerysiphe galeopsidis	
Sanvitalia procumbens	Compositae	Podosphaera xanthii	

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
Schedonorus arundinaceus	Gramineae	Blumeria graminis	
Scolymus	Compositae	Neoerysiphe nevoi	
Sechium edule	Cucurbitaceae	Golovinomyces cucurbitacearum	
Sedum praealtum	Crassulaceae	?	
Senecio cruentus	Compositae	?	
Senecio glomeratus	Compositae	?	
Senecio rufiglandulosus	Compositae	?	endemic host
Senecio vulgaris	Compositae	?	
Sinningia	Gesneriaceae	Golovinomyces orontii	
Sisymbrium irio	Cruciferae	Erysiphe cruciferarum	
Sisymbrium officinale	Cruciferae	Erysiphe cruciferarum	
Solanum	Solanaceae	Euoidium lycopersici	
Solanum aviculare	Solanaceae	?	
Solanum betaceum	Solanaceae	Euoidium lycopersici	
Solanum integrifolium	Solanaceae	?	
Solanum laciniatum	Solanaceae	?	
Solanum lycopersicum	Solanaceae	Pseudoidium neolycopersici	
Solanum mauritianum	Solanaceae	?	
Solanum melongena var. esculenta	Solanaceae	?	
Solanum physalifolium	Solanaceae	?	
Solanum tuberosum	Solanaceae	?	
Solidago altissima	Compositae	Golovinomyces asterum var. solidagini	
Solidago Canadensis	Compositae	Golovinomyces asterum var. solidagini	
Sonchus oleraceus	Compositae	Golovinomyces sonchicola	
Sophora microphylla	Leguminosae	?	endemic host
Sophora prostrate	Leguminosae	?	endemic host
Spiraea	Rosaceae	?	
Spiraea japonica	Rosaceae	?	
Stachys byzantine	Lamiaceae	Golovinomyces biocellatus or Neoerysiphe galeopsidis	
Streblus banksii	Moraceae	?	endemic host. DOC Relict
Streblus smithii	Moraceae	?	endemic host
Streptocarpus	Gesneriaceae	Golovinomyces orontii	
Symphyotrichum subulatum	Compositae	Golovinomyces asterum	
Tanacetum vulgare	Compositae	Golovinomyces macrocarpus	
Taraxacum officinale	Compositae	Golovinomyces cichoracearum or Podosphaera erigerontis-canadensis	
Thunbergia gibsonii	Acanthaceae	Golovinomyces orontii	
Thunbergia gregorii	Acanthaceae	Golovinomyces orontii	
Thymus	Labiatae	Neoerysiphe galeopsidis or Golovinomyces biocellatus	
Thymus serpyllum	Labiatae	Neoerysiphe galeopsidis or Golovinomyces biocellatus	
Tragopogon porrifolius	Compositae	Golovinomyces cichoracearum or Podosphaera erigerontis-canadensis	
Trifolium dubium	Leguminosae	Erysiphe trifolii	
Trifolium micranthum	Leguminosae	Erysiphe trifolii	
Trifolium striatum	Leguminosae	Erysiphe trifolii	
Trifolium subterraneum	Leguminosae	Erysiphe trifolii	
Triticum	Gramineae	Blumeria graminis	
Triticum aestivum	Gramineae	Blumeria graminis	
Urtica australis	Urticaceae	?	
Urtica dioica	Urticaceae	?	
Urtica ferox	Urticaceae	?	endemic host
Urtica incise	Urticaceae	?	

