

Four new species of *Chaetosphaeria* from New Zealand and redescription of *Dictyochoaeta fuegiana*

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Abstract: Four new species of *Chaetosphaeria* are described and illustrated based on collections from New Zealand, i.e. *Chaetosphaeria curvispora* (anamorph: *Chloridium*-like), *Ch. fusichalaroides* (anamorph: *Fusichalara dingleyae*), *Ch. fuegiana* (anamorph: *Dictyochoaeta fuegiana*) and *Ch. phaeostalacta* (anamorph: *Phaeostalagmus* sp.). *Zignoëlla gallica* is redescribed on the basis of holotype material and a new combination in *Chaetosphaeria* is proposed. The connections of the new *Chaetosphaeria* species with their anamorphs were proven experimentally using single- and mass-ascospore isolations. *Dictyochoaeta fuegiana*, the type species of the genus, is redescribed based on the recent collection from New Zealand.

Taxonomic novelties: *Chaetosphaeria curvispora* Réblová sp. nov., *Chaetosphaeria fusichalaroides* Réblová sp. nov., *Chaetosphaeria fuegiana* Réblová sp. nov., *Chaetosphaeria phaeostalacta* Réblová sp. nov., *Chaetosphaeria gallica* (Sacc. & Flageolet) Réblová comb. nov.

Key words: *Chaetosphaeriaceae*, *Codinaea*, *Chloridium*, *Fusichalara*, life cycles, systematics.

INTRODUCTION

Chaetosphaeria Tul. & C. Tul. (*Chaetosphaeriaceae*, *Sordariales*) is a cosmopolitan genus of perithecial ascomycetes that colonize wood or bark of angiosperms and gymnosperms in different stages of decay. The anamorph genera associated with *Chaetosphaeria* (13 genera, listed in the key below) are all phialidic dematiaceous hyphomycetes including some modifications (e.g. annellate proliferations of meristematic tip of a phialidic conidiogenous cell in *Cacumisporium*, *Kylindria* or *Chloridium virescens*), and exhibit much of the obvious phenotypic diversity within the genus. The anamorphs are also common on leaf litter or wood and may occur together with or independently from the perithecia of the teleomorph. Many species assigned to the anamorph genera associated with *Chaetosphaeria* are still known only as asexually reproducing fungi, lacking a connection to known teleomorphs.

During a survey of ascomycetes in New Zealand in February and March 2003, four new species of *Chaetosphaeria* were collected, which are described here. Single- or mass-ascospore isolations from the teleomorphs yielded hyphomycetous, dematiaceous anamorphs in culture. The new species, and their corresponding anamorphs, are *Ch. curvispora* (anamorph *Chloridium*-like), *Ch. phaeostalacta* (*Phaeostalagmus* sp.), *Ch. fusichalaroides* (*Fusichalara dingleyae* S. Hughes & Nag Raj) and *Ch. fuegiana* (*Dictyochoaeta fuegiana* Speg.). *Dictyochoaeta fuegiana*, the type species of the genus, is redescribed based on a recent

collection from New Zealand. Although *Chaetosphaeria fuegiana* and *Ch. phaeostalacta* are based on single specimens, their characters and life-histories are so distinctive that there is no possibility that they represent variants of previously known species.

A dichotomous key to previously known *Chaetosphaeria* species (Réblová 2000) is updated and revised with 16 new species or combinations that have been published from 1999 to the present (Hyde *et al.* 1999, Huhndorf *et al.* 2001, Réblová & Seifert 2003), with 46 species now accepted in the genus. The generic characters of the anamorphs are an important tool for the identification of *Chaetosphaeria* species and are the “backbone” for the key and the taxonomy of the genus.

MATERIAL AND METHODS

Dried specimens were rehydrated in water and subsequently mounted for microscopic examination in Melzer's reagent, cotton blue in lactic acid, and 90 % lactic acid. All measurements were made in lactic acid. Means \pm standard errors (se) are given for spore and ascus dimensions and are based on 20–25 measurements. The length/width ratios (L/W) for asci are given for *pars sporifera*. Images were captured in Melzer's reagent using differential interference microscopy (DIC) and phase contrast (PC) and processed using Adobe Photoshop 6.0 CE.

Single- and mass-ascospore and conidial isolates were obtained from fresh material with the aid of a

single-spore isolator (Meopta, Czech Republic). All anamorph-teleomorph connections are based on the isolation of ascospores, and the development of conidia and conidiophores in the cultures derived from those ascospores. Colonies were grown on potato-carrot agar (PCA, Gams *et al.* 1998). Colony characters were taken from cultures grown on PCA for 14 d at 24 °C in darkness. Colony colours were character-

ised according to Kornerup & Wanscher (1978). The cultures are maintained at the Institute of Botany, Academy of Sciences in Průhonice, Centraalbureau voor Schimmelcultures (CBS), Utrecht, and Landcare Research, Auckland (ICMP). Type material is deposited in Landcare Research, Auckland (PDD).

Key to the species of *Chaetosphaeria*

The numbers after each species name indicate principal references listed after the key. A dichotomous key to anamorph genera was provided in Réblová (2000).

1. Ascospores hyaline 2
1. Ascospores versicolorous, anamorph *Exserticlava* 43
2. Ascospores 1-septate, sometimes fragmenting into part-spores 3
2. Ascospores more than 1-septate, sometimes fragmenting into part-spores 17
3. Anamorph *Chloridium* or *Chloridium*-like 4
3. Anamorph different 9
4. Ascospores always fragmenting into part-spores 5
4. Ascospores never fragmenting 6
5. Anamorph *Chloridium virescens*; conidia arising on multiple loci within phialidic aperture; part-ascospores 6–10 × 2–3 µm *Ch. vermicularioides*⁵
5. Anamorph *Chloridium preussii*; conidia arising on single loci within phialidic aperture; part-ascospores 2.5–3.5 × 1.5–2 µm *Ch. preussii*⁵
6. Ascospores up to 10 µm long; collarette pigmented; conidia borne in short chains 7
6. Ascospores longer than 10 µm; collarette hyaline; conidia borne in slimy droplets 8
7. Anamorph *Chloridium clavaeforme*; collarette flared, vase- or funnel-shaped; conidia 2–3 × 1.5–2.5 µm, distinctly truncate at the base; ascospores 5–7(–8) × 2.5–3 µm *Ch. myriocarpa*^{2,4,5}
7. Anamorph *Phialophora phaeophora*; collarette cup-shaped, not flared; conidia 2–3 × 1.5–2 µm, less conspicuously truncate at the base; ascospores (5–)6–8 × 2–2.5 µm *Ch. pygmaea*⁴
8. Anamorph *Chloridium* sp.; conidiophores forming two distinct layers; conidia ellipsoidal, apiculate, 3.5–4(–5) × 2–2.5 µm; ascospores 10.5–17.5 × 2.5–3.5 µm; asci up to 80 µm long *Ch. barbicincta*¹
8. Anamorph *Chloridium pachytrachelum*; conidiophores forming only one layer; conidia ellipsoidal to subcylindrical, (3.5–)5–7.5(–9) × (2–)2.5–3.5 µm; ascospores (10.5–)12.5–14.5(–16.5) × 4–5 µm; asci longer than 80 µm *Ch. lentomita*⁵
9. Anamorph *Codinaea sensu stricto* (i.e. conidia with setulae) 10
9. Anamorph different 11
10. Anamorph *Codinaea dingleyae*; phialides discrete and integrated, terminal; conidia 1-septate, 14–17 × 1.5–2.7 µm; ascospores 9–12.5 × 2.5–3.5 µm *Ch. dingleyae*¹³
10. Anamorph *Codinaea* sp.; phialides integrated, terminal; conidia 1-septate, (12–)13–16(–19) × 2–2.5 µm; ascospores (10–)11–12.5(–13) × 3.5–4 µm *Ch. verruculospora*¹⁹
11. Anamorph *Dictyochaeta sensu stricto* (i.e. conidia lacking setulae) 12
11. Anamorph different 13

12. Anamorph *Dictyochaeta fuegiana*; conidia 15–23 × 2–2.5 µm; ascospores (15–)17–22 × 4–5 µm *Ch. fuegiana*²⁰
12. Anamorph *Dictyochaeta* sp.; conidia 14–16 × 2–3 µm; ascospores 11–16 × 3–4 µm *Ch. callimorpha*^{2,13,20}
13. Anamorph *Chalara pro parte* 14
13. Anamorph different 15
14. Anamorph *Chalara brevispora*; conidia wedge-shaped, 1.5–2.5 × 1–1.5 µm; ascospores 7–10 × 2–2.5 µm; asci up to 60 µm long *Ch. bramleyi*^{3,5}
14. Anamorph *Chalara breviclavata*; conidia short-clavate, 10–20 × 3.5–4.5 µm; ascospores 9–17 × 3–4 µm; asci more than 60 µm long *Ch. chalaroides*⁹
15. Anamorph *Gonytrichum* 16
15. Anamorph *Zanclospora brevispora* *Ch. brevispora*¹³
16. Anamorph *Gonytrichum chlamydosporium*; conidiophores unbranched, proliferating percurrently; part-ascospores 3–4 × 2–3 µm *Ch. chloroconia*⁵
16. Anamorph *Gonytrichum caesium*; conidiophores with a conspicuous lateral branching pattern; part-ascospores 2.5–3.5(–4.5) × 2–2.5(–3) µm *Ch. inaequalis*⁵
17. Anamorphs *Cacumisporium*, *Catenularia*, *Chalara*, *Chloridium*, *Codinaea*, *Cryptophiale*, *Cylindrotrichum pro parte*, *Fusichalara*, *Menispora* or *Phaeostalagmus* 18
17. Anamorph belonging to different genera or hitherto unknown 44
18. Anamorph *Chloridium* or *Chloridium*-like 19
18. Anamorph different 28
19. Ascospores always fragmenting; conidia pale brown, ellipsoidal; ascospores 3-septate, part-ascospores (2–)2.5–3 × 2–2.5 µm *Ch. dilabens*¹⁸
19. Ascospores not fragmenting 20
20. Ascospores with symmetrical ends 21
20. Ascospores asymmetrical: rounded apically, tapering towards the base 26
21. Ascospores up to 22 µm long, 3-septate 22
21. Ascospores longer than 22 µm, 3- to more-septate 24
22. Perithecial setae present 23
22. Perithecial setae absent; anamorph *Chloridium botryoideum*; ascospores (10–)12–16 × 3.5–4 µm; asci up to 90 µm long *Ch. innumera*⁵
23. Conidiophores simply branched; conidia aseptate, ellipsoidal, apiculate, 4–4.5(–5) × 2–2.5 µm; ascospores 15–21(–22.5) × 4–5 µm, finely verruculose; asci more than 90 µm long *Ch. hebetiseta*¹⁸
23. Conidiophores unbranched; conidia 0–1-septate, ellipsoidal to oblong, truncate at the base, 17.5–20 × 4.5–5 µm; ascospores 19–22 × 4–5 µm, smooth; asci 95–110(–115) × 11–13 µm *Ch. curvispora*²⁰
24. Ascospores cylindrical-fusiform, with more or less obtuse ends 25
24. Ascospores fusiform, with acute ends 26

