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## Lichens of mainland Yemen

### Abstract

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18 lichen species are newly reported for mainland Yemen, including *Teloschistes austroarabicus*, which is described as a species new to science. *T. stenophyllus*, from the Cape Verde Islands, is raised to species rank. A checklist of the 71 species currently known from mainland Yemen, with additional records for already known species, is provided.

### 1. Introduction

The Yemen has not attracted much attention of lichenologists, although it is climatically the most favourable country on the Arabian Peninsula. Accordingly, the number of publications dealing with lichens of mainland Yemen is very restricted and a database search discovered only contributions by Acharius (1810), Müller Arg., (1893), Steiner (1903) and Schultz (1998). Altogether, these publications report only 45 species. This includes six species, viz. *Acarospora lavicola*, *Caloplaca lobulascens*, *Dictyographa arabica*, *Phloeopeccania pulvinulina*, *Physcia vulcanica* and *Squamarina congrescens*, based on type specimens from Yemen. This figure contrasts markedly with that for the Socotra Archipelago off the Horn of Africa, which is part of the Yemen territory and much more popular among botanists, and from which 243 lichen species are recorded (Mies 1994). This suggests that the lichen flora of mainland Yemen is under explored. A convincing proof of this was given by Schulz (1998), who more than doubled the number of known species during a short visit to the country, finding 25 additional species, notably in the groups of *Lichinaceae* and *Heppiaceae*, for which he is a specialist.

Recent collections of mainly epiphytic fruticose and foliose lichens made by N. Kilian and P. Hein of the Botanic Garden and Botanical Museum Berlin-Dahlem provided an opportunity to add to the knowledge of the Yemen lichen flora. These collections were made as part of a joint research project with the Eastern Coastal Branch of the Agricultural Research and Extension Authority (AREA) in Mukalla, which deals with the vascular plant flora of palaeo-African refugia in southern Yemen and has been funded by the German Ministry for Education and Research (BMBF) in the program BIOLOG (Biodiversity and Global Change) since March 2001. A study of these lichen collections adds another 19 species to the mainland Yemen flora, raising the total number of species 71.

## 2. New names

### *Teloschistes austroarabicus* Sipman, *sp. nova*

Holotype: Oman, Dhofar, Jabal Nuss at Ras Nuss, 17°14'N, 55°13'E, 300 m, dry, leeward NW slopes, on *Boscia arabica*, 7.10.1998, N. Kilian & P. Hein NK5545a (B) – Fig. 1.

*Diagnosis.* – *Teloschistes* *sorediatus* ex affinitate *T. villosus*, a *T. californico* differt thallo globulare, laciniis terminalibus amplioribus et partibus basalibus angustioribus.

*Thallus* fruticose, from a small hold-fast, densely branched, forming rounded, pale brownish-grey cushions, 1-4 cm diam. *Lobes* applanate over most of their length, 0.5-1 mm wide, densely branched with internodes usually < 1 mm long, at the tips attenuate to c. 0.3 mm, in large thalli (over 4 cm diam.) up to c. 3 mm wide, regularly anastomosing or perforate; upper side convex, smooth or occasionally hairy, commonly so at the incurved tips, pale brownish-grey; lower side flat, whitish, marginal rims usually not more prominent than the vein-like ridges, near the tips sorediate between the ridges and sometimes along the margins; hairs c. 25 µm wide at base and 100-150 µm long, with projecting tips of hyphae (Sipman 1993: fig. 2B). – *Anatomy*: thallus c. 150-200 µm thick; upper cortical layer prosoplectenchymatic, c. 30 µm thick; algal layer c. 50 µm thick; medulla composed of loose hyphae, 50-100 µm thick, its thickness depending on the presence or absence of the ventral outer layer, sometimes containing groups of algae ventrally; ventral outer, prosoplectenchymatic layer incomplete to 50 µm thick at the ridges, thin to absent in between; photobiont *Trebouxia*-like, consisting of cells c. 12 µm diam. Ascomata and conidia not known. – *Chemistry*: no lichen substances detected by TLC.

