Section 3

Descriptions and Taxonomic Studies of Australian Species

The species of *Septoria* are considered under alphabetical order of host plant families and are arranged in alphabetical order of fungal species in each host family. The accepted name of the taxon is followed by a list of synonyms which is not necessarily complete but represents names under which the species has been referred to in the Australian literature or currently accepted synonyms. All descriptions of the following taxa have been prepared from Australian collections. Illustrations of type collections studied as well as other non-Australian exsiccatus material have been included for comparative purposes. Dimensions for conidia quoted in the discussion for each species of *Septoria* have been taken from (i) the original description where available (ii) Saccardo's *Sylloge Fungorum Vols. 1-26* particularly where publications containing original descriptions of many species have been unavailable to the author (iii) other revisionary and monographic works. The terminology for the disposition of lesions and conidiomata is that of Pascoe and Sutton (1986).

Host plant names used are those accepted in the several volumes of the *Flora of Australia* that have so far been published. Names and author citations of hosts in families not yet dealt with in the Flora have been taken from *The Census of Australian Vascular Plants* (Hnatiuk 1990), *The Australian Plant Name Index* Vols. 1-4 (Chapman 1991), *CSIRO Handbook of Economic Plants* (Lazarides & Hince 1993) and *Hortus Third* (Bailey & Bailey 1976).

Author abbreviations follow those given by Brummitt and Powell (1992) and journal abbreviations are those found in *The World List of Scientific Periodicals Published in the years 1900-1960 Edition 4* (Brown and Stratton 1963-1965), *Taxonomic Literature Vols. 1-7* plus *supplements 1-4* (Stafleu and Cowan 1976-1997). Dates of publications have been taken principally from *Taxonomic Literature* and *Thesaurus litteraturae mycologicae et lichenologicae Vols. 1-5* (Lindau and Sydow 1908-1917).

In many cases reports of the occurrence of species of *Septoria* in Australia cannot be authenticated by herbarium material and have been included as either "report only" under the appropriate taxon, where the taxon is known from elsewhere in Australia, or dealt with in the body of the text under the host plant family. Reference to published reports of each taxon are to be found under the distribution given for each species.

ACANTHACEAE

Septoria acanthi Thuem., *Contr. Mycol. Lusit.* **I**: 25 (1878)

Listed by Brittlebank (1937-1940) as occurring on *Acanthus* sp. and by Chambers (1982) as occurring on *Acanthus mollis* L. in Victoria prior to 1940. No herbarium collection under this name has been located and the record cannot be verified.

AIZOACEAE

Septoria confluens McAlpine, *Proc. Linn. Soc. N.S.W.* ***28****: 560 (1903)*

= *Septoria carpobroti* Hansf., Proc. Linn. Soc. N.S.W. **79**: 138 (1954) as "*carpholobi*", orthographic variant corrected in Proc. Linn. Soc. N.S.W. **82**: 229 (1957).

(Fig. 1)

Leaf lesions epigenous, white to grey, 5 to 12mm diam. with an indistinct margin, occasional pale brown concentric zones visible. *Conidiomata* scattered on the lesions, immersed, separate, globose, black, mostly 150-200µm diam., occasionally up to 250µm, pycnidial. *Ostiole* single, apical, 25-35µm, opening widely at maturity to 60µm. *Conidiomatal wall* four cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, cells 10-15µm diam., outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, doliiform to ampulliform, 8-10 x 4-5µm producing conidia holoblastically, secession schizolytic with subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, filiform, 2-3 septate, straight to curved, 32-45(-64) x 3.5-4µm with truncate base and tapering to an obtuse rounded apex.

Host: *Carpobrotus aequilaterus* (Haw.) N.E. Br.

Distribution: South Australia (Hansford 1954, Warcup & Talbot 1981, Cooke & Dube 1989), Victoria (McAlpine 1903, Brittlebank 1937-1940, Chambers 1982)

Septoria confluens is placed satisfactorily in *Septoria* due to the pycnidial nature of its conidioma and sympodial holoblastic conidiogenesis. It is known currently only from the type collections of *S. confluens* and *S. carphobroti* and examination has revealed that they are identical. In the type collection of *S. confluens* conidia are slightly longer than in *S. carpobroti* but in all other morphological characters such as conidial septation and width they are indistinguishable. Hansford (1954) described the fungus originally as *S. carpholobi* due to a misspelling of the host name but later corrected it (Hansford 1957). The type host for *S. confluens* was given by McAlpine as

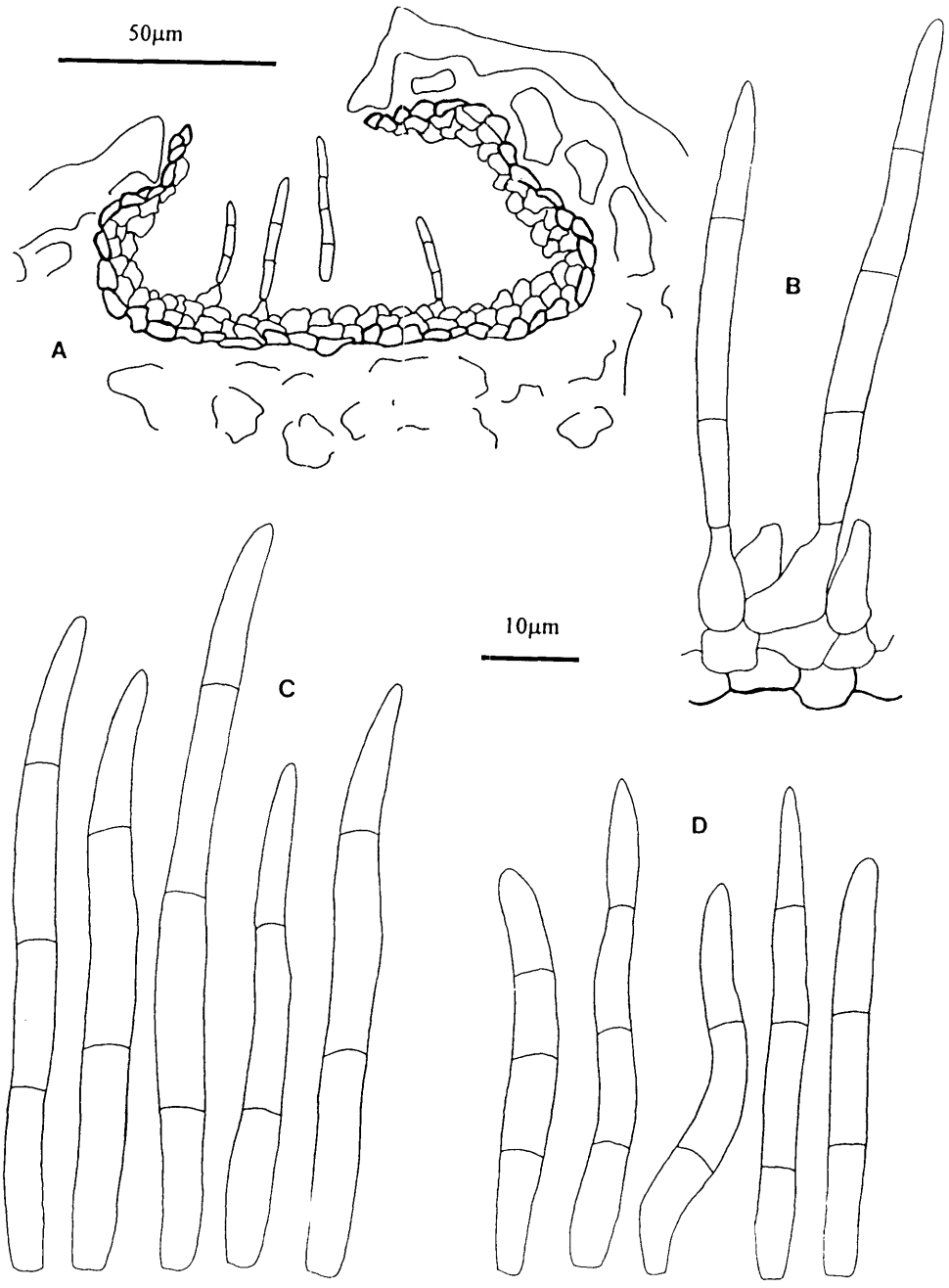

Fig.1. *Septoria confluens* (A) v.s of conidioma VPRI 1772 (type) ; (B) conidiogenous cells VPRI 1772 ;(C) conidia VPRI 1772 ; (D) conidia ADW 3527 (type of *S. carpobroti*)

Mesembryanthemum aequilaterale Haw. but this species is now classified in the genus *Carpobrotus*. In the McAlpine material most pycnidia are mature and ostioles are open widely. However conidiomata in the type of *S. carpobroti* are found to be ostiolate. The un-numbered slide in VPRI revealed some fruiting structures and conidia up to 4µm wide but length of conidia was too difficult to measure, being obscured by host tissue present on the slide and no further useful information could be obtained. The host is present also in New South Wales and Tasmania but *S. confluens* has not been collected from either state. There are no other species of *Septoria* described from hosts in the family Aizoaceae.

Specimens examined:

on *Carpobrotus aequilaterus* (as *Mesembryanthemum*): **Victoria**; Sandringham, 26 Oct. 1902, D. McAlpine (VPRI 1772) **holotype** of *S. confluens*; **South Australia**; Meningie, July 1953, L.D. Williams (ADW 3527) **holotype** of *S. carpobroti*.

on *Mesembryanthemum*; **Victoria**; Mordialloc, 17 Sept. 1901, C. French Jnr. (VPRI, un-numbered slide only).

AMARANTHACEAE

Septoria gomphrenae Sacc. & D. Sacc., *Ann. Mycol.* **3**: 167 (1905)

This species was listed by Brittlebank (1937-1940) and Chambers (1982). A single collection labelled *S. gomphrenae* on *Gomphrena globosa* L. (VPRI 1788) was examined. No evidence of a *Septoria* could be found on the specimen. The only fungus found was *Alternaria tenuissima* (Kunze ex Pers.) Wiltshire. It is interesting to note that in the original type description, *S. gomphrenae* was noted as occurring on languid leaves of *G. globosa* and associated with *Alternaria*.

Specimen examined: on *Gomphrena globosa*: **Victoria**; Burnley, no date, C. French Jnr. (VPRI 1788).

APIACEAE

Six species of *Septoria* are recognised on genera in the Apiaceae in Australia. *Septoria apiicola* Speg. is restricted to *Apium* spp., and *S. petroselini* (Lib.) Desm. is recorded on *Petroselinum* and *Coriandrum*. A complex of three taxa is recognised on *Hydrocotyle* and *Centella*, these being *S. hydrocotylicola* Speg,, *S. centellae* G. Wint. and *S. hydrocotyles* Desm. *Septoria schizeilematis* Petrak is considered a distinct taxon occurring on the native *Schizeilema fragoseum* (F. Muell) Domin.

Several published treatments dealing with species of *Septoria* in the Apiaceae are available including Jørstad (1965) and Teterevnikova-Babayan & Anastasyan (1967) who dealt with ten species associated with edible umbelliferous plants in the USSR.

Key to Australian species of *Septoria* on the Apiaceae

1 Conidia mostly more than 2μm wide.....2

1: Conidia 2μm wide or less.....3

2 Conidia 30-48 x 2-2.5μm, enteroblastic, on *Apium* spp.....**S. apiicola**

2: Conidia 30-60 x 2-2.5 (-3)μm, holoblastic, on *Centella* and *Hydrocotyle*....**S. centellae**

3 Conidia falcate, on *Hydrocotyle* and *Centella*.....**S. hydrocotyles**

3: Conidia mostly straight 4

4 Conidia (12-)17-36(-52) x 1-1.5μm, on *Hydrocotyle* and *Centella*.....**S. hydrocotylicola**

4: Conidia 26-45(-52) x (1-)1.5-2μm, on *Petroselinum* and *Coriandrum*.....**S. petroselini**

4 : Conidia (19-) 45-58 (-66) x 1-1.5μm, on *Schizeilema*.....**S. schizeilematis**

Septoria apiicola Speg., *Boln. Acad. nac. Cienc. Cordoba* ***11****: 297 (Fung. Fueg. No. 415) 1888;* emend. Gabrielson & Grogan (1964)

= *Septoria apii* Chester, Bull. Torrey Bot. Club **18**: 373 (1891)

= *Septoria apii-graveolentis* Dorogin, Mater. Mikol. Fitopat. Rossii **1(4)**: 72 (1915)

= *Septoria petroselini* Desm. var. *apii* Briosi & Cavara, *Funghi Paras.* **144** (1891)

(Figs. 2, 3)

Leaf lesions hologenous, orbicular to slightly elliptical, 3-5mm diam., on both surfaces lesions pale greenish yellow, often raised with indistinct margin but with a broad diffuse yellow brown chlorotic halo, at maturity with pale grey to white centre and pale brown margin. *Conidiomata* scattered on lesions, separate, often aggregated, globose, black, immersed then becoming erumpent, (75-)100-150 x 80-100 μm, pycnidial. *Ostiole* single, apical, often slightly papillate, cells thickened, opening 30-40μm diam. *Conidiomatal wall* two to three cell layers thick, composed of pseudoparenchymatous

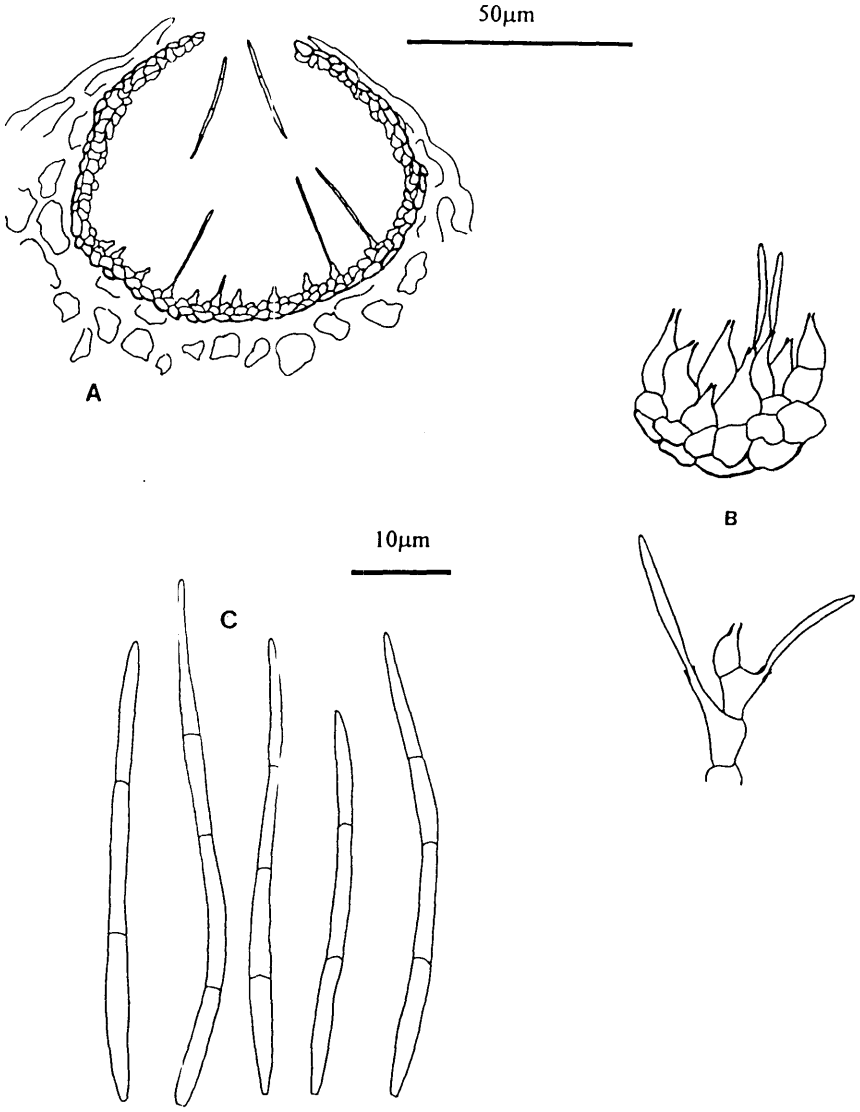

Fig.2. *Septoria apiicola* (A) v.s. of conidium DAR 43696 ; (B) conidiogenous cells DAR 43696 ; (C) conidia DAR 43696

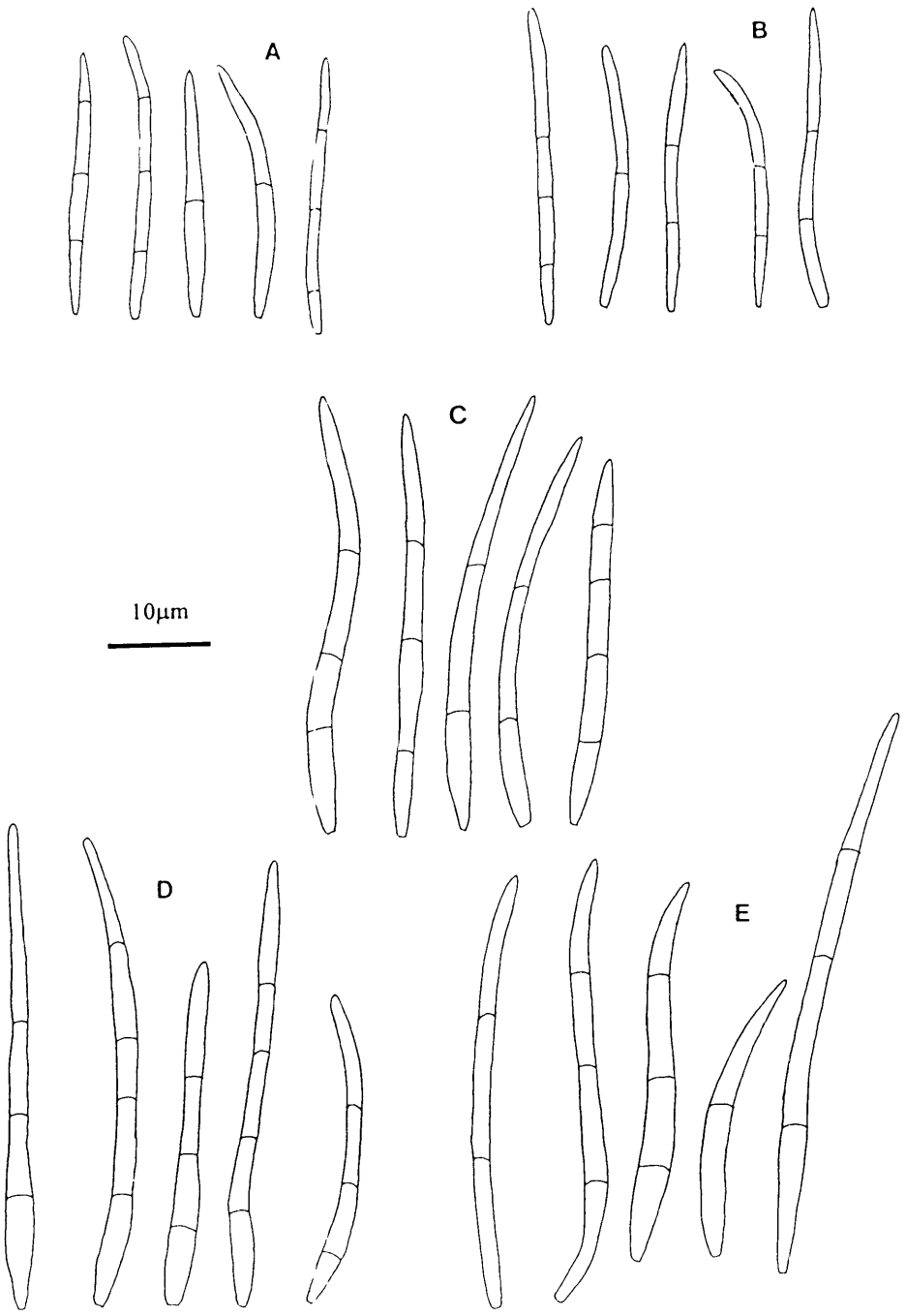

Fig.3. *Septoria apiicola* ; conidia (A) VPRI 1752 (*A. prostratum*); (B) ADW 1226 (*A. graveolens*); (C) VPRI 11710 (*A. graveolens*, host); (D) VPRI 11710 (culture); (E) BRIP 5827 (*A. graveolens*, culture)

tissue, *textura angularis*, cells 5-8µm diam., outer layer pale brown, inner layers pale brown to sub-hyaline. *Conidiogenous cells* arising from inner wall layer, hyaline, cylindrical to obclavate, often becoming septate and integrated, 5-8 x 3-4 µm narrowing to apex of 2µm, producing conidia holoblastically, secession schizolytic with subsequent conidia produced enteroblastically and seceding at the same level from a single narrow conidiogenous locus. *Conidia* hyaline, filiform, 1-4 septate, tapering to sub-acute apex with truncate to slightly rounded base 30-48 x (1-)2-2.5 µm.

Hosts: *A. graveolens* L. (Celery), *A. graveolens* L. var. *rapaceum* DC. (Celeriac) and *A. prostratum* Vent.

Distribution: New South Wales (Darnell-Smith 1912, Noble *et al.* 1935; both as *S. apii* Rostr.; Anon. 1938, Morschel 1951, Anon. 1964; all as *S. apii-graveolentis*; Letham 1985 as *S. apiicola*), Queensland (Simmonds 1966), South Australia (Warcup & Talbot 1981, Cooke & Dube 1989), Tasmania (Henrick 1938 as *S. apii-graveolentis*, Sampson & Walker 1982), Victoria (Harrison *et al.* 1975, Washington & Nancarrow 1983), Western Australia (Carne 1924 as *S. apii* Rostr., Carne 1925 as *S. petroselini* var. *apii*, Shivas 1989.

Septoria apiicola is a cosmopolitan species widely known as the causal agent of late blight of celery (Sutton and Waterston 1966b). Cochran (1932) studied isolates of *S. apiicola* from 'large' and 'small' leaf spot types and noted some morphological differences in spore dimensions but failed to infect any other hosts in the Apiaceae apart from celery and celeriac. Gabrielson and Grogan (1964) demonstrated that isolates of. *S apiicola* from *A. australe* (the type host) and *A. graveolens* were morphologically identical and cross-infective which, in addition to the earlier studies demonstrating that celery isolates did not attack parsley or other hosts in the Apiaceae, has led to the conclusion that *S. apiicola* is host specific to *Apium* spp. This conclusion is also supported by Sheridan (1968) who found *S. apiicola* to be cross-infective to *A. graveolens* and *A. australe*. In the original description (Spegazzini 1888), spore dimensions were given as 30-45 x 1.5µm which is closer to that seen in *S. petroselini* Desm. and narrower than the 2-2.5 µm width given by Sutton and Waterston (1966b), the dimensions generally found in Australian and extralimital collections examined. Sheridan (1968) examined the type collections of *S. apiicola*, *S. apii* Rostr. and *S. apii-graveolentis* and found the conidial width in the latter two taxa to be identical to that of *S. apiicola*. The spore width given by Gabrielson and Grogan (1964) in their emended description of *S. apiicola* ranges from 0.9 -3.0µm and they concluded that *S. apiicola* was the name to apply to a series of minor variations of leaf spot types and morphological characters as noted by Cochran (1932) and encompassing *S. apii* Chester and *S. apii-graveolentis* Dorogin. Jorstad (1965) examined material from the type host (*A. australe*) and

found a spore width of 1-2μm, closer to the original size given by Spegazzini and, after studying figures and conidial dimensions given by Gabrielson and Grogan (1964) concluded that *S. apii* was better placed as a synonym of *S. petroselini* rather than *S. apiicola.* In Australian material most conidia were 2-2.5μm in width except for many of the conidia seen in VPRI 1752 from *A. prostratum* which were narrow (1-1.5μm). However similar sized conidia were also seen in DAR 27974 from *A. graveolens* in Australia and in DAR 23844 from Romania. The variation seen is encompassed by the dimensions given by Gabrielson and Grogan (1964), but it is apparent that at least two recognisable taxa are present on *Apium* spp. in Australia and elsewhere and revision based on examination of all the relevant type collections is required.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *A. graveolens*: **New South Wales**; Roseville, Aug. 1914 (DAR 129); Hawkesbury Agricultural College, July 1929 (DAR 1304); Hawkesbury Agricultural College, Aug. 1941, C.J. Magee (DAR 3753); Arcadia, 11 Jan. 1974, D. Hatfield (DAR 24115); Horsley Park, 6 Oct. 1976, D. Hicks, (DAR 27974); Hunter's Hill, 12 May 1986, H.W. Lee (DAR 56112); **South Australia**; Stirling, 10 Nov. 1912, T.G.B. Osborn (ADW 1226); **Tasmania**; New Town, 12 Oct. 1981, I.D. Geard (DAR 43696); **Queensland**; Brisbane, 7 Nov. 1950 (BRIP 5740); Nudgee, 13 Nov. 1947 (BRIP 5739); Eight Mile Plains, 27 Aug. 1974, E. Collett (BRIP 5744); Moggill, 23 Mar. 1972, G. Curtis (BRIP 5826); Brisbane, 8 June 1971, R.A. Peterson, (BRIP 5827) **Victoria**; Vegetable Research Station, Frankston, 15 July 1982, I. Porter (VPRI 11710); Camberwell, 3 Aug. 1987, S. Isaacs (VPRI 15545); Berwick, 30 Aug. 1991, D. Gardner (VPRI 17567); Bairnsdale, Sept. 1935, A.T. Pugsley (VPRI 1753); **Western Australia**; Osborne Park, 27 Apr. 1923, Edwards (PERTH 788848);

on *A. graveolens* var *rapaceum*: **New South Wales**; Concord, 1 June 1977 (DAR 29159);

on *A. prostratum*: **New South Wales**; Lake Conjola, 23 Aug. 1975, J. Walker (DAR 25874); **South Australia**; Meningie, Aug. 1953, L.D. Williams (ADW 3514) host as *A. australe*; **Tasmania**; Tamar River, Launceston, Sept. 1975, R. Turner (DAR 28584); **Victoria**; Beaumaris, 12 Apr. 1900, D. McAlpine (VPRI 1752).

EXTRALIMITAL COLLECTIONS:

on *A. graveolens*: Auckland, **New Zealand**, 30 Aug. 1963, J.D. Reid (DAR 62676 ex PDD); Greenville, New Jersey, **U.S.A.**, Sept. 1893, B.D. Halsted, *Seymour and Earle Economic Fungi* No. 474 (DAR 51763); Bridgeworth, **United Kingdom**, 21 Sept. 1925 (DAR 13313 ex IMI 20817);

Flatford Mill, **United Kingdom**, 16 Aug 1962, B.C. Sutton (DAR 22835 ex IMI 95198); Transylvania, **Roumania**, 23 July 1925, I. Pradan, *Flora Romaniae Exsiccati* No. 3326 (DAR 23844); on *A. prostratum*: Auckland, **New Zealand**, Oct. 1945, J.M. Dingley (DAR 62677 ex PDD 7212) host as *A. australe*.

Septoria asiatica Speg. see under *S. hydrocotylicola*

Septoria carotae Nagornyj, *Boljesni Rastenii* **7**: 114 (1913)

Listed by Harrison *et al.* (1975) and Washington & Nancarrow (1983) on *Daucus carota* L. in Victoria in 1897. No herbarium specimen under this name has been located and the record cannot be verified. It is curious that the original recording for Victoria pre-dates the existence of the published name. In the original description the conidia were given as 40-70 (-80) x 3-4µm and mostly 1-2 septate. Teterevniova-Babayan & Anastasyan (1967) gave conidial dimensions as 39-80 x 2.4-3.6µm and figured 0-5 septate conidia from Russian material.

Septoria centellae G. Winter, Grevillea **15**: 92 (1887)

(Fig. 4)

Leaf lesions hologenous, irregular and angular, bounded by veins, 8-10mm long x 2-5mm wide, lesions on both surfaces mid-brown with indistinct margin and occasionally with a narrow purple brown halo. *Conidiomata* amphigenous but mostly hypogenous, scattered on lesions, discrete, mostly separate but occasionally aggregated, immersed becoming erumpent, globose, black, 70-120µm diam., pycnidial. *Ostiole* single, apical, circular, 10-30µm diam., cells slightly thickened and darker around the opening. *Conidiomatal wall* 2-3 cell layers thick, composed of pseudoparenchymatous tissue, textura angularis, cells 4-6µm diam, cells of outer layer dark brown inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform, 8-10 x 2.5-3 µm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, cylindrical, smooth walled, 3-4 septate, straight to slightly curved, 30-50(-60) x 2-2.5(-3) µm, with truncate base and rounded apex.

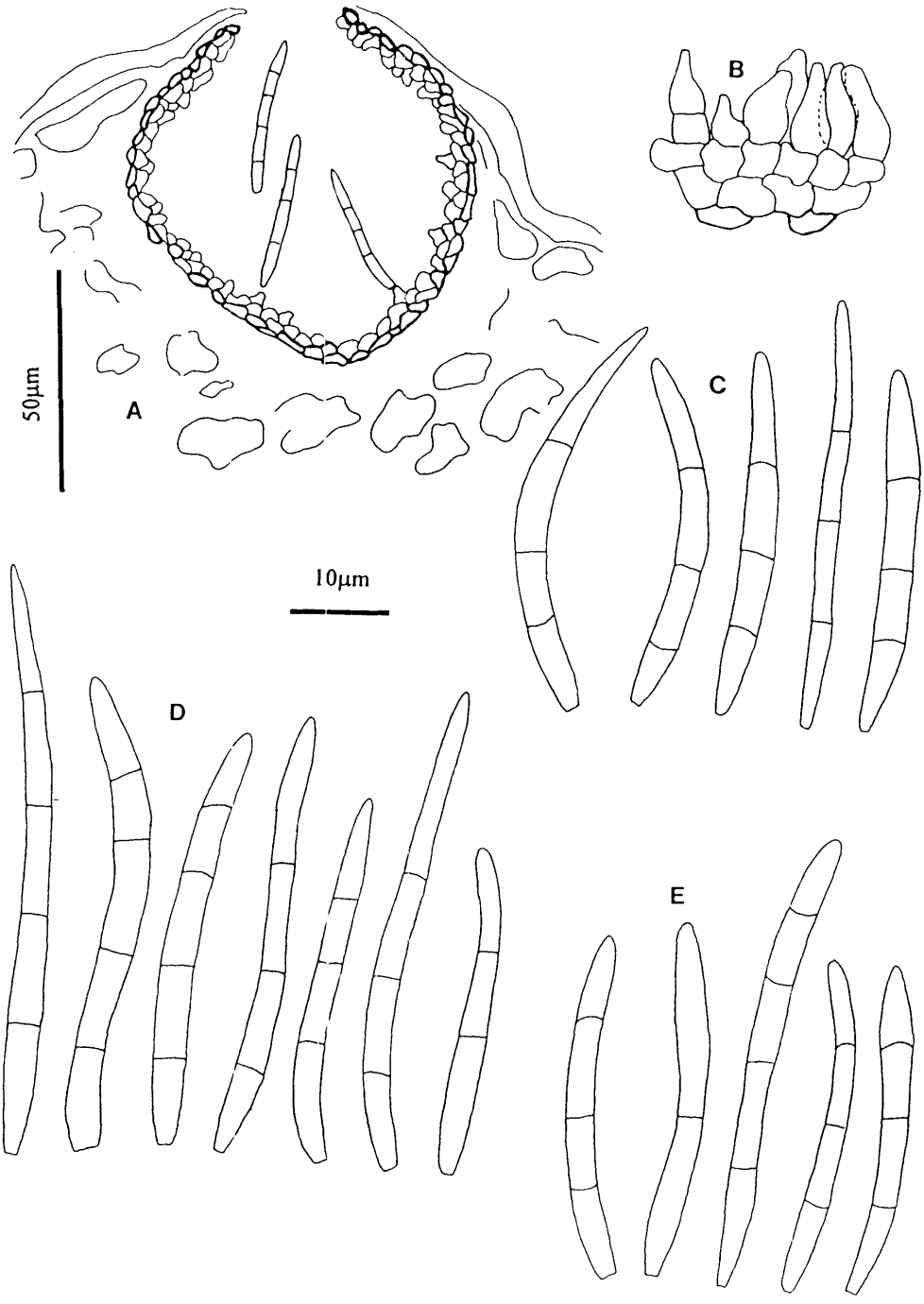

Fig.4. *Septoria centellae* (A) v.s. conidioma DAR 49162; (B) conidiogenous cells DAR 49162; C-E conidia; (C) DAR 73320; (D) DAR 49162; (E) DAR 12019

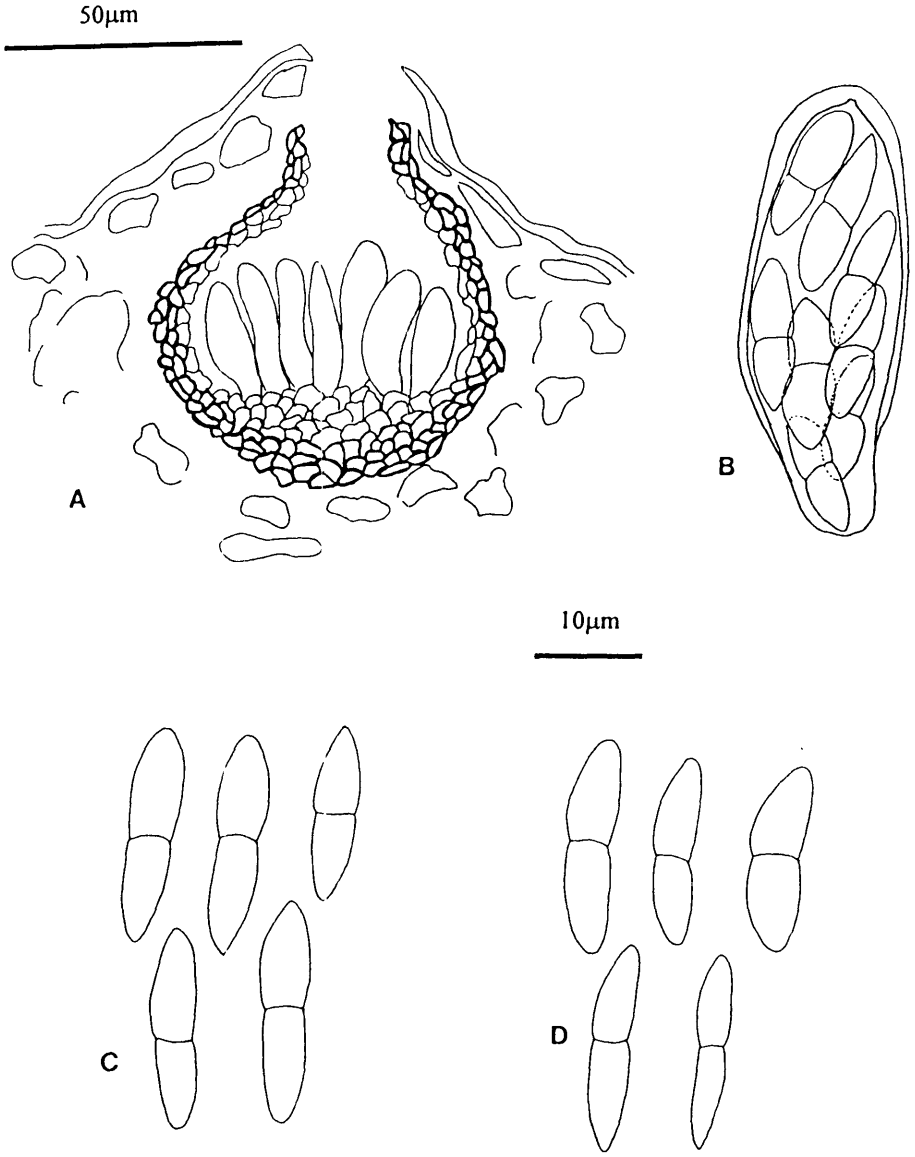

Fig.5. *Mycosphaerella* sp. on *Centella*; (A) v.s. ascoma DAR 49162; (B) ascus DAR 49162; (C) ascospores DAR 49162; (D) ascospores DAR 73320

Mycosphaerella sp. (presumed teleomorph of *S. centellae*)

(Fig.5)

Ascomata amphigenous, mostly hypogenous, scattered on lesions, discrete, sub-epidermal becoming erumpent, black, globose, 50-90μm diam., with a single apical ostiole. *Ascomatal wall* 2-3 cell layers thick, outer layer dark brown and thickened, inner layers pale brown. *Asci* bitunicate, obclavate to ellipsoidal, 40-45 x 9-11(-13) μm, sessile, eight-spored. *Ascospores* hyaline, smooth-walled, three-multiseriate, ellipsoidal to fusiform with rounded ends, medianly 1-septate, often constricted at the septum, 16-20 x 4-5μm.

Host: *Centella asiatica* (L.) Urb.

Distribution: New South Wales, Western Australia (Shivas 1989).

In the original description of *S. centellae* conidia were described as 30-45 x 2 μm, which is quite distinct from other taxa described or recorded from this host. The type was collected in Brazil by Ule. I have not examined the type, but material from Australia agrees with the original description and is placed under this name. Conidiomata are mostly hypogenous and become aggregated into large black masses which is a distinctive character. Two collections examined have associated with the conidiomata a species of *Mycosphaerella*. This is distinct from *M. hydrocotyle-asiaticae* (Pat.) Petrak (1929) described originally by Patouillard (1918) from Madagascar on *Centella asiatica* (as *Hydrocotyle asiatica*) and having ascospores 9-12 x 3-4μm. In *Mycosphaerella centellae* Petrak (1924) they were given as 12-16 x 5μm. Petrak (1929) synonymised both species under *M. hydrocotyle-asiaticae* despite the difference in ascospore sizes. Ascospores in Australian material are longer than given in both those species but as the type collections of neither have been examined it seems premature to suggest that a new taxon be recognised. It is of interest that Sydow (1937) examined one of the Australian collections (DAR 73320) and identified it as *M. hydrocotyle-asiaticae*. There is no mention in the description of *M. hydrocotyle-asiaticae* or *M. centellae* Petrak of an associated *Septoria* anamorph.

Septoria centellae Ciferri (Ciferri 1938), a later homonym of *S. centellae* G. Wint., is almost certainly synonymous with *S. centellae* G. Wint. from its description which gives conidia as 16-32 x 2-3μm, only slightly shorter than seen in most collections. On one Australian collection examined (DAR 56858) both *S. centellae* and *S. hydrocotyles* are present, the conidiomata of *S. centellae* being predominately hypogenous and those of *S. hydrocotyles* epigenous.

Specimens examined: on *Centella asiatica* (with teleomorph); **New South Wales**; Glenorie, May 1932, L.R. Fraser S110 (DAR 73320); **Western Australia**;Yanchep, 8 Aug. 1960, E.R.L. Johnson (DAR 49162 ex UWA 609); anamorph only; **New South Wales**; Shoalhaven Crossing, Nov. 1956, L.R. Fraser (DAR 12019); Dooralong, 16 June 1969, O.M. Williams 69/31 (DAR 56858a).

Septoria daucina Brun., *Glanules Mycologiques* **II**, 8 (1892)

Listed by Brittlebank (1937-1940) as occurring on *Daucus carota* in Victoria. No herbarium collection under this name has been located.

Septoria hydrocotyles Desm., *Ann. Sci. Nat.* (Ser. 2) **17**: 109 (1842) var. ***hydrocotyles***
= *Septoria nesodes* Kalchbr., *Grevillea* **9**: 20 (1880)

(Figs. 6, 7)

Leaf lesions hologenous, orbicular to irregular, 2-3mm diam., often coalescing into large blotches up to 5mm diam, occasionally elongated and bounded by leaf veins. Upper surface lesions dark brown, mostly raised with narrow margin, lower surface lesions pale brown. *Conidiomata* epigenous, scattered on lesions, separate, black, globose, immersed, scarcely erumpent, (75-)90-120µm diam., pycnidial. *Ostiole* single, apical, circular, 20-25µm, cells thickened around the opening. *Conidiomatal wall* 2-3 cell layers thick, composed of pseudoparenchymatous tissue, textura angularis, cells 5-8µm diam., outer layer mid-brown, inner layers becoming pale brown to sub-hyaline. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform to doliiform, 8-10 x 3-4µm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth walled, filiform, cylindrical, 1-3 septate, mostly falcate, (12-)21-30 x 1.5-2µm, with truncate to rounded base and rounded to sub-acute apex.

Hosts: *Centella asiatica*, *Hydrocotyle acutiloba*, *H. hirta* R. Br. ex A. Rich., *H. laxiflora*, *H. pedicellosa* Benth.

Distribution: New South Wales (Priest & Walker 1987), Queensland, South Australia (Warcup & Talbot 1981, Cooke & Dube 1989; report only), Victoria (Brittlebank 1937-1940, Chambers 1982).

