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Stirtoniella, a new genus for *Catillaria kelica* (*Lecanorales*: *Ramalinaceae*)

David J. GALLOWAY, Josef HAFELLNER and John A. ELIX

Abstract: *Lecidea kelica* Stirt., formerly accepted as a corticolous species of *Catillaria* is shown to belong to a new, monospecific genus here described as *Stirtoniella* in the family *Ramalinaceae*. Details of *Stirtoniellia kelica*, its synonymy, chemistry, ecology and distribution are presented. It is known from New Zealand and Tasmania.

Key words: New Zealand, *Stirtoniella kelica*, Tasmania

Introduction

The Scottish lichenologist James Stirton (1833–1917) prefaced his paper on new Australian and New Zealand lichens, with the following paragraph; ''. . . The materials for the determination of the lichens forming the subject of the present paper have been sent to me from time to time through a long series of years, ranging as far back as 1863, not long after my graduation. The first small parcel is memorable as containing two or three characteristic lichens sent by Mr. James Johnstone, a fellow-student in Edinburgh University, who died shortly after the despatch of his parcel. One lichen from him in New Zealand is recorded here, to which I have appended his pet name of *kelica*—viz., *Lecidea kelica* . . .'' (Stirton 1898: 382). Stirton first described *Lecidea kelica*, in English, from material sent to him from the Wellington area by John Buchanan (Stirton 1873: 18), the protologue not giving a locality of collection but mentioned that the lichen's bright yellow apothecia react K+ red and added the comment: ''. . . This lichen is peculiar in having attached to the hypothecium, or indeed forming part of it, little cushions of green granular matter, not gonidiac cells, but rather as if their granular contents were set free—granular gonimia, in fact; so that a microscopic preparation capable of showing the asci and spores, has, to the naked eye, a bright lemon colour throughout.'' Both of these observations give this lichen a special status that its subsequent taxonomic history has not properly addressed.

Stirton's *Lecidea kelica* first appeared in the New Zealand lichen literature identified as *Parmelia pyrophthalma* (Mont.) Bab. (Babington 1855: 292), based on North Island material collected by William Colenso and sent to Kew for identification. Churchill Babington was at that time much interested in New Zealand lichens and apparently sent some of this material to Camille Montagne in Paris for determination, as his following comment suggests ''. . . Our specimen is named by Dr. Montagne, who has given an ample description, and we have added a figure'' (Babington 1855: 293 and pl. CXXIX A as *Parmelia pyropthalma* [sic.] Mont.), see Fig. 1. Although Montagne apparently regarded the New Zealand material sent to him as conspecific with *Biatora*

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pyrophthalma, a lichen he had earlier described from Chile (Montagne 1843—see Note 1 below), in reality Colenso's New Zealand collection was another taxon entirely, as shown by Nylander (1861, 188—see Note 1 below). Indeed, Nylander later referred Montagne's *Biatora pyrophthalma* to *Dimerella lutea* [=*Coenogonium luteum*] (Nylander 1861: 380).

Several synonyms appeared in the 19th century literature of New Zealand lichenology, based on a misunderstanding of Montagne's *Biatora pyrophthalma* (see Note 1, below). Adding more confusion, Nylander redescribed the species as *Lecidea stillata* (Nylander 1888: 86), leading to further synonyms (see Note 2, below).

In the 20th century Zahlbruckner (1941: 313) recorded both *Catillaria pyrophthalma* and *C. kelica* from South Island, New Zealand. *Catillaria pyrophthalma* collected from *Fuchsia excorticata* on Flagstaff Hill near Dunedin by Jack Scott Thomson (T2380 [V. 127]—OTA 029474!) is referable to *Coenogonium luteum* (formerly *Dimerella lutea*), whereas *C. kelica* collected by Thomson from *Weinmannia racemosa* in the Kaituna Gorge in Nelson (CHR 162084!, OTA 029471!), is correctly named. Curiously, Zahlbruckner (1941: 131) described *Catillaria perpulchra* from the trunk of the tree-fern *Hemitelia smithii* [=*Cyathea smithii*], collected from Leith Saddle again by Jack Scott Thomson (isotype T2167, OTA 029473!) for material now referred to *Coenogonium luteum* (Lücking & Kalb 2000). Martin (1966) in his Census Catalogue of New Zealand lichens followed Zahlbruckner in recording both *Catillaria kelica* and *C. pyrophthalma* (Martin 1966) from New Zealand, and his later record of *C. pyrophthalma* from the Dunedin area (Martin 1970), refers to Scott Thomson's record of *Coenogonium luteum* from *Fuchsia* on Flagstaff (Zahlbruckner 1941: 313), discussed above.