Current interpretation			
Plant Current Name	Family	Most probable PM	notes
Valerianella locusta	Caprifoliaceae	Golovinomyces orontii	
Vasconcellea microcarpa	Caricaceae	?	
Vasconcellea pubescens	Caricaceae	?	
Verbascum	Scrophulariaceae	Golovinomyces verbasci	
Verbascum thapsus	Scrophulariaceae	Golovinomyces verbasci	
Verbascum virgatum	Scrophulariaceae	Golovinomyces verbasci	
Verbena	Verbenaceae	?	
Verbena xhybrida	Verbenaceae	?	
Verbena bonoriensis	Verbenaceae	?	
Veronica	Plantaginaceae	Golovinomyces orontii or Podosphaera fuliginea	
Veronica	Plantaginaceae	Golovinomyces orontii or Podosphaera fuliginea	
Veronica arvensis	Plantaginaceae	Golovinomyces orontii or Podosphaera fuliginea	
Veronica persica	Plantaginaceae	Golovinomyces orontii or Golovinomyces orontii or Podosphaera fuliginea	
Veronica speciosa	Plantaginaceae	Golovinomyces orontii or Podosphaera fuliginea	
Viburnum japonicum	Adoxaceae	Erysiphe viburni	
Viburnum opulus	Adoxaceae	Erysiphe viburni	
Viburnum trilobum	Adoxaceae	Erysiphe viburni	
Vigna caracalla	Leguminosae	Podosphaera xanthii	
Vigna mungo	Leguminosae	Podosphaera xanthii	
Viola	Violaceae	Golovinomyces orontii	
Viola xwittrockiana	Violaceae	Golovinomyces orontii	
Viola tricolor	Violaceae	Golovinomyces orontii	
Viola tricolor var. hortensis	Violaceae	Golovinomyces orontii	
Vitex lucens	Labiatae	?	endemic host
Vitis vinifera	Vitaceae	Erysiphe necator	
Wasabia japonica	Cruciferae	Erysiphe heraclei	
Weinmannia	Cunoniaceae	Erysiphe carpophila	
Weinmannia racemosa	Cunoniaceae	Erysiphe carpophila	
Weinmannia silvicola	Cunoniaceae	Erysiphe carpophila	
Wisteria	Leguminosae	Erysiphe trifoliorum or Phyllactinia fraxini	
Wisteria sinensis	Leguminosae	Erysiphe trifoliorum or Phyllactinia fraxini	
Xerochrysum bracteatum	Compositae	Euoidium helichrysi	
Zinnia elegans	Compositae	?	

I emphasize that I have carried out a rapid paper-based exercise. The list will certainly contain errors and should be considered preliminary. Table 3 is the proposed preliminary checklist.

Table 3: Possible checklist of New Zealand powdery mildews, their hosts, and dates of first record. Entries with a question mark require verification. Entries with an asterisk are known to have the teleomorph present in NZ. Entries with a dagger are taxa not historically recognised as present in New Zealand until this exercise.

New Zealand Checklist of PMs (probably)		
PM	Hosts	First Date
Arthrocladiella mougeotii	Lycium chinense	1974
Blumeria graminis *	Bromus hordeaceus, Dactylis glomerata, Hordeum vulgare, Lolium multiflorum x Festuca arundinacea, Lolium perenne, Phalaris aquatic, Phalaris minor, Poa trivialis, Schedonorus arundinaceus, Triticum sp, Triticum aestivum	1922
Erysiphe acaenae †	Acaena sp	2000
Erysiphe alphitoides	Quercus sp, Quercus canariensis, Quercus robur	1922
Erysiphe aquilegiae var. aquilegiae	Aquilegia vulgaris, Clematis sp., Clematis xjackmanii, Clematis australis var. rutaefolia, Clematis forsteri, Clematis paniculata, Clematis recta, Clematis stans, Clematis vitalba, Delphinium sp., Delphinium xcultorum, Delphinium ajacis	1930