*Distribution and ecology.* – So far known only from southern Arabia and adjacent Africa, from Erkowit table mountain in Sudan as far as Dhofar in Oman. It grows on twigs of scattered trees in xerophytic vegetation on mountains with frequent fog, perhaps always in remnants of primary savannah forest.

Additional specimens seen

SUDAN: Coastal plain along Red Sea, Erkowit table mountain, 800 m, epiphyte on *Euphorbia abyssinica*, 12.1985, A. K. Elshafie 18a (B).

YEMEN: AL-MAHRA: Jabal Sharwayn 10 km W of Qishn, rocky slopes and plateau overlooking the Qishn plain, 180 m, epiphyte on *Euphorbia balsamifera*, 24.9.1998, P. Hein, S. A. Ghazanfar & N. Kilian PH 4873a (B); plateau around the settlement Sarif (between Al Ghaida and Habarut), c. 900 m, scattered trees and shrubs in shallow depression with sandy-silty soil, on branches of *Acacia tortilis*, 3 m tall, 7.11.2000, P. Hein & N. Kilian PH 7952a3 (B) (filed under *Ramalina lacera*); Fartak Mts, SW of Nishtun, 400-500 m, 20.11.1999, N. Kilian & P. Hein NK 6200 (B).

OMAN: Dhofar, Jabal Nuss E of Jabal Samhan, N of village Hadbin, 640 m, rocky slopes with monsoon-affected vegetation, epiphyte on *Euphorbia balsamifera*, 7.10.1998, P. Hein & N. Kilian PH 5479a (B).

*Notes.* – This new species is very similar to *Teloschistes californicus* Sipman (1993), and a sorediate relative of *T. villosus* (Ach.) Norman. The easiest differentiation is by region of origin, since the morphological differences are subtle and difficult to quantify. The two species are allopatric, *T. californicus* being known only from California and Baja California, while *T. austroarabicus* is only known from southern Arabia and the east coast of Sudan. Thalli of *T. californicus* grow in more flattened bushes, while *T. austroarabicus* forms denser, more rounded bushes. The lobes of *T. californicus* are thinner, become more rapidly attenuate with narrower tips, 0.2 mm wide or less, and are wider near the base, to over 10 mm, with many perforations; the veins on the lower side are sharper and more numerous; the thalli are more frequently hairy, usually over much of their surface and not as pronounced at the lobe tips as in *T. austroarabicus*; the small size of the hairs of *T. californicus* is not so useful for distinction, because in *T. austroarabicus* they are mostly present only on the lobe tips and never fully developed.

