

The lichen genus *Pertusaria sens. lat.* (Pertusariaceae, Ascomycotina) in Papua New Guinea: checklist and keys

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Abstract

A checklist and keys are provided to the 82 species of *Lepra*, *Pertusaria* and *Varicellaria* in Papua New Guinea.

Introduction

Papua New Guinea is the eastern half of the island of New Guinea to the north of Australia, lying south of the Equator between latitudes 4°S and 10°S and rising to 4509 m at its highest point, Mount Wilhelm, in the centre of the country. A detailed account of the topography, geology, climate and vegetation of Papua New Guinea is given by Lambley (Lambley 1991).

In his account of the lichen flora of New Guinea, Szatala (1956) recorded only one species, *P. rechingeri* Zahlbr. Thirty years later, Streimann's *Catalogue of the lichens of Papua New Guinea and Irian Jaya* (Streimann 1986) recorded an additional species, *P. gyalectoides* Vězda. In 1993, *Pertusaria epitheciifera* Sipman, known originally from Malaysia, was reported from Papua New Guinea (Sipman 1993), and further species were recorded by Aptroot *et al.* (1993) and Streimann & Sipman (1994). Additional new taxa and new reports were subsequently published (Archer *et al.* 1995; Elix *et al.* 1997; Archer & Elix 1998a, b), bringing the total number of reported taxa to 82. A preliminary key to the genus, including 67 taxa, was provided in 1998 (Archer & Elix 1998).

Checklist

***Lepra* Scop.**

L. clarkeana (A.W.Archer) I.Schmitt, Hodkinson & Lumbsch, *PLoS ONE* 12(7), 7/14 (2017)
[syn: *Pertusaria clarkeana* A.W.Archer, *Mycotaxon* 53, 280 (1995)]

L. erythrella (Müll.Arg.) I.Schmitt, Hodkinson & Lumbsch, *PLoS ONE* 12(7), 8/14 (2017)
[syn: *Pertusaria erythrella* Müll.Arg., *Bull. Herb. Boissier* 1, 41 (1893)]

L. lacerans (Müll.Arg.) I.Schmitt, Hodkinson & Lumbsch, *PLoS ONE* 12(7), 8/14 (2017)
[syn: *Pertusaria lacerans* Müll.Arg., *Flora* 67, 270 (1884)]

L. muricata (J.C.David) A.W.Archer & Elix, *Australas. Lichenol.* 82, 132 (2018)
[syn: *Pertusaria muricata* J.C.David, *Biblioth. Lichenol.* 57, 102 (1995)]

L. psoromica (A.W.Archer & Elix) A.W.Archer & Elix, *Australas. Lichenol.* 82, 132 (2018)
[syn: *Pertusaria psoromica* A.W.Archer & Elix, *Mycotaxon* 50, 206 (1994)]

L. scaberula (A.W.Archer) I.Schmitt, Hodkinson & Lumbsch, *PLoS ONE* 12(7), 9/14 (2017)
[syn: *Pertusaria scaberula* A.W.Archer]

L. tropica (Vain.) Lendemer & R.C.Harris, *Bryologist* 120, 189 (2017)
[syn: *Pertusaria tropica* Vain., *Catal. Welw. Afr. Pl.* 2, 404 (1901)]

L. umbricola (A.W.Archer & Elix) A.W.Archer & Elix, *Australas. Lichenol.* 82, 134 (2018)
[syn: *Pertusaria umbricola* A.W.Archer & Elix, *Biblioth. Lichenol.* 69, 158 (1997)]

