

## An annotated check-list of Ascomycota reported from soil and other terricolous substrates in Egypt

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**Abstract:** By screening of available sources of information, it was possible to figure out a range of 310 taxa that could be representing Egyptian Ascomycota up to the present time. In this treatment, concern was given to ascomycetous fungi of almost all terricolous substrates while phytopathogenic and aquatic forms are not included. According to the scheme proposed by Kirk *et al.* (2008), reported taxa in Egypt belonged to 88 genera in 31 families, and 11 orders. In view of this scheme, very few numbers of taxa remained without certain taxonomic position (*incertae sedis*). It is also worthy to be mentioned that among species included in the list, twenty-eight are introduced to the ascosporic mycobiota as novel taxa based on type materials collected from Egyptian habitats. The list includes also 19 species which are considered new records to the general mycobiota of Egypt. When species richness and substrate preference, as important ecological parameters, are considered, it has been noticed that Egyptian Ascomycota shows some interesting features noteworthy to be mentioned. **At the substrate level**, clay soils, came first by hosting a range of 108 taxa followed by desert soils (60 taxa). **At the taxonomic level**, Sordariales, compared to other orders, accommodated the greatest number of taxa i.e. 92 taxa followed by Eurotiales (61 taxa). Chaetomiaceae and Trichocomaceae are by far the richest families by housing 61 taxa. At the generic level, *Chaetomium* occupied the first place among all reported genera by including 51 species followed by *Arthroderma* (15 spp.). Provisional keys to the identification of reported taxa are given.

**Key words:** Ascomycota, biodiversity, check-list, Egypt, fungi, taxonomy

### Introduction

Informations about Egyptian ascosporic fungi are very rare and limited because members of the group were either overlooked during investigations or never been the sole target of any investigation before until Abdel-Azeem (2003) conducted a survey study focusing mainly on the ascosporic forms. Based on the results of this study and beside data collected from previous studies as well as informations obtained from web sites, compilations, and check-lists of Egyptian fungi previously introduced by several investigators (Moubasher, 1993; Mouchacca, 1995, 1999, 2005 and El-Abyad, 1997) it can be deduced that the number of ascosporic mycobiota of soil and other terricolous substrates in Egypt up to the present time is nearly 310.

The present list is concerned with only saprotrophic species isolated from soil and some other substrates such as dung, compost, sludge, seeds, grains, nails and hooves. Plant parasitic and aquatic taxa, whether algicolous or lignicolous, are not included in the present list. Therefore, it should be mentioned here that, although the present study will add some new data to our information concerning the Ascomycota of Egypt, this updated check-list must be considered as a provisional one always waiting for continuous supplementation.

For the ease of reference, collected names were sorted out into two main groups, the **first** comprised those taxa originally described from Egypt and introduced as novel taxa, and the **second** contained those taxa which were reported during routine

isolations from different sources. Species of each group were given in a taxonomic sequence. Accepted names were highlighted in bold and synonyms were also mentioned. The systematic arrangement in the present list follows the latest system of classification appearing in the 10<sup>th</sup> edition of Anisworth & Bisby's Dictionary of the fungi (Kirk *et al.* 2008). Name correction, authority, and taxonomic assignments of all taxa reported in this article are checked with the web site of *Index Fungorum* (<http://www.indexfungorum.org/Names/Names.asp>).

Sources of information obtained from other databases are referred to in the text by abbreviations as follows: American Type Culture Collection (ATCC), Centraalbureau voor Schimmelcultures (CBS, Holland), Commonwealth Agricultural Bureau International (CABI-Bioscience, UK) and Mycotheque de l'Universite Catholique de Louvain (MUCL, Belgium). Taxa considered as new Egyptian records are referred to by solid arrows (➔).

### Identification

It is well known that microscopic characters of teleomorphs (perfect states) are considered by far the fundamentals for the identification of Ascomycetes. However, associated anamorphs (imperfect states) may be in some instances very crucial where they serve as useful key characters especially in some genera like *Arthroderma*, *Byssoschlamys*, *Eurotium*, *Neosartorya*, *Fennellia* and *Talaromyces*. Various anamorphic forms are produced by ascosporic fungi. The mode of conidial development (conidiogenesis) in these forms however follow different patterns

where conidia may be **phialidic**, either remaining in dry, long chains as in *Aspergillus* and *Penicillium* or slimming down to form gloeoid balls as in *Acremonium*, *Gliocladium* and *Fusarium*. Also, conidia may belong to the **aleuriotype** as in *Sepedonium*, *Nigrospora*, *Chrysosporium*, *Myceliophthora* or may be **annelidic** as in *Scopulariopsis*, *Wardomyces*, *Spilocaea* or **thallic** as in *Microsporium* and *Trichophyton* or develop **sympodially** on geniculate conidiophores as in *Drechslera*, *Curvularia*, *Bipolaris*, *Exserohilum*, *Alternaria* and *Stemphylium*.

**Criteria for distinction between ascomycete taxa**  
 (See Figs. 1-6)

**A. Ascomata**

- Present or absent (absent in yeast fungi)
- Structure: if present
  - a: macroscopic and fleshy or microscopic to minute
  - b: gymnothecial, cleistothecial, perithecial, apothecial or psuedothecial
- Texture: soft or sclerotoid
- Colour: colourless, creamy, yellowish orange or brown.

**B. Peridia and peridial appendages** (Figs. 1 & 2)

- Peridium surface: glabrous (smooth) or tomentose (hairy); hairs (appendages): similar to vegetative hyphae (mycelioid) or distinct.
- Peridium structure: loose envelops (gymnothecial) or compactly woven (pseudoparenchymatic).
- Wall transparency: dark or translucent.
- Surface cells (textura): epidermoidea, angularis or intricata.
- Peridial appendages: long or short, straight, undulate, loosely or compactly

coiled, uncinete, comb-like, branched, unbranched, septate or aseptate.

**C. Asci**

- Uni or bitunicate.
- Spherical, subspherical, ellipsoidal, cylindrical, clavate or broadly-clavate.
- Operculate or non-operculate.
- Deliquescent (evanescent) or with persistent walls.

**D. Ascospores** (Figs. 3-6)

- Shape: spheroid, ellipsoid, allantoid, triangular, fusiform, planoconvex, rhomboid.
- Septation: aseptate (unicellular)
  - Septate: with transverse septa only (phragmotype) or with both transverse and longitudinal septa (dictyotype).
- Colour: hyaline (colourless).
  - Pigmented (dextrinoid, pinkish, brownish).
- Surface: smooth, finely-verrucose, tuberculate, rough, spiny, porrate, crestate or acrestate

Crests if present: 1, 2 or 4

Crests bounding a furrow or not bounding a furrow.

- Surface structures: present or absent in the form of: germ pores or slits, appendages or mucoid caudae, gelatinous sheath.

**E. Yeast forms (ascosporic yeasts)**

- False mycelium: present or absent
- Number of ascospores per ascus: 1, 2, 4, 8 or many.
- Ascospore morphology: spherical, reniform, ellipsoidal, acicular, hat-shaped, saturnoid.
- Ascospore surface: smooth, finely verrucose, rough.

**General Key to ascomycete groups**

1-	Ascomata absent, thallus made of loose budding cells.....	Key I (Ascosporegenous yeasts)
1-	Ascomata present, thallus made of richly branched mycelium.....	2
2-	Ascomatal wall consists of loose network of hyphae.....	Key II (Gymnothecial Ascomycetes)
2-	Ascomatal wall typically pseudoparenchymatic .....	3
3-	Ascomata not fleshy, usually microscopic .....	4
3-	Ascomata fleshy, usually macroscopic.....	6
4-	Asci unitunicate.....	5
4-	Asci bitunicate .....	Key III (Pseudothecial Ascomycetes)
5-	Ascomata non-ostiolate .....	Key IV (Cleistothecial Ascomycetes)
5-	Ascomata ostiolate .....	Key V (Perithecial Ascomycetes)
6-	Ascomata non mushroom-like or tuber-like.....	Key VI (Apothecial Ascomycetes)
6-	Ascomata mushroom-like or tuber-like.....	Key VII (Truffles and Morels)

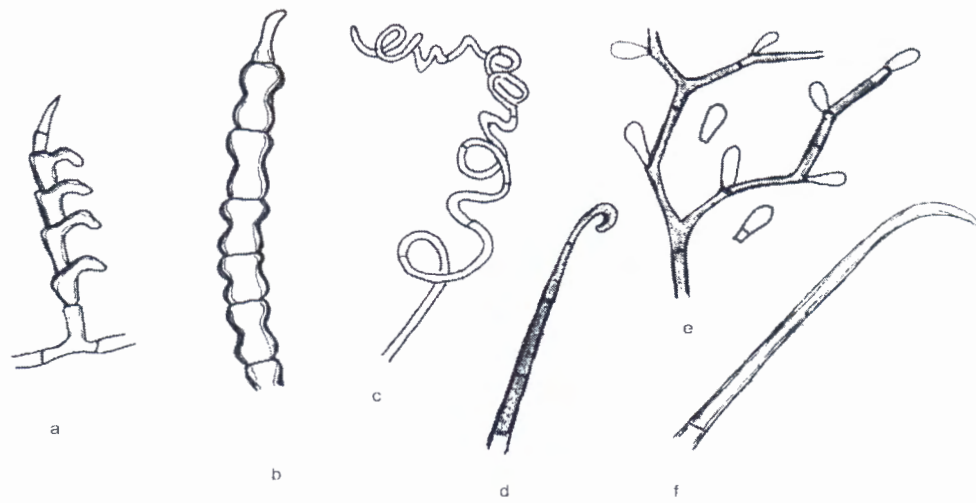


Fig. 1. Peridial appendages

- a- *Ctenomyces*: Comb-like (ctenoid), each cell with curved spine.
- b- *Arthroderma*: Dumb-bell shaped (ossiform) cells.
- c- *Lasiobolidium*: Hyaline, long sinuous to loosely coiled.
- d- *Myxotrichum*: Dark pigmented, septate, uncinat (curved) ends.
- e- *Ascotricha*: Pigmented dichotomously-branched with ampullae (bulbills)
- f- *Auxarthron*: Hyaline to subhyaline, non-septate curved ends.

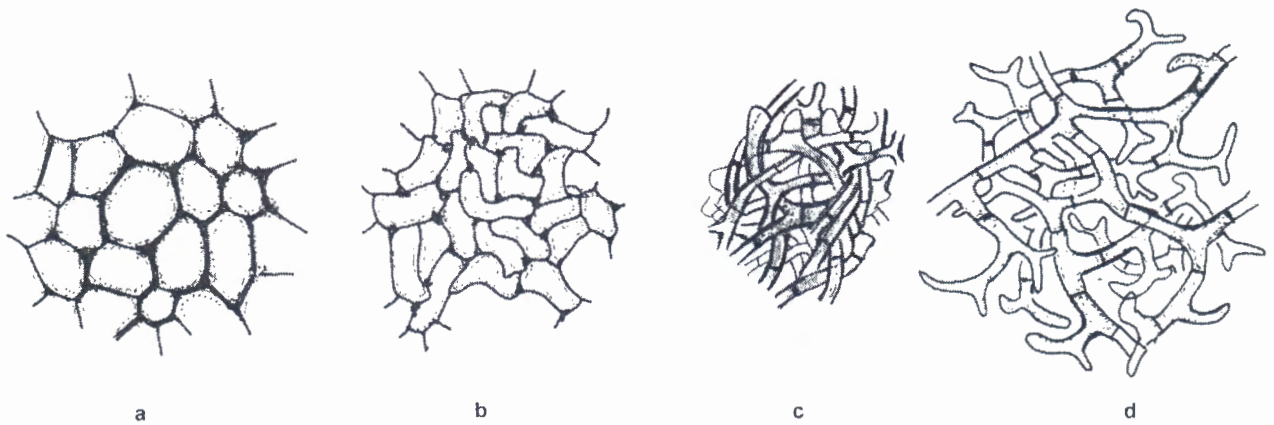


Fig. 2. Textura (surface cells of ascomata)

- a- Angularis ((hyphae polygonal in cross section)
- b- Epidermoidea ((hyphae in cross section resemble jigsaw puzzle pieces)
- c- Intricata (hyphae appear interwoven)
- d- Loose mantle (gymnothecia)

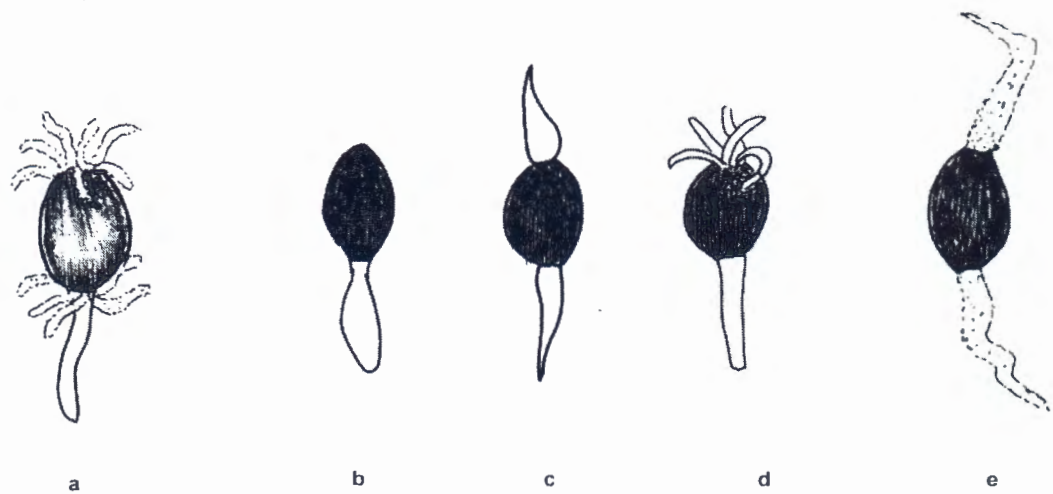


Fig.