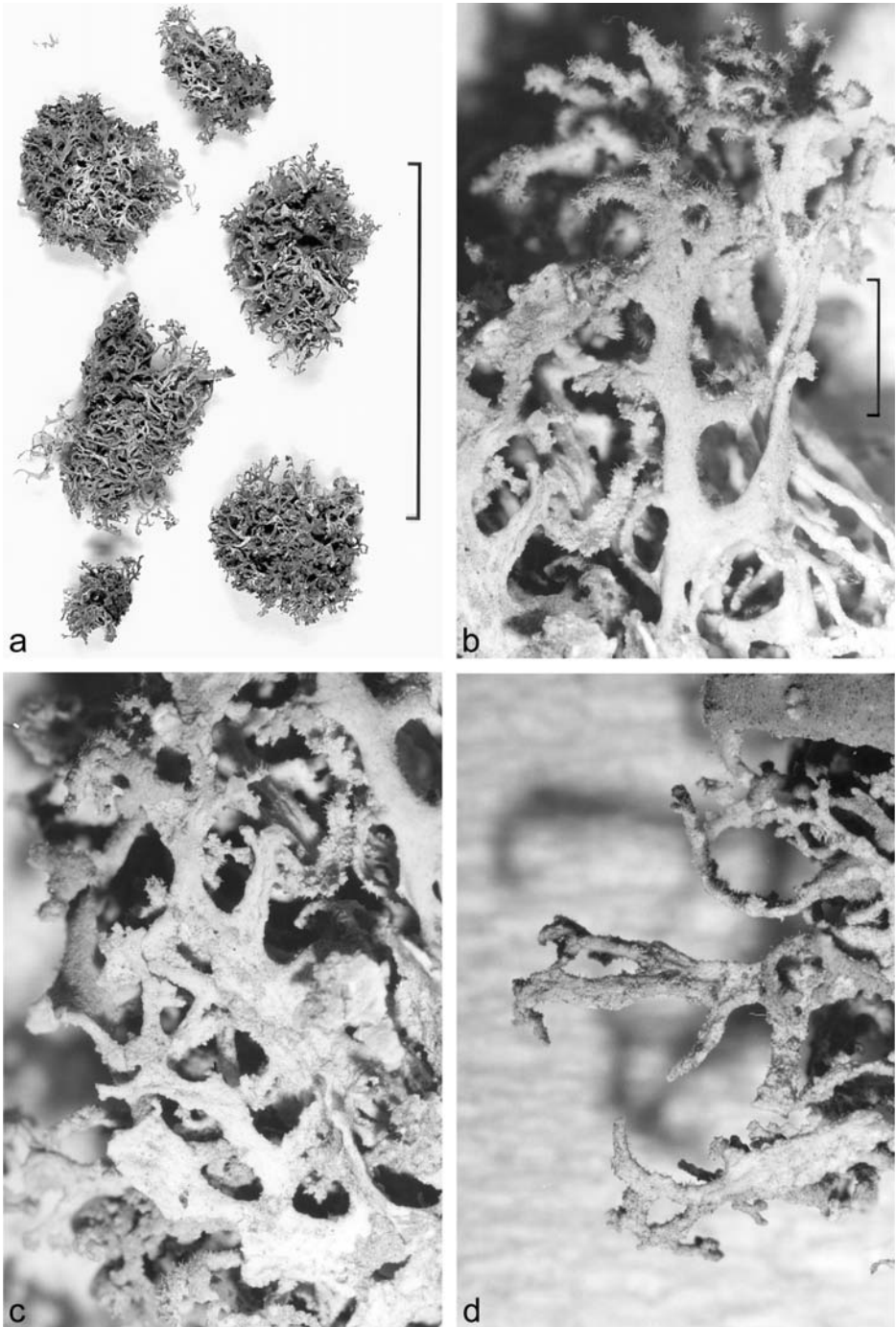


Fig. 1. *Teloschistes austroarabicus*, holotype – a: habitus; b: upper side of lobe tips, showing convex surface and hairs; c: lower side of lobes, showing pale, flat face with weakly pronounced vein-like ridges; d: lower side at lobe tips, showing irregular, granular soralia. – Scale: a = 5 cm; b-d = 0.2 cm.

*Tornabea scutellifera* may occur in the same habitats and is then superficially very similar; however, its lobes are rounded, not flattened, and their tips are not incurved with hairs.

The species has been erroneously reported from the Erkowit table mountain as *T. villosus* (Elshafie & Sipman 1999).

***Teloschistes stenophyllus* (C. Tavares) Sipman, comb. & stat. nov.**

≡ *Teloschistes villosus* var. *stenophyllus* C. Tavares in Revista Biol. 4: 142. 1964.

In order to ascertain the status of *Teloschistes austroarabicus*, numerous specimens of *T. villosus* were investigated. This showed that the latter species is well characterised by the fairly persistent hairs on the upper side, the strap-shaped lobes, c. 0.5 mm wide near the tips and gradually increasing to 1-2 mm, or occasionally c. 5 mm wide in older parts, with a convex upper side and a concave lower side with swollen marginal rims. Specimens from the Cape Verde Islands which corresponded to var. *stenophyllus* C. Tavares, however, deviate by having sparse or no hairs on the upper side, except at the tips; the lobes are narrower and do not exceed 0.5 mm in width over most of their length. The most distinct difference is that the lobes in cross section are rounded for much of their length, and are applanate only over short distances. Accordingly, the lower side is mostly convex, and somewhat concave only over short distances between the vein-like ridges. This was already observed by Tavares (1964) who mentions “not clearly dorsiventral laciniae”. Furthermore the soralia-like patches reported by the same author are a feature not found in *T. villosus*. Therefore, contrary to the opinion expressed by Follmann & Mies (1988: 63), it is proposed here to raise the variety to species level.