In the *Flora of New Zealand Lichens* (Galloway 1985: 74–8), names recorded under *Catillaria* (including *C. kelica*) do not accord with the accepted modern circumscription of *Catillaria* s. str. (Kilias 1981: 297–308; Hafelllner 1984: 271–272; Coppins 1989; Pant & Awasthi 1989) which refers specifically mainly to saxicolous species united by the following characters: lecideine ascomata; asci in KI with a uniformly amyloid apical dome (*Catillaria*-type); hyaline, non-halonate, 1-septate ascospores; simple to occasionally branched paraphyses having dark-brown apical caps; and pleurogenous, aseptate, short, bacilliform conidia. Currently, only *Catillaria chalybeia* (Borrer) A. Massal., and *C. contristans* (Nyl.) Zahlbr., are known with certainty from New Zealand (Galloway 2003). All of the remaining species thus far recorded from New Zealand in *Catillaria* s. lat., are corticolous, being now accommodated in the genera *Fellhanera* and *Megalaria* (Galloway 1992, 2004; Malcolm & Galloway 1997). The taxon known formerly as *C. kelica* (Stirt.) Zahlbr. is not, however, either a species of *Fellhanera*, or of *Megalaria*, and it is here transferred to a new genus, *Stirtoniella* accommodated in the family *Ramalinaceae*.

Materials and Methods

Type and other material was obtained from the following herbaria AK, BM, CHR, H-NYL, OTA, WELT. Chemical compounds were identified by TLC and HPLC using standardized methods (Culberson 1972; Culberson & Amman 1979; Culberson & Johnson 1982; Elix & Ernst-Russell 1993; Feige *et al.* 1993).

Results

Stirtoniella D. J. Galloway, Hafellner & Elix, gen. nov.

Generi *Catillariae* similis sed thallo glauco-cinerascenti, tenui, inaequali, cartilagineo, K − , corticola. Apothecia biatorina laete cerino-aurantiaca subopaca convexula, stillato-difformia, immarginata, intus citrina, K+ purpurascentia, ascis *Bacidia*-typo; ascosporae 8:nae incolores oblongae 1-septatae; hypothecium incoloratum cum photobiontis dispersis.

Typus: *Stirtoniella kelica* (Stirt.) D. J. Galloway, Hafellner & Elix.

It is placed in the family *Ramalinaceae* C. Agardh.

Thallus crustose, corticolous, K − . Photobiont green, *Chlorococcaeae*.

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Ascomata apothecia, biatorine, mustard-yellow to ochre-yellow, K+ red-purple (responsible compound(s) not detected). *Exciple* of *textura intricata* in longitudinal section. *Hymenium* hyaline, covered with an epithecial layer of yellow crystals (K+ red-purple) that penetrate here and there to subhymenial layers. *Asci Bacidia*-type, with rostrate dehiscence, I+ blue (Lugol's). *Hamathecium* of paraphyses (1·5–2·5 µm diam.), branching and with many anastomoses, tips swollen (up to 5 µm diam.) surrounded by crystals of golden yellow pulvinic acid derivates. *Hypothecium* hyaline, interpenetrated by strands or clumps of unicellular green algae. *Ascospores* colourless, 1-septate, straight or slightly curved, without a perispore.

Conidiomata pycnidia, immersed in minute thalline warts. *Conidia* bacilliform.

Chemistry. Thallus K−, C−, KC−, Pd+ orange; containing protocetraric acid (major) and subvirensic acid (trace); apothecia K+ reddish or purplish red, C−, KC−, Pd− or + orange; containing calycin (major or minor), pulvinic dilactone (major) and protocetraric acid (minor).

Etymology. The genus is named after the Scottish lichenologist James Stirton (1833–1917), who described *Lecidea kelica*, the type species of the genus, and who made major contributions to Australasian lichenology in the 19th century.