3. Ascospores with caudae/or gelatinous sheath

a & c- *Podospora appendiculata*

b- *P. comata*

d- *P. communis*

e- *Arnium* with secondary caudae (gelatinous appendages).

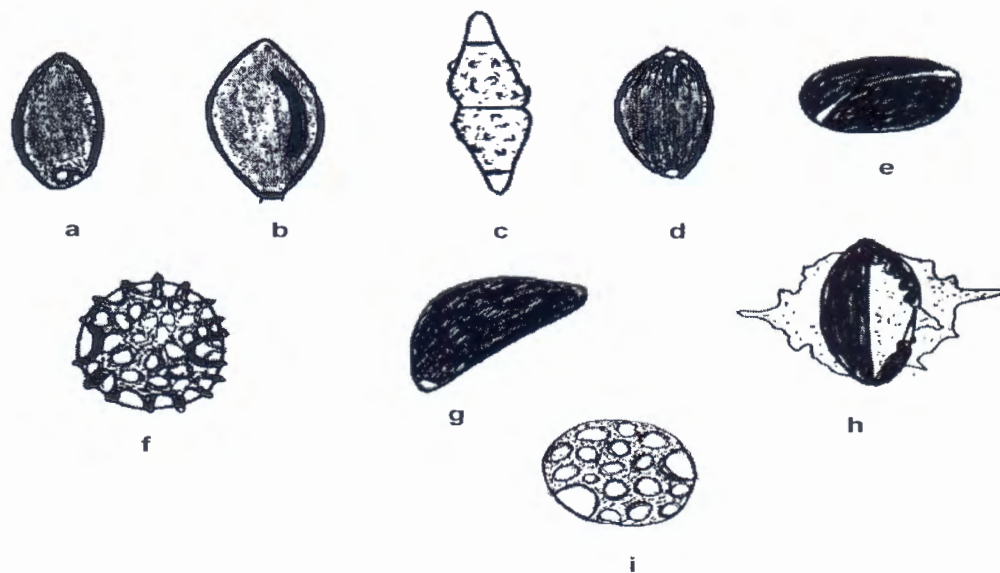


Fig. 4. Ascospores showing distinct structures

a- *Thielavia*: subapical germ pore.

b- *Thielavia*: dark-band and protuberant germ pore.

c- *Hypomyces*: rough wall.

d- *Corynascus*: two apical germ pores.

e- *Ascotricha*: germ slit.

f- *Gelasinospora*: now as *Neurospora*, reticulate surface.

g- *Melanospora*: planoconvex surface.

h- *Emericellopsis*: hyaline wings.

i- *Chaetomiopsis*: pitted wall.

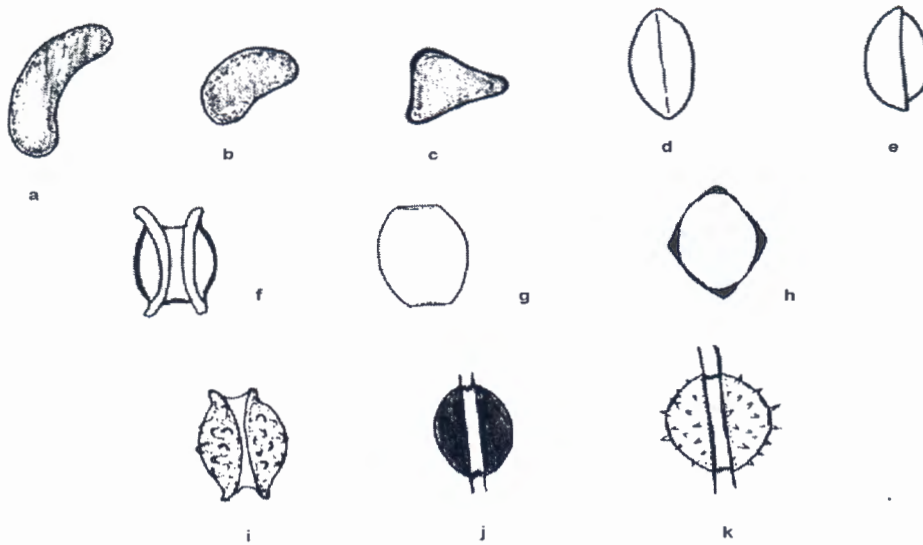


Fig. 5. Some characteristic ascospores

- a- *Microascus albonigrescens*: lunate (allantoid)
- b- *M. cinereus*: naviculate (kidney-shape)
- c- *M. trigonosporus*: triangular.
- d- *Talaromyces*: single crest.
- e- *Narasimhella*: unequal halves.
- f- *Gymnoascus ruber*: two crests bounding prominent furrow.
- g- *G. desertorum*: blunt ends, not showing furrows.
- h- *Gymnascella dankaliensis*: equatorial thickening, not showing furrows.
- i- *Eurotium*: hyaline, rough, low crests.
- j- *Emericella*: red and hyaline furrow.
- k- *Neosartorya*: hyaline, rough, long crests.

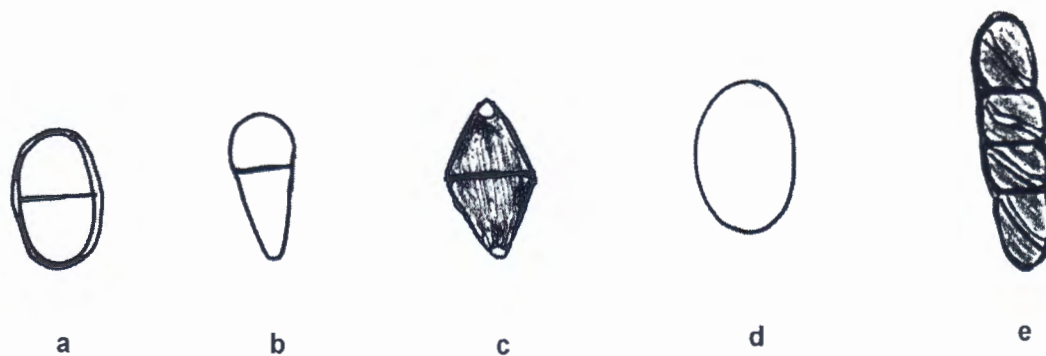


Fig. 6. Ascospores of bitunicate asci

- a- *Mycosphaerella*. Bicellular equal cells, ellipsoid, hyaline.
- b- *Venturia*. Bicellular unequal cells, triangular, hyaline.
- c- *Neotestudina*. Bicellular equal cells, rhomboid, dark.
- d- *Setosphaeria*. Unicellular, ellipsoid, hyaline.
- e- *Preussia*. Multicellular, dark, with germ slits.

**Key I**

**Ascosporic yeasts**

**Mycelium** absent or poorly developed: **vegetative** cells reproducing by bipolar or multilateral budding; **asci** morphologically similar to vegetative cells, globose to elongated to ellipsoid, not in well-defined chains, 1- to 8-spored; deliquescent or persistent; **ascospores** acicular, oval, globose, reni-form, crescenti-form or helmet- to hat- or saturn-shaped, smooth to verrucose or rough to pitted.

1-	Septate or false hyphae presnt.....	<i>Endomycopsella</i>
1-	Septate or false hyphae absent.....	2
2-	Vegetative reproduction by bipolar budding.....	<i>Hanseniaspora</i>
2-	Vegetative reproduction by multilateral budding.....	3
3-	Asci elongated with two acicular ascospores.....	<i>Metschnikowia</i>
3-	Above characters not combined.....	4
4-	Asci persistent.....	5
4-	Asci deliquescent.....	8
5-	Ascospores clavate.....	<i>Clavispora</i>
5-	Ascospores spheroid.....	6
6-	Ascospores rough.....	<i>Torulaspota</i>
6-	Ascospores smooth.....	7
7-	Asci definitely persistent.....	<i>Saccharomyces</i>
7-	Asci persistent or deliquescent.....	<i>Lachancea</i>
8-	Asci 1-spored, ascospores rough.....	<i>Schwanniomyces</i>
8-	Asci 2- or 4- or 8-spored, ascospores smooth.....	9
9-	Ascospores reniform to crescentiform.....	<i>Kluyveromyces</i>
9-	Ascospores otherwise.....	10
10-	Ascospores oval to spheroid.....	11
10-	Ascospores helmet- to hat- or saturn- shaped.....	12
11-	Ascospores oval, verrucose to pitted.....	<i>Debaryomyces</i>
11-	Ascospores spheroid, smooth.....	<i>Saccharomyces</i>
12-	Ascospores saturn-shaped.....	<i>Pichia</i>
12-	Ascospores helmet-shaped.....	<i>Dekkera</i>

**Key II**

**Gymnothecial Ascomycetes**

**Ascomata** walls consist of loose mantle (envelope of hyphae), with or without characteristic appendages; **asci** mostly globose to ellipsoid, **ascospores** hyaline to pale, aggregated, spherical to ellipsoid to fusiform.

1-	Peridial appendages absent, if present as short projections and similar to vegetative hyphae.....	2
1-	Peridial appendages well-defined, present as spines or long hairs distinctive from vegetative hyphae ...	6
2-	Ascospores, lenticular-ellipsoid to fusiform.....	3
2-	Ascospores spherical.....	10
3-	Ascospores fusiform.....	<i>Pseudogymnoascus</i>
3-	Ascospores ellipsoid.....	4
4-	Ascospores asymmetrical showing one crest or band splitting spores into unequal halves... ..	<i>Narasimhella</i>
4-	Ascospores symmetrical with one or two crests.....	5
5-	Mature ascospores hyaline to golden yellow.....	<i>Gymnoascus</i>
5-	Mature ascospores hyaline to dark orange.....	<i>Arachniotus</i>
6-	Appendages comb-like.....	<i>Ctenomyces</i>
6-	Appendages not comb-like.....	7
7-	Appendages with curved ends but aseptate.....	<i>Auxarthron</i>
7-	Appendages with curved ends with prominent septa.....	8
8-	Appendages made of dumb-bell shaped cells.....	<i>Arthroderma</i>
8-	Appendages made of arcuate to uncinat ends.....	9
9-	Appendages dark-pigmented.....	<i>Myxotrichum</i>
9-	Appendages subhyaline.....	<i>Gymnascella</i>
10-	Ascospores with reticulate surface.....	<i>Amauroascus</i>
10-	Ascospores with smooth surface.....	<i>Apinisia</i>

### Key III

#### Pseudothecial Ascomycetes

**Ascomata** ostiolate or non-ostiolate; **asci** bitunicate, 8 or many-spored; **ascospores** uni, bi, or multicellular, very often showing germ pores or germ slits; **anamorphs** may be present as dark-pigmented conidia.