***Pertusaria* DC.**

P. allogibberosa A.W.Archer & Elix, *Mycotaxon* 67, 155 (1998)

P. angabangensis A.W.Archer & Elix, *Mycotaxon* 67, 156 (1998)

P. anomalospora A.W.Archer, Elix & Streimann, *Mycotaxon* 56, 388 (1995)

P. aptrootii A.W.Archer & Elix, *Mycotaxon* 67, 157 (1998)

P. asterella Aptroot, *Mycotaxon* 64, 18 (1997)

P. atropilota A.W.Archer & Elix, *Mycotaxon* 67, 158 (1998)

P. balekensis A.W.Archer & Elix, *Mycotaxon* 67, 158 (1998)

P. bogia A.W.Archer & Elix, *Mycotaxon* 67, 160 (1998)

P. buloloensis A.W.Archer, Elix & Streimann, *Mycotaxon* 56, 388 (1995)

P. bundiense A.W.Archer & Elix, *Mycotaxon* 69, 311 (1998)

P. burburana Elix & A.W.Archer, *Mycotaxon* 64, 19 (1997)

P. ceylonica Müll.Arg., *Flora* 67, 351 (1884)

P. cicatricosa Müll.Arg., *Proc. Roy. Soc. Edinburgh* 11, 461 (1882)

P. cicatricosa var. *deficiens* A.W.Archer, Elix & Streimann, *Mycotaxon* 56, 389 (1995)

P. consanguinea Müll.Arg., *Flora* 67, 283 (1884)

P. copelandii Vain., *Philipp. J. Sci. Sect. C*, 8, 2, 105 (1913)

P. damiense A.W.Archer, Elix & Streimann, *Mycotaxon* 56, 390 (1995)

P. dehiscens Müll.Arg., *Flora* 67, 349 (1884)

P. elliptica Müll.Arg., *Bull. Herb. Boissier* 3, 635 (1895)

P. endoxantha Vain., *Hedwigia* 37, 41 (1898)
[syn: *P. norstictica* A.W.Archer, *Mycotaxon* 41, 232 (1991)]

P. epitheciifera Sipman, *Tropical Bryology* 8, 301 (1994)

P. flavosidiata A.W.Archer & Elix, *Mycotaxon* 49, 144 (1993)

P. gongylospora Elix & A.W.Archer, *Mycotaxon* 64, 21 (1997)

P. gorokorana Elix & A.W.Archer, *Mycotaxon* 64, 23 (1997)

P. gyalectoides Vězda, in W.A. Weber, *Bryologist* 74, 191 (1971)

P. hermaka A.W.Archer, *Mycotaxon* 41, 227 (1991)

P. hypoprotocetrarica A.W.Archer & Elix, *Mycotaxon* **67**, 161 (1998)
P. inconspicua A.W.Archer & Elix, *Mycotaxon* **67**, 161 (1998)
P. irregularis Müll.Arg., *Bull. Herb. Boissier* **3**, 638 (1895)
P. isidiosa A.W.Archer, *Mycotaxon* **41**, 228 (1991)
P. kagamugana Elix & A.W.Archer, *Mycotaxon* **64**, 23 (1997)
P. kaindiensis A.W.Archer, Elix & Streimann, *Mycotaxon* **56**, 393 (1995)
P. karkarensis A.W.Archer & Elix, *Mycotaxon* **67**, 162 (1998)
P. laeana A.W.Archer & Elix, *Mycotaxon* **67**, 164 (1998)
P. leiocarpella Müll.Arg., *Bull. Herb. Boissier* **3**, 636 (1895)
P. leioplacella Nyl., *Bull. Soc. Linn. Normandie sér. 2*, **2**, 71 (1867)
P. manamensis A.W.Archer & Elix, *Mycotaxon* **67**, 164 (1998)
P. mesotropa Müll.Arg., *Flora* **67**, 350 (1884)
[syn: *P. paragibberosa* A.W.Archer, *Mycotaxon* **31**, 236 (1991)]
P. microstoma Müll.Arg., *Flora* **65**, 328 (1882)
P. modesta Müll.Arg., *Flora* **67**, 352 (1884)
P. montpittensis A.W.Archer, *Proc. Linn. Soc. N.S.W.* **113**, 65 (1992)
P. myola A.W.Archer & Elix, *Mycotaxon* **67**, 165 (1998)
P. naduriensis A.W.Archer & Elix, *Mycotaxon* **67**, 166 (1998)
P. novaeguineae A.W.Archer & Elix, *Mycotaxon* **67**, 166 (1998)
P. oblongata Müll.Arg., *Flora* **67**, 401 (1884)
[syn: *P. howeana* A.W.Archer & Elix, *Telopea* **6**, 15 (1994)]
P. orarensis A.W.Archer & Elix, *Biblioth. Lichenol.* **69**, 117 (1997)
P. papuana A.W.Archer & Elix, *Mycotaxon* **67**, 167 (1998)
P. parmatica A.W.Archer & Elix, *Mycotaxon* **67**, 168 (1998)
P. perthwaitesii A.W.Archer & Elix, *Mycotaxon* **67**, 168 (1998)
P. pertusella Müll.Arg., *Flora* **67**, 283 (1884)
P. petrophytes C.Knight, *Trans. Linn. Soc. London*, ser. 2, **2**, 47 (1881)
P. philippina Vain., *Philipp. J. Sci. Sect. C*, **8**, **2**, 105 (1913)
P. plethocarpa A.W.Archer, Elix & Streimann, *Mycotaxon* **56**, 395 (1995)