New Zealand Checklist of PMs (probably)		
PM	Hosts	First Date
Erysiphe aquilegiae var. ranunculi *	Nigella damascene, Ranunculus acris, Ranunculus asiaticus, Ranunculus bulbosus, Ranunculus parviflorus, Ranunculus repens, Ranunculus sardous	1953
Erysiphe australiana	Lagerstroemia indica	2008
Erysiphe azalea	Rhododendron sp. Rhododendron xfragrantissimum, Rhododendron aurigeranum x macgregoriae, Rhododendron cv vireya, Rhododendron indicum, Rhododendron occidentale	1985
Erysiphe begoniicola?	Begonia sp, Begonia xsemperflorens, Begonia xtuberhybrida, Begonia coccinea, Begonia masoniana, Begonia masoniana, Begonia rex	1960
Erysiphe betae	Beta vulgaris	1996
Erysiphe carpophila	Weinmannia sp, Weinmannia racemosa, Weinmannia silvicola	1923
Erysiphe castaneae †	Castanea sp, Castanea crenata, Castanea sativa	1964
Erysiphe cotini? †	Cotinus coggygia	1981
Erysiphe cruciferarum *	Brassica sp, Brassica juncea var. crispifolia, Brassica napobrassica, Brassica oleracea var. capitata, Brassica oleracea var. ramosa, Brassica rapa, Cardamine sp., Cardamine debilis, Cardamine flexuosa, Cardamine hirsuta, Cleome sp., Cleome hassleriana, Fumaria bastardii, Fumaria officinalis, Iberis umbellata, Raphanus raphanistrum subsp. maritimus, Sisymbrium irio, Sisymbrium officinale	1919
Erysiphe delavayi †	Ailanthus altissima	1981
Erysiphe densa	Aristotelia sp., Aristotelia fruticosa, Aristotelia serrata	1855
Erysiphe euonymi	Euonymus europaeus	1958
Erysiphe heraclei	Anethum graveolens, Pastinaca sativa, Wasabia japonica	1969
Erysiphe howeana	Oenothera biennis, Oenothera glazioviana	2000
Erysiphe hyperici	Hypericum gramineum	1937
Erysiphe lonicerae	Lonicera japonica	?
Erysiphe magnifica? †	Magnolia liliflora	1978
Erysiphe necator	Vitis vinifera	1922
Erysiphe pisi	Medicago lupulina, Melilotus indicus, Pisum sativum, Lathyrus clymenum?, Lathyrus inconspicuus?, Lathyrus latifolius?, Lathyrus linifolius?, Lathyrus odoratus?, Lathyrus tuberosus?, Lupinus polyphyllus	1948
Erysiphe platani	Platanus sp, Platanus xacerfolia, Platanus orientalis	1984
Erysiphe rubicola	Rubus australis, Rubus cissoides	1925
Erysiphe russellii	Oxalis corniculata, Oxalis exilis	1972
Erysiphe trifolii	Trifolium dubium, Trifolium micranthum, Trifolium striatum, Trifolium subterraneum	1967
Erysiphe trifoliorum	Cytisus scoparius, Wisteria sp?, Wisteria sinensis?	2011
Erysiphe viburni	Viburnum japonicum, Viburnum opulus, Viburnum trilobum	1975
Euoidium helichrysi †	Xerochrysum bracteatum	1975
Euoidium lycopersici †	Cyphomandra fragrans, Solanum sp, Solanum betaceum	1919
Golovinomyces ambrosiae †	Helianthus sp, Helianthus annuus	1968
Golovinomyces asterum * †	Aster sp, Aster ericoides, Symphyotrichum subulatum	1937
Golovinomyces asterum var. solidagini †	Solidago altissima, Solidago canadensis	1940
Golovinomyces biocellatus	Mentha sp, Monarda didyma, Mondara sp, Salvia hydrangea?, Salvia judaica?, Stachys byzantine?	1982
Golovinomyces brunneopunctatus †	Erythranthe guttata	2008
Golovinomyces cichoracearum	Helminthotheca echioides, Taraxacum officinale?, Tragopogon porrifolius?	1953
Golovinomyces cucurbitacearum * †	Citrullus lanatus, Cucumis melo var. cantalupensis, Cucumis metuliferus, Cucumis sativus, Cucurbita maxima, Cucurbita moschata, Cucurbita pepo, Cucurbita pepo var. melopepo, Sechium edule	1937
Golovinomyces cynogloss	Myosotis arvensis, Myosotis sylvatica, Borago officinalis, Echium vulgare	1975
Golovinomyces depressus	Arctium lappa	1974
Golovinomyces macrocarpus †	Achillea millefolium, Cota tinctoria, Tanacetum vulgare	2003
Golovinomyces magnicellulatus	Cirsium arvense, Phlox paniculata	2001
Golovinomyces montagnei †?	Cynara scolymus	1981
Golovinomyces oronti	Chrysanthemum indicum, Chrysanthemum morifolium, Dahlia sp, Kalanchoe sp, Matricaria discoidea?, Nicotiana alata, Nicotiana tabacum, Papaver dubium, Papaver nudicaule, Papaver somniferum, Penstemon hartwegii, Penstemon strictus, Petunia?, Petunia xhybrida?, Rosmarinus officinalis ?,	1925