1-	Asci containing 8 spores or less.....	2
1-	Asci containing many spores (16-32 or more).....	13
2-	Ascospores unicellular, spherical.....	<i>Rhexothecium</i>
2-	Ascospores bi-or multicellular, ellipsoid, fusiform to filiform.....	3
3-	Ascospores bicellular.....	4
3-	Ascospores multicellular.....	6
4-	Ascospores yellowish, made of unequal cells.....	<i>Venturia</i>
4-	Ascospores yellowish to brownish, made of equal cells.....	5
5-	Ascospores yellowish, narrow ellipsoid.....	<i>Mycosphaerella</i>
5-	Ascospores brownish, biconical.....	<i>Neotestudina</i>
6-	Ascospores with transverse septa only (phragmospores).....	7
6-	Ascospores with transverse and longitudinal septa (dictyospores).....	9
7-	Ascospores long filiform.....	8
7-	Ascospores ellipsoid, fusoid or cylindrical.....	11
8-	Ascospores coiled around each other, anamorph <i>Bipolaris</i> .....	<i>Cochliobolus</i>
8-	Ascospores not coiled around each other, anamorph <i>Curvularia</i> .....	<i>Pseudocochliobolus</i>
9-	Associated anamorph <i>Drechslera</i> .....	<i>Pyrenophora</i>
9-	Associated anamorph <i>Alternaria</i> or <i>Stemphylium</i> .....	10
10-	Associated anamorph <i>Alternaria</i> .....	<i>Lewia*</i>
10-	Associated anamorph <i>Stemphylium</i> .....	<i>Pleospora</i>
11-	Ascospores fusoid, anamorph <i>Exserohilum</i> .....	<i>Setosphaeria</i>
11-	Ascospores ellipsoid to cylindrical, anamorph absent.....	12
12-	Ascomata small, non-ostiolate, ascospores 4-celled.....	<i>Preussia</i>
12-	Ascomata large with clearly defined ostiole, ascospores multicelled (5-16).....	<i>Sporormiella</i>
13-	Ascospores ellipsoid, smooth.....	<i>Pycnidiphora</i>
13-	Ascospores spherical, reticulate.....	<i>Westerdykella</i>

\* For more details see Kwasna & Kosiak (2003)

### Key IV

#### Cleistothecial Ascomycetes

**Ascomata** non-ostiolate, ascoma wall bright- or dark-coloured, translucent or dark carbonaceous, peridial appendages sometimes present; **asci** globose to ellipsoid, evanescent; **ascospores** dextrenoid to brownish; characteristic anamorphs may also exist.

1-	Ascomata covered with distinct peridial appendages.....	2
1-	Ascomata not covered with distinct peridial appendages.....	5
2-	Appendages aggregated in tufts (fascicles).....	3
2-	Appendages scattered over ascoma surface.....	4
3-	Ascomata polygonal, appendages in several fascicles.....	<i>Kernia</i>
3-	Ascomata round, appendages in one fascicle.....	<i>Lophotrichus</i>
4-	Ascospores unicellular, oblate or lemoniform.....	<i>Chaetomidium</i>
4-	Ascospores bicellular (unequal cells), one dark, the other hyaline.....	<i>Zopfiella</i>
5-	Ascomata dark-brownish.....	6
5-	Ascomata bright-coloured (creamy, yellowish, reddish).....	14
6-	Peridial wall translucent, ascus wall evanescent.....	7
6-	Peridial wall dark, ascus wall persistent.....	9
7-	Ascospores showing hyaline wings, anamorph <i>Acremonium</i> .....	<i>Emericellopsis*</i>
7-	Ascospores not showing hyaline wings, anamorph otherwise.....	8
8-	Ascospores showing one germ pore, chlamydospores very often present.....	<i>Thielavia</i>
8-	Ascospores showing two germ-pores, anamorph <i>Sepedonium</i> -like.....	<i>Corynascus</i>
9-	Ascospores hyaline, anamorph <i>Nigrospora</i> .....	<i>Khuskia</i>
9-	Ascospores reddish to pale brown, anamorph otherwise.....	10
10-	Ascospores reniform.....	<i>Pithoascus</i>
10-	Ascospores spherical, broad-ellipsoid to broad fusiform.....	11

11-	Ascospores reticulate or pitted, ellipsoid.....	12
11-	Ascospores smooth, spherical to fusiform.....	14
12-	Thermophilic.....	13
12-	Not thermophilic, anamorph <i>Chrysosporium</i> .....	<i>Aphanoascus**</i>
13-	Anamorph <i>Paecilomyces</i> .....	<i>Coonemeria</i>
13-	Anamorph aleuriospore type.....	<i>Thermoascus</i>
14-	Thermophilic, anamorph arthroconidia.....	<i>Melanocarpus</i>
14-	Non-thermophilic.....	15
15-	Associated anamorph <i>Paecilomyces</i> .....	<i>Byssochlamys</i>
15-	Associated anamorph otherwise.....	16
16-	Associated anamorph <i>Aspergillus</i> or <i>Penicillium</i> .....	19
16-	Associated anamorph otherwise.....	17
17-	Ascospores spherical or fusiform.....	18
17-	Ascospores ellipsoidal with <i>Basipetospora</i> anamorph.....	<i>Monascus</i>
18-	Ascospores spherical, anamorph <i>Sporothrix</i> .....	<i>Pseudeurotium</i>
18-	Ascospores fusiform, anamorph <i>Scedosporium</i> .....	<i>Pseudoallescheria</i>
19-	Associated anamorph <i>Penicillium</i> .....	20
19-	Associated anamorph <i>Aspergillus</i> .....	21
20-	Ascomata soft.....	<i>Talaromyces</i>
20-	Ascomata sclerotoid.....	<i>Eupenicillium</i>
21-	Conidial head uniseriate.....	22
21-	Conidial head biseriate.....	23
22-	Conidial head compactly columnar belonging to <i>Aspergillus</i> Section <i>Fumigati</i> .....	<i>Neosartorya</i>
22-	Conidial heads loosely radiate belonging to <i>Aspergillus</i> Section <i>Aspergillus</i> .....	<i>Eurotium</i>
23-	Ascospores red to violet, ascomata purple, Hülle cells present.....	<i>Emericella</i>
23-	Ascospores pale, ascomata yellowish-green, Hülle cells absent.....	<i>Fennellia</i>

\*Considered by some authors as perithecial

\*\* Considered by some authors as gymnothecial

#### Key V

##### Perithecial Ascomycetes

**Ascomata** ostiolate, ostioles papillate or neck-form, ascoma wall either dark-coloured or translucent (very often with long necks and covered with peridial appendages and/or scales); **asci** cylindrical or clavate; **ascospores** brownish, sometimes covered with gelatinous sheath or showing extended gelatinous caudae.

1-	Ascoma wall very dark.....	2
1-	Ascoma wall bright or translucent.....	15
2-	Ascospores showing gelatinous sheath and/or caudae.....	3
2-	Above characters not combined.....	6
3-	Ascospores showing only gelatinous sheath.....	<i>Sordaria</i>
3-	Ascospores showing gelatinous sheath and/or caudae.....	4
4-	Ascospores connected in pairs within the ascus.....	<i>Zygopleurage</i>
4-	Ascospores not connected in pairs.....	5
5-	Ascospores showing primary and/or secondary caudae.....	<i>Podospora</i>
5-	Ascospores showing only secondary caudae.....	<i>Arnium</i>
6-	Ascomata glabrous (smooth).....	7
6-	Ascomata covered with characteristic peridial appendages.....	11
7-	Ascospores hyaline to straw-coloured.....	8
7-	Ascospores dark pigmented.....	10
8-	Ascospores hyaline.....	9
8-	Ascospores straw-coloured, lunate to triangular, not showing prominent germ pores..	<i>Microascus*</i>
9-	Anamorph present ( <i>Stachybotrys</i> or <i>Custingophora</i> -like).....	<i>Melanopsamma</i>
9-	Anamorph absent, ascoma covered with short setae.....	<i>Trichosphaeria</i>
10-	Ascospores showing germ pores.....	<i>Achaetomium</i>
10-	Ascospores showing germ slits.....	<i>Phaeosporis</i>
11-	Ascospores smooth.....	12
11-	Ascospores pitted.....	<i>Chaetomiopsis</i>
12-	Asci spherical, 1-4 spored.....	<i>Monosporascus</i>
12-	Asci clavate to cylindrical, 8 spored.....	13



13-	Peridial appendages with bulbils (ampoules), borne on denticles, ascospores showing Germ slits.....	<i>Ascotracha</i>
13-	Peridial appendages without bulbils, ascospores showing one or two germ pores.....	14
14-	Associated anamorph <i>Botryotrichum</i> .....	<i>Farrowia</i>
14-	Associated anamorph usually aleuriospores or phialospores.....	<i>Chaetomium</i>
15-	Ascomata with setose long necks.....	<i>Melanospora</i>
15-	Ascomata with papillate short necks.....	16
16-	Ascospores one-celled.....	17
16-	Ascospores more than one-celled.....	18
17-	Ascospores ellipsoid, fusiform, striated or pitted.....	<i>Neurospora</i> **
17-	Ascospores round, reticulate.....	<i>Neocosmospora</i>
18-	Ascospores bicelled.....	19
18-	Ascospores multicellular (with 2 or 3 septa).....	<i>Gibberella</i>
19-	Ascospores smooth.....	<i>Nectria</i>
19-	Ascospores not smooth.....	20
20-	Ascospores fusiform, very rough.....	<i>Hypomyces</i>
20-	Ascospores naviculate, verrucose.....	<i>Sphaerostilbella</i>

\*Considered by some authors as cleistothecial

\*\* For more details see Garcia *et al.* (2004)

#### Key VI

##### Apothecial Ascomycetes

**Ascomata** micro- or macroscopic, angio- or gymnocarpic, bright-coloured (flesh, orange, or purplish), discoid, cup-shaped or spherical; **asci** 8 or many-spored, cylindrical to broadly-clavate, operculate or non-operculate; **ascospores** hyaline or brown, spherical or ellipsoid, smooth or rough or spiny or striated.

1-	Mature ascospores brownish and/or ornamented.....	2
1-	Mature ascospores hyaline and smooth.....	4
2-	Ascospores firmly adhered and ejaculated as a group.....	<i>Saccobolus</i>
2-	Ascospores not adhered and singly ejaculated.....	3
3-	Mature ascospores pale to hyaline, mostly globose with reticulate surface.....	<i>Ascodesmis</i>
3-	Mature ascospores brown to pink, ellipsoid, very often showing striations.....	<i>Ascobolus</i>
4-	Ascomata spherical, without excipulum.....	<i>Lasiobolidium</i>
4-	Ascomata discoid to cup-shaped with excipulum.....	5
5-	Asci 8-spored, ascospores punctuate or finely verrucose.....	<i>Iodophanus</i>
5-	Asci many-spored, ascospores smooth.....	<i>Coprotus</i>

#### Key VII

##### Macroscopic fleshy ascomycetes (morels and truffles)

Biologically morels are quite different from truffles, while morels are free living saprotrophs growing on decaying leaf litter in forests, truffles are obligate symbionts with roots of woody trees and/or desert annuals.

**Ascomata** are morphologically distinct, being mushroom-like in morels and tuber-like in truffles. However spore dispersal in both groups depends on mammal mycophagy; **asci** cylindrical in morels, broadly-clavate in truffles; **ascospores** uniseriate in morels and irregular in truffles.

1-	Ascomata epigeal, hymenium exposed.....	<i>Morchella</i>
1-	Ascomata hypogean, hymenium enclosed.....	2
2-	Gleba yellowish, ascospores smooth.....	<i>Tirmania</i>
2-	Gleba pinkish, ascospores rough.....	<i>Terfezia</i>

#### List of treated taxa

##### Group I: Species introduced as novel taxa

This group comprises 28 taxa out of which four were subjected to generic changes (referred to by ●), one was synonymised (□), and another one was brought

to the variety level (◊), while the rest of names remained as proposed.