P. porinella Nyl., *Ann. Sci. Nat. Bot.*, sér. 3 **19**, 321 (1863)
[syn: *P. ramuensis* A.W.Archer & Elix, *Mycotaxon* **69**, 315 (1998)]
P. praecipua A.W.Archer & Elix, *Mycotaxon* **69**, 312 (1998)
P. pseudococcodes Müll.Arg., *Flora* **67**, 287 (1884)
P. puffina A.W.Archer & Elix, *Telopea* **6**, 22 (1994)
P. pycnophora Nyl., *Acta Soc. Sci. Fenn.* **7**, 449 (1863)
P. pycnothelia Nyl., *Syn. Lich. Novae Caledoniae*, 31 (1868)
P. ramulifera H.Magn, *Ark. Bot.* **31A**(6), 56 (1944)
P. rechingeri Zahlbr., *Denkschr. Kaiserl. Akad. Wien, Math.-Naturwiss. Kl.* **88**, 24 (1911)
P. sipmanii A.W.Archer & Elix, *Mycotaxon* **67**, 170 (1998)
P. streimannii Elix & A.W.Archer, *Mycotaxon* **64**, 24 (1997)
P. subplanaica A.W.Archer & Elix, *Mycotaxon* **45**, 422 (1992)
P. subsorodes Elix & A.W.Archer, *Mycotaxon* **64**, 25 (1997)
P. subventosa var. *hypothamnicola* A.W.Archer & Elix, *Mycotaxon* **49**, 147 (1993)
P. thwaitesii Müll.Arg., *Flora* **67**, 460 (1884)
P. trachyspora A.W.Archer, *Mycotaxon* **41**, 247 (1991)
P. vulpina A.W.Archer, *Mycotaxon* **41**, 249 (1991)
P. wauensis Elix & A.W.Archer, *Mycotaxon* **64**, 25 (1997)
P. weberi Elix & A.W.Archer, *Mycotaxon* **64**, 26 (1997)
P. xanthoplaca Müll.Arg., *Flora* **65**, 485 (1882)
P. yupna A.W.Archer & Elix, *Mycotaxon* **67**, 155 (1998)

Varicellaria Nyl.

Varicellaria velata (Turner) I.Schmitt & Lumbsch, *Myckeys* **4**, 31 (2012)
[syn: *P. velata* (Turner) Nyl., *Lichenes Scandinaviae* 179 (1861)]

Keys

Some of the species present in groups A, B and C (lacking chlorinated xanthenes and perlatolic acid derivatives) belong to the recently resurrected genus *Lepra* Scop. (see above), but not all of the required new combinations have been made.

Chloroxanthenes refers to a mixture, in varying proportions, of 2,4,5-trichlorolichexanthone, 2,4-dichlorolichexanthone, 2,5-dichlorolichexanthone and 2-chlorolichexanthone.

1 Thallus saxicolous or terricolous	GROUP G
1: Thallus corticolous	2
2 Thallus sterile, isidiate or sorediate	GROUP A
2: Thallus fertile	3
3 Thallus with disciform apothecia	4
3: Thallus with verruciform apothecia	5
4 Ascospores 1 or 2 per ascus	GROUP B
4: Ascospores 8 per ascus	GROUP C
5 Ascospores 1 or 2 per ascus	GROUP D
5: Ascospores 4 or 8 per ascus	6
6 Ascospores 4 per ascus	GROUP E
6: Ascospores 8 per ascus	GROUP F

GROUP A: Thallus corticolous, sterile, isidiate or sorediate

1 Thallus isidiate	2
1: Thallus sorediate	11
2 Xanthenes present	3
2: Xanthenes absent	6
3 Lichexanthone and salazinic acid present	<i>Pertusaria parmatica</i>
3: Chlorinated xanthenes present	4
4 Thiophaninic and stictic acids present	<i>Pertusaria flavoisidiata</i>
4: 4,5-Dichlorolichexanthone and stictic acid present	5
5 Methyl barbatate absent	<i>Pertusaria montpittensis</i>
5: Methyl barbatate present	<i>Pertusaria angbangensis</i>
6 Thallus K+ red or yellow	7
6: Thallus K-	8
7 Thallus K+ red; norstictic acid present	<i>Pertusaria ramulifera</i>
7: Thallus K+ yellow; stictic acid present	<i>Lepra muricata</i>
8 Thallus Pd+ yellow or red	9
8: Thallus Pd-	10
9 Thallus Pd+ yellow; psoromic acid present	<i>Pertusaria wauensis</i>
9: Thallus Pd+ red; protocetraric acid present	<i>Lepra umbricola</i>

10 2'- <i>O</i> -Methylperlatolic acid present	<i>Pertusaria burburana</i>
10: Hypoprotocetraric acid present	<i>Pertusaria hypoprotocetrarica</i>
11 Soralia Pd+ orange	12
11: Soralia Pd-; picrolichenic and subpicrolichenic acids present	<i>Pertusaria buloloensis</i>
12 Soralia K-; psoromic acid present	<i>Lepra psoromica</i>
12: Soralia K+ yellow or red	13
13 Soralia K+ red; norstictic acid present	<i>Lepra erythrella</i>
13: Soralia K+ yellow	14
14 Thamnic acid present	<i>Lepra scaberula</i>
14: Stictic acid present with chloroxanthenes	<i>Pertusaria puffina</i>

GROUP B: Thallus corticolous; apothecia disciform; ascospores 1 or 2 per ascus

1 Ascospores 2 per ascus, 105–125 µm long; thallus C+ red; lecanoric acid present	<i>Pertusaria philippina</i>
1: Ascospores 1 per ascus	2
2 Discs K+ yellow or violet	3
2: Discs K-	4
3 Discs K+ yellow; thamnic acid present; ascospores 112–132 µm long	<i>Pertusaria yupna</i>
3: Discs K+ violet; hypothamnic acid present; ascospores 150–180 µm long	<i>Lepra tropica</i>
4 Discs KC-; lichexanthone only present; ascospores 100–150 µm long	<i>Pertusaria asterella</i>
4: Discs KC+ red or violet	5
5 Discs KC+ red; lecanoric acid present; ascospores 110–155 µm long	<i>Varicellaria velata</i>
5: Discs KC+ violet; picrolichenic acid present	6
6 Lichexanthone absent; ascospores 170–220 µm long	<i>Lepra lacerans</i>
6: Lichexanthone present	7
7 Ascospores 175–195 µm long	<i>Pertusaria myola</i>
7: Ascospores 135–150 µm long	<i>Lepra clarkeana</i>

GROUP C: Thallus corticolous; apothecia disciform; ascospores 8 per ascus

1 Discs K+ yellow; thamnic acid present	2
1: Discs K-; thamnic acid absent	3
2 Ascospores globular, 20–25 µm diam., 1-seriate	<i>Pertusaria gongylospora</i>
2: Ascospores ellipsoid, 30–50 µm long, 2-seriate	<i>Pertusaria epitheciifera</i>
3 Discs KC-; lichen compounds absent; ascospores 45–50 µm long	<i>Pertusaria gyalectoides</i>
3: Discs KC+ red; lecanoric acid present	4

- 4 Ascospores 1-seriate, 30–50 µm long *Pertusaria pycnophora*
 4: Ascospores 2-seriate, 58–75 µm long *Pertusaria kaindiensis*

GROUP D: Thallus corticolous; apothecia verruciform; ascospores 2 per ascus

- 1 Inner ascospore wall rough 2
 1: Inner ascospore wall smooth 8
- 2 Pd–; 2'-*O*-methylperlatolic acid present; ascospores 212–255 µm long
 *Pertusaria suborodes* 3
 2: Pd+ red or orange 3
- 3 Pd+ red; protocetraric acid present; ascospores 110–160 µm long ... *Pertusaria thwaitesii*
 3: Pd+ orange 4
- 4 Norstictic acid present; ascospores 150–200 µm long *Pertusaria perthwaitesii*
 4: Stictic acid present 5
- 5 Stictic acid only present; ascospores 110–125 µm long
 *Pertusaria cicatricosa* var. *deficiens* 6
 5: Stictic acid with chloroxanthenes or 4,5-dichlorolichexanthone or 2'-*O*-methylperlatolic acid 6
- 6 2'-*O*-Methylperlatolic acid present; ascospores 150–175 µm long .. *Pertusaria bundiensis*
 6: Chloroxanthenes or 4,5-dichlorolichexanthone present 7
- 7 Chloroxanthenes present; ascospores 100–150 µm long *Pertusaria cicatricosa*
 7: 4,5-Dichlorolichexanthone and 2'-*O*-methylperlatolic acid present; ascospores 95–120 µm long *Pertusaria trachyspora*
- 8 Chloroxanthenes and stictic acid present 9
 8: Chloroxanthenes absent 10
- 9 Ascospores 80–105 µm long *Pertusaria damiensis*
 9: Ascospores 100–140 µm long *Pertusaria pertusella*
- 10 4,5-Dichlorolichexanthone absent 11
 10: 4,5-Dichlorolichexanthone present 12
- 11 Stictic acid present; ascospores 80–105 µm long *Pertusaria porinella*
 11: Stictic and 2'-*O*-methylperlatolic acids and lichexanthone present; ascospores 100–112 µm long *Pertusaria isidiosa*
- 12 4,5-Dichlorolichexanthone only present; ascospores 130–155 µm
 *Pertusaria irregularis* 13
 12: 4,5-Dichlorolichexanthone present with stictic and/or 2'-*O*-methylperlatolic acids 13
- 13 Stictic and 2'-*O*-methylperlatolic acids present; ascospores 163–200 µm long (can have 4 ascospores per ascus) *Pertusaria copelandii*
 13: Stictic or 2'-*O*-methylperlatolic acids present 14
- 14 Stictic acid present; ascospores 85–110 µm long *Pertusaria pseudococcodes*
 14: 2'-*O*-Methylperlatolic acid present; ascospores 110–125 µm long *Pertusaria pycnothelia*

GROUP E: Thallus corticolous; apothecia verruciform; ascospores 4 per ascus

- 1 Arthothelin or thiophanic acid present 2
 1: Other chlorinated compounds present or absent 3
- 2 Arthothelin and 6-*O*-methylarthothelin present; ascospores 50–62 µm long
 *Pertusaria inconspicua* 2
 2: Thiophanic and 2'-*O*-methylperlatolic acids present; ascospores 95–120 µm long
 *Pertusaria rechingeri* 3
- 3 Chloroxanthenes or 4,5-dichlorolichexanthone present 4
 3: 2-Chlorolichexanthone present or chlorinated compounds absent 11
- 4 Chloroxanthenes present 5
 4: 4,5-Dichlorolichexanthone present 6
- 5 Stictic acid present; ascospores 95–125 µm long; inner spore wall smooth
 *Pertusaria ceylonica* 5
 5: 2'-*O*- and 2-*O*-Methylperlatolic acids present; ascospores 80–110 µm long; inner spore wall rough *Pertusaria elliptica*
- 6 2-*O*-Methylisohyperlatolic acid present; ascospores 105–115 µm long
 *Pertusaria streimannii* 6
 6: Stictic acid, with 2'-*O*-methylperlatolic acid, 2-*O*-methylperlatolic acid or 2-*O*-methylconfluent acid present 7
- 7 2-*O*-Methylconfluent acids present; ascospores 100–120 µm long *Pertusaria bogia*
 7: 2'-*O*-Methylperlatolic acid or 2-*O*-methylperlatolic acids present 8
- 8 Stictic and 2-*O*-methylperlatolic acids present; ascospores 100–120 µm long
 *Pertusaria laeana* 9
 8: Stictic and 2'-*O*-methylperlatolic acids present 9
- 9 Ascospores 163–200 µm long ... *Pertusaria copelandii* (can have 2 ascospores per ascus)
 9: Ascospores 82–125 µm long 10
- 10 Ascospores 90–125 µm long; apothecia 0.7–1.4 mm diam.; ostioles pale
 *Pertusaria hermaka* 10
 10: Ascospores 82–105 µm long; apothecia 0.4–0.7 mm diam.; ostioles black
 *Pertusaria microstoma* 10
- 11 2-Chlorolichexanthone, lichexanthone and 2-*O*-methylsuperlatolic acid present; ascospores 90–115 µm long *Pertusaria modesta*
 11: Xanthenes absent 12
- 12 Lichen compounds absent; ascospores 90–110 µm long *Pertusaria plethocarpa*
 12: Lichen compounds present 13
- 13 Norstictic acid present; ascospores 70–80 µm long *Pertusaria naduriensis*
 13: Norstictic acid absent 14
- 14 2'-*O*-Methylperlatolic and stictic acids present; ascospores 125–150
 *Pertusaria novaeguineae* 14
 14: 2-*O*-Methylsuperlatolic acid present; ascospores 80–100 µm long *Pertusaria manamensis*