New Zealand Checklist of PMs (probably)		
PM	Hosts	First Date
	Saintpaulia ionantha?, Sinningia sp, Streptocarpus sp, Thunbergia gibsonii, Thunbergia gregorii, Thymus sp?, Thymus serpyllum, Valerianella locusta, Veronica sp, Veronica speciosa, Viola sp, Viola xwittrockiana, Viola tricolor, Viola tricolor var. hortensis	
Golovinomyces sonchicola †	Sonchus oleraceus	1919
Golovinomyces sordidus	Plantago sp, Plantago lanceolata, Plantago major, Plantago raoulii, Plantago triandra subsp. triandra	1951
Golovinomyces verbasci	Verbascum sp, Verbascum thapsus, Verbascum virgatum,	1938
Leveillula lappae †?	Cynara cardunculus, Cynara scolymus, Gazania sp., Gazania rigens	2000
Leveillula taurica	Capsicum annum	2004
Neoerysiphe galeopsidis	Acanthus mollis, Ajuga reptans, Lamium amplexicaule, Rosmarinus officinalis?, Salvia hydrangea ?, Salvia judaica ?, Salvia officinalis ?, Stachys byzantina ?, Thymus sp?, Thymus serpyllum?	1984
Neoerysiphe geranii	Geranium homeanum, Geranium solanderi	1965
Neoerysiphe nevoi †	Scolymus	2004
Oidiopsis parietaria? †	Parietaria judaica	1991
Phyllactinia fraxini †?	Wisteria sp, Wisteria sinensis	2008
Podosphaera aphanis?	Potentilla sp, Eucalyptus sp?, Eucalyptus albens?, Eucalyptus diversifolia?, Eucalyptus eremophila?, Eucalyptus grossa?, Eucalyptus megacarpa?, Eucalyptus moluccana?, Eucalyptus nutans?, Eucalyptus nutans?, Eucalyptus torquata?	1950
Podosphaera epilobii †	Epilobium ciliatum, Epilobium melanocaulon, Epilobium pubens	1953
Podosphaera erigerontis-canadensis †	Matricaria discoidea?, Taraxacum officinale?, Tragopogon porrifolius?	1975
Podosphaera erodii? †	Erodium moschatum	1954
Podosphaera euphorbiae	Euphorbia sp, Euphorbia peplus,	2005
Podosphaera euphorbiae-hirtae†	Euphorbia tithymaloides	?
Podosphaera fuliginea	Veronica sp, Veronica arvensis?, Veronica persica?	1972
Podosphaera leucotricha *	Cydonia oblongata, Malus xdomestica, Malus sylvestris, Photinia glabra, Photinia serrulata	1919
Podosphaera mors-uvae	Ribes grossularia, Ribes uva-crispa	1988
Podosphaera pannosa *	Rosa sp, Rosa xrehdhexana?, Rosa chinensis x multiflora, Rosa multiflora, Rosa rubiginosa	1919
Podosphaera tridactyla?	Prunus armeniaca, Prunus laurocerasus, Prunus persica	1960
Podosphaera xanthii *	Calendula officinalis, Carica xheilbornii, Cosmos atrosanguineus, Cosmos bipinnatus, Hoheria glabrata, Hoheria lyallii, Hoheria lyallii, Hoheria populnea, Impatiens sp, Impatiens balsamina, Lactuca serriola, Lagenaria siceraria, Plagianthus regius, Sanvitalia procumbens, Saintpaulia ionantha ?, Vigna Caracalla, Vigna mungo	1937
Pseudoidium euonymi-japonici	Euonymus japonicus, Euonymus japonicus 'aureomarginatus'	1953
Pseudoidium hardenbergiae	Hardenbergia violacea	1974
Pseudoidium hortensiae	Hydrangea sp, Hydrangea macrophylla	1937
Pseudoidium neolycopersici †	Solanum lycopersicum	1983
Sawadaea bicornis	Acer negundo, Acer pseudoplatanus, Alectryon excelsus, Alectryon excelsus subsp. grandis, Dodonaea viscosa	1958

In addition, the following plants have records of PMs which require further investigation to ascertain their identity.

Alseuosmia quercifolia, *Araujia sericifera*, *Brachyglottis repanda* var. *fragrans*, *Bupthalmum speciosum*, *Carica papaya*, *Carica pubescens*, *Carica pubescens* x *stipulata*, *Ceropegia haygarthii*, *Clianthus puniceus*, *Coriaria angustissima*, *Coriaria arborea*, *Coriaria lurida*, *Crataegus monogyna*, *Erica* spp, *Gerbera* sp, *Gerbera jamesonii*, *Hibiscus syriacus*, *Huernia macrocarpo*, *Hylotelephium spectabile*, *Jacobaea vulgaris*, *Limosella lineata*, *Linaria* spp, *Mida salicifolia*, *Modiola caroliniana*, *Myriophyllum* sp, *Myriophyllum aquaticum*, *Nemesia* sp, *Nemesia strumosa*, *Olearia furfuracea*, *Olearia nummularifolia*, *Olearia rani*, *Phaseolus coccineus*, *Phaseolus vulgaris*, *Phebalium*, *Phlox paniculata*, *Pyrus communis*, *Pyrus pyrifolia*, *Robinia pseudoacacia*, *Sedum praealtum*, *Senecio cruentus*, *Senecio glomeratus*, *Senecio rufigliandulosus*, *Senecio vulgaris*, *Solanum* sp, *Solanum*

aviculare, *Solanum integrifolium*, *Solanum laciniatum*, *Solanum mauritianum*, *Solanum melongena* var. *esculenta*, *Solanum physalifolium*, *Solanum tuberosum*, *Sophora micophylla*, *Sophora microphylla*, *Sophora prostrata*, *Spiraea* sp, *Spiraea japonica*, *Streblus banksii*, *Streblus smithii*, *Urtica australis*, *Urtica dioica*, *Urtica ferox*, *Urtica incisa*, *Vasconcellea microcarpa*, *Vasconcellea pubescens*, *Verbena* sp, *Verbena xhybrida*, *Verbena bonoriensis*, *Vigna caracalla*, *Vitex lucens*, *Zinnia elegans*