25. Anamorph *Cylindrotrichum zignoëllae*; conidia arising on a single locus, 1-septate, 6–12 × 2–3.5 µm; ascospores 3-septate, 27–36.5(–41) × (2.5–)3–4 µm *Ch. abietis*^{5,17}
25. Anamorph *Chloridium*-like; conidia arising on multiple loci, aseptate, (11.5–)14.5–17(–21) × 3–4.5 µm; ascospores 3–6-septate, (15.5–)19–26(–28) × 3–3.5(–4) µm *Ch. crustacea*¹⁷
26. Anamorph *Chloridium*-like; conidia hyaline, 1-septate; ascospores 3-septate, (28–)30.5–38(–44) × 3–4(–5) µm *Ch. acutata*¹⁷
26. Anamorph *Chloridium*-like; conidia pale brown, aseptate; ascospores 3-septate, immediately after the middle septum tapering strongly towards the ends (34.5–)36.5–42(–43) × (3.5–)4(–4.5) µm *Ch. fennica*¹⁷
27. Anamorph *Chloridium cylindrosporum*; conidiophores forming two layers; conidia 0–3-septate, subcylindrical, narrower at the middle, 10.5–13.5 × 3.5–5 µm; ascospores 3-septate, (34.5–)39–53.5(–62) × 2.5–3(–4) µm *Ch. fusiformis*^{5,17}
27. Anamorph *Chloridium*-like; conidiophores forming one layer; conidia aseptate, ellipsoidal to obovoidal, (4.5–)5–6 × 2.5–3 µm; ascospores 1–7-septate, 74–82(–87) × (3–)3.5–4 µm *Ch. hispida*¹⁹
28. Anamorph *Codinaea sensu stricto* 29
28. Anamorph different 31
29. Conidia initially with setulae, lacking setulae when mature, 0–1-septate; ascospores (7.5–)8–10(–11) × 3–3.5(–3.7) µm; asci 70–80 × 7–7.5(–10) µm *Ch. falacrospora*¹⁹
29. Conidia with short appendages at both ends 30
30. Setae strongly pointed at their apices, always with opaque contents in the apical cells; conidia 23–29 × 2.4–3 µm; ascospores 3-septate, 12–18 × 4–6 µm; asci up to 80 µm long *Ch. pulchriseta*¹³
30. Setae blunt at their apices, always with paler or hyaline contents of the apical cells; conidia 22–26(–29) × 3–4 µm; ascospores 1–3-septate, (18.5–)19–25 × 5.5–7 µm; asci more than 80 µm long *Ch. montana*¹⁵
31. Anamorph *Dictyochaeta sensu stricto*; setae or setiform conidiophores forming an upper layer absent; conidia 7–11 × 1.5–2.5 µm; ascospores 3-septate, 15–22 × 4–5 µm; asci 70–100 in *pars sporifera* × 7–10 µm, stipe 8–14 µm long *Ch. talbotii*¹³
31. Anamorph different 32
32. Anamorph *Chalara* sp., conidia obclavate, truncate at the base, aseptate, 11–16 × 4–6 µm; ascospores 1–3-septate, (13–)15–17 × 4–5 µm; asci 47–58 × 8.5–9(–10) µm *Ch. tubulicollaris*¹⁹
32. Anamorph different 33
33. Anamorph *Fusichalara dingleyae*, conidia fusiform, conical at the apex, truncate at the base, 3–7-septate, 34–58 × 4–5(–6) µm; ascospores 15–19(–20) × (3.5–)4(–4.5) µm; asci 60–74(–76) × (8.5–)9–10 µm *Ch. fusichalaroides*²⁰
33. Anamorph different 34
34. Anamorph *Cacumisporium capitulatum*; ascospores 3–5-septate, (28–)30–42(–46) × 3–4 µm; asci 68–90 µm in *pars sporifera* × 10.5–11.5 µm, stipe 30–54 µm long *Ch. decastyla*¹⁷
34. Anamorph different 35
35. Anamorph *Catenularia* 36
35. Anamorph different 39
36. Anamorph *Catenularia cubensis*; ascospores up to 20 µm long (12–18 × 2.5–3.5 µm); conidia 5.5–9 µm long, 3.5–5.5 µm wide at the distal end, 1.5–2.5 µm wide at the base *Ch. cubensis*⁸
36. Ascospores longer than 20 µm 37

37. Anamorph *Catenularia cuneiformis*; ascospores 4–5-septate, 15–28 × 4–5 µm; conidia (9–)11–13.5(–15) µm long, (5.5–)7.5–10(–11.5) µm wide at the distal end, (2.5–)3.5–4.5(–6) µm wide at the base..... *Ch. cupulifera*³
37. Ascospores 3-septate..... 38
38. Anamorph *Catenularia* sp.; conidia 2 µm wide at the base, (8–)9–10 µm long, 9–11 µm wide at the distal end; ascospores 25–29(–30) × (3.5–)4–4.5 µm *Ch. trianguloconidia*¹⁹
38. Anamorph *Catenularia novaezelandiae*; conidia 3–6 µm wide at the base, 15–21 µm long, (13–)15–21 µm wide at the distal end; ascospores 20–28(–32) × 4.5–5 µm..... *Ch. novaezelandiae*¹²
39. Anamorph *Phaeostalagmus* sp.; ascospores (28–)30–38(–40) × 5–6(–8) µm *Ch. phaeostalacta*²⁰
39. Anamorph different 40
40. Anamorph *Cryptophiale* 41
40. Anamorph *Menispora* with *Phialophora*-like synanamorph..... 42
41. Anamorph *Cryptophiale kakombensis*; conidia 22–30 × 1.5–2 µm, falcate, 1-septate, attenuated towards both pointed ends *Ch. saltuensis*¹⁰
41. Anamorph *Cryptophiale udagawae*; conidia 20–35 × 1.5–3 µm, falcate, 1-septate, distal end narrower and drawn into short stout appendage..... *Ch. hongkongensis*¹⁰
42. Anamorph *Menispora glauca*; conidia 3-septate, fusiform, with setulae at each end, 17–24(–27) × 3–4 µm; *Phialophora*-like conidia aseptate, cylindrical to clavate, 4–5 × 1.5–2 µm; ascospores 3-septate, 21–29 × 4–5.5(–6) µm *Ch. ovoidea*^{4,7,16}
42. Anamorph *Menispora caesia*; conidia aseptate, clavate, without setulae, 15–20 × 2.5–3.5(–4) µm; *Phialophora*-like conidia aseptate, clavate, non-septate, (5–)6–7.5 × 1–1.5 µm; ascospores 1–3-septate, 19–23(–25) × 3–3.5(–4) µm *Ch. pulviscula*^{2,7,16}
43. Anamorph *Exserticlava triseptata*; conidia more than 13 µm wide (13–15 µm); ascospores 5–7(–8)-septate, 36–43(–48) × (6–)7–7.5(–8) µm..... *Ch. hiugensis*^{6,14}
43. Anamorph *Exserticlava* sp.; conidia less than 13 µm wide [(10–)11–12.5(–13) µm]; ascospores 3–7-septate, 28–32(–33.5) × 3.5–4.5 µm *Ch. exserticlavoides*¹⁹
44. Ascospores 3-septate, fusiform, verruculose, 27–33.5 × 6–7.5 µm; asci 92–134 × 15–20 µm... *Ch. arecacensis*¹⁰
44. Ascospores more than 3-septate 45
45. Ascospores 7–10-septate, asymmetrical, fusiform-cylindrical, rounded apically, tapering towards the base, 75–100 × 3–4 µm; asci short-stipitate, 130–170 × 12–15 µm; perithecial setae capitate *Ch. capitata*²¹
45. Ascospores symmetrical, fusiform 46
46. Ascospores 6–7-septate, 25–32 × 4–5 µm; asci long-stipitate, 75–147 × 9–20 µm, perithecial setae not capitate *Ch. cylindrospora*¹¹
46. Ascospores (3–)5-septate, (21–)23–25 × 4.5–6 µm; asci short-stipitate, 131–160 × (11–)12.5–13.5(–15) µm..... *Ch. gallica*²⁰

Principal references to current descriptions: ¹Barr (1993), ²Booth (1957), ³Booth (1958), ⁴Constantinescu *et al.* (1995), ⁵Gams & Holubová-Jechová (1976), ⁶Hino & Katamoto (1961), ⁷Holubová-Jechová (1973), ⁸Holubová-Jechová (1982), ⁹Holubová-Jechová (1984), ¹⁰Hyde *et al.* (1999), ¹¹Huhndorf *et al.* (2001), ¹²Hughes (1965), ¹³Hughes & Kendrick (1968), ¹⁴Matsushima (1975), ¹⁵Réblová (1998a), ¹⁶Réblová (1998b), ¹⁷Réblová & Gams (1999), ¹⁸Réblová & Gams (2000), ¹⁹Réblová & Seifert (2003), ²⁰Réblová (this study), ²¹Sivanesan & Chang (1995).

TAXONOMY

Chaetosphaeria curvispora Réblová, **sp. nov.**
MycoBank MB500043. Figs 1–12, 31.
Anamorph: *Chloridium*-like.

Etymology: *Curvus*- (L) and *spora* (L); in reference to the slightly curved ascospores.

Perithecia superficialia, solitaria vel gregaria, subglobosa usque globosa, papilla minuta praedita, 175–200 µm diam, 215–230 µm alta, nigra, ostiolo periphysato, setosa. Setis obtusis, simplicibus, fuscis, opacis, 115–170 µm longis, 5–5.5 µm latis prope basim. Paries perithecii fragilis, bistratosus. Paraphyses persistentes, cylindraceae, septatae, ultra ascorum apices protrudentes. Asci unitunicati, cylindrici usque clavati, 95–110(–115) × 11–13 µm, apice non amyloideo, annulo refractivo, 8-spori. Ascosporae fusiformes usque oblongae, 19–22 × 4–5 µm, 3-septatae, leves, hyalinae.

Anamorphe ad *Dictyochaetam* vel *Chloridium* pertinens: Conidiophora macronematosa, mononematosa, fusca ad basim, sursum pallidiora, 120–140 µm alta, 4.5–5 µm lata prope basim, sub collari ad 3.5–3.7 µm constricta. Collare hyalinum, 5 µm diam. Conidia ellipsoidea usque oblonga, ad basim truncata, 17.5–20 (mean ± se = 18.7 ± 1.2) × 4.5–5 (mean ± se = 4.7 ± 0.2) µm, aseptata, hyalina.

Perithecia superficial, solitary to gregarious, subglobose to globose, papillate, 175–200 µm diam, 215–230 µm high, black, setose, ostiolate. *Setae* sparsely covering the perithecia, arising on the perithecial wall and around the perithecia from the substrate, cylindrical, dark brown, becoming paler towards the upper part, sometimes with 1–2 percurrent proliferations, septate, unbranched, 115–170 µm long, 5–5.5 µm wide above the base, base bulbous and 10–15 µm wide, apical cell 24–30 µm long, (4–)4.5–5.5 µm wide, pale brown to subhyaline, finely verruculose at the obtuse to broadly rounded apex. *Ostiolar canal* periphysate. *Perithecial wall* 20–25 µm thick, carbonaceous, fragile, consisting of two regions; outer region formed of dark brown, thin-walled, brick-like cells; inner region formed of hyaline, thinner-walled, elongated, compressed cells. *Paraphyses* persistent, branching, hyaline, septate, 3–4 wide near the base, not tapering, broadly rounded at the top, longer than the asci. *Asci* unitunicate, cylindrical-clavate, 95–110(–115) (mean ± se = 104.9 ± 1.3) × 11–13 (mean ± se = 11.5 ± 0.2) µm, L/W 9:1, short-stipitate, truncate at the apex, with a distinct refractive apical annulus, ca. 3 µm diam, 1.5 µm high, 8-spored. *Ascospores* fusiform, often curved, inequilateral, 19–22 (mean ± se = 20.3 ± 0.2) × 4–5 (mean ± se = 4.4 ± 0.1) µm, L/W 4.6:1, 3-septate, not constricted at the septa, hyaline, smooth, 2-seriate in the ascus.

Colonies on the natural substratum irregularly effuse, dark brown, hairy, conidiophores occurring among or on the perithecia. *Conidiophores* macronematous, mononematous, solitary, erect, straight or slightly flexuous, cylindrical, unbranched, septate, brown, darker brown at the septa, paler towards the top, 120–140 µm long, 4.5–5 µm above the base. *Conidiogenous cells* phialidic, cylindrical, 20–25 × 5 µm, tapering to 3.5–3.7 µm just below the collarette, conidia formed on a single conidiogenous locus within the aperture. *Collarette* ca. 5 µm wide, 5 µm deep, subhyaline to hyaline. *Conidia* ellipsoidal to oblong, broadly rounded apically, truncate at the base, 17.5–20 (mean ± se = 18.7 ± 1.2) × 4.5–5 (mean ± se = 4.7 ± 0.2) µm, L/W 4:1, 0–1-septate, hyaline, smooth.

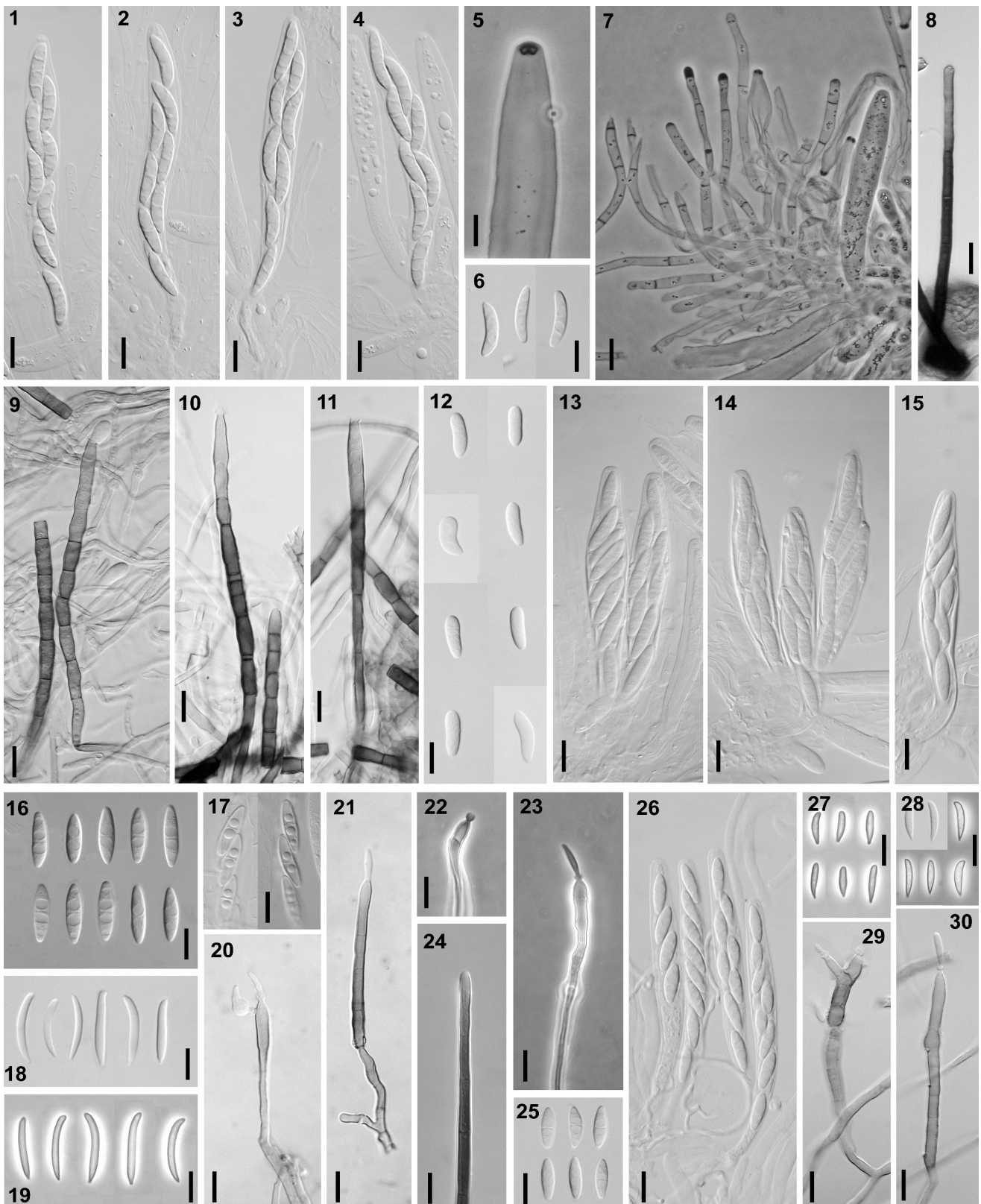
Characteristics in culture: Colonies on PCA reaching 3–4 mm diam after 14 d, convex, aerial mycelium well-developed throughout the colony, with copious widespread sporulation; conidiophores erect, occurring above and under the aerial mycelium, forming a single, uniform layer, dark brownish grey; conidial masses whitish, slimy; reverse dark brown-grey, margins entire, discrete. *Setae* absent. *Conidiophores* similar to those on the natural substratum, 98–135 µm long, 4–5 µm wide above the base. *Conidiogenous cells* 18–30 µm long, 4–5 µm wide, tapering to 2–3 µm just below the collarette, subhyaline, terminal, integrated with 1 apical conidiogenous aperture or rarely polyphialidic with 1–3 lateral apertures. *Collarette* 4–5 µm diam, ca. 2 µm deep. *Conidia* ellipsoidal, (10–)13–16(–17) (mean ± se = 14.5 ± 0.4) × 4–5 (mean ± se = 4.8 ± 0.1) µm, L/W 3:1, 0–1-septate.

Holotype: **New Zealand**, Tasman Prov., Abel Tasman National Park, Takaka, ca. 100 km NW of Nelson, Pigeon Saddle point, on unpaved road between Tata Beach and Totaranui ca. 10 km NW of Totaranui, on decorticated wood of a branch buried in the soil, 24 Feb. 2003, M. Réblová M.R. 2607/03, PDD 78268, culture ex-type CBS 113644, ICMP 15115.

Additional material examined. **New Zealand**, Tasman Prov., Abel Tasman National Park, Takaka, ca. 100 km NW of Nelson, Pigeon Saddle point, on unpaved road between Tata Beach and Totaranui, ca. 10 km NW of Totaranui, on decorticated wood, 24 Feb. 2003, M. Réblová M.R. 2608/03, PDD 78269, cultures CBS 113656, ICMP 15116; M.R. 2611/03, PDD 78270, culture ICMP 15118; M.R. 2629/03, PDD 78271, culture ICMP 15120.

Known distribution: New Zealand.

Habitat: Saprobic on decayed wood.



Figs 1–30. Species of *Chaetosphaeria* and their anamorphs. 1–12. *Chaetosphaeria curvispora*. 1–4. Asci. 5. Apical annulus. 6. Ascospores. 7. Paraphyses. 8. Seta. 9–11. Conidiophores of the *Chloridium*-like anamorph, from culture. 12. Conidia, from culture. 13–24. *Chaetosphaeria fuegiana*. 13–15. Asci. 16, 17. Ascospores. 18, 19. Conidia of the *Dictyochoaeta fuegiana* anamorph, from culture. 20–23. Conidiophores, from culture. 24. Seta. 25–30. *Chaetosphaeria callimorpha*. 25. Ascospores. 26. Asci. 27, 28. Conidia of the *Dictyochoaeta* sp. anamorph (27 from nature, 28 from culture). 29, 30. Conidiophores, from culture. 1–4, 6, 8, 9–18, 20–21, 24–26, 28 (in part), 29, 30: DIC; 5, 7, 19, 22, 23, 27, 28 (in part): PC. *Ch. curvispora*: 1–8 from PDD 78268 (holotype), 9 from CBS 15115 ex-type PDD 78268, 10–12 from CBS 113656 ex PDD 78269; *Ch. fuegiana*: 13–16, 24 from PDD 78273 (holotype), 18–23 from CBS 114553 ex-type PDD 78273; *Ch. callimorpha*: 25, 26 from PDD 78279, 27 from PDD 78278, 28–30 from CBS 114555 ex PDD 78278. Scale bars: 1–30 = 10 μ m.

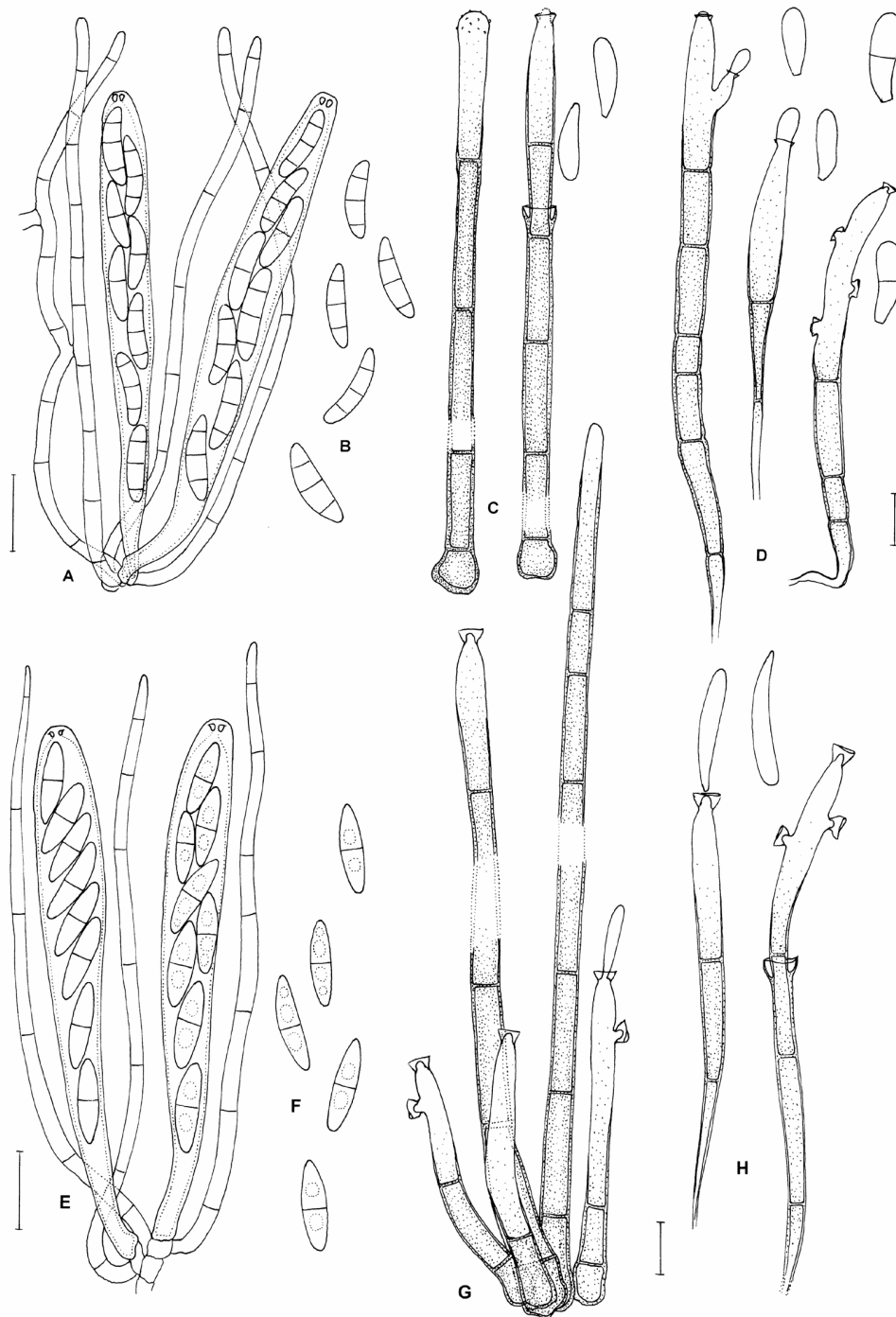


Fig. 31A–H. Species of *Chaetosphaeria* and their anamorphs. A–D. *Chaetosphaeria curvispora*. A. Asci with paraphyses. B. Ascospores. C. Conidiophores and conidia of the *Chloridium*-like anamorph, from nature. D. Conidiophores and conidia, from culture. E–H. *Chaetosphaeria fuegiana*. E. Asci with paraphyses. F. Ascospores. G. Conidiophores and conidia of the *Dityochaeta fuegiana* anamorph, from nature. H. Conidiophores and conidia, from culture. *Ch. curvispora*: A–C from PDD 78268 (holotype), D from CBS 113644 (ex PDD 78268); *Ch. fuegiana*: E–G from PDD 78273 (holotype), H from CBS 114553 (ex PDD 78273). Scale bars = 10 µm.

Commentary: The anamorph of *Ch. curvispora* has conidia that are similar in size and shape to the anamorphs of *Ch. acutata* Réblová & W. Gams and *Ch. crustacea* (P. Karst.) Réblová & W. Gams. While the conidia of *Ch. curvispora* are produced on a single locus within the collarette, the conidia of *Ch. acutata* and *Ch. crustacea* are produced sympodially on multiple conidiogenous loci within the conidiogenous aperture and the meristematic tip of their phialides proliferates percurrently above the collarette, resulting

in several densely annellate proliferations (Réblová & Gams 1999).

Chaetosphaeria curvispora is somewhat similar to *Zignoëlla gallica* Sacc. & Flageolet. The latter species differs by having longer asci and longer, (3–)5-septate ascospores and glabrous, semiimmersed perithecia. Revision of the type material of *Z. gallica* revealed that it is a species of *Chaetosphaeria* and a new combination is proposed below.

Chaetosphaeria fuegiana Réblová, sp. nov.
MycoBank MB500044. Figs 13–23, 31.

Anamorph: *Dictyochoeta fuegiana* Speg., Physis 7: 18. 1923.

= *Dictyochoeta querna* P.M. Kirk, Trans. Brit. Mycol. Soc. 78: 58. 1982.

Etymology: *Fuegiana*, derived from Tierra del Fuego.

Perithecia superficialia, solitaria, subglobosa, papilla minuta praedita, 225–265 µm diam, 260–275 µm alta, brunnea usque nigra, ostiolo periphysato. Pariet peritheci fragilis, bistratosus. Paraphyses persistentes, cylindratae, septatae, ultra ascorum apices protrudentes. Asci unitunicati, cylindrici usque clavati, (77–)83–92 × 12–13(–15) µm, apice non amyloideo, annulo refractivo, 8-spori. Ascospores fusiformes, (15–)17–22 × 4–5 µm, 1-septatae, leves, hyalinae.

Anamorph *Dictyochoeta fuegiana*: Conidiophora macronematosa, mononematosa, fusca ad basim, sursum pallidiora, in duobus stratis formata, maiora fusciora, 237–287 µm alta, 6–7.5 µm lata prope basim, setiformia, plerumque ostiola phialidica singula formantia, breviora 55–60 µm alta, 3.5–4 µm lata prope basim, saepe sympodialiter proliferantia, sub collari ad 1.5 µm constricta. Collare hyalinum, 2 µm diam. Conidia clavata, asymmetrica, 16–17 × 2 µm, aseptata, hyalina.

Perithecia superficial, solitary, subglobose, papillate, 225–265 µm diam, 260–275 µm high, dark brown to black, sparsely covered with conidiophores, not setose, ostiolate. *Ostiolar canal* periphysate. *Perithecial wall* 20–25 µm thick, carbonaceous, fragile, consisting of two regions; outer region formed of dark brown, thin-walled, polyhedral cells; inner region formed of hyaline, thinner-walled, elongated, compressed cells. *Paraphyses* persistent, branching, hyaline, septate, 3–4 µm wide near the base, tapering to 1.5–2 µm, longer than the asci. *Asci* unitunicate, cylindrical-clavate, (77–)83–92 (mean ± se = 84.6 ± 1) × 12–13(–15) (mean ± se = 12.8 ± 0.3) µm, L/W 6.6:1, short-stipitate, broadly rounded to truncate at the apex, with a distinct refractive apical annulus, 3.5–4 µm diam, 0.5 µm high, 8-spored. *Ascospores* fusiform to ellipsoidal, straight or inequilateral, (15–)17–22 (mean ± se = 19 ± 0.3) × 4–5 (mean ± se = 4.3 ± 0.1) µm, L/W 4.3:1, 1-septate, not constricted or slightly constricted at the median septum, hyaline, smooth, 2–3-seriate in the ascus.

Colonies on the natural substratum irregularly effuse, dark brown, hairy, conidiophores interspersed among or on the perithecia. *Conidiophores* macrone-matous, mononematous, erect, straight or slightly flexuous, cylindrical, unbranched, septate, dark brown, paler towards the top, forming two layers. *Conidiophores* of the upper layer setiform, 237–287 µm long, 6–7.5 µm wide above the base, apical cell

subhyaline, when sterile obtuse to broadly rounded, 11–21 × 4–4.5 µm, sometimes developing into a monophialide, or rarely polyphialide with 2–3 lateral apertures. *Conidiophores* of the lower layer always fertile, paler brown, 55–60 µm long, 3.5–4 µm wide above the base, monophialidic, rarely polyphialidic with 2–4 lateral apertures. *Conidiogenous cells* phialidic, subcylindrical, 15–19 × 5 µm, tapering to 1.5 µm just below the collarete, terminal, integrated with 1 apical conidiogenous aperture, or polyphialidic with 2–4 lateral apertures, conidia formed on a single conidiogenous locus within the aperture. *Collarete* funnel-shaped, 2 µm diam, 2 µm deep, hyaline. *Conidia* clavate to falcate, asymmetrical, rounded at the apex, tapering towards the truncate base, 16–17 (mean ± se = 16.5 ± 0.5) × 2 µm, L/W 8.2:1, aseptate, hyaline, without setulae, smooth.

Characteristics in culture: Colonies on PCA reaching 12–13 mm diam after 14 d, cushion-like, gray, aerial mycelium well-developed throughout the colony, with copious and widespread sporulation; conidiophores erect arising from both the aerial mycelium and substrate mycelium, conidial masses whitish, slimy; reverse brown centrally and dark gray to black at the margins; margin discrete, entire to slightly gnawed. *Conidiophores* as on the natural substratum but forming only one layer, 26–70 µm long, 3.5–5 µm wide above the base. *Conidiogenous cells* 13–16 × 5 µm, tapering to 1.5–2 µm just below the collarete. *Collarete* funnel-shaped, 2.5–3 µm diam, 2 µm deep. *Conidia* (14–)15–23 (mean ± se = 17.6 ± 0.5) × 2–2.5 (mean ± se = 2.3 ± 0.1) µm, L/W 7:1.