*Investigated specimens.* – CAPE VERDE ISLANDS: Brava, SW of Fundo Grande, 900 m, 1.11.1986, A. Kalnins 417b (B); id., Fundo Grande, 980 m, 19.11.1987, B. Mies 709e (B); São Nicolão, Monte Agua de José, 650 m, 3.1986, G. Follmann, Lich. Exs. 417 (B).

### 3. Augmented list of the lichen flora of mainland Yemen

New records for the lichen flora of mainland Yemen are preceded by an asterisk. Particularly dubious records are preceded by a question mark. Additional records, mainly from Hadhramout and Al-Mahra, have been added for the previously known taxa to improve our knowledge of their distribution in southern Arabia.

*Acarospora lavicola* J. Steiner – Steiner 1903: 95-96 (protologue, type specimen from Yemen; reported from “Harida el Hamra”).

\**Arthonia cinnabarina* (DC.) Wallr. – AL-MAHRA: 15 km W of Al Fatk, southern flank of Jabal Faydami, windward side, 350-450 m, 8.11.2000, P. Hein & N. Kilian PH 7994d (B); Hawf Mts, at Shah’rut, 650-700 m, 2.10.2001, P. Hein, H. Kürschner & M. Reisch YP 755m (B), YP 756b (B). – A widespread species in tropical and humid-temperate regions (Nimis 1993).

\**Arthonia elegans* (Ach.) Almq. – AL-MAHRA: Hawf Mts, N of the village Damqawt, 400 m, 12.11.2000, P. Hein, S. O. Bahah, M. Hubaishan, N. Kilian & C. Naumann PH 8067b2 (B); Hawf Mts, at Shah’rut, 650-700 m, 2.10.2001, P. Hein, H. Kürschner & M. Reisch YP 755f (B). – A southern suboceanic species in Europe, known also from Siberia (Nimis 1993).

\**Arthothelium ruanum* (Massal.) Körb. – AL-MAHRA: Hawf Mts, at Shah’rut, 650-700 m, 2.10.2001, P. Hein, H. Kürschner & M. Reisch YP 755i (B). – A rather widespread species in western Europe, also known from North America (Nimis 1993).

*Aspicilia circumnita* (Nyl.) Flagey – Schultz 1998: 294.

*Buellia subalbula* (Nyl.) Müll. Arg. – Schultz 1998: 294.

*Caloplaca (Amphiloma) lobulascens* J. Steiner – Steiner 1903: 95-96 (protologue, type specimen from Yemen).

*Caloplaca ochraceofulva* (Müll. Arg.) Jatta – Müller Arg. 1893: 130 (as *Amphiloma ochraceofulvum* Müll. Arg.).

*Catapyrenium semaforonense* Breuss – Schultz 1998: 294.

*Catapyrenium squamulosum* (Ach.) Breuss – Schultz 1998: 294.

*Collema coccophorum* Tuck. – Schultz 1998: 294.

?*Cresponea chloroconia* (Tuck.) Egea & Torrente – Müller Arg. 1893: 131 (as *Opegrapha* (s. *Lecanactis*) *chloroconia* (Tuck.) Müll. Arg.). As currently understood, this species is restricted to cool areas of Europe and North America, and is not reported from Yemen in the recent revision (Egea & Torrente 1993).

*Dictyographa arabica* Müll. Arg. – Müller Arg. 1893: 131 (protologue, type specimen from Yemen).

\**Dictyographa varians* (Müll. Arg.) Müll. Arg. – AL-MAHRA: 15 km W of Al Fatk, southern flank of Jabal Faydami, E of highest peak, windward side, 350-450 m, 8.11.2000, *P. Hein & N. Kilian PH 7992b2* (B). – Previously known only from Socotra. The specimen reflects more the description of *D. varians* than of the related *D. arabica* Müll. Arg. reported from Yemen (Müller Arg. 1893); both may be modifications of the same species.

*Digitothyrea divergens* (Henssen) Moreno & Egea – Schultz 1998: 294.