##### Eurotiales

##### Thermoascaceae

- 1. *Coonemeria aegyptiaca* (Ueda & Udagawa) Mouch., Cryptogamie, Mycologie 19: 31 (1997) (*Thermoascus*

*aegyptiacus* Ueda & Udagawa) – isolated by Ueda from marine sludge at Port Said (Udagawa & Ueda, 1983).

#### Trichocomaceae

2. *Emericella desertorum* Samson & Mouch., Antonie van Leeuwenhoek **40**: 121 (1974) – isolated by Mouchacca from sandy soil, Kharga Oasis, Western Desert (Samson & Mouchacca, 1974).
3. *E. purpurea* Samson & Mouch., Antonie van Leeuwenhoek **41**: 350 (1975) isolated by Mouchacca from sandy soil, Kharga Oasis, Western Desert (Samson & Mouchacca, 1975).
- 4. *Eupenicillium aegyptiacum* (J.F.H. Beyma) Stolk & D.B. Scott, Persoonia **4**: 391-405 (1967) (*Penicillium aegyptiacum* J.F.H. Beyma) – isolated by Sabet (1935) from sandy soil at Burg El-Arab, west of Alexandria.
5. *E. sinaicum* Udagawa & S. Ueda, Mycotaxon **14**: 266 (1982) - isolated by Ueda from marine sludge, Sinai Peninsula (Udagawa & Ueda, 1982).
6. *Eurotium xerophilum* Samson & Mouch., Antonie van Leeuwenhoek **41**: 348 (1975) – isolated by Mouchacca from sandy soil, Kharga Oasis, Western Desert (Samson & Mouchacca, 1975).
- 7. *Talaromyces trachyspermus* (Shear) Stolk & Samson var. *assiutensis* (Samson & Abdel-Fattah) Yaguchi & Udagawa, Mycoscience **35**: 65 (1994) (*Talaromyces assiutensis* Samson & Abdel-Fattah) – isolated by Maghazy from cultivated soil, Assiut, Upper Egypt (Samson & Abdel-Fattah, 1978).

#### Melanosporales

##### Ceratostomataceae

8. *Melanospora aegyptiaca* Stchigel, Caldach & Guarro, (1999) – isolated by Caldach & Stchigel from desert soil, Sinai. Protolog: CBS ([http://www.CBS.Knaw.nl/search\\_fsp.html](http://www.CBS.Knaw.nl/search_fsp.html)).

#### Sordariales

##### Chaetomiaceae

9. *Chaetomiopsis dinae* Moustafa & Abdul-Wahid, Mycologia **82**: 129 (1990) – isolated from cultivated soil, Ismailia (Moustafa & Abdul-Wahid, 1990a).
10. *Chaetomium gelasinosporum* Aue & E. Müller, Ber. Schweiz. Bot. Ges. **77**: 187-207 (1967) isolated from cultivated soil, Quos, Upper Egypt (Aue & Müller, 1967).
11. *C. mareoticum* Besada & Yusef, Trans. Brit. Mycol. Soc. **52**: 502-504 (1969) – isolated from sandy loam soil at kingi Mariut (Besada & Yusef, 1969).

12. *C. sinaense* Moustafa & Ess El-Din, Can. J. Bot. **67**: 3417 (1989) isolated from saline soil, Sinai Peninsula (Moustafa & Ess El-Din, 1989a).

- 13. *C. strumarium* (J.N. Rai, J.P. Tewari & Mukerji) P.F. Cannon, Trans. Brit. Mycol. Soc. **87**: 45-76 (1986) (*Achaetomium cristalliferum* Faurel & Locq.-Lin.) isolated by Faurel (1969) from soil, km 32 S Kharga Oasis, Western Desert (Locquin-Linard, 1980).
14. *C. uniporum* Aue & E. Müller, Ber. Schweiz. Bot. Ges. **77**: 187-207 (1967) isolated from cultivated soil, Quos, Upper Egypt (Aue & Müller, 1967).
15. *Thielavia aegyptiaca* Moustafa & Abdul-Wahid, Persoonia **14**: 173 (1990) – isolated from cultivated soil, Ismailia (Moustafa & Abdul-Wahid, 1990b).
16. *T. arenaria* Mouch., Bull. Trimestriell Soc. Mycol. France **89**: 295 (1973) – isolated from sandy soil, Kharga Oasis, Western Desert (Mouchacca, 1973a).
17. *T. gigaspora* Moustafa & Abdel-Azeem, Microbiological Research **163**: 441 (2008) – isolated from camel dung, El-Sheikh Zweid, North Sinai (Moustafa & Abdel-Azeem, 2008).
18. *T. microspora* Mouch., Bull. Trimestriell Soc. Mycol. France **89**: 295 (1973) – isolated from sandy soil, Kharga Oasis, Western Desert (Mouchacca, 1973a).
19. *T. subthermophila* Mouch., Bull. Trimestriell Soc. Mycol. France **89**: 295 (1973) – isolated from sandy soil, Kharga Oasis, Western Desert (Mouchacca, 1973a).

##### Lasiosphaeriaceae

20. *Arniium bellum* N. Lundq., Svensk Bot. Tidskr. **68**: 290 (1974) – reported from rodent dung sample collected from ca 60 km South West of Alexandria, in dried-up salt marsh at the coastal sand dunes (Lundqvist, 1974).
21. *Podospora aegyptiaca* N. Lundq., Svensk bot. Tidskr. **64**: 409-420 (1970) – reported from sheep dung, Wadi El-Natron (Lundqvist, 1970).
22. *Zopfiella karachiensis* (S.I. Ahmed & Asad) Guarro, Trans. Br. Mycol. Soc. **91**: 589 (1988) (*Podospora faurelii* Mouch.) – isolated from sandy soil, Kharga Oasis, Western Desert (Mouchacca, 1973b).
23. *Zygopleurage faiyumensis* N. Lundq., Bot. Notiser **122**: 354 (1969) – reported from cow dung, along the Cairo-Faiyum desert road, Kom Aushim 10 km North East of Lake Qarun (Lundqvist, 1969).

### Sordariaceae

- 24. *Neurospora hippopotama* (J.C. Krug, R.S. Khan & Jeng) D. Garcia, Stchigel & Guarro, Mycol. Res. **108**: 1119-1142 (2004) (*Gelasinospora hippopotama* Krug, Khan & Jeng). – isolated from sandy soil, Dakhleh Oasis, Western Desert (Krug *et al.*, 1994a).

### Pezizales

#### Ascobolaceae

- 25. *Ascobolus egyptiacus* Mouch., Travaux dédiés à G. Viennot-Bourgin, Société Française de Phytopathologie, Paris, 236-267 (1977) isolated from sandy soil, Kharga Oasis, Western Desert (Mouchacca, 1977).

#### Pyronemataceae

- 26. *Lasiobolidium aegyptiacum* Moustafa & Ess El-Din, Mycol. Res. **92**: 377 (1989) – isolated from saline soil, Sinai Peninsula (Moustafa & Ess El-Din, 1989b).

### Families with uncertain order position (*incertae sedis*)

#### Eremomycetaceae

- 27. *Rhexothecium globosum* Samson & Mouch., Canad. J. Bot. **53**: 1637 (1975) – isolated by Mouchacca from sandy soil, Kharga Oasis, Western Desert (Samson & Mouchacca, 1975).

#### Pseudeurotiaceae

- 28. *Pseudeurotium desertorum* Mouch. [as '*Pseudoeurotium desertorum*'], Rev. Mycol. **36**: 123-127 (1971)– isolated from reclaimed desert soil, Dakhleh Oasis, Western Desert (Mouchacca, 1971).

### Group II: Species recorded during routine isolations

#### Ascosporogenous yeast taxa

#### Saccharomycetales

##### Metschnikowiaceae

- 29. *Clavispora lusitaniae* Rodr. Mir., Antonie van Leeuwenhoek **45**: 480 (1979) – isolated by Haridy (1994b) from flour and bakery air in El-Minia City.
- 30. *Metschnikowia pulcherrima* Pitt & M.W. Mill., Mycologia **60**: 669 (1968) – isolated by Haridy (1993) from different types of fruits in El-Minia City.

##### Pichiaceae

- 31. *Dekkera intermedia* Van der Walt, Antonie van Leeuwenhoek **30**: 278 (1964) – isolated by Haridy (1992b) from raw milk in El-Minia City.

- 32. *Pichia angusta* (Teun., H.H. Hall & Wick.) Kurtzman, Antonie van Leeuwenhoek **50**: 212 (1984) – isolated by Haridy (1992a, 1994a), as *Hansenula polymorpha* Morais & M.H. Maia, from air of El-Minia City and *Althaea rosea* & *Hibiscus sabdariffa* flowers.

- 33. *P. farinosa* (Lindner) Hansen, Grundlinien zur Systematik der Saccharomyceten. Zentralbl Bakteriologie Parasitenkd, Abt II **12**: 529-538 (1904) – isolated by Haridy (1994b) from bran, flour, dough, and bakery air in El-Minia City.

- 34. *P. guilliermondii* Wick., J. Bact. **92**: 1269 (1966) – isolated by Haridy (1993) from apricot fruits in El-Minia City.

- 35. *P. methanolica* Makig. in Kato *et al.*, J. Gen. Appl. Microbiol., Tokyo **20**:124 (1974) – isolated by Haridy (1993) from guava fruits in El-Minia City.

- 36. *P. membranifaciens* (E.C. Hansen) E.C. Hansen [as '*P. membranaefaciens*'], Comptes Rendus des Travaux du Laboratoire Carlsberg **2**: 143-192 (1888) – isolated by El-Hashimi (1964) from pickling brine solutions.

#### Saccharomycetaceae

- 37. *Kluyveromyces marxianus* (E.C. Hansen) Van der Walt, Bothalia **10**(3): 418 (1971) – isolated by Haridy (1992a, 1994a) from air at El-Minia City and different flowers.

- 38. *Lachancea kluyveri* (Phaff, M.W. Mill. & Shifrine) Kurtzman, FEMS Yeast Res. **4**(3): 240 (2003)– isolated by Haridy (1992a) from air at El-Minia City as *Saccharomyces kluyveri* Phaff, M.W. Mill. & Shifrine.

- 39. *Saccharomyces cerevisiae* Meyen ex E.C. Hansen, Wieg. Arch. IV. Jahrgang, p. 109, Reess. Bot. Unters., p. 81 (1838) – isolated by Moawad (1970) from different soil types.

- 40. *Torulaspota delbrueckii* (Lindner) E.K. Novák & Zsolt, Acta Botanica Hungarica **7**: 113 (1961) – isolated by Haridy (1992a) from air of El-Minia City and by El-Refai & El-Kady (1969), as *Saccharomyces fermentati* (Saito) Lodder & Kreger-van Rij from soil.

#### Saccharomycodaceae

- 41. *Hanseniaspora occidentalis* M.T. Sm., Antonie van Leeuwenhoek **40**: 441 (1974) – isolated by Haridy (1993) from dates fruits in El-Minia City.

- 42. *H. valbyensis* Klöcker, Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Abteilung II, **35**: 375-388 (1912) – isolated by Haridy

(1993) from different types of fruits in El-Minia City.

43. *H. vineae* Van der Walt & Tscheuschner, Trans. Br. Mycol. Soc. **40**: 212 (1957) – isolated by Haridy (1993) from different types of fruits in El-Minia City.

**Genera with uncertain family position (*incertae sedis*)**

44. *Debaryomyces hansenii* (Zopf) Lodder & Kreger, The Yeasts, A Taxonomic Study (Amsterdam), 280 (1952) – isolated by Haridy (1994b) from flour, dough, and bakery air in El-Minia City.
45. *D. vanrijae* (Van der Walt & Tscheuschner) Abadie, Pignal & J.L. Jacob [as 'vanriji'], Bull. Trimest. Soc. Mycol. Fr. **79**: 36 (1963) – isolated by Haridy (1994a) from *Althaea rosea* flowers.
46. *Endomycopsella vini* (Kreger) Arx, Antonie van Leeuwenhoek **46**: 518 (1980) – isolated by Haridy (1994a) from flowers of *Pelargonium zonale*.
47. *Schwanniomyces occidentalis* Klöcker, Medd. Carlsberg Lab., p. 7 (1909) – isolated by Haridy (1992b) from raw milk in El-Minia City.

