

This key is far from perfect, please send any comments to ambroise.baker@gmail.com. The version below is that of my PhD thesis, with last revisions September 2013 and it has not been updated since.

If you use this key for your work, please cite my publications about dung fungal spores, Baker et al. 2013 and Baker et al 2016, paper for which it was developed.

There is of course no guarantee that you are going to identify your microfossils correctly using this key – but I'd say you are more likely to successfully identify dung fungal spores with this key than without it.

In **bold** are the types that have been identified by Baker *et al.* (2013) as originating from dung fungal spores. Other types are either not coprophilous or in need of further research but are included in order to allow a better discrimination of the types that rely on large herbivores to complete their life cycle.

This key may not enable identification of every single spore, bearing in mind that:

- Spore shape and size is variable within species, genus and types.
- Not all spore types have been described, hence spore types not reported so far in the literature are likely to be encountered
- If this key does not lead to the identification of the target spore(s), it is unlikely to be a coprophilous fungi

First step: Is it worth going through the Key?

0. Body between 8 and 50 µm in its maximum length, dark brown in..... Yes it is, go to
colour, external surface of the wall perfectly smooth, rarely with any couplet 1
ornamentation, wall generally simple (but may be covered by an additional
wrinkly, or loose layer)

0. Body orange, pink, light orangy-pinky brown, to deep reddish brown..... No, it is not, pollen grain
but never chocolate brown, wall composed of more than one layer
(this applies to saffarin-stained samples)

0. Any other palynological microfossil..... No, it is not, Exit

- ‡ = “Not Observed by the authors, refer to the original publication(s)”
- Dimensions are between square brackets [].

PTO

Master key to groups A B and C:

1. Microfossil not septate, may have slit(s) or pore(s) but always formed.....2
of one single body.

1. Microfossil septate, formed of a couple to several bodies or cells.....**Key A**

2. Absence of both slit and pore.....Exit

2. Presence of either slit(s) or pore(s).....3

3. Presence of a slit.....**Key B**

3. Presence of one to several pores.....**Key C**

Key A: septate microfossils

1. Radially septate..... ‡ Types HdV - 8 (A-G)
G)
1. Either transversally septate, or septate in an irregular way but not radially..... 2
2. 1-septate, i.e. formed of two cells..... 3
2. 2- to more-septate..... 7
3. Brown wall of the main body covered with an extra wrinkly layer..... Valsaria-type
3. Brown wall of the main body not covered..... 4
4. Cells of different dimensions, or absence of both pore(s) and slit(s)..... Check couplet 9, otherwise Exit
4. Cells of same dimension, presence of either pore(s) or slit(s)..... 5
5. Presence of a pore centred in the polar region of each cell, with thick rim around half the diameter of the spore's diameter..... **Trichodelitschia-type**
5. Presence of a slit on each cell (running from one polar area to another)..... 6
6. Both polar areas rounded and of similar shape..... **Delitschia-type**
6. Polar areas either both truncated or one truncated, one rounded (2 cells)..... **Sporormiella-type** (2 cells)
7. Multi septate..... ‡ HdV - 3A, or Exit
7. 2 to 7-septate..... 8
8. 2 to 3-septate, presence of a slit on each cell..... **Sporormiella-type** (3 or 4 cells)
8. 2 to 7-septate, absence of any slit or pore..... ‡ HdV - 10, ‡ HdV - 494, or Exit

Key B: One-celled spores with slit(s)

1. Slit curved, either S-shaped, or following the arcuate edge of the spores, spore not or hardly elongated..... 2
1. Slit straight and flat, spore clearly longer than large and wide, i.e. elongated..... 3
2. Spore lentil-shaped (of the shape of a culinary lentil) with a slit on arcuate edge, body slightly ellipsoidal from polar view..... Coniochaeta-types
2. Spore +/- cylindrical, rounded at one end or truncated at both, slit running from one polar area to the other..... **Sporormiella-type**
3. Both polar areas rounded, [45 x 21 µm (Feaser & O'Connell 2009)]..... ‡ BRN8

3. One polar area sharply acute, the other truncated, [18-25 x 5-7 μm ‡ Anthostomella fuegiana-type
(van Geel & Aptroot 2006)]

Key C: One-celled spore with pore(s)

