Santessonia, a new lichen genus from Southwest Africa

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The genus *Santessonia* Hale & Vobis is proposed as new. The only known species, *S. namibensis* Hale & Vobis, is fruticose and has buellioid apothecial characters, placing it in the family Physciaceae. It occurs in the coastal fog zone on rocks and shrubs.

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The discovery of a new genus of lichens is not a common event. It was surprising, therefore, to receive for identification a conspicuous fruticose specimen from the Namib coast of Southwest Africa which could not be compared with any known genus. One might have presumed that such a large showy lichen would already have been collected by the German botanists in the 19th century even along the little-known Namib coast. Superficially the plant seems to resemble *Roccella* in the flat, strap-shaped lobation (Fig. 1 A), but the lack of a dense, fastigiately arranged cortex and the apothecial characters rule this out at once. The apothecia and spores are typically buellioid, yet we have seen no reports of anything but crustose or at most primitively squamulose members of *Buellia* or *Diploicia*. The chemistry (norstictic acid), however, would be considered normal for *Buellia*.

This lichen, then, appears to be a fruticose relative of *Buellia* in the family Physciaceae, falling in the series *Buellia* (crustose) – *Pyxine* (foliose) – *Santessonia* (fruticose). It would be comparable, for example, to fruticose *Teloschistes* in the series *Caloplaca* (crustose) – *Xanthoria* (foliose) – *Teloschistes* (fruticose). The correspondence is not perfect, obviously, since *Teloschistes* and *Xanthoria* have highly developed cortical tissues.

The genus, quoting from data provided by the collector, Mr E. R. Robinson, occurs on shrubs and metamorphic rock outcrops (dolomite and marble) along the Namib coast about 200 km south of Walvis Bay, from 25° 10' S to 25° 50' S. Photographs provided by Mr Robinson show the thalli, both erect and pendulous, moderately covering large boulders. The most outstanding climatic feature of the habitat is the persistent coastal fog and mist which occurs on 150–200 days of the year and contributes 3–5 mm of precipitation each month. The thalli are actually very brittle when dry, an expected consequence of the lack of well developed supporting tissues.

We are dedicating the genus to Dr Rolf Santesson, who has contributed so much fundamental work to lichenology at the generic level.

Santessonia namibensis Hale & Vobis, gen. et sp. nov. – Fig. 1 A

Thallus fruticosus, semi-erectus vel pendulus, crassus, fragilissimus, cinereo-albus, 2–4 cm altus, lobis elon-

gatis, planis vel apicem versus plus minusve radialibus, integris, 5–9 mm latis vel apice pro parte ramosis, ramis ca. 1 mm diametro, recurvis, ca. 250–300 μm crassis, stratis corticalibus parce evolutis, strato gonidiali distincto; alga chroococcoides; apothecia numerosa, terminalia, 1.5–2 mm diametro, sporis octonis, fuscis, 2-loculatis, 7–8 × 10–14 μm; pycnidia immersa, conidiis 1 × 5–6μm.

Chemistry: Norstictic and connorstictic acids (determined with thin-layer chromatography).

Type. Southwest Africa. Spencer Bay, North Head (14° 52–1/2' E, 25° 35' S), about 117 km N of Lüderitz Bay, growing on a *Lycium* shrub and rocks close to the sea at 15 m above s.l., 1971, E. R. Robinson (holotype in US, isotypes in LD, UPS).

Other collections. Southwest Africa. Saddle Hill (14° 55' E, 25° 50' S), about 89 km N of Lüderitz Bay, growing on metamorphic rocks at 10–100 m above s. l., 1971, E. R. Robinson (US).