**Gymnothecial taxa**

**Onygenales**

**Arthrodermataceae**

48. *Arthroderma cajetanum* (Ajello) Ajello, Weitzman, McGinnis & A.A. Padhye, Mycotaxon **25**: 514 (1986) – isolated as *Nannizzia cajetani* Ajello from soil and sewage sludge by hair baits (after El-Abyad, 1997).
49. *A. ciferrii* Varsavsky & Ajello, Riv. Patol. Veg. **4**: 358 (1964) – isolated by Gherbawy (1996) from a mangrove soil at the Red Sea.
50. *A. cuniculi* C.O. Dawson, Sabouraudia **2**: 187 (1962) – isolated by Gherbawy (1996) from a mangrove soil at the Red Sea.
51. *A. curreyi* Berk., Outlines of British Fungology, p. 357 (1860) – isolated by Gherbawy (1996) from a mangrove soil at the Red Sea.
52. *A. gertleri* H. Böhme, Mikosea **10**: 251 (1967) – isolated from sheep hairs (after El-Abyad, 1997).
53. *A. gypseum* (Nann.) Weitzman, McGinnis, A.A. Padhye & Ajello, Mycotaxon **25**: 514 (1986) – isolated as *N. gypsea* (Nann.) Stockdale from soil, sewage sludge, and animal hairs by hair baits (after El-Abyad, 1997).
54. *A. incurvatum* (Stockdale) Weitzman, McGinnis, A.A. Padhye & Ajello,

Mycotaxon **25**: 514 (1986) – isolated as *Nannizzia incurvata* Stockdale from soil, sewage sludge, and animal hairs by hair baits (after El-Abyad, 1997).

55. *A. lenticulare* Pore, G.C. Tsao & Plunkett, Mycologia **57**: 970 (1965) – isolated from male and female hair, finger tips and finger nails (after El-Abyad, 1997).
56. *A. obtusum* (C.O. Dawson & Gentles) Weitzman, McGinnis, A.A. Padhye & Ajello, Mycotaxon **25**: 514 (1986) – isolated as *Nannizzia obtusa* C.O. Dawson & Gentles from children noses, dog and donkey hairs by hair baits (after El-Abyad, 1997).
57. *A. persicolor* (Stockdale) Weitzman, McGinnis, A.A. Padhye & Ajello, Mycotaxon **25**: 514 (1986). Isolated as *Nannizzia persicolor* Stockdale from Wadi Qena soil by hair baits (after El-Abyad, 1997).
58. *A. quadrifidum* C.O. Dawson & Gentles, Sabouraudia **1**: 55 (1961) – isolated from children noses, goat & sheep cloven-hooves, and sewage sludge by hair baits (after El-Abyad, 1997).
59. *A. racemosum* (Rush-Munro, J.M.B. Sm. & Borelli) Weitzman, McGinnis, A.A. Padhye & Ajello, Mycotaxon **25**: 514 (1986) – isolated as *Nannizzia racemosa* Rush-Munro, J.M.B. Sm. & Borelli. from Ibrahimia canal mud, guinea pigs and cats hairs by hair baits (after El-Abyad, 1997).
60. *A. simii* Stockdale, D.W.R. Mackenzie & Austwick, Sabouraudia **4**: 112 (1965) – isolated from goat and sheep hairs, male and female toe nails by hair baits (after El-Abyad, 1997).
61. *A. tuberculatum* Kuehn, Mycopath. Mycol. Appl. **13**: 190 (1960) – isolated by Abdel-Mallek *et al.* (1988) from floor dust.
62. *A. uncinatum* C.O. Dawson & Gentles, Sabouraudia **1**: 55 (1961) – isolated from dog and donkey hairs (after El-Abyad, 1997).
63. *Ctenomyces serratus* Eidam, Beitr. Biol. Pfl. **3**: 274 (1880) – isolated from goat hairs, chickens and pigeons claws by hair baits (after El-Abyad, 1997).

**Gymnoascaceae**

64. *Arachniotus aurantiacus* (Kamyschko) Arx, Persoonia **6**(3): 373 (1971) isolated from sandy soil (after El-Abyad, 1997).
65. *A. flavoluteus* Kuehn & Orr Mycologia **51**(6): 864 (1961) isolated from sandy soil (after El-Abyad, 1997).
66. *A. punctatus* (B.G. Dutta & G.R. Ghosh) Arx, Persoonia **6**(3): 373 (1971), isolated

- as *Gymnoascus punctatus* (B.G. Dutta & G.R. Ghosh) Arx from sandy soil (after El-Abyad, 1997).
- ➔ 67. *A. ruber* (Tiegh.) J. Schröt., Cohn's Krypt.-Fl. Schles. (Breslau) 3(2): 210 (1893) – isolated as *Gymnoascus ruber* Tiegh. by Abdel-Azeem (2003) from camel and donkey dung.
68. *Gymnascella citrina* (Massee & E.S. Salmon) G.F. Orr, G.R. Ghosh & K. Roy, Mycologia 69: 134 (1977) – isolated by Abdel-Hafez, A. *et al.* (1990b), as *Arachniotus citrinus* Massee & E.S. Salmon from animal horns and hooves and from goat cloven, hooves, horns, and sewage sludge by hair baits (after El-Abyad, 1997).
- ➔ 69. *G. confluens* (Sartory & Bainier) Currah, Mycotaxon 24: 75 (1985) isolated as *Gymnoascus desertorum* (Moustafa) Arx by Abdel-Azeem (2003) from camel and donkey dung.
70. *G. dankaliensis* (Castell.) Currah, Mycotaxon 24: 77 (1985) – as *Arachniotus dankaliensis* (Castell.) J.F.H. Beyma from cultivated soil at Assiut (Abdel-Fattah *et al.*, 1982), from saline soil, Sinai Peninsula by Ess El-Din (1988), and from dung (Abdel-Azeem 2003), and as *Pseudoarachniotus terrestris* Thirumalachar & Mathur from rabbit claws (Moharram & Abdel-Gawad, 1989).
71. *G. hyalinospora* (Kuehn, G.F. Orr & G.R. Ghosh) Currah, Mycotaxon 24: 84 (1985) isolated by Mouchacca (1972 at CBS) from desert soil and as *Narasimhella hyalinospora* (Kuehn, G.F. Orr & G.R. Ghosh) Arx by Ibrahim (1999) and by Abdel-Azeem (2003) from cultivated soil
72. *Gymnoascus reessii* Baran., Bot. Ztg. 158 (1872) – isolated by Moharram *et al.* (1990) from buffalo hair and reported by Abdel-Azeem (2003) on dung.
- Onygenaceae**
73. *Amauroascus aureus* (Eidam) Arx, Persoonia 6: 375 (1971) – isolated by Essa (1984 at CBS) from a cultivated soil.
74. *A. niger* J. Schröt., in Cohn, Krypt.-Fl. Schlesien 3(2): 211 (1893) – isolated by Youssef *et al.* (1989) from different localities in Ismailia Governorate.
75. *Aphanoascus fulvescens* (Cooke) Apinis, Mycopathol. Mycol. Appl. 35: 99 (1968) – isolated by Gherbawy (1996) from mangrove soil at the Red Sea and by Abdel-Hafez, S. *et al.* (2000) from desert soil.
76. *A. terreus* (H.S. Randhawa & R.S. Sandhu) Apinis, Mycopathol. Mycol. Appl. 35: 99 (1968) isolated by Gherbawy (1996) from mangrove soil at the Red Sea and by Abdel-Hafez, S. *et al.* (2000) from desert soil.
77. *Apinisia queenlandica* Apinis & R.G. Rees, Trans. Brit. Mycol. Soc. 67: 524 (1976) – isolated by Gherbawy (1996) from a mangrove soil at the Red Sea.
78. *Auxarthron brunneum* (J.G. Kühn) G.F. Orr & Kuehn, Can. J. Bot. 41: 1439 (1963) isolated by Besada & Yusef (1968) from sandy loam soil.
79. *A. thaxteri* (J.G. Kühn) G.F. Orr & Kuehn, Can. J. Bot. 41: 1439 (1963) isolated by Yusef (1963 at IMI) from soil.
80. *A. umbrinum* (Boud.) G.F. Orr & Plunkett, Can. J. Bot. 41: 1446 (1963) – isolated by Yusef (1962 at IMI) from soil.
81. *A. zuffianum* (Morini) G.F. Orr & Kuehn, Can. J. Bot. 41: 1439 (1963) – isolated by Mouchacca (1975 at IMI) from desert soil and by Abdel-Fattah (1977 at CBS) from cultivated soil using hair baiting technique.
- Pseudothecial taxa**
- Mycosphaerellales**
- Mycosphaerellaceae**
82. *Mycosphaerella cruenta* Latham, Mycologia 26: 516 (1934) – isolated by Kararah (1969 at IMI) from *Vigna unguiculata*.
83. *M. fragariae* (Tul.) Lindau, Die Natürlichen Pflanzenfamilien 1(1): 424 (1897) – isolated by Ahmed (1975 at IMI) from *Fragaria vesca*.
84. *M. tassiana* (de Not.) Johanson, Öfersigt af Konglelige Vetenskaps-Akademiens Förhandlingar 9: 167 (1884) – isolated by Abdel-Hafez, S. *et al.* (1995) from plant parts.
- Pleosporales**
- Pleosporaceae**
85. *Cochliobolus australiensis* (Tsuda & Ueyama) Alcorn, Mycotaxon 16: 373 (1983) – isolated by Moubasher *et al.* (1985) from desert soil.
86. *C. bicolor* A.R. Paul & Parbery, Trans. Brit. Mycol. Soc. 49: 386 (1966) – isolated by El-Said & Abdel-Hafez (1995) from air above banana fields.
87. *C. geniculatus* R.R. Nelson, Mycologia 56: 777 (1964) – isolated from saline sandy soil (after El-Abyad, 1997).
88. *C. hawaiiensis* Alcorn, Trans. Brit. Mycol. Soc. 70: 64 (1978) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.

