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NEW EUROPEAN AND AUSTRALIAN RECORDS OF *PORONIA ERICI* Lohmeyer and Benkert, AND A FAIRY TALE CONCERNING THEIR POSSIBLE RELATIONSHIP

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Poronia erici was described in 1988 by Lohmeyer & Benkert on the base of an ample collection found on rabbit (and, in one case, sheep) droppings on the Baltic Sea island of Hiddensee in what used to be at that time still the German Democratic Republic (type in HBU). Other records were from West Germany (island of Heligoland), the Netherlands, Belgium and possibly Great Britain. After publication the species was again recorded in Germany by Andreas Heller, Axel Schilling and Knut Wöldecke on the North Sea islands of Borkum and Baltrum (Wöldecke *in litt.*). More recently, Jalink (1992) studied the *speldeprikzwam* (*Poronia*) collections in the Leiden herbarium, adding more information on the distribution of the species in the Netherlands. *Poronia erici* differs from *Poronia punctata* in having considerably larger and broader spores, smaller, perhaps more turbinate ascomata, and a different substrate (hare, rabbit, goat, sheep and marsupial dung as against horse and cow dung preferred by *P. punctata*). Jalink, however, and Thomas Læssøe (pers. comm.) reported unusually large-spored collections with small stromata from horse dung in the Netherlands, indicating, perhaps, that *P. erici* does not restrict itself any more to its 'original' substrate. In Australia, several *erici*-records are likewise from horse or cow dung (see below).

Fig. 1(a) *Poronia erici*, Kangaroo dung, Victoria, 17.7.1989 (leg. Bruce Fuhrer). Photo: Anke Schmidt.

Fig. 1(b) *Poronia oedipus*, Pony dung, Queensland, 17.12.1988 (collected and photographed by the author).

Before further elaborating on the subject, an omission has to be admitted: when describing the species as new in 1988, we overlooked two earlier articles by the Dutch mycologists O. F. Uffelie and G. L. van Eyndhoven, who had drawn attention to the existence of a large-spored *Poronia* on rabbit dung as early as 1937. Van Eyndhoven, former president of the Dutch Mycological Society, hesitated to describe it as a new species. Speaking of *Poronia punctata*, he wrote (translated from the Dutch): 'The species grows on dung and is commonly found upon horse dung. I have known the fungus for many years, but always from rabbit and hare dung. It is curious that the shape of the fruit-bodies differed in many ways from samples collected on horse dung.' Uffelie quotes a collector named Smits who was also acquainted with the

rabbit dung species and did not know the other.

Shortly after the publication of *Poronia erici* Prof. Lundqvist (Stockholm) kindly informed us that he already knew the species from Spain. In addition he distributed a collection from New South Wales (Australia) in his series 'Fungi Fimicolae Exsiccati' (1989). Two more Australian records are mentioned in the accompanying text (see list, p. 20).

During and after a journey to the fifth continent in 1988/1989 (see Lohmeyer 1991), I was able to gather further evidence on the local distribution of *Poronia erici*. A western Australian sample from kangaroo-dung was slumbering in the private herbarium of Queensland mycologist Tony Young (Blackbutt). Further information was provided by Bruce Fuhrer (Melbourne), who sent me an impressive number of Victorian kangaroo-droppings dotted with dozens of stromata (Fig. 1). The spore measurements were in full accordance with those of the German type material and other European records. My own field work in the Sunshine Coast hinterland (Queensland) proved less successful though I happened to find beautiful specimens of *Poronia oedipus* (Mont.) Mont. on pony dung in a Maleny backyard (Fig. 2) – a species that has only rarely been illustrated.

Six different gatherings from four Australian states belonging without doubt to *P. erici* raised the question as to whether the classic *Poronia punctata* existed in Australia at all. There are a few published records. For instance, Berkeley (1845) and Berkeley & Broome (1882) reported *Sphaeria (Poronia) punctata* from the Swan River (on horse dung, leg. Drummond) and Gippsland, Victoria (leg. Miss F.M. Campbell). M.C. Cooke, in his *Handbook of Australian Fungi* (1892), simply said 'on dung. Vict., W. Austr., Tas.' The spore measurements (18–26 x 10–14 µm) are exactly the same as those given by Saccardo (1882) and Winter (1887) for *P. punctata*, so it is doubtful whether they have really been taken from Australian material. Cleland, in his landmark study on South Australian fungi (1934/35), simply quotes Cooke for earlier records, but adds a personal find from horse dung in South Australia with spores '30 x 17.8 µm', perhaps the first published indication of the large spored species in Australia. The obvious scarcity of microscopical data may be explained by the fact that *Poronia*

Map 1: *Poronia erici* in Europe.

punctata was for almost two centuries regarded as an uncritical species, easily identified by its gross morphology.

In 1985 Bruce Fuhrer published a magnificent photograph of a *Poronia* in his *Field Companion to Australian Fungi*. There is no material left of the illustrated collection but according to the author (*in litt.*) the substrate was most probably wombat dung.

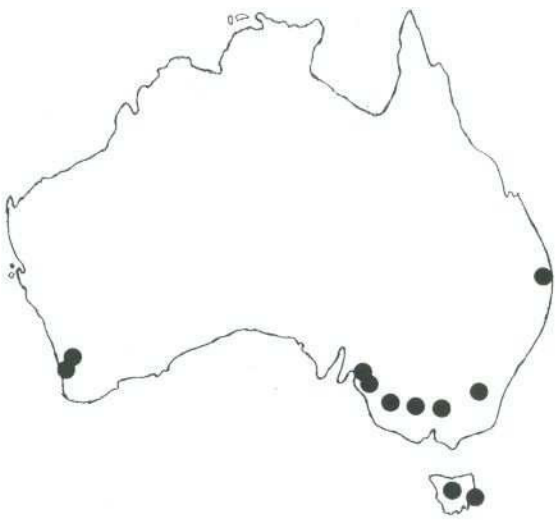
The most likely institution in Europe to amplify our knowledge on Australian fungi is, I guess, the Kew Herbarium. I am very grateful to Thomas Læssøe who went to great lengths studying the Australian specimens deposited there. The results were amazing: Out of fourteen collections eleven could be assigned to *Poronia erici*, displaying a spore-range of 22.4–34.4 x 14.4–18.4 µm [compared with (22)25–32(33.5) x (12)14–18(19.5) µm in European material investigated by us in 1988]. Only one Australian sample deviates markedly from that pattern (Crawford, '*Ascobolus crawfordi*', spores 23.2–24 x 12.8–13.6 µm). It should also be added that the maximum-width of the stromata in all Australian collections of *erici* did not exceed 6 mm. This, too, corresponds with our European results. *Punctata*-stromata often reach a diameter of 10 mm or even more. The two remaining Australian samples checked by Læssøe were immature.

Poronia erici, so it seems, has a strikingly disjunct distribution pattern, being hitherto re-

stricted to the eastern, southern and western parts of Australia and the coastal districts of the North Sea and the Baltic Sea in central Europe. The Spanish record from the Extremadura (leg. Engelmark, see Lundqvist 1989) remains, up till now, somewhat out of area, although the present gap between Belgium and Spain does not appear to be insurmountable (see maps 1 & 2).

Another intriguing question arises from the fact that first sightings of *erici* date from a period when the much discussed and well documented decline of *P. punctata* in Europe had already set in (see Arnolds 1981, Reid 1986, Lohmeyer & Benkert 1988 for more details, and Whalley and Dickson 1986 for a slightly different view). Jelink has revised the earliest Dutch records of *P. erici*, found by van Eyndhoven in autumn 1929. Four years later, the species was apparently collected on the British island of Scolt Head off the Norfolk coast.