\**Diploicia canescens* (J. Dicks.) A. Massal. – HADHRAMOUT: C. 10 km N of Al Mukalla, on track to Bayn al Jibal, 550-600 m, 9.11.1999, *P. Hein & N. Kilian PH 6204y1* (B). – AL-MAHRA: Jabal Sharwayn 10 km W of Qishn, 180 m, 24.9.1998, *P. Hein, S. A. Ghazanfar & N. Kilian PH 4873b* (B); plateau at the settlement Sarif (between Al Ghaida and Habarut), c. 900 m, 7.11.2000, *P. Hein & N. Kilian PH 7952a4* (B). – A widespread species in regions with a Mediterranean climate, and probably not uncommon in coastal Yemen.

\**Diploicia subcanescens* (Werner) Haf. & Poelt – AL-MAHRA: Fartak Mts, SW of Nishtun, 400-500 m, 20.11.1999, *N. Kilian & P. Hein NK 6201* (B). – Previously reported from the western part of the Mediterranean basin and Macaronesia (Nimis 1993). Remarkably the Yemen specimen was epiphytic on *Jatropha*.

*Diploschistes ocellatus* (Vill.) Norm. – Schultz 1998: 294. – HADHRAMOUT: Kor Seiban, summit plateau, 2000-2060 m, 21.9.2001, *N. Kilian & P. Hein YP 305c* (B); Kor Seiban, wadi (running S to N) parallel to the vertical escarpment into Wadi Howeirah, 1950-2000 m, 7.10.2001, *N. Kilian, P. Hein, H. Kürschner & M. Reisch YP 1235* (B).

*Diploschistes gypsaceus* (Ach.) Zahlbr. – Müller Arg. 1893: 131 (as *Diploschistes scruposus* var. *cretaceus* (Ach.) Müll. Arg.).

\**Dirina immersa* Müll. Arg. – HADHRAMOUT: Coastal mountain 1 km W of Al Mukalla, 350-390 m, 16.11.1999, *P. Hein 6207a* (B). – A southern Mediterranean species, extending to Socotra (Tehler 1983).

\**Dirina paradoxa* subsp. *africana* (Fée) Tehler – HADHRAMOUT: C. 10 km N of Al Mukalla, on track to Bayn al Jibal, 550-600 m, 9.11.1999, *P. Hein & N. Kilian PH 6196b* (B), *PH 6204y6* (B). – Distribution range similar to the preceding, and equally reported from Socotra (Tehler 1983).

*Endocarpon pusillum* Hedw. – Müller Arg. 1893: 131.



?*Fulgensia bracteata* (Hoffm.) Räs. – Müller Arg. 1893: 130 (as *Placodium fulgens* var. *bracteatum* Müll. Arg.). This species in the current definition is restricted to cool environments, and specimens from Yemen are more likely to belong to the related *F. subbracteata* (Hoffm.) Räs.

*Fulgensia fulgida* (Nyl.) Szatala – Schultz 1998: 294. – HADHRAMOUT: Kor Seiban, wadi (running S to N) parallel to the vertical escarpment facing Wadi Howeirah, 1950-2000 m, 7.10.2001, N. Kilian, P. Hein, H. Kürschner & M. Reisch YP 1235c (B).

*Gloeoheppia erosa* (J. Steiner) Marton – Schultz 1998: 294.

*Gloeoheppia turgida* (Ach.) Gyeln. – Schultz 1998: 294. – HADHRAMOUT: Coastal mountain 1 km W of Al Mukalla, 14°32'N, 49°07'E, 350-390 m, 16.11.1999, P. Hein 6207b (B).

*Heppia conchiloba* Zahlbr. – Schultz 1998: 294.

*Heppia solorinoides* (Dufour ex Nyl.) Nyl. – Schultz 1998: 294.

\**Heterodermia speciosa* (Wulf.) Trevis. – AL-MAHRA: Hawf Mts, at Shah'rut, 650-700 m, 2.10.2001, P. Hein, H. Kürschner & M. Reisch YP 755j (B). – A widespread species in tropical and humid temperate regions (Nimis 1993).

*Lecanographa lyncea* (Sm.) Egea & Torrente – Müller Arg. 1893: 131 (as *Opegrapha* (s. *Lecanactis*) *vestita* Müll. Arg.).

