

**MACROVENTURIA, A NEW GENUS OF THE VENTURIACEAE**

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(With four Text-figures)

*Macroventuria*, a new genus of Venturiaceae, is described with two new species.

Amongst fungus cultures recently sent to the "Centraalbureau voor Schimmelcultures" for identification strains of two closely related ascomycetes belonging to the Pseudosphaeriales were encountered, with some characters pointing to the Venturiaceae as well as to the Mycosphaerellaceae and Pleosporaceae. The relatively large, nearly hyaline, two-celled ascospores suggest *Mycosphaerella* Johanson sect. *Didymellina* (von Arx, 1949; Müller & von Arx, 1962). On the other hand the perithecia are provided with well developed setae, a character recalling *Venturia* De-Not. sensu Saccardo (Saccardo, 1882; von Arx, 1952). In this character and in the permanently two-celled ascospores, the present strains differ from *Leptosphaerulina* McAlpine, a genus with characters that can be compared in pure culture, where relatively quick-ripening ascospores are formed. The saprophytic mode of life and the morphology are suggestive of a rather primitive organisation, like that of *Wettsteinina* Höhn. and *Pyrenophora* Fr. (Müller & von Arx, 1950).

The genus *Venturia* contains a fairly large number of species. These are parasitic on higher plants and restricted to a single host or to a few closely related hosts (Menon, 1956; Müller, 1957; Nuesch, 1960; Müller & von Arx, 1962; Barr, 1968). The present strains resemble *Venturia* by their setose perithecia but they differ in the restricted number of the relatively large asci, the almost hyaline, large ascospores and the saprophytic mode of life. They are considered to be primitive Venturiaceae and are described here as representatives of a new genus.

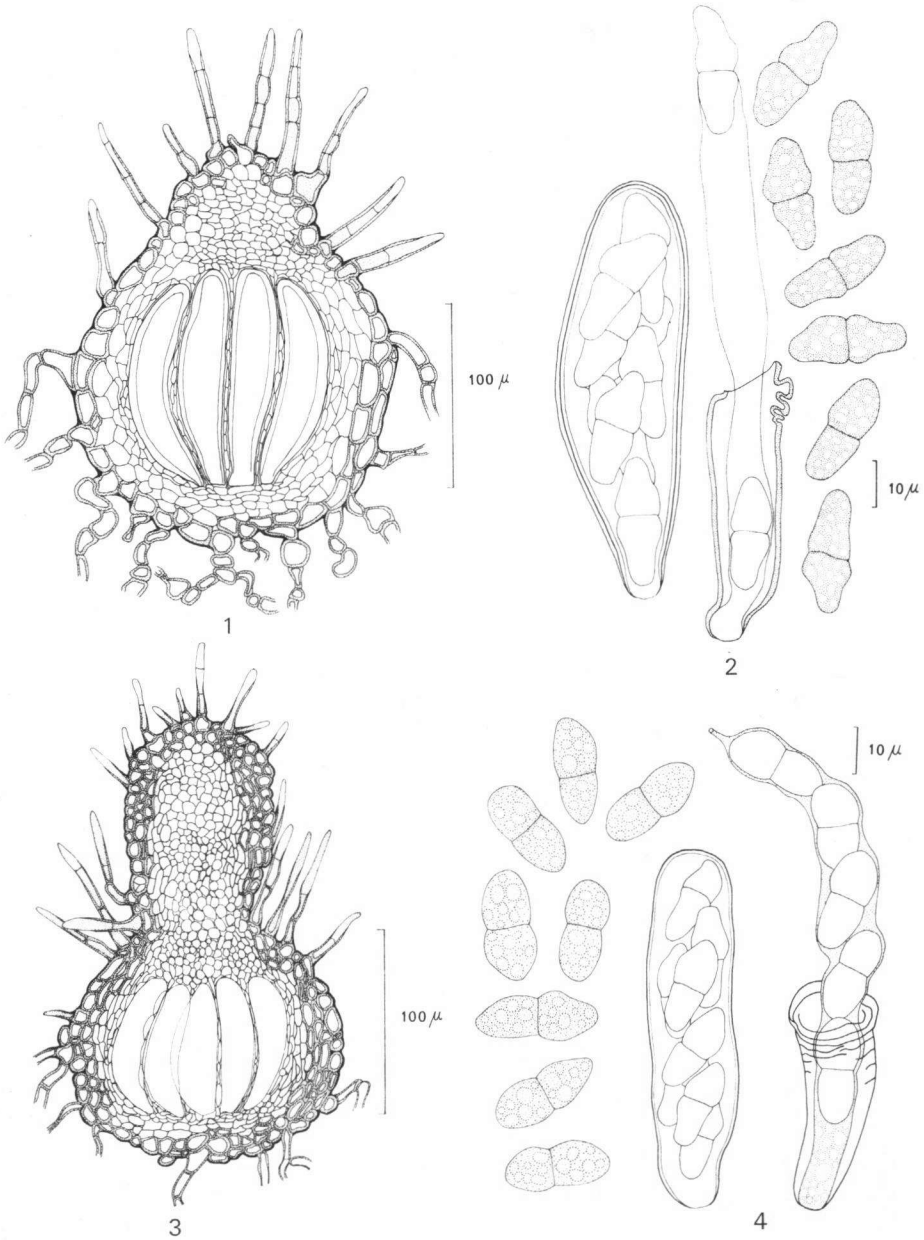
***Macroventuria* van der Aa, gen. nov.**