The late discovery of the species is, in itself, rather unusual. Though hardly to be spotted by



Map 2: *Poronia erici* in Australia.

the uninitiated, *P. erici* is a spectacular, fairly big fungus for the specialist on Pyrenomycetes and/or dung fungi. Both groups were intensively studied in Europe in the nineteenth century by authors such as the Crouans in France, Hansen in Denmark, Cesati and de Notaris in Italy, Winter and Fuckel in Germany and Plowright in England to name just a few. So impressed was Lundqvist (1972) with the accumulated knowledge of this epoch that he spoke of 'The classical period, 1860–1900' in his modern classic on *Nordic Sordariaceae*. Describing hundreds of minute, inconspicuous dung-dwellers, the nineteenth century masters of mycological scatology obviously overlooked a true giant with stromata reaching a diameter of 4–7 mm.

Did they really? If *erici* had been continuously mistaken for, or mixed up with *punctata*, we definitely should have more nineteenth-century records of *punctata* on rabbit, hare, sheep or goat dung. I could not find *any*. There is, of course, the horse, there is the donkey, there is occasionally the cow and even the elephant (mentioned already by Fries 1823), but neither the faeces of *Capridae* nor the droppings of rodents ever seem to have been affected. Furthermore, the only European records of the related, predominantly tropical or subtropical species *Poronia oedipus* and the predominantly north and central American *Poronia leporina* Ell. & Ev. [= *Podosordaria leporina* (Ell. & Ev.) Dennis] also date from the last century or the first decade of the present respectively (see Lohmeyer & Benkert 1988). If *P. erici* existed in Europe in the nineteenth century, the only feasible reason for its having been overlooked for such a long time may be the possible neglect of coastal habitats by collectors. But what may well apply to Fuckel and Winter, does not seem very probable in the cases of Hansen, the Crouans and the British experts.

Speculation cannot replace science, but what would science be without speculation? The amateur may, perhaps, occasionally be forgiven for developing a theory sounding intolerably hazardous when put forward by a professional.

I wonder whether *P. erici* might not have been a well established species on dung of marsupials before the arrival of the first European settlers at Botany Bay, Australia. The rabbit, as we know, followed suit. Five domesticated specimens were imported in 1788, a dozen wild ones arrived on Boxing Day 1859 at Melbourne Harbour (Schneider 1988). By the end of the century, the overall rabbit population was estimated at roughly twenty million, proving almost equally disastrous to the native Australian flora and fauna as their importers. Yet – to continue our fantasy – the little, large spored cousin of *P. punctata*, refusing to be pushed out of its ecological niche by the European intruders, adapted to the rabbits' stool. With the clearing of the bush as a consequence of the ever increasing demand for

grazing land, sheep, rabbits and, according to some sources, several varieties of kangaroo thrived. For *Poronia* and other fungi specialised on dung of herbivorous animals it must have been something like the dawning of a golden age. Myriads of spores were produced. Used to long periods of drought, their capacity to germinate may well have been superior to their European counterparts.

The next paragraph of the fairy tale models itself after a famous example, recently summed up in a comprehensive article by Krieglsteiner (1992). It is the remarkable success story of *Clathrus archeri* (Berk.) Dring, certainly the most famous cryptogamic neophyte ever introduced from the fifth continent. Although there had been rumours of earlier records, the first proven European collection was sent to René Maire by a pharmacist from La Petit-Raon (Lorraine, east France) in 1920. Whereas now the exotic looking fungus with the nauseating stench is a common sight and an olfactory offence in large parts of central Europe during the summer months.

Poronia erici was discovered in Europe in the same decade, and, as in the case of *Clathrus*, contemporary observers claimed to have known the species for years before the first records were published and discussed among European mycologists.

Whether the first spores of *Clathrus* were carried to Europe hidden in Australian wool-shippings or in the socks and boots of Aussie diggers fighting the Kaiser during the First World War has ever since been a matter of speculation. Human and economic contacts between the antipodes certainly intensified during the tens and twenties, and the number of ships from Australia calling at British and continental ports must have increased considerably. So, I guess, it was only a question of time for an enterprising bunch of the tiny – and yet so big – black spores of *Poronia erici* to reach European shores. In the coastal dunes of Holland, Belgium, Germany and Great Britain they were immediately received with a familiar (or, at least, acceptable) diet – millions of rabbit pellets in the *Ammophiletea* and *Corynephoretum* associations. Some of them also attached to leaves and stalks of grass, readying themselves for the passage through an animal's intestines prior to germination.

And this is where the story ends. But it would be incomplete, and not quite fair at that, to conclude without a few words about the big – though small spored – cousin *P. punctata*, which was, after all, one of the few fungi accepted already by the great Linné.

Imagine a seasoned, somewhat flattened ball of donkey dung on a Belgian meadow not far from the sea. (It has to be donkey dung, because for Heinemann and Thoen in 1981 the decline in frequency of *P. punctata* was merely the result of the dramatic decline of the Belgian donkey population. I am glad not to be left alone in the realm of speculation.) It is a warm, dry autumn day in 1920, and a strong westerly breeze is blowing in from the sea. The three last stromata of *P. punctata* in Belgium morosely reflect upon their future status on the red data lists. Then, all of a sudden, they fall silent. A single rabbit pellet comes rolling towards their heap and home. Its movement is not as gentle, not as swift as those of hundreds and thousands of other little balls the wind is driving over the dunes. It staggers, it hobbles past, visibly impeded by up to twenty little stromata of an unnamed *Poronia* never met with before. The ostioles are dotted with huge black spores, immediately causing a sexual inferiority complex in each of the much larger *punctata*-stromata who carry, alas, nothing but stale conidia (and who never had such spores).

The newcomer is gone, collides with other pellets, rubbing off here and there its shockingly fertile reproductive agents.

What other feelings might have moved the old conidiophorous stromata of *punctata*, a species on the verge of extinction due, perhaps, to some invisible new additives in the donkeys' or the horses' fodder, perhaps to artificial fertilizers and other new methods in the treatment of the soil, perhaps even to the Belgian donkeys' decline or simply out of disgust with modern times and tunes?

Was it something like envy? Was it hatred? Or even hope? The latter would have been, to a certain degree, justified. Here and there, *punctata* lived on happily ever after, if not on Belgian donkey dung, at least – quite comfortably – on the pony droppings of Britain's New Forest. In the French *département* Maine et Loire it was recently rediscovered for the first time since 1901 (Mornand 1991).

List of Australian records of *Poronia erici:*
New South Wales:

- on rabbit dung, 18 km NW of Adaminaby, 5.IV.1981, leg. L. Tibell, det. N. Lundqvist (UPS, see Lundqvist 1989);
- on rabbit and kangaroo dung, Alum Creek, 5.IV.1981, leg. L. Tibell, det. N. Lundqvist (UPS, see Lundqvist 1989).

Queensland:

- substrate unknown, Brisbane, 82b, JMC (ex herb. Broome, K).

South Australia:

- on sheep dung, Meningie, VII. 1956, leg. L.D. Williams (K);
- on horse dung, Mount Lofty, Eagle-on-the-Hill (see Cleland 1934/35).

Tasmania:

- on cow dung, leg. Archer (K);
- on wallaby dung, Santa Maria Isl. Nat. Park, 12.III.1981, leg. L. Tibell, det. N. Lundqvist (UPS, see Lundqvist 1989);
- substrate unknown, Herb. Berkeley (K);
- substrate unknown, Herb. Berkeley, second collection (K).

Victoria:

- on dung of Grey Kangaroo (*Macropus macropus giganteus*), Great Western, 17.VII.1989, leg. B. Fuhrer, det. T.R. Lohmeyer (HBU, K. M. S.) – see Fig. 1;
- on wallaby dung, Alexandra, Crystal Creek, G. Beaton 41, 19.VII.1963 (K);
- substrate unknown, Clarendon, 865, ?epper (K).

Western Australia:

- on kangaroo dung, Bibra Lake, 15 km S. of Perth, 1.VII.1971, leg. T. Young, det. T.R. Lohmeyer (Herb. T. Young, Blackbutt/Qld.);
- substrate unknown, Swan River, no. 187 (K);
- substrate unknown, Swan River, no. 187 (second collection, K).

Locality unknown:

- on horse dung, no. 16, leg. Reader (K).

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