*Lichinella algerica* (J. Steiner) Moreno & Egea – Schultz 1998: 294.

*Lichinella iodopulchra* (Crozsals) Moreno & Egea – Schultz 1998: 294.

*Lichinella mauretana* (Lange) Moreno & Egea – Schultz 1998: 294.

*Lichinella sinaica* (Galun & Marton) Moreno & Egea – Schultz 1998: 294.

*Lichinella stipatula* Nyl. – Schultz 1998: 294.

\**Opegrapha ochrocheila* Nyl. – AL-MAHRA: Hawf Mts, N of the village Damqawt, 400 m, 12.11.2000, P. Hein, S. O. Bahah, M. Hubaishan, N. Kilian & C. Naumann 8072a2 (B); Hawf Mts, N of Jadib, J. Chatan escarpment, 800-850 m, 13.11.2000, P. Hein & N. Kilian PH 8115b (B). – This species is mainly distributed in central and western, suboceanic Europe (Torrente & Egea 1989, Nimis 1993) and therefore unexpected in Yemen. It is easily recognisable by the frequent, yellow-pruinose, semi-emergent pycnidia producing large, 3-septate conidia. In the Yemen material these measure 21-25 × 2 µm, somewhat larger than indicated by Torrente & Egea (1989).

*Parmelia caperata* (L.) Ach. – Müller Arg. 1893: 130.

*Peccania coralloides* (A. Massal.) A. Massal. – Schultz 1998: 294.

*Peccania fontqueriana* Moreno & Egea – Schultz 1998: 294.

*Peltula bolanderi* (Tuck.) Wetmore – Schultz 1998: 294.

*Peltula impressa* (Vain.) Swinscow & Krog – Schultz 1998: 294.

*Peltula obscurans* (Zahlbr.) Wetmore – Schultz 1998: 294.

*Peltula omphaliza* (Nyl.) Wetmore – Schultz 1998: 294.

*Peltula patellata* (Bagl.) Swinscow & Krog – Schultz 1998: 294.

*Peltula radicata* Nyl. – Schultz 1998: 294.

\**Phaeophyscia hispidula* (Ach.) Moberg – AL-MAHRA: Hawf Mts, N of Jadib, J. Chatan escarpment, 850-920 m, 13.11.2000, in coll. P. Hein & N. Kilian PH 8153b (B) (*Ramalina* sp.). – A widespread species in the tropics, extending into humid temperate regions (Nimis 1993).

*Phloeopeccania pulvinulina* J. Steiner – Steiner 1903: 93-94 (protologue, type specimen from Yemen; reported from “Harida el Hamra”); Schultz 1998: 294.

\**Physcia nubila* Moberg – AL-MAHRA: Jabal Fartak, SW facing slopes below the disused radio tower, 550-950 m, 26.11.1999, *P. Hein & N. Kilian PH 6884c* (B); Hawf Mts, near the village Con, 670 m, 11.11.2000, *P. Hein, S. O. Bahah, S. Ghoufali, M. Hubaishan, N. Kilian & C. Naumann PH 8052* (B); Hawf Mts, N of the village Damqawt, 400 m, 12.11.2000, *P. Hein, S. O. Bahah, M. Hubaishan, N. Kilian & C. Naumann PH 8067b3* (B), *PH 8072a5* (B); Hawf Mts, N of Jadib, below the J. Chatan escarpment, 850-920 m, 13.11.2000, *P. Hein & N. Kilian PH 8144b* (B); Hawf Mts, at Shah’rut, 650-700 m, 2.10.2001, *P. Hein, H. Kürschner & M. Reisch YP 755k* (B), *YP 756a* (B). – One of the commonest lichens in the collections studied; previously only reported from Peru and Australia (Moberg 2001). The material deviates slightly from Australian specimens (in B) because the thallus is usually thinner and the lower side has grey patches.

*Physcia tribacia* Nyl. – Steiner 1903: 94.

*Physcia vulcanica* J. Steiner – Steiner 1903: 94-95 (protologue, type specimen from Yemen).

*Psora decipiens* (Hedw.) Hoffm. – Schultz 1998: 294. – HADHRAMOUT: Maula Matar gorge, between boulders and on the foot of cliffs above the N part of the gorge, 1900 m, 21.9.2001, *N. Kilian & P. Hein YP 302a* (B). – AL-MAHRA: Jabal Fartak, SW facing slopes below the disused radio tower, 550-950 m, 26.11.1999, *P. Hein & N. Kilian PH 6885* (B).

*Psorotichia diffracta* (Nyl.) Forssell – Schultz 1998: 294.

*Psorotichia schaeferi* (A. Massal.) Arnold – Schultz 1998: 294.

*Pyrenopsis picina* (Nyl.) Forssell – Schultz 1998: 294.

?*Ramalina celastri* (Spreng.) Krog & Swinscow – Acharius 1810: 602\* (as *Ramalina fraxinea*  $\beta$  *yemensis* Ach.). This report is remarkable. It is a conspicuous lichen, usually growing associated with other conspicuous lichens such as *Parmotrema austrosinensis*, *P. tinctorum* and *Ramalina* spp. None of these have ever been found in Yemen. This leads to the supposition that the original material may have been sold on a market. Lichens as trade goods in Arabia are reported already by Steiner (1916) from “Markat” (probably sphalm for Muscat).

*Ramalina lacera* (With.) Laundon – Müller Arg. 1893: 130 (as *Ramalina evernioides* Nyl.). – HADHRAMOUT: C. 10 km N of Al Mukalla, on track to Bayn al Jibal, 14°36'N, 49°06'E, 550-600 m, 9.11.1999, *P. Hein & N. Kilian PH 6204y2* (B). – AL-MAHRA: Plateau at the settlement Sarif (between Al Ghaida and Habarut), c. 900 m, 7.11. 2000, *P. Hein & N. Kilian PH 7952a3* (B).

?*Ramalina farinacea* Ach. – Müller Arg. 1893: 130. Steiner 1903: 94. These reports are very probably based on *R. nervulosa* (see below), which for a long time was included in this species.

*Ramalina maciformis* (Del.) Nyl. – Schultz 1998: 294. – HADHRAMOUT: Jol Berka plateau above Wadi Al Muhammedin (upper Wadi Fuwwah system), 1200-1400 m, 30.11.1999, *P. Hein, S. M. Bashmela, A. F. Bin-Nesr & N. Kilian PH 7014* (B). – AL-MAHRA: Track between Ghaydah and Habarut, flat inselberg SW of Shubayt (Shubut, Shaybit), 1100 m, 25.9.1998, *P. Hein, S. A. Ghazanfar & N. Kilian PH 4957* (B).

\**Ramalina nervulosa* (Müll. Arg.) Abbayes – AL-MAHRA: Jabal Sharwayn 10 km W of Qishn, 180 m, 24.9.1998, *P. Hein, S. A. Ghazanfar & N. Kilian PH 4873* (B); *ibid.*, 550 m, 18.11.1999, *P. Hein, S. O. Bahah, S. M. Bashmela & N. Kilian PH 6502* (B); Jabal Fartak, SW facing slopes below the disused radio tower, 550-950 m, 26.11.1999, *P. Hein & N. Kilian PH 6884a* (B); 15 km W of Al Fatk, southern flank of Jabal Faydami, E of highest peak, 350-450 m, 8.11.2000, *P. Hein & N. Kilian PH 7994a* (B); Hawf Mts, N of the village Damqawt, 400 m, 12.11.2000, *P.*



*Hein, S. O. Bahah, M. Hubaishan, N. Kilian & C. Naumann PH 8067b1* (B). – This species closely resembles *R. farinacea*, reported before from Yemen, and is most clearly recognisable by the presence of sekikaic acid. It is a more coastal species in tropical Africa (Swinscow & Krog 1988). Probably most records of *R. farinacea* for Yemen belong to this species.

***Roccella montagnei*** Bél. – Müller Arg. 1893: 130, Steiner 1903: 96. – ADEN: Western Jabal Shamsan, 450-520 m, 24.3.1997, *P. Hein, N. Kilian & M. Smalla 3559b* (B). – HADHRAMOUT: C. 10 km N of Al Mukalla, on track to Bayn al Jibal, 550-600 m, 9.11.1999, *P. Hein & N. Kilian PH 6204y3* (B), *6204y4* (B). – AL-MAHRA: 15 km W of Al Fatk, southern flank of Jabal Faydami, 350-450 m, 8.11.2000, *P. Hein & N. Kilian PH 7992b1* (B).

\****Schismatomma decolorans*** (Sm.) Clauz. & Vězda – AL-MAHRA: Hawf Mts, at Shah'rut, 650-700 m, 2.10.2001, *P. Hein, H. Kürschner & M. Reisch YP 755o* (B). – A widespread species in western and southern Europe and Macaronesia (Tehler 1993). The Yemen specimen, without ascomata as usual, means a considerable range extension.

\****Sphinctrina tubiformis*** Massal. – AL-MAHRA: Hawf Mts, at Shah'rut, 650-700 m, 2.10.2001, *P. Hein, H. Kürschner & M. Reisch YP 756d* (B). – A widespread species growing as a parasymbiont on thalli of *Pertusaria* (Nimis 1993).

***Squamarina conrescens*** (Müll. Arg.) Poelt – Müller Arg. 1893: 130 (as *Placodium conrescens* Müll. Arg.; protologue, type specimen from Yemen). – HADHRAMOUT: Maula Matar gorge, between boulders and on the foot of cliffs W above the N part of the gorge, 1900 m, 21.9.2001, *N. Kilian & P. Hein YP 302* (B); Kor Seiban, wadi (running S to N) parallel to the vertical escarpment into Wadi Howeirah, 1950-2000 m, 7.10.2001, *N. Kilian, P. Hein, H. Kürschner & M. Reisch YP 1235e* (B). – AL-MAHRA: N Fartak Mts, summit area of J. Karmoun, 850-950 m, 7.10.2001, *P. Hein, H. Kürschner & M. Reisch YP 1033* (B). – Chemistry: TLC (P. 302, 1235e): usnic, psoromic and ?psoromic acids, not terpenoid.

\****Teloschistes austroarabicus*** Sipman – see above.

***Teloschistes chrysophthalmus*** var. *subinermis* Müll. Arg. – Müller Arg. 1893: 130.

\****Teloschistes flavicans*** (Sw.) Norm. – AL-MAHRA: Jabal Fartak, SW facing slopes below the disused radio tower, 550-950 m, 26.11.1999, *P. Hein & N. Kilian PH 6884* (B). – A widespread species of tropical localities with frequent fog, already reported from Socotra (Mies 1994).

\****Thelotrema lacteum*** Kremp. – AL-MAHRA: Hawf Mts, at Shah'rut, 650-700 m, 2.10.2001, *P. Hein, H. Kürschner & M. Reisch YP 756* (B). – A widespread species in tropical and subtropical regions (Hale 1981).

***Toninia albilabra*** (Dufour) H. Olivier – Schultz 1998: 294.

***Toninia diffracta*** (A. Massal.) Zahlbr. – Schultz 1998: 294.

***Toninia sedifolia*** (Scop.) Timdal – Müller Arg. 1893: 131 (as *Thalloidima caeruleo-nigricans* (Lightf.) Poetsch).

***Toninia tristis*** (Th. Fr.) Th. Fr. – Schultz 1998: 294.

***Xanthoria parietina*** (L.) Th. Fr. – Müller Arg. 1893: 130, Schultz 1998: 294. – HADHRAMOUT: Jol Berka plateau above Wadi Al Muhammedin (upper Wadi Fuwwah system), 1200-1400 m, 30.11.1999, *P. Hein, S. M. Bashmela, A. F. Bin-Nesr & N. Kilian PH 7015* (B). – AL-MAHRA: Track between Ghaydah and Habarut, flat inselberg SW of Shubayt (Shubut, Shaybit), 1100 m, 25.9.1998, *P. Hein, S. Ghazanfar & N. Kilian PH 4958* (B); plateau at the settlement Sarif (between Al Ghaida and Habarut), c. 900 m, 7.11.2000, *P. Hein & N. Kilian PH 7952a2* (B).

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