Thallus morphology

The thallus is flattened and quite variable in width toward the central older parts but narrows and becomes more or less radially symmetric at the tips (Fig. 1 A). It is not dorsiventral and the two surfaces are identical (Fig. 1 C, D). The surface of the thallus (Fig. 1 B) consists of loosely packed hyphae with considerable interstices. No dense polysaccharide layer or epicortex are present. In cross section the cortical layer appears as a loosely aggregated layer with many dead cells interspersed with branched living hyphae (Fig. 1 E–G). Algal layers are found on both surfaces just below this cortical layer (Fig. 1 E), clearly visible in stained sections but seen only as hollowed out pockets in scanning electron microscope sections (Fig. 1 D). The medullary hyphae are rather dense and irregularly arranged in the flattened part of the thallus (Fig. 1 C, D). Toward the lobe ends they are thick walled and more or less prosoplectenchymatously arranged, running parallel to the surface (Fig. 2 A, B). The surfaces of the hyphae in the various layers are covered with the rather amorphous crystalline accretions of norstictic acid.

Apothecia

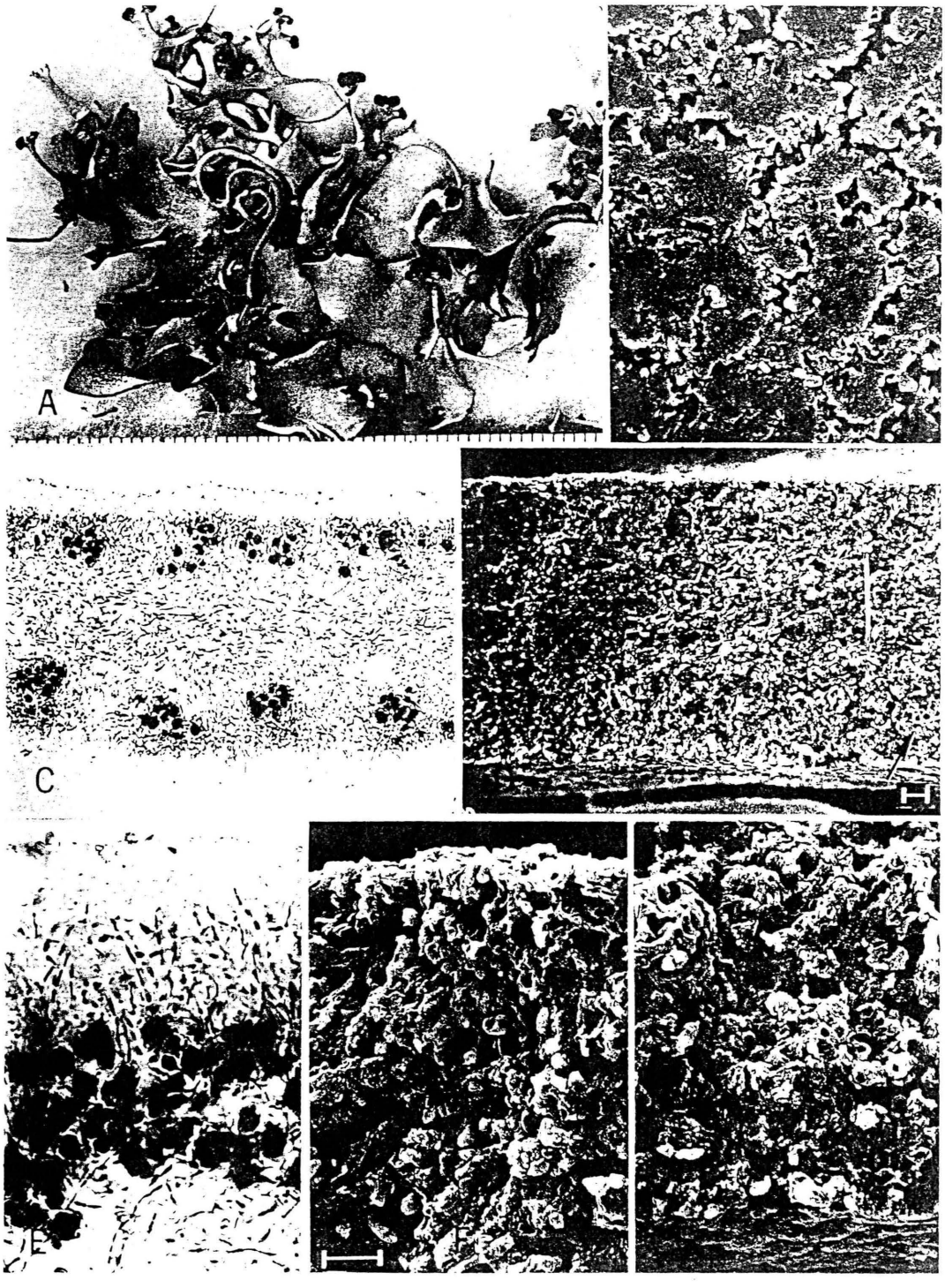
The apothecial primordia are located laterally o the flattened part of the thallus, appearing a brownish areas caused by darkening of the ce walls. The generative tissue is comparable t that of *Buellia wahlenbergii* (see Lamb & Henssen 1968). Although ascogones and tri chogynes could be observed only in a degen erated condition (Fig. 2 C), it appears that th apothecial "stroma" is raised up from th vegetative tissue below by spreading (com parable to pseudopodial formation in *Thysanothecium* according to Jahns 1970). The unoriented medullary hyphae in the flattened part of the thallus maintain their orientation parallel to the surface at this time. If several "stromata" are present they are manifested by further growth of the thallus part. Mature apothecia are located on branched pseudopodetia (Fig. 3).

The apothecia are hemispherical and delimited by a weakly developed exciple (Fig. 2 D). The hymenium stains deep blue in Lugol's solution. It is about 100 μm high with a dark subhymenium about 110 μm thick (Fig. 2 E). The paraphyses are branched and anastomosing (Fig. 2 F) and their tips are capitately thickened with brown cells as in *Buellia*. The ascus apex stains blue in iodine. There are 8 spores, 7–8 × 10–14 μm, ovoid to elliptical at maturity and 2-celled with a dark roughened wall (Fig. 2 I). Spores that have not been ejected were observed in the hymenium and in the subhymenium (as in *Buellia wahlenbergii*).

Pycnidia

Pycnidia are produced mostly terminally at the lobe ends, more rarely on the margins. They are immersed in the thallus and aggregated (Fig. 2 G). They vary from elongate to pear-shaped, spherical, or conical. Size varies from 65–80 (rarely 120) μm wide and 120–170 μm long. The pycnidial wall consists of the basal cells of the conidiophores (Fig. 2 H). The ostiole, which is

Fig. 1. *Santessonia namibensis*. – A: Habit of plant from Saddle Hill. – B: Scanning electron microscope view of thallus surface (× 450). – C: Stained cross section of flattened part of thallus (same scale as D). – D: Scanning electron microscope view of cross section of flattened part of thallus (scale = 20 μm) (arrow points to area of algal colony). – E: Stained section of cortical area (×450). – F: Scanning electron microscope view of upper cortical area (scale = 10 μm). – G: Scanning electron microscope view of lower cortical area (same scale as F).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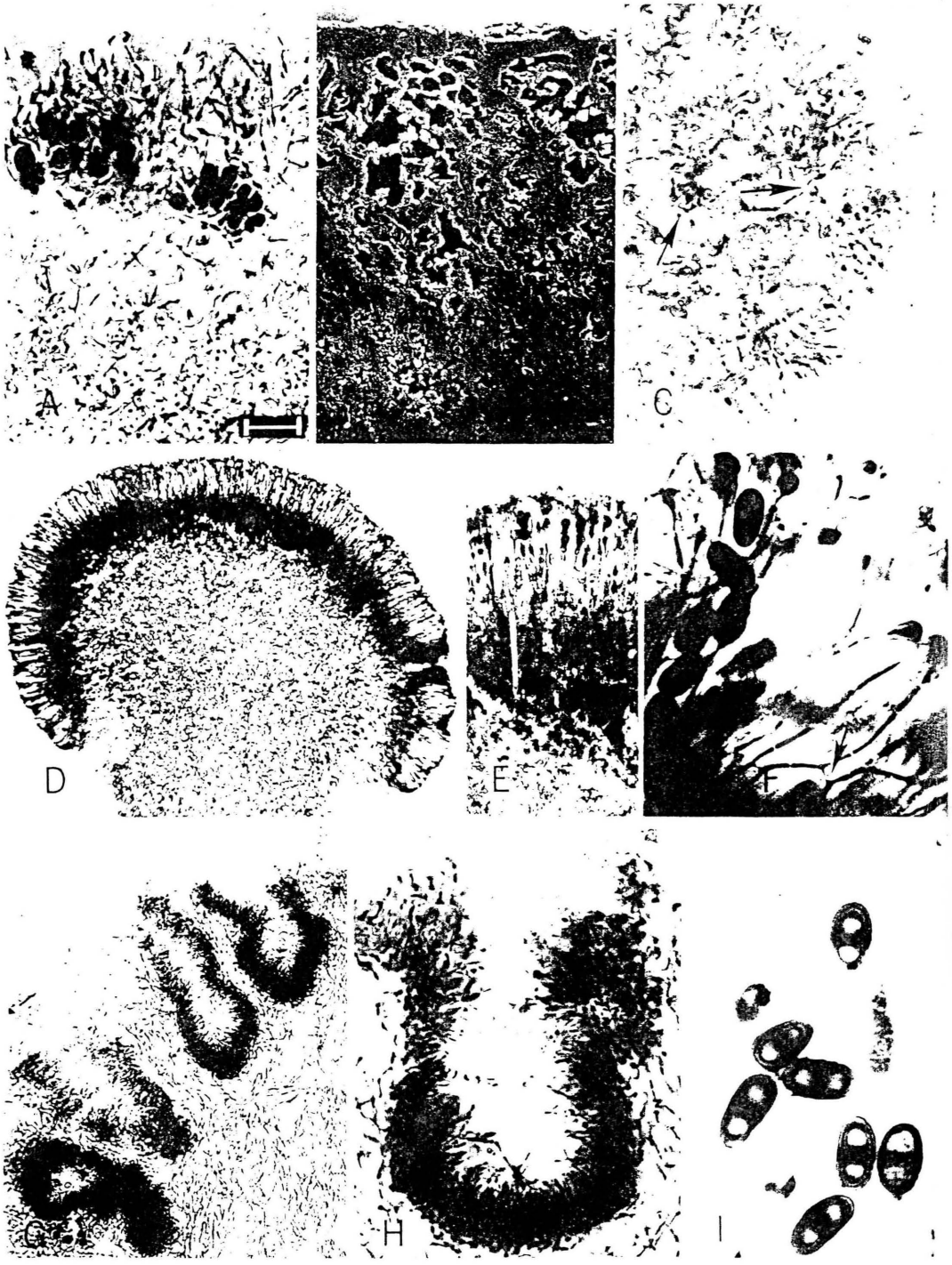
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open when the conidia are mature, has very dark cell walls, making the surrounding area appear black. Conidiophores are made up of several conidiogenous cells arranged in a series of 3–5 cells. They branch frequently. Conidia are formed terminally from apical conidiogenous cells or laterally on conidiophore cells below. The formation of conidia follows the phialid pattern. At maturity the conidia are elongate and cylindrical, 1 × 5–6 μm.

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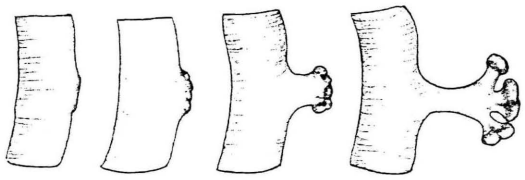

Fig. 3. Stages in development of apothecia (stage shown in second from left illustrated in Fig. 2 C).

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Fig. 2. *Santessonia namibensis*. – A: Stained cross section of upper cortical area at lobe tip (scale = 20 μm). – B: Scanning electron microscope view of a cross section of cortical area at lobe tip (same scale as A). – C: Ascogone (left arrow) and trichogyne (right arrow) (same scale as A). – D: Vertical cross section of apothecium (× 50). – E: Portion of the hymenium (× 180). – F: Paraphyses with arrow pointing to anastomosing group (× 800). – G: Clump of pycnidia (× 180). – H: Single pycnidium (same scale as A). – I: Ascospores (× 1000).