Genus Venturiacearum, *Venturiae* affine, sed saprophyticum, peritheciis globosis papillatis erumpentibus, demum superficialibus, fuscis, sursum setulatis. Asci pauci, ellipsoidei vel sacciformes, bitunicati, octospori. Ascosporae fere hyalinae, ellipsoideae, bicellulares, semper plus quam 20  $\mu$  longae.

SPECIES TYPICA *Macroventuria wentii* van der Aa.

Genus belonging to the Venturiaceae, saprophytic, with perithecia spherical and papillate, erumpent, becoming superficial, dark, setose on the upper part. Asci in small number, ellipsoid or sack-like, bitunicate, 8-spored. Ascospores almost hyaline, ellipsoid, 2-celled, over 20  $\mu$  long.

TYPE SPECIES.—*Macroventuria wentii* van der Aa.



FIGS. 1-4. — 1-2, *Macroventuria wentii*. 1. Perithecium. 2. Asci and ascospores. — 3, 4 *Macroventuria anomochaeta*. 3. Perithecium. 4. Asci and ascospores.

***Macroventuria wentii*** van der Aa, *spec. nov.*

Coloniae in vitro celeriter crescunt, e die decimo perithecia matura formant. Perithecia disseminata vel dense aggregata in strato stromatico, hyphis valde sinuosis, crassitunicatis, septatis, olivaceis, 6–9  $\mu$  diametro, enascentia.

Perithecia piriformia vel globosa, maturitate papilla prominente instructa, 135–180  $\times$  105–160  $\mu$ , apice setis obtecta; setae crassitunicatae, olivaceae, sursum tenuitunicatae et fere hyalinae, cylindratae vel attenuatae, sursum rotundatae, nonnumquam acuminatae, 40–90  $\times$  5–7.5  $\mu$ . Paries peritheciorum 25–35  $\mu$  crassus, strato externo e cellulis brunneis, crassitunicatis, plerumque rotundatis constante, intus in nonnulla strata cellularum fere hyalinarum, tenuitunicatarum, angulatarum vel compressarum transeunte.

Asci cylindratici vel clavati, sursum late rotundati, nonnumquam brevipedicellati, bitunicati, tunica externa crassa, tunica interna tenui, octospori, 75–93  $\times$  24–30  $\mu$ . Ascosporae una vel tribus seriebus dispositae, bicellulares, medio septatae et perspicue constrictae, utrinque sensim attenuatae ad finem rotundatum, granula parva hyalina vel viridula et nonnullas vacuolas majores transparentes continentes, 22–32  $\times$  8–14  $\mu$ ; paraphyses tam longae quam asci, vix 1–2  $\mu$  crassae.

TYPE CBS 526.71, isolatus e stramento foliorum, Death Valley, Nevada, U.S.A. (*F. W. Went* 229; *H. van der Aa* 2592).

Colonies on oatmeal- or cornmeal-agar growing quickly, reaching a diameter of 4.5–5 cm within 10 days, dark olivaceous brown to almost black with a broad pale olivaceous border, without aerial mycelium or with sparse greyish to brownish aerial mycelium. Perithecia produced from the very beginning and ripening within 10 days, scattered over and in the agar, free or growing close together and in older cultures connected by a loose stromatic tissue.

Perithecia piriform or globose, with a prominent papilla, 135–180  $\mu$ , seldom more than 200  $\mu$  in diameter. Perithecial wall about 25–35  $\mu$  thick, composed of an outer layer of more or less thick-walled, rounded or somewhat angular, dark brown cells, on the inner side gradually passing into some layers of prismatic or rounded, often somewhat flattened, subhyaline to hyaline cells; on the outer side passing into the agar or into the aerial mycelium with brownish, strongly twisted, septate and thick-walled hyphae, 6–9  $\mu$  in diameter, locally with swollen, chlamydospore-like cells, 10–25  $\mu$  in diameter, in older cultures with irregular septation in all directions, probably representing new perithecial initials; at top, starting from base of papilla, set with characteristic setae. Setae pale olivaceous, with a sub-hyaline tip, cylindrical or tapering to the rounded or somewhat pointed tip, 0–11, often 4–7-septate, thick-walled except in upper part, mostly 40–90  $\mu$  long, 5–7.5  $\mu$  in diameter at the broadest part often to be found at the base, present from the very beginning of perithecial development and also occurring on upper side of undeveloped, chlamydospore-like perithecial initials.

Asci restricted in number, often 7–10 in one perithecium, arranged more or less parallel to one another, broadly cylindrical or club-shaped, the widest part somewhat below the middle, with or without a short, broad stalk, bitunicate, the outer membrane thick, the inner one thin, liberating from the top of the ascus at maturity and lengthening in the direction of the pore of the perithecium. Asci 75–93  $\times$  24–30  $\mu$ , 8-spored, the spores in 1–3 series.

Ascospores 2-celled, the cells equal in size, often constricted at the septum, with one or both of the cells suddenly narrowing at the middle and tapering to the rounded ends, hyaline and filled with rather fine colourless or greenish granula surrounding some larger vacuoles, which may be brighter in colour, 22–32  $\times$  8–14  $\mu$ .

Asci surrounded by very slender, septate paraphyses, composed of 6–10  $\mu$  long and 1–2  $\mu$  broad cells. These connect the small, thin-walled, hyaline, prismatic

or somewhat flattened cells at the base of the asci, with the tissue above the asci, where mainly prismatic, thin-walled hyaline cells occur, these merging indistinguishably on the outer side with the sub-hyaline inner wall-cells. At maturity a canal originates in the papilla by decay of the inner cells, a process favoured by the increase of pressure in the perithecium.

Living, lyophilized and dried cultures and permanent slides are deposited in the CBS collection and herbarium.

**MATERIAL EXAMINED.**—

CBS 526.71, isolated from dead litter (*F. W. Went 229; H. van der Aa 2592*) holotype.

CBS 877.70, isolated from young *Franseria* bur (*F. W. Went 136p; H. van der Aa 2209*).

CBS 527.71A, isolated from air (*F. W. Went 240; H. van der Aa 2593*).

CBS 527.71B, isolated from ant pellet (*F. W. Went 773; H. van der Aa 2627*).

CBS 527.71C, isolated from floor of *Veromessor* nest (*F. W. Went 796; H. van der Aa 2628*).

CBS 527.71D, isolated from mycelium of *Veromessor* nest (*F. W. Went 814; H. van der Aa 2725*).

An isolation from male inflorescence of *Hymenoclea* (*F. W. Went 630; H. van der Aa 2619*) was intermixed with *Penicillium* and not kept.

All the collections mentioned were isolated by F. W. Went in 1970 and 1971, and originate from Death Valley, Nevada, U.S.A.

The present species differs clearly from *Macroventuria anomochaeta* in its lack of the characteristic arrangement of the setae in two series and in some details of perithecial and spore shape and sizes. Ascospore measurements show a rather wide range, but in a single perithecium differences in spore sizes are small. In strain CBS 527.71B for example some perithecia contain spores of about  $27\text{--}28 \times 10\text{--}12 \mu$ . Others were found with all the spores over  $30 \mu$  long and  $13\text{--}14 \mu$  wide.

***Macroventuria anomochaeta* van der Aa, *spec. nov.***

Coloniae in vitro tarde crescunt, post 4–6 hebdomades perithecia formant. Perithecia dense aggregata in crusta stromatica. Mycelium aerium obscure brunneum vel nigrum, nonnumquam absens. Perithecia piriformia, cylindrica vel globosa, papilla perspicua prominente instructa,  $120\text{--}150 \mu$  diametro,  $140\text{--}260\text{--}(300) \mu$  alta, quorum  $75\text{--}150 \mu$  papilla occupat; disparibus setis praedita, alterae collare inferius in margine perithecii formant, brunneae, rigidae, 2–6-septatae,  $60\text{--}120 \mu$  longae,  $3\text{--}5 \mu$  crassae, basi nonnumquam usque ad  $10 \mu$  inflatae, sursum plerumque rotundatae, raro aliquam acuminatae, alterae in summa papilla, subhyalinae vel basi pallide brunneae, 1–4-septatae,  $30\text{--}75 \times 3\text{--}4 \mu$ , basi ad  $9 \mu$  inflatae, sursum acuminatae vel rotundatae. Inter ambos zona nuda, raro setis formae intermediae obiecta. Prima forma etiam in hyphis vegetativis vel in stadiis juvenilibus perithecorum adest. Paries perithecorum  $16\text{--}24 \mu$  crassus, extus ex uno vel quattuor stratis cellularum crassitunicatarum, brunnearum, rotundarum vel prismatarum, intus e nonnullis stratis cellularum tenuitunicatarum hyalinarum constat.

Asci pauci, fere paralleli, cylindranei vel sacciformes, bitunicati, apedicellati, apice late rotundati, octospori,  $60\text{--}75 \times 16\text{--}21 \mu$ . Ascosporae una vel tribus seriebus dispositae, bicellulares, medio septatae et constrictae, utrinque attenuatae, vel una parte late rotundatae; plasma leve, raris granulis intermixtis pallide viride;  $21\text{--}27 \times 9\text{--}11 \mu$ . Paraphyses paucae, nonnumquam maturitate dilapsae.

Typus CBS 525.71, isolatus e linteo tentorii exeso, in deserto Karroo, Africa meridionali (*M. C. Papendorf 278*).

Colonies on different media growing slowly, reaching a diameter of 1 cm in 10–12 days, the best growth being on oatmeal- or cornmeal-agar with sterile stems of lupin that stimulate production of perithecia. Aerial mycelium dark brown to almost black, lacking when grown in ultraviolet light, which seems to have a stimulating effect on the production of perithecia. Perithecia formed in 4–6 weeks old cultures, very abundant on lupin stems in agar, ripening within 10 days, dense but separate, or tightly packed together in a stroma-like crust.

Perithecia piriform, somewhat columnar or more often globose with a conspicuous papilla, 120–150  $\mu$  in diameter and 140–260  $\mu$ , seldom more than 300  $\mu$  high, the papilla measuring 75–150  $\mu$ . Perithecial wall mostly 16–24  $\mu$  thick on the outer side with 1–4 layers of thick-walled, rounded or prismatic, often flattened cells, 6–15  $\mu$  large, passing on the outer side of perithecium, especially at the base, into brownish, strongly interwoven hyphae, septate and often about 3–7  $\mu$  thick; on the inner side the wall passes into some layers of hyaline, prismatic or flattened, thin-walled cells, variable in diameter, above the asci more or less globose, very thin-walled and partly disappearing at maturity. Setae on perithecia of two types; lower ones on the upper part of the perithecial body and the lower part of the papilla, brownish, often very stiff, with 2–6, mostly 2–4 septa, 60–120  $\mu$  long, 3–5  $\mu$  in diameter, at the base sometimes swollen and up to 10  $\mu$  broad, somewhat tapering to the top and mostly rounded, but seldom pointed; second type of setae on the top of the papilla, sub-hyaline or only faintly brownish near the base, 30–75  $\times$  3–4  $\mu$ , at the base up to 9  $\mu$  in diameter, with 1–4 septa; the two types of setae usually separated by a zone without setae, but sometimes with intermediate forms occurring on the side of the papilla; the first type may also occur on the mycelium or on the chlamydospore-like initials of the perithecia from the very beginning of their development.

Asci restricted in number, arranged parallel or almost parallel to one another, cylindrical or sack-like, the widest part in the middle or just below the middle, almost without a stalk, rounded at their base, broadly rounded at the top, bitunicate, the inner tunica suddenly elongating at maturity, 60–75  $\times$  16–21  $\mu$ , 8-spored, the spores in 1–3 series.

Ascospores 2-celled, the cells equal in size, constricted at the septum, tapering toward the ends or broadly rounded at one end and somewhat tapering toward the other end, the contents very thin, greenish granular, 21–27  $\times$  9–11  $\mu$ .

Asci surrounded by very slender paraphyses, composed of 5–8  $\mu$  long and 1.5–3  $\mu$  broad cells, sometimes completely disappearing at maturity.

Living, lyophilized and dried cultures and permanent slides are deposited in the CBS collection and herbarium.

#### MATERIAL EXAMINED.—

CBS 525.71, isolated from almost decayed canvas, in Karroo Desert, S. Africa (*M. C. Papendorf 278*; *H. van der Aa 2427*).

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