89. *C. intermedius* R.R. Nelson, Mycologia 52: 775 (1960) isolated by Abdel-Hafez & El-Said (1997) from pepper and cinnamon.
90. *C. lunatus* R.R. Nelson & Haasis, Mycologia 56: 316 (1964) isolated by Yusef (1959 at IMI) and Moubasher & Moustafa (1970) from cultivated soil.
91. *C. sativus* (S. Ito & Kurib.) Drechsler ex Dastur, Indian J. Agric. Res. 12: 733 (1942) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.
92. *C. setariae* (S. Ito & Kurib.) Drechsler ex Dastur, Indian J. Agric. Res. 12: 733 (1942) – isolated by Darwich (1965 at IMI) from cultivated soil and by El-Said & Abdel-Hafez (1995) from air above banana fields.
93. *C. spicifer* R.R. Nelson, Mycologia 56: 196 (1964) – isolated by Yusef (1959 at IMI) from cultivated soil and by Moubasher & Moustafa (1970) from cultivated soil.
94. *C. tuberculatus* Sivan., Trans. Brit. Mycol. Soc. 84: 548 (1985) – isolated by Moubasher & Mazen (1972) from cultivated soil.
95. *Lewia infectoria* (Fuckel) M.E. Barr & E.G. Simmons, Mycotaxon 25: 296 (1986) – isolated by Abdel-Fattah *et al.* (1977a), as *Pleospora infectoria* Fuckel, from salt marsh soil and by Moubasher & Abdel-Hafez (1978) from cultivated soil and isolated from sandy soil (after El-Abyad, 1997).
96. *Pleospora herbarum* (Pers.) Rabenh., Comm. Soc. Crittog. Ital. 1: 217 (1863) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil and by Abdel-Azeem (2003) from stored cereals.
97. *P. rubelloides* (Plowr. ex Cooke) J. Webster, Trans. Br. Mycol. Soc. 40: 183 (1957) – isolated by Abou El-Seood (1968) from *Solanum nigrum* fruits at Assiut.
98. *P. tardu* E.G. Simmons, Sydowia 38: 291 (1986) – isolated by Moubasher *et al.* (1985) from desert soil.
99. *Pseudocochliobolus pallescens* Tsuda & Ueyama, Memoirs of the College of Agriculture, Kyoto Imperial University 122: 86 (1983) – isolated by Abdel-Hafez & El-Said (1997) from rosemary as *Cochliobolus pallescens*.
100. *P. verruculosus* Tsuda & Ueyama, Mycologia 74: 565 (1982) – isolated by Yusef (1959 at CBS), as *Cochliobolus verruculosus* (Tsuda & Ueyama) Sivan., from cultivated soil.
101. *Pyrenophora seminiperda* (Brittlebank & B.D. Adam) Shoemaker, Canad. J. Bot. 44: 1451 (1966) – isolated by Abdel-Hafez (1968 in MUCL) from *Gossypium*.
102. *Setosphaeria holmii* (Luttr.) K.J. Leonard & Suggs, Mycologia 66: 295 (1974) – isolated by Abdel-Fattah *et al.* (1977b) from phyllosphere of broad bean cultivated in the Oases.
103. *S. pedicellata* (R.R. Nelson) K.J. Leonard & Suggs, Mycologia 66: 295 (1974) – isolated by Hussein (at IMI) from *Oryza sativa*.
104. *S. rostrata* K.J. Leonard, Mycologia 68: 409 (1976) – isolated by Moubasher (1968 at IMI) from cultivated soil and by Abdel-Fattah *et al.* (1977a) from salt marsh soil.
- Sporormiaceae**
105. *Preussia fleischhakkii* (Auersw.) Cain, Canad. J. Bot. 39: 1640 (1961) – isolated by Naguib & Mouchacca (1971), as *Sporormia fasciculata* C.N. Jensen, from desert soil.
106. *Pycnidophora dispersa* Clum, Mycologia 47: 900 (1956) – isolated by Abdul-Wahid (1990) from a cultivated soil at Ismailia.
107. *Sporormiella chaetomioides* (Griffiths) S.I. Ahmed & Cain, Can. J. Bot. 50: 436, (1972) – isolated from sandy soil (after El-Abyad, 1997).
108. *S. intermedia* (Auersw.) S.I. Ahmed & Cain ex Kobayasi, Bull. Natn. Sci. Mus., Tokyo 12: 339 (1969) – isolated by Besada & Yusef (1968), as *Preussia intermedia* (Auersw.) Ahmed, from cultivated soil.
109. *S. minima* (Auersw.) S.I. Ahmed & Cain, Pakist. J. Scient. Ind. Res. 12(3): 241, (1970) – isolated by Abdel-Azeem (2003), as *Preussia minima* (Auersw.) Arx, from camel and donkey dung, and by Besada & Yusef (1968) and Ibrahim (1994), as *Sporormia minima* Auersw., from cultivated soil.
110. *S. minimoides* S.I. Ahmed & Cain, Can. J. Bot. 50: 450 (1972) – isolated by Krug & Khan (1999), as *Preussia minimoides* (S.I. Ahmed & Cain) Valldos. & Guarro, from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
111. *Westerdykella multisporea* (Saito & Minoura) Cejp & Milko, Česká Mykol. 18: 83 (1964) – isolated by Besada & Yusef (1968), as *Pseudeurotium multisporeum* (Saito & Minoura ex Cain) Stolk, from cultivated soil.
112. *W. nigra* (Routien) Arx, Proc. K. Ned. Akad. Wet., Ser. C, Biol. Med. Sci. 76:

294 (1973) isolated by Abdul-Wahid (1990), as *Preussia nigra* (Routien) Cain, from a cultivated soil at Ismailia.

#### Venturiaceae

113. *Venturia carpophila* E.E. Fisher, Trans. Brit. Mycol. Soc. **44**: 337 (1961) isolated by Moharram *et al.* (1995) from various substrates.

#### Cleistothecial taxa

#### Eurotiales

#### Trichocomaceae

114. *Byssosclamyces fulva* Oliver & G. Sm., J. Bot., London, London **71**: 196 (1933) – isolated by El-Morsy (1993) from water in Dakahlia province.
115. *B. nivea* Westling, Svensk Bot. Tidskr. **3**: 134 (1909) isolated by Halal (1983 at IMI) and Abdel-Azeem (2003) from cultivated soil.
116. *Emericella aurantiobrunnea* (G.A. Atkins, Hindson & A.B. Russell) Malloch, Can. J. Bot. **50**(1): 61 (1972)- isolated by Ismail *et al.* (1995) from various substrates in Egypt.
117. *E. bicolor* M. Chr. & States, Mycologia **70**(2): 337 (1978)- isolated by Ismail *et al.* (1995) from various substrates in Egypt.
118. *E. fruticulosa* (Raper & Fennell) Malloch & Cain, Canad. J. Bot. **50**: 61 (1972) isolated by Samson & Mouchacca (1974) from desert soil, Kharga Oasis.
119. *E. nidulans* var. *acristata* Subram., Curr. Sci. **41**: 758 (1972) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.
120. *E. nidulans* var. *dentata* Subram., Curr. Sci. **41**: 758 (1972) – isolated by Moubasher *et al.* (1985) from desert soil.
121. *E. nidulans* var. *echinulata* Godeas, Mycopath. Mycol. Appl, **46**(3): 193 (1972) – isolated by Ibrahim (1999) from cultivated soil.
122. *E. nidulans* var. *lata* (Thom & Raper) Subram., Curr. Sci. **41**: 758 (1972) – isolated by Moubasher & Abdel-Hafez (1978) and Moubasher *et al.* (1981a) from cultivated soil and Abdel-Azeem (2003) from desert soil.
123. *E. nidulans* var. *nidulans* (Eidam) Vuill., Compte Rendu Hebdomadaire des Sciences de l'Academie des Sciences, Paris **184**: 137 (1927) – isolated by Moubasher & Moustafa (1970) from cultivated soil.
124. *E. parvathecica* (Raper & Fennell) Malloch & Cain [as '*parvithecica*'], Can. J. Bot. **50**(1): 62 (1972) - isolated by Ismail *et al.* (1995) from various substrates in Egypt.
125. *E. quadrilineata* (Thom & Raper) C.R. Benj., Mycologia **47**: 680 (1955) – isolated by Moubasher & Moustafa (1970) from cultivated soil.
126. *E. striata* (J.N. Rai, J.P. Tewari & Mukerji) Malloch & Cain, Can. J. Bot. **50**(1): 62 (1972) - isolated by Ismail *et al.* (1995) from various substrates in Egypt.
127. *E. sublata* Y. Horie, Trans. Mycol. Soc. Japan **20**(4): 481 (1979) - isolated by Ismail *et al.* (1995) from various substrates in Egypt.
128. *E. rugulosa* (Thom & Raper) C.R. Benj., Mycologia **47**: 680 (1955) – isolated by Moubasher & Moustafa (1970) from cultivated soil.
129. *E. unguis* Malloch & Cain, Can. J. Bot. **50**: 62 (1972)- isolated by Ismail *et al.* (1995) from various substrates in Egypt.
130. *E. varicolor* Berk. & Broome, Introduction to Cryptogamic Botany, p. 340 (1857) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.
131. *E. violacea* (Fennell & Raper) Malloch & Cain, Canad. J. Bot. **50**: 62 (1972) – isolated by El-Kady & Abdel-Hafez (1981) from barley grains.
132. *Eupenicillium baarnense* (J.F.H. Beyma) Stolk & D.B. Scott, Persoonia **4**: 401, (1967) – isolated from cultivated soil (after El-Abyad, 1997).
133. *E. brefeldianum* (B.O. Dodge) Stolk & D.B. Scott, Persoonia **4**: 400 (1967) – isolated by Moubasher & Moustafa (1970) from cultivated soil.
134. *E. cinnamopurpureum* D.B. Scott & Stolk, Antonie van Leeuwenhoek **33**: 308, (1967) – isolated by Moubasher *et al.* (1990a) from harvest dust.
135. *E. euglaucum* (J.F.H. Beyma) Stolk & Samson, Stud. Mycol. **23**: 90 (1983) – isolated by Moubasher *et al.* (1990b) from Nile water by cellulose baits.
136. *E. javanicum* (J.F.H. Beyma) Stolk & D.B. Scott, Persoonia **4**: 398 (1967) *s. lat.* – isolated by Moubasher *et al.* (1985) from desert soil and by Abdel-Azeem (2003) from a cultivated soil at Ismailia.
137. *E. javanicum* var. *javanicum* – isolated by Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
138. *E. levitum* (Raper & Fennell) Stolk & D.B. Scott, Persoonia **4**: 402 (1967) – isolated by Krug & Khan (1999), as *E. javanicum* var. *levitum* (Raper & Fennell) Stolk & Samson, from soil sample

- collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
139. *E. meridianum* D.B. Scott, Mycopathol. Mycol. Appl. **36**: 12 (1968) isolated by Ismail *et al.* (2002) from air in Western Desert.
140. *E. shearti* Stolk & D.B. Scott, Persoonia **4**: 396-398 (1967) isolated by Moubasher *et al.* (1985) from sandy soil.
141. *Eurotium amstelodami* L. Mangin, Ann. Sci. Nat., Bot., ser. 9, **10**: 360 (1909) – isolated by Abdel-Hafez, S. *et al.* (1977) from salt marsh soil and by Abdel-Azeem (2003) from salt marsh soil, desert soil, compost, stored cereals.
142. *E. athecium* (Raper & Fennell) Arx, The genera of fungi sporulating in pure culture, p. 91 (1974) – isolated from leaf surface and desert soil by Abdel-Hafez, S. *et al.* (1995, 2000).
143. *E. chevalieri* L. Mangin, Ann. Sci. Nat., Bot., Ser. 9, **10**: 360 (1909) – isolated by Moubasher & Abdel-Hafez (1978) from soil and by Abdel-Azeem (2003) from compost, desert and cultivated soil.
144. *E. cristatum* (Raper & Fennell) Malloch & Cain, Canad. J. Bot. **50**: 64 (1972) – isolated by Abdel-Hafez & El-Said (1997), as *Eurotium intermedium* Blaser, from cinnamon.
145. *E. halophilicum* C.M. Chr., Papav. & C.R. Benj., Mycologia **51**: 636 (1959) – isolated by Abdel-Hafez, S. *et al.* (2000) from desert soil.
146. *E. herbariorum* (F.H. Wigg.) Link, Ges. Naturf. Freunde Berlin Mag. Neuesten Entdeck. Gesammten Naturk. **3**: 31 (1809) – isolated by Ess El-Din (1988) and Abdel-Azeem (2003) from saline soil collected from Sinai Peninsula.
147. *E. montevidense* (Talice & J.A. Mackinnon) Malloch & Cain, Canad. J. Bot. **50**: 64 (1972) – isolated by Abdel-Hafez, A. *et al.* (1990a) and Abdel-Hafez, S. *et al.* (1990) from air dust particles.
148. *E. repens* de Bary, Abhandl. Senckenberg. Naturforsch. Ges. **7**: 379 (1870) Isolated by Moubasher *et al.* (1990 c) from cultivated and salt marsh soils.
149. *E. rubrum* König, Spieck & Bremer, Z. Untersuch. Nahrungs- Gen.smittel **4**: 726, (1901) – isolated by Moubasher *et al.* (1990c) from cultivated, desert, and salt marshes soil and by Abdel-Azeem (2003) from compost and salt marsh soil.
150. *E. tonophilum* Ohtsuki, Bot. Mag. Tokyo **75**: 438 (1962) – isolated by Abdel-Hafez, S. *et al.* (1995) from leaf surface of *Saccharum officinarum*.
151. *Fennellia flavipes* B.J. Wiley & E.G. Simmons, Mycologia **65**: 937 (1973) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.
152. *F. nivea* (B.J. Wiley & E.G. Simmons) Samson, Stud. Mycol. **18**: 5 (1979) isolated by Moubasher *et al.* (1990c) from cultivated, desert, salt marshes soil; isolated by El-Said & Abdel-Hafez (1995), as *Emericella nivea* Wiley & Simmons, from air above banana fields.
153. *Neosartorya fischeri* (Wehmer) Malloch & Cain var. *fischeri*. Canad. J. Bot. **50**: 2621 (1972) – isolated by Abdel-Hafez, S. *et al.* (1977) from salt marsh soil and by Moubasher & Abdel-Hafez (1978) from cultivated soil.
154. *N. fischeri* var. *glabra* Fennell & Raper, Can. J. Bot. **50**: 2621 (1973) – isolated by Abdul-Wahid (1990), Ibrahim (1999), and Abdel-Azeem (2003) from cultivated soil.
155. *N. spinosa* (Raper & Fennell) Kozak., Mycol. Pap. **161**: 58 (1989) – isolated by Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
156. *Talaromyces byssochlamydoides* Stolk & Samson, Stud. Mycol. **2**: 45 (1972) – isolated by Mouchacca (1975 at CBS) from desert soil.
157. *T. flavus* (Klöcker) Stolk & Samson, Stud. Mycol. **2**: 45 (1972) – isolated by Fravel & Adams (1986) from mineral soil collected from Sohag by M. E. El-Gammal.
158. *T. gossypii* Pitt, The Genus *Penicillium* (London): 500 (1980) [1979] – isolated by Hussien (1997) from wheat flour samples from Assiut.
159. *T. helicus* (Raper & Fennell) C.R. Benj., Mycologia **47**: 684 (1955) – isolated by Abdul-Wahid (1990) from cultivated soil.
160. *T. luteus* (Zukal) C.R. Benj., Mycologia **47**: 684 (1955) – isolated from cultivated soil and buffalo manure by hair baits (after El-Abyad, 1997).
161. *T. stipitatus* (Thom) C.R. Benj., Mycologia **47**: 684 (1955) – isolated by El-Hissy *et al.* (1990) from High Dam Lake and by Ibrahim (1999) from cultivated soil.
162. *T. thermophilus* Stolk, Antonie van Leeuwenhoek **31**: 268 (1965) – isolated by Moubasher *et al.* (1981b, c) from cultivated soil, probably as *Penicillium dupontii* Griffin & Mautlanc.
163. *T. trachyspermus* (Shear) Stolk & Samson, Stud. Mycol. **2**: 32 (1972) – isolated by Sabet (1939), as *Penicillium*