- 1. Pores more than 2..... 2
- 1. Pores 1 or 2..... 3
- 2. Pores (pits) larger, covering regularly the whole surface of the spore..... Gelasinospora-type
- 2. Pores smaller, main one polar, the others irregularly scattered over the..... **Bombardioidea-type**
surface, polar area without pore slightly truncated, large spore
- 3. Pore 2 (of similar diameter, otherwise: Exit)..... 4
- 3. Pore 1..... 7
- 4. Spore wall covered with a loose outer layer..... ‡ Rhytidospora-type,
‡ Pteridospora-type
- 4. Spore wall formed of only one layer 5
- 5. Spore clearly heteropolar, large [37 x 18 μm type BRN2
(Feeser & O’Connell 2009)] one polar area roundly tapering, 2 pores
according to (Feeser & O’Connell 2009) but only 1 pore observed.
- 5. Spores homopolar..... 6
- 6. Small [6–12 x 4–9 μm (van Geel *et al.* 2003)], constricted at both..... Chaetomium-type
ends thus having a lemon shape
- 6. Medium to large, not constricted at both ends..... Arnium-type or
Soradria (2-pored)-
type
- 7. Spore either perfectly spherical or clearly inequilateral, i.e..... Exit
having one side straight, or bean shaped
- 7. Spore equilateral and elongated..... 8
- 8. Pore perfectly centred in the polar area (apical)..... 9
- 8. Pore slightly to clearly off-centre (sub-apical), and as a result at least..... 12
partly visible from equatorial view
- 9. Spore outline homopolar, to nearly homopolar..... 10
- 9. Spore outline clearly heteropolar..... 11
- 10. Pore clearly extruding, polar area obtuse..... **Schizothecium
conicum-type**

10. Pore not extruding or only slightly, polar areas obtuse to acute, **Sordaria-type**
(possible presence of a slight truncation)

11. Spore about as long as wide, one end truncated, the other slight **Apiosordaria-type**
constricted, occasional presence of a transparent appendage at the truncated end

11. Spore longer than wide, large [37 x 18 μm **Type BRN2**
(Feeser & O'Connell 2009)], one polar area acutely tapering into a
narrow point, the other polar area roundly tapering, 2 pores according
to (Feeser & O'Connell 2009) but only 1 pore observed

12. Widest section often nearer the polar area without pore, internal **Type HdV - 65**
wall of irregular thickness, very variable in shape

12. Widest section usually nearer the middle, outer and inner **13**
surface perfectly smooth

13. Polar area with pore often constricted, the other, truncated **Cercophora-type**
[13–27 x 6–14 μm (van Geel *et al.* 2003)]

13. Neither constricted nor truncated, slight truncation located **Podospora-type**
in the polar area without pore [39–48 x 16–23 μm (van Geel *et al.*
2003)]

Septate: formed of more than one cell, or sometimes of one cell that shows a membranous
internal separation (a septa), or simply a body not recognisable as cellular in origin but
patterns suggesting some sort of partitioning. A 1-septed body is made up of 2 cells.

Slit: An elongated rupture of the spore wall.

Pore: A round opening of the spore wall.

Extruding pore: raised pore area sticking out from the outline curve of the spore.

Polar area: apices or ends, in spores that are elongated, for other shapes, top and bottom.
Here the polar areas are generally those two areas of the spores that show a radial symmetry.

Polar view: viewed from above the polar area, so that one of the polar areas is fully visible
and the other polar area is fully concealed behind it.

Equatorial view: viewed from the side, so that one side of the equatorial area is fully visible
and half of both polar area too.

Homopolar: Whose polar areas are identical, symmetric (note that the pore and extruding
pores are not taken into account for this character).

Heteropolar: Whose polar areas are dissimilar, asymmetric (note that the pore and extruding
pores are not taken into account for this character).

Inequilateral: with uneven equatorial area, with no reflection symmetry from the equatorial
view.

Constricted / constriction: whose outline become abruptly narrower.

Truncated / truncation: whose polar area is abruptly flattened. This generally has an
ontogenetic/developmental origin, whereby the growth of the forming cell is physically

limited by the presence of another cell (see e.g. Hanlin (1999) for a description and pictures of the process in *Cercophora palmicola*).