GROUP F: Thallus corticolous; apothecia verruciform; ascospores 8 per ascus

1 Arthothelin or thiophanic acid present.....	2
1: Other chlorinated compounds present or absent.....	4
2 Thiophanic and stictic acids present; ascospores 52–72 µm long.....	
2: Arthothelin present.....	3
3 6- <i>O</i> -Methylarthothelin present; ascospores 75–87 µm long.....	<i>Pertusaria oblongata</i>
3: Thiophanic acid present; ascospores 85–95 µm long.....	<i>Pertusaria karkarensis</i>
4 Chloroxanthones or 4,5-dichlorolichexanthone present.....	5
4: 2-Chlorolichexanthone present or chlorinated compounds absent.....	11
5 Chloroxanthones present; ascospores 105–134 µm long, with rough inner walls.....	
5: 4,5-Dichlorolichexanthone present.....	<i>Pertusaria anomalospora</i> 6
6 2'- <i>O</i> -Methylperlatolic acid present.....	7
6: Other compounds present.....	8
7 2,4,5-Trichlorolichexanthone and 2'- <i>O</i> -methylperlatolic acid present; ascospores 55–65 µm long.....	<i>Pertusaria allogibberosa</i>
7: 2,4,5-Trichlorolichexanthone absent; 2'- <i>O</i> -methylperlatolic acid present; ascospores 75–100 µm long.....	<i>Pertusaria mesotropa</i>
8 Alternariol or stictic acid present.....	9
8: 2,2'-Di- <i>O</i> -methylstenosporic acid or confluent acid present.....	10
9 Alternariol present; ascospores 75–87 µm long.....	<i>Pertusaria praecipua</i>
9: Stictic acid present; ascospores 55–80 µm long.....	<i>Pertusaria leiocarpella</i>
10 2,2'-Di- <i>O</i> -methylstenosporic acid present; ascospores 80–100 µm long.....	
10: Confluent acid present; ascospores 60–75 µm long.....	<i>Pertusaria subplanaica</i>
11 Divaricatic acid present; ascospores 70–92 µm long.....	<i>Pertusaria orarensis</i>
11: Chlorinated xanthonones absent.....	12
12 Norstictic acid present.....	13
12: Norstictic acid absent.....	14
13 Ascospores 1-seriate, 60–95 µm long.....	<i>Pertusaria endoxantha</i>
13: Ascospores 2-seriate, 150–210 µm long.....	<i>Pertusaria sipmanii</i>
14 Lichexanthone and stictic acid present; ascospores 100–140 µm long.....	
14: Divaricatic, 2- <i>O</i> -methylstenosporic or confluent acid present.....	<i>Pertusaria dehiscens</i> 15
15 Confluent acid present; ascospores 50–60 µm long.....	<i>Pertusaria gorokorana</i>
15: Divaricatic or 2- <i>O</i> -methylstenosporic acid present.....	16
16 Divaricatic acid present.....	<i>Pertusaria papuana</i>
16: 2- <i>O</i> -Methylstenosporic acid present.....	<i>Pertusaria kagamugana</i>