*spiculisporum* Lehman, from cultivated soil at Aga, Delta Region.

164. *T. ucrainicus* Udagawa, Stud. Mycol. 2: 34 (1972) – isolated by Hussien (1997) as *T. panasenkoi* Pitt from cultivated soil.

165. *T. wortmanii* (Klöcker) C.R. Benj., Mycologia 47: 684 (1955) – isolated by Moubasher & Moustafa (1970) from cultivated soil and by Mouchacca & Joly (1974) from desert soil.

#### Thermoascaceae

166. *Thermoascus aurantiacus* Miede, Die Selbsterhitzung des Heus, Jena, p. 70 (1907) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.

167. *T. thermophilus* (Sopp) Arx, The genera of fungi sporulating in pure culture, p. 94 (1974) – isolated by Moharram *et al.* (1990) from buffalo hair.

#### Microascales

##### Microascaceae

➔ 168. *Kernia nitida* (Sacc.) Nieuwl., Am. Midl. Nat. 4: 379 (1961) – reported by Abdel-Azeem (2003) on camel, donkey, and goat dung.

169. *Lophotrichus bartlettii* (Masse & E.S. Salmon) Malloch & Cain, Canad. J. Bot. 49: 866 (1971) – isolated by Mouchacca (1975 at CBS) from desert soil.

➔ 170. *L. plumbescens* Morinaga, Minoura & Udagawa, Trans. Mycol. Soc. Japan 19: 140 (1978) – isolated by Abdel-Azeem (2003) from dung and stored cereals.

171. *Microascus albonigrescens* (Sopp) Curzi, Boll. Staz. Patol. Veg. Roma 11: 60, (1931) – isolated by Moubasher (1968 at IMI) from cultivated soil and by Abdel-Azeem (2003) from dung and cultivated soil.

172. *M. cinereus* Curzi, Boll. Staz. Patol. Veg. Roma 11: 60 (1931) – isolated by Besada & Yusef (1968) from cultivated soil, Abdel-Hafez, S. *et al.* (1989a) from sorghum dust, and Abdel-Azeem (2003) from desert and cultivated soil.

173. *M. cirrosus* Curzi, Boll. Staz. Patol. Veg. Roma 10: 308 (1930) – isolated from sandy soil (after El-Abyad, 1997).

174. *M. decorticatus* C. Ram, Nova Hedwigia 21: 226 (1971) – isolated from sandy soil (after El-Abyad, 1997).

175. *M. desmosporus* (Lechmere) Curzi, Boll. Staz. Patol. Veg. Roma 11: 60 (1931) – isolated by Moharram & Abdel-Gawad (1989) from rabbit claws.

176. *M. manginii* (Loubière) Curzi, Boll. Staz. Patol. Veg. Roma 11: 60 (1931) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soils.

177. *M. trigonosporus* C.W. Emmons & B.O. Dodge, Mycologia 23: 317 (1931) – isolated by Besada & Yusef (1968) from cultivated soil and by Moubasher *et al.* (1990a) from combined harvester sorghum dust and by Abdel-Azeem (2003) from dung, cultivated and salt marsh soil.

178. *Pithoascus nidicola* (Masse & E.S. Salmon) Arx, Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci., 76: 292 (1973) – isolated by Fadl (1985 at IMI), as *Pithoascus intermedius* (C.W. Emmons & B.O. Dodge) Arx, from *Cucumis melo*.

179. *Pseudallescheria boydii* (Shear) McGinnis, A.A. Padhye & Ajello, Mycotaxon 14: 97 (1982) – isolated by Abdel-Fattah *et al.* (1982) from soil by animal hair baits.

180. *P. ellipsoidea* (Arx & Fassat.) McGinnis, A.A. Padhye & Ajello, Mycotaxon 14: 97 (1982) – isolated from desert soil and identified by Arx (1985 at CBS).

#### Perithecial taxa

##### Hypocreales

##### Hypocreaceae

181. *Hypomyces chrysospermus* Tul. & C. Tul., Ann. Sci. Nat., Bot. 13: 16 (1860) – isolated by Moubasher *et al.* (1982) as *Apocrea chrysosperma* from broad bean straw and by Abdel-Hafez, S. *et al.* (1989b) from desert soil.

182. *Sphaerostilbella aureonitens* (Tulasne) Seifert, Samuels & W. Gams, Stud. Mycol. 27: 145 (1985) – isolated from sandy soil (after El-Abyad, 1997).

##### Ceratostomataceae

183. *Melanospora brevirostris* (Fuckel) H. Öhn., Sitzungsber. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 123: 94 (1914) – isolated by Shehata (1972 at IMI) from *Narcissus* sp. and by Abdel-Azeem (2003) from donkey dung.

➔ 184. *M. fallax* Zukal, Ascomycetes, p. 28 (1889) – isolated by Abdel-Azeem (2003) from donkey dung.

185. *M. zamiae* Corda, Icon. Fung. (Prague) 1: 24 (1837) – isolated by Abdel-Sater (1990) from desert soil and by Ibrahim (1994) and Abdel-Azeem (2003) from cultivated soil.

##### Nectriaceae

186. *Gibberella acuminata* C. Booth, Genus *Fusarium*, p. 161 (1971) – isolated by Abdel-Sater (1990) from cultivated soil.

187. *G. avenacea* R.J. Cook, Phytopathology 57: 735 (1967) – isolated by El-Said &

- Abdel-Hafez (1995) from air above banana fields.
188. *G. baccata* (Wallr.) Sacc., *Michelia* 1: 317 (1878) isolated by Sabet (1935) from cultivated soil.
189. *G. fujikuroi* (Sawada) Wollenw. var. *fujikuroi*, Report Hokkaido Prefect. Agric. Exp. Station 27: 28 (1931) isolated by Moubasher & Moustafa (1970) from cultivated soil.
190. *G. intricans* Wollenw., *Fusaria Autographica Delineata*, Edn 2, no. 810 (1930) - isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.
191. *G. pulcaris* (Fr.) Sacc., *Michelia* 1(1): 43 (1877) isolated by El-Faham (1971 at IMI), as *G. cyanogena* (Desmazieres) Sacc., from *Lycopersicon esculentum*.
192. *G. zeae* (Schwein.) Petch, *Ann. Mmycol.* 34: 260 (1936) isolated by El-Said & Abdel-Hafez (1995) from air above banana fields.
193. *Nectria haematococca* Berk. & Broome, *J. Linn. Soc., Bot.* 14(74): 116 (1873) isolated by Moubasher & Moustafa (1970) from cultivated soil, Gherbawy & Prillinger (2000) from root surface, and Abdel-Hafez, S. *et al.* (2000) from desert soil.
194. *N. inventa* Pethybr., *Trans. Br. Mycol. Soc.* 6: 104 (1919) isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.
195. *Neocosmospora vasinfecta* E.F. Sm., *Bulletin of the U.S. Department of Agriculture* 17: 45 (1899) isolated by Abdul-Wahid (1990), Ibrahim (1999), and Abdel-Azeem (2003) from cultivated soil.

**Genera with uncertain family position (*incertae sedis*)**

196. *Emericellopsis humicola* (Cain) Cain ex Grosklags & Swift, *Mycologia* 49: 306 & 307 (1957) isolated by Kowalik & Sadurska (1973) from papyrus samples of Cairo museum and from goat hairs (after El-Abyad, 1997).
197. *E. minima* Stolk, *Trans. Brit. Mycol. Soc.* 38: 419 (1955) - isolated by Kowalik & Sadurska (1973) from papyrus samples of Cairo museum, by Abdel-Sater (1990) from desert soil, and by Abdul-Wahid (1990), as *E. salmosynnemata* Grosklags & Swift, from cultivated soil.
198. *Melanopsamma pomiformis* (Pers.) Sacc., *Michelia* 1(3): 347 (1878) isolated by El-Said & Abdel-Hafez (1995) from air above banana fields

**Sordariales**

**Chaetomiaceae**

199. *Achaetomium fusisporum* J.N. Rai & H.J. Chowdhery, *J. Indian Bot. Soc.* 52: 310 (1973) isolated by Ibrahim (1999) from cultivated soil at Ismailia.
- ➔200. *A. macrosporum* J.N. Rai, Wadhvani & J.P. Tewari, *Indian Phytopath.* 23(1): 54 (1970) - isolated by Abdel-Azeem (2009) from desert soil in Saint Katherine.
201. *Chaetomidium fimeti* (Fuckel) Zopf, *Syll. Fung. (Abellini)* 1: 39 (1882) - isolated as *Chaetomium fimeti* Fuckel from sandy soil (after El-Abyad, 1997).
202. *Chaetomium affine* Corda, *Icon. fung. (Prague)* 4: 37, tab. 8, fig. 101 (1840) - isolated by Sabet (1935) from cultivated soil.
203. *C. angustum* Chivers, *Mem. Torrey bot. Club* 14: 168 (1915) isolated by Kowalik & Sadurska (1973) from papyrus samples collected from Cairo museum.
204. *C. atrobrunneum* L.M. Ames, *Mycologia* 41: 641 (1949) - isolated by Besada & Yusef (1968) from cultivated soil and by Abdel-Azeem (2003) from a salt marsh soil; isolated by Rushdi (1969 at IMI), as *C. fusisporale* J.N. Rai & Mukerji, from cultivated soil,
205. *C. aureum* Chivers, *Proc. Amer. Acad. Arts* 48(4): 86 (1912) - isolated from sandy soil (after El-Abyad, 1997).
206. *C. bostrychodes* Zopf, *Abhandl. Botan. Ver. de Prov. Brandenburg* 19: 173 (1877) - isolated by Sabet (1939), Moubasher & Abdel-Hafez (1978), and Abdel-Azeem (2003) from cultivated soil.
207. *C. brasiliense* Bat. & Pontual, *Bol. Secr. Agric. Ind. Com. Pernambuco* 15: 70 (1948) - isolated by Abdel-Azeem (2003) from desert soil
208. *C. britannicum* L. M. Ames, *Monograph of the Chaetomiaceae (U.S. Army Research and Development Service)*: 16 (1963) - isolated by Moharram *et al.* (1995) from different substrates.
209. *C. caprinum* Bainier, *Bull. Soc. mycol. Fr.* 25(4): 223 (1910) - isolated by Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
210. *C. circinatum* Chivers, *Mem. Torrey bot. Club* 14: 168 (1915) - Isolated by Abdul-Wahid (1990) from cultivated soil collected from Ismailia, and Abdel-Hafez, A. *et al.* (1991) from mangrove soil at the Red Sea.
211. *C. cochlioides* Palliser [as '*cochliodes*'], *N. Amer. Fl. (New York)* 3(1): 61 (1910) -