Stirtoniella, as a genus in the *Ramalinaceae*

Because of its apothecial and ascus characters (see above and below), *Stirtoniella* is placed in the family *Ramalinaceae*, which includes, besides crustose species, squamulose, foliose and subfruticose taxa. Considering mainly ascomatal and molecular characters, and disregarding growth habit, Ekman (2001) has shown that *Bacidiaceae* Walt. Watson [1929], is hardly separable from the much older *Ramalinaceae* C. Agardh [1821], a view accepted in the most recent outline of the *Ascomycota* (Eriksson *et al.* 2004) and one we adopt here.

Stirtoniella is distinguished from other 'catillarioid' genera, by its unique development of pulvinic acid pigments in the ascomatal tissues (Table 1). Some species of *Candelariella* with biatorine apothecia have a superficial resemblance to *S. kelica*, but are readily distinguished by their *Lecanora*-type asci and non-conglutinate hymenia with asci and paraphyses easily separating under only slight pressure. A comparison of *Stirtoniella* with other crustose genera having pulvinic acid derivatives developed in their cortical tissue is given in Table 2, and a comparison of *Stirtoniella* with other crustose genera having brightly coloured apothecial pigments is given in Table 3.

Stirtoniella kelica (Stirt.) D. J. Galloway, Hafellner & Elix comb. nov.

Lecidea kelica Stirt., *Rep. Trans. Glasgow Soc. Fld Nat.* **1:** 18 (1873).—*Catillaria kelica* (Stirt.) Zahlbr., *Cat. lich. univ.* **4** (1)**:** 49 (1926); type: New Zealand, near Wellington [Kaka Hill, August 1873] *J. Buchanan* 178 (BM!—lectotype [*fide* Galloway (1985: 76)]; WELT L1980!—isolectotype).

Biatora pyrophthalma auct. non Mont., *sensu* Nylander, *Ann. Sci. Nat. Bot. Sér.* 4, **15:** 380 (1861).—*Parmelia pyrophthalma sensu* C. Bab., *Fl. Nov. Zel.* **2:** 292 (1855).—*Sporoblastia pyrophthalma sensu* Trevis., *Linnaea* **28:** 291 (1856).—*Lecidea pyrophthalma sensu* Linds., *Trans. Linn. Soc.* **25** (3)**:** 545 (1866).—*Patellaria pyrophthalma sensu* Müll. Arg., *Bull. Herb. Boissier* 2, App. **1:** 62 (1894).—*Biatorina pyrophthalma sensu* Hellb., *Bih. K. Svenska Vet.-Akad. Handl.* **21** (3/13): 108 (1896).

[*Note 1*: Montagne described *Biatora pyrophthalma* from material collected near Quillota in Chile by Carlo Guiseppe Bertero (Montagne 1843: 357–358; 1856: 339) giving the dimensions of the 1-septate ascospores as 15 × 4 µm. Nylander (1861: 380) referred this species to *Dimerella lutea*, and in a discussion of Montagne's *Biatora pyrophthalma* indicates that the Colenso material from New Zealand is distinct from the South American collections, citing the dimensions of the ascospores in Colenso's collection (H-NYL 20935—annotated by Nylander as "*Biatora pyrophthalma* Bab. non Mont.") as 16–22 × 4·5–5·5 µm (Nylander 1861: 380; 1888: 185).

Examination of Colenso's specimen No. 1216 (BM) is instructive. The collection comprises two small pieces of bark, one loose in a folded blue paper packet, the other and rather larger specimen is stuck directly onto a Kew herbarium sheet and is labelled "N. Zealand Colenso No. 1216". It is annotated by four separate hands. (1) The specimen was evidently sent to Ireland

Table 1. *Comparison of* Stirtoniella *with other 'catillarioid' genera in the* Lecanorales

Genus	Ascus-type	Interascal filaments	Apothecial pigmentation	References
Catillaria	*Catillaria*	non-reticulate	non-crystallized brown pigments	Kilias (1981); Hafellner (1984)
Cliostomum	*Bacidia*	non-reticulate	greenish or reddish brown non-crystalline pigments	Ekman (1997)
Toninia p.p. (incl. *Kiliasia* and *Lobiona*)	*Bacidia*	non-reticulate	non-crystallized pigments of various colours	Timdal (1992); Hafellner (1984)
Bacidia p.p.	*Bacidia*	non-reticulate	non-crystallized pigments of various colours	Ekman (1996)
Biatora	*Bacidia*	slightly reticulate	brown non-crystallized pigments, rarely of other colours	Printzen (1995)
Catinaria	*Bacidia*	slightly reticulate	brown non-crystallized pigments	Hafellner (1984)
Stirtoniella	*Bacidia*	reticulate	golden yellow crystalline pigments (pulvinic acid derivatives)	This publication
Megalaria	*Bacidia*	non-reticulate	blue-green non-crystallized pigments	Hafellner (1984); Ekman & Tønsberg (1996)
Megalospora	*Megalospora*	slightly reticulate, inspersed	brown non-crystallized pigments	Sipman (1983)
Micarea p.p.	*Micarea*	reticulate	non-crystallized pigments of various colours, some with unpigmented lichen substances	Coppins (1983)
Fellhanera	*Fellhanera*	slightly reticulate	non-crystallized pigments of various colours, some with unpigmented lichen substances	Vězda (1986)
Tylothallia	*Bacidia*	slightly reticulate	brown non-crystallized pigments	Kilias (1981)

TABLE 2. *Comparison of* Stirtoniella *with other genera in the* Lecanorales *having crustose thalli and apothecia with pulvinic acid derivatives*

Genus	Ascoma type	Ascus type	Ascospores	Thallus chemistry	References
Candelariella	lecanorine, rarely biatorine	*Lecanora*	0–1-septate	pulvinic acid derivatives or none	Hakulinen (1954); Poelt (1974)
Thelocarpon	biatorine or perithecioid	*Thelocarpon*	0-septate	none	Salisbury (1966)
Acarospora p.p.	aspicilioid to lecanorine	*Acarospora*	0-septate	pulvinic acid derivatives, depsides or none	Clauzade *et al.* (1981)
Pleopsidium	lecanorine	*Lecanora*	0-septate	pulvinic acid derivatives, fatty acids	Hafellner (1993*a*)
Lecanora p.p.	lecanorine	*Lecanora*	0-septate	pulvinic acid derivatives, usnic acid, depsidones, zeorin, fatty acids	Vänskä (1984); Obermayer & Poelt (1992); Hawksworth & Dalby (1992)
Psilolechia p.p.	immarginate, exciple poorly developed	*Psilolechia*	0-septate	pulvinic acid derivatives <(rhizocarpic acid)	Coppins & Purvis (1987)
Stirtoniella	biatorine, exciple excluded from an early stage of development	*Bacidia*	1-septate	depsidones	This publication

TABLE 3. *Comparison of* Stirtoniella *with other genera (in* Lecanorales *and* Teloschistales*) having crustose thalli and brightly coloured biatorine apothecia*

Genus	Ascus-type	Ascospores	Apothecium chemistry	Thallus chemistry	References
Candelariella	*Lecanora*	0–1-septate	pulvinic acid derivatives	pulvinic acid derivatives or none	Hakulinen (1954), Poelt (1974)
Stirtoniella	*Bacidia*	1-septate	pulvinic acid derivatives	depsidones	This publication
Psilolechia p.p.	*Psilolechia*	0-septate	pulvinic acid derivatives	pulvinic acid derivatives	Coppins & Purvis (1987)
Pyrrhospora	*Lecanora*	0-septate	anthraquinones or derivatives	various lichen substances including anthraquinones	Hafellner (1993*b*)
Caloplaca p.p.	*Teloschistes*	1-septate	Anthraquinones	anthraquinones, rarely other lichen substances	Laundon (1992)

to Thomas Taylor, the lichenologist who first worked up Joseph Hooker's New Zealand lichens (Hooker & Taylor 1844), as Taylor has annotated the specimen thus "... *Lecidea rupestris*, Ach. New Zealand ... *Lecidea rupestris*, Ach. On bark!! With us, always on limestone, T.T.". (2) Churchill Babington who prepared the account of lichens in Part II of Joseph Hooker's *Flora Novae Zealandiae* (Babington 1855; Galloway 1991, 1998) made several annotations to the specimen. In ink he has written "*P*[*armelia*] *aurantiaca* v. *laetissima* Bab. Colenso"; and in pencil he has crossed out Taylor's [*Lecidea*] "*rupestris*" replacing it with "*aurantiaca* var. with very bright apothecia, var. *pyrophthalma*". Above this Babington wrote "*Biatora pyrophthalma* Mont. named by himself". (3) Attached to the same sheet as Colenso's specimens are five pencil sketches made by Joseph Hooker and used by Walter Hood Fitch who engraved Plate CXXIX for the *Flora Novae Zealandiae*. Hooker has made a pencil habit drawing showing thallus and one apothecium, slightly larger than life size; a detail of the "... surface of apothecium"; four 1-septate ascospores: ... variable in size, pale straw colour, very transparent, minute"; a section of the apothecium with the epithecium annotated "... yellow orange opaque"; the hymenium annotated "... transparent golden"; and the hypothecium annotated "... greenish orange". The last drawing is a detailed transverse section showing asci with 1-septate ascospores in the hymenial layer, with the supporting hypothecium showing the parallel arrangement of microalgae in strands (later noted by Stirton, see above) which Hooker labelled "greenish yellow" appending a cluster of five small unicells. (4) The remaining annotation, "... *L. lutea* var. Lindsay" is in ink in William Lauder Lindsay's hand, made no doubt in the 1860s when he visited Kew, and after his return from his sojourn in Otago in 1861 (Galloway 1985, 1998).

Subsequently, Colenso's collection was referred to *Lecidea pyrophthalma* (Nyl.) Nyl. (Lindsay 1866: 545; Hooker 1867: 582; Nylander 1888: 185; Hue 1891: 110); to *Sporoblastia pyrophthalma* (Mont.) Trevis (Trevisan 1856: 291); to *Patellaria pyrophthalma* (Mont.) Müll.Arg. (Müller Argoviensis 1894: 62); and to *Biatorina pyrophthalma* (Mont.) Hellb. (Hellbom 1896: 108)].

Lecidea stillata Nyl., *Lich. Nov. Zel.*: 86 (1888).—*Patellaria stillata* (Nyl.) Müll.Arg., *Bull. Soc. Roy. Bot. Belg.* **31**(2)**:** 33 (1892).—*Biatorina stillata* (Nyl.) Hellb., *Bihang K. Sv. Vet.-Akad. Handl.* **21**(3/13)**:** 108 (1896); type: New Zealand, *sine loc.* (probably Wellington), 1867, *Dr Knight* 124 (H-NYL 18199!—holotype; H-NYL 19066!—isotype [part of *Knight 124* and sent to Nylander in 1881]).

[*Note 2:* Nylander (1888: 188) described *Lecidea stillata* from a specimen sent to him by Charles Knight (no. 124) in 1867, noting on the outside of the packet containing the isotype specimen [H-NYL 19066—another part of Knight's No. 124, the specimen being labelled in Knight's hand "... Lecidea stillata Nyl. (Nyl. det. No. 124)"]—"... *L. stillata* Nyl. *in litt. Lecidea kelica* Stirt. in *Linn. Journ.* 1874, p. 467". Although he obviously recognized this material as Stirton's *L. kelica* he did not use Stirton's name and *Lecidea stillata* Nyl., and the later names of *Patellaria stillata* (Nyl.) Müll.Arg. (Müller Argoviensis 1894: 62), and *Biatorina stillata* (Nyl.) Hellb. (Hellbom 1896: 108) became synonyms of *Lecidea kelica* (Zahlbruckner 1926: 49). Müller Argoviensis (1894: 62) correctly recognized that *Lecidea kelica* and *L. stillata* were conspecific, but erroneously made *L. kelica* a synonym of *Patellatia stillata*].

Illustrations. Babington (1855: pl. CXXIX A—as *Parmelia pyropthalma* [sic.] Mont.); Lindsay (1866: pl. LXIII, fig. 32—as *Lecidea pyrophthalma* Mont.); Malcolm & Malcolm (2000: 112—as *Catillaria kelica*); Lumbsch *et al.* (2001: 14—as *Catillaria kelica*).

(Fig. 1)

Thallus 50–80(–100) µm thick, spreading in irregular patches (1–)2–5(–8) cm diam., sometimes delimited by a thin to thick, black, sinuous, prothalline line. Upper surface pale greenish grey to grey-white, continuous to minutely areolate-cracked, areolae angular, 0·1–1 mm diam., separated by very narrow cracks, smooth or minutely verrucose-papillate, matt or shining.

Apothecia sessile (0·1–)0·5–2(–3) mm diam., round to irregular, solitary to clustered to somewhat conglomerate, large apothecia frequently fragmenting into smaller, contiguous parts, shallowly convex to ± flattened; disc smooth to irregularly wrinkled or pitted, mustard-yellow to ochre-yellow (becoming darker to somewhat reddish to red-purple in K), convex, exciple becoming excluded from an early stage of development. *Exciple* of *textura intricata* in longitudinal section, excipular hyphae reticulate but with a tendency to radiate orientation, with narrow lumina, golden yellow pigment crystals covering and penetrating deeply between the hyphae, intercellular space otherwise filled with gelatinous matrix. *Hypothecium* hyaline or pale brownish (Lugol's I+ pale violet), 20–30 µm thick, of intricate, thick-walled, short-celled hyphae, in the uppermost part at the edge to the subhymenium with a layer of ± irregularly globose pigment crystals of a slightly different colour to those of the epihymenium, interpenetrated by strands or clumps of unicellular, green algae.

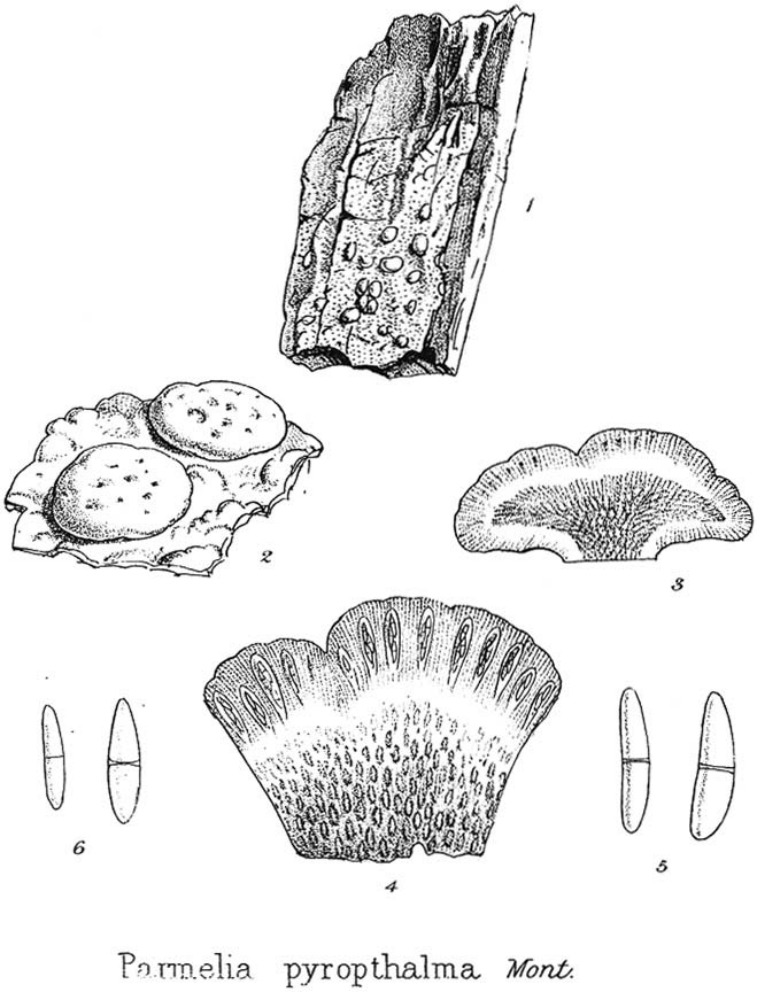

FIG. 1. Engraving of *Stirtoniella kelica* (as *Parmelia pyrophthalma*) from Babington (1855).

Hymenium hyaline, 60–80(–100) µm tall, covered by a layer (8–)12·5(–22) µm thick, of mainly bacilliform, golden yellow pigment crystals (K+ purple-red, then decolourizing), without inspersion of oil droplets, but with golden-yellow pigment crystals penetrating here and there down to the subhymenium. Interascal filaments relatively few in ascomata with a sporulating hymenium, with many ramifications and anastomoses, apices generally swollen. *Asci* of *Bacidia*-type (i.e. with euamyloid tholus having a conical non-amyloid axial body), cylindrical-clavate, 50–65(–70) × 11·5–15 (–17) µm, 8-spored. *Ascospores* hyaline, narrowly ellipsoid, straight or slightly curved, 1-septate, without a distinct perispore, septum simple without any peculiar features, (15–)18(–22) × 4–5·5 µm.

Pycnidia widely scattered, immersed in minute, thalline warts (0·01 mm diam., or less), interior pale red-brown, ostiole punctiform, brown to black. *Conidia* bacilliform, hyaline, 3–3·5 × 1 µm.

Chemistry. As for the genus above.

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FIG. 2. Known distribution of *Stirtoniella kelica* in New Zealand.

Distribution (Fig. 2). In New Zealand *Stirtoniella kelica* occurs from Northland (lat. 34°27′S) in North Island, southwards to Nelson and Marlborough (to lat. 41°13′S) in South Island, being most frequently collected from northern coastal forest habitats (Stirton 1873, 1874, 1875; Zahlbruckner 1941; Galloway 1985; Hayward & Hayward 1974, 1991; Hayward *et al.* 1975, 1986), with a conspicuous gap in its distribution between the Kaimai Range and Kapiti Island (lats. 37°45′S–40°52′S). It is absent from much of South Island and Stewart Island, contrary to the distribution given in Galloway (1985: 76). It is known also from Tasmania (Kantvilas 1989, 1994; Jarman *et al.* 1991; Jarman & Kantvilas 1995).

Habitat ecology. *Stirtoniella kelica* is a corticolous species occurring on the bark of lowland, and predominantly coastal forest trees in New Zealand including: *Agathis australis*, *Hedycarya arborea*, *Nothofagus truncata*, *Rhopalostylus sapida* and *Weinmannia racemosa* as phorophytes. It associates on bark with the lichens *Bacidia laurocerasi*, *Graphis subcontexta*, *Lecanora flavopallida*, *Menegazzia eperforata*, *M. nothofagi*, *Opegrapha* sp. *Porina exocha*, *Pyrenula deliquescens* and *Usnea* spp. In Tasmania it is ". . . common and widespread in rainforest on the lower trunks and branches of trees with smooth bark, especially *Atherosperma*, *Cenarrhenes* and *Tasmannia*" (Kantvilas & James 1991: 273). It is found in medium- to high-light forest habitats and has an altitudinal range from 140–774 m.

Representative specimens examined. **Australia:** *Tasmania*: Sumac Spur 2, S of Arthur River, on *Cenarrhenes nitida* in rainforest, 170 m, 1981, *G. Kantvilas* 355/81 (BM 760023); Near Lyons River on *Nothofagus cunninghamii* in rainforest, 280 m, 1982, *G. Kantvilas* 25/82 (BM 760024).—**New Zealand:** *Northland*: Radar Bush, on bark, 14 v 1984, *B.W. Hayward* (AK 296719); Herekino Gorge, *J. K. Bartlett* (AK 185181); Little Barrier Island, kauri forest on bark, 9 v 1990, *A. E. Wright s.n.* (WELT L 2645). *Auckland*: Chelsea, on bark, *H. H. Allan* (CHR 373807); Waitakere, *J. K. Bartlett* (201595, 201597). *South Auckland*: Mt Moehau, Coromandel Peninsula, 500–650 m, 1974, *B. W. Hayward* H39.63 (AK 161427); Kaimai Range, Tangitu, *J. K. Bartlett* (AK 185180). *Wellington*: Kapiti Island, Trig Track, *Beilschmiedia tawa* forest, on N-facing slope, 300 m, on stem of *Hedycarya arborea* sapling, 1993, *D. Glenny* 4646 (CHR 488753, WELT L 4494); Tararua Range, Smith Creek, in beech-podocarp forest, 250 m, 1987, *B. W. Hayward* (AK 186132); Kaka Hill, Wellington, 1873, *J. Buchanan 83* (WELT L 1996 *pr.min.p.*); Wainuiomata, 1873, *J. Buchanan* 146 (WELT L 1996 *pr.max.p.*). *Nelson*: Karamea, lower Opara River, 200 m, trunk of sapling of *Weinmannia racemosa* in *Weinmannia racemosa*+ *Quintinia serrata* forest, 1992, *D. Glenny* 3674 (WELT L 3701); Kaituna Gorge, on Kamahi, *J. S. Thomson* T 1949 [ZA 660] (CHR 162084, OTA 029471). *Marlborough*: D'Urville Island, E ridge to Mt Maud, in beech forest, 400–550 m, 4 i 1988, *B. W. & G. C. Hayward* (AK 182643); Queen Charlotte Sound, track from Resolution Bay to Ship Cove, 130 m, on *Weinmannia racemosa* in mixed beech-broadleaf forest, 2 i 1992, *B. W. Hayward* (AK 204902).

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