This species is very distinctive due to its falcate conidia, a characteristic mentioned in the original description and by subsequent authors such as Grove (1935). Examination of named European and American material of this species confirms the identity of Australian collections. Examination of the type collection of *S. nesodes* from South Africa on *Centella asiatica* (as *Hydrocotyle asiatica*) reveals

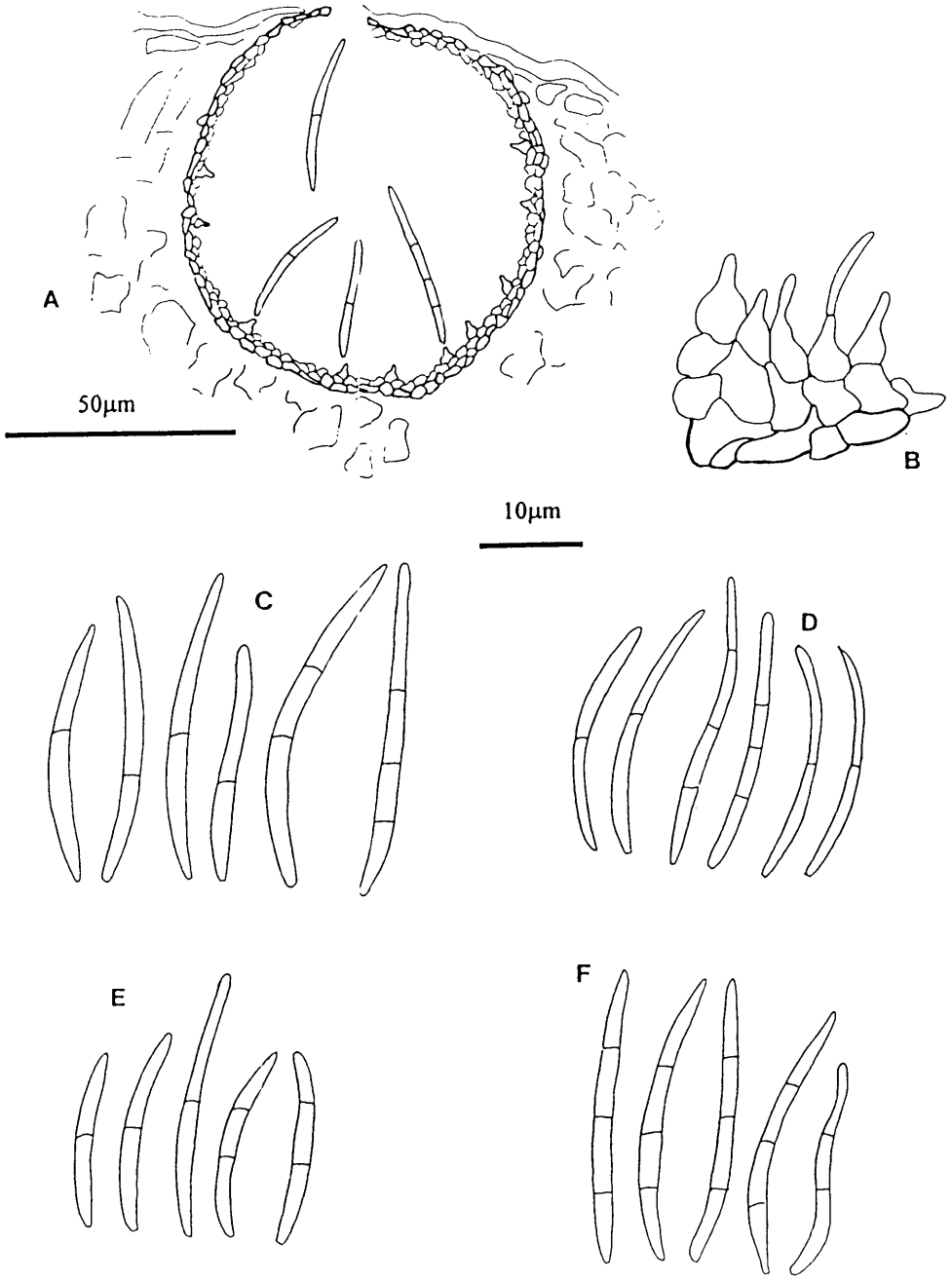

Fig.6. *Septoria hydrocotyles* (A) v.s conidioma VPRI 17683; (B) conidiogenous cells VPRI 17683; C-F conidia; (C) VPRI 17683; (D) DAR 15999; (E) DAR 15479; (F) DAR 5709

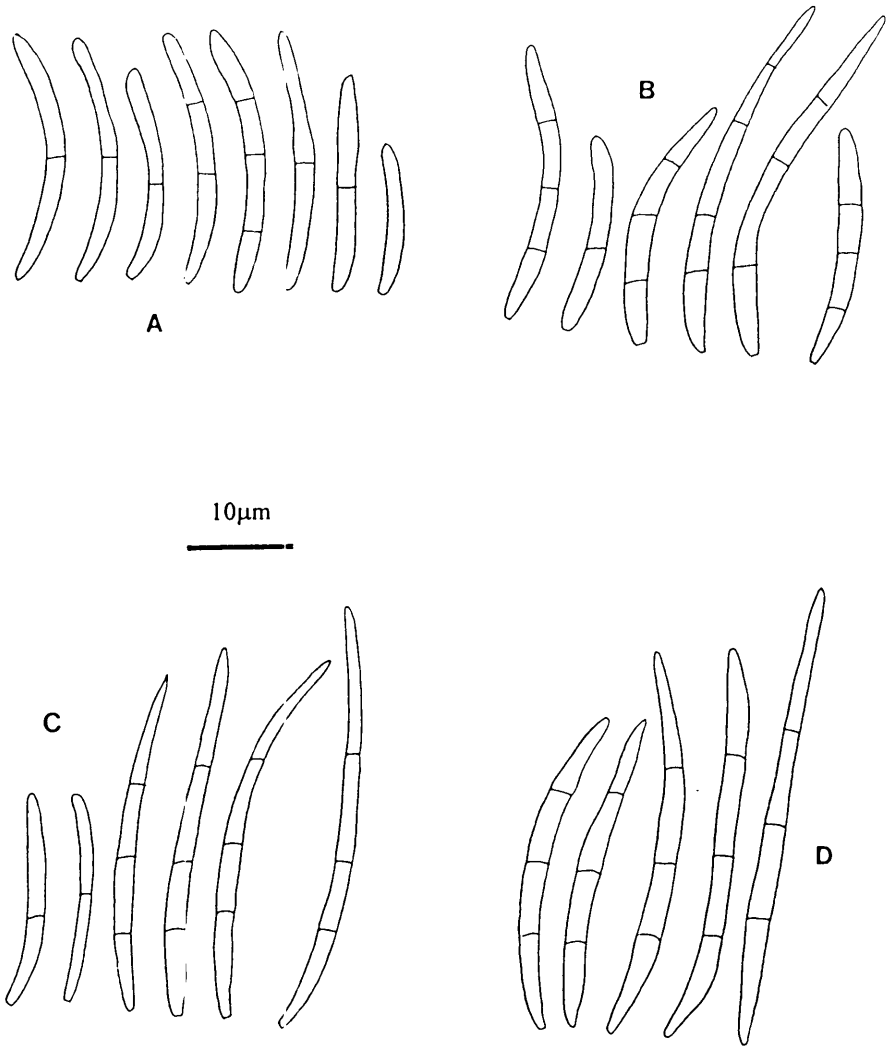

Fig.7. *Septoria hydrocotyles*; conidia (A) ex type of *S. nesodes*; (B) ex Fungi Columbiani No. 3580; (C) BRIP 5837 (culture); (D) *S. hydrocotyles* var *spegazzinii* (type of *S. spegazzinii*)

that the two taxa are identical. This species is also present in Australia on *Centella.* Two other taxa described from *Hydrocotyle* are *Septoria hydrocotylicola* Speg. (Spegazzini 1908) on an un-named species of *Hydrocotyle* from Brazil and *S. spegazzinii* Sacc. & Trotter (= *S. hydrocotyles* Speg. non Desm.) from Argentina (Spegazzini 1882). *Septoria hydrocotylicola* is recognised as the earliest name for the taxon commonly named *S. asiatica* (see discussion under *S. hydrocotylicola*). *Septoria spegazzinii* was described from *Hydrocotyle bonariensis* in Argentina and examination of the type collection showed that conidia were mostly 32-40 (-45) x 1.5-2.0µm and generally falcate in contrast to the original description in which the conidia were given as 45-50 x 1.5µm and curved. Conidia of *S. hydrocotyles* are rarely more than 30µm long, although in American material examined some conidia up to 36µm long were found. Also in a single dried culture examined (BRIP 5837) some longer conidia were found. Given the generally longer conidia it would be more appropriate to regard *S. spegazzinii* as a variety of *S. hydrocotyles* and the following new combination is proposed:

Septoria hydrocotyles Desm. var. ***spegazzinii*** (Sacc. & Trotter) Priest **comb. nov.**

Basionym: *S. spegazzinii* Sacc. & Trotter, *Syll. Fung.* **3**: 531 (1884)

Synonym: *Septoria hydrocotyles* Speg. *F. Arg. Pug.* **4**, No. 288 (1882) non *S. hydrocotlyes* Desm. (1842)

Thus there are now two varieties of *S. hydrocotyles* Desm., the type var. *hydrocotyles* with conidia generally less than 30µm, and var. *spegazzinii* with longer conidia up to 45µm. Whilst only var. *hydrocotyles* has been seen in Australian specimens examined, precise data on the geographic distributions and host ranges of the two varieties must await study of a wider range of collections.

Specimens examined :

AUSTRALIAN COLLECTIONS:

on *Centella asiatica*; **New South Wales**; Thornleigh, 14 May 1966, J. Walker (DAR 15999); Upper Dooralong, 16 June 1969, O.M. Williams 69/31 (DAR 55858b); National Park, 24 Jan. 1966, J. Walker (DAR 15479); St. Albans Common, 10 Jan. 1971, O.M. Williams 71/4 (DAR 56857) **Queensland**; Saiba Island, Torres Strait, 11 June 1981, J.L. Alcorn 8199 (BRIP 13749);

on *Hydrocotyle acutiloba*; **New South Wales**; Brown Mountain, L.R. Fraser, Apr. 1959 (DAR 5709); **Queensland**; Beerwah, 6 Apr. 1967, J.L. Alcorn (BRIP 5774); Beerburrum, 26 July 1967, J.L. Alcorn (BRIP 5775); Nambour, 18 Feb 1957 (BRIP 5836);

on *H. hirta*; **Victoria**; Nagambie, 1903, D. McAlpine (VPRI 8832); Wandong, 1903, C. French Jnr. (VPRI 8831);

on *H. laxiflora*; **Queensland**; Benarkin State Forest, J.L. Alcorn 9044, 7 Apr. 1990 (BRIP 17037); **Victoria**; Silverband Falls, Grampians, 1 Jan. 1981, J.H. Warcup (VPRI 17683);

on *H. pedicellosa*; **Queensland**; Cunningham's Gap, 28 Mar. 1972, J.L. Alcorn 72-052 (BRIP 5837); Mount Glorious, 16 Oct 1977, D.E. Shaw (BRIP 12362);

EXTRALIMITAL COLLECTIONS:
on *Centella asiatica* (as *Hydrocotyle asiatica*); Cape of Good Hope, **South Africa**, MacOwan 1115 (K) **holotype** of *S. nesodes* Kalchbr.; Gold Coast, **Africa**, 29 Apr. 1949, S.J. Hughes 117 (BRIP 5804 ex IMI 42224) as *S. nesodes*;

on *Hydrocotyle americana* Ithaca, New York, **U.S.A.**, 26 July 1911, B.B. Higgins, *Fungi Columbiani* No. 3580 (DAR);

on *Hydrocotyle bonariensis*; Buenos Aires, Recoleta, **Argentina**, 8 May 1881 (LPS 10668) **holotype** of *S. spegazzinii* (*S. hydrocotyles* Speg. non Desm.);

on *Hydrocotyle vulgaris;* Manton Moor, **United Kingdom**, E.R. Wallace, 19 Aug. 1950 (BRIP 5776 ex IMI 43091).

Septoria hydrocotylicola Speg. *Rev. Mus. La Plata* (Ser.2) **2**: 38 (1908)
= *Septoria asiatica* Speg., *Rev. Fac. Agron. Vet. La Plata* **6**: 168 (1910)

(Fig. 8)

Leaf lesions hologenous, orbicular to irregular, 1-5mm diam., upper surface lesions mid-brown becoming grey with age with a raised mid-brown margin, lower surface lesions remaining mid-brown even at maturity also with raised mid-brown margin. *Conidiomata* mostly epigenous, a few hypogenous, scattered on lesions, immersed, becoming erumpent, separate, globose, black, 80-110µm diam., pycnidial. *Ostiole* single, apical, circular, 20-35µm diam., slightly thickened. *Conidiomatal wall* three cell layers thick, composed of pseudoparenchymatous tissue, textura angularis, cells 5-8µm diam, outer layer of cells dark brown, inner layers pale brown. *Conidiogenous cells* arising from

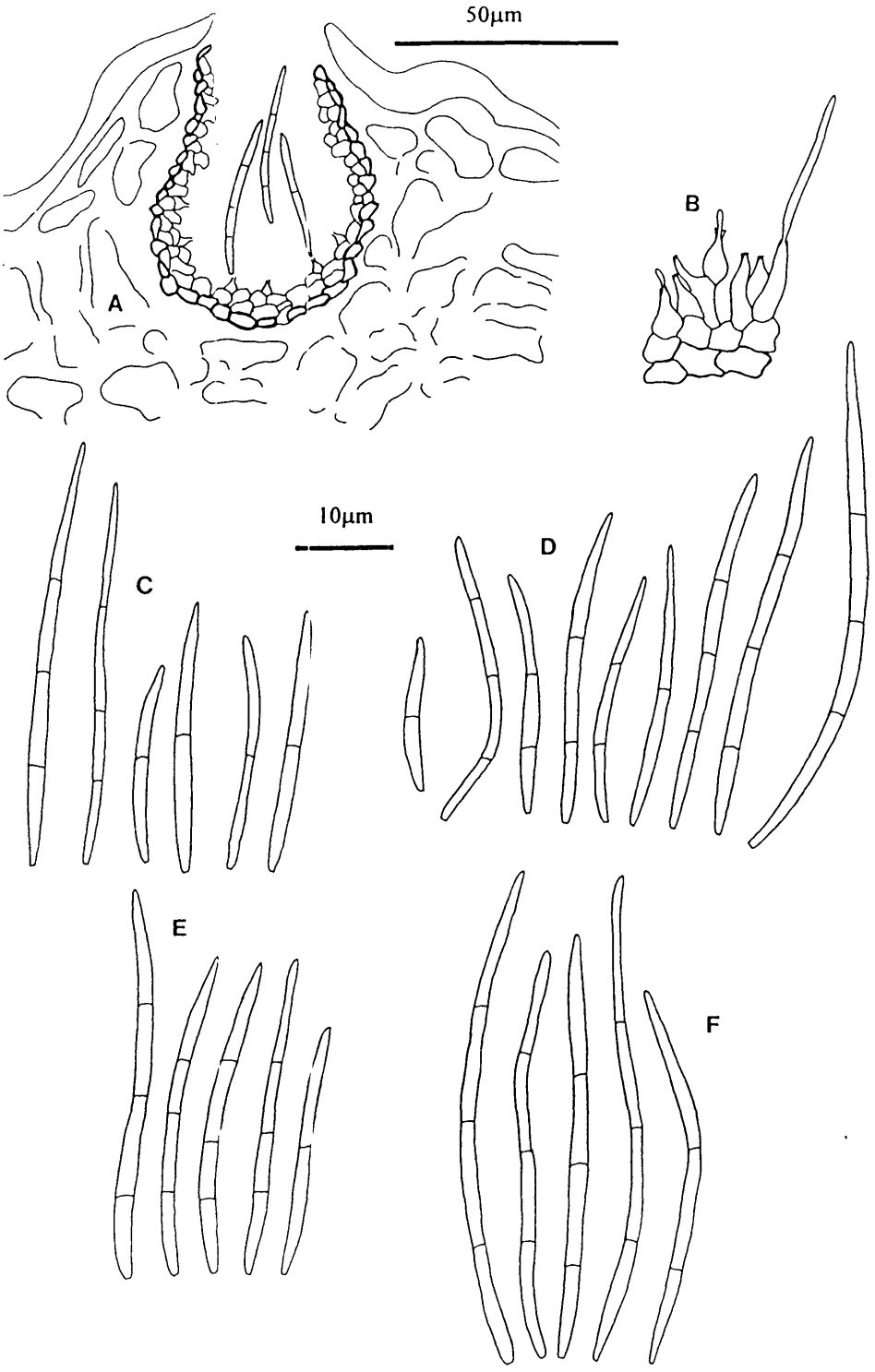

Fig.8. *Septoria hydrocotylicola* (A) v.s. conidioma DAR 57967; (B) conidiogenous cells DAR 57967; C-F conidia (C) ex type of *S. asiatica*; (D) DAR 55969; (E) DAR 7041; (F) ex type of *S. hydrocotylicola*

inner wall layer, discrete, hyaline, ampulliform to lageniform, 5-7 x 2-3µm producing conidia holoblastically, secession schizolytic with subsequent conidia produced enteroblastically and seceding at the same level from a single narrow conidiogenous locus. *Conidia* hyaline, filiform, cylindrical, 3 septate, straight, narrowing in the upper third to an acute to sub-acute apex, base rounded to slightly truncate (12-) 17-36 (-52) x 1-1.5µm.

Hosts: *Centella asiatica* (L.) Urban, *Hydrocotyle acutiloba* (F. Muell.) Wakefield, *H. laxiflora* DC.

Distribution: New South Wales and Queensland

Examination of the type collections of both *S. hydrocotylicola* and *S. asiatica* reveals that they are identical. In the type collection of *S. asiatica* a few pycnidia examined contained many conidia that were short (12-36 µm), but other pycnidia contained conidia up to 52µm long. Conidia measuring 36-48 x (1-)1.5(-2) µm were found in the type collection of *S. hydrocotylicola* and all Australian collections fell well into the range found in both type collections, particularly in conidial width which is the distinctive character of this taxon. *Septoria hydrocotylicola* was described from an unidentified species of *Hydrocotyle* in Brazil and *S. asiatica* from *Centella asiatica* in Chile. *Septoria hydrocotylicola* has been reported from Brazil (type locality) on *Hydrocotyle*, Chile and India (as *S. asiatica*) on *Centella* (Sukapure and Thirumalachar 1964) and Florida in the U.S.A. (Farr *et al.* 1989) on both *Centella* and *Hydrocotyle* (as *S. asiatica*). The recognition of this species in Australia extends its known geographic range.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Centella asiatica;* **New South Wales**; Port Macquarie, 7 Dec. 1986, J. Walker 86/179 (DAR 57967); Baulkham Hills, 9 Jan. 1996, J. Walker 96/1(DAR 71770); **Queensland**; Indooroopilly, 26 Oct. 1983, J.L. Alcorn (BRIP 14163);

on *Hydrocotyle acutiloba*; **New South Wales**, Mount Werong, Ap.r 1962, L.R. Fraser (DAR 7041); Araluen Valley, 23 Jan. 1953, E. Gauba (DAR 24931 ex Herb Gauba 3093);

on *H. laxiflora;* **New South Wales**; Mount Wilson, 20 Apr. 1986, A. Francis & M.J. Priest (DAR 55969);

EXTRALIMITAL COLLECTIONS:

on *Centella asiatica*; Temuco, **Chile**, Jan. 1909, C. Spegazzini (LPS 10713) **holotype** of *S. asiatica*;

on *Hydrocotyle* sp.; Sao Paulo, **Brazil**, Usteri, (LPS 10772) **holotype** of *S. hydrocotylicola.*

Septoria pastinacina Sacc., *Michelia* **2**: 102 (1880)

This species was recorded by Noble *et al.* (1935) as causing a leaf spot on *Pastinaca sativa* L. (Parsnip) on the Southern Tablelands of New South Wales in 1925. No material of this species is available for examination and the record is doubtful. *Septoria pastinacina* was described originally from stems of parsnip with conidia 20-30 x 0.7-1μm and curved to flexuous which is possibly more like β-condia of a species of *Phomopsis* Sacc. rather than *Septoria.* Other reports of *Septoria* on parsnip exist in the Australian literature. Walker & Sampson (1982) reported a *Septoria* sp. in Tasmania but no material is available and the record remains unsubstantiated. In Victoria, Harrison *et al.* (1975) and Washington & Nancarrow (1983) also report a *Septoria* sp. causing a leaf spot from Drouin, Victoria in 1915. The only material available in VPRI is a collection labelled *S. petroselini* dated 1915 but from West Blackburn. Examination of the collection (VPRI 1838) has shown that it is acervular, not pycnidial, and is identical with the fungus currently known as *Phloeospora crescentium* (Barth.) Riley. Several collections on parsnip under this name are present in DAR.

Septoria petroselini (Lib.) Desm., *Mem. Soc. Sci. Lille* 1843
≡ *Ascochyta petroselini* Lib., *Pl. Crypt. Ard.* No. 252 (1834)

(Fig. 9)

Leaf lesions hologenous, irregular, bounded by veins, 2-3mm diam., on both surfaces pale orange brown, becoming creamy white in centre with age, often coalescing into large blotches 6-8mm diam. *Conidiomata* amphigenous, scattered on lesions, mostly discrete but occassionally aggregated, immersed, becoming erumpent, globose, black, mostly 70-140μm diam., pycnidial. *Ostiole* apical, single, circular, 10-20(-25) μm, cells thickened around the opening. *Conidiomatal wall* three cell layers thick composed of pseudoparenchymatous tissue, textura angularis, cells 5-9μm diam., outer layer mid to dark brown, the inner layer layers becoming pale brown to hyaline. *Conidiogenous cells* arising from inner wall layer, hyaline, doliiform to ampulliform, discrete, producing conidia holoblastically, secession schizolytic with subsequent proliferation both enteroblastically from short doliiform cells 5-6 x 3-5μm at the same level, and holoblastically with sympodial proliferation from ampulliform cells 10-12 x 3-5μm. *Conidia* hyaline, smooth-walled, filiform, straight to slightly curved, 3(-5) septate, apex rounded to sub-acute, base truncate, 26-45(-52) x (1-)1.5-2μm.

Hosts: *Coriandrum sativum* L. (Coriander), *Petroselinum crispum* (Miller) Nyman ex A.W. Hill (Parsley)

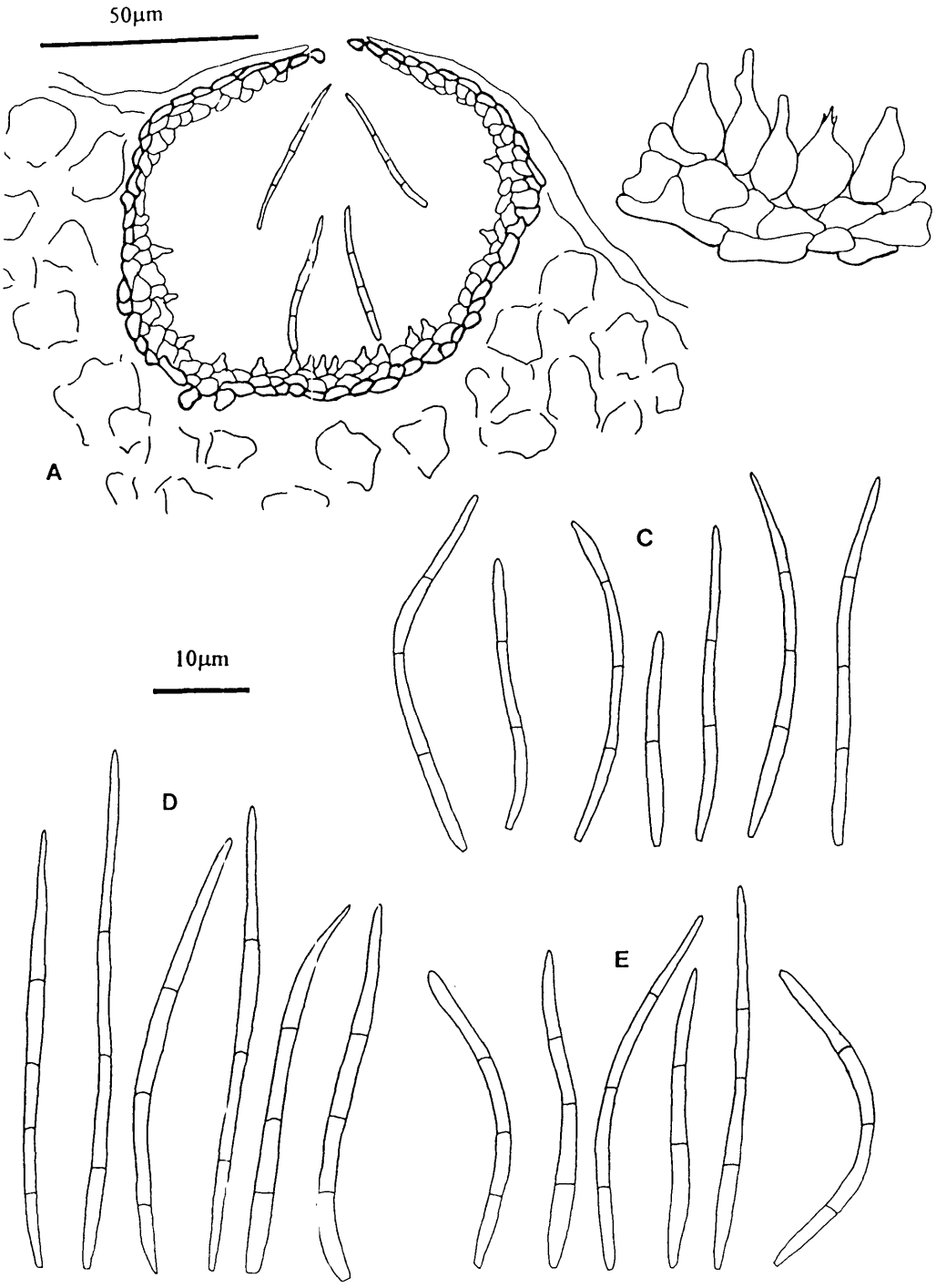

Fig.9. *Septoria petroselini* (A) v.s conidioma DAR 29913; (B) conidiogenous cells DAR 29913; C-E conidia (C) DAR 29913; (D) VPRI 18584 (ex *Coriandrum*); (E) ex isotype (FH)

Distribution: New South Wales (Noble *et al.* 1935, Brittlebank 1937-1940), Queensland (Simmonds 1966 as *Septoria* sp.), South Australia (Brittlebank 1937-1940, Warcup & Talbot 1981, Cooke & Dube 1989; report only), Tasmania (Sampson & Walker 1982), Victoria (Harrison *et al.* 1975, Washington & Nancarrow 1983), Norfolk Island

Comparison with the type specimen has confirmed the identity of this species in Australia. *Septoria petroselini* is very close morphologically to *S. hydrocotylicola* found on *Hydrocotyle* and *Centella.* However, its conidia are, over the range of collections examined, generally slightly wider, 1.5-2.0μm compared with 1.0-1.5μm seen in *S. hydrocotylicola.* The observed dual mode of conidiogenesis has not been reported previously for *S. petroselini* although the phenomenon is not unknown in the genus. The ratio of the two forms of conidiogenesis seems to vary amongst collections examined. The original description of *S. petroselini* gave conidia as 35-40 x 1-2μm with which all Australian collections agree. The status of *S. petroselini* forma *segetum* P. Brun. on *P. segetum* (L.) Koch in which conidia were given as 30-50 x 1.0μm is unclear, although Teterevnikova & Anastasya (1967) recognise it as a separate taxon on the host *Conioselinum univittatum* Turcz. These measurements are within the range seen in Australian collections and agree with measurements given by other authors e.g. Grove (1935) 30-40 x 1-2μm, and Dingley (1959) 30-50 x 1-1.5μm. *Septoria petroselini* has been found worldwide wherever parsley is cultivated. An Australian collection on *Coriandrum* is morphologically identical to *S. petroselini* and is included here. In their treatment of *Septoria* spp. on umbelliferous plants in the USSR, Teterevnikova & Anastasyan (1967) report *S. umbelliferarum* Kalchbr. from *Coriandrum.* Kalchbrenner (Kalchbrenner & Cooke 1880) described this species from an undetermined umbelliferous plant in South Africa with conidia given as 35-50μm long. No conidial width was given and, as conidial length could be encompassed by several species its identity is uncertain. Examination of the type material will be needed to resolve the possible identity of the host and subsequent placement of this taxon.

Specimens examined :

AUSTRALIAN COLLECTIONS :

on *Petroselinum crispum*; **New South Wales**; Glenorie, 17 June 1977, M. Kukula (DAR 29913); Leppington, 18 June 1981, L. Ullio (DAR 38220); Kellyville, 13 May 1985, R. Jamieson (DAR 52781); Schofields, 10 Feb. 1986, J. Eccles (DAR 55372); Tamworth, 3 Feb. 1988, C. Mudge (DAR 61792); Glenorie, 2 June 1967, R.J. Conroy (DAR 16382); Caringbah, 13 July 1964, Goldrick (DAR 13442); Lismore Heights, 6 July 1971, F. Hartridge (DAR 22168); Sydney, 1950, J. Walker (DAR

3776); Roseville, Dec. 1934 (DAR 1403); Caringbah, 1952, J. Walker (DAR 4330); **Norfolk Island**; Duncombe Bay, Nov 1980, D.R. Jones (BRIP 13295); no locality, 9 Dec. 1986, J.L. Alcorn 8653 (BRIP 15582); **Queensland**; Toowoomba, 25 Aug. 1982, W. Mills (BRIP 13802); Eight Mile Plains, 16 July 1981, R.G. O'Brien (BRIP 13437);.**Tasmania**; Claremont, 30 Mar. 1977, J. Walker 77/380 (DAR 30318); **Victoria**; Pakenham, May 1936, A.T. Pugsley (VPRI 1835);

on *Coriandrum sativum*; **Victoria**; Lower Templestowe, 16 Oct. 1992, C. Copes (VPRI 18584b).

EXTRALIMITAL COLLECTIONS:
on *Petroselinum crispum* (as *Apium petroselinum*), Ardennes, **Belgium**, Pl. Crypt. Ard. No 252 (FH) **type** of *Ascochyta petroselini* Lib.

Septoria schizeilematis Petrak, *Sydowia* **9**: 566-567 (1955)

(Fig. 10)

Leaf lesions hologenous, irregular, often on leaf margin, 1-2 mm diam., upper surface lesions pale brown, raised with a very pale brown margin, halo absent, lower surface lesions barely discernible as a pale discoloration of leaf tissue without raised margin. *Conidiomata* amphigenous, scattered on lesions, immersed becoming erumpent, separate, often aggregated, pycnidial, 100-120μm diam., pycnidial. *Ostiole* single, apical, circular, thickened around opening, 28-36μm diam. *Conidiomatal wall* mostly two cells thick, composed of slightly thickened pseudoparenchymatous tissue, textura angularis, cells 5-8μm diam, the outer cell layer mid-brown, inner layer becoming hyaline. *Conidiogenous cells* hyaline, discrete, lageniform, 7-9(-11) x 3-4μm producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, cylindrical, straight to curved, 3-4 septate, with acute apex and truncate base, (19-)45-58(-66) x 1-1.5μm.

Host: *Schizeilema fragoseum* (F. Muell.) Domin.

Distribution: New South Wales (Petrak 1955).

This species is separated from *S. hydrocotylicola* and *S. petroselini* by its holoblastic sympodial conidiogenesis and much longer conidia. *Schizeilema fragoseum*, commonly known as Alpine Pennywort, is endemic to alpine and subalpine areas of the Australian Alps (Costin *et al.* 1980).

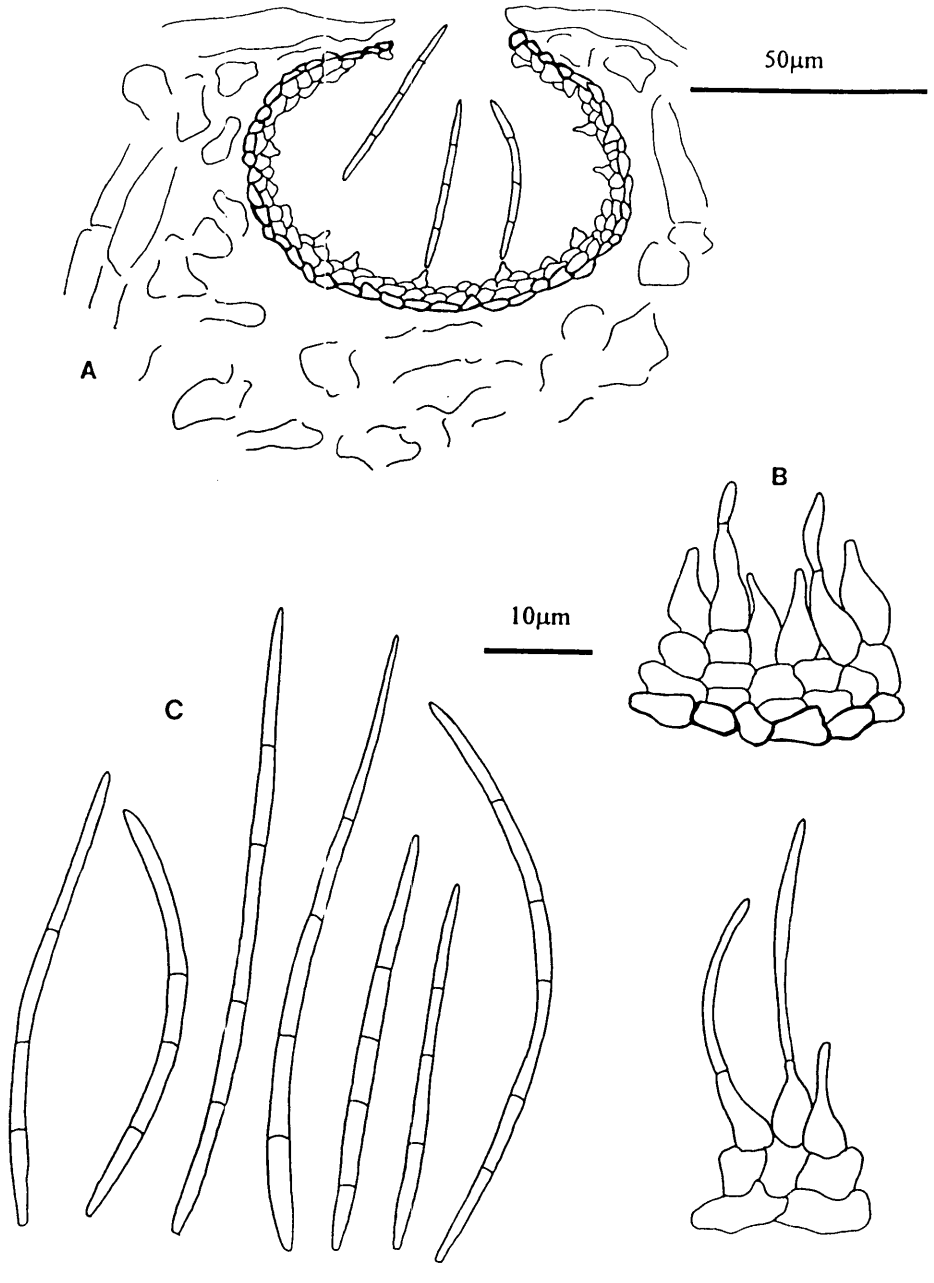

Fig.10. *Septoria schizeilematis* ex type; (A) v.s. conidioma; (B) conidiogenous cells; (C) conidia

Specimen examined: on *Schizeilema fragoseum;* **New South Wales**; Mount Kosciusko, 15 Mar 1955, E. Gauba (W) **holotype**.

APOCYNACEAE

Septoria alyxiae on *Alyxia buxifolia*

Listed by Chambers (1982) as occurring in Victoria. This name, attributed to McAlpine, has never been published and therefore has no nomenclatural standing. The collections available are currently the subject of investigation by Dr. B.C. Sutton (formerly of IMI) and will be the subject of future publication (Dr. B.C. Sutton, pers. comm., 29 Jan 1997)

Septoria oleandrina Sacc., *Fungi Veneti* **5** : 205 (1876)

This species was reported by Cooke (1892), Cobb (1893), McAlpine (1895), Brittlebank (1937-1940) and Simmonds (1966) on *Nerium oleander* L. in Queensland, based on a Bailey collection from 1889. According to Simmonds (1966) the material was considered to belong to *Glomerella cingulata* (Stonem. & Spaulding) Schrenck and noted a further collection by Shea in 1952. Examination has revealed no evidence of a *Septoria* on any of the collections available. The only fungus in evidence was *Pseudocercospora neriella* (Sacc.) Deighton.

Specimens examined: on *Nerium oleander*, **Queensland**; Brisbane, no date, F.M. Bailey 605 (BRIP 255); Gregory Terrace , Brisbane, no date, F.M. Bailey (BRIP 465); Mackay, 8 Sept. 1952, K.N. Shea (BRIP 5809).

Septoria sp. on *Carissa macrocarpa* (Eckl.) DC. (Natal Plum)

A *Septoria* sp. was reported causing a leaf spot on *Carissa macrocarpa* by Warcup & Talbot (1981) and Cooke & Dube (1989). *Carissa macrocarpa* is a native of South Africa and no *Septoria* has been described on it or any other species of *Carissa*. There is no specimen available to verify the record and the basis for the report is unknown.

ARALIACEAE

Septoria hederae Desm., *Ann. Sci. Nat.* **19**: 340 (1843)

(Fig. 48E)

Listed by Brittlebank (1937-1940) and Chambers (1982) as occurring on *Hedera helix* L. at Port Fairy in Victoria in 1901. Examination of the single collection available (VPRI 1795) has shown pycnidial conidiomata and holoblastic conidia, 10-19 x 1-1.5μm and 1 (-3) septate. *Septoria hederae* was described with conidia 30-40 x 1-2μm and this fungus bears no relationship to it. The collection is morphologically close to the taxon seen on *Stephanotis* (see under Asclepiadaceae) and *Rosa* (see under Rosaceae).

Specimen examined: *Septoria* sp. on *Hedera helix*; **Victoria**; Port Fairy, 25 Jan. 1901, D. McAlpine (VPRI 1795) as *Septoria hederae.*

ARECACEAE

Septoria calami P. Henn., *Hedwigia* **42**: 86 (1903)

Septoria calami was described from *Calamus caryotoides* C. Martius (Fishtail Lawyer Cane) collected by Pritzel in northern Queensland. The conidiomata were described as being 50-60μm diam., with conidia 25-40 x 0.4-0.5μm. The type collection consists of a single leaf bearing many brown circular lesions with immersed and erumpent fungal fruiting structures covering most of the leaf surface. No fungus resembling *S. calami* could be found on the material. The only fungus present was a species of *Guignardia* Viala & Ravaz, with ascospores 12-16 x 4-6μm and covered with a gelatinous sheath.

Specimen examined: on *Calamus caryotoides*; **Queensland**; near Cairns, May 1902, Pritzel 78a (B) **holotype**.

Septoria sp. aff. ***S. cocoina*** Ellis & Everhart , *Journal of Mycology* **3**: 85 (1887)

(Fig. 11)

Leaf lesions hologenous, circular to irregular, 1-3mm diam., upper surface lesions dark brown to almost black, raised in the centre which turns grey-brown with age, pale watery brown necrotic area up to 1mm diam. evident, often coalescing into larger blotches, lower surface lesions paler in colour but otherwise similar to upper surface lesions. *Conidiomata* scattered on upper surface lesions, immersed becoming erumpent, globose, 70µm diam., pycnidial. *Ostiole* single, apical, very widely open at maturity. *Conidiogenous cells* hyaline, aseptate, discrete, 8-10 x 2.5-3.0 µm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth walled, filiform, 1-3 septate, straight to curved, apex rounded, base rounded (4-)8-16 x 1.0-1.5(-2) µm.

Culture on PDA after 17 days, 5cm diam, deep grey-brown aerial mycelium, reverse fuscous brown. *Conidiomata* produced abundantly on Carnation Leaf Agar, immersed 70-90µm, pycnidial. *Ostiole* single, apical, slightly thickened, opening narrow 10-15(-20) µm. *Conidiomatal wall* composed of two-three cell layers of pseudoparenchymatous tissue, cells 4-7µm diam, outer two layers dark brown, inner layer hyaline. *Conidiogenous cells* arising from inner wall layer, hyaline, cylindrical to lageniform, aseptate, 8-10 x 2-3µm, producing conidia holoblastically, secession schizolytic with subsequent sympodial proliferation. *Conidia* hyaline, smooth walled, filiform to slightly clavate, straight to slightly curved, 1-3 septate, with rounded apex and rounded to truncate base, (10-)14-20 (24) x 1.5(-2)µm.

Host: *Arecastrum romanzoffianum* (Cham.) Becc., *Howea* sp. (probably, as "Kentia").

Distribution: New South Wales and Victoria (Chambers 1982 as *Septoria* sp.).

Septoria cocoina was described from the U.S.A. on *Cocos plumosa* Hook. (a synonym of *Arecastrum romanzoffianum*). In the original description conidia were described as 8-16 x 1.5-2µm, within the range of Australian material. Other taxa described from hosts in the Arecaceae are *S. asaricola* Allesch. with conidia 20-30 x 1µm and *S. palmarum* Sacc. with conidia 15-18 x 1µm. A collection from 'Kentia Palm' in Victoria is included here based on the similarity of its conidia which measure 8-16 x 1-1.5µm and are up to 3 septate, thus close to those of *S. cocoina.* They differ from those of *Ascochyta kentiae* Maubl. and *Ascochyta palmicola* Punith., both of which have wider conidia and are only 1-septate (Punithalingam 1988). The identity of the Victorian palm host is unknown,

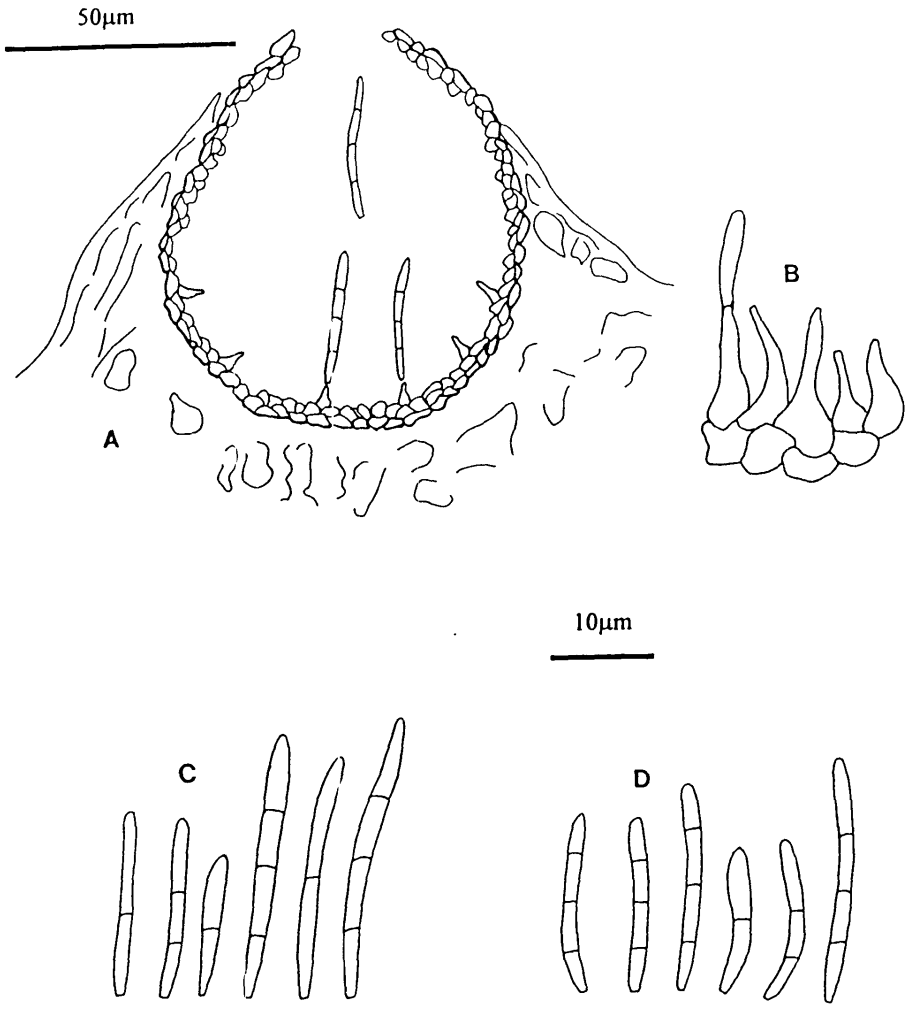

Fig.11. *Septoria* sp. aff. *S. cocoina* (A) v.s conidioma DAR 27039b; (B) conidiogenous cells DAR 27039b; (C) Conidia DAR 27039b; (D) conidia VPRI 1798

although Kentia palm in Australia is normally the common name of *Howea forsteriana* (C. Moore & F. Muell.) Becc. one of a genus of two species endemic to Lord Howe Island.

Specimens examined: on *Arecastrum romanzoffianum*; **New South Wales**; Baulkham Hills, 18 Oct 1976, C.H. Curnow (DAR 27039b); **Victoria**;on 'Kentia', Armadale, 4 July 1903, D. McAlpine (VPRI 1798)

ASCLEPIADACEAE

Septoria gomphocarpi P. Henn., *Hedwigia* **43**: 188 (1904)

Septoria gomphocarpi was described by Hennings in a paper entitled "*Fungi Australienses II*" which included several new fungi collected by Pritzel and Diels in Australia. The type locality for *S. gomphocarpi* is Clanwilliam which is in the Cape Province of South Africa, not Australia. Listed in error by Garman & Stevens (1920) and Brittlebank (1937-1940) as occurring in Queensland, Australia. Doidge (1950) correctly lists *S. gomphocarpi* for South Africa.

Septoria hoyae Sacc., *Michelia* **1** : 172 (1878)

Listed by Chambers (1982) as occurring on *Hoya carnosa* (L.f.) R.Br. in Victoria in 1905. No herbarium material under this name has been located and the record is unconfirmed.

Septoria sp. on *Stephanotis floribunda*

(Fig. 12)

Leaf lesions absent, conidiomata associated with indefinite areas of discoloration of the leaf, upper surface pale grey green, occasionally raised, becoming grey to white with age, distinct margin absent, pale brown necrotic halo often present, lower surface lesions similar. *Conidiomata* amphigenous, scattered on lesions, separate, rarely confluent, 65-100μm diam., black, globose, erumpent, pycnidial. *Ostiole* single, apical, often seen as a flap of tissue in section due to pressure of spore masses, opening very widely at maturity and becoming almost acervular. *Condiomatal wall* 2-3 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, cells 4-8μm diam, outer layer mid-

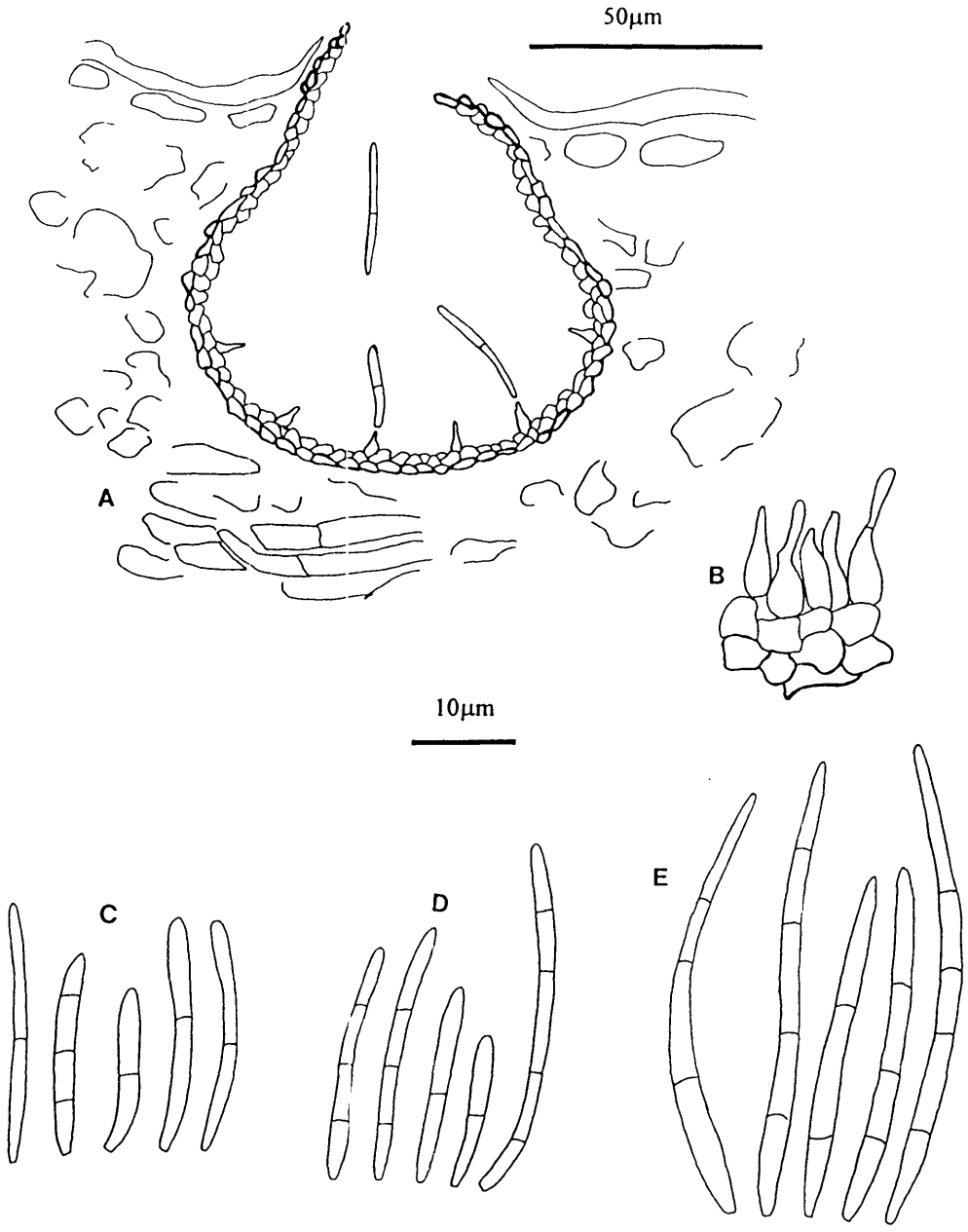

Fig.12. *Septoria* sp. on *Stephanotis* (A) v.s conidioma DAR 50445a; (B) conidiogenous cells DAR 50445a; C-E conidia; (C) host; (D) culture; (E) *S. asclepiadicola*; Fung. Col. No. 2979

brown, inner layers pale brown becoming hyaline. *Conidiogenous cells* arising from the inner wall, hyaline, separate, aseptate, becoming integrated, ampulliform to doliiform, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, straight to curved, *in-vivo* 1(-3) septate, apex rounded with truncate base, 14-20 x 1-1.5µm, *in-vitro* conidia may measure up to 34µm long and be up to 3-4 septate.

Host: *Stephanotis floribunda* Brongn.

Distribution : New South Wales (Walker & Priest 1986).

The identity of this taxon is uncertain. It fits into *Septoria* comfortably based on the structure of the conidiomata, conidiogenesis and spore morphology. However the fungus appears to be non-pathogenic or at most mildly pathogenic being associated with *Colletotrichum gloeosporioides* (Penz.) Penz et Sacc. on moist chamber incubated leaves, suggesting an endophytic or hyperparasitic habit. *Stephanotis floribunda* is a native of Madagascar, grown as an ornamental plant worldwide. No species of *Septoria* are described from *Stephanotis* and there are very few described taxa of *Septoria* or related genera on hosts in the Asclepiadaceae. Examination of exsiccatus material of *S. asclepiadicola* Ellis & Everh. revealed conidia measuring 29-42 x 2.0-2.5µm, thus much longer and wider than the Australian collection. This species shows a remarkable similarity to another seen on *Rosa* (associated with moist chamber incubated leaves) and *Hedera* (see discussions under those hosts). The relationship of these species is not known and requires cultural and host infection studies.

Specimens examined :

AUSTRALIAN COLLECTION:

on *Stephanotis floribunda*; **New South Wales**; Merimbula, 26 Oct. 1984, H. Kemp (DAR 50445a);

EXTRALIMITAL COLLECTION:

Septoria asclepiadicola Ellis & Everh.; on *Asclepias incarnata* L.; London, **Canada**, Sept. 1909, J. Dearness, *Fungi Columbiani* No. 2979 (DAR).

ASTERACEAE

Twenty two species of *Septoria* are distinguished on hosts in the family Asteraceae in Australia. Two taxa are described as new: *S. helichrysicola* sp. nov. on *Helichrysum* and *S. podolepidis* sp. nov on *Podolepis*. *Septoria martiniae* on *Bedfordia* is transferred to the genus *Septocyta*. Four taxa are recognised on *Chrysanthemum*; *S. adanensis* Petrak, *S. chrysanthemella* Sacc., *S. obesa* Syd. and *S. minima* Halst. Many authors such as Heywood *et al.* (1977) and Mabberley (1983) place the autumn flowering garden chrysanthemum in the genus *Dendranthema* (DC.) Des Moulins and regard it as being derived from both *C. morifolium* and *C. indicum*. Australian records are currently to be found under both these names and are so listed here. *Septoria lagenophorae* McAlp. is recognised as a hyperparasite on several hosts, this taxon being previously identified as *S. hypochaeridis* (Allesch.) McAlp. Reasons for the rejection of *S. hypochaeridis* in favour of *S. lagenophorae* are given. The morphological similarity of *S. lactucae* Pass. and *S. sonchi* Sacc. is discussed but the two are currently retained as separate taxa.

Key to Australian species of *Septoria* on the Asteraceae

1 Conidia mostly more than 3µm wide.....2

1: Conidia mostly less than 3µm wide.....3

2 Conidia 45-69 x 3.5-4µm, on *Helichrysum*.....**S. helichrysicola**

2 Conidia (40-)56-85(-105) x (2.5) 3-4µm, on *Chrysanthemum*.....**S. obesa**

2: Conidia (43-) 60-110 x 3-3.5µm, on *Ixodia*.....**S. ixodiae**

3 Conidia mostly 2-3µm wide.....4

3: Conidia mostly 1-2µm wide.....9

4 Conidia mostly 2.5-3µm wide.....5

4: Conidia mostly 2-2.5µm wide.....8

5 Conidia less than 30µm long, on *Gerbera*.....**S. gerberae**

5: Conidia more than 30µm long.....6

6 Conidia often with a short basal projection, on *Olearia*.....**S. paradisi**

6: Conidia lacking a basal projection.....7

7 Conidia (28-) 45-75 x 2.5-3µm, on *Senecio*.....**S. anaxaea**

7: Conidia 43-60(-85) x 2.5-3µm, on *Helianthus*.....**S. helianthi**

8 Conidia 22-36µm long, 3-6 septate, on *Chrysanthemum*.....**S. adanensis**

8 Conidia 22-36µm long, 1-3 septate, on *Lactuca*.....**S. lactucae**

8: Conidia 22-36µm long, 1-3 septate, on *Arctotheca*.....**S. perforans**

9 Conidia 1.5-2µm wide.....10

9: Conidia 1-1.5µm wide.....13

10 Conidia mostly less than 50µm long.....11

10: Conidia mostly more than 50µm long.....12

11 Conidia 30-55µm long, 3-5 septate, on *Centaurea*.....**S. centaureae**

11: Conidia 25-35µm long, 1-2 septate, on *Sonchus*.....**S. sonchi**

12 Conidia 49-65µm long, 3-6 septate, on *Chrysanthemum*.....**S. chrysanthemella**

12: Conidia 50-90µm long, 5-7 septate, on *Carthamus*.....**S. carthami**

13 Conidia (15-) 20-25 (-32)µm long, hyperparasitic on other fungi.....**S. lagenophorae**

13: Not hyperparasitic on other fungi.....14

14 Conidia mostly less than 40µm long.....15

14: Conidia mostly more than 40µm long.....16

15 Conidia 18-30µm long, 1-3 septate, on *Carthamus*.....**Septoria** sp. aff. **carthamicola**

15 Conidia 30-40µm long, 3 septate, on *Chrysanthemum*.....**S. minima**

15: Conidia 24-40µm long, 1-4 septate, on *Conyza*.....**S. erigerontis**

16 Conidia 36-40μm long, 3 septate, on *Carduus*.....**Septoria** sp. aff. **associata**

16 Conidia (25-) 45-60(-96)μm long, 0-3 septate, on *Galinsoga*.....**S. galinsogae**

16 Conidia (20-)32-60(-72)μm long, 2-4 septate, on *Podolepis*.....**S. podolepidis**

16: Conidia 35-65 (-75)μm long, 3-5(-9) septate, on *Silybum*.....**S. silybi**

Septoria adanensis Petrak, *Sydowia* 7: 40-41 (1953)

(Figs. 13, 33 C)

Leaf lesions hologenous, 3-6mm in diam., orbicular but often coalescing to form large blotches with an indefinite margin, upper surface lesions orbicular later becoming irregular, dark brown with indefinite margin, lower surface lesions similar but pale brown. *Conidiomata* scattered on lesions, immersed, 70-110μm in diam., pycnidial. *Ostiole* single, circular, opening narrow, 15-25μm, cells around the opening darkened and slightly thickened. *Conidiomatal wall* mostly 2 cells thick, often up to 3 cell layers around the ostiole, composed of pseudoparenchymatous tissue, textura angularis, 4-6μm diam., pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, doliiform 2-5 x 2.5-3μm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform to fusiform, (2-)3(-4) septate, straight to slightly curved, 22-36 x (1.5-)2-2.5μm with rounded to truncate base and rounded to occasionally tapered apex.

Hosts: *Chrysanthemum morifolium* Ramat., *C. indicum* L.

Distribution: New South Wales, Queensland (Simmonds 1966 in part as *S. chrysanthemella*).

This species was described originally from cultivated *Chrysanthemum indicum* L. in Turkey. Australian material examined agrees with the original description and subsequent descriptions by Punithalingam & Wheeler (1965), Punithalingam (1967) and Cejp & Dolejs (1967). Little is known of this species but it has been recorded previously from Hong Kong, India, Malaysia (Punithalingam 1967) and Czechoslovakia on *C. indicum* (Cejp & Dolejs 1967). Simmonds 1966 recorded *S. chrysanthemella* Sacc. on *C. indicum* in Queensland. Examination of several collections available has shown that some are *S. adanensis*.

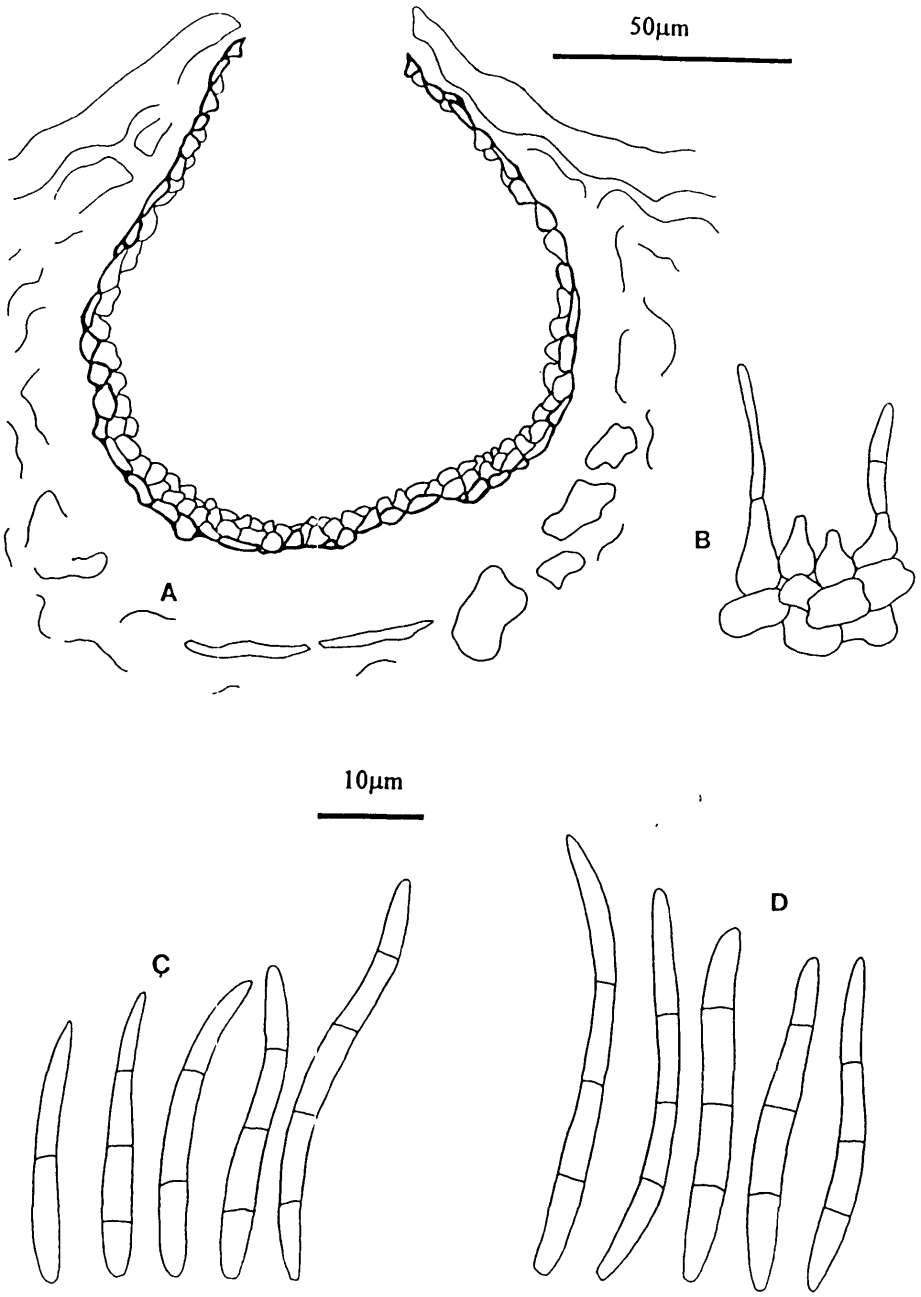

Fig. 13. *Septoria adanensis*; (A) v.s conidioma DAR 12843; (B) conidiogenous cells DAR 12843; (C) conidia DAR 12843 (D) conidia BRIP 5748 (culture)

Specimens examined:

New South Wales; Pennant Hills, Apr. 1953 (DAR 4735); on *C. indicum*; Horsley Park, 25 March 1964, D.L. White (DAR 12843) on *C. morifolium*; **Queensland**; Brisbane, 8 Apr. 1971 (BRIP 5748) as *S. chrysanthemella*; Indooroopilly, 2 Apr. 1965, J.H. Simmonds (BRIP 5828); Sunnybank, 5 Apr. 1965, J.L. Alcorn (BRIP 5829); Brisbane, 30 May 1983, R.C. Colbran (BRIP 13943) as *S. chrysanthemella.*

Septoria anaxaea Sacc., *Michelia* **1**: 189-190 (1878)

(Fig. 14)

Leaf lesions hologenous, irregular, 2-4mm diam. Upper surface lesions pale brown in centre with ill-defined raised black margin, lower surface lesions paler and lacking margin. *Conidiomata* amphigenous scattered on lesions, separate, immersed becoming erumpent, globose, 90-150μm diam, pycnidial. *Ostiole* single, apical, 20-45μm, surrounding 2-3 cells dark and thickened. *Conidiomatal wall* 3-4 cells thick, composed of pseudoparenchymatous tissue, textura angularis, cells 5-8μm diam., outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform to lageniform 8-12 x 3-4μm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, smooth-walled, 3(-6) septate, straight to slightly curved, (28-) 45-75 x 2.5-3μm with truncate base and tapering to a sub-acute to rounded apex.

Hosts: *Senecio glomeratus* Desf.. ex Poiret x *minimus* Poiret (hybrid), *S. gunnii* (Hook. f.) Belcher, *S. quadridentatis* Labill., *S. vagus* F. Muell., *Senecio* sp.

Distribution: New South Wales, Victoria (Brittlebank 1937-1940, Chambers 1982 as *S. anaxaea* on *Senecio vagus* and *S. martinii* on *Erechtites quadridentatus*).

Examination of the type specimen has confirmed the identity of this species. *Septoria anaxaea* was described from *Senecio praeltis* in Italy by Saccardo (1878) and all Australian collections examined on *Senecio* are morphologically indistinguishable from it. In the original description conidia were given as 50-70 x 3.5μm, but no conidia wider than 3μm were found in the type collection, where the range was 2.5-3μm. A few Australian collections have previously been identified as *S. anaxaea* on hosts given as *Erechtites* but these have now been transferred to *Senecio*. A single collection on

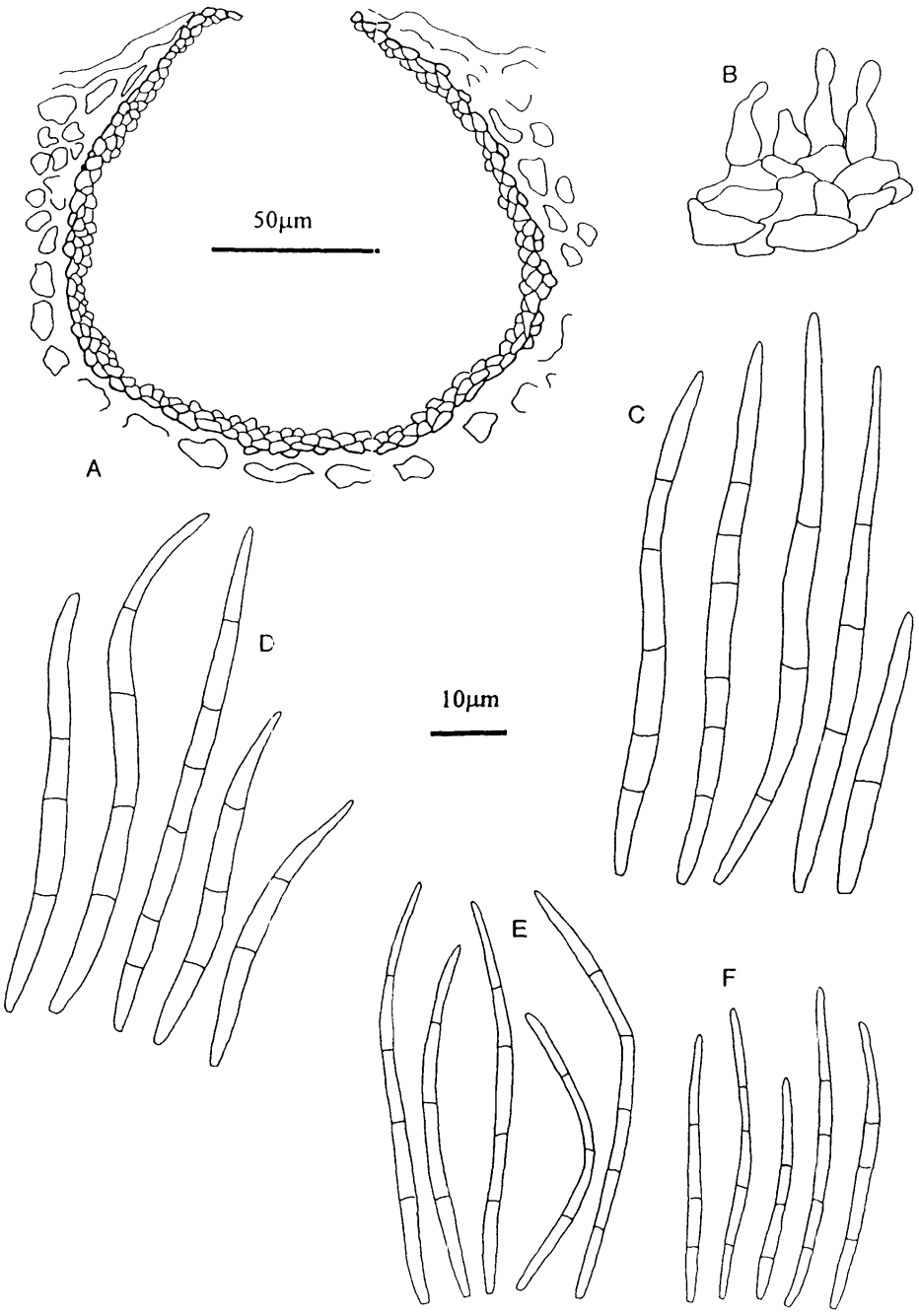

Fig. 14. *Septoria anaxaea* (A) v.s. conidioma DAR 60173; (B) conidiogenous cells DAR 60173; C-F conidia (C) DAR 60173; (D) type ex PAD; (E) *S. senecionis* DAR 47387; (F) *S. senecionis-silvatici* DAR 48322

Senecio quadridentatis Labill. (VPRI 1827) was named *S. martiniae* Cooke but this species is known currently only from *Bedfordia*. Examination of the collection has shown that it is *S. anaxaea*. Many species of *Septoria* have been described from *Senecio* including *Septoria senecionis* Westend. (conidia 35-50 x 1.5μm), *S. senecionis-silvatici* Syd. (conidia 30-50 x 1-2μm), *S. selloi* Speg. (conidia 25-40 x 1.5-1.75μm) and *S. sanzii* Unamuno (conidia 25-37 x 1.5-2μm), all of which have narrower conidia than *S. anaxaea*. *Septoria websteri* Speg. (conidia 25-40 x 2-2.5μm) has conidia shorter than *S. anaxaea*. *Septoria putrida* Strasser has conidia 70-80 x 2 μm, of similar length and width to those of *S. anaxaea,* but are reported as being 10-12 septate. Examination of exsiccatus material of *S. senecionis* and *S. senecionis-silvatici* has shown that they are distinct from each other as well as from *S. anaxaea*. The occurrence of *S. anaxaea* in Australia is of interest as it has not been previously recorded outside Italy since its original description.

Specimens examined:

AUSTRALIAN COLLECTIONS:
on *Senecio glomeratus* x *minimus* (hybrid); **New South Wales**; Brown Mountain, 14 Dec. 1973, J. Walker (DAR 60173);

on *Senecio gunnii*; **New South Wales**; Tantangara Road, Lake Eucumbene, 19 Apr. 1987, M.J. Priest & I.G. Pascoe (DAR 71727);

on *Senecio quadridentatis*; **Victoria**; Ardmona, 1897, G.H. Robinson (VPRI 1827) host originally as *Erechtites quadridentatis;*

on *Senecio* sp; **Victoria**; Burmah Track, Grampians National Park, Oct. 1983, J.H. Warcup (VPRI 17649);

EXTRALIMITAL COLLECTIONS:
on *Senecio praeltus*, Montello, **Italy** (PAD) **holotype** of *S. anaxaea;*

Septoria senecionis Westend.; on *Senecio sarracenis* L.; **Austria**, *Krypt. Exs.* No.1935 (DAR 62908), on *Senecio nemorensis* ssp. *fuchsii*; **Roumania**, 24 May 1965, O. Constaninescu, *Herb. Mycol. Rom.* No 1817 (DAR 47307);

Septoria senecionis-silvatici on *Senecio sylvaticus*, Vilcea, **Roumania**, G. Negean, *Herb Mycol. Rom.* No. 2749 (DAR 48322).

Septoria sp. aff.. ***S. associata*** Bubák & Kabat, *Ann. Mycol.* **5**: 42 (1907)

(Fig. 15)

Leaf lesions hologenous, orbicular becoming irregular, 4-6mm diam., occasionally coalescing into large irregular blotches up to 16mm diam. Upper surface lesions pale grey brown in centre with mid to dark brown margin. Lower surface lesions similar but paler in colour with indistinct margin. *Conidiomata* mostly epigenous, scattered on lesions, separate, immersed becoming erumpent, depressed globose, dark brown to black, 80-110µm diam., pycnidial. *Ostiole* single, apical, 20-30µm, cells dark and thickened around opening. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, cells 4-8µm diam., outer cell layer thickened and dark brown, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform to lageniform 7-8 x 3.5-4.5µm producing conidia holoblastically, secession schizolytic, with subsequent conidia produced enteroblastically and seceding at the same level through restricted conidiogenous loci. *Conidia* hyaline, filiform, smooth-walled, 3 septate, straight to curved, 36-48 x 1-1.5µm with narrowly rounded to obtuse base and slight tapered to an acute apex.

Host: *Carduus tenuiflorus* Curtis.

Distribution: New South Wales.

This collection has been difficult to place. Prior to this study the collection had been identified as *S. cirsii* Niessl but examination of exsiccatus material identified as that species shows conidia 27-50 x 2-2.5µm, much wider than Australian material. Two further collections on *Carduus* from the U.S.A. identified as *S. cirsii* have also been examined and these collections have conidia (12-)20-25(-35) x (1.0-)1.5µm which are shorter than seen in Australian material and are also not *S. cirsii*. From descriptions available this collection is very close to *Septoria associata* Bubák & Kabat described from *Carduus personata* (L.) Jacq. with conidia 18-45 x 1-1.5µm. Sameva (1991) recorded *S. associata* from Bulgaria on *C. personata* and gave conidia as 18.7-30.6 x 1µm. *Septoria cirsii-heterophylli* Petrak, described from *Cirsium heterophyllum* with conidia 21-40 x 1-1.5µm (Petrak 1925) and reported by Jorstad (1967) on the same host, has similar and overlapping conidial dimensions with *S. associata*. Both *Cirsium* and *Carduus* belong in the tribe Cynarae as defined by

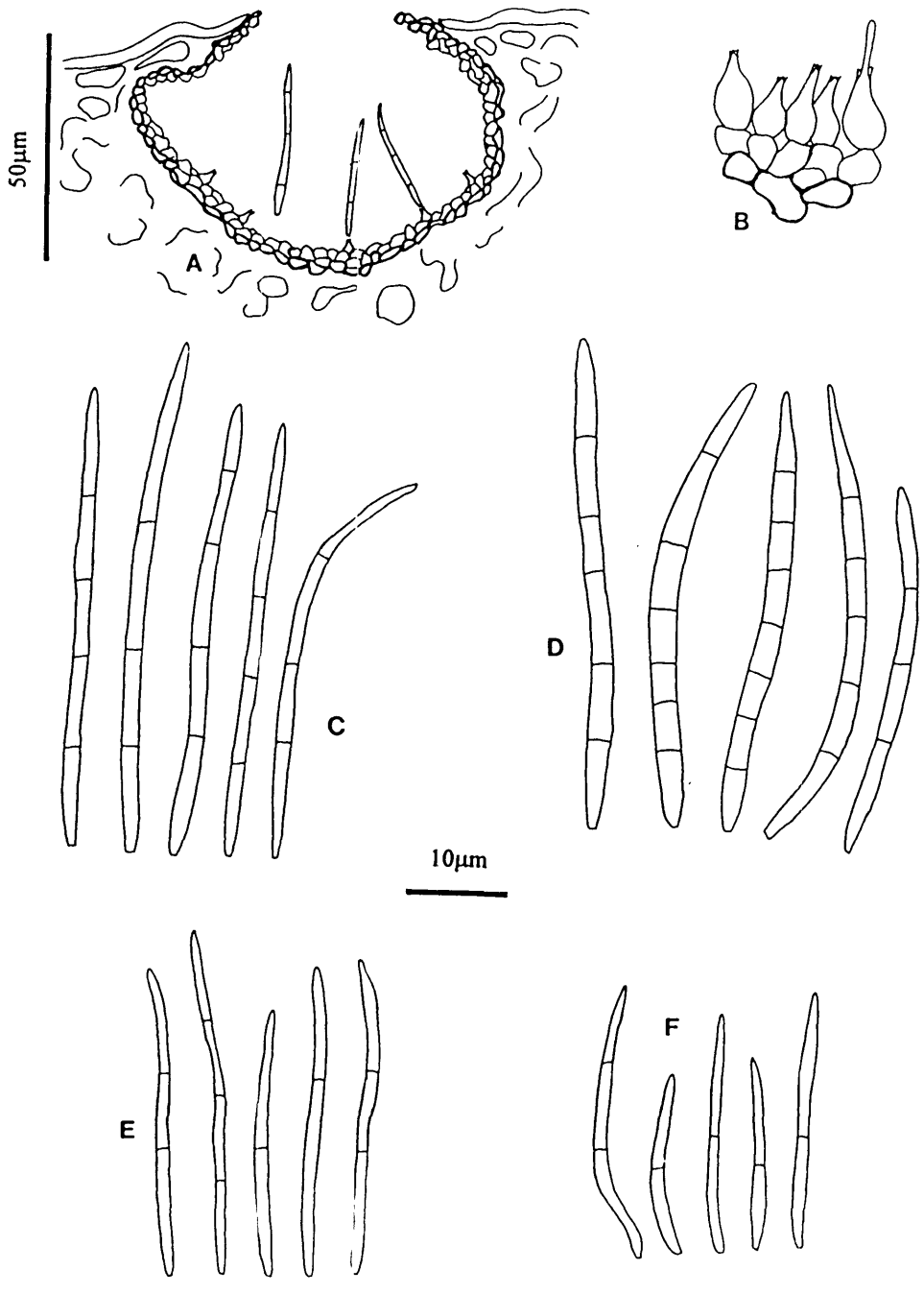

Fig.15. *Septoria* sp. aff *associata*; (A) v.s conidioma DAR 58797a; (B) conidiogenous cells DAR 58797a; C-F conidia; (C) DAR 58797a; (D) DAR 47382 (Europe); (E) DAR 15326 (U.S.A. as *S. cirsii*); (F) DAR 15165 (U.S.A. as *S. cirsii*)

Heywood *et al.* (1977) with other genera such as *Silybum* and *Carthamus.* Some *Septoria* species could occur on several host genera within the tribe. As *S. associata* is the earlier name for the two above similar taxa I have selected it as the better one to apply to Australian material.

Specimens examined:

AUSTRALIAN COLLECTION:
on *Carduus tenuiflorus*; **New South Wales**; Upper Dooralong, 16 June 1969, O.M. Williams (DAR 58797a).

EXTRALIMITAL COLLECTIONS:
Septoria cirsii on *Cirsium oleraceum*; **Roumania**, 31 Aug. 1966, O. Constantinescu, *Herb. Mycol. Rom.* No. 1812 (DAR 47382);

Septoria sp. as *cirsii* on *Carduus nutans*, Wisconsin, **U.S.A.**, 20 June 1957, H.C. Greene 2080 (DAR 15165 ex WIS), on *Carduus acanthoides*, Wisconsin, **U.S.A.**, 5 Aug. 1955, H.C Greene 1871 (DAR 15326 ex WIS).

Septoria bellidis Desm. & Rob., *Ann. Sci. Nat.* (Ser. 3) **20**: 85 (1853)

Listed by Brittlebank (1937-1940) and Chambers (1982) on *Bellis perennis* L. in Victoria in 1923. No herbarium specimen under this name has been located and the record cannot be verified.

Septoria carthami Murashk., *Mitteil. Westsibir. Abt. Russ.Geogr. Ges.* **5**: 3 (1926)

(Fig. 16)

Leaf lesions hologenous, orbicular to irregular, 3-5mm diam., occasionally coalescing to form larger irregular blotches. Upper surface lesions pale grey brown in centre with raised dark brown margin and pale yellow brown chlorotic halo. Lower surface lesions paler in colour and lacking the raised margin and chlorotic halo. *Conidiomata* at first epigenous but later becoming amphigenous, separate, immersed, dark brown to black, globose, 140-200μm diam., pycnidial. *Ostiole* single, apical, circular, 20-25μm diam, opening surrounded by darkened slightly thickened cells. *Conidiomatal wall* 4-5 cells thick, composed of pseudoparenchymatous cells, textura angularis, thickened and dark brown in the

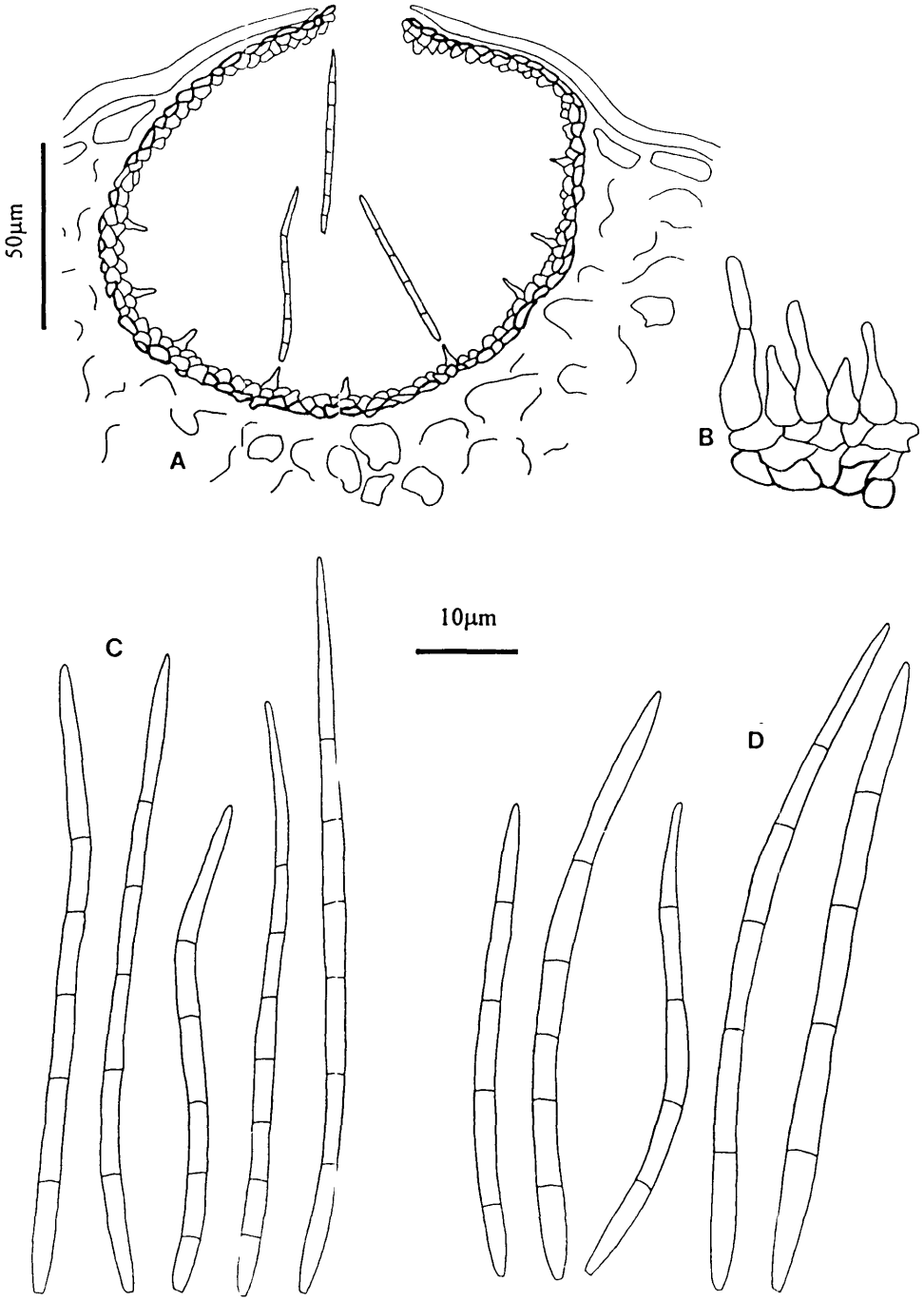

Fig. 16. *Septoria carthami*; (A) v.s conidioma DAR 22062; (B) conidiogenous cells DAR 22062; (C) conidia DAR 22062; (D) conidia DAR 31036 (ex LPS)

outer wall layer, becoming paler to hyaline in the inner wall layers. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, occasionally septate, ampulliform, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, 5(-7) septate, straight to slightly curved, (50-) 65-90 x 2μm, with truncate base and rounded to sub-acute apex.

Host: *Carthamus tinctorius* L. (Safflower).

Distribution: New South Wales (Anon. 1972).

This specimen agrees in all respects with the description of *S. carthami* given by Punithalingam (1980) and with exsiccatus material examined. It is known in Australia only from a single collection in New South Wales. According to Punithalingam (1980), this species is quite distinct from several others described on *Carthamus* by its longer more septate conidia.

Specimens examined:

AUSTRALIAN COLLECTION:
on *Carthamus tinctorius*; **New South Wales**; "Rawsonville", Dubbo-Narromine, 24 Nov. 1970, G. Stovold & K. Moore (DAR 22062).

EXTRALIMITAL COLLECTION:
on *Carthamus tinctorius*, La Plata, **Argentina**, 8 Dec 1938, J. Lindquist (DAR 31016 ex LPS 3350).

Septoria sp. aff. ***S. carthamicola*** Tropover apud Kokhryakova, *Blezni i Vrediteli Maslichnykh Kul'tur* **1**(2): 35 (1934)

(Fig. 17)

Leaf lesions hologenous, orbicular to irregular, 2-5mm diam. Upper surface lesions grey-brown with an ill-defined margin, lower surface lesions similar. *Conidiomata* scattered on lesions, at first epigenous but later amphigenous on older lesions, separate, immersed, globose, dark brown to black,70-90μm diam, pycnidial. *Ostiole* single, apical, slightly papillate, 10-15μm, cells around the opening thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from

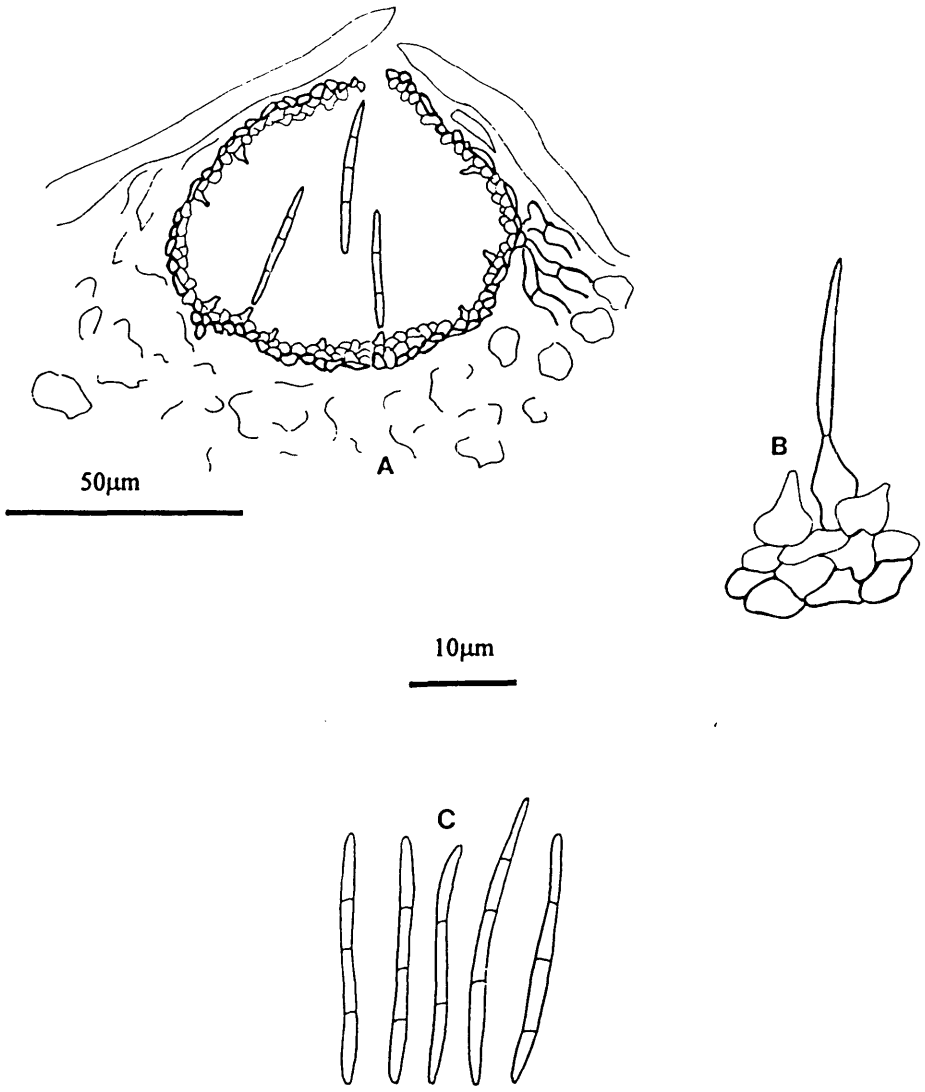

Fig. 17. *Septoria* sp. aff. *carthamicola* DAR 24369b; (A) v.s conidioma: (B) conidiogenous cells; (C) conidia

inner wall layer, discrete, hyaline, occasionally septate, ampulliform, 7-10 x 3μm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, 1-3 septate, straight to curved, 18-30 x 1μm with truncate base and acute apex.

Host: *Carthamus tinctorius* L. (Safflower).

Distribution: New South Wales (Anon. 1975 as *Septoria* sp.).

Septoria carthamicola was described originally from the Caucasus region of the U.S.S.R. In the original description conidia were given as 20-35 x 2μm and 2-3 septate and I have been unable to find any reference to its occurrence since then. Examination of a single collection on *C. tinctorius* in New South Wales shows conidia narrower than that described for *S. carthamicola* and with some similarity to *S. associata* on *Carduus*. However, its shorter conidia and enteroblastic conidiogenesis clearly differentiate it from this species. There appears to be a series of morphologically similar species defined by short narrow conidia occurring on hosts in the tribe Cynarae, which requires revision.

Specimen examined: on *Carthamus tinctorius*; Tamworth, **New South Wales**, 14 Dec. 1973, G. Hennessy (DAR 24369a).

Septoria centaureae (Roum.) Sacc., *Syll. Fung.* **3**: 551 (1884)
= *Phyllosticta centaureae* Roum. *Fungi gallici* No. 1633 (1881)
= *Septoria cyani* Hollós, *Ann. Mus. Nat. Hung.* **5**: 462 (1884)

(Fig. 18)

Leaf lesions hologenous, irregular, 4-7mm diam., upper surface lesions pale cream white in the centre with raised brown margin and purplish halo, lower surface lesions without distinct margin and halo. *Conidiomata* scattered over leaf lesions, at first epigenous but amphigenous on older lesions, separate, immersed, becoming erumpent, globose, dark brown, 80-120μm diam., pycnidial. *Ostiole* single, apical, central, circular, 20-30μm, cells around opening dark and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, ampulliform, 7-12 x 3-5μm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci.

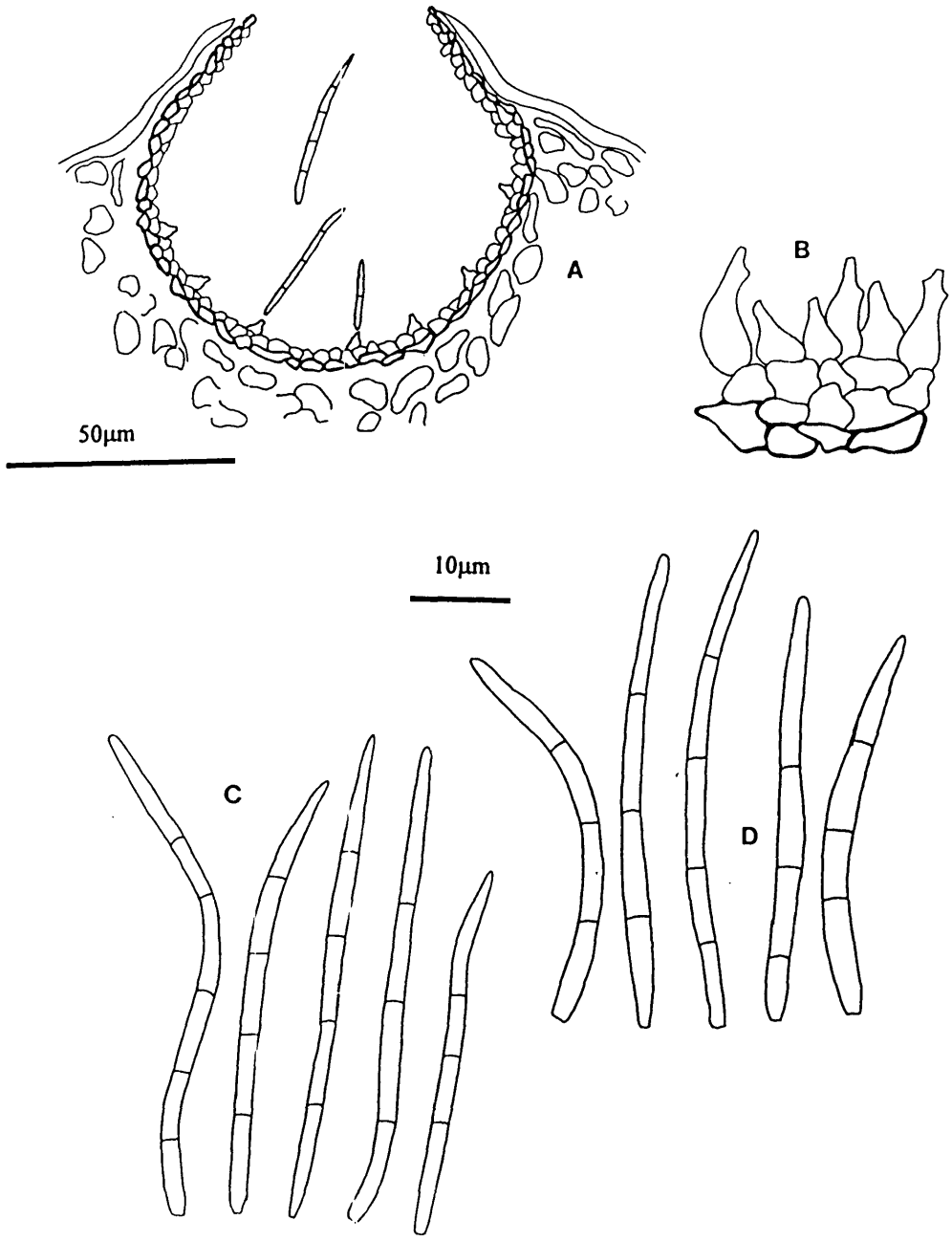

Fig.18. *Septoria centaureae*; (A) v.s conidioma DAR 1561; (B) conidiogenous cells DAR 1561; (C) conidia DAR 1561; (D) conidia DAR 14233a

Conidia hyaline, smooth-walled, filiform to fusiform, (2-)3-4(-5) septate, straight to curved, often flexuous, (20-)30-55 x (1.0-)1.5-2μm with truncate base and acute apex.

Host: *Centaurea cyanus* L. (Cornflower).

Distribution: New South Wales (Noble *et al.* 1935), Victoria (Brittlebank 1937-1940, Chambers 1982)

Saccardo (1884) described this species on *Centaurea nigra* in France with conidia 55-60 x 1.5-2μm and 2-4 septate. Grove (1935) also gave these dimensions for material from *C. nigra* in the U.K. There are many other species of *Septoria* described from *Centaurea* viz. *S. centauricola* Brun. from *C. scabiosa* in France with conidia 60-65 x 1-1.5μm, *S. cyani* Hollós from *C. cyanea* in Hungary with conidia 30-40 x 2μm, *S. centaureae-asperae* Unamuno from *C. aspera* in Spain with conidia 17.5-38.5 x 3.5-3.8μm, *S. aderholdii* Voglino from *C. candidissima* in Italy with conidia 22-30 x 2μ and *S. collinae* Gonz. Frag. on *C. collina* from Spain with conidia 30-48 x 1.7-2μm. Naito (1940) reported *S. cyani* from Japan with conidia 27.82-52.17 x 1.74-2.00μm and distinguished it from most of the above species on conidial size and disease characteristics. Andrianova (1992) studied several species of *Septoria* described by Hollós including *S. cyani,* and synonymised it under *S. centaureae*. Conidia in Australian collections are intermediate in size between the measurements given in the literature for *S. centaureae* and *S. cyani*. Revision of all species on *Centaurea* is obviously necessary.

Specimens examined: on *Centaurea cyanus*; **New South Wales**; Eastwood, 7 June 1965, Mrs. Dayman (DAR 14233a); **Victoria**; exact locality unknown, July 1922, W.A. Birmingham (DAR 1561).

Septoria chrysanthemella Sacc., *Syll. Fung.* **11**: 542 (1895)

≡ *S. chrysanthemi* Cav., *Atti. Inst. Bot. Univ. Pavia* (Ser.2) **3**: 266 (1892)

= *S. chrysanthemi* Rostr., *Bot. Tidsskr.* **21**: 48 (1897)

= *S. varians* Joffrin, *Compt. Rend. Seanc. Acad. Sci. Paris* **133**: 959 (1901)

= *S. chrysanthemi-indici* Bubák & Kabat, *Hedwigia* **46**: 194 (1907)

(Figs. 19, 33B)

Leaf lesions hologenous, orbicular to slightly irregular, 4-6mm diam. Upper surface lesions dark brown, raised with ill-defined margin, lower surface lesions similar. *Conidiomata* epigenous, scattered on lesions, separate, immersed, becoming erumpent, globose, dark brown, 90-110μm diam.,

pycnidial. *Ostiole* single, apical, central, 25-35μm, cells around the opening thickened. *Conidiomatal wall* 2-3 cells thick, 5-8μm diam., composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, lageniform to cylindrical, 6-10 x 2.5-3μm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, 3-6 septate, straight to slightly curved, 49-65 x 1.5 -2μm with truncate to rounded base and tapering to a sub-acute apex.

In-vitro; culture on PDA with pale brown aerial mycelium, reverse deep brown, on acidified PDA black in reverse with sparse areas of white aerial mycelium. *Conidiomata* aggregated and becoming papillate, pycnidial, 100-180μm diam, composed of dark brown pseudoparenchymatous tissue, textura angularis. *Conidiogenous cells* discrete, hyaline, lageniform to cylindrical 5-10 x 2.5μm, producing conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, 5-7 septate, straight to slightly curved, (30-)42-63 x 1.5(-2.0)μm with truncate base and tapering to an acute apex.

Hosts: *Chrysanthemum indicum* L., *Chrysanthemum* sp.

Distribution: Queensland (Simmonds 1966), Victoria.

According to Punithalingam and Wheeler (1965) and Punithalingam (1967a) this species is readily separated from others described from *Chrysanthemum* due to its long narrow conidia. *Septoria chrysanthemi* Cav. was originally described from *C. indicum* but the name was a later homonym of *chrysamthemi* Allesch. described from *C. leucanthemum*. Saccardo retained *S. chrysanthemi* Allesch. and renamed Cavara's species *S. chrysanthemella*. Suggested lists of synonyms of this species have been given by Hemmi & Nakamura (1927), Jørstad (1965) and Punithalingam & Wheeler (1965). In Japan, Hemmi & Nakamura (1927) named the disease caused by *S. chrysanthemella* black spot of *Chrysanthemum* to distinguish it from brown spot caused by *S. obesa* Syd. The physiology and pathogenicity of both *S. chrysanthemella* and *S. obesa* was studied by Waddell and Weber (1963) who in addition gave morphological differences between the two species. Comparison of Australian collections with named exsiccatus material including collections of Cavara under the name *S. chrysanthemi* Cav. confirm the identity of this species. Conidiogenesis in *S. chrysanthemella* was illustrated by Punithalingam (1967a) as holoblastic and sympodially proliferating. However, Verkley (1998) has clearly shown with transmission electron microscopy that both percurrent and sympodial

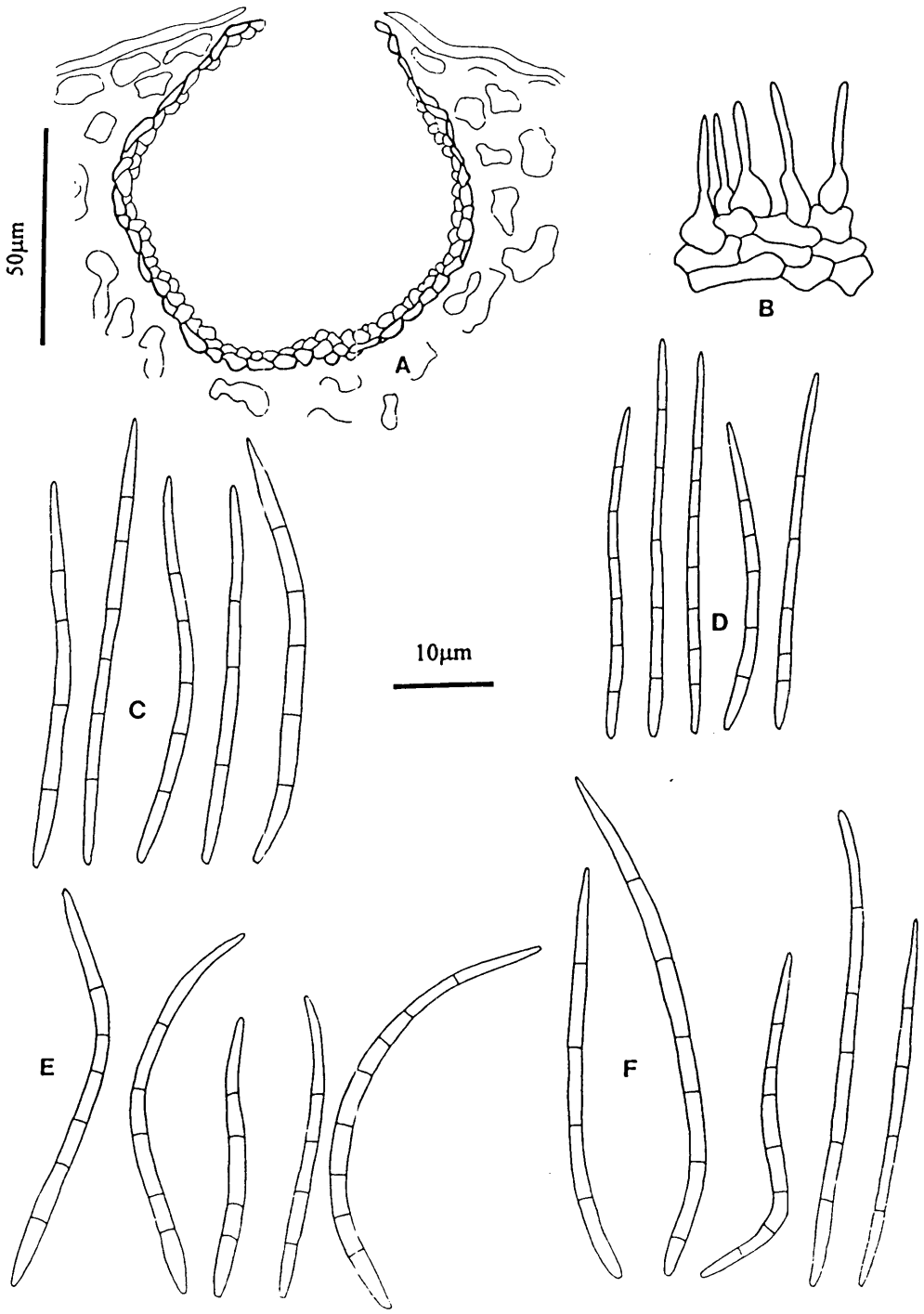

Fig.19. *Septoria chrysanthemella*; (A) v.s conidioma BRIP 5747; (B) conidiogenous cells BRIP 5747; C-F conidia; (C) BRIP 5747; (D) VPRI 12250; (E) DAR 47725 (ex BUCM); (F) DAR 22837 (ex IMI 105099)

proliferation can occur in a single conidiogenous cell.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Chrysanthemum indicum*; **Queensland**; South Brisbane, 30 Aug. 1914, H. Tryon (BRIP 5747);

on *Chrysanthemum* sp.; **Victoria**; Belgrave South, 1 Mar. 1984, R. Cantrill (VPRI 12250); culture only.

EXTRALIMITAL COLLECTIONS:

on *Chrysanthemum morifolium*; Silwood, **United Kingdom**, 28 Oct. 1962, E. Punithalingam (DAR 22837, BRIP 17677 both ex IMI 105099);

on *Chrysanthemum indicum*; Orto Botanico, Patavia, **Italy**, 1889, Briosi & Cavara, *I. Funghi Parastici* No. 221 (BRIP) as *S. chryanthemi* Cav.;

on *Chrysanthemum japonicum*; Orto privato, Granito, **Italy**, 1890, Briosi & Cavara, *I. Funghi Parasitici* No. 221 (BRIP) as *S. chrysanthemi* Cav.;

on *Leucanthemum vulgare*; Bucharest, **Roumania**, 20 May 1960, O. Savulescu & E. Eliade, *Herb. Mycol. Rom.* No. 1685 (DAR 47255 ex BUCM).

Septoria erigerontis Peck, *24th Rept. N.Y. State Mus. Nat. Hist.* 87 (1872)

= *Septoria erigerontis* Berk. & Curtis, *N. Am. Fungi* No. 437 (1874)

= *Septoria erigeronata* Thuem, *Bull. Soc. Imp. Nat. Moscou* **56**: 132 (1881)

= *Septoria stenactis* Vill. ex Syd., *Ann. Mycol.* **8**: 493 (1910)

= *Septoria erigerontis* Hollos, *Math. Termesz. Koslem. Magy. Tudom. Akad.* **35**: 57 (1926)

(Fig. 20)

Leaf lesions hologenous, orbicular, 1-3mm diam., on both surfaces lesions pale yellow-brown to mid-brown in the centre with dark brown margin and occasional purplish brown halo. *Conidiomata* epigenous, rarely hypogenous, scattered on lesions, separate, immersed, dark brown to black, globose, 100-110µm diam., pycnidial. *Ostiole* single, apical, slightly papillate, 20-25µm, cells around the

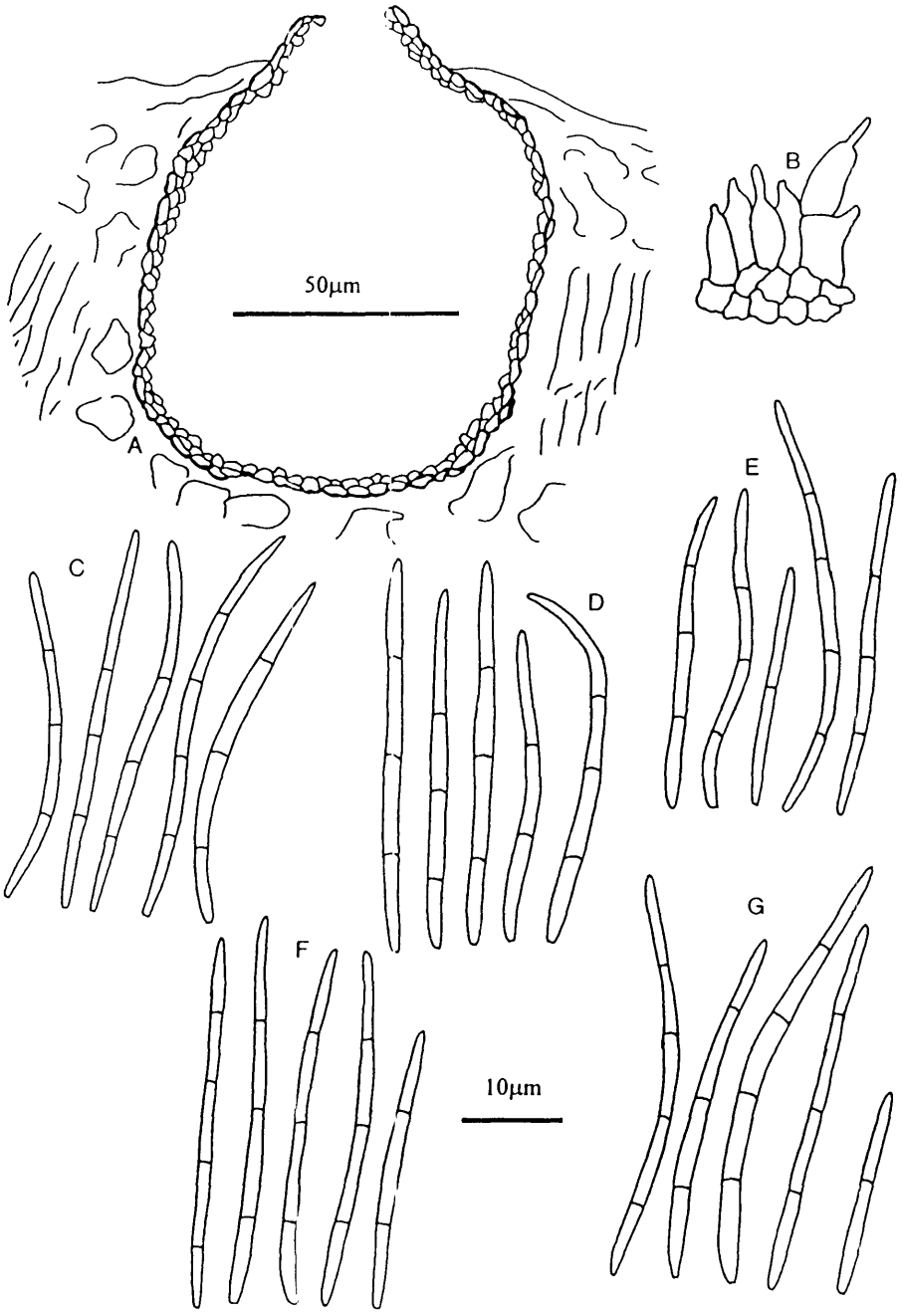

Fig.20. *Septoria erigerontis*; (A) v.s. conidioma BRIP 5830; (B) conidiogenous cells BRIP 5830; C-G conidia; (C) BRIP 5830; (D) DAR 50247 ex *Conyza* (plant); (E) DAR 31597 (Canada); (F) DAR 60818 ex *Conyza* (plant); (G) DAR 50427 ex *Conyza* (culture)

ostiole slightly thickened. *Conidiomatal wall* 3 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, hyaline, discrete, rarely integrated, ampulliform, 6-9 x 3.5-4.5µm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, (1-)3(-4) septate, straight to slightly curved, (17-)24-42 x 1-1.5(-2)µm with truncate to rounded base and rounded to sub-acute apex.

Hosts: *Conyza albida* Willd. ex Spreng., *C. bonariensis* (L.) Cronquist, *Conyza* sp.

Distribution: New South Wales (Walker & Priest 1986), Queensland (Alcorn 1972).

Australian collections on *Conyza* are morphologically indistinguishable from material examined under this name on *Erigeron* from the U.S.A. and Canada, including material on the type host *Erigeron annuus* (L.) Pers. Collections from Queensland examined are placed under the host name *Erigeron floribundus* (Kunth) Sch.-Bip., regarded as a misapplied name for *Conyza albida* (Jacobs & Pickard 1981). Hirayama (1931) dealt with this species under the name *S. erigerontis* Berk. & Curtis and described conidia as 19.8-52.5 x 1-2.3µm which is indistinguishable from those of *S. erigerontis* Peck. Other species described from *Erigeron* are *S. erigerontis* Hollos, *S. stenactis* Vill. on *Stenactis annua* (= *Erigeron annuum*) all of which are currently regarded as synonyms of *S. erigerontis* Peck (see Jørstad 1965). *Septoria chanousii* Died. was described from *E. uniflora* in Italy with conidia 45-50 x 1.5µm which are not different from those seen in collections of *S. erigerontis* or available descriptions. *Septoria conyzae* Died. was described from a *Conyza* sp. in India with conidia 20-40 x 2-3µm, much wider than seen in Australian collections on this host. Farr *et al.* (1989) list *Conyza canadensis* (L.) Cronq. (= *Erigeron canadensis*) as a host of *S. erigerontis* in the U.S.A.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Conyza albida*; **New South Wales**; Bega, 8 May 1975, J. Walker (DAR 57420); **Queensland**; Coes Creek, Nambour, 13 Feb. 1968, J.L. Alcorn (BRIP 5767); Beerwah, 25 Feb. 1975, J.L. Alcorn (BRIP 5830) host as *Erigeron floribundus*;

on *Conyza bonariensis*; **New South Wales**; Springwood, 14 Sept. 1984, E. Maddocks (DAR 50243);

on *Conyza* sp.; **New South Wales**; Baulkham Hills, 21 Sept. 1987, J. Walker 87/51 (DAR 60818).

EXTRALIMITAL COLLECTIONS:

on *Erigeron annuus* (L.) Pers.; Columbus, Ohio, **U.S.A.**, 19 May 1903, W.A. Kellerman, *Ohio Fungi* No. 136 (DAR 50567); Linden, New Jersey, **U.S.A.**, 15 Sept. 1892, B D. Halsted, *Seymour & Earle Economic Fungi* No. 311 (DAR 50999); Granton, Ontario, **Canada**, 20 Sept. 1913, J. Dearness, *Sydow Fungi Exotici Exs.* No. 432 (VPRI);

on *E. philadelphus*; Ontario, **Canada**, 12 June 1943, R.F. Cain (DAR 31597 ex TRTC 19012);

on *E. ramosus* (Walt.) B.S.P.; Columbus, Ohio, **U.S.A.**, 15 Apr. 1903, W.A. Kellerman, *Ohio Fungi* No. 156 (DAR 50587);

on *Conyza canadense* (L.) Britt.; Kansas, **U.S.A.**, 30 June 1902, E. Bartholomew, *Fungi Columbiani* No. 1680 (DAR 62476) host as *Leptilon canadense* (L.) Britt.

Septoria galinsogae Speg., *Ann. Soc. Cient. Argent.* **13**: 15-16 (1882)

(Fig.21)

Leaf lesions hologenous, orbicular to angular, 2-3mm diam., upper surface lesions pale cream to brown with raised brown margin, lower surface lesions similar but lacking margin. *Conidiomata* scattered on lesions and petioles, separate, immersed, becoming erumpent, black, globose, (60-)90-130µm diam., pycnidial. *Ostiole* single, apical, central, ostiole opening 15-20µm diam., thickening not observed. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, dark brown and thickened in outer layer, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, lageniform, 5-7 x 3µm. producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, cylindrical, (0-)3 septate, straight to flexuous, (25-)45-60(-96) x 1-1.5µm with truncate base and rounded apex.

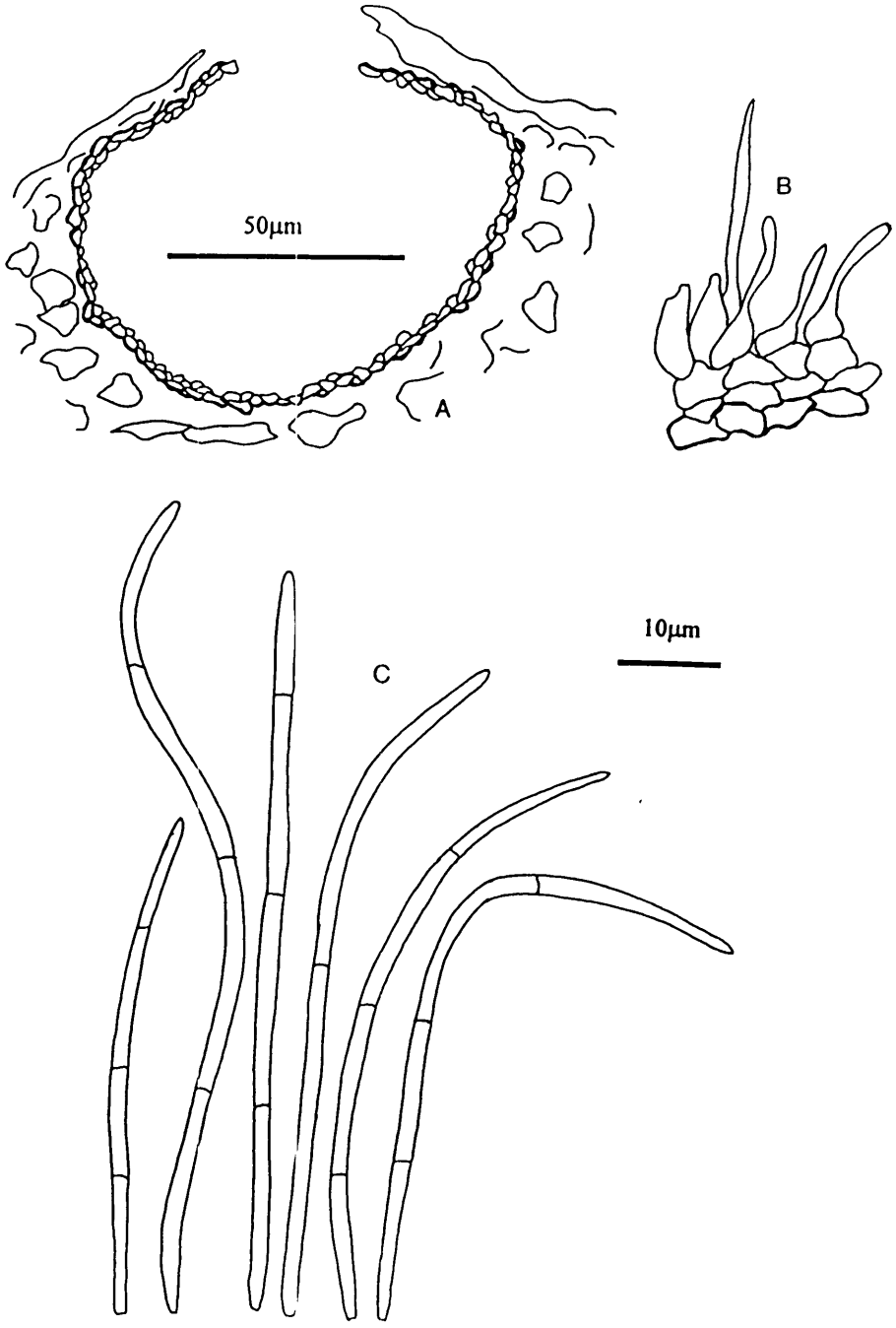

Fig.21. *Septoria galinsogae* DAR 4151 (A) v.s. conidioma; (B) conidiogenous cells; (C) conidia

Host: *Galinsoga parviflora* Cav. (Potato weed).

Distribution: New South Wales (Anon. 1950), Queensland.

This species was originally described on *Galinsoga parviflora* from Argentina (Spegazzini 1882) with conidia given as 40-60 x 1μm, and is the only species described from this host. Australian material compares well morphologically with the original description, although collections from Australia show some conidia of up to 96μm. There appears to be, until now, no other reports of the occurrence of *S. galinsogae* outside Argentina since its original description.

Specimens examined: on *Galinsoga parviflora*; **New South Wales**; Glenorie, Apr. 1950, L.R. Fraser (DAR 4151); Glenorie, Mar. 1956, L.R. Fraser (DAR 5701);North Coast, exact locality not given, 15 Oct. 1949, W. Sutton (DAR 4152); **Queensland**; Cooroy, 23 May 1967, J.L. Alcorn (BRIP 5770); Nambour, 27 July 1966, J.L. Alcorn (DAR 5832); without locality, date or collector (BRIP 5883).

Septoria gerberae Syd., *Ann. Mycol.* **10**: 43 (1912)

(Fig. 22)

Leaf lesions hologenous, orbicular to irregular, 3-5mm diam., often coalescing into large blotches up to 15mm diam., upper surface lesions dark purplish brown, becoming pale grey in the centre, slightly raised with distinct purple-brown margin, lower surface lesions paler in colour with indistinct margin. *Conidiomata* epigenous, scattered on lesions, separate, immersed, becoming erumpent, black, globose, 80-95μm diam., pycnidial. *Ostiole* single, apical, 20-30μm, cells around the ostiole dark and thickened. *Conidiomatal wall* 2-3 cell layers thick, composed of pseudoparenchymatous tissue, textura angularis, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, doliiform to obclavate, 5-7 x 3-5μm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, filiform, cylindrical, (1-)3(-4) septate, straight to slightly curved, (15-)22-29 x 2.5-3(-4)μm with truncate base and slightly narrowing to rounded apex.

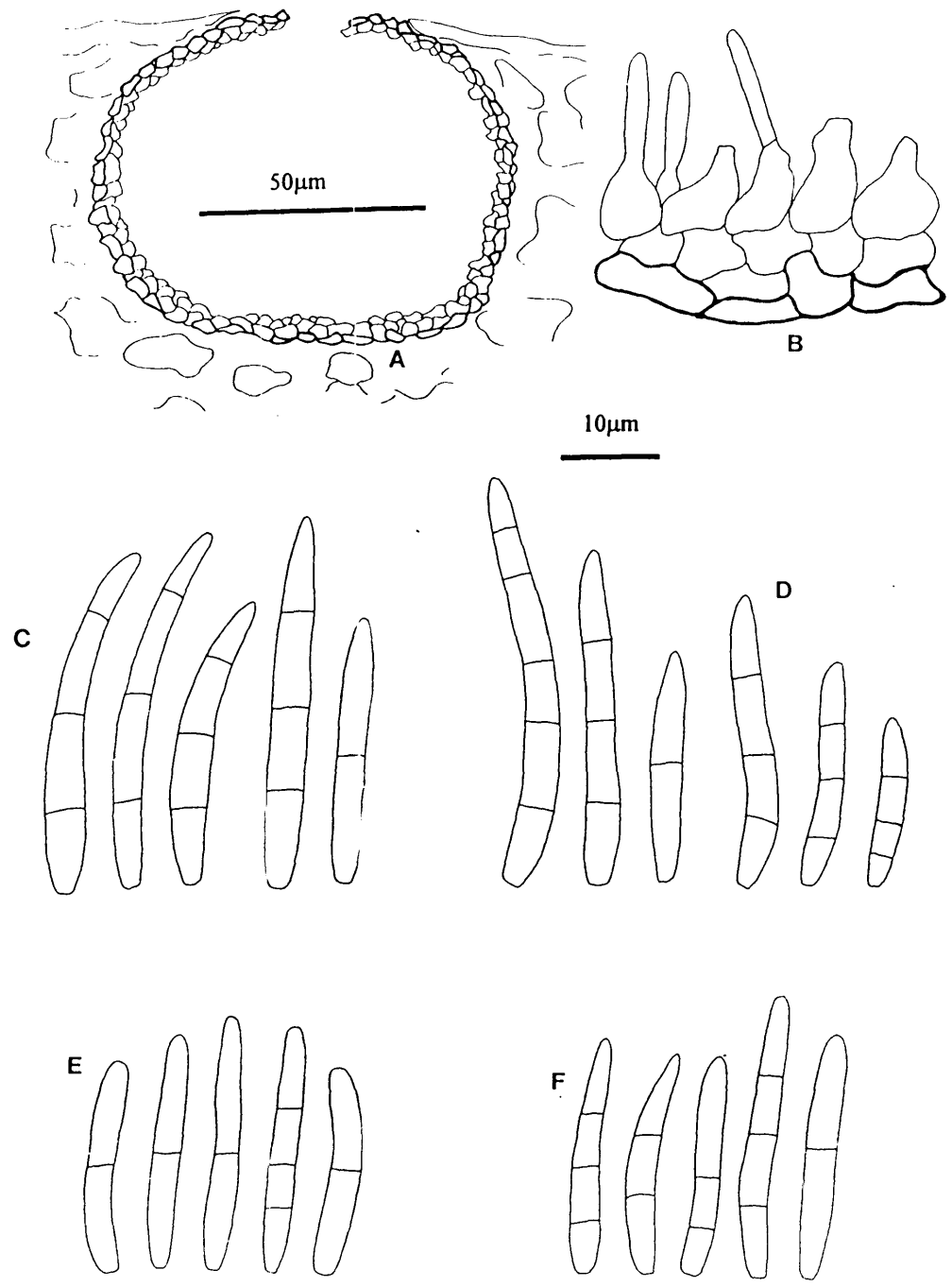

Fig.22. *Septoria gerberae*; (A) v.s. conidioma DAR 1610; (B) conidiogenous cells DAR 1610; C-F conidia; (C) DAR 1610; (D) type ex S ; (E) DAR 22840 ex IMI 73877; (F) DAR 13314 ex IMI 99731

Host: *Gerbera jamesonii* Bolus

Distribution: New South Wales (Hynes *et al* 1941, Anon. 1951), Queensland (Simmonds 1966), South Australia (Warcup & Talbot 1981, Cooke & Dube 1989),Victoria (Chambers 1982), Western Australia (Goss 1964, Shivas 1989, report only)

Comparison with the type collection has confirmed the identity of Australian collections. A second species, *S. gerbericola* Sawada, has been described on *Gerbera anandria* from Japan but I have been unable to sight the original description of that species and compare it with *S. gerberae*. *Gerbera jamesonii* is grown throughout the world as an ornamental plant and *S. gerberae* has been recorded in South Africa on *G. jamesonii*, *G. discolor* Sond. and *G. burmanii* Cass. (Doidge 1950), and from Rhodesia (Whiteside 1966), New Zealand (Pennycook 1989), Fiji and Tonga (Dingley *et al.*1981) and Barbados (Norse 1974) on *G. jamesonii*.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Gerbera jamesonii*; **New South Wales**; Epping, Mar. 1929 (DAR 1610); Sydney, Apr. 1925, R.J. Noble (DAR 1608); Hornsby, Jan. 1962 (DAR 1606); no locality, date or collector (DAR 1607); Sydney, May 1941, L.R. Fraser (DAR 3925); Beecroft, Mar. 1941, L.R. Fraser (DAR 3926); Mullumbimby, Apr. 1970, E.S. Flowers (DAR 19877); Mullumbimby, 22 Apr. 1986, J. McMaugh (DAR 56097); **Queensland**; Botanic Gardens, Brisbane, 29 Jan. 1926, J.H. Simmonds (BRIP 5772); Brisbane, 26 June 1926, R. von Steight (BRIP 5834); Chapel Hill, Brisbane, 4 Feb. 1988, J.L. Alcorn 8803 (BRIP 16090); **South Australia**; Meningie, June 1953, L.D. Williams (ADW 3434); **Victoria**; Silvan, Dec. 1954, E.E. Fisher (VPRI 1785).

EXTRALIMITAL COLLECTIONS:

on *Gerbera jamesonii*; Pretoria, **South Africa**, 23 Apr. 1906, J.B. Pole Evans (S) **holotype**; Nairobi, **Kenya**, June 1953, R.M. Nattrass (DAR 22840 ex IMI 73877); Moshi, **Tanganyika**, 5 Mar. 1963, D.R. Watson (DAR 13314 ex IMI 99731).

Septoria helianthi Ellis & Kellerman, *American Naturalist* **17**: 1165 (1883)

(Fig. 23)

Leaf lesions hologenous, orbicular to irregular, 4-9mm diam., on both surfaces lesions pale brown

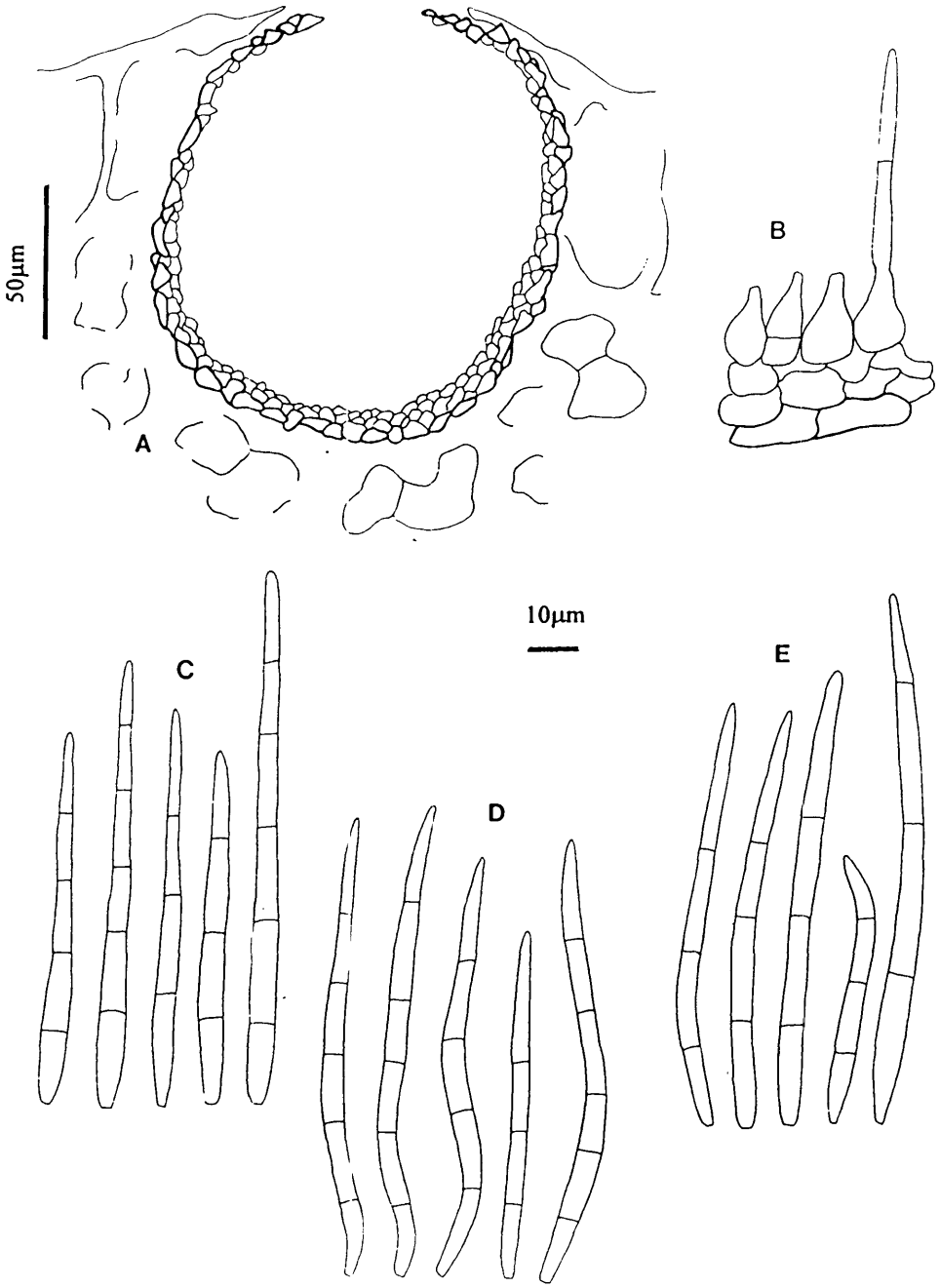

Fig.23. *Septoria helianthi*; (A) v.s conidioma DAR 23074; (B) conidiogenous cells DAR 23074; C-E conidia: (C) DAR 23074; (D) DAR 25995; (E) DAR 48778 (Kellerman Ohio Fungi)

with indistinct margin. *Conidiomata* epigenous, scattered on lesions, separate, immersed, black, globose, 90-140μm diam., pycnidial. *Ostiole* single, apical, central, 20-30μm, no thickening around the opening observed. *Conidiomatal wall* 2-4 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer pale yellow brown, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, clavate to obpyriform, 4-6 x 3μm producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, 3-5 septate, straight to slightly curved, 43-60(-85) x 2.5-3μm with truncate base and tapering slightly to rounded apex.

Host: *Helianthus annuus* L. (Sunflower), *H. argophyllus* L.

Distribution: New South Wales (Anon. 1977), Queensland (Simmonds 1956, Simmonds 1966), Victoria (Brittlebank 1937-1940, Woodcock & Clarke 1983 report only).

Septoria helianthi is the cause of leaf spot of sunflower which can cause severe defoliation and subsequent loss of yield (Holliday & Punithalingam 1970). In Australia *S. helianthi* is known only from Queensland and New South Wales, reports of its occurrence in Victoria being unconfirmed by herbarium material. Several species of *Septoria* have been described from species of *Helianthus* including *S. helianthicola* Cooke & Harkness with conidia 30-35 x 1μm on *H. annuus* in the U.S.A., *S. paupera* Ellis with conidia 45-55 x 1-1.5μm on *H. divaricatus* L. in the U.S.A. and more recently the newly described *S. helianthina* Petrov & Arsenijevic (1996) on *H. annuus* in Yugoslavia. Both Petrov & Arsenijevic (1996) and Holliday & Punithalingam (1970) have summarised the differences between all described species. Australian collections have been compared with exsiccatus material of *S. helianthi* with which they agree morphologically.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Helianthus annuus*; **New South Wales**; Inverell, 8 Jan. 1973, P. Walters (DAR 23074); Glen Innes, 14 Dec. 1973, J. Brown (DAR 24476); Molong, 6 Feb. 1976, W. McDonald (DAR 25995); **Queensland**; Wooroolia, 28 June 1974, G. McCarthy (BRIP 8398);

on *Helianthus argophyllus* ; **Queensland**; Yepoon, Dec. 1982, D. George (BRIP 14123).

EXTRALIMITAL COLLECTIONS:

on *Helianthus annuus*; Columbus, Ohio, **U.S.A.**, 6 June 1901, W.A. Kellerman, *Ohio Fungi* No. 58 (DAR 48778); Passaic, New Jersey, **U.S.A.**, 12 June 1892, B.D. Halsted, *Seymour & Earle Economic Fungi* No.316 (DAR 51004); London, **Canada**, 1893, J. Dearness, *Fungi Columbiani* No.74 (DAR 52072); Billing, Montana, **U.S.A.**, 11 Sept. 1915, E. Bartholomew, *Fungi Columbiani* No. 4984 (DAR); **Northern Rhodesia**, 15 Feb. 1962, A. Angus (DAR 22841 ex IMI 95774).

Septoria helichrysicola Priest, **sp.nov.**

Etymology: from host genus *Helichrysum*

(Fig.24)

Maculae hologenae, orbicularae vel elongatae, 3-7mm diam, pallide brunneae cum margine distincto. *Conidiomata* amphigena, pycnidialia, immersa, separata, globosa, 130-175µm diam, crassitudine 2-3 cellularum, parietes pseudoparenchymatici, textura angulari, brunnea compositi. *Ostiolum* singulum, apicale, papillatum, 25-35µm diam. *Cellulae conidiogenae* e cellulis interioribus conidiomatum formatae, discretae, hyalinae, obpyriformes vel lageniformes, 9-15 x 5.5-7µm, holoblastica simplicia conidia producentes. *Conidia* hyalina, filiformia, (2-)3(-8) septata, recta vel curvata, laevia, 45-69 x 3.5-4µm, deminuta versus basim truncatum et apicem rotundatum.

Holotypus; in foliis *Helichrysi ramosissimi* Hook., Mount Tambourine Road, propre Camp Cable, Queenslandia, Australia, 14 October 1974, J.L. Alcorn (BRIP 8955)

Leaf lesions hologenous, orbicular to elongated, 3-7mm diam., upper surface lesions pale brown with diffuse dark brown margin and creamy brown necrotic halo, lower surface lesions similar but lacking margin and halo. *Conidiomata* amphigenous, scattered on lesions, separate, immersed, dark brown, globose, 130-175µm diam., pycnidial. *Ostiole* single, apical, central, slightly papillate, 25-35µm diam, cells slightly thickened around the opening. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, 5-9µm diam, outer layer pale brown and scarcely thickened, inner layers very pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, obpyriform to lageniform, 9-15 x 5.5-7µm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, (2-)3(-8) septate, straight to slightly curved, 45-69 x 3.5-4(-5)µm, tapering to truncate base and tapering apically to a rounded apex.

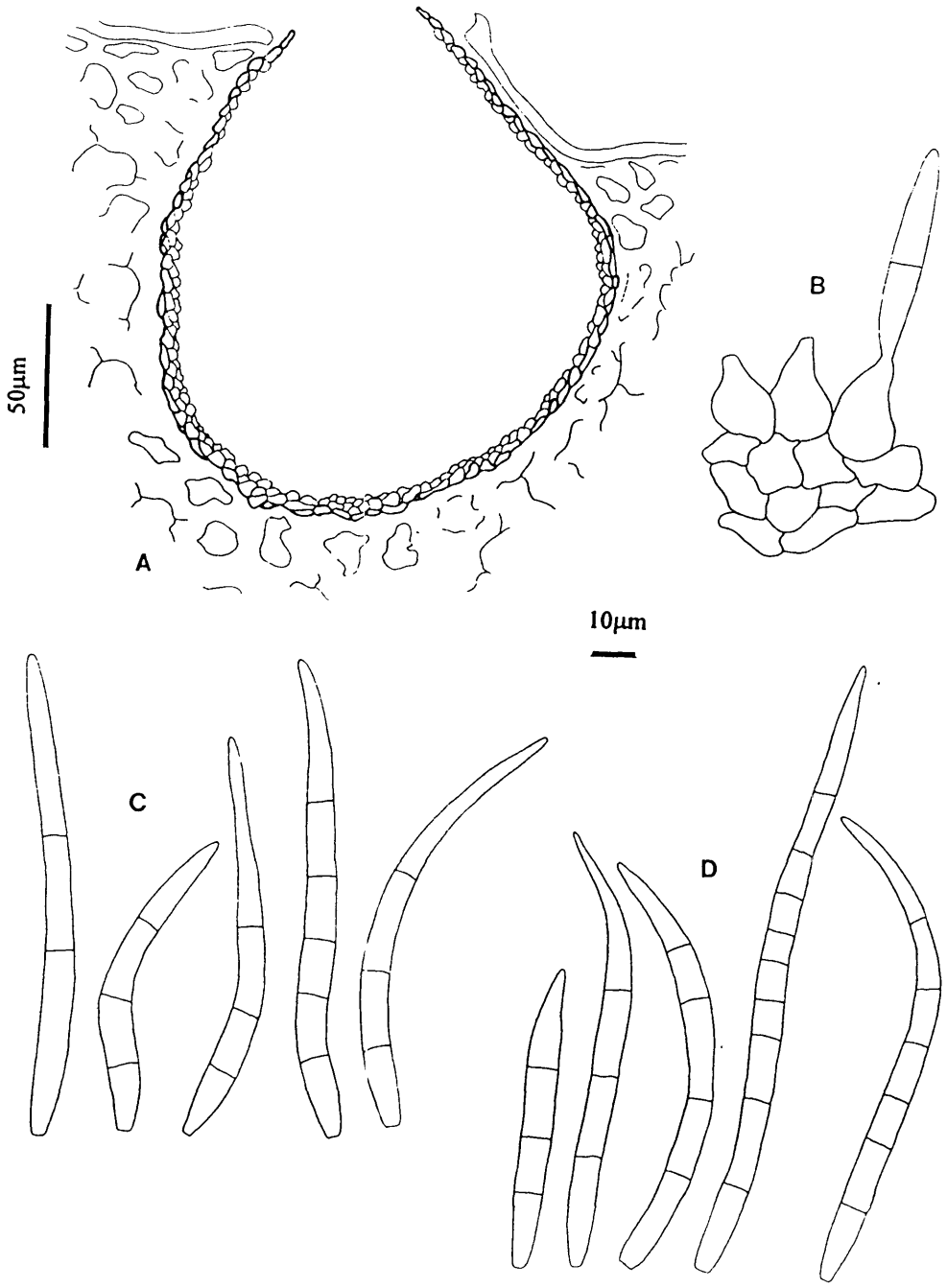

Fig. 24. *Septoria helichrysicola* BRIP 8955; (A) v.s. conidioma; (B) conidiogenous cells; (C) conidia (host); (D) conidia (culture)

Host: *Helichrysum ramosissimum* Hook.

Distribution: Queensland.

Although only known from a single collection, *S. helichrysicola* is distinctive enough to be described as new. The only species described to date from *Helichrysum* is *S. helichrysi* H. Syd. & Syd. (Sydow & Sydow 1912) on *Helichrysum* sp. from South Africa with conidia 30-80 x 1μm, much narrower than those of *S. helichrysicola*. Similar taxa with long wide conidia are *S. anaxaea* on *Senecio*, *S. helianthi* on *Helianthus* and *S. obesa* on *Chrysanthemum*. The conidia of *Septoria helichrysicola* are wider (3.5-4μm) than those of *S. anaxaea* and *S. helianthi* which are 2.5-3μm and are generally shorter (45-69μm) than those of *S. obesa* which has conidia up to 105μm long. A dried down culture accompanying the specimen shows growth of only 5-6mm after one month on PDA with black mycelium and some white mycelial strands overlying the culture. The conidiomata are very clumped in the centre. Conidia from culture are very similar to those found *in-vitro*.

Specimen examined: on *Helichrysum ramosissimum;* **Queensland**; Mount Tambourine Road, near Camp Cable, 14 Oct. 1974, J.L. Alcorn (BRIP 8955) **Holotype**.

Septoria intermedia Ellis & Everhart, *Journal of Mycology* **5**:159 (1889)

Listed by Garman and Stevens (1920) as occurring in Australia and New Zealand. *Septoria intermedia* was described from *Solidago* in Wisconsin, U.S.A. and there is no record of it occurring in either Australia or New Zealand. As Garman and Stevens (1920) extracted all of their data from Saccardo's *Sylloge Fungorum*, the reason for their listing of this species in Australia and New Zealand is unclear.

Septoria ixodiae Hansf., *Proc. Linn. Soc. N.S.W.* **81**: 35-36 (1956)

(Fig. 25)

Leaf lesions hologenous irregular, elongated, bounded by leaf veins, 10-12 x 3mm, upper surface lesions mid-brown without definite margin, lower surface lesions paler with a diffuse pale yellow margin. *Conidiomata* epigenous, scattered on lesions, separate, immersed, globose, black, 80-110μm diam., pycnidial. *Ostiole* single, apical, central, 25-35μm, cells around opening slightly thickened. *Conidiomatal wall* 3 cell layers thick, composed of pseudoparenchymatous tissue, textura angularis,

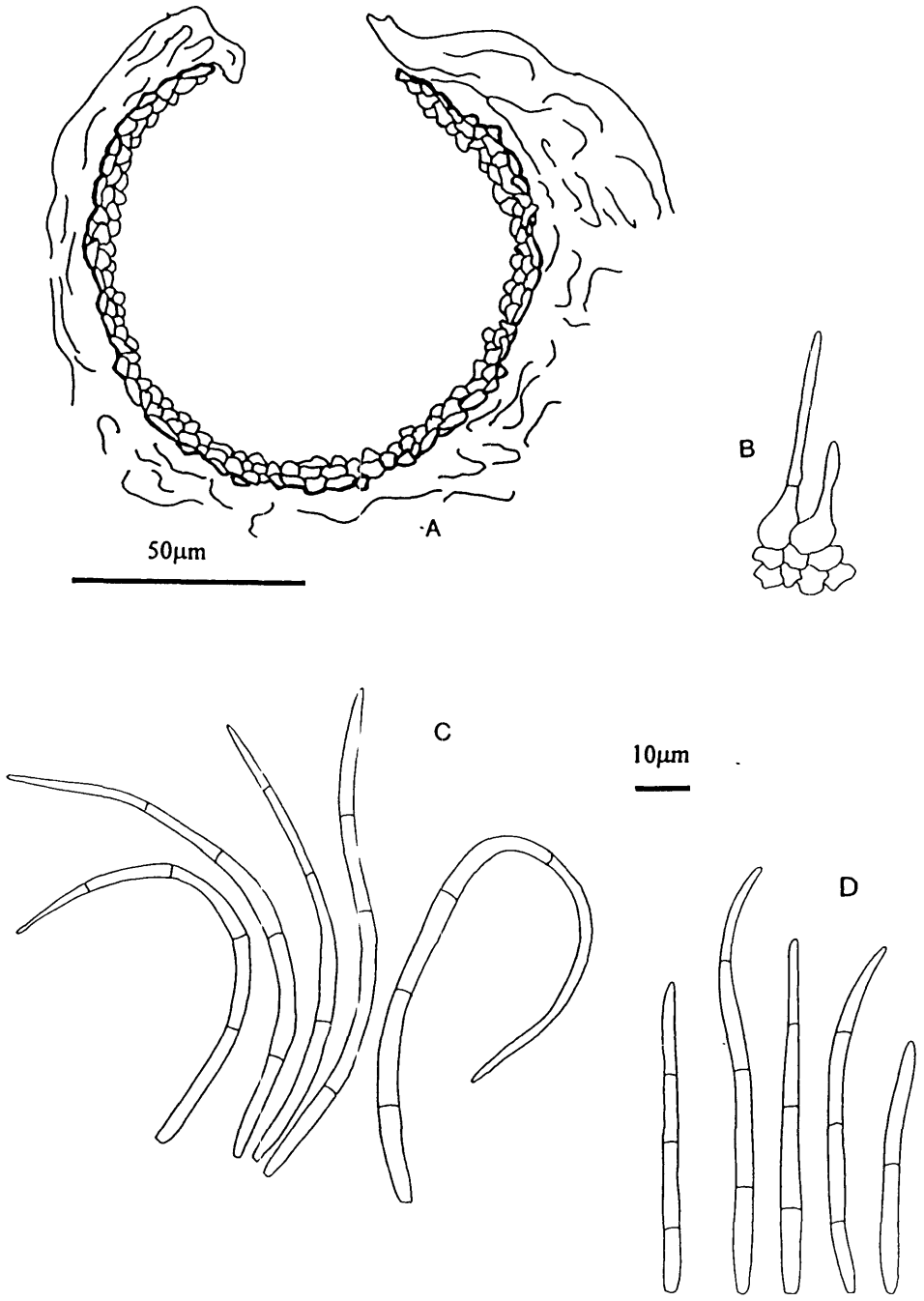

Fig.25. *Septoria ixodiae*; (A) v.s conidioma ADW 3793 (type); (B) conidiogenous cells ADW 3793; (C) conidia ADW 3793; (D) conidia VPRI 17271

outer wall layer dark brown, inner layers becoming pale brown to sub-hyaline. *Conidiogenous cells* arising from inner wall layer, discrete, ampulliform to obpyriform, 6-11 x 1.5-2.0μm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, (1-)3(-4) septate, straight to strongly curved, (43-)60-110 x 3-3.5μm, with truncate base and slight tapering to rounded apex.

Teleomorph:

Mycosphaerella ixodiae Hansf., *Proc. Linn. Soc. N.S.W.* **81**: 35 (1956)

(Fig.26)

Ascomata mostly epigenous, scattered on older lesions amongst pycnidia, discrete, immersed, scarcely erumpent, black, globose, 140-175μm diam. with single apical, slightly papillate ostiole. *Ascomatal wall* 3 cell layers thick, composed of pseudoparenchymatous tissue, textura angularis, fuscous brown and slightly thickened. *Asci* bitunicate, aparaphystae, ellipdoidal, 58-66 x 11-13μm, sessile, 8-spored. *Ascospores* hyaline, smooth-walled, 2-3 seriate, fusiform with rounded base and apex, centrally 1-septate, non-constricted, 18-20 x 3.5-4μm.

Hosts: *Ixodia achilleioides* R. Br., *I. alata* Schldl.

Distribution: South Australia (Hansford 1956, Warcup & Talbot 1981, Cooke & Dube 1989), Victoria.

The closest species to *S. ixodiae* morphologically is *S. obesa* which has conidia of a similar length and width at 56-85(-105) x (2.5-)3-4μm. However, *S. ixodiae* is at most 4-septate compared to *S. obesa* which is mostly 5-9 septate. Examination of the type collection has revealed both the anamorph and teleomorph to be present and little variation from the original description was seen. *Septoria ixodiae* has been rarely recorded since the original description even though *Ixodia achilleioides* is currently widely grown as an ornamental crop for cut flower production in South Australia and recent reports of diseases in plantation situations do not include *S. ixodiae* (Hall *et al.* 1996). In the type collection most of the conidia seen were strongly curved compared to those seen in VPRI 17271 from Victoria. However, conidiogenesis, conidial length and width in all collections were identical.

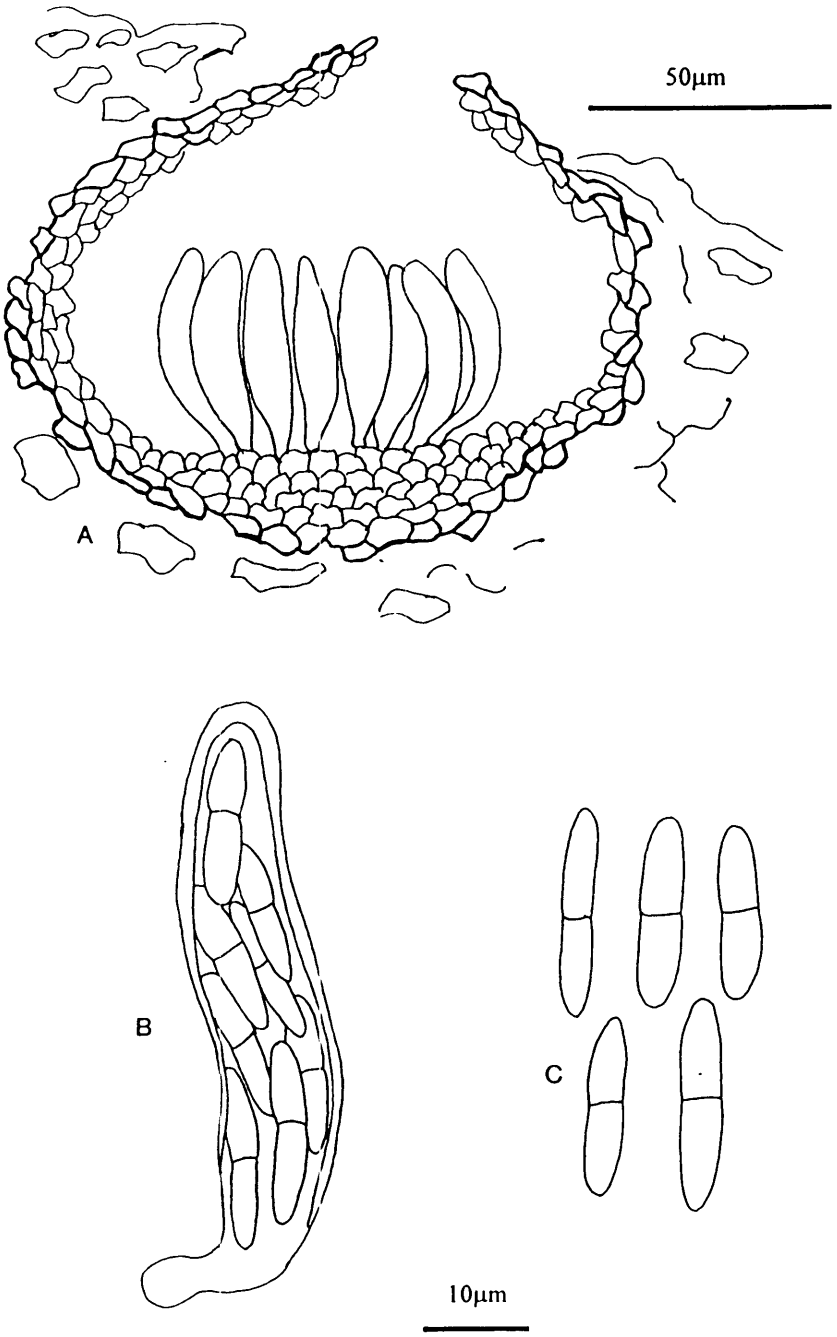

Fig.26. *Mycosphaerella ixodiae* ADW 3797 (type); (A) v.s. ascoma; (B) ascus; (C) ascospores

Specimens examined:

on *Ixodia alata*; **Victoria**; Longford, 7 Sept. 1990, A. Sivapalan (VPRI) 17271;

on *Ixodia achilleioides*; **South Australia**; Mount Lofty, May 1954 C.G. Hansford (ADW 3793) **holotype** of *Septoria ixodiae* and *Mycosphaerella ixodiae*.

Septoria lactucae Pass., *Erbar. Critt. Ital.* (Ser. 2), 746 (1878)

= *Septoria lactucae* Peck, *Bot. Gaz.* **4**: 170 (1879)

= *Ascochyta lactucae* Rostrup, in *Thuem. Myc. Univ.* No. 2095 (1882)

= *Septoria lactucicola* Ellis & Martin, *Am. Nat.* **16**: 1002 (1882)

= *Septoria consimilis* Ellis & Martin, *J. Mycol.* **1**: 100 (1885)

(Fig. 27)

Leaf lesions hologenous, orbicular to irregular, 3-7mm diam., on both surfaces lesions at first brown becoming creamy in the centre with indistinct margin. *Conidiomata* amphigenous, mostly epigenous, scattered on lesions, separate, immersed becoming erumpent, black, globose, 90-200µm diam., pycnidial. *Ostiole* single, apical, 5-15µm diam., cells around opening slightly thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer mid to dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, doliiform to lageniform, 5-9 x 3-5µm, producing conidia holoblastically, secesion schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, cylindrical, 1-3 septate, straight to slightly curved, 22-32(-36) x 2-2.5(-3)µm with truncate base and rounded apex.

Hosts: *Lactuca sativa* L. (Lettuce), *L. serriola* L. (Prickly lettuce).

Distribution: New South Wales (Noble *et al.* 1935, Brittlebank 1937-1940, Anon. 1945, Anon. 1971), Northern Territory (Pitkethley 1970), Queensland (Blackford 1944, Aberdeen 1946, Simmonds 1966), South Australia, Tasmania (Sampson & Walker 1982), Victoria (Brittlebank 1937-1940, Harrison *et al* 1975, Washington & Nancarrow 1983), Western Australia (Shivas 1989, report only).

Septoria lactucae is one of several species described from *Lactuca* spp. throughout the world. Punithalingam & Holliday (1972) summarised the morphological differences between all of these species on the basis of conidial measurements. Examination of type material of *S. lactucae* has

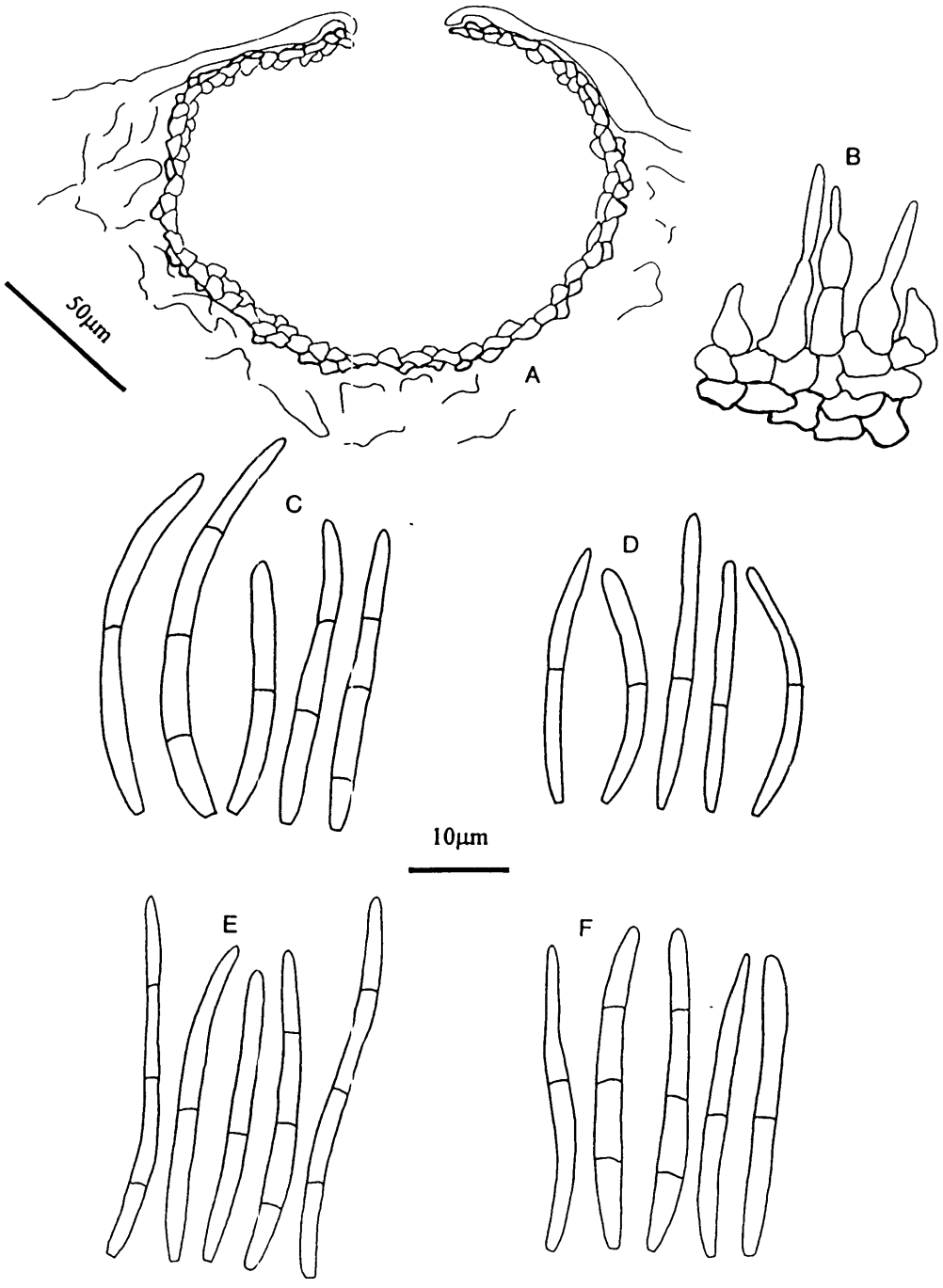

Fig.27. *Septoria lactucae* (A) v.s. condioma DAR 1376; (B) conidiogenous cells DAR 1376; C- F conidia (C) DAR 1376; (D) type ex MEL; (E) *S. consimilis* DAR 68823; (F) *S. lactucicola* DAR 53434

shown conidia to be 24-32 x 2μm similar to those described originally for this species. Over the range of Australian collections examined, length and septation of conidia is consistent with that reported by authors such as Jørstad (1965) but are much wider at 2-2.5(-3)μm compared with Punithalingam & Holliday who gave width of conidia as 1.5-2μm. Examination of exsiccatus material of *S. lactucicola* Ellis & Martin (on *L. serriola*) and *S. consimilis* Ellis & Martin (on *L. sativa*) from the U.S.A. shows that both are indistinguishable from *S. lactucae* although some conidia of *S. consimilis* can be narrower at 1.5-2(-2.5)μm, consistent with the type collection. The type host of *S. lactucicola* is *L. canadensis*, not *L. sativa,* but from the original description it is not morphologically different from *S. lactucae*. In addition, Beach (1919) was able to cross-infect *S. lactucae* from *L. sativa* and *L. serriola* (as *L. scariola*) to *L. canadensis* and *Sonchus asper,* and isolates of *S. lactucicola* from *L .canadensis* to *L. sativa, L. serriola* (as *L. scariola*) and *Sonchus asper*. On both morphological and pathological evidence there is no reason the separate *S. lactucae* and *S. lactucicola.* The morphological similarity of *S. lactucae* and *S. sonchi* Sacc. suggests that revision of the *Septoria* spp. on *Lactuca* and *Sonchus* is required (Jorstad 1965). Beach (1919) was able to cross-inoculate isolates of *S. lactucicola* from *L. canadensis* to *Sonchus asper* but was unable to cross-inoculate isolates of *S. lactucae* from *L. sativa* to *S. oleraceus*. At present the two taxa on *Lactuca* and *Sonchus* are retained as separate species. Following de Vries & Jarvis (1987) the correct name for the host formerly known as *L. scariola* is *L. serriola.*

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Lactuca sativa*; **New South Wales**; Sydney, 1918 (DAR 145); Glen Innes, Mar. 1928 (DAR 1376); Wentworthville, May 1942, L.R. Fraser (DAR 3768); Experimental Farm, Bathurst, Jan. 1930, C.J. Magee (DAR 1377); Wellington, Apr. 1957, J. Walker (DAR 5195); Taree, July 1960; J.B. Noonan (DAR 5993); Grafton, Oct. 1961, J.R. Robson (DAR 6575); Maitland, Apr. 1962, J.A. Beck (DAR 7054); Baulkham Hills, 24 Apr. 1962, J. Walker (DAR 7286); Whitton, 4 Feb. 1969, P. Kable (DAR 17495); Griffith 11 Feb. 1969, D. Letham (DAR 17478); Armidale, 24 Feb. 1970, M. Whan (DAR 19616); Kellyville, 23 Jan. 1973, D. Hadfield (DAR 23075); Maroota, 26 Apr. 1974, M. McDonald (DAR 24396); Agnes Banks, 26 Nov. 1976, D. Letham (DAR 28418); Whitton, 7 Feb. 1969, L. Cunial (DAR 32012); Rydalmere, 29 Nov. 1978, D. Letham (DAR 33480); Queanbeyan, 4 May 1979, M.J. Keys (DAR 1969); Freemans Reach, 2 Apr. 1981, R. Ahern (DAR 37874); Mangrove Mountain, 21 Feb. 1988, M. Titley (DAR 61488); Kemps Creek, 1 Feb. 1988, G. Sanderson (DAR 61238); Eleebana, Feb. 1995, D. Hinchcliffe (DAR 71754); **Northern Territory**; Katherine, 4 June 1964, J. Heaton (DAR 13367); same locality, date and collector (DAR 13368); **Queensland**;

Wynnum West, 14 Oct. 1930, H. Mills (BRIP 5778); Eight Mile Plains, 28 Feb. 1967, J.L. Alcorn (BRIP 5784); Aspley, 3 Dec. 1969, R.A. Peterson (DAR 5938); Willawong, 7 Dec. 1993, D. Wright (BRIP 21478); **South Australia**; Ashbourne, 24 Feb. 1994, B. Philp (DAR 71755); **Tasmania**; Opossum Bay, 22 May 1978, V. Wheeler (DAR 44152); **Victoria**; Rosebud, 17 Apr. 1996, C. Copes (VPRI 20982); Clyde, 7 Mar 1996, K. Reidel (VPRI 21052);

on *Lactuca serriola*; **New South Wales**; Griffith, 10 June 1942, L.R. Fraser (DAR 4024); Griffith, Feb 1969, D. Trimboli (DAR 17477); Rockley, 17 Apr 1978, J. McGechan (DAR 31963); Glen Innes, 24 Dec 1967, C.E. Chadwick (DAR 49363); Griffith, 11 Feb 1969, D. Letham (DAR 57190);
EXTRALIMITAL COLLECTIONS:
Septoria consimilis; on *Lactuca sativa*; Brookings, South Dakota, **U.S.A.**, 11 Aug. 1892, T.Williams (DAR 68823 ex BPI 65345);
Septoria lactucae; on *Lactuca sativa*; Parma, Vigheffio, **Italy**, June 1878, G. Passerini, *Thuem. Myc. Univ.* No. 1295 (MEL) **type**; Parma, Vigheffic, **Italy**, June 1878, G. Passerini, *Erb. Critt. Ital. Ser. II* No. 746 (BRIP) **type**; on *Lactuca virosa* L.; Columbus, Ohio, **U.S.A.**, May 1903, W.A. Kellerman, *Ohio Fungi* No. 178; on *Lactuca serriola*; Wisconsin, **U.S.A.**, June 1894, *Fungi Columbiani* No. 436 (DAR 53587);
Septoria lactucicola; on *Lactuca serriola*; Bot. Garden, Michigan, **U.S.A.**, Aug 1873, G. Hicks, *Fungi Columbiani* No. 285 (DAR 53434) host as *L. scariola.*

Septoria lagenophorae McAlp., *Proc. Linn. Soc. N.S.W.* **57**: 561 (1903)

(Fig. 28)

Leaf lesions hologenous, irregular, 3-6mm diam., upper surface lesions pale to mid-brown with a dark brown margin, lower surface lesions paler and without definite margin. *Conidiomata* scattered on lesions and occasionally on petioles, separate, immersed becoming erumpent, globose, black, 80-120μm diam., pycnidial. *Ostiole* single, apical, central, 25-40μm, cells around the opening dark and thickened. *Conidiomatal wall* 2-4 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, doliiform, 6-10 x 2-3.5μm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced enteroblastically and seceding at the same level through a narrow conidiogenous locus. *Conidia* hyaline, smooth-walled, filiform, 1-2 septate, straight to flexuous, (15-)20-25(-32) x 1-1.5μm with truncate to rounded base and tapering to a rounded apex.

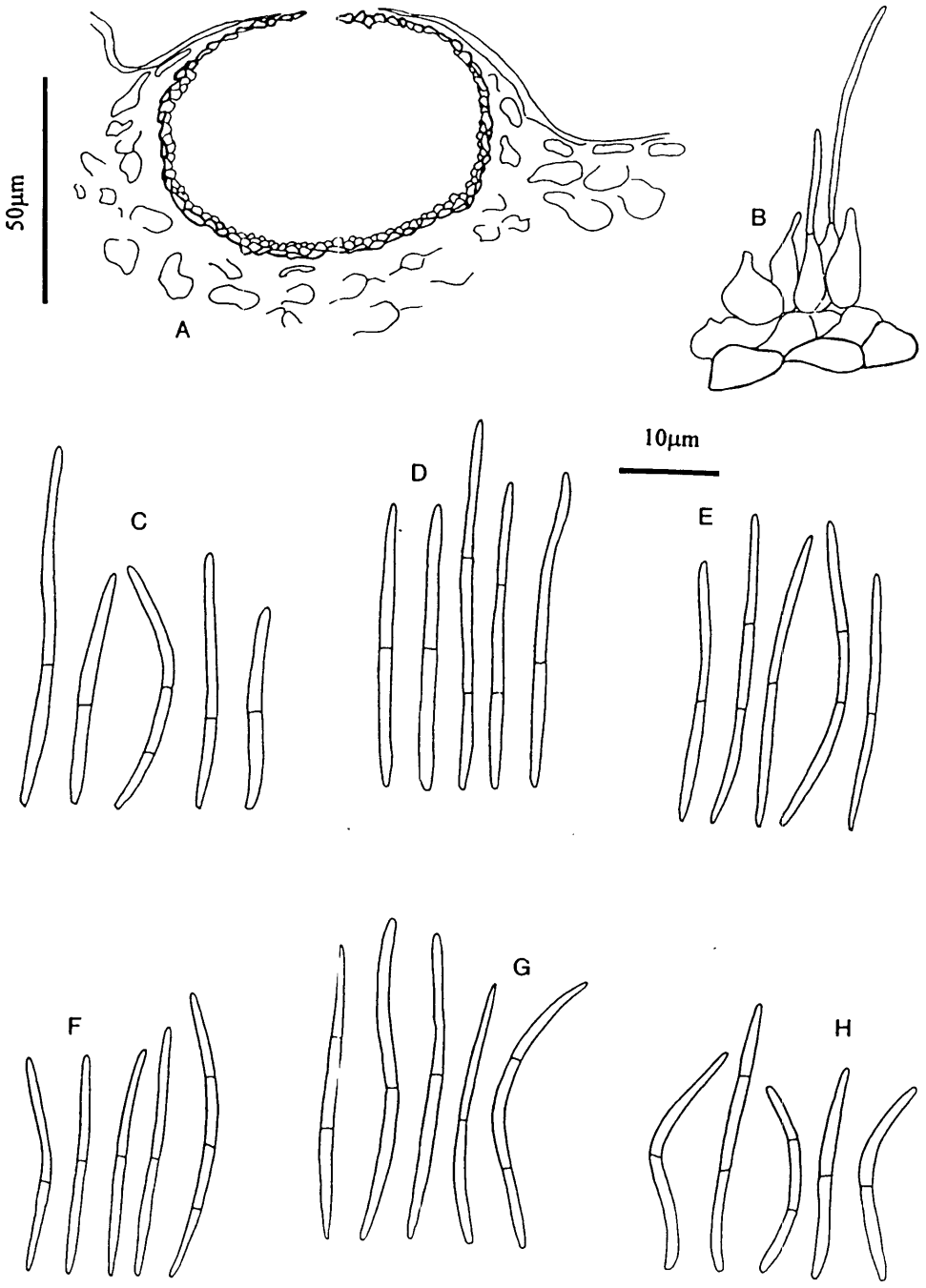

Fig.28. *Septoria lagenophorae*; (A) v.s conidioma VPRI 1797; (B) conidiogenous cells VPRI 1797; C-H conidia; (C) VPRI 1797; (D) VPRI 1800; (E) DAR 60821b; (F) BRIP 22023b; (G) DAR 58225; (H) ADW 6666

Hosts:

Hypochaeris radicata L. associated with *Puccinia hypochaeridis* Oud., *P. hieracii* (Rohl.) H. Mart. and *Ramularia hypochaeridis* Magnus;

Hypochaeris glabra L. associated with *P. hypochaeridis*;

Duchesnea indica (Andre) Focke associated with *Frommeella duchesnae* (Arth.) Yohem, Cummins & Gilbertson;

Lagenophora billardierii associated with *Puccinia lagenophorae* Cooke;

Lagenophora sp. associated with *Puccinia lagenophorae*.

Distribution: New South Wales, Queensland, South Australia (Warcup & Talbot 1981, Cooke & Dube 1989; as *S. hypochaeridis*), Victoria (McAlpine 1903, Brittlebank 1937-1940 as both *S. hypochaeridis* and *S. lagenophorae*, Chambers 1982 as *S. hypochaeridis*)

Septoria lagenophorae appears to be a hyperparasite associated principally with rusts but occasionally other leaf spotting fungi. Jørstad (1965, p. 59) reported a species of *Septoria* being associated with *Pucciniastrum arcticum* Tranz. on *Rubus arcticus* L. with conidia 14-26 x 1µm. This species of *Septoria* is probably *S. ficariaecola* Sacc. described (conidia 18-20 x 1.5µm, 1-septate) which is associated with *Aecidiumn ficariae* on *Ficaria ranunculoides*. The type collection of *S. lagenophorae* consists of three microscope slides and a single leaf. The microscope slides have dried out and no useful information could be obtained from them. The leaf specimen has few leaf spots and even fewer conidiomata are present. No attempt was made to examine the material due to the paucity of conidiomata present. Another collection of *S. lagenophorae* (VPRI 1800) had more conidiomata present and in all respects was identical with the original description with conidia 14-28(-34) x 1.5µm and 1-2 septate. Examination of the material identified as *S. hypochaeridis* by McAlpine and cited by him has also been examined and showed conidia (15-) 20-25 (-32) x 1-1.5µm and 1-septate. Over the range of material on *Hypochaeris* examined conidia are identical and are usually 1-2 septate. The collection on *Duchesnea* is associated with the rust *Frommeella duchesnae* and is identical in all respects with other material. *Septoria duchesnae* Hemmi & Naito (Naito 1940) was described with conidia 27-54 x 1.3-2µm and 1-5 (mostly 3) septate which are longer and more septate than *S. lagenophorae*. All the collections on *Hypochaeris* until now have been identified as *S. hypochaeridis* (Allesch.) McAlp.; however there is no evidence that it is the correct name to apply to the taxon under consideration. In the original description of *Rhabdospora hypochaeridis* Allesch. the conidia are described as being 16-30 x 0.6-1µm and curved, suggesting the β-conidia of *Phomopsis* rather than *Septoria*. In addition *R. hypochaeridis* was described as occurring on dead stems of *Hypochaeris*

radicata, not leaves, and, there is no mention of the fungus being associated with a rust such as *Puccinia hypochaeridis*, an association obvious in all Australian material examined. Whether *S. lagenophorae* is conspecific with *S. ficariaecola* awaits examination of the type collection of the latter taxon.

Specimens examined:

on *Duchesnea indica*; **Queensland**; Chapel Hill, 9 May 1994, J.L. Alcorn (BRIP 22023b) associated with *Frommeella duchesnae*;

on *Hypochaeris glabra*; **New South Wales**; Centennial Park, Oct. 1910, A.A. Hamilton (DAR 58225b); **Queensland**; Sunnybank, 29 Oct. 1965, J.L. Alcorn (BRIP 3555) both associated with *Puccinia hypochaeridis*;

on *Hypochaeris radicata*; **New South Wales**; Baulkham Hills, 21 Nov. 1987, J. Walker (DAR 60821b) associated with *Ramularia hypochaeridis*; **South Australia**; Meningie, Feb. 1956, L.D. Williams (ADW 6666) associated with *Puccinia hieracii*; **Victoria**; Doncaster, Oct. 1903, D. McAlpine (VPRI 1797) associated with *Puccinia hypochaeridis*;

on *Lagenophora billardieri*; **Victoria**; Kiewa Valley, 14 Nov. 1902, G.H. Robinson (VPRI 1799) **holotype** of *S. lagenophorae* McAlp., associated with *Puccinia lagenophorae*;

on *Lagenophora* sp.; **Victoria**; Bright, 17 Dec. 1904, C. French Jnr (VPRI 1800) associated with *Puccinia lagenophorae*.

Septocyta martiniae (Cooke) Priest, **comb. nov.**

≡ *Septoria martiniae* Cooke, *Grevillea* **19**: 5 (1890)

(Figs. 29,30)

Leaf lesions epigenous, irregular, 3-5 mm diam., occasionally coalescing to form large blotches up to 35mm diam., dark brown to black. *Conidiomata* epigenous, scattered on lesions, separate, immersed, becoming erumpent, dark brown to black, unilocular to multilocular, (50-)120-220μm diam., eustromatic. *Ostiole* absent, opening apically by dehiscence of wall. *Conidiomatal wall* 2-3 cell layers thick in unilocular conidiomata, up to 7 cells thick in multilocular conidiomata, composed of pseudoparenchymatous tissue, *textura angularis*, outer wall layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, 6-10 x 3μm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled,

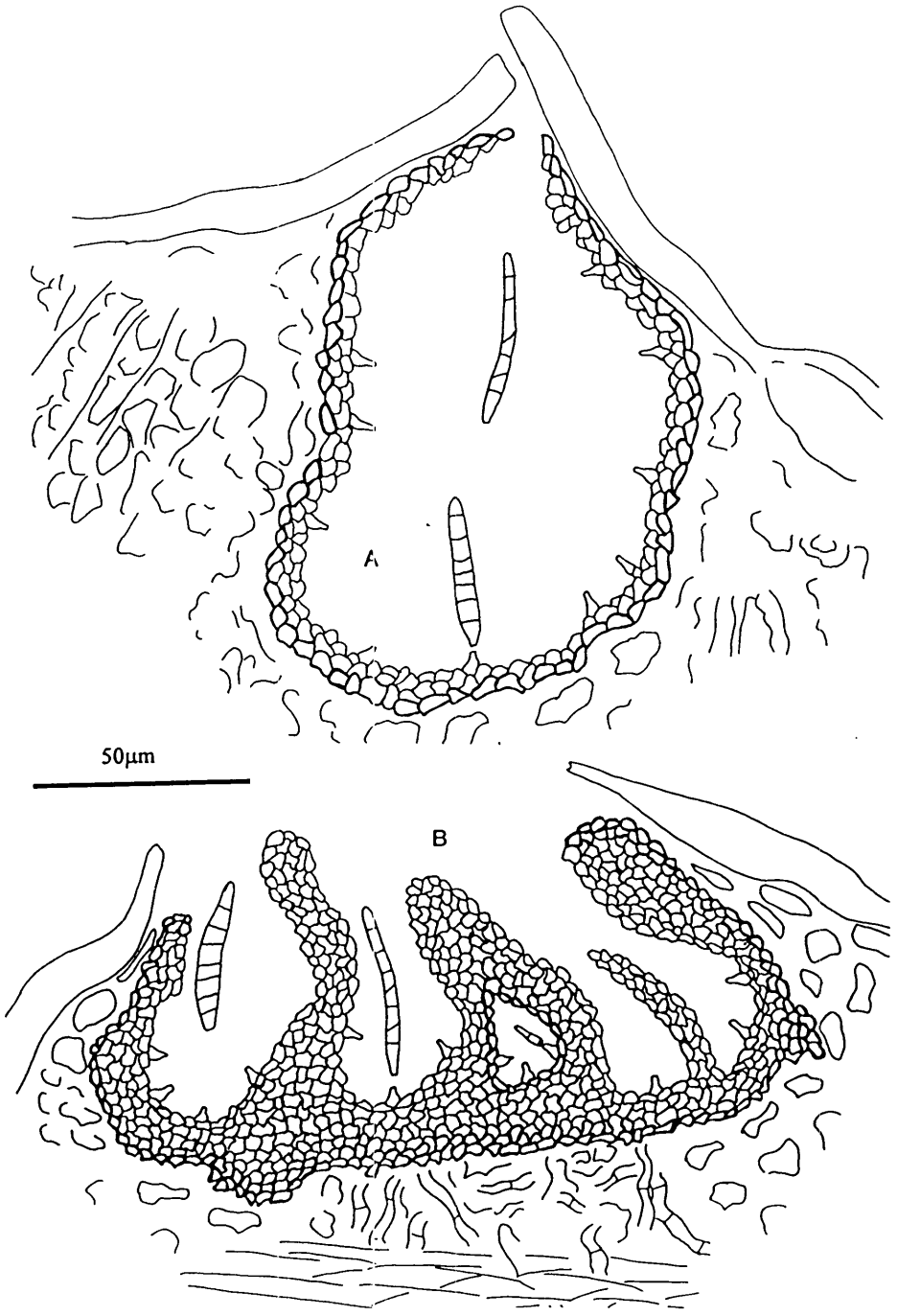

Fig.29. *Septocyta martiniae*; v.s. conidiomata; (A) DAR 44155; (B) DAR 71676

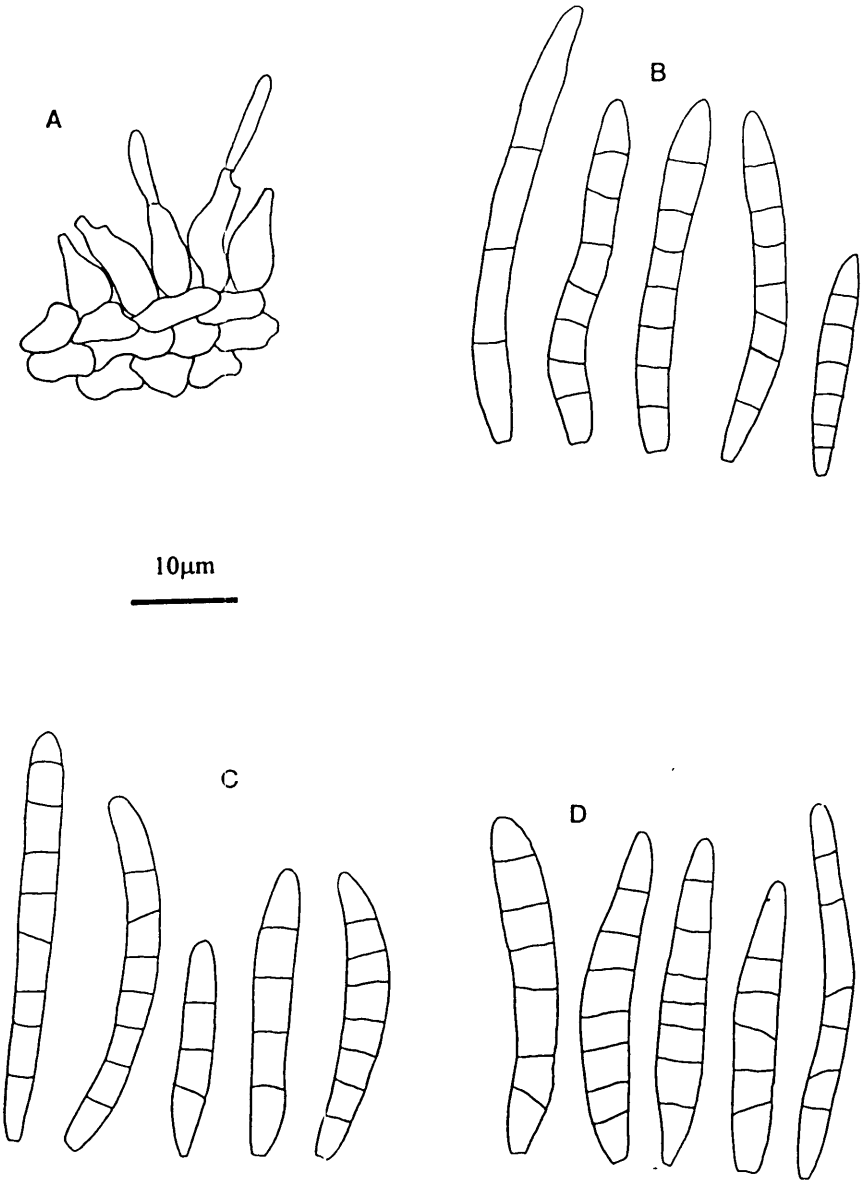

Fig.30. *Septocyta martiniae*; (A) conidiogenous cells DAR 71676; B-D conidia; (B) DAR 71676; (C) DAR 44155; (D) DAR 44157

filiform, 3-8 septate, septa transverse to oblique, straight to slightly curved, (16-)20-36 x (2.5-)3-4µm with truncate base and rounded apex.

Hosts: *Bedfordia arboresens* Hochbr., *B. linearis* (Labill.) DC., *B. salicina* (Labill.) DC.

Distribution: Tasmania (Sampson & Walker 1982), Victoria (Cooke 1890, Cobb 1893, McAlpine 1895, Brittlebank 1937-1940 as *S. martinii*, Hansford 1956 as *S. martinii*, Chambers 1982).

Hansford (1956) examined the type collection of *S. martiniae* in K and stated that the conidiomata were pycnidial with an apical pore which became wide open due to secession of the apex of the conidioma. I found no evidence of a preformed pore in collections examined. Examination of a range of collections available has revealed that this is not a species of *Septoria*. The conidiomata are not pycnidial but are multilocular and do not possess a true preformed ostiole, dehiscence being by breakdown of the upper wall. The multilocular nature of the conidioma clearly places this taxon outside *Septoria*. Both *Dothistroma* Hulbary and *Septocyta* as defined by Sutton (1980) are available for this taxon. However, *Dothistroma* has simple holoblastic conidiogenesis and is currently restricted by its occurrence on the host genus *Pinus* and having known teleomorphs in the genus *Schirria* Nitschke ex Fuckel. *Septocyta* is currently a monotypic genus, the only taxon being *S. ruborum* (Lib.) Petrak which occurs on *Rubus* spp. and is defined by uni-multilocular conidiomata and sympodial holoblastic conidiogenesis. On this basis *Septoria martiniae* is clearly accommodated in the genus *Septocyta*.

Specimens examined:

on *Bedfordia arboresens*; **Victoria**; Silvan Dam, J.W. Green (DAR 71676 ex NE 20642);

on *Bedfordia linearis*; **Tasmania**; Mount Barrow, 13 Feb. 1969, E.M. Canning (DAR 44157 ex NE 24184);

on *Bedfordia salicina*; **Victoria**; Mrs. Martin, no date or locality (VPRI 1825) **possible type**, host as *Aster bedfordii*; Mount Macedon, 20 Jan. 1900, C. French Jnr. (VPRI 1826) host as *Senecio bedfordii*; **Tasmania**; Myrtle Gully Track, Cascades, Hobart, 14 May 1984, J. Walker 84/64 (DAR 44155); Fern Glade Track, Fern Tree, 14 May 1984, J. Walker 84/61 (DAR 44156).

Septoria minima Halsted, *Rept. N.J. Expt. Station 1894*, p.365 (1895)

= *Septoria chrysanthemi* Halsted, *Bull. Torr. Bot. Club* **20**: 251 (1893) non Cav. or Allesch.

= *Septoria halstedii* Ellis & Everh., *Trans. Wisc. Acad. Sci.* **14**: 100 (1903) superfluous name

(Figs. 31, 33D)

Leaf lesions hologenous, orbicular to irregular, 2-5mm diam., upper surface lesions dark brown with indefinite margin, lower surface lesions very pale and ill-defined. *Conidiomata* epigenous, scattered on lesions, separate, on older lesions becoming aggregated, immersed becoming erumpent, black, globose, 80-110µm diam., pycnidial. *Ostiole* single, apical, often papillate, 15-20µm diam., cells around the opening dark brown and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, often integrated, hyaline, ampulliform, 6-10 x 3µm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, (1-)3(-4) septate, straight to slightly curved, 30-40 x (1-) 1.5µm, with truncate to rounded base and rounded apex.

Hosts: *Chrysanthemum leucanthemum* L., *Chrysanthemum* sp.

Distribution: Queensland, Victoria.

Several names have been used for short narrow-spored taxa on *Chrysanthemum*. *Septoria socia* was described originally from *Leucanthemum vulgare* (now *Chrysanthemum leucanthemum*) with conidia 25-30µm long. No conidial width was given, but Punithalingam & Wheeler (1965) on the basis of several collections examined ascribed conidial dimensions of 20-34 x 0.7-1µm and 1-3(5) septate to this species which is also identical to those given for *S. socia* f. *catalunica* Gonz. Frag. (20-25 x 0.7-1µm). Another taxon with short narrow conidia is *S. minima* Halsted with conidia described as 14-30 x 1.5-2µm and 3-5 septate. Halsted originally named his species *S. chrysamthemi* but remamed it *S. minima* as the name was already occupied by *S. chrysanthemi* Cav. and *S. chrysanthemi* Allesch. Ellis & Everhart, unaware of Halsted's new name created a superfluous name in *S. halstedii*. A number of Australian collections have been examined which have conidia 30-40 x (1-)1.5µm and are mostly 3 septate. Examination of type material of *S. minima* has revealed conidia are mostly 20-29 x 1-1.5µm, slightly narrower than given in the original description, but identical with Australian collections. All three species (*S. socia*, *S. socia* f. *catalunica* and *S. minima*) have been described from *C.*

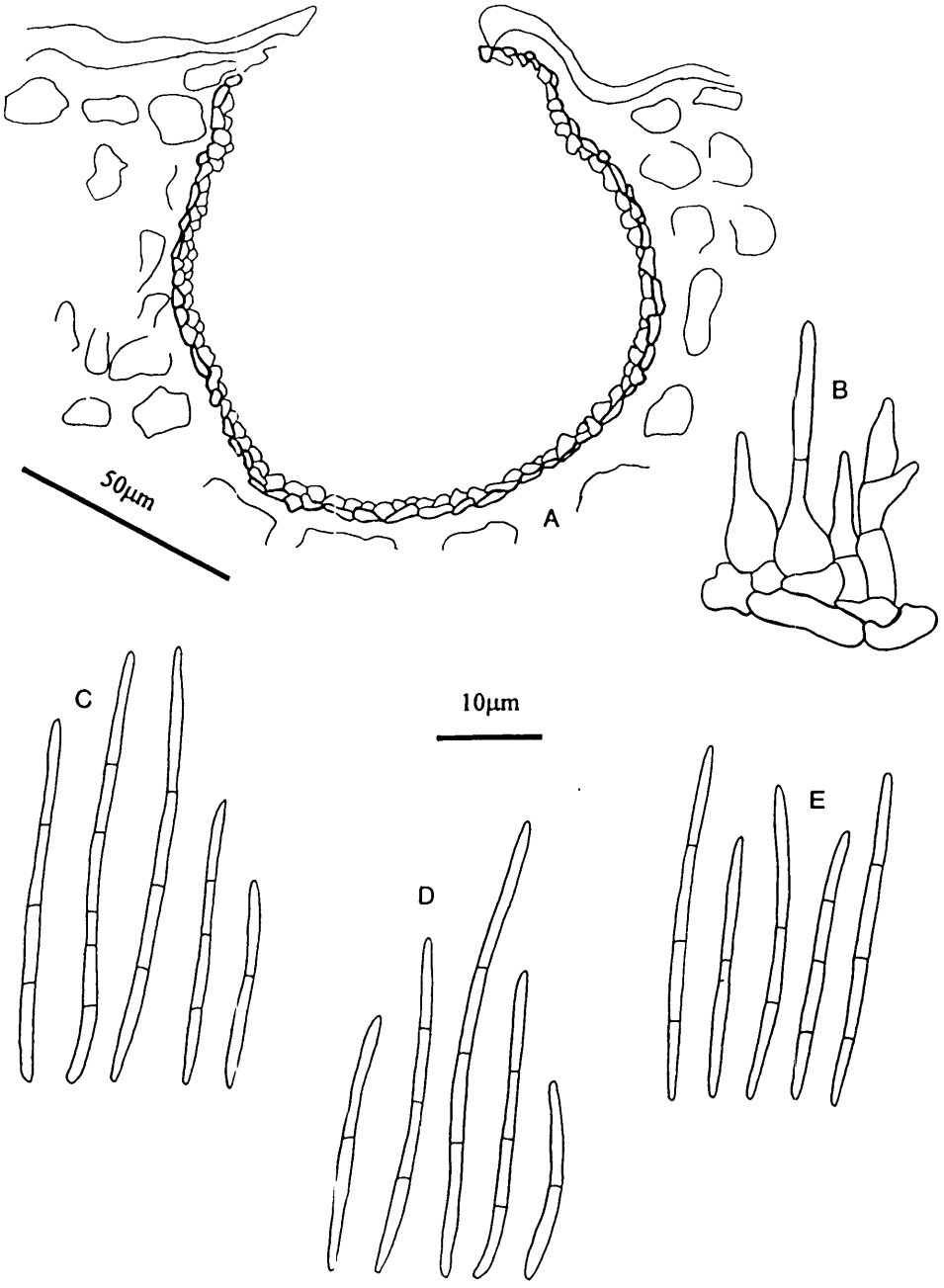

Fig.31. *Septoria minima*; (A) v.s. conidioma VPRI 1765; (B) conidiogenous cells VPRI 1765; C-E conidia; (C) VPRI 1765; (D) BRIP 12049 (culture); (E) DAR 58094 (type)

leucanthemum and are all narrower than *S. adanensis* which currently is not known to occur on this host. Two taxa appear to be present based on the descriptions of Punithalingam and Wheeler (1965), and examination of the type collection of *S. minima*. Since Australian specimens are identical to *S. mimima* they are placed under this name. Study of the type of *S. socia* is needed to resolve the obvious dilemma.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Chrysanthemum leucanthemum*; **Queensland**; Indooroopilly, 22 Nov. 1976, J.H. Simmonds (BRIP 12049);

on *Chrysanthemum* sp.; **Victoria**; Balook, 13 Mar. 1911, H. Cook (VPRI 1765).

EXTRALIMITAL COLLECTIONS:

Septoria minima Halsted; on *Chrysanthemum leucanthemum*; Milltown, New Jersey, **U.S.A.**, June 1892, F.L. Stevens, *Seymour & Earle Economic Fungi* No. 301 (DAR 50984) **type** of *S. minima* Halsted.

Septoria obesa Syd., *Ann. Mycol.* **12**: 163 (1914)

(Figs. 32, 33A)

Leaf lesions hologenous, orbicular to irregular, often with concentric zones and coalescing to form large blotches which can cover large areas of the leaf surface, raised, mostly 6-10mm diam., upper surface lesions dark brown with a purplish brown margin, lower surface lesions similar but mostly without definite margin. *Conidiomata* amphigenous, scattered on lesions, separate, immersed becoming erumpent, black, globose, (100-)150-250μm diam., pycnidial. *Ostiole* single apical, central, 30-50μm, opening to 100μm in mature conidiomata, cells around the opening dark brown. *Conidiomatal wall* 2-4 cells thick, composed of pseudoparenchymatous tissue, textura angularis, outer layer dark brown and thickened, inner layers pale brown, *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, doliiform to clavate, 7-9 x 5-6μm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, 5-9 septate, straight to slightly curved, (40-)56-85(-105) x (2.5-)3-4μm narrowing to a truncate base and tapering gradually in the upper half to a

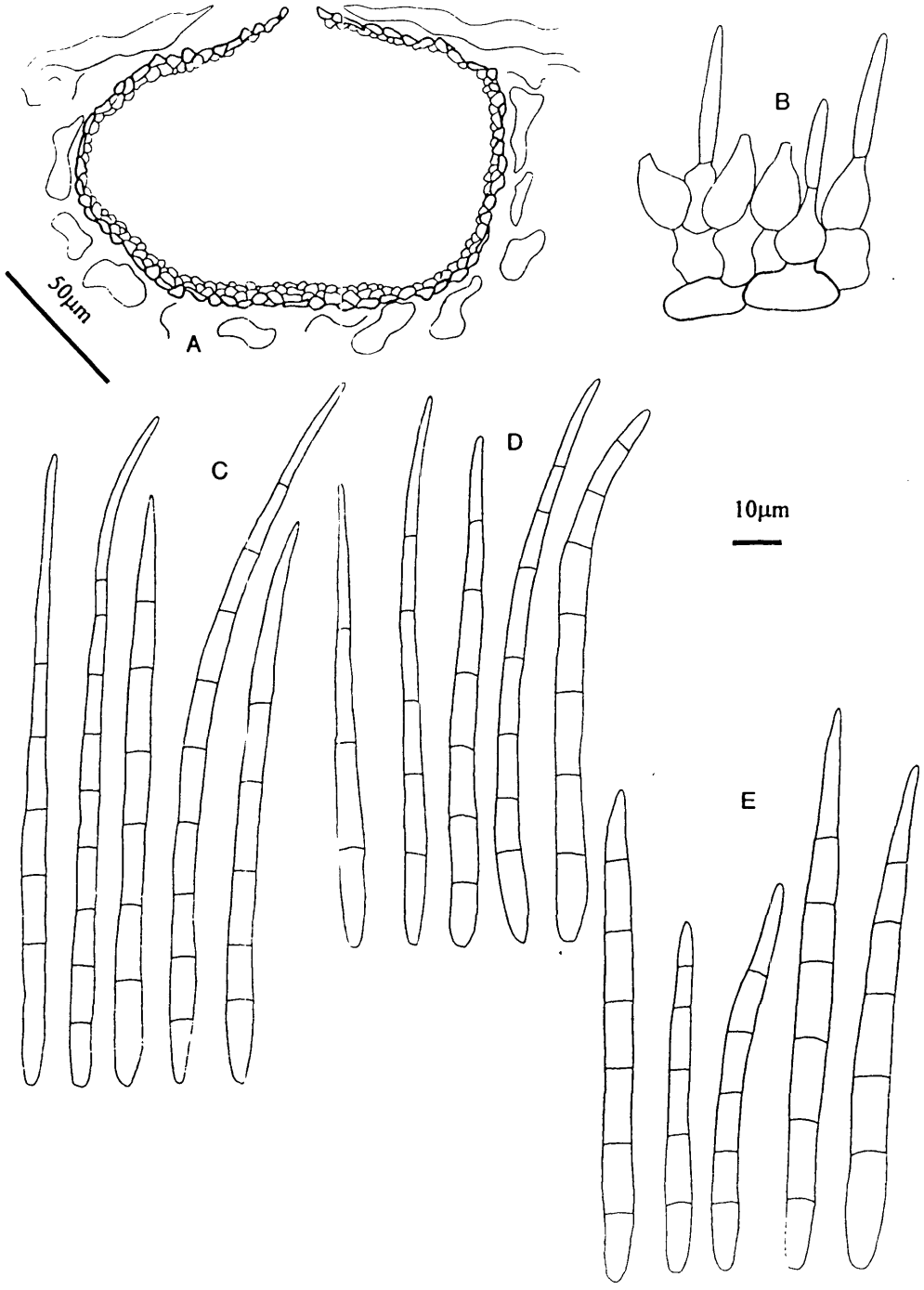

Fig.32. *Septoria obesa*; (A) v.s conidioma DAR 60357; (B) conidiogenous cells DAR 63057; C-E conidia; (C) DAR 63057; (D) DAR 1563; (E) DAR 3889

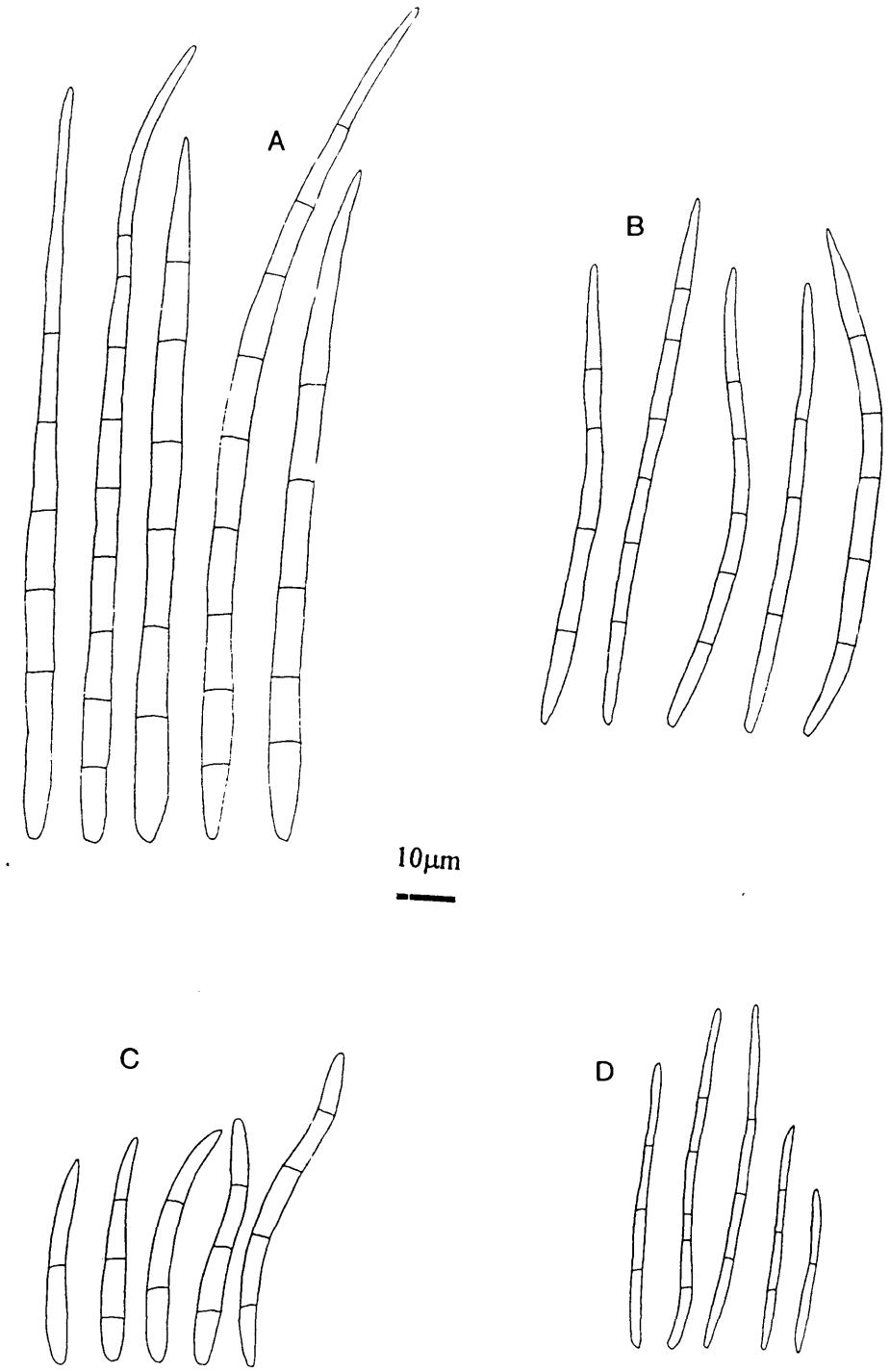

Fig.33. Conidia of *Septoria* spp. on *Chrysanthemum*; (A) *S. obesa* DAR 63057; (B) *S. chrysanthemella* BRIP 5747; (C) *S. adanensis* DAR 12843; (D) *S. minima* VPRI 1765

rounded apex.

Hosts: *Chrysanthemum indicum*, *C. morifolium* Ramat. (Florist's Chrysanthemum), *Leucanthemum maximum* (Ramond) DC. (Shasta daisy)

Distribution: New South Wales (Noble *et al.* 1935 as *Cylindrosporium chrysanthemi* Ell. & Dearn., Noble *et al.* 1937 as *Septoria* sp. on *C. maximum,* Anon. 1949a as *S. leucanthemi* on *C. maximum*), Queensland (Simmonds 1966), South Australia (Cooke & Dube 1989 as *Septoria* sp.), Tasmania (Sampson & Walker as *Septoria* sp.), Victoria (Chambers 1982), Western Australia (Shivas 1989)

Septoria obesa is name the currently accepted for the species of *Septoria* occurring on *Chrysanthemum* characterised by very long and wide conidia. There are two taxa that are morphologically very similar viz. *Septoria leucanthemi* Sacc. & Speg. with conidia 100-130 x 4-5µm and "obsolete septatis" from *Leucanthemum vulgare* Lam. (now *Chrysanthemum leucanthemum* L.) and, *S. obesa* Syd. described from *C. arcticum* with conidia 50-100 x 3-4.5µm and 5-12 septate. Jorstad (1965) synonymised *S. obesa* under *S. leucanthemi* on the basis of examination of the type of *S. leucanthemi* by Petrak (1957) who found that the conidia were slightly narrower (3.5-4.5µm) than given in the original description and were much closer to *S. obesa.* Over the range of material he examined on several hosts including *C. leucanthemum*, *C. morifolium* and *C. maximum* he concluded only one taxon was discernible and accepted *S. leucanthemi* as the earliest name available. Punithalingam & Wheeler (1965) kept *S. leucanthemi* separate from *S. obesa* because isolates from *C. leucanthemum* and *C. maximum* were cross-infective but failed to infect *C. morifolium.* This result however does not necessarily indicate difference at the species level and may well be indicative of race or differences at the sub-specific level. Punithalingam & Wheeler (1965) did not examine the type collections of either species but gave conidial width for *S. leucanthemi* as 2.5-3µm and for *S.obesa* as 2.7-3.5µm both of which are significantly different from those measurements given in the original descriptions. On the basis of Punithalingam & Wheeler (1965), the Australian collection on *L. maximum* should be placed under *S. leucanthemi*, but the conidia are 3.5-4µm wide and are closer to their concept of *S. obesa.* The examination of the type collections of *S. obesa* and *S. leucanthemi* is obviously necessary to solve the problem as confusion still remains as to the correct name to apply to the taxon under discussion. On the basis of usage of the name *S. obesa* by authors such as Hemmi & Nakamura (1927), Waddell & Weber (1963), Punithalingam & Wheeler (1965) and Punithalingam (1967), the name *S. obesa* is adopted here.

Specimens examined:

on *Chrysanthemum indicum*: **Queensland**; South Brisbane, 24 July 1902, H. Tryon (BRIP 5808); Tambourine, 3 Mar 1983, J. Davey (BRIP 13909); Toowoomba, 25 May 1984, I.K. Hughes (BRIP 14309);

on *Leucanthemum maximum*; **New South Wales**; Sydney, July 1947, F.C. Butler (DAR 3889); Sydney, Feb 1957 (DAR 5021) host as *C. maximum*;

on *Chrysanthemum morifolium*; **New South Wales**; Mittagong, Mar. 1928 (DAR 1563); Botanic Gardens, Sydney, May 1926 (DAR 1568); Wee Waa, 28 Feb. 1962, L. Hibbens (DAR 6898); Koorawatha, 10 Jan. 1962, A. Allen (DAR 6872); Horsley Park, 25 Mar. 1964, D.L. White (DAR 12842); Milperra, June 1974, D. Trimboli (DAR 24370); South Nowra, 13 Apr. 1978 (DAR 31819); West Pennant Hills, 17 Apr. 1967, H. Barry (DAR 56896); Kellyville, 13 Dec. 1984, E. Maddock (DAR 54648); Doyalson, 14 Nov. 1984, M. Buda (DAR 54649); Kellyville, 13 Dec. 1984, E. Maddock (DAR 55002); Kellyville, 13 Mar. 1986, E. Maddock (DAR 55499); McLeans Ridge, 24 Feb. 1987, R. Loebel (DAR 59130); Dural, 27 Mar. 1987, T. Wilkinson (DAR 60357); Agnes Banks, 3 Mar. 1988, E. Maddock (DAR 61540); Kellyville, 5 Apr. 1995, B. Gollnow (DAR 71743); **South Australia**: Smithfield, 15 Dec. 1986, T. Wicks (ADW 16979); **Tasmania**; Hobart, 28 Mar. 1979, J. Davies (DAR 71673); **Victoria**; Armadale, 22 July 1900, D. McAlpine (VPRI 1761); Armadale, Apr. 1904, D. McAlpine (VPRI 1762); Camberwell, 7 Dec. 1907, C. French Jnr (VPRI 1763); Doncaster, 8 May 1903, G.H. Robinson (VPRI 1764); Burnley Gardens, 26 May 1909 (VPRI 1768); Oakleigh, 27 June 1901, C. French Jnr (VPRI 8824); Monbulk, 19 Nov. 1976 (VPRI 10187); Tooradlin, 8 May 1981 (VPRI 11325); Drysdale, 6 June 1984, F. Barkla (VPRI 12416); Drysdale, 29 June 1984, F. Barkla (VPRI 12359); Silvan, 24 June 1987, G. Guy (VPRI 15492); Clyde, 24 June 1987, G. Guy (VPRI 15494); Pearcedale, 23 Mar. 1989, G. Guy (VPRI 16205); **Western Australia**; Lesmurdie, 28 Oct. 1988, R. Shivas (PERTH 740926).

Septoria paradisi Sutton & Pascoe, *Studies in Mycology* **31**: 179-182 (1989)

(Fig. 34)

Leaf lesions hologenous, irregular, bounded by leaf veins, 1-2mm diam., occasionally coalescing up to 10mm, upper surface lesions mid brown in the centre bounded by creamy yellow to deep brown narrow margin, lower surface lesions pale and obscured by leaf hairs. *Conidiomata* epigenous,

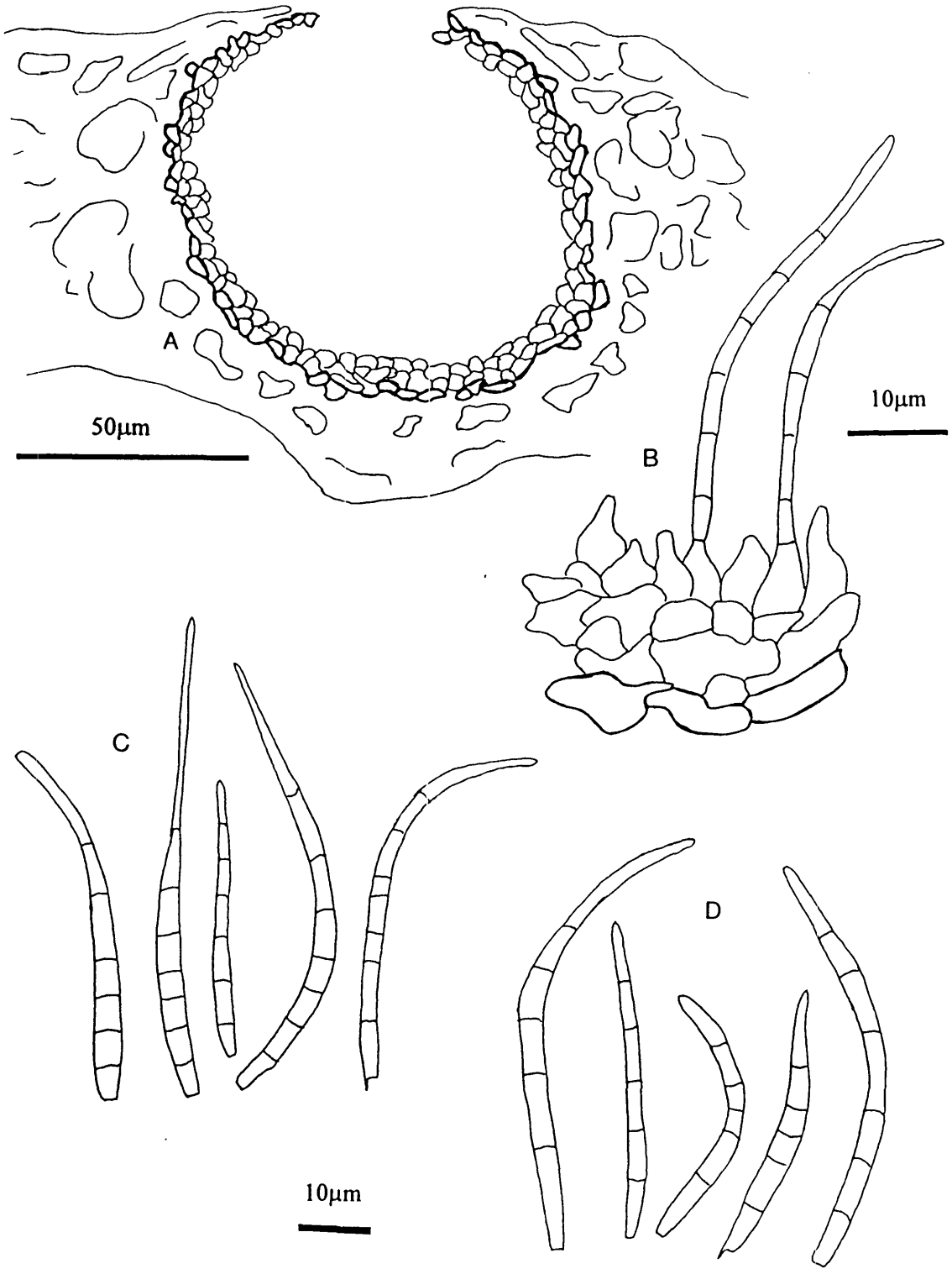

Fig.34. *Septoria paradisi*; (A) v.s conidioma VPRI 13578 (type); (B) conidiogenous cells VPRI 13578; (C) conidia VPRI 13578; (D) conidia VPRI 15849

scattered on lesions, separate, immersed, dark brown to black, globose, 80-120μm diam., pycnidial. *Ostiole* single, apical, central, 20-30μm diam, cells around opening dark and slightly thickened. *Conidiomatal wall* 3-4 cells thick, composed of pseudoparenchymatous tisue, textura angularis, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform, 5-8 x 6μm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, 5-7(-8) septate, straight to curved, 40-60 x 2.5-3μm with truncate base, occasionally with basal projection and tapering to rounded to sub-acute apex.

Host: *Olearia argophylla* (Labill.) F. Muell. ex Benth., *O. stellulata* (Labill.) DC.

Distribution: Victoria (Sutton & Pascoe 1989).

This species was fully described and illustrated by Sutton & Pascoe (1989). One feature of this species is the presence of a short basal projection on some of the conidia, observed only in *S. cratagei* Kickx elsewhere in the genus *Septoria*.

Specimens examined:

on *Olearia argophylla*; **Victoria**; Barham Paradise Picnic Ground, Otway Ranges, 10 June 1986, I. Pascoe & B. Sutton (VPRI 13758) **holotype**;

on *Olearia stellulata*; **Victoria**; Wallaby Creek, 13 Nov. 1986, H.Y. Yip (VPRI 15849) host as *Olearia lirata* (Sims) Hutch.

Septoria perforans McAlp., *Proc. Linn. Soc. N.S.W.* **28**: 100 (1903)

(Fig. 35)

Leaf lesions hologenous, orbicular, slightly raised, 2-5mm diam., upper surface lesions greyish brown in centre with dark brown raised margin, lower surface lesions much paler without distinct margin. *Conidiomata* amphigenous, scattered on lesions, separate, immersed, black, globose, 75-100μm diam., pycnidial. *Ostiole* single, apical, papillate, 15-20μm, cells around opening slightly darker and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising

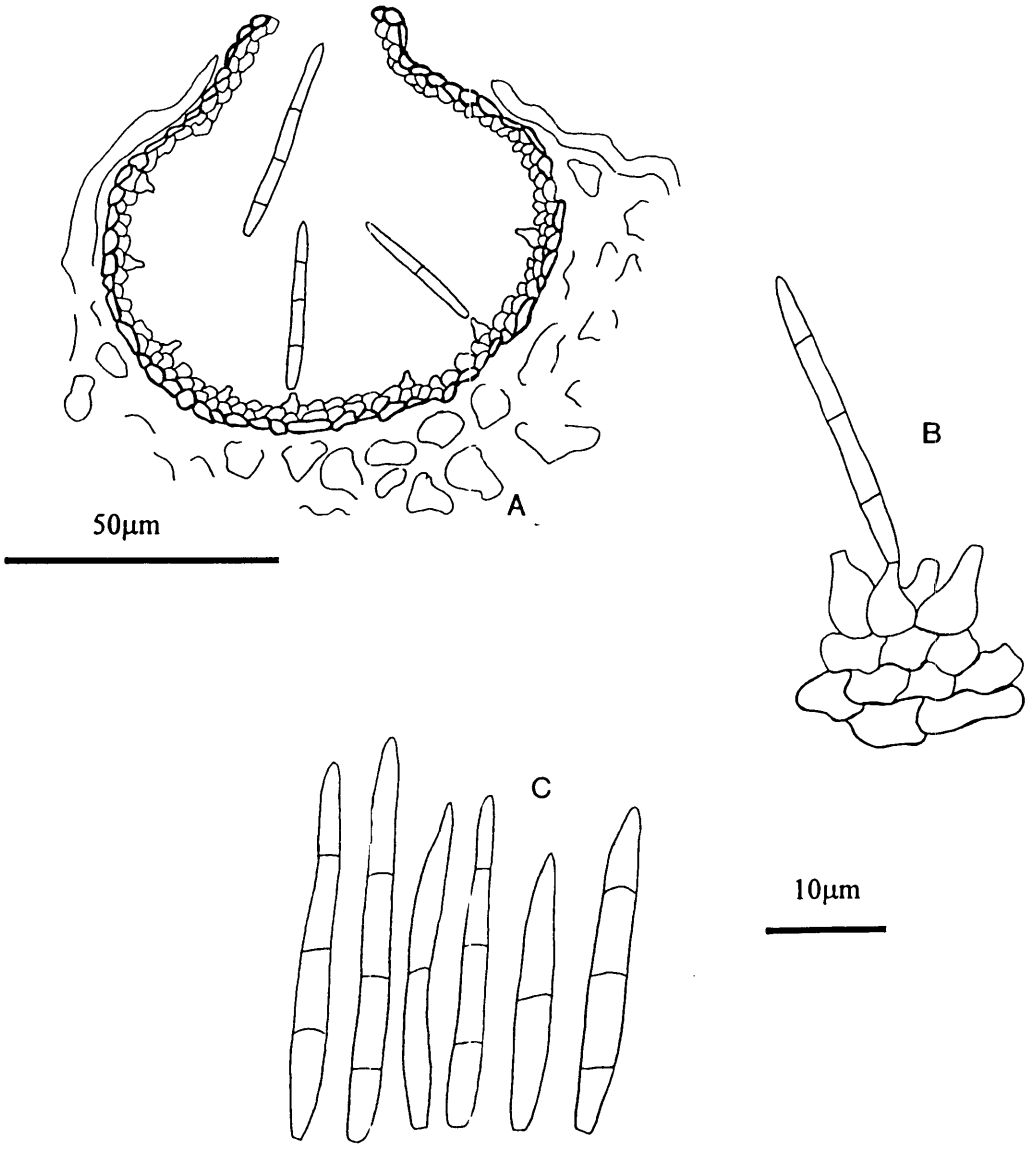

Fig.35. *Septoria perforans* VPRI 1834 (type); (A) v.s. conidioma; (B) conidiogenous cells; (C) conidia

from inner wall layer, hyaline, discrete, ampulliform 5-8 x 5μm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, smooth-walled, filiform, 1-3 septate, straight to slightly curved, (15-)27-36 x 2.5(-3)μm with rounded base and rounded to sub-acute apex.

Host: *Arctotheca calendula* (L.) Levyns (Capeweed).

Distribution: Victoria (McAlpine 1903, Brittlebank 1937-1940, Chambers 1982).

Septoria perforans was described originally from *Arctotheca calendula* formerly known as *Cryptostemma calendula* (L.) Druce, a native of South Africa which has become a widespread weed throughout eastern Australia. Since the original description, *S. perforans* has been recorded in South Africa (Doidge 1950) and New Zealand (Dingley 1960). The close morphological similarity of *S. perforans* to *S. lactucae* was noted by Dingley (1960), however no cross-inoculation studies have ever been carried out to determine if *S. perforans* and *S. lactucae* are to be kept as separate taxa. Morphologically there are some differences between the two species; *S. lactucae* being holoblastic sympodial and *S. perforans* being simple holoblastic. *Arctotheca* is in the tribe Arctotidae and *Lactuca* and *Sonchus* (see discussion under *S. lactucae*) are both in the tribe Lactucae.

Specimen examined: on *Arctotheca calendula*; **Victoria**; Doncaster, 1 Oct. 1902, D. McAlpine (VPRI 1834) **holotype,** host as *Cryptostemma calendula*

Septoria podolepidis Priest, **sp.nov**.

Etymology: from name of host genus *Podolepis*

(Fig. 36)

Maculae hologenae, orbiculares vel irregulares interdum confluentes, 3-7mm diam., pallide brunneae cum margine distincto. *Conidiomata* epigena, separata, immersa, globosa, nigra, (80-)120-150μm diam, crassitudine 2-3 cellularum, parieties pseudoparenchymatici, textura angulari, brunnea compositi. *Ostiolum* singulum, apicalum, vel apiculatum, 15-25μm *Cellulae conidiogenae* e cellulis interioribus conidiomatum formatae, discretae, hyalinae, ampulliformes vel lageniformes, 5-10 x 2.5μm, holoblastica simplicia conidia producentes. *Conidia* hyalina, laevia, filiformia, (1-) 2-4 septata, recta vel curvata, (20-)32-60(-72) x 1μm, basim truncatum, apicem rotundatum vel sub-acutum versus deminuta.

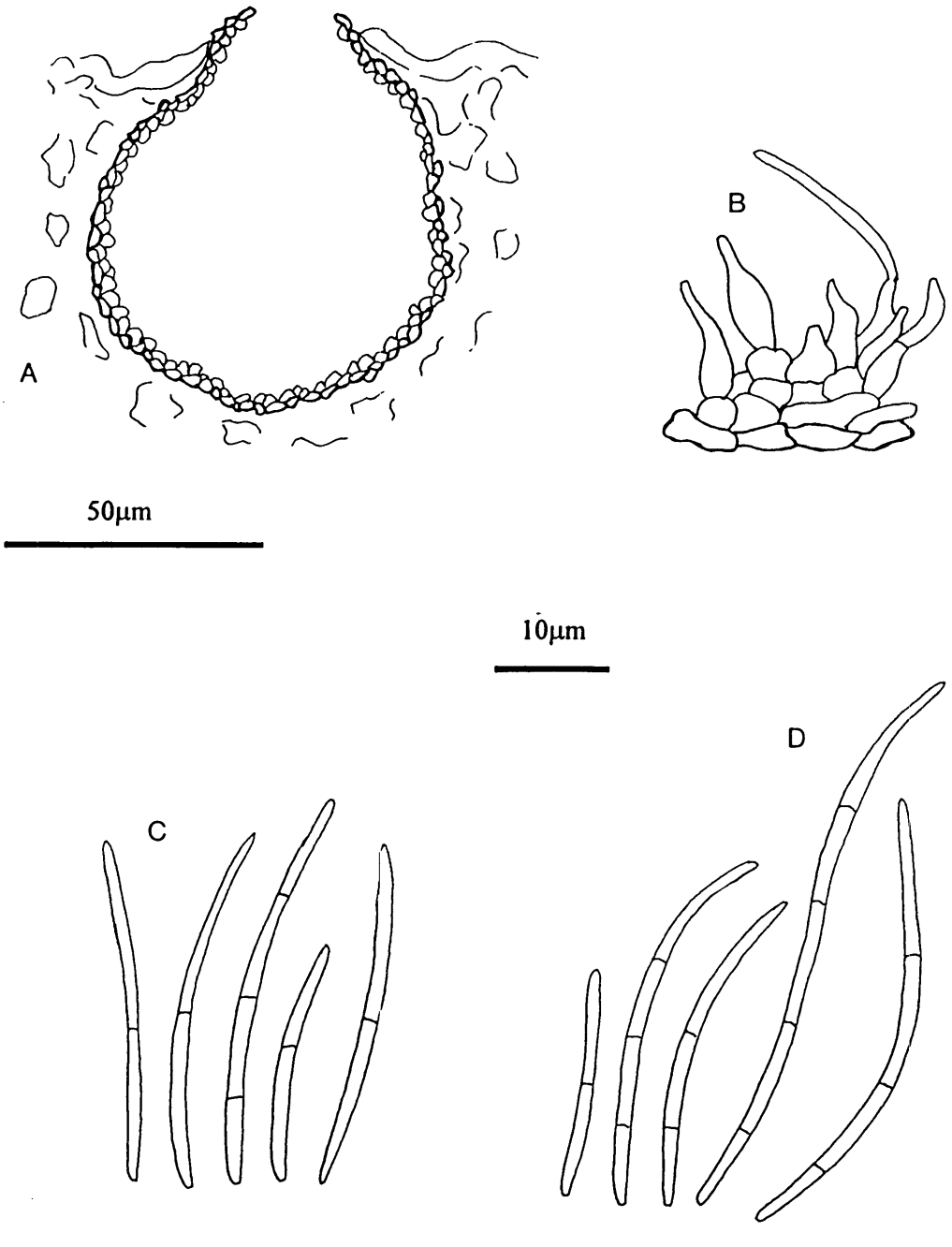

Fig.36. *Septoria podolepidis*; (A) v.s conidioma DAR 4192b; (B) conidiogenous cells DAR 4192b; (C) conidia DAR 4192b; (D) conidia DAR 16585

Holotypus: in foliis *Podolepidis jaceoidis* (Sims) Voss, The Chalet, Mount Kosciusko, Nova Wallia Australis, Australia, 24 April 1947, A. Costin 6 (DAR 4192b).

Leaf lesions hologenous, orbicular to irregular, 3-7mm diam., often coalescing to form large blotches, upper surface lesions pale brown becoming grey in the centre with age, margin brown and slightly raised, lower surface lesions paler in colour. *Conidiomata* amphigenous, mostly epigenous, scattered on lesions, separate, immersed becoming erumpent, globose, black, (80-)120-150µm diam., pycnidial. *Ostiole* single, apical, occasionally papillate, 15-25µm diam., cells around the opening dark brown and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, ampulliform to lageniform, 5-10 x 2.5µm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, (1-)2-4 septate, straight to slightly curved, (20-)32-60(-72) x 1µm, with truncate base and tapering to sub-acute to rounded apex.

Distribution: New South Wales

Hosts: *Podolepis jaceoides* (Sims) Voss, *P. neglecta* G.L. Davis

Septoria podolepidis is easily distinguished from other narrow-spored taxa in the Asteraceae so far encountered. It has conidia longer than those of *S. socia* (30-40µm), *S. lagenophorae* (20-32µm) and the taxa seen on *Carduus* (18-26µm) and *Carthamus* (36-48µm). *Septoria silybi* Pass. with conidia 35-65 x 1.5µm and *S. galinsogae* with conidia 45-60(-90) x 1.5µm have similar conidial dimensions to *S. podolepidis*, but the conidia of those two species are slightly wider. Two of the collections examined have a species of *Albugo* (Pers.) S.F. Gray, present often associated with the leaf lesions; however, as the association does not appear on all lesions or all collections, there is no evidence that *S. podolepidis* is hyperparasitic or in constant association with another pathogen.

Specimens examined:

on *P. jaceoides*; **New South Wales**; The Chalet, Mount Kosciusko, 24 Apr. 1947, A. Costin 6 (DAR 4192b) **holotype;** same locality and date, A. Costin 6a (DAR 71755b);

on *P. neglecta*; **New South Wales**: Warrumbungle National Park, 10 Oct. 1964, L.R. Fraser (DAR 16585).

Septoria pyrethri Bres. & Krieg., *Hedwigia* **38**: 381 (1897)

Listed by Brittlebank (1937-1940) on *Chrysanthemum pyrethrum* and Chambers (1982) on *Tanacetum parthenium* (L.) Sh.-Bip. at Mentone in Victoria in 1904. No herbarium collection under this name has been located and the record remains unverified.

Septoria silybi Pass., *Atti. Soc. Critt. Ital.* **2**: 34 (1879)

(Fig. 37)

Leaf lesions hologenous, orbicular to irregular, 2-8mm diam., occasionally coalescing to form large blotches covering extensive areas of the leaf, up to 2.5cm diam., upper surface lesions brown, raised in centre, becoming pale grey with age, margin brown and ill-defined, lower surface lesions similar but paler in colour. *Conidiomata* amphigenous, scattered on lesions, separate, becoming aggregated on older lesions, immersed, black, globose, often depressed, (60-)100-140µm diam., pycnidial. *Ostiole* single, apical, 15-25µm, cells around opening thickened and dark brown. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, textura angularis, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, doliiform to lageniform, 5-9 x 2.5-3µm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, (1-)3-5(-9) septate, straight to slightly curved, 35-65 (-75) x 1.5µm with truncate to rounded base and rounded apex.

Host: *Silybum marianum* (L.) Gaertn.

Distribution: New South Wales (Anon. 1974), South Australia (Hansford 1954, Warcup & Talbot 1981, Cooke & Dube 1989), Tasmania, Victoria (Brittlebank 1937-1940, Chambers 1982 both as *S. silybi* and *S. cirsii*).

Septoria silybi was described originally from *Silybum marianum* in Italy and some affinity with *S. cirsii* was noted; however the conidia of *S. cirsii* in material examined are 27-50 x 2-2.5µm (see Fig.15) and 4-7 septate compared with *S. silybi* whose conidia are 35-65 x 1.5µm and mostly 3-5(-9) septate. Extant descriptions of *S. silybi* are rare in the literature and the only two found are from Spegazzini (1910) who gave conidial dimensions as 30-50 x 1µm and 3-5 septate and Hansford

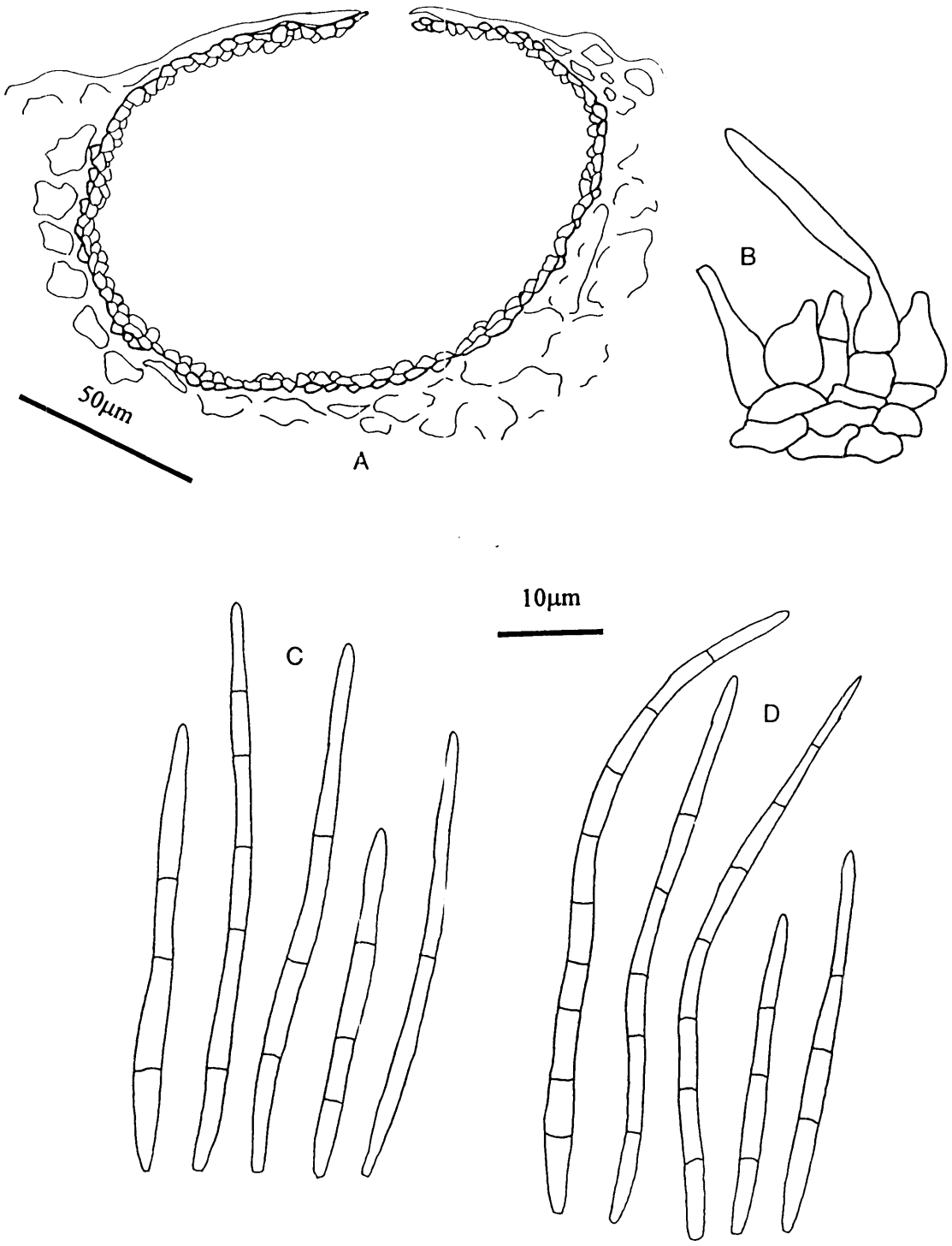

Fig.37. *Septoria silybi*; (A) v.s. conidioma DAR 29923; (B) conidiogenous cells DAR 29923; (C) conidia DAR 29923; (D) Conidia DAR 35226

(1954) who described conidia as up to 65 x 1.5µm but lacking septa. In collections examined the septa are obscure but are revealed with staining in erythrosin. Australian collections agree with these descriptions and are on the type host. Conidia from dried culture material (DAR 66114) are identical to those found on host material and measure 30-45(-60) x 1.5µm and are (1-) 3-5 septate.

Specimens examined: all on *Silybum marianum*; **New South Wales**; Bilpin, 10 Jan. 1963, C. Nuzum (DAR 12318); Yetholme, 8 Oct. 1963, R.J. Conroy (DAR 12319); Wagga Wagga, 12 Sept. 1972, A. Wapshere (DAR 23204); Quirindi, 12 Aug. 1977, N. Forrester (DAR 29923); Coonabarabran, 12 Sept. 1983, R. Freebairn (DAR 45857); Garah, 3 July 1985, P. Byrnes (DAR 53045); Cowra, 11 Nov. 1985, D. Briese (DAR 55065); Mendooran, 22 June 1990, R. Freebairn (DAR 66995); Rouchel, Oct. 1990, R. Watson (DAR 66114); **South Australia**; Meningie, 25 June 1953, L.D. Williams (ADW 3441); **Tasmania**; Gretna, 29 Sept. 1980, D. Morris (DAR 35226); **Victoria**; Myrniong, 8 Aug. 1900, D. McAlpine (VPRI 1769); Myrniong, 8 Dec. 1901, D. McAlpine (VPRI 1862)

Septoria sonchi Sacc., *Michelia* **1**: 183 (1878)

(Fig. 38)

Leaf lesions hologenous, orbicular to irregular, mostly 2mm diam., often coalescing to form large blotches bounded by leaf veins over extensive areas of the leaf, upper surface lesions raised, pale brown in the centre with dark brown margin, lower surface lesions paler in colour and lacking margin. *Conidiomata* amphigenous, scattered on lesions, separate, immersed becoming erumpent, globose, black, 110-190µm diam., pycnidial. *Ostiole* single, apical, 20-30µm diam., cells around the opening dark brown and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, textura angularis, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, doliiform, 4-5 x 3 µm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, smooth-walled, filiform, 1-2 septate, straight to slightly curved, (15-) 25-35 x (1.0-) 1.5-2.0µm, with truncate to rounded base and rounded apex.

Hosts: *Sonchus oleraceus* L., *Actites megalocarpa* (J.D. Hook.) Lander

Distribution: New South Wales (Hynes *et al.* 1941 as *Septoria* sp.), Queensland, Victoria (Brittlebank 1937-1940 as *S. sonchi* and *S. sonchina*, Chambers 1982 as *S. sonchi*. *S. sonchina* and *Septoria* sp.).

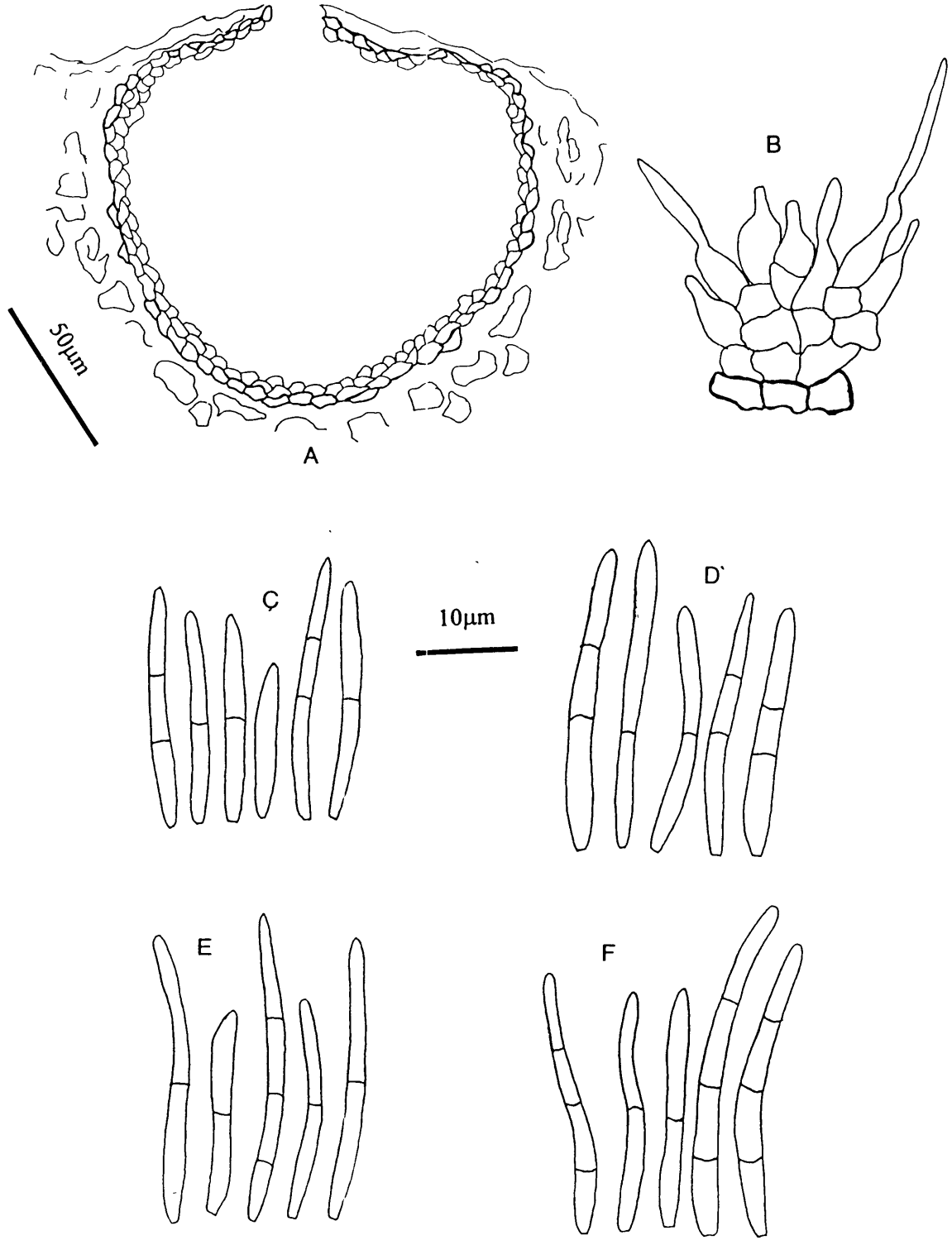

Fig.38. *Septoria sonchi* (A) v.s. conidioma DAR 6068; (B) conidiogenous cells DAR 6068; C-F conidia (C) DAR 6068; (D) DAR 2185; (E) *S. sonchifolia* DAR 15372; (F) *S. sonchifolia* DAR 51814

Several species of *Septoria* have been described from species of *Sonchus* including *S. sonchifolia* Cooke (conidia 20μm long) on *S. asper* in the U.S.A., *S. sonchina* Thuem. (conidia 28-34 x 1.5-2μm) on *S. oleraceus* in Siberia, *S. sonchi* Sacc. (conidia 20-24 x 1.5-2μm) on *S. oleraceus* in Italy, *S. sonchicola* Hollós (conidia 40-54 x 2μm) on *S. uliginosus* in Hungary, *S. modonia* Sacc. (conidia 40-50 x 2μm) on *S. arvensis* in France, *S. modonia* var. *brevispora* Sawada (conidia 20-38 x 2-2.5) on *S. arvensis* in Formosa and *S. sonchi-arvensis* Dearness & Bisby (conidia 20-22 x 1.5-2.5μm) on *S. arvensis* in the U.S.A.. Sukapore & Thirumalachar (1964) maintained that differences in leaf spot character and size of pycnidia could be used to distinguish both *S. sonchi* and *S. sonchina* on *S. oleraceus* in India despite very similar conidial size and septation. Examination of exsiccatus material under the name *S. sonchifolia* from the U.S.A. and Canada have shown that they are identical to Australian collections. All species described appear to have little, if any, morphological characters that could separate them from the earliest named species *S. sonchi* into which all Australian collections are placed. A single collection on *Actites megalocarpa* is morphologically identical to collections on *Sonchus*. *Actites* is a monotypic endemic Australian genus, separated from *Sonchus* (in which the species was placed previously) by morphology of the achenes. The similarities with *S. lactucae* have been discussed under that species.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Actites megalocarpa*: **Queensland**; Peregian Beach, 24 Oct. 1982, J.L. Alcorn (BRIP 13856);

on *Sonchus oleraceus*: **New South Wales**; Roseville, 18 Nov. 1940, C.J. Magee (DAR 2161); Coffs Harbour, 30 July 1940, C.J. Magee (DAR 2185); Pennant Hills, June 1960, L.R. Fraser (DAR 5865); Baulkham Hills, 7 Feb. 1960, J. Walker (DAR 6068); Narromine, July 1980, D. Trimboli (DAR 35488); Dubbo, Nov 1985, D. Trimboli (DAR 54897); Biological & Chemical Research Institute, Rydalmere, 2 May 1990, J. Walker (DAR 63315); **Queensland**; Kenmore, 7 Jan. 1972, J.L. Alcorn (BRIP 5819); Mount Alford, 27 Mar. 1972, J.L. Alcorn (BRIP 5820); Running Creek, Rathdowney, 9 Jan. 1974, J.L. Alcorn (BRIP 8892); Indooroopilly, 20 Dec. 1974, J.L. Alcorn (BRIP 5847); **Victoria**; Leongatha, Oct. 1898, D. McAlpine (VPRI 1804 & 1805); Pakenham, 12 July 1915, W. Ardwinkle (VPRI 1863).

EXTRALIMITAL COLLECTIONS:

S. sonchifolia; on *Sonchus oleraceus*; London, **Canada**, 7 Aug. 1897, J. Dearness, *Seymour & Earle Economic Fungi* No. 517 (DAR 51814); Columbia, Wisconsin, **U.S.A.**, 17 Aug. 1954, H.C. Greene 1754 (DAR 15372 ex WIS).

Septoria sp. on *Cymbonotus lawsonianus* Gaudich.

Reported by Chambers (1982) from Victoria in 1920. No herbarium material under this name has been located and the record is unsubstantiated.

BALSAMINACEAE

Septoria sp. cf.. *S. noli-tangere* W. Gerard, *Bull. Torrey Bot. Club* **4**: 64 (1874)

(Fig. 39)

Leaf lesions hologenous, orbicular, 1-2mm diam., occasionally up to 5mm, upper surface lesions pale creamy white, raised with narrow dark purplish-red margin, lower surface lesions similar but lacking the margin. *Conidiomata* epigenous, scattered on lesions, separate, immersed, becoming erumpent, globose, black, 80-120µm diam., pycnidial. *Ostiole* single, apical, 18-28µm, cells around opening darkened and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer mid-brown, inner layers pale. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform, 10-12 x 3-3.5µm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, 1-2 septate, straight to slightly curved, 16-32 x 1(-1.5)µm

Host: *Impatiens* sp. cult.

Distribution: New South Wales

This taxon shows a remarkable similarity to *S. lagenophorae* in the dimensions of the conidia, however there does not appear to be any evidence of it being hyperparasitic which is characteristic of that species. Species of *Septoria* described from *Impatiens* include *S. noli-tangere* W. Gerard with conidia 15-30 x 2µm, *S. noli-tangere* Thüm. (a later homonym of Gerard's species) with conidia 8-

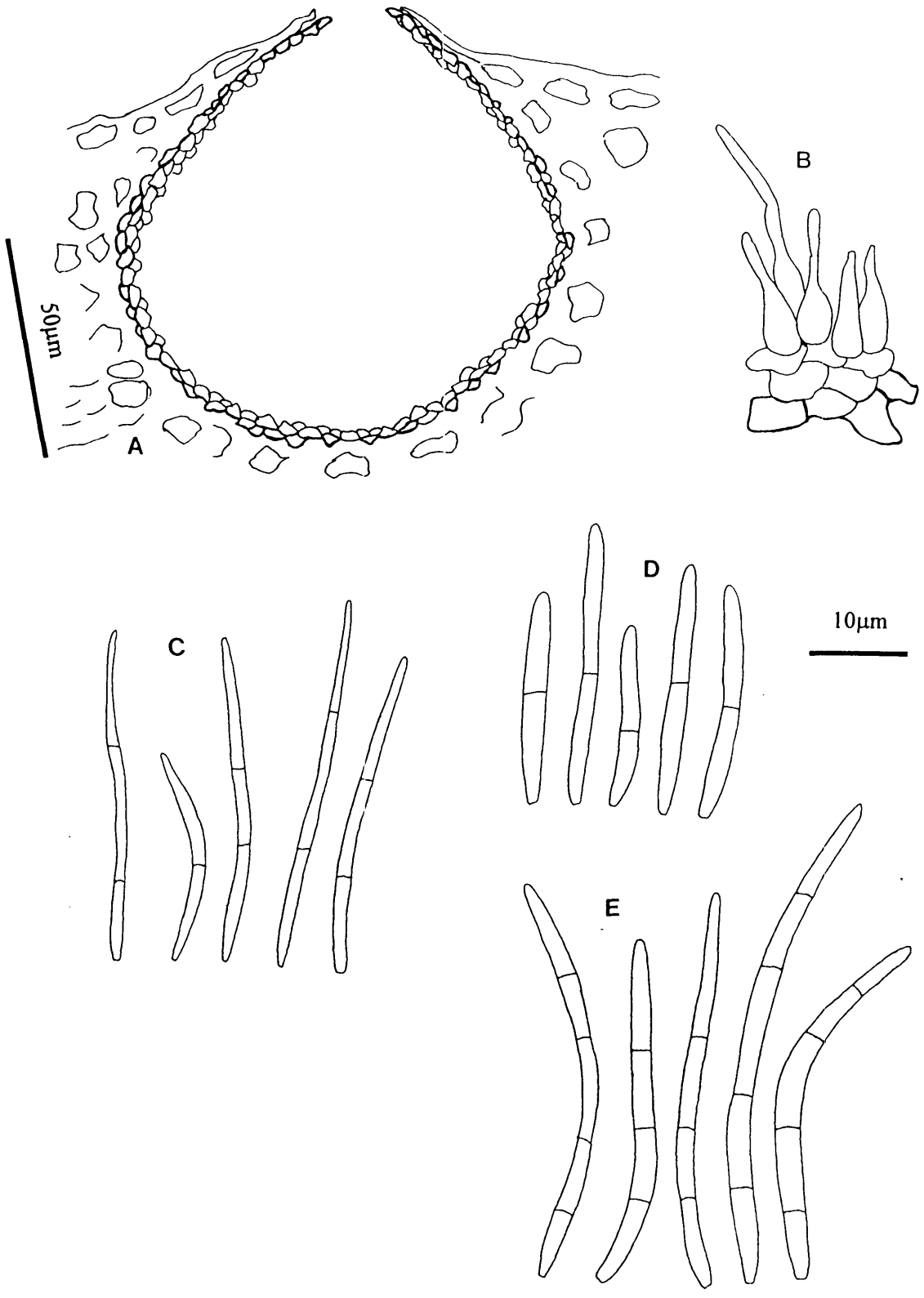

Fig.39. *Septoria* sp. on *Impatiens* (A) v.s conidioma DAR 40019b; (B) conidiogenous cells DAR 40019b; C-E conidia (C) DAR 40019b; (D) *S. noli-tangere*, Harper (NY); (E) *S. noli-tangere*, North American Fungi No. 1137 (NY)

12 x 1.5μm and *S. balsaminae* Pass. with conidia 30-35 x 2.5-3μm and 3-septate. The type collection of *S. noli-tangere* W. Gerard (in NY) consists of a single leaf with very few leaf spots present. Conidiomata were 100-150μm and ostiolate but no conidia were found in any of the conidiomata examined, all appearing to be overmature. Examination of other exsiccatus collections filed under the same name in NY revealed that two taxa could be recognised on conidial dimensions, one having conidia 20-30 x 1-1.5μm and being 1-septate represented by Rabenhorst-Winter, *Fungi Europaei* No. 3495 and a collection from the Arnold Arboretum, Massachusetts, collected by R.A. Harper. The second taxon has conidia 30-45 x 1.5-2μm, 3-5 septate and is represented by *North American Fungi* No. 1137. Which taxon represents Gerard's species is open to question as Gerard described his species with curved conidia (found in both the above taxa) but did not mention septation. The 1-septate taxon has conidia of the right length but they are slightly narrower than described by Gerard. The second taxon has conidia much longer than those described. The Australian collection is close to *S. noli-tangere* Gerard but the conidia are narrower than those described and being 1-2 septate does not clearly match any of the material examined.

Specimens examined:

AUSTRALIAN COLLECTION:

on *Impatiens* sp. cult., **New South Wales**, Galston, 9 Mar. 1982, P. Ord (DAR 40017b);

EXTRALIMITAL COLLECTIONS:

on *Impatiens pallida* Nutt., Iowa, **U.S.A.**, E.W.D. Holway, June 1886, Rabenhorst-Winter *Fungi Europaei* No. 3495 (NY);

on *Impatiens* sp. Ohio, **U.S.A.**, July 1883, Kellerman, *North American Fungi* No. 1137 (NY); Arnold Arboretum, Massachusetts, **U.S.A.**, 28 July 1892, R.A. Harper (NY); New York, **U.S.A.**, Sept. 1872, W.R. Gerard No. 538, ex Herb. W.R. Gerard (NY) **Type**.

BERBERIDACEAE

Septoria berberidis Niessl in Rabenh., *Fungi Europaei* No. 1080 (1866)

Listed by Brittlebank (1937-1940) and Chambers (1982) as occurring on *Berberis vulgaris* L. in Victoria in 1902. No herbarium material under this name has been located and the record cannot be verified.

BETULACEAE

Septoria betulae Pass., *Comm. Soc. Critt. Ital.* **2**: 441 (1867)

(Fig.40)

Leaf lesions hologenous, irregular, bounded by leaf veins,1-3mm diam., upper surface lesions mid-brown to reddish brown with a narrow dark brown margin, lower surface lesions pale brown. *Conidiomata* amphigenous, scattered on lesions, separate, immersed, black, globose, 80-140µm diam., pycnidial. *Ostiole* single, apical, 15-35µm, opening widely at maturity up to 75µm, cells around the ostiole slightly darker and thickened. *Conidiomatal wall* 3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layers mid-brown, inner layer pale. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform to lageniform, 7-8 x 3-4µm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, (1-)3-6 septate, mostly curved, 25-45(-60) x (1-)1.5-2(-3)µm with truncate base and rounded apex.

Hosts: *Betula papyrifera* Marsh, *B. pendula* Roth., *B. platyphylla* Sukachev var. *japonica* (Miq.) Hara, *B. pubescens* J.F. Ehrh., *Betula* sp.

Distribution: New South Wales (Anon. 1963), Queensland.

All Australian collections examined are morphologically indistinguishable from *S. betulae* as defined by Constantinescu (1984). In most of the material seen the ostiole is clearly defined only in very young conidiomata and at maturity has opened very widely by irregular dehiscence to appear almost acervular. Constantinescu (1984) defined the conidiogenesis as holoblastic with sympodial

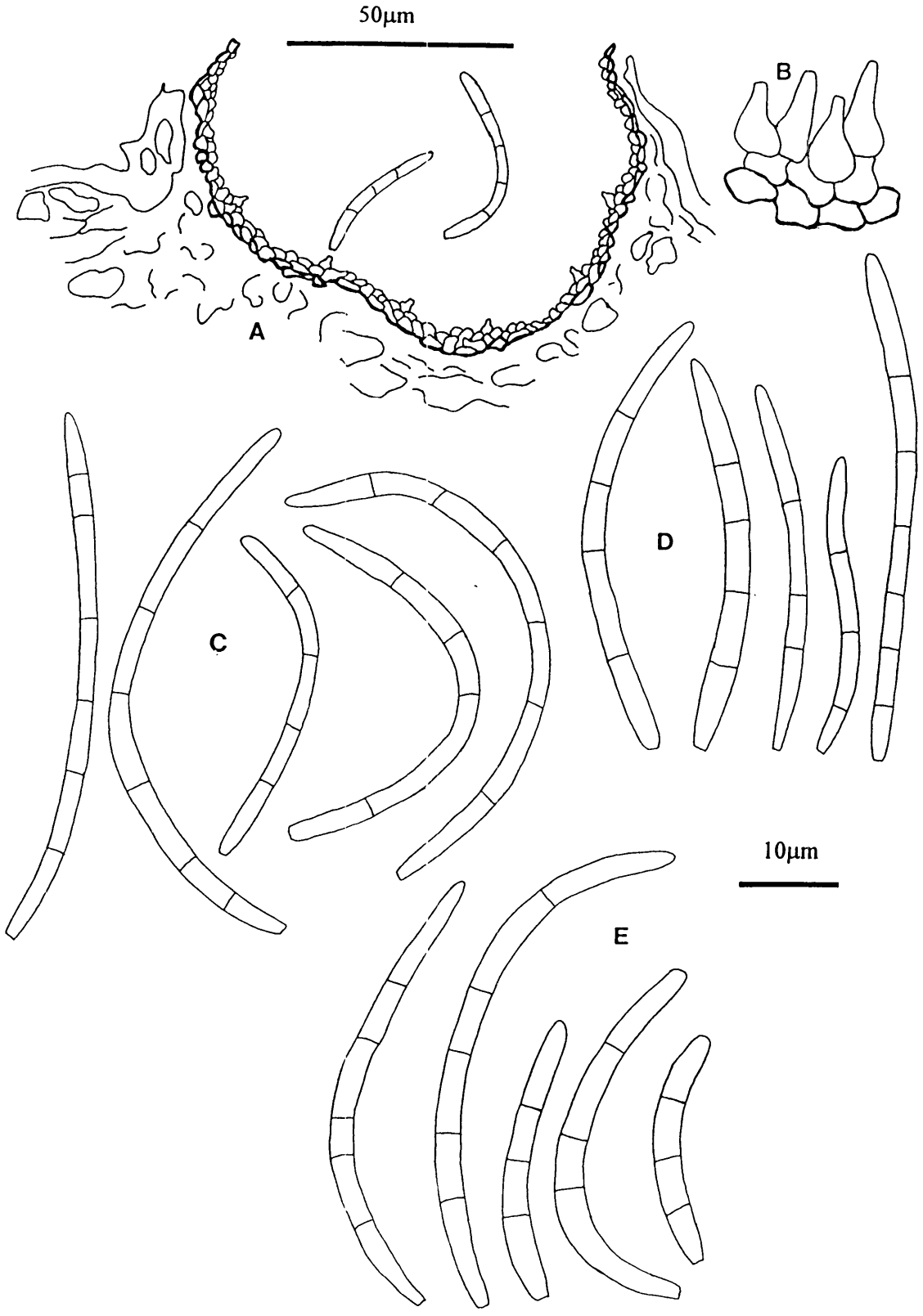

Fig.40 *Septoria betulae* (A) v.s. conidioma DAR 56614; (B) conidiogenous cells DAR 56614; C-E conidia (C) DAR 56614 (D) DAR 56613 (E) DAR 26130

proliferation but I did not observe any proliferation in collections examined. Most of the conidia were in the range of 1.5-2μm in width, with a few collections having wider conidia 2-2.5(-3)μm which is similar to that given for *S. weiriana* Sacc. However, no conidia exceeded 60μm in length and all collections are in the range given by Constantinescu (1984) for *S. betulae*. In addition, one collection examined (DAR 13578) had the accompanying *Asteromella* spermatial state which according to Constantinescu (1984) is frequently associated with this species.

Specimens examined:

on *Betula papyrifera*; **New South Wales**; Wentworth Falls, no date, Robinson (DAR 12430);

on *Betula pendula*: **New South Wales**; Bilpin, Feb. 1962, C. Nuzum (DAR 6884); Wahroonga, 13 Feb. 1962, C.J. Cope (DAR 6915); Bilpin, 23 Mar. 1962, R. Greever (DAR 7105); Ryde, 20 Mar. 1964, J. Collins (DAR 13578); Glenbrook, 9 Feb. 1972, J. Tidswell (DAR 22288); Oberon, 22 Apr. 1973, L.R. Fraser (DAR 26630); West Pennant Hills, 12 Feb. 1976 (DAR 28243); St. Ives, Jan. 1988, J. Eccles (DAR 61189);

on *Betula platyphylla* var. *japonica*; **New South Wales**; Botanic Gardens, Mount Tomah, 1 May 1992, C. Nuzum (DAR 56614);

on *Betula pubescens*; **New South Wales**; Botanic Gardens, Mount Tomah, 1 May 1992, C. Nuzum (DAR 56613);

on *Betula* sp.; **New South Wales**; Penrith, 22 Dec. 1975, J.A. Gill (DAR 26130); Botanic Gardens, Mount Tomah, 25 Jan. 1974, W.R. Watson (DAR 49567); Bowral, 5 Mar. 1993, I. Ross (DAR 71774); **Queensland**; Toowoomba, 10 Feb. 1982, M.J. Ryley (BRIP 13889).

BRASSICACEAE

In Australia two species of *Septoria* are distinguished on hosts in the Brassicaceae. *Septoria lepidii* is described from *Cardaria draba*. *Septoria sisymbrii* is recognised as the taxon occurring on both *Sisymbrium* and *Sinapis* and following examination of types and other collections, *S. polyadelpha*, *S. brassicae* and *S. lepidiicola* are synonymised with it. The *Septoria* sp. reported on *Matthiola incana* from Western Australia is referred to *Ascochyta matthiolae*.

Septoria armoraciae Sacc., *Michelia* 1: 187 (1879)

Listed by Brittlebank (1937-1940) as occurring on *Armoracia rusticana* P. Gaertn, B. Mey & Schenb. (given as *Cochlearia rusticana* L.) in Victoria. No herbarium collection under this name has been located and the record is unsubstantiated.

Septoria cheiranthi Rob. & Desm., *Ann. Sci. Nat. (Ser. 3)*, **8**: 20 (1847)

Listed by Brittlebank (1937-1940) as occurring on *Cheiranthus cheiri* L. in Victoria. No herbarium collection under this name has been located and the record is unsubstantiated.

Septoria lepidii Desm., *Ann. Sci. Nat.* **17**: 110 (1842)

(Fig. 41)

Leaf lesions absent. *Conidiomata* scattered on leaves and covering both leaf surfaces, separate, immersed becoming erumpent, dark brown, globose, 120-180µm diam., pycnidial. *Ostiole* single, apical, 20-45µm, opening widely at maturity to 90µm, cells around the opening dark brown and thickened. *Conidiomatal wall* 3-4 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, hyaline, discrete, cylindrical, 10-15 x 4-5µm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced both enteroblastically and holoblastically from percurrently proliferating loci, and from sympodially proliferating conidiogenous loci respectively. *Conidia* hyaline, filiform, 1-3 septate, straight to curved, 35-65 x 2-2.5µm, with rounded to truncate base and occasionally tapering to a rounded apex.

Host: *Cardaria draba* (L.) Desv. (≡ *Lepidium draba* L.).

Distribution: South Australia (Warcup & Talbot 1981, Cooke & Dube 1989), Victoria (Brittlebank 1937-1940, Chambers 1982).

Septoria lepidii was originally described as occurring on a number of species of *Lepidium* across Europe with conidia 50-60µm long. Grove (1935) also recorded *S. lepidii* on *L. smithii* in the United Kingdom but added no further details of the fungus merely repeating the original description.

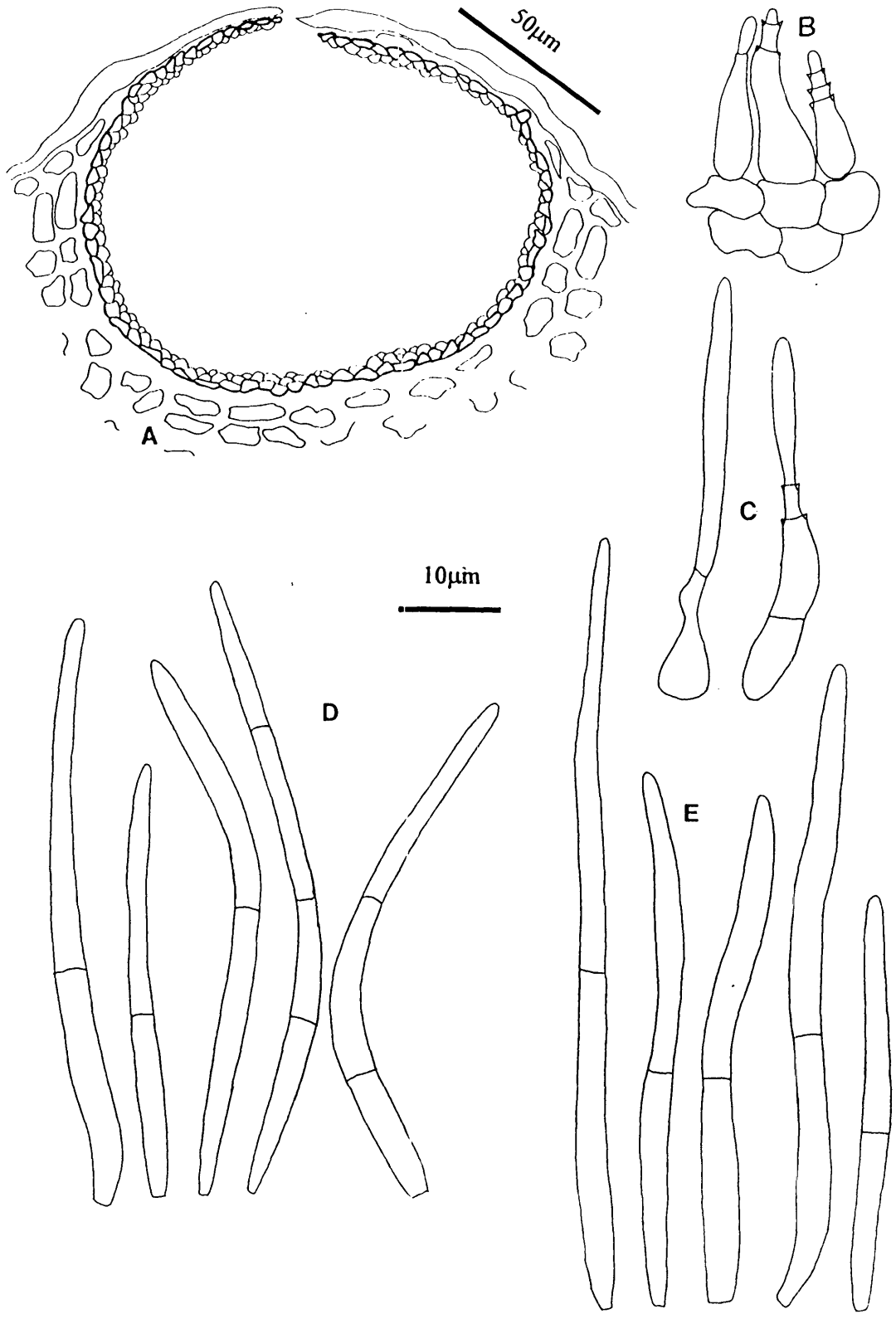

Fig.41 *Septoria lepidii* (A) v.s. conidioma ADW 1766; (B-C) conidiogenous cells ADW 1766; D-E conidia (D) ADW 1766; (E) DAR 35477

Australian collections are identical with exsiccatus material filed under the name *S. lepidii* on *Cardaria draba* from Europe. A second species, *S. lepidiicola* Ellis & Martin has been described on *Lepidium* spp. from the U.S.A. with conidia 24-33 x 2.5-3µm and examination of material under that name has shown conidia to be of the size given, being much shorter than those of *S. lepidii* and synonymous with the fungus described as *S. sisymbrii* Ellis & Martin (see below).

Specimens examined:

AUSTRALIAN COLLECTIONS:
on *Cardaria draba*; **South Australia**; Morphett Vale, Sept. 1915 (ADW 1766); **Victoria**; Werribee, 27 Aug. 1916, C. French Jnr. (VPRI 1806) host as *Lepidium*.

EXTRALIMITAL COLLECTION:
Septoria lepidii on *Cardaria draba*; Vieste, **Italy**, 29 Apr. 1970, S. Hasan (DAR 35447).

Ascochyta matthiolae Oud., *Nedel. Kruidkund. Arch.* (Series 3) **1**: 496 (1898)

(Fig. 42)

Leaf lesions hologenous, circular to irregular, 4-5mm diam., lesions on both surfaces pale green becoming grey-white, often coalescing into large blotches 12-25mm. *Conidiomata* amphigenous, scattered on lesions, separate, immersed becoming erumpent, black, globose to obpyriform, 70-150µm diam., pycnidial. *Ostiole* single, apical, 35-55µm, cells around the opening dark brown but non-thickened. *Conidiomatal wall* 3 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, hyaline, ampulliform, 8-12 x 3-4µm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceeding at the same level from enteroblastic conidiogenous loci. *Conidia* hyaline, filiform, cylindrical, 1-3 septate, straight, 11-22(-33) x 2.5-4µm with rounded base and apex.

Host: *Matthiola incana* R. Br. (Stock).

Distribution: New South Wales, Western Australia (Goss 1964, Shivas 1989 both as *Septoria* sp.).

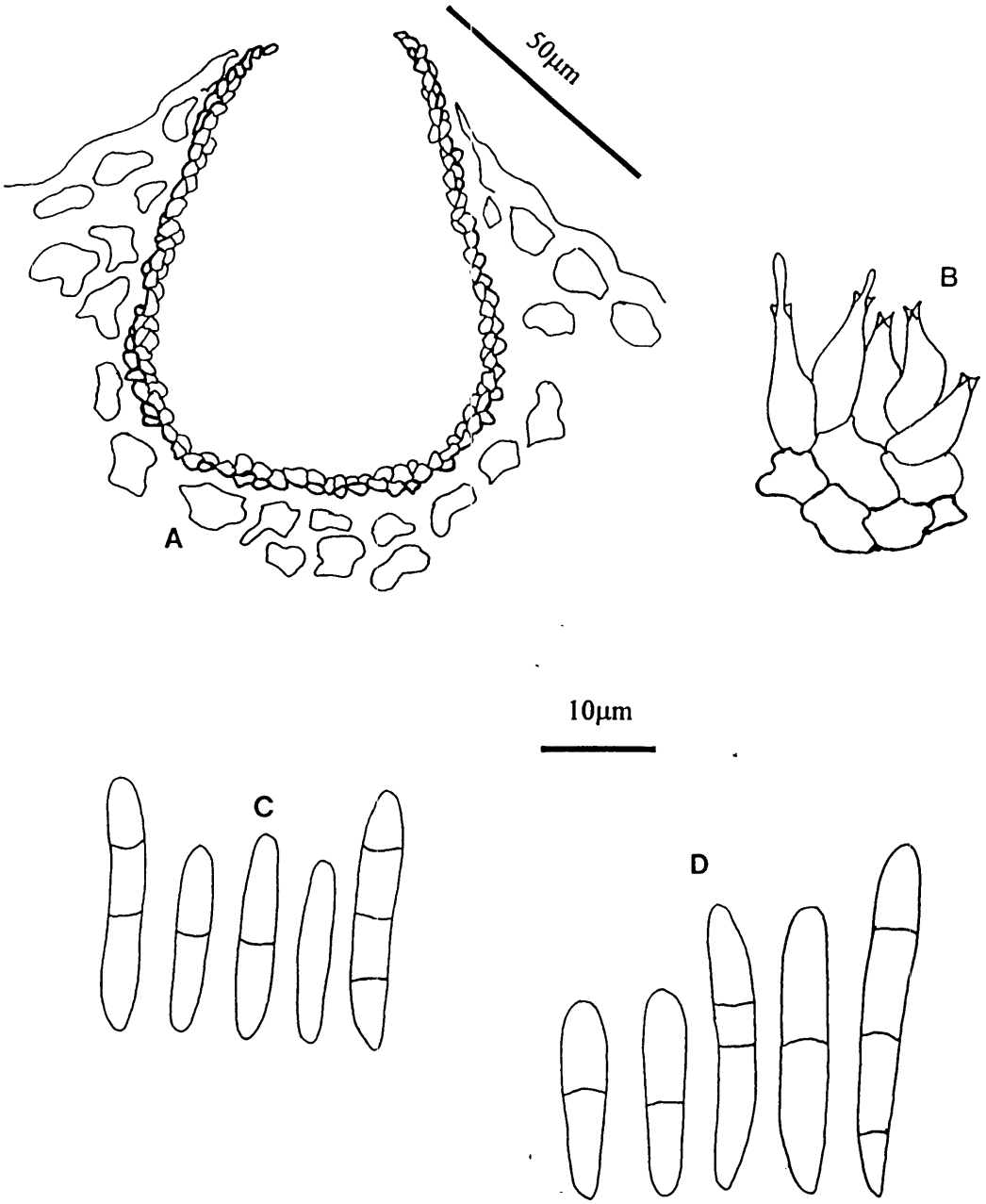

Fig.42 *Ascochyta matthiolae* (A) v.s. conidioma PERTH 785644; (B) conidiogenous cells PERTH 785644; (C) conidia PERTH 785644; (D) conidia DAR DAR 58588

Both Goss (1964) and Shivas (1989) reported a *Septoria* sp. as occurring on *M. incana* in Western Australia. Examination of the specimen (PERTH 785644) and an identical collection from New South Wales has shown that it is probably better placed in the genus *Ascochyta* Lib. based on the enteroblastic nature of conidiogenesis and the short, wide conidia which are mostly 1-septate. Several species close to this taxon have been described from *M. incana* in the literature including *Rhabdospora matthiolae* Malbr. & P. Brun. (conidia 16-25 x 3 and 1-septate), *S. henriquesii* Thüm. forma *santonensis* P. Brun. (conidia 15-20 x 3-3.5μm) and *Ascochyta matthiolae* Oud. with conidia 16-21 x 3-4μm and 1-septate. In New Zealand, *S. henriquesii* Thuem. has been recorded on *M. incana* (Pennycook 1989) but this species was described as having conidia 8-11 x 2μm, narrower than the taxon under discussion. The earliest name in *Ascochyta*, *A. matthiolae* Oud. is the name adopted here.

Specimens examined: on *Matthiola incana*: **New South Wales**; Penshurst, 29 May 1910, E. Cheel (DAR 58588); **Western Australia**; South Perth, 20 Oct. 1926. Hewston (PERTH 785644).

Septoria sisymbrii Ellis, *Am. Nat.* **16**: 811 (1882)
= *Septoria lepidiicola* Ellis & Martin, *Am. Nat.* **16**: 1002 (1882)
= *Septoria brassicae* Ellis & Everhart, *Publ. Field. Col. Mus. Bot.* **1**: 117 (1896)
= *Septoria polyadelpha* Syd. *Ann. Mycol.* **36**: 307 (1938)

(Figs. 43, 44)

Leaf lesions hologenous, 2-3mm diam., lesions on both surfaces pale grey-green with an occasional dark brown margin, occasionally occurring on stems. *Conidiomata* mostly epigenous, rarely hypogenous, scattered on lesions, separate, immersed becoming erumpent, globose, dark brown, 90-120μm diam., pycnidial. *Ostiole* single, apical, 15-30μm, up to 40μm at maturity, cells around the opening darkened. *Conidiomatal wall* 3 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer 2 layers mid-brown, inner layer very pale brown. *Conidiogenous cells* arising from the inner wall layer, hyaline, discrete, occasionally integrated, ampulliform, 9-13 x 3.5-5μm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced enteroblatically and seceding from percurrently proliferating conidiogenous loci. *Conidia* hyaline, filiform, 1-3(-4) septate, straight to slightly curved, 21-42(-50) x 2.5-3μm with a truncate base and a rounded apex.

Hosts: *Sinapis arvensis* L., *Sisymbrium officinale* (L.) Scop.

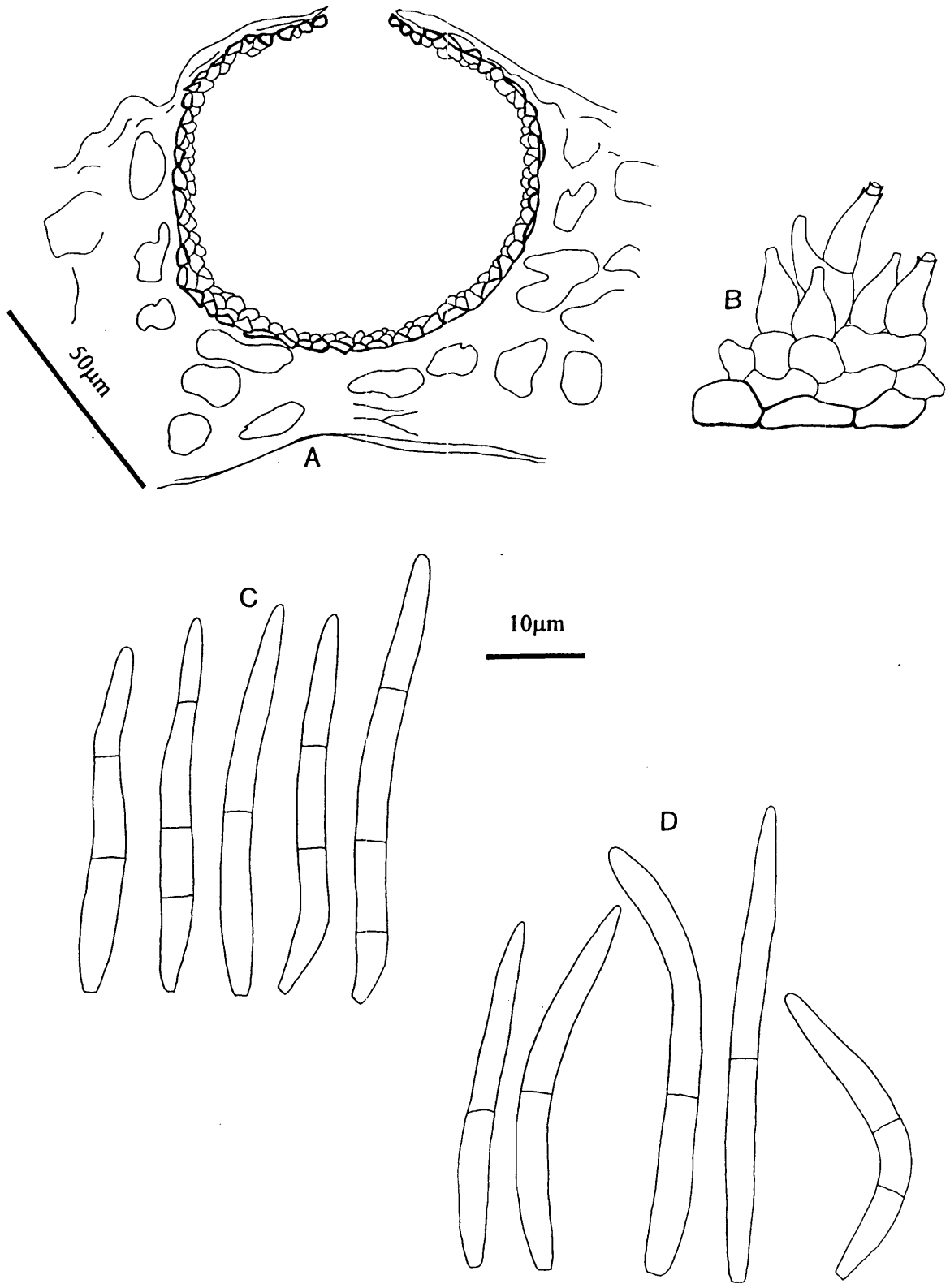

Fig.43 *Septoria sisymbrii* (A) v.s. conidioma *S. polyadelpha* (type); (B) conidiogenous cells *S. polyadelpha* (type); (C) conidia *S. polyadelpha*; (D) conidia *S. brassicae* (type)

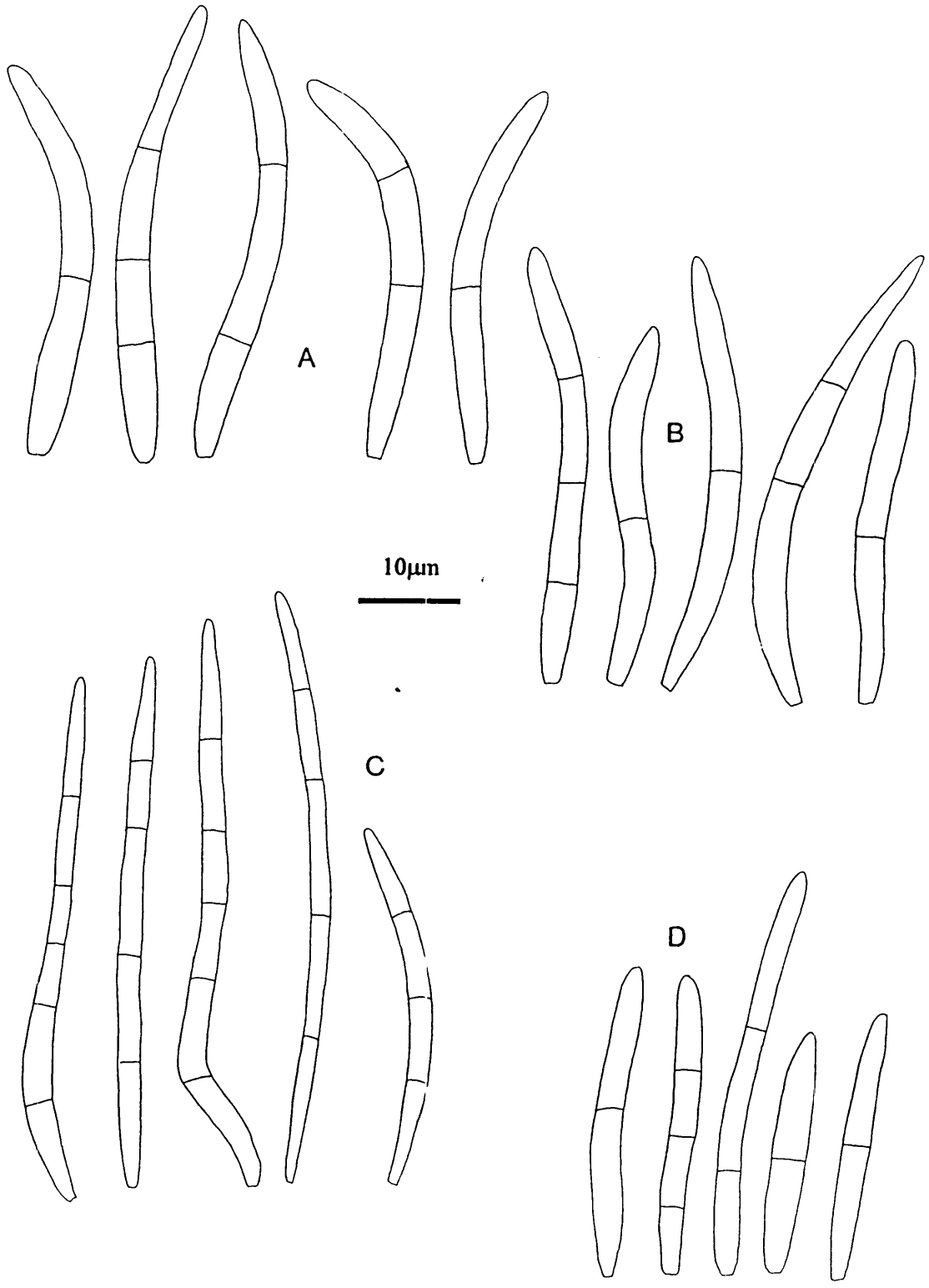

Fig.44 *Septoria sisymbrii* A-D conidia (A) *S. sisymbrii* DAR 50928 (*Econ. Fungi* No. 260); (B) DAR 73546; (C) *S. radiculae* DAR 69056 (ex UC); (D) *S. lepidiicola* DAR 54401(*Fungi Columbiani* No. 1449)

Distribution: New South Wales (Sydow 1938, Hynes *et al.* 1941; both as *S. polyadelpha*), Tasmania, Victoria (Brittlebank 1937-1940, Chambers 1982; report only).

Sydow (1938) described *Septoria polyadelpha* from New South Wales on the host *Brassica sinapistrum* which is now *Sinapis arvensis*. Several species of *Septoria* which appear to be morphologically similar have been described from the closely related hosts *Brassica, Lepidium, Sisymbrium* and *Sinapis* including, *S. brassicae* (conidia 25-45 x 2-3µm), *S. lepidiicola* (conidia 24-33 x 2.5-3µm) and *S. sisymbrii* with conidia 30-40 x 3-5 and 1-2 septate. Examination of the type collections of *S. brassicae* and *S. polyadelpha* authentic material of *S. lepidiicola* and collections on *Sisymbrium officinale* (the type host of *S. sisymbrii*) has shown that all are morphologically indistinguishable. A single collection of *S. lepidiicola* had conidia 25-40 x 2.5-3µm and although many were slightly shorter than those seen in other collections they were in the range of spore dimensions found in *S. brassicae* and *S. sisymbrii* and I consider it synonymous with *S. sisymbrii*. The earliest name for this taxon is *S. sisymbrii* whose date of publication is October 1882, predating *S. lepidiicola* published in December 1882. The percurrent proliferation of the conidiogenous cells observed in *S. polyadelpha* was also observed in material on *Sisymbrium*. *Septoria radiculae* Dearness which occurs on *Nasturtium* (another closely related member of the Brassicaceae) was described with much longer and more septate conidia. Examination of exsiccatus material under this name confirms that it is distinct from *S. sisymbrii*.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Sinapis arvensis*; **New South Wales**; Pennant Hills, Feb. 1935, L.R. Fraser (DAR 64052) **holotype** of *S. poylyadelpha*;

on *Sisymbrium officinale*; **Tasmania**; Pawleena, 3 Nov. 1980, D.I. Morris (DAR 73546).

EXTRALIMITAL COLLECTIONS:

Septoria brassicae; on *Brassica nigra* (L.) W.D.J. Koch, Nuttalburg, West Virginia, **U.S.A.**, Nov. 1894, L.W. Nuttall, *Fungi Columbiani* No. 777 (DAR 53992) **type**;

Septoria lepidiicola; on *Lepidium densiflorum*, Nebraska, **U.S.A.**, 23 May 1900, J.M. Bates 1321, *Fungi Columbiani* No. 1449 (DAR 54401);

Septoria radiculae; on *Nasturtium officinale* R.Br., Botanic Garden, University of California, Berkley, **U.S.A.**, 22 May 1972, W. Hirano, *Fungi of California* No. 1415 (DAR 69056 ex UC);

Septoria sisymbrii; on *Sisymbrium officinale*, New Brunswick, New Jersey, **U.S.A.**, 24 June 1892, B.D. Halsted, *Seymour & Earle Economic Fungi* No. 260 (DAR 50928).

CAMPANULACEAE

Two species of *Septoria* are distinguished in Australia on hosts in the Campanulaceae. *Septoria lobeliae* is recognised on *Pratia purpurascens* and a new species *S. wahlenbergii-australiensis* is described from *Wahlenbergia* spp.

Septoria lobeliae Peck, 24th Rept. N.Y. State Mus. 87 (1872)
= *Septoria lobeliae* Peck var. *berolinensis* Syd., *Hedwigia* **38** :139 (1899)
= *Septoria lobeliae* Peck var. *lobeliae-inflatae* Sacc. *Ann. Mycol.* **13**: 120 (1915)

(Fig. 45)

Leaf lesions hologenous, 3-5mm diam., on both surfaces, lesions pale creamy brown, slightly raised, surrounded by a very pale brown necrotic area. *Conidiomata* amphigenous, mostly hypogenous, scattered on lesions, immersed becoming erumpent, separate, globose to depressed globose, black, 110-190µm diam., pycnidial. *Ostiole* single, apical, 16-34µm, papillate, cells around opening dark and thickened. *Conidiomatal wall* 3-4 cell layers thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown and thickened, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, occasionally integrated, hyaline, ampulliform to lageniform, 10-15 x 3.5-4.5µm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, filiform, 1-3 septate, straight to curved, 20-40 x (1-)1.5-2µm with truncate to rounded base and rounded apex.

Host: *Pratia purpurascens* (R.Br.) E.Wimmer (=*Lobelia purpurascens* R. Br.).

Distribution: New South Wales (Walker, Fahy & Mcleod 1985 as *Septoria* sp.), Queensland (Simmonds 1966 as *Septoria* sp.), South Australia (Warcup & Talbot 1981, Cooke & Dube 1989; report only).

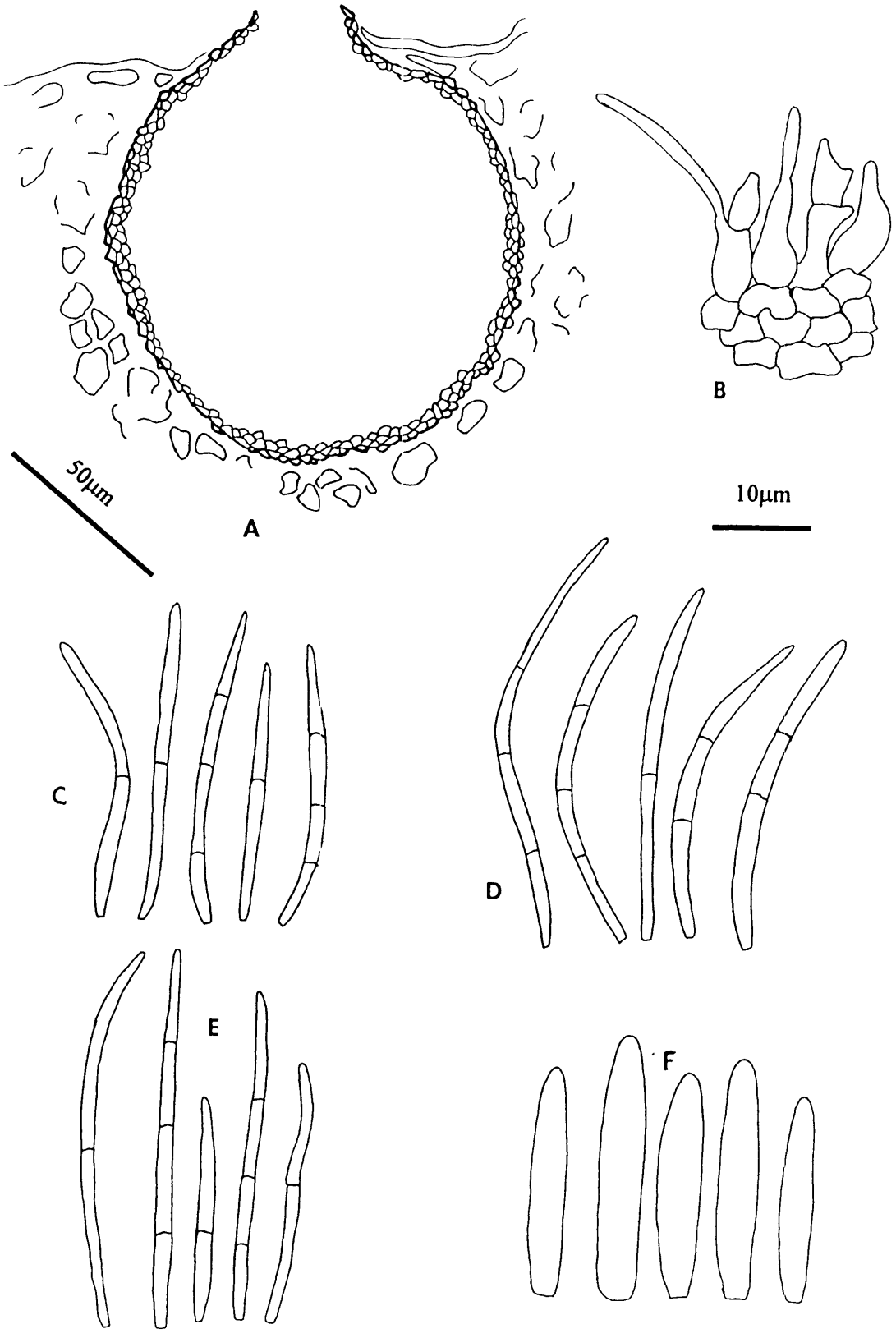

Fig.45 *Septoria lobeliae* (A) v.s. conidioma BRIP 6166; (B) conidiogenous cells BRIP 6166; C-F conidia (C) BRIP 6166; (D) IMI 88541; (E) DAR 53430 (*Fungi Columbiani* No. 282); (F) *Rhabdospora lobeliae* VPRI 1744 (type)

Septoria lobeliae was described from *L. spicata* in the U.S.A. with conidia 17-25µm long. Several other taxa have been described from species of *Lobelia* including *S. lobeliae* var. *berolinensis* Syd. (conidia 20-26 x 1.5µm), *S. lobeliae* var. *lobeliae-inflatae* Sacc. (conidia 28-30 x 1.8µm) which was described as differing from *S. lobeliae* in the absence of a red margin on the leaf lesions, *S. ramonensis* Syd. (conidia 27-55 x 2-3µm and 3-5 septate) from *L. laxiflora* in Costa Rica and *S. lobeliae-syphiliticae* P. Henn. with conidia 45-55 x 1-1.2µm. Examination of exsiccatus material from the U.S.A. under the name *S. lobeliae* including material from *L. inflata* has shown that conidia are generally (12-)20-40 x 1-2µm and 1-3 septate which encompasses the dimensions given for *S. lobeliae* var. *lobeliae-inflatae* and *S. lobeliae* var. *berolinensis* and hence it would be prudent to regard them as synonymous with *S. lobeliae*. Australian collections on *Pratia* Gaud.-Beaup. are morphologically identical to the named material examined and are placed under the name *S. lobeliae*. *Rhabdospora lobeliae* McAlp. was described from stems of *Lobelia gibbosa* Labill. with conidia 24-31 x 3-3.5µm. Examination of the type material (VPRI 1744) has revealed that conidia are hyaline, aseptate, produced on simple holoblastic conidiogenous cells and measure (22-)24-28(-36) x 3-5µm.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Pratia purpaurascens*; **New South Wales**; Galston, 24 July 1983, J. Walker 83/2 (DAR 33850); **Queensland**; Yarraman, 15 Aug. 1932, R.B. Morwood (BRIP 6166) host as *Lobelia*; Kenmore, 5 Dec. 1972, J.L. Alcorn (BRIP 8775) host as *Lobelia*;

Rhabdospora lobeliae on *Lobelia gibbosa*, **Victoria**; Sandringham, Dec 1902, C. French Jnr. (VPRI 1744) **holotype**.

EXTRALIMITAL COLLECTIONS:

on *Lobelia cardinalis*; Nuttallburg, West Virginia, **U.S.A.**, July 1894, L.W. Nuttall, *Fungi Columbiani* No. 282b (DAR 53431);

on *Lobelia inflata*; New Jersey, **U.S.A.**, Oct. 1892, B. Halsted, *Fungi Columbiani* No. 282 (DAR 53430);

on *Lobelia* sp.; **Ethiopia**, May 1960, R.B. Stewart (DAR 13262 & BRIP 17654 ex IMI 88541).

Septoria wahlenbergii-australiensis M.J. Priest **sp. nov.**

Etymology: on Australian species of *Wahlenbergia*

(Fig. 46)

Maculae hologenae, elongatae, 2-5 x 2mm, pallide brunneae vel cremeae, cum marginae distinctae. *Conidiomata* amphigenae, pycnidialia, immersa, separata, globosa, 60-110µm diam., crassitudine 2-cellularum, parieties pseudoparenchymatici, textura angulari, brunnea compositi. *Ostiolum* singulum, apicalum, 10-25µm. *Cellulae conidiogenae* e cellulis interioribus conidiomatum formatae, discretae, hyalinae, ampulliformes vel lageniformes, 8-12 x 3.5-4µm, holoblastica simplicia conidia producentes. *Conidia* hyalina, filiformia, 1-2(-3) septata, cylindrica vel obclavata, recta vel curvata, laevia, (26-)35-43 x (1.5-)2µm, basim truncatum, apicem deminuta subacuta.

Holotypus: in foliis *Wahlenbergia gracilenta* Lothian, Keith, South Australia, Australia, 22 Oct 1953, L.D. Williams (ADW 3695).

Leaf lesions hologenous, elongated, 2-5 x 2mm, on both surfaces at first pale-mid brown with cream centre but later becoming mostly cream with a very pale brown margin. *Conidiomata* amphigenous, scattered on lesions, separate, immersed becoming erumpent, globose, dark brown, 60-110µm diam., pycnidial. *Ostiole* single, apical, 10-25µm, cells around opening dark and thickened. *Conidiomatal wall* 2 cell layers thick, composed of pseudoparenchymatous tissue, textura angularis, both cell layers dark brown. *Conidiogenous cells* arising from the inner wall layer, discrete, occasionally septate, hyaline, ampulliform to lageniform, 8-12 x 3.5-4µm producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, cylindrical to slightly obclavate, 1-2(-3) septate, (26-)35-43(-52) x (1.5-)2µm, straight to slightly curved, with truncate base and tapering to a sub-acute apex.

Hosts: *Wahlenbergia gracilenta* Lothian, *W. stricta* Sweet

Distribution: New South Wales, South Australia (Hansford 1954, Warcup & Talbot 1981, Cooke & Dube 1989; as *Septoria* sp.).

Hansford (1954) described a *Septoria* sp. from South Australia on *W. gracilenta* but was unable to place the species. *Septoria wahlenbergii* Speg. was described from *W. linearioides* in Argentina

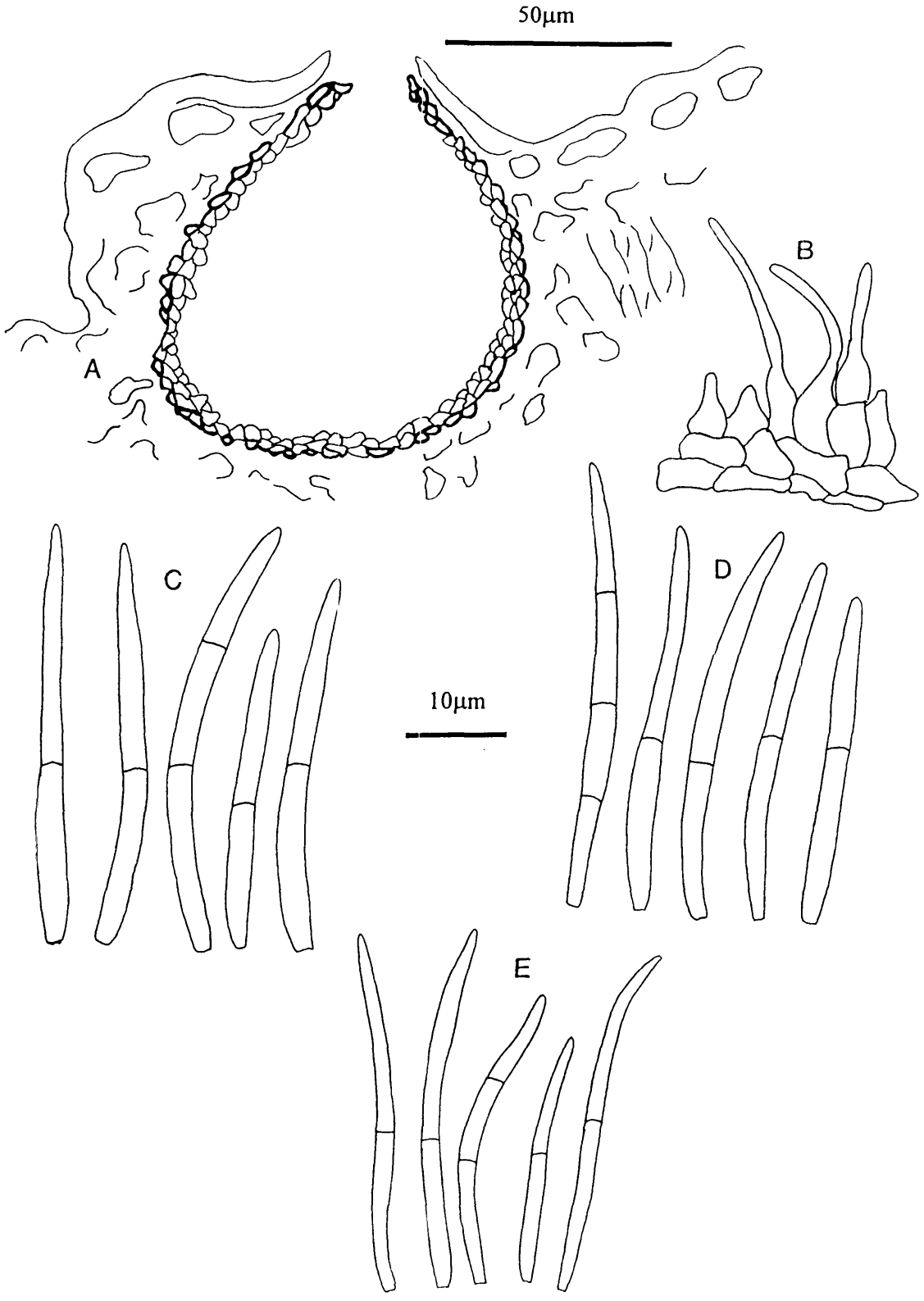

Fig.46 *Septoria wahlenbergii-australiensis* (A) v.s. conidioma ADW 3695; (B) conidiogenous cells ADW 3695; C-E conidia (C) ADW 3695; (D) DAR 62084; (E) *S. wahlenbergii* LPS (type)

(Spegazzini 1882), the name given as "*walembergii*" due to a misspelling of the host genus. Saccardo (1884) transferred it to the genus *Rhabdospora* and corrected the name to *wahlenbergii*. Examination of the type collection in LPS has revealed that the conidiogenesis is holoblastic with sympodial proliferation and the conidia are 20-36 x 1.5μm and are 0-1 septate (in the original description the conidia were given as 30-40 x 1.5μm and continuous). Australian collections examined have conidia which are mostly longer and slightly wider than *S. wahlenbergii,* conidiogenesis is simple holoblastic without proliferation and is described here as a new species *S. wahlenbergii-australiensis*.

Specimens examined:

AUSTRALIAN COLLECTIONS:

on *Wahlenbergia gracilenta*; **South Australia**; Keith, 22 Oct. 1953, L.D. Williams (ADW 3695) **holotype**;

on *Wahlenbergia stricta*; **New South Wales**; near Woomargana, 13 Nov. 1969, J. Walker (DAR 62084).

EXTRALIMITAL COLLECTION:

Septoria wahlenbergii; on *Wahlenbergia linearioides*, Chacarita near Buenos Aires, **Argentina**, Oct. 1880 (LPS 10522) **holotype**.

CANNABIDACEAE

Septoria humuli Westend., *Bull. Acad. Roy. Soc. Belg.* **12**: 252 (1845)

= *Ascochyta humuli* Lasch in Rabenh., Herb. Mycol. 1: 680 (1844)

= *Septoria humulina* Bond., J. Pfl. Krankh., St. Petersburg 1910: 34 (1910)

(Fig. 47)

Leaf lesions hologenous, orbicular to irregular, 2-3mm diam. often coalescing to form large blotches on the leaf surface, upper surface lesions dark green-grey becoming grey at maturity with a dark green margin, lower surface lesions remaining dark green. *Conidiomata* epigenous, scattered on lesions, separate, immersed becoming erumpent, globose to depressed globose, dark brown, 90-130 x 75-120μm diam., pycnidial. *Ostiole* single, apical, 20-30μm, cells around the opening darkened and thickened. *Conidiomatal wall* 2-4 cell layers thick, composed of pseudoparenchymatous tissue,

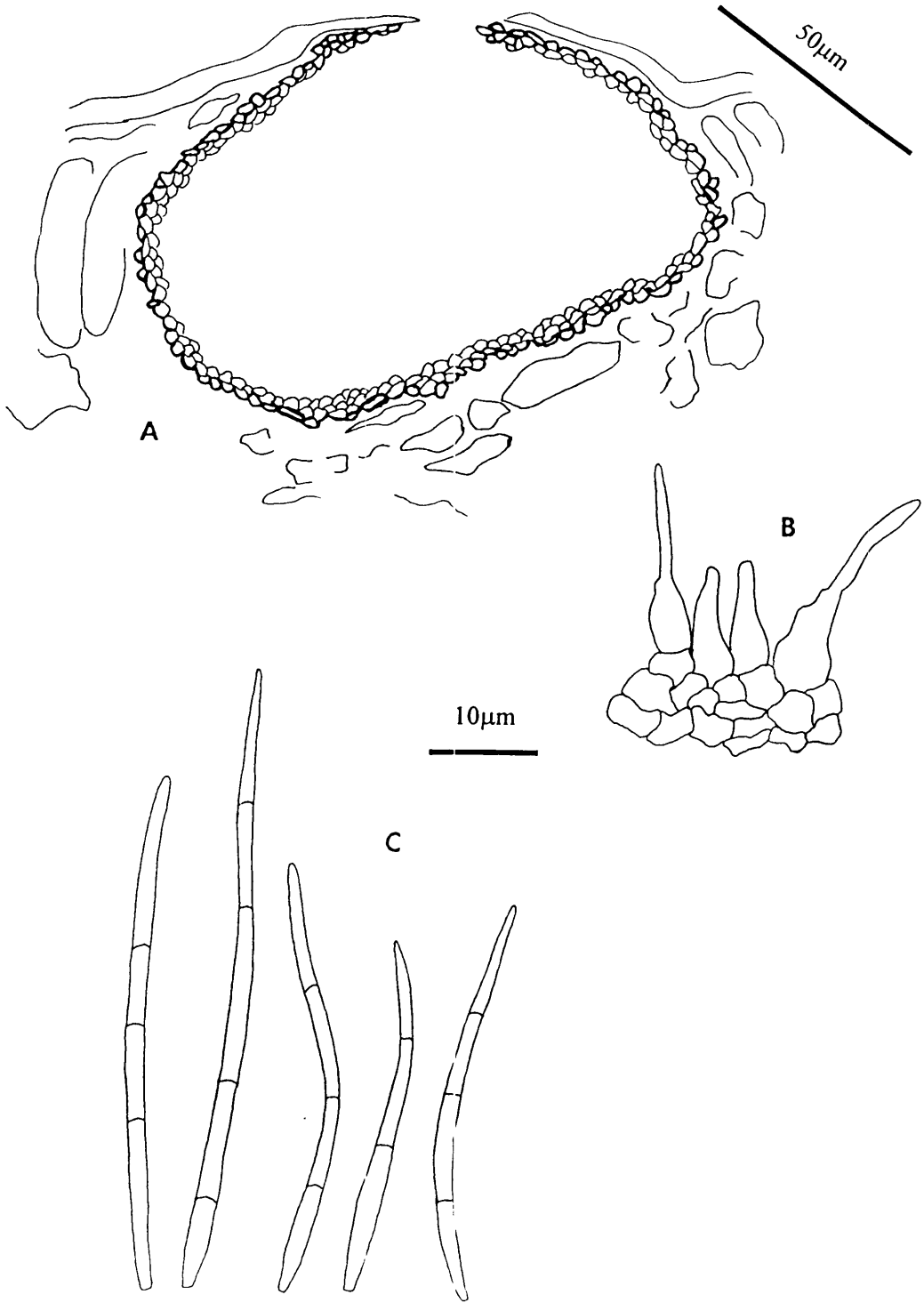

Fig.47 *Septoria humuli* DAR 69282 (A) v.s. conidioma; (B) conidiogenous cells; (C) conidia

textura angularis, outer layer mid-yellow brown, inner layers pale brown. *Conidiogenous cells* arising from the inner wall layer, discrete, occasionally septate and integrated, hyaline, ampulliform, 10-12 x 2.5-3.5µm, producing conidia holoblastically, secession schizolytic, subsequent conidia produced and seceding holoblastically from sympodially proliferating conidiogenous loci. *Conidia* hyaline, filiform, 1-4 septate, straight to flexuous, 22-44(-56) x 1-1.5µm, with truncate to obtuse base and tapering gradually to a sub-acute apex.

Host: *Humulus lupulus* L. (Hop).

Distribution: Tasmania.

The taxonomy and biology of *S. humuli* has been outlined by Punithalingam (1985). Morphologically, the single Australian collection examined agrees with descriptions given by Grove (1935), Jørstad (1965) and Punithalingam (1985). This appears to be the first and only record of this species in Australia.

Specimen examined: on *Humulus lupulus*; **Tasmania**, Oct. 1992, C. Wilson (DAR 69282).

CAPRIFOLIACEAE

Septoria viburni Westend., *Bull. Roy. Soc. Brux.* **19**: 121 (1852)

Listed by Brittlebank (1937-1940) and Chambers (1982) as occurring on *Viburnum opulus* L. (Guelder Rose) in Victoria prior to 1940. No herbarium specimen has been located and the record cannot be verified.

Septoria sp. on *Lonicera caprifolium*

(Fig. 48)

Leaf lesions hologenous, marginal, 5-8mm diam., upper surface lesions at first dark brown but becoming pale brown with a grey centre and an irregular dark brown margin, lower surface lesions pale brown and lacking margin. *Conidiomata* amphigenous but mostly hypogenous, scattered on lesions, separate, immersed becoming erumpent, globose, pycnidial, 50-70µm diam. *Ostiole* single,

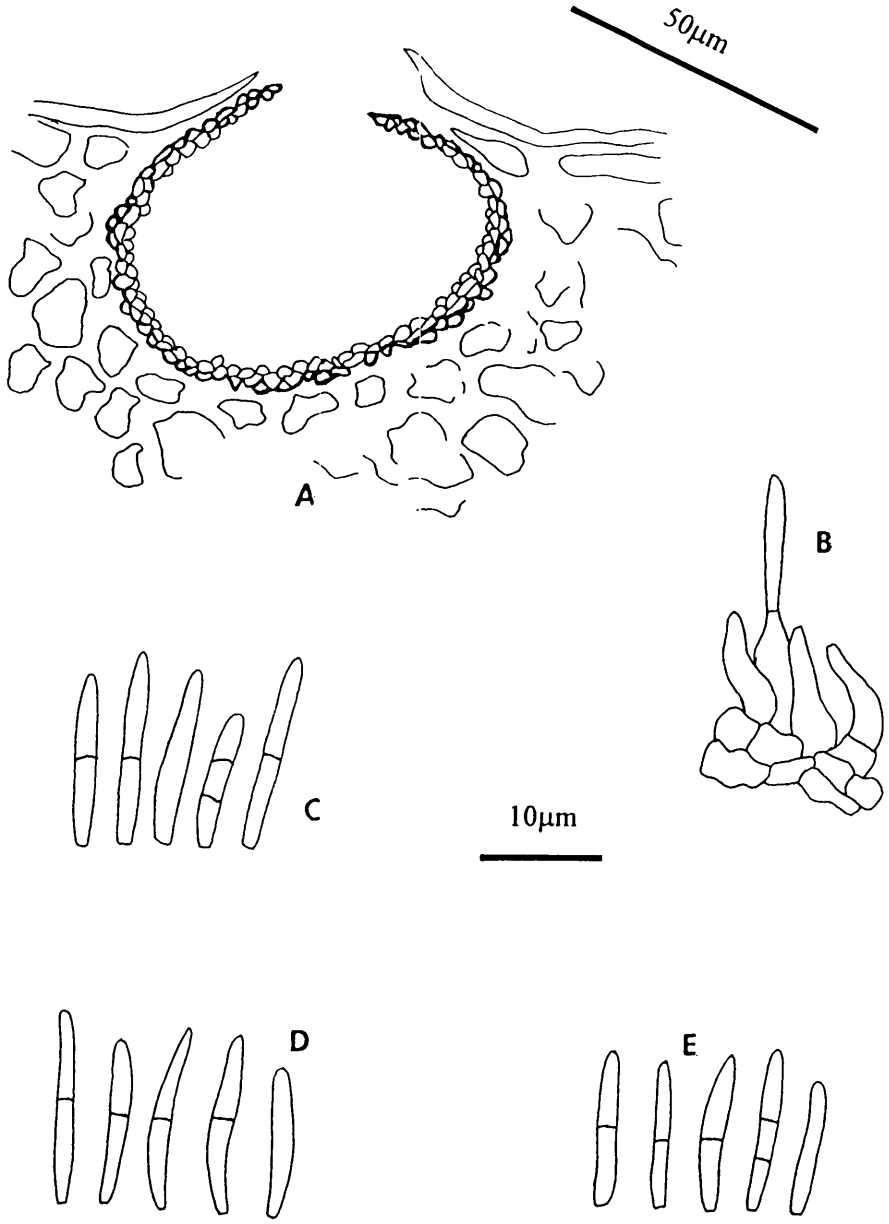

Fig.48 *Septoria* sp.; on *Lonicera* DAR 6980 (A) v.s conidioma; (B) conidiogenous cells; (C) conidia; (D) conidia on *Hedera* VPRI 1795; (E) conidia on *Ligustrum* DAR 72945

apical, 15-25μm, cells around ostiole dark brown and thickened. *Conidiomatal wall* 2-3 cells thick, composed of pseudoparenchymatous tissue, *textura angularis*, outer layer dark brown, inner layers pale brown. *Conidiogenous cells* arising from inner wall layer, discrete, hyaline, ampulliform, 8-10 x 2-3μm, producing one or more conidia holoblastically, secession schizolytic, subsequent proliferation of the conidiogenous locus not observed. *Conidia* hyaline, filiform, cylindrical, 0-1(-2) septate, straight, rarely curved, 8-17 x 1-1.5μm, with truncate base and rounded apex.

Host: *Lonicera caprifolium* L.

Distribution: New South Wales.

The identity of this taxon is uncertain. There are no similar species of *Septoria* or closely related genera described from *Lonicera*. *Septoria obscurata* Thuem. described from *L. periclymenum* has condia 12 x 4μ and *S. xylostei* Sacc. & G. Wint. described from *L. xylostei* has conidia 40-60 x 1.5μm. This taxon is associated with marginal leaf lesions and shows a remarkable similarity to the taxon seen on a diverse range of hosts such as *Stephanotis*, *Hedera*, *Prunus* and *Rosa* with short narrow conidia in the range of 10-20 x 1-1.5μm and associated with incubated, dead or dying leaves.

Specimen examined: on *Lonicera caprifolium*; **New South Wales**; Baulkham Hills, 10 June 1962, J. Walker (DAR 6980).

CARYOPHYLLACEAE

Four taxa of *Septoria* are recognised on hosts in the Caryophyllaceae in Australia being, *S. cerastii* on *Cerastium glomeratum*, *S. dianthi* on *Dianthus* spp., *S. silenicola* on *Silene gallica* and *S. stellariae* on *Stellaria media* and the native host *Drymaria diandra*.

Key to Australian species of *Septoria* on Caryophyllaceae

1 Conidia mostly less than 40μm long.....2

1: Conidia mostly more than 40μm long.....3