GROUP G: Thallus saxicolous or terricolous

1 Thallus terricolous, sorediate; chloroxanthones and stictic acid present.....	
1: Thallus saxicolous.....	<i>Pertusaria puffina</i> 2
2 Thallus sorediate, sterile.....	3
2: Thallus with verruciform apothecia.....	5
3 Lichexanthone, picrolichenic and hypothamnolic acids present.....	
3: 4,5-Dichlorolichexanthone or thiophanic acid present.....	<i>Pertusaria subventosa</i> var. <i>hypothamnolica</i> 4
4 4,5-Dichlorolichexanthone and stictic acid present.....	<i>Pertusaria balekensis</i>
4: Thiophanic acid and stictic acid present.....	<i>Pertusaria xanthoplaca</i> (also fertile, see below)
5 Asci with 8 ascospores.....	6
5: Asci with 2 or 4 ascospores.....	8
6 Thiophanic acid absent; lichexanthone and 2- <i>O</i> -methylperlatolic acid present; ascospores 75–90 µm long.....	<i>Pertusaria consanguinea</i>
6: Thiophanic acid present.....	7
7 Stictic acid present; ascospores 50–75 µm long.....	<i>Pertusaria xanthoplaca</i>
7: 2- <i>O</i> -Methylperlatolic acid present; ascospores 60–85 µm long.....	<i>Pertusaria petrophyes</i>
8 Asci 4-spored; 2-chlorolichexanthone, stictic acid and 2- <i>O</i> -methylperlatolic acid present.....	<i>Pertusaria aptrootii</i>
8: Asci 2-spored; 4,5-dichlorolichexanthone and stictic acid present.....	9
9 Ascospores 95–115 µm long.....	<i>Pertusaria atropilota</i>
9: Ascospores 140–175 µm long.....	<i>Pertusaria vulpina</i>

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Abstract

Seven lichen species, *Arthonia vinosa* Leight., *Caloplaca chalybaea* (Fr.) Müll. Arg., *Pertusaria alboatra* Zahlbr., *P. labuensis* A.W. Archer & Elix, *P. neilgherrensis* (Müll. Arg.) D.D. Awasthi & P. Srivast., *Rhizocarpon ridescens* (Nyl.) Zahlbr. and *Varicellaria hemisphaerica* (Flörke) I. Schmitt & Lumbsch, are reported from Australia for the first time. New state, territory and oceanic island records are provided for 50 other taxa.

New records for Australia

Arthonia vinosa Leight., *Ann. Mag. nat. Hist.*, ser. 2, **18**, 331 (1856)

Fig. 1

This species was previously known from Europe, North America and New Zealand (Galloway 2007; Coppins & Aptroot 2009). It is characterized by a crustose, immersed or slightly powdery to scurfy, granular, whitish to yellow-orange to pale fawn thallus, often with darker yellow-orange (K+ purple) patches; lecideine apothecia, 0.2–0.6 mm wide, which are often rounded, convex, with an orange to dark brown, epruinose disc, K+ purple in section, and oval to ellipsoid, usually 1-septate ascospores, 10–15 × 3.5–5 µm, which are initially colourless but become brown and warty with age. Pycnidia frequent, conidia bacilliform, 4–6 × 1 µm, straight or slightly curved.

Chemistry: containing an anthraquinone (*O*-methylhaematommone).

A detailed description is given in Coppins & Aptroot (2009) and a colour photograph in Wirth (1995, p. 135).

SPECIMEN EXAMINED

Australian Capital Territory. • Tidbinbilla Nature Reserve, Ring Road causeway over Tidbinbilla River near Fishing Gate Trail, 35°29'S, 148°54'E, 810 m alt., on dead bark of live *Eucalyptus viminalis*, *J.A. Curnow 5324*, 10.vi.2001 (CANB).

Caloplaca chalybaea (Fr.) Müll. Arg., *Mém. Soc. Phys. Hist. Nat. Genève* **16**, 388 (1862)

Fig. 2

This species was previously known from Europe, Macaronesia, Asia and Africa (Fletcher & Laundon 2009). It is characterized by a crustose, grey-brown, rimose to areolate thallus with a marginal, black prothallus, scattered to crowded apothecia, 0.2–0.3(–0.5) mm wide, initially immersed then adnate, thalline margin distinct, often paler than the disc, the disc flat, level with areole surface when mature, black but often blue-grey-pruinose, a grey-green epiphytism that reacts K+ purple and polarilocular ascospores, 10–[12.5]–15 × 6–[7.1]–8 µm, with a broad septum, 3–5 µm wide.