Holotype: **New Zealand**, West Coast Prov., Arthur's Pass National Park, Kelly Shelter, ca. 5 km W of Otira, Cockayne Nature Walk, on decorticated wood of a twig in podocarp broad-leaf forest, 16 Mar. 2003, M. Réblová M.R. 2826/03, PDD 78273, culture ex-type CBS 114553, ICMP 15153.

Additional material of Ch. fuegiana examined (as anamorph): **Argentina**, Río Negro, Lago Gutiérrez, on decayed leaves of *Nothofagus dombeyi*, 7 Aug. 1975, O.A. Cueto, LPS 38629; **Argentina**, Neuquén, Peninsula Quetrihué, on decayed leaves of *Nothofagus dombeyi*, 16 Dec. 1975, P. Benavente, LPS 38630. **U.K.**, Stoke Woods, Exeter, Devon, mast of *Quercus robur*, 4 Sep. 1978, P.M. Kirk 266 (IMI 232051, **holotype** of *Dictyochoeta querna*); Wolfim Wood, Warwickshire, on a leaf of *Quercus* sp., 9 Jul. 1979, M.C. Clark M.C. 2203 (IMI 240546, **paratype** of *D. querna*).

Material of Chaetosphaeria callimorpha examined: **Czech Republic**, Flora Bohemiae et Moraviae Exs. Lfg. 2, no. 54., Hranice na Moravě, Rubus sp., 31 Aug. 1912, F. Petrak, PRM 777943, PRM 777944 as *Trichosphaeria nitidula* (Sacc.) Petr.; Flora Bohemiae et Moraviae Exs. Lfg. N/1, no. 54b., Hranice na Moravě, Svrcov, on stems of *Rubus* sp., 7 Oct. 1913, F. Petrak, PRM 777945 as *Trichosphaeria*

nitidula. **Belgium**, Courtrai, no. 1110, K 49558. **France**, Meudon, on stems of *Rubus* sp., Montagne (K 49557, **holotype** of *Ch. callimorpha*); Pyrenées Atlantiques, distr. Rimont 09, Ker de Loure, on decayed wood of *Coriaria myrtifolia*, 12 Mar. 2000, J. Fournier J.F. 00026. **New Zealand**, West Coast Prov., Hokitika 40 km S of Greymouth, Mananui Point, Lake Mahinapua, Swimmers Beach walks, on decayed wood, 5 Mar. 2003, M. Réblová M.R. 2704/03, PDD 78276; Arthur's Pass National Park, Kelly Shelter, ca. 5 km W of Otira, Cockayne Nature Walk, 16 Mar. 2003, on decayed wood, M. Réblová M.R. 2832/03, PDD 78277; M.R. 2834/03, PDD 78279; M.R. 2867/03, PDD 78278. **U.K.**, Ossetts Hole, on stems of *Rubus* sp., 8 Aug. 1970, M.C. Clark, K 46879; Esher, West End Common, on dead stem of *Rubus* sp. in litter, 22 Dec. 1996, B.M. Spooner, K 44768.

Known distribution: Argentina, Chile, New Zealand, U.K.

Habitat: Saprobic on decayed wood and leaves.

Commentary: *Chaetosphaeria fuegiana* is closely related to *Ch. callimorpha* (Mont.) Sacc. (Figs 25–30). Conidia of the latter are slightly wider (2–3 µm wide) and shorter [all measurements are from nature: 10–14.5 µm *vide* Hughes & Kendrick (1968); 10–15 µm *vide* Ellis (1976); 12–15 µm *vide* Booth (1957); 14–16 µm *vide* Réblová (unpublished)] than those of *D. fuegiana*. However, the anamorphs of these two *Chaetosphaeria* species are otherwise almost indistinguishable. The teleomorph of *Chaetosphaeria callimorpha* differs from *Ch. fuegiana* by having shorter, 1–3-septate ascospores (11–16 µm) and longer asci (90–100 µm).

Dictyochaeta fuegiana, the type species of the genus, was described from fallen leaves of *Nothofagus betuloides* from Chile (Spegazzini 1923). Hughes & Kendrick (1968) and Godeas *et al.* (1977) reexamined its type material (LPS 12793!). Hughes & Kendrick (1968) noted that the specimen was scanty, containing only a few setae (= setiform conidiophores), shorter fertile conidiophores and conidia, and they failed to observe collarettes. Godeas *et al.* (1977) redescribed the species as follows: "Setae 150–400 µm long and 6–7 µm wide, cylindrical, black and opaque becoming paler at the apex, conidiophores 30–70 × 3–4 µm, pale, olivaceous, conidia 20 × 2 µm, hyaline, curved, basally truncate, 1-celled." Subsequent to its description, the fungus was reported only twice, from leaves of *Nothofagus dombeyi* in Argentina (setiform conidiophores 200–280 × 7.2 µm, shorter conidiophores 24–70 × 4.5–5 µm, conidia 12–14.5 × 1.5–2 µm *vide* Gamundí *et al.* 1977; LPS 38629, LPS 38630) and from wood of *Quercus* from the Czech Republic (setiform conidiophores 90–300 × 8 µm, shorter conidiophores 25–90 µm, conidia 9–17 × 1.5–2.2 µm *vide* Holubová-Jechová 1984). Kirk (1982) described

Dictyochaeta querna from decayed leaves and cupules of *Quercus* [setiform conidiophores up to 350 × 8–10 µm, shorter conidiophores up to 150 × 4–6 µm, conidia (12–)14–18(–20) × 1.5–2 µm]. He distinguished his new species from *D. fuegiana* sensu Gamundí *et al.* (1977) by somewhat larger conidia and conidiophores and setae with fewer septa.

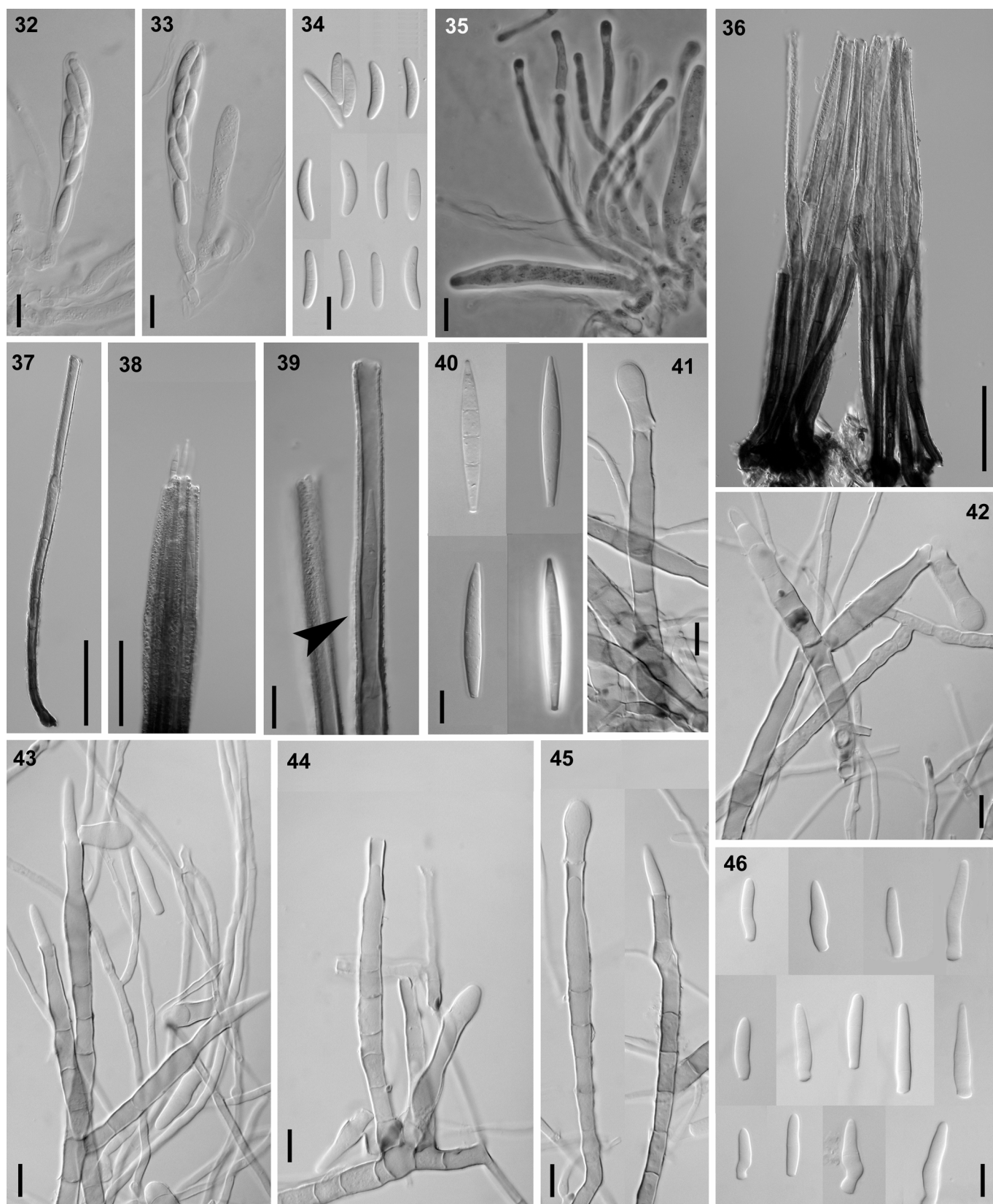
I compared the type and other herbarium material of several collections referred to *D. fuegiana*, *D. querna* and the *Dictyochaeta* anamorph of *Ch. callimorpha*. These collections represent two distinct species, i.e. *D. fuegiana*, the anamorph of *Ch. fuegiana*, and the *Dictyochaeta* anamorph of *Ch. callimorpha*, distinguished by the characters noted above. *Dictyochaeta querna* is identical to *D. fuegiana* and is here relegated to synonymy. Clearly, Gamundí *et al.* (1977) did not distinguish between the type of *D. fuegiana* and the fungus that they collected and used for their description, and which would represent in fact the *Dictyochaeta* anamorph of *Ch. callimorpha* according to the given size of conidia. Subsequent records of *D. fuegiana* and the distinguishing characters of *D. querna* were then based on the description by Gamundí *et al.* (1977) under the name *D. fuegiana*, rather than Spegazzini's original description (Spegazzini 1923) or the redescription of the type material of *D. fuegiana* by Godeas *et al.* (1977) and Hughes & Kendrick (1968). Recent reexamination of the two collections, on which Gamundí *et al.* (1977) based their description of *D. fuegiana* (LPS 38629, LPS 38630), revealed a fungus conspecific with the type of *Dictyochaeta fuegiana* [setiform conidiophores 360–375 µm long, 10 µm wide at the base, tapering to 2.5 µm; shorter conidiophores 37–80 µm long, 6–7.5 µm wide above the base, conidia (17.5–)19–23 × 2 µm]. The collection reported by Holubová-Jechová (1984) as *D. fuegiana* should be referred to the *Dictyochaeta* anamorph of *Ch. callimorpha*.

***Chaetosphaeria fusichalaroides* Réblová, sp. nov.** MycoBank MB500045. Figs 32–47.

Anamorph: *Fusichalara dingleyae* S. Hughes & Nag Raj, New Zealand J. Bot. 11: 665. 1973.

Etymology: *Fusichalaroides*, to match the generic name of the anamorph.

Perithecia superficialia, solitaria vel gregaria, subglobosa usque globosa, papilla minuta praedita, 120–150 µm diam, 140–180 µm lata, brunnea, setosa, ostiolo periphysato. Paries perithecii fragilis, bistratosus. Paraphyses persistentes, cylindratae, septatae, ultra ascorum apices protrudentes. Asci unitunicati, cylindrici usque clavati, 60–72(–76) × (8.5–)9–10 µm, apice non amyloideo, annulo refractivo, 8- spori. Ascospores fusiformes usque ellipsoideae, 14–17(–19) × 4(–4.5) µm, 1–3-septatae, leves, hyalinae.



Figs 32–46. *Chaetosphaeria fusichalaroides*. 32, 33. Asci. 34. Ascospores. 35. Paraphyses. 36. Fascicle of conidiophores of the *Fusichalara dingleyae* anamorph, from nature. 37–39. Conidiophores, from nature (39. arrow indicates a conidium in the tubular collarette). 40. Conidia, from nature. 41–45. Conidiophores with conidia, from culture. 46. Conidia, from culture. 32–34, 36–40 (in part), 41–46: DIC; 35, 40 (in part): PC. 32, 33, 35–41 from PDD 78272, 34 from PDD 21599 (holotype), 42–46 from CBS 113647 (ex PDD 78272). Scale bars: 32–35, 39–46 = 10 μ m, 36–38 = 50 μ m.

Anamorphe: *Fusichalara dingleyae*. Conidiophora macronematosa, mononematosa, brunnea vel atrobrunnea, 275–360 µm alta, 10–11 µm lata, 8–9 µm lata prope basim, sub collari ad 10 µm constricta. Collare subcylindricum, luteobrunneum, 10 µm diam. Conidia fusiformia, ad basim truncata, 40–46 (mean ± se = 43.6 ± 1.3) × 4–5(–6) (mean ± se = 5 ± 0.2) µm, 3–7-septata, hyalina.

Perithecia superficial, solitary or gregarious, subglobose to globose, papillate, 120–150 µm diam, 140–180 µm high, dark brown, sparsely setose, ostiolate. Setae sparsely covering the perithecia, arising from the perithecial wall, cylindrical, dark brown, becoming paler towards the upper part, septate, unbranched, 45–80 µm long, 3.5–5 µm wide, apical cell 15–25 µm long, 4.5–5 µm wide. *Ostiolar canal* periphysate. *Perithecial wall* 22–25 µm thick, carbonaceous, fragile, consisting of two regions; outer region formed of dark brown, thin-walled, polyhedral cells; inner region formed of hyaline, thinner-walled, elongated, compressed cells. *Paraphyses* persistent, branching, hyaline, septate, ca. 4 µm wide near the base, not tapering, rounded at the top, longer than the asci. *Asci* unitunicate, cylindrical-clavate, 60–74(–76) (mean ± se = 67 ± 1.5) × (8.5–)9–10 (mean ± se = 9.2 ± 0.1) µm, L/W 7.4:1, short-stipitate, rounded at the apex, with a distinct refractive apical annulus, 2.5–3 µm diam, 1 µm high, 8-spored. *Ascospores* fusiform to ellipsoidal, straight or inequilateral, 15–19(–20) (mean ± se = 18 ± 0.3) × (3.5–)4(–4.5) (mean ± se = 4 ± 0.1) µm, L/W 4.5:1, 1–3-septate, not constricted at the septa, hyaline, smooth, 2-seriate in the ascus.

Colonies on the natural substratum irregularly effuse, sparse, brown to reddish brown, hairy, with fascicles of conidiophores interspersed among the perithecia, or growing singly on them. *Conidiophores* macronematous, mononematous, tightly aggregated in groups of 5–15 on a thin stroma, erect, straight or slightly flexuous, cylindrical, unbranched, septate, brown to reddish brown, becoming yellowish brown towards the top, usually with 1 percurrent proliferation, 275–360 µm long, 10–11 µm wide in the middle, tapering to 8–9 µm above the bulbous base. *Conidiogenous cells* phialidic, subcylindrical to ampulliform, 137–187.5 µm long, yellowish-brown, roughened, terminal, integrated, with 1 apical conidiogenous aperture, composed of a *venter* 37–75 × 12.5–14 µm and a tubular *collarete*, 100–112.5 × 10 µm, transition from venter to collarete gradual to abrupt, conidia formed on a single locus within the aperture. The first *conidium* long-cylindrical, rounded at the apex, truncate at the base, 40–85 × 4.5–6.5 µm, L/W 11.5:1, hyaline, 0–14-septate, not constricted at the septa. Subsequent *conidia* fusiform, conical at the apex, truncate at the base, seceding in chains, 34–58 (mean ± se = 44.3 ± 1.3) × 4–5(–6) (mean ± se = 5 ± 0.2)

µm, 2(–3) µm wide at the base, L/W 9:1, 3–7-septate, not constricted at the septa, hyaline, smooth; all conidia with a conspicuous marginal frill 0.5–1 µm around the whole conidium.

Characteristics in culture: Colonies on PCA reaching 4–5 mm diam after 14 d, convex, greyish brown; aerial mycelium well-developed throughout the colony; with moderate sporulation in the centre; conidiophores erect beyond the aerial mycelium or at the margins of the colony; conidial masses whitish, slimy; reverse dark brown; margin entire, discrete. *Conidiophores* identical to those on the natural substratum, (45–)65–210 µm long, (5–)7–9 µm wide in the middle. *Conidiogenous cells* subcylindrical to ampulliform, 33–60 × 6–8(–9) µm. *Collarete* 13–24 µm long, 6–7 µm wide. The first *conidium* clavate, broadly rounded and slightly swollen at the apex, truncate at the base, 13–21 × 7–8.5 µm, 5.5–7 µm wide at the base, L/W 2.2:1, hyaline, aseptate. Subsequent *conidia* fusiform, straight or slightly curved, tapering and narrowly rounded apically, truncate at the base and slightly constricted, (15–)20–30 (mean ± se = 22.5 ± 1.2) × 4–5 (mean ± se = 4.6 ± 0.1) µm, 3–5 µm wide at the base, L/W 5:1, 1–3-septate, the marginal frill not observed.

Holotype: **New Zealand**, Auckland Prov., Waitakere Ra., Upper Piha Valley, Home Track, on decorticated wood, 9 Oct. 1963, S. Hughes, PDD 21599, also **holotype** of *Fusichalara dingleyae*.

Additional material examined: **New Zealand**, West Coast Prov., Haast, Lake Paringa, ca. 42 km NE of Haast, Mōeraki River valley, Paringa Cattle track, ca. 12 km SE of the Lake Paringa, on decorticated wood of a trunk of *Dacryodes* sp., 9 Mar. 2003, M. Réblová M.R. 2759/03, PDD 78272, culture CBS 113647, ICMP 15141; West Coast Prov., Haast, Jackson River valley, a track to the Lake Ellery, ca. 33 km SW of Haast, on decayed wood, 10 Mar. 2003, M. Réblová M.R. 2877/03, PDD 78275; Auckland Prov., Waitakere Ra., Upper Piha Valley, Home Track, on decayed wood, 9 Oct. 1963, S. Hughes, DAOM 93957a, **isotype**.

Known distribution: New Zealand, U.S.A. (New York).

Habitat: Saprobic on decayed wood.

Commentary: *Fusichalara* S. Hughes & Nag Raj (Hughes & Nag Raj 1973) is an anamorph genus that has not been linked previously to *Chaetosphaeria* or to any other teleomorph genus. *Fusichalara* was distinguished from the morphologically similar genus *Chalara* by the thickened inner walls of the phialide at the point of transition from venter to collarete and by the production of two types of conidia, primary and secondary. The type specimen of the *F. dingleyae*

anamorph also contains a sufficient number of perithecia and was selected as holotype also for the teleomorph.

Fusichalara dingleyae is recognized by its reddish brown conidiophores growing in fascicles on a thin stroma and hyaline, predominantly 3–7-septate fusiform conidia. The conspicuous wall thickening at the point of transition from venter to collarette that is easily visible in phialides in nature was not observed on material obtained in PCA culture (21-d-old).

The other five known species of *Fusichalara* have brown to black conidiophores that are solitary rather than fasciculate on the natural substrate. *Fusichalara dimorphospora* S. Hughes & Nag Raj and *F. novaezealandiae* S. Hughes & Nag Raj (Hughes & Nag Raj 1973) have 7-septate versicolorous conidia with median cells that are uniformly brown and polar cells that are hyaline to subhyaline. *Fusichalara clavatispora* P.M. Kirk (Kirk & Spooner 1984), *F. goanensis* Bhat & W.B. Kendr. (Bhat & Kendrick 1993) and *F. minuta* Hol.-Jech. (Gams & Holubová-Jechová 1976) have hyaline conidia that differ from those of *F. dingleyae* in shape, size and septation.

***Chaetosphaeria phaeostalacta* Réblová, sp. nov.**

MycoBank MB500046. Figs 47–64.

Anamorph: *Phaeostalagmus* sp.

Etymology: *Phaeostacta* (Gk), referring to the generic name of the anamorph; *-stalagmos* is derived from Greek *stalasso*, participle *stalaktos*, the poetic form of *stalazo*, to drip.

Perithecia superficialia vel semiimmersa, solitaria vel gregaria, subglobosa usque globosa, papilla minuta praedita, 210–230 µm diam, 240–290 µm alta, nigra, ostiolo periphysato, non-setosa. Paries perithecii fragilis, bistratosus. Paraphyses persistentes, cylindraceae, septatae, ultra ascorum apices protrudentes. Asci unitunicati, cylindrici usque clavati, 96–127 µm longi in parte sporifera, 12–15(–16) µm lati, stipite 16–30(–50) µm longi, apice non amyloideo, annulo refractivo, 8-spori. Ascospores fusiformes (28–)30–38(–40) × 5–6(–8) µm, 5–7-septatae, leves, hyalinae.

Anamorphe: *Phaeostalagmus* sp. Conidiophora macronematosa, mononematosa, fusca ad basim, sursum pallidiora, ramos nonnullos simplices et plerumque ostiola phialidica singula ferentia, 26–50 µm alta, 2–3 µm lata prope basim, sub collari ad 1.5 µm constricta. Collare hyalinum, 2–2.5 µm diam. Conidia ellipsoidea vel modice asymmetrica usque apiculata, 4–7 × 2–2.5 µm, aseptata, hyalina.

Perithecia superficial or slightly immersed, solitary or in small groups, conical, papillate, 210–230 µm diam, 240–290 µm high, dark brown to black, glossy, glabrous, perithecial setae absent, ostiolate. *Ostiolar canal* periphysate. *Perithecial wall* 37–50 µm thick,

carbonaceous, leathery to fragile, consisting of two regions; outer region formed of dark brown, thin-walled, angular to polyhedral cells, cells becoming thicker-walled and opaque towards the surface of the perithecium; inner region formed of hyaline, thinner-walled, elongated, compressed cells. *Paraphyses* persistent, branching, anastomosing, hyaline, septate, 5–7 µm wide near the base, tapering to 2–2.5 µm, longer than the asci. *Asci* unitunicate, cylindrical-clavate, 96–127 (mean ± se = 110.6 ± 3.3) µm long in *pars sporifera*, 12–15(–16) (mean ± se = 14 ± 0.6) µm wide, stipe 16–30(–50) µm, L/W 8:1, narrowly rounded and truncate at the apex, with a distinct refractive apical annulus, 3.5–4 µm diam, 2–2.5 µm high, 8-spored. *Ascospores* fusiform, (28–)30–38(–40) (mean ± se = 33.8 ± 0.5) × 5–6(–8) (mean ± se = 5.6 ± 0.1) µm, L/W 6:1, 5–7-septate, slightly constricted at the median septum or not constricted, hyaline, smooth, 2–3-seriate in the ascus.

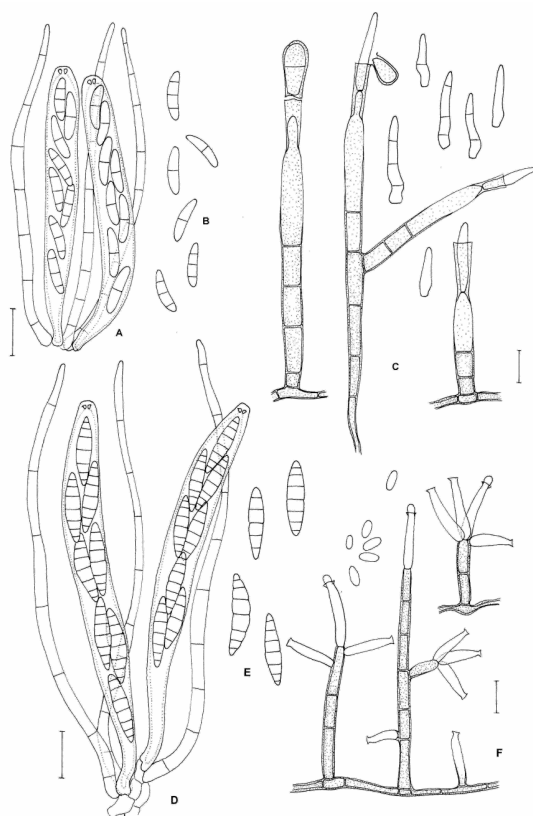


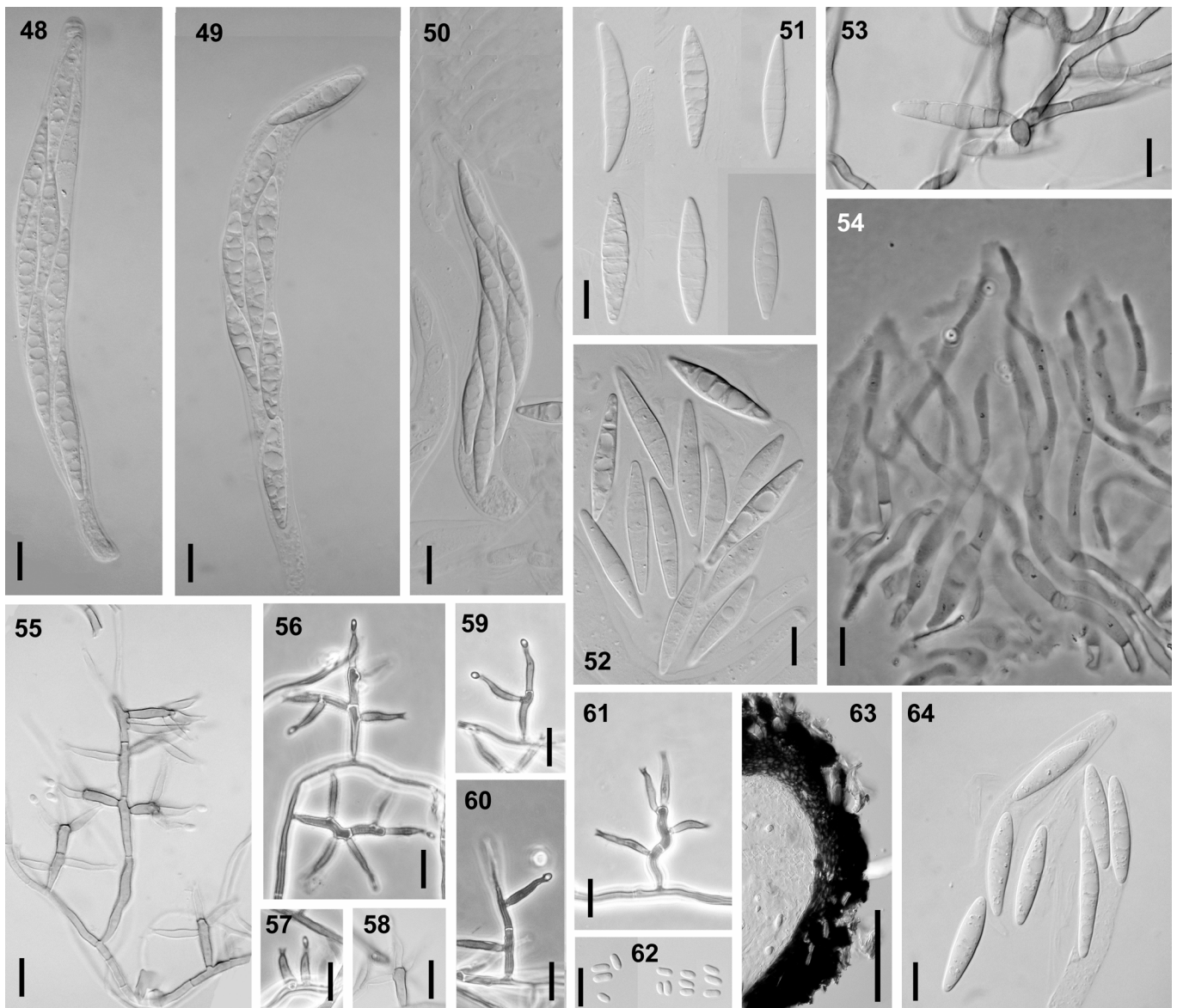
Fig. 47A–F. Species of *Chaetosphaeria* and their anamorphs. A–C. *Chaetosphaeria fusichalaroides*. A. Asci with paraphyses. B. Ascospores. C. Conidiophores and conidia of the *Fusichalara dingleyae* anamorph, from culture. D–F. *Chaetosphaeria phaeostalacta*. D. Asci with paraphyses. E. Ascospores. F. Conidiophores and conidia of the *Phaeostalagmus* sp. anamorph, from culture. *Ch. fusichalaroides*: A, B from PDD 78272, C from CBS 113647 ex PDD 78272; *Ch. phaeostalacta*: D, E from PDD 78274 (holotype), F from CBS 114554 ex-type PDD 78274. Scale bars = 10 µm.

Characteristics in culture: Colonies on PCA reaching 13–16 mm diam after 14 d, convex, aerial mycelium well-developed, centre of colony funiculose, with

subhyaline, erect fascicles; sporulation copious throughout the colony; conidiophores erect and forming a uniform layer, whitish to pale grey, grey in the centre on the inoculum block; conidial masses whitish, slimy; reverse greyish to pale olive; margin entire, discrete. *Conidiophores* macronematous, mononematous, solitary, erect, straight or slightly flexuous, cylindrical, branched, septate, pale brown, 26–50 μm long, 2–3 μm wide above the base. *Conidiogenous cells* phialidic, 8–15 \times 2–2.5 μm wide, tapering to 1.5 μm below the collarette, subulate to lageniform, subhyaline, discrete and then arising singly in lateral position or in groups of 2–4 in a terminal whorl on the conidiophore, or integrated and terminal on short intermediately pigmented opposite branches on the

conidiophore; conidia arising from a single conidiogenous locus within the aperture. Discrete phialides also arising from the aerial mycelium. *Collarette* inconspicuous to short-flared, 2–2.5 μm diam, 2 μm deep, hyaline. *Conidia* ellipsoidal, some becoming slightly apiculate, 3–4.5 (mean \pm se = 3.9 \pm 0.2) μm long, L/W 1.8:1 in the first transfer, after a second transfer 4–7 (mean \pm se = 4.3 \pm 0.2) \times 2–2.5 (mean \pm se = 2 \pm 0.1) μm , L/W 2.3:1, aseptate, hyaline, smooth.

Holotype: New Zealand, West Coast Prov., Ross 27 km S of Hokitika, Totara River valley, Totara forest, on decorticated wood of a branch, 7 Mar. 2003, M. Réblová M.R. 2735/03, **holotype** PDD 78274, culture ex-type CBS 114554, ICMP 15137.



Figs 48–64. *Chaetosphaeria phaeostalacta*. 48–50. Asci. 51, 52, 64. Ascospores. 53. Germinating ascospore. 54. Paraphyses. 55–61. Conidiophores of the *Phaeostalagmus* sp. anamorph, from culture. 62. Conidia, from culture. 63. Longitudinal section of the perithecial wall. 48–53, 55, 63, 64: DIC; 54, 56–61: PC. 48–54, 63, 64 from PDD 78274 (holotype), 55–62 from CBS 114554 ex PDD 78274. Scale bars: 48–62, 64 = 10 μm , 63 = 20 μm .

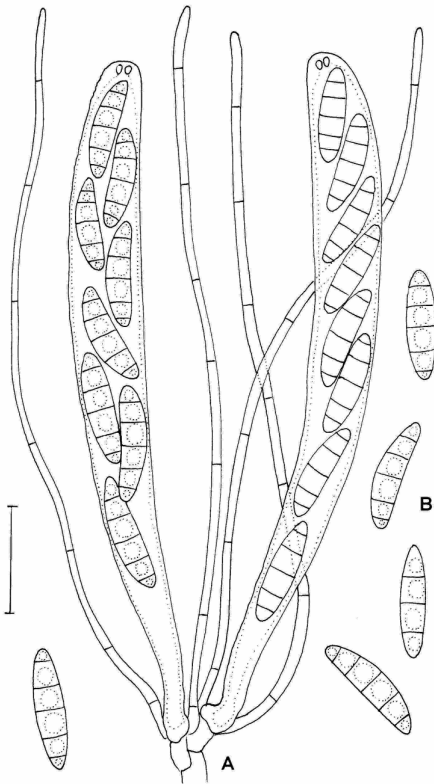


Fig. 65. *Chaetosphaeria gallica*. A. Asci with paraphyses. B. Ascospores. From PAD (holotype). Scale bar = 10 µm.

Additional material of Phaeostalagmus spp. examined: **New Zealand**, Wellington distr., Tongariro National Park, Ohakume Mt. Road, decayed wood of *Libocedrus bidwillii*, 7 Mar. 1963, S.J. Hughes 453, DAOM 96012a, *Ph. cyclosporus*. **Czech Republic**, Central Bohemia, Kostelec n. Černými lesy, Krymlov, on cone of *Pinus sylvestris*, 5 Jul. 1979, D.W. Minter, IMI 243575, **holotype** of *Ph. peregrinus*. **U.K.**, Suffolk, Tunstall Forest, *Castanea sativa*, 4 Jul. 1979, M.B. & J.P. Ellis, IMI 243725, *Ph. peregrinus*.

Known distribution: New Zealand.

Habitat: Saprobic on decayed wood.

Commentary: No anamorph was observed on the original material. The *Phaeostalagmus* conidiophores and conidia formed *in vitro* from isolated ascospores. The anamorph resembles *Phaeostalagmus cyclosporus* (Grove) W. Gams in branching pattern and pigmentation of branches in the fertile part of the conidiophore, as described by Gams & Holubová-Jechová (1976) in culture. However, *Ph. cyclosporus* differs by its less conspicuous collarettes and subglobose conidia 1.5–2.2 µm diam (DAOM 96012a). *Phaeostalagmus peregrinus* Minter & Hol.-Jech. (Minter & Holubová-Jechová 1981) is similar to the anamorph of *Ch. phaeostalacta* in its conspicuous collarettes and the size of the conidia, but differs by having ellipsoidal to irregularly clavate conidia with a narrow truncate base (IMI 243575!, IMI 243725).

Chaetosphaeria gallica (Sacc. & Flageolet) Réblová, **comb. nov.** MycoBank MB500047. Fig. 65.

Basionym: *Zignoëlla gallica* Sacc. & Flageolet, Syll. Fung. 24: 967. 1926.

Anamorph: Unknown.

Perithecia immersed or semiimmersed, solitary, subglobose to globose, papillate, 200–230 µm diam, 280–350 µm high, dark brown to black, glabrous, not setose, ostiolate. **Ostiolar canal** periphysate. **Perithecial wall** 35–48 µm thick, carbonaceous, fragile, consisting of two regions; outer region formed of dark brown, thin-walled, polyhedral cells; inner region formed of hyaline, thinner-walled, elongated, compressed cells. **Paraphyses** persistent, branching, hyaline, septate, 1.5–2 µm wide, not tapering, rounded at the top, longer than the asci. **Asci** unitunicate, cylindrical-clavate, 131–160 (mean ± se = 150 ± 3.2) × (11)12.5–13.5(–15) (mean ± se = 12.8 ± 0.3) µm, L/W 11.7:1, short-stipitate, truncate at the apex, refractive apical annulus distinct, 2.5–3 µm diam, 1–1.5 µm high. **Ascospores** fusiform, curved or straight, often inequilateral, (21–)23–25 (mean ± se = 23.6 ± 0.2) × 4.5–6 (mean ± se = 5.5 ± 0.1) µm, L/W 4.3:1, (3–)5-septate, not constricted at the septa, hyaline, smooth, obliquely 1-seriate or 2-seriate in the ascus.

Holotype: **Italy**, on decayed wood, P.A. Saccardo 2823 (PAD).

Known distribution: Italy.

Habitat: Saprobic on decayed wood.

Commentary: *Chaetosphaeria gallica* is similar to *Ch. curvispora*, but differs by longer asci, longer ascospores and glabrous perithecia that were half-immersed in the wood on the type material.

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REFERENCES

- Barr ME (1993). Redisposition of some taxa described by J. B. Ellis. *Mycotaxon* **46**: 45–76.
- Bhat DJ, Kendrick WB (1993). 25 New conidial fungi from the Western Ghats and the Andaman islands (India). *Mycotaxon* **49**: 19–90.
- Booth C (1957). Studies on pyrenomycetes I. and II. *Mycological Papers* **68**: 1–27.
- Booth C (1958). The genera *Chaetosphaeria* and *Thaxteria* in Britain. *Naturalist* **1958**: 83–90.
- Constantinescu O, Holm K, Holm L (1995). Teleomorph-anamorph connections in *Ascomycetes*: the anamorphs of three species of *Chaetosphaeria*. *Mycological Research* **99**: 585–592.
- Ellis MB (1976). *More dematiaceous hyphomycetes*. CMI, Kew, Surrey.
- Gams W, Holubová-Jechová V (1976). *Chloridium* and some other dematiaceous hyphomycetes growing on decaying wood. *Studies in Mycology* **13**: 1–99.
- Gams W, Hoekstra ES, Aptroot A (1998). *CBS course of mycology*. CBS, Baarn.
- Gamundí IJ, Arambarri AM, Giaiotti A (1977). Micoflora de la hojarasca de *Nothofagus dombeyi*. *Darwiniana* **21**: 81–114.
- Godeas A, Marchand S, Cabral D (1977). Hyphomycetes. In: *Flora Criptogámica de Tierra del Fuego* (Guarrera SA, Gamundí IA, Rabinovich DH, eds). Buenos Aires, Argentina, Vol. **10**: 1.
- Hino I, Katumoto K (1961). *Icones fungorum bambusicolorum Japonicorum*. The Fuji Bamboo Garden, Yamaguti, Japan.
- Holubová-Jechová V (1973). Lignicolous hyphomycetes from Czechoslovakia 4. *Menispora*. *Folia Geobotanica et Phytotaxonomica* **8**: 317–336.
- Holubová-Jechová V (1982). New or interesting phialidic hyphomycetes from Cuba. *Mycotaxon* **15**: 277–292.
- Holubová-Jechová V (1984). Lignicolous hyphomycetes from Czechoslovakia 7. *Chalara*, *Exochalara*, *Fusichalara* and *Dictyochaeta*. *Folia Geobotanica et Phytotaxonomica* **19**: 387–438.
- Hughes SJ (1965). New Zealand fungi 3. *Catenularia* Grove. *New Zealand Journal of Botany* **3**: 136–150.
- Hughes SJ, Kendrick WB (1968). New Zealand fungi 12. *Menispora*, *Codinaea*, *Menisporopsis*. *New Zealand Journal of Botany* **6**: 323–375.
- Hughes SJ, Nag Raj TR (1973). New Zealand Fungi 20. *Fusichalara* gen. nov. *New Zealand Journal of Botany* **11**: 661–671.
- Huhndorf SM, Fernandez FA, Taylor JE, Hyde KD (2001). Two pantropical *Ascomycetes*: *Chaetosphaeria cylindrospora* sp nov and *Rimaconus*, a new genus for *Lasiosphaeria jamaicensis*. *Mycologia* **93**: 1072–1080.
- Hyde KD, Goh TK, Taylor JE, Fröhlich J, (1999). *Byssosphaeria*, *Chaetosphaeria*, *Niesslia* and *Ornatisporea* gen. nov., from palms. *Mycological Research* **103**: 1423–1439.
- Kirk PM (1982). New or interesting microfungi IV. Dematiaceous hyphomycetes from Devon. *Transactions of British Mycological Society* **78**: 55–74.
- Kirk PM, Spooner BM (1984). An account of the fungi of Arran, Gigha and Kintyre. *Kew Bulletin* **38**: 503–597.
- Kornerup A, Wanscher JH (1978). *Methuen handbook of colour*. Eyre Methuen, London, U.K.
- Matsushima T (1975). *Icones Microfungorum a Matsushima Lectorum*. Kobe, Japan.
- Menzies SA (1973). Factors increasing root rot and affecting persistence of clover. *Proceedings of New Zealand Weed and Pest Control Conference*: 122–124.
- Minter DW, Holubová-Jechová V (1981). New or interesting Hyphomycetes on decaying pine litter from Czechoslovakia. *Folia Geobotanica et Phytotaxonomica* **16**: 195–217.
- Réblová M (1998a). A new *Chaetosphaeria* with a *Dictyochaeta* anamorph. *Czech Mycology* **50**: 151–159.
- Réblová M (1998b). Revision of three *Melanomma* species described by L. Fuckel. *Czech Mycology* **50**: 161–179.
- Réblová M, Gams W (1999). Teleomorph-anamorph connections in *Ascomycetes*. 1. *Cylindrotrichum* and *Cacumisporium* anamorphs of *Chaetosphaeria*. *Czech Mycology* **51**: 1–40.
- Réblová M (2000). The genus *Chaetosphaeria* and its anamorphs. *Studies in Mycology* **45**: 149–168.
- Réblová M, Gams W (2000). Life-history of *Ascomycetes*: Two new species of *Chaetosphaeria* with *Chloridium* and *Chloridium-Dictyochaeta* anamorphs. *Mycoscience* **42**: 129–138.
- Réblová M, Seifert KA (2003). Six new species of *Chaetosphaeria* from tropical rain forests in Thailand and re-description of *Chaetosphaeria hiugensis*. *Sydowia* **55**: 313–347.
- Sivanesan A, Chang HS (1995). *Pseudofuscophialis lignicola* gen. et sp. nov. and *Chaetosphaeria capitata* sp. nov. from wood in Taiwan. *Mycological Research* **99**: 711–716.
- Spegazzini C (1923). Algunos hongos de Tierra del Fuego. *Physis*, Buenos Aires **7**: 7–23.