Currently we may have 72 taxa of PMs (5 of which require confirmation), together with a number of unknown and unidentified species. Only 8 of these taxa are known to have the teleomorphic stage in New Zealand and the rest are represented by anamorphs only. These 72 taxa are associated with 170 genera of host plants. Many PMs have a narrow host range but *Golovinomyces orontii* and *Podosphaera xanthii* are known to have a broad host range.

The preliminary revision adds 24 names for PMs which are probably present in New Zealand but historically unrecognised. The list removes 7 names associated with probable historical misapplications (*Erysiphe euonymi-japonici*, *Erysiphe penicillata*, *Erysiphe polygoni*, *Euoidium chrysanthemi*, *Phyllactinia guttata*, *Podosphaera clandestina*, *Podosphaera fugax*)

The majority of NZ PMs are introduced along with their hosts. Our only endemic PMs are *Erysiphe densa* on *Aristotelia*, *Erysiphe carpophila* on *Weinmannia* and *Erysiphe rubicola* on endemic *Rubus* species. However, Braun & Cook note that *E. rubicola* is poorly known and is similar to *E. carpophila* (which would be an unusual host range if they are the same). In addition, I believe the identity of the *Alectryon* and *Dodanaeae* PMs as *Sawadaea bicornis* merits further investigation. It wouldn't surprise me to find these PMs are undescribed. Furthermore we have a number of endemic host species with unidentified PMs, viz. *Alseuosmia quercifolia*, *Brachyglottis* spp, *Clianthus puniceus*, *Coriaria* spp, *Mida salicifolia*, *Olearia* spp, *Senecio rufiglandulosus*, *Sophora* spp, *Streblus* spp, *Urtica ferox* and *Vitex lucens*. Many of these will turn out to be known PMs with global distributions, but some may turn out to be endemic and undescribed PM species. For example the PM of *Coriaria* can be accompanied by chasmothecia indicating it has been here a long period, and therefore potentially an endemic species. In particular the PMs associated with the threat listed plants *Clianthus puniceus* and *Streblus banksii* require identification.

New Zealand PMs follow the general rule that there is a significant time lag between the first introduction of a PM as the anamorph, and the subsequent discovery of the teleomorph. Boesewinkel (1976) noted the first occurrence of the teleomorph of a number of PMs and from the date of first records we can calculate the minimum potential lag period, summarised in Table 4.

Table 4: New Zealand powdery mildews exhibiting the teleomorph stage

PM	First record of PM (acc. PDD records)	First record of teleomorph	Lag (years)
<i>E. rubicola</i> (endemic)	1925	1927	2
<i>P. leucotricha</i>	1919	1923	3
<i>E. carpophila</i> (endemic)	1923	1923	0
<i>E. densa</i> (endemic)	1855	1855	0
<i>G. cichoracearum</i>	1953	1956	3
<i>G. asterum</i>	1937	1974	37
<i>E. aquilegiae</i> var. <i>ranunculi</i>	1953	1974	21

<i>P. xanthii</i>	1937	2005	68
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We can see a distinct bimodal distribution with very short time lag for endemic species and a long time lag for introduced species. Obviously, the short time lag for endemic species simply indicates that the PMs are indeed indigenous and the teleomorph historically present, even if not recorded. The remainder indicate a time lag of 20-70 years. It is likely that more teleomorph states have been recorded but the PDD material would need to be examined to identify them. The short time lags for the occurrence of the teleomorphs of the introduced *Podosphaera leucotricha* and *Golovinomyces cichoracearum* probably indicate a significant delay between the introduction of the fungus and its first record.

In summary, this analysis presents a tentative re-interpretation of the available evidence to provide a list of PM taxa known to be present in New Zealand with their known hosts. The analysis highlights that our knowledge remains inadequate, with many poorly known and potentially undescribed taxa. Available data lend support to the observation of a time lag between introduction of a new PM, its persistence as the anamorph, and the discovery of a teleomorph. Why this should happen is an interesting and open question.

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