- isolated by Sabet (1935) from cultivated soil.
212. *C. convolutum* Chivers, Mem. Torrey Bot. Club **14**: 173 (1915) – isolated by Khouzau (1983 at IMI) from sandy soil and by Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
213. *C. crispatum* (Fuckel) Fuckel, Jahrb. Nassauischen Vereins Naturk. **23-24**: 90 (1870) isolated as *C. tortile* Bain. from sandy soil (after El-Abyad, 1997).
214. *C. cuniculorum* Fuckel, Jahrb. Nassauischen Vereins Naturk. **23-24**: 89 (1870) isolated from dung (after El-Abyad, 1997).
215. *C. cymbiforme* Lodha, J. Indian Bot. Soc. **43**: 127 (1965) isolated from sandy soil (after El-Abyad, 1997).
216. *C. elatum* Kunze, Deutschlands Schwämme **8**: 3, no. 184 (1818) isolated by Kowalik & Sadurska (1973) from papyrus samples at Cairo Museum.
217. *C. fusiforme* Chivers, Proc. Amer. Acad. Arts & Sci. **48**: 87 (1912) – isolated by Kowalik & Sadurska (1973) from papyrus samples of Cairo museum.
218. *C. gangligerum* L.M. Ames, Mycologia **41**: 637 (1949) isolated by Abdul-Wahid (1990) from a cultivated soil at Ismailia.
219. *C. globosum* Kunze, Mykologische Hefte **1**: 16 (1817) isolated by Sabet (1935), Moubasher & Abdel-Hafez (1978), as *C. olivaceum* Cooke & J. B. Ellis and Abdel-Azeem (2003) from cultivated soil.
220. *C. gracile* Udagawa, J. Gen. Appl. Microbiol. **6**: 235 (1960) – isolated by Ibrahim (1994) and by Abdel-Azeem (2003) from cultivated soil.
221. *C. humadae* (Udagawa) Arx, Proc. Indian Acad. Sci., Pl. Sci. **94**: 343 (1985) – isolated by El-Morsy (2000) from endorhizosphere of halophytic plants.
- 222. *C. hexagonosporum* A. Carter & Malloch, Can. J. Bot. **60**: 1249 (1982) isolated by Abdel-Azeem (2003) from a salt marsh soil in Sinai Peninsula.
223. *C. homopilatum* Omvik, Mycologia **47**: 748 (1955) isolated from sandy and saline sandy soil (after El-Abyad, 1997).
224. *C. indicum* Corda, Icon. Fung. (Prague) **4**: 38 (1840) isolated by Kowalik & Sadurska (1973) from papyrus samples of Cairo museum.
225. *C. jodhpurensis* Lodha, J. Indian Bot. Soc. **43**: 131 (1964) – isolated by Abdel-Hafez & El-Said (1997) from pepper and cinnamon.
226. *C. lucknowense* J.N. Rai & J.P. Tewari, Can. J. Bot. **40**: 1379 (1963) isolated by Müller (1971 at IMI) from a cultivated soil.
227. *C. madrasense* Natarajan, Proc. Indian Acad. Sci., Pl. Sci., **74**: 255 (1971) – isolated by Abdel-Hafez (1986 at IMI) from cultivated soil.
228. *C. megalocarpum* Bainier, Bull. Soc. Mycol. Fr. **25**: 202 (1910) – isolated by Salem (1975 at IMI) from cultivated soil.
229. *C. mollicellum* L.M. Ames, Monograph of the Chaetomiaceae, p. 30 (1963) – isolated by Dreyfuss (1985 at CBS) from a cultivated soil.
230. *C. murorum* Corda, Icon. Fung. (Prague) **1**: 24 (1837) – isolated by Moubasher & Moustafa (1970) from cultivated soil, Saad (1983 at IMI) from house dust and Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
231. *C. nigricolor* L.M. Ames, Mycologia **42**: 645 (1950) – isolated by Aue & Müller (1967), Ibrahim (1999), and Abdel-Azeem (2003) from cultivated soil; by Aue & Müller (1967), as *C. abuense* Lodha, from a cultivated soil, Quos.
232. *C. ochraceum* Tschudy, Am. J. Bot. **24**: 475 (1937) – isolated by Kowalik & Sadurska (1973) from papyrus samples collected from Cairo Museum.
233. *C. perlucidum* Sergejeva, Not. Syst. Pl. Non-Vasc. **11**: 108 (1956) – isolated by Dreyfuss (1983 at CBS) from sandy soil, Sinai Peninsula.
234. *C. piluliferum* J. Daniels, Trans. Brit. mycol. Soc. **44**: 84 (1961) – isolated by Moharram *et al.* (1990) from buffalo hairs and by Abdel-Azeem (2003) from salt marsh soil and stored cereals.
235. *C. rectopilium* Fergus & Amelung, Mycologia **63**(6): 1213 (1971) – isolated by Ess El-Din (1988) and by Abdel-Azeem (2003) from saline soil.
236. *C. senegalense* L.M. Ames, Monograph of the Chaetomiaceae, p. 36 (1963) – isolated from sandy soil (after El-Abyad, 1997).
237. *C. sphaerale* Chivers, Proc. Amer. Acad. Arts **48**(4): 84 (1912) – isolated by Abdul-Wahid (1990) from a cultivated soil at Ismailia and as *C. semispirale* Udagawa & Cain, from monkey dung by Carter (at ATCC).
238. *C. spirale* Zopf, Nova Acta Leop.-Carol. Acad. **42**: 272 (1881) – isolated by Moubasher *et al.* (1985) from desert soil and by El-Nagdy & Abdel-Hafez (1990) from aquatic environment.

239. *C. subaffine* Sergejeva, Not. Syst. Pl. Non-Vasc. 14: 148 (1961) isolated from sandy soil (after El-Abyad, 1997).
240. *C. subspirale* Chivers, Proc. Amer. Acad. 48: 84 (1912) – isolated by Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis.
- ➔ 241. *C. subspirilliferum* Sergejeva, Not. Syst. Pl. Non-Vasc. 13: 174 (1960) – isolated by Abdel-Azeem (2003) from a salt marsh soil at Sinai Peninsula.
242. *C. sulphureum* Sörgel ex Seth, Nova Hedwigia 37: 108 (1970) – isolated by Abdul-Wahid (1990) from cultivated soil.
243. *C. thermophilum* La Touche, Trans. Br. Mycol. Soc. 33: 95 (1950) isolated by Moubasher *et al.* (1981b) from cultivated soil.
244. *C. thermophilum* var. *coprophilum* Cooney & R. Emerson, Thermophilic Fungi, p. 68 (1964) – isolated by Moharram *et al.* (1990) from buffalo hair.
245. *C. trigonosporum* (Marchal & É.J. Marchal) Chivers, Mem. Torrey Bot. Club 14: 166 (1915) – isolated by Bagy & El-Sharouny (1985) from herbivore dung and by Abdel-Hafez, A. *et al.* (1991) from desert soil.
246. *C. trilaterale* Chivers, Proc. Amer. Acad. Arts & Sci. 48: 87 (1912)– isolated by Kowalik & Sadurska (1973) from papyrus samples collected from Cairo museum.
247. *C. turgidopilosum* L.M. Ames, Mycologia 41: 639 (1949) – isolated by Kowalik & Sadurska (1973) from papyrus samples collected from Cairo museum.
248. *C. venezuelense* L.M. Ames, Monograph of the Chaetomiaceae (U.S. Army Research and Development Service) 2: 42 (1963) - isolated by Aue & Müller (1967) from cultivated soil, Quos, Upper Egypt.
249. *Corynascus novoguineensis* (Udagawa & Y. Horie) Arx, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 76: 295 (1973) – isolated from goat hairs (after El-Abyad, 1997).
250. *C. sepedonium* (C.W. Emmons) Arx, Proc. Kon. Ned. Akad. Wetensch., Ser. C, Biol. Med. Sci. 76: 292 (1973) – isolated from cultivated soil by Abdul-Wahid (1990) at Ismailia and by Besada & Yusef (1968), as *Thielavia sepedonium* C.W. Emmons.
251. *C. setosus* (Dade) Arx, Stud. Mycol. 8: 22 (1975) – isolated from sandy soil (after El-Abyad, 1997).
252. *C. thermophilus* (Fergus & Sinden) Klopotek, Arch. Microbiol. 98(4): 366 (1974) – isolated by Abdel-Hafez & El-Maghraby (1993) as *Thielavia thermophila* Fergus & Sinden from desert soil.
253. *Farrowia seminuda* (L.M. Ames) D. Hawksw., Persoonia 8(2): 181 (1975) – isolated as *Ch. seminudum* L.M. Ames from goat hairs (after El-Abyad, 1997).
254. *Thielavia coactilis* Nicot, Compt. Rend. Hebd. Séances Acad. Sci., Sér. D 253: 304 (1961) – isolated by Abdul-Wahid (1990) from cultivated soil.
255. *T. heterothallica* Klopotek, Arch. Microbiol. 107: 223 (1976) – isolated from cultivated soil (after El-Abyad, 1997).
256. *T. hyalocarpa* Arx, Stud. Mycol. 8: 6 (1975) – isolated by Mouchacca (1974 at IMI) from desert soil.
257. *T. lycraniae* Nicot, Acad. Sci. Paris 253: 304 (1961) – isolated by Abdel-Hafez (1986 at IMI) from cultivated soil.
258. *T. terrestris* (Apinis) Malloch & Cain, Can. J. Bot. 50: 66 (1972) – isolated from cultivated soil (after El-Abyad, 1997).
259. *T. terricola* (J.C. Gilman & E.V. Abbott) C.W. Emmons, Bull. Torrey Bot. Club 57: 124 (1930) – isolated by Krug & Khan (1999) from soil sample collected by Hollett (1987) near an irrigation canal in Dakhleh Oasis and by Abdel-Azeem (2003) from a salt marsh soil.
- Lasiosphaeriaceae**
- ➔ 260. *Podospora appendiculata* (Auersw. ex Niessl) Niessl, Hedwigia 22: 156 (1883) – reported by Abdel-Azeem (2003) from cow, donkey, goat, and camel dung.
- ➔ 261. *P. comata* Milovtz., Trav. Inst. Bot. Kharkov 2: 20 (1937) – reported by Abdel-Azeem (2003) from donkey and camel dung.
- ➔ 262. *P. communis* (Speg.) Niessl, Hedwigia 22: 156 (1883) – reported by Abdel-Azeem (2003) from donkey dung.
263. *P. minicauda* Faurel & Locq.-Lin., Revue Mycol. (Paris) 42: 344 (1978) – isolated by Mouchacca (1978 at CBS) from Kharga Oasis, Western Desert.
264. *P. pyriformis* (A. Bayer) Cain, Canad. J. Bot. 40: 460 (1962) – reported by Bagy *et al.* (1986) from camel dung.
265. *P. tetraspora* (G. Winter) Cain, Canad. J. Bot. 40: 460 (1962) – reported by Bagy *et al.* (1986) from camel dung.
266. *Zopfiella erostrata* (Griffiths) Udagawa & Furuya, Trans. Mycol. Soc. Japan 15: 208 (1974) – reported by Lundqvist (1969) as *Tripterospora erostrata* (Griffiths) Cain

on camel dung and by Abdel-Azeem (2003) on camel & donkey dung.

- ➔ 267. *Zygopleurage zygospora* (Speg.) Boedijn, Persoonia 2: 316 (1962) – reported by Moustafa & Abdel-Azeem (2005) from donkey dung.

#### Sordariaceae

- ➔ 268. *Neurospora cerealis* (Dowding) Dania García, Stchigel & Guarro, Mycol. Res. 108: 1119-1142 (2004) isolated by Abdel-Azeem (2003), as *Gelasinospora cerealis* Dowