

## Two new brown subcrustose *Parmelia* species from southern Africa (lichenized Ascomycetes)

F. BRUSSE\*

**Keywords:** new species, lichenized Ascomycetes, *Parmelia*, southern Africa, subcrustose, taxonomy

### ABSTRACT

Two new brown subcrustose species of *Parmelia* (Lichenes) are described from southern Africa on rock. They are *P. barda* Brusse and *P. princeps* Brusse. The affinities of the two species are discussed.

### UITTREKSEL

Twee nuwe bruin halfkorsagtige *Parmelia*-spesies (Lichenes) is op klippe uit suidelike Afrika beskryf. Die nuwe spesies is *P. barda* Brusse en *P. princeps* Brusse. Die verwantskappe van die twee spesies word bespreek.

### *Parmelia barda* Brusse, sp. nov.

Thallus subcrustosus, saxicola, usque ad 50 mm diametro. *Lobi* elongati, 0,2–0,7 mm lati, usque ad 1,5 mm longi, 75–100  $\mu$ m crassi. *Thallus superne* brunneus, nitidus, isidiis sorediisque nullis. *Cortex superior* 7–17  $\mu$ m crassus, anticlinate prosoplectenchymatus, epicortice poroso (Figure 2). *Stratum gonidiale* 10–35  $\mu$ m crassum, fasciculatum, algis *Trebouxiae*, 5–22  $\mu$ m diametro. *Medulla* alba, 20–80  $\mu$ m crassa. *Cortex inferior* hyalinus, paraplectenchymatus, 9–13  $\mu$ m crassus. *Thallus inferne* pallidus. *Rhizinae* non bene evolutae. *Apothecia* sessilia, numerosa, usque ad 0,8 mm diametro. *Hypothecium* hyalinum, 15–30  $\mu$ m crassum. *Subhymenium* 10–15  $\mu$ m crassum. *Hymenium* 44–55  $\mu$ m altum, J+ caeruleum. *Asci* clavati, poricidales, cum tholis J+

caeruleis (Figure 3). *Ascospores* octonae, hyalinae, simplices, ellipsoideae, 7–10  $\times$  4,0–4,5  $\mu$ m. *Pycnidia* globosa, hyalina, circa 120  $\mu$ m diametro. *Pycnidiospores* hyalinae, aciculares, 7–10  $\times$  0,8  $\mu$ m. *Thallus atranorium* ( $\pm$ ) et materiam ignotam continens.

**TYPE.**—Cape, 3320 (Montagu): 4 km SW of Montagu, Kogmans Kloof near the old British Fort of 1899, on top of an E-W ridge, on Table Mountain Sandstone outcrops, alt. 200–250 m (–CC), Brusse 3718, 1981.05.12 (PRE, holo.). Figure 1.

Thallus subcrustose, saxicolous, up to 50 mm diam. *Lobes* elongate, 0,2–0,7 mm broad, up to 1,5 mm long, 75–100  $\mu$ m thick. *Upper surface* brown, non-isidiate and non-soresiate. *Upper cortex* 7–17  $\mu$ m thick, anticli-

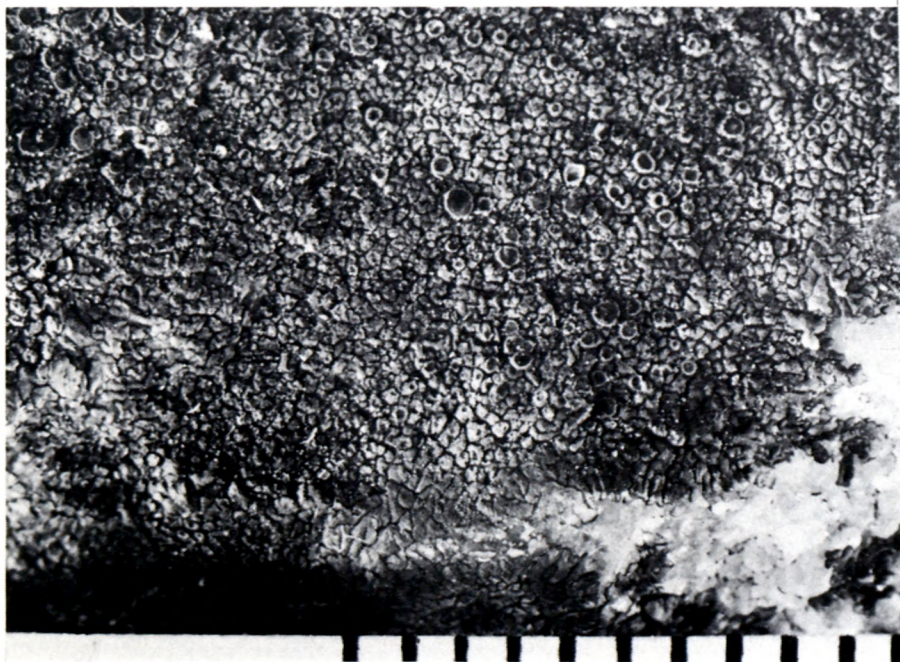


FIGURE 1.—*Parmelia barda*, habit. Brusse 3718, holotype. Scale in mm.

\* Botanical Research Institute, Department of Agriculture and Water Supply, Private Bag X101, Pretoria 0001.

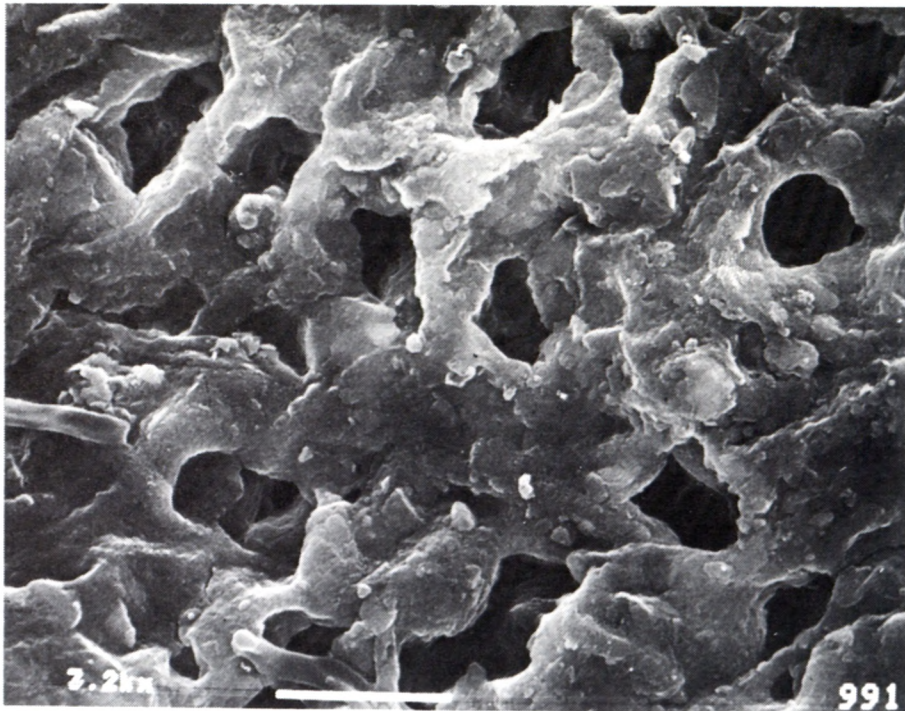


FIGURE 2.—*Parmelia barda*, SEM of upper surface. Brusse 3718, holotype. Bar = 6,3  $\mu\text{m}$ .

nally prosoplectenchymatous, epicortex pored (Figure 2). *Algal layer* clustered, clusters mainly subcortical, but also scattered in the medulla, 10–35  $\mu\text{m}$  thick, algae *Trebouxia*, 5–22  $\mu\text{m}$  diam. *Medulla* white, 20–80  $\mu\text{m}$  thick. *Lower cortex* hyaline, paraplectenchymatous, 9–13  $\mu\text{m}$  thick. *Lower surface* pale. *Rhizines* not well developed. *Apothecia* sessile, numerous, up to 0,8 mm across. *Hypothecium* hyaline, 15–30  $\mu\text{m}$  thick. *Subhymenium* 10–15  $\mu\text{m}$  thick. *Hymenium* 45–55  $\mu\text{m}$  high, J+ blue. *Asci* clavate, 8-spored, poricidal, tholus J+ blue (Figure 3). *Ascospores* hyaline, monolocular (but equatorial 'plasma-bridges' common), ellipsoid, 7–10  $\times$  4,0–4,5  $\mu\text{m}$ . *Pycnidia* hyaline, globose, about 120  $\mu\text{m}$  diam. *Pycnidiospores* hyaline needles, 7–10  $\times$  0,8  $\mu\text{m}$ . *Chemistry*: Atranorin ( $\pm$ ) and an unidentified substance present (Table 1: bard-1).

TABLE 1.—TLC data for the two unidentified lichen substances, using norstictic acid and atranorin as standards (Culberson 1972)

Lichen substance	$R_f$ class			$R_f \times 100$		
bard.-1	3	5	5–6	41/46,78	36/28,63	47/36,63
princ.-1	3	5	5–6	38/46,77	35/28,63	48/36,63

The rather narrow ascospores of this species are like those of the genus *Protoparmelia* Choisy. *Protoparmelia* differs from this species in many other respects even though it is also brown. The paraphyses are not capitate and capped, and the tholus iodine reaction differs significantly from *Protoparmelia*. At present the degree of tholus reaction variation is rather marked in *Parmelia*, but it is not yet clear how much variation there is within one species. If the iodine reaction pattern within the tholus proves to be consistent, one could use these patterns for generic segregation of the genus *Parmelia*, particularly if these correlate with the presently used thalline and chemical characters. The thallus anatomy of *Protoparmelia badia*, the type of *Protoparmelia* (Hafellner 1984) is also divergent from that of this new species. It was therefore thought best to place this species in the genus *Parmelia*. In fact the cortex reacts green with concen-

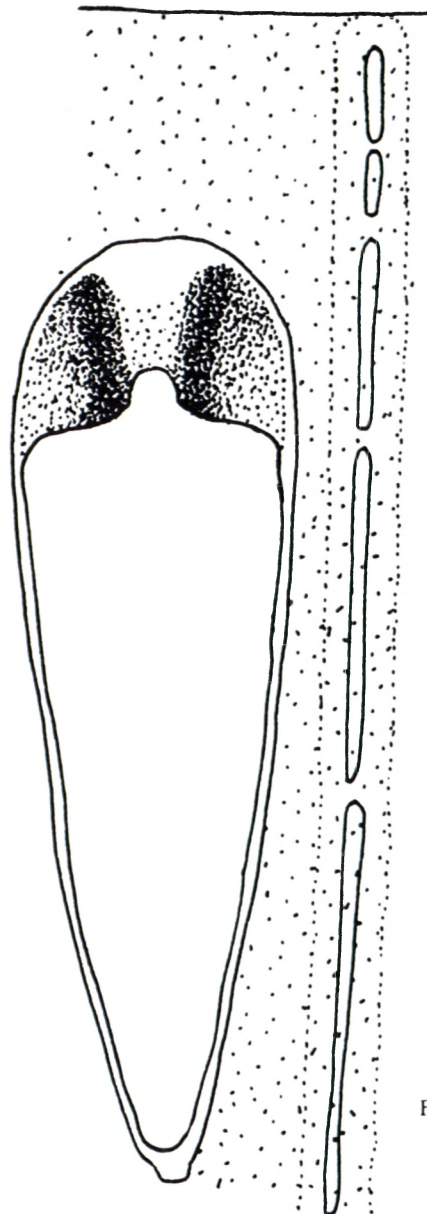


FIGURE 3.—*Parmelia barda*, ascus and paraphysis. Brusse 3718, holotype. Bar = 10  $\mu\text{m}$ .

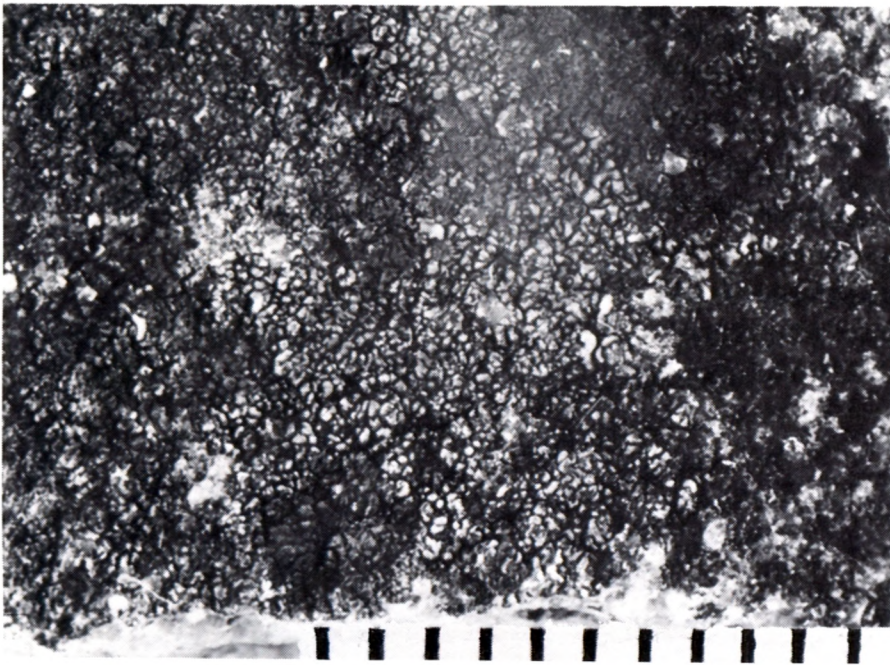


FIGURE 4.—*Parmelia princeps*, habit. Brusse 3074, holotype. Scale in mm.

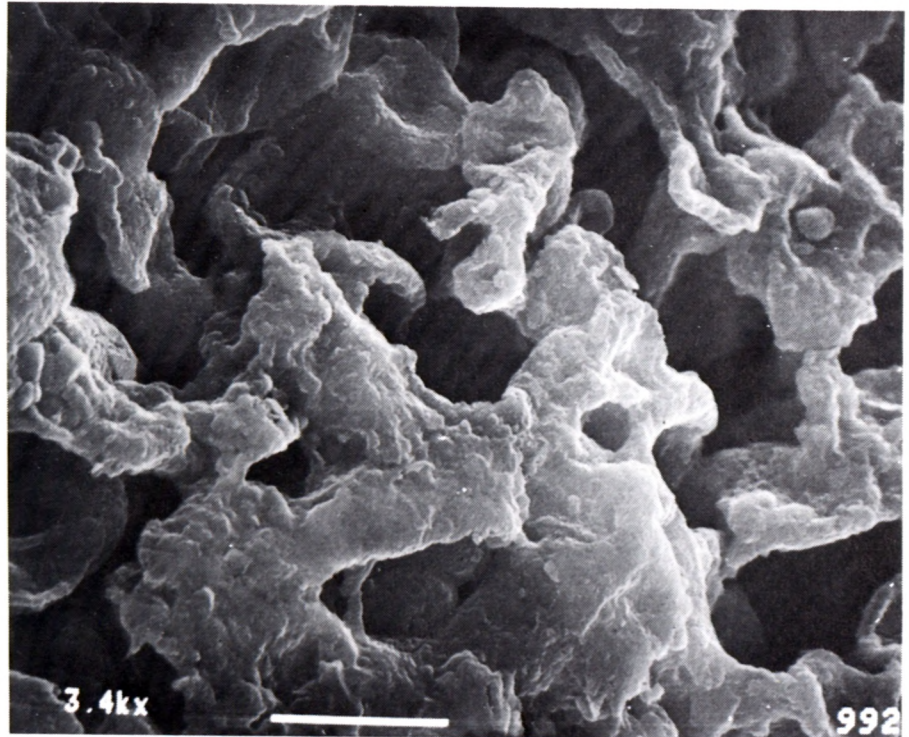


FIGURE 5.—*Parmelia princeps*, SEM of upper surface. Brusse 3074, holotype. Bar = 5,9  $\mu$ m.

trated nitric acid, and can be considered a small subcrustose member of the *Neofuscae* (Esslinger 1977), despite the additional presence of atranorin. *P. barda* was tested twice for chemical contents, the second run revealed no atranorin. The type specimen is growing on a rock with two micro-aspects and this may explain this difference. More exposed positions usually support specimens with a greater quantity of a particular lichen substance.

Although the substance in the medulla was not identified further, the spot characteristics indicated that it may be an orcinol *para*-depside. The  $R_f$  data for 'bard-1' are similar to those given for loxodellic acid (Esslinger 1977, p.19), but this could not be confirmed by direct comparison, for lack of a lichen at PRE containing loxodellic acid, or a confirmatory test such as a micro-crystal test (no published data). Nevertheless all the known subcrustose species of the section *Neofusca* contain depsi-

done, with the exception of the New Zealand endemic, *P. minuta* Essl. which contains gyrophoric acid (Esslinger 1977).

At present this species is known only from the type specimen from Kogmans Kloof near Montagu.

#### *Parmelia princeps* Brusse, sp. nov.

Thallus subcrustosus, saxicola, usque ad 25 mm diametro. *Lobi* elongati, 0,1–0,3 lati, usque ad 1 mm longi, 80–95  $\mu$ m crassi. *Thallus superne* atro-brunneus, nitidus, isidiis sorediisque destitutus. *Cortex superior* 7–10  $\mu$ m crassus, epicortice poroso (Figure 5). *Stratum gonidiale* 15–35  $\mu$ m crassum, algis *Trebouxiae*, 5–18  $\mu$ m diametro. *Medulla* alba, 20–45  $\mu$ m crassa. *Cortex inferior* paraplectenchymatus, circa 15  $\mu$ m crassus, brunneus. *Thallus inferne* piceus. *Rhizinae* non bene

evolutae. *Apothecia* sessilia, rara, usque ad 0,5 mm diametro. *Hypothecium* hyalinum, 30–33  $\mu\text{m}$  crassum, paraplectenchymatum, cellulis 3,5–7,5  $\mu\text{m}$  diametro. *Subhymenium* 30–45  $\mu\text{m}$  crassum. *Hymenium* hyalinum, 50–60  $\mu\text{m}$  altum, J+ caeruleum. *Asci* clavati, poricidales, cum tholis J+ caeruleis (Figure 6). *Ascospores* hyalinae, simplices, ellipsoideae, 9,5–12,5  $\times$  5,0–6,0  $\mu\text{m}$ . *Pycnidia* non visa. *Thallus* acidum squamaticum continens.

TYPE.—Cape, 3218 (Clanwilliam), 3 km W of Olyvenboskraal, Witelskloof, on large Table Mountain Sandstone boulder-outcrop, alt. 450–500 m (–BD), F. Brusse 3074, 1981.05.02 (PRE, holo.). Figure 4.

Thallus subcrustose, saxicolous, up to 25 mm across. Lobes elongate, 0,1–0,3 mm broad, up to 1 mm long, 80–95  $\mu\text{m}$  thick. Upper surface dark brown, glossy, non-isidiate and non-sorediate. Upper cortex 7–10  $\mu\text{m}$  thick, epicortex pored (Figure 5). Algal layer 15–35  $\mu\text{m}$  thick, algae *Trebouxia*, 5–18  $\mu\text{m}$  diam. Medulla white, 20–45  $\mu\text{m}$  thick. Lower cortex paraplectenchymatous, around 15  $\mu\text{m}$  thick, brown. Lower surface black. Rhizines not well developed. *Apothecia* sessile, rare, up to 0,5 mm across. *Hypothecium* hyaline, 30–33  $\mu\text{m}$  thick, paraplectenchymatous, cells 3,5–7,5  $\mu\text{m}$  diam. *Sybhy-menium* 30–45  $\mu\text{m}$  thick. *Hymenium* hyaline, 50–60  $\mu\text{m}$  high, J+ blue. *Asci* clavate, poricidal, tholus J+ blue (Figure 6). *Ascospores* hyaline, monolocular, ellipsoid, 9,5–12,5  $\times$  5,0–6,0  $\mu\text{m}$ . *Pycnidia* not seen. *Chemistry*: cortical substances absent, squamatic acid and an unidentified substance (Table 1: princ.-1) in the medulla.

*Parmelia princeps* is another brown lichen that is not assignable to *Protoparmelia* Choisy, presently used for the *Lecanora badia* group, due to important structural differences (see the discussion of the previous species for these). The cortex of this species does not react with concentrated nitric acid (nor with 2 molar potassium hydroxide solution), but could probably still be assigned to the *Neofuscae*, as some members of this group are negative with concentrated nitric acid (Esslinger 1977). The only other subcrustose species containing squamatic acid is *Parmelia squamatica* Brusse (1980, 1986) but this is yellow-green coloured, with usnic acid in the upper cortex.

*Parmelia princeps* is presently known only from the type locality south-west of Clanwilliam.

#### ACKNOWLEDGEMENTS

The author is grateful to Mrs S. M. Perold for assistance with the Scanning Electron Micrographs, Mrs A. J. Romanowski for the photographs and Mrs E. L. Bunton for the typing.

#### REFERENCES

- BRUSSE, F. A. 1980. A taxonomic and geographic study of the genus *Xanthoparmelia* in the Karoo. M.Sc. thesis, University of the Witwatersrand, Johannesburg.
- BRUSSE, F. A. 1986. Four new effigurate-crustose species of *Parmelia* (Lichenes, Parmeliaceae) from southern Africa. *Mycotaxon* 27: 237–245.
- CULBERSON, C. F. 1972. Improved conditions and new data for the identification of lichen products by a standardized thin-layer chromatographic method. *Journal of Chromatography* 72: 113–125.
- ESSLINGER, T. L. 1977. A chemosystematic revision of the brown *Parmeliae*. *Journal of the Hattori Botanical Laboratory*. 42: 1–211.
- HAFELLNER, J. 1984. Studien in Richtung einer natürlicheren Gliederung der Sammelfamilien Lecanoraceae und Lecideaceae. *Beihefte zur Nova Hedwigia* 79: 241–371.

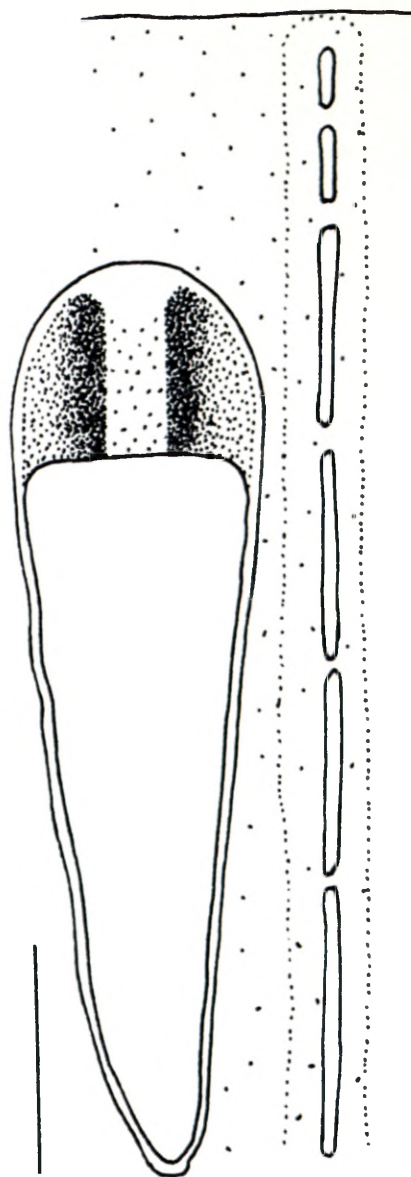


FIGURE 6.—*Parmelia princeps*, ascus and paraphysis. Brusse 3074, holotype. Bar = 10  $\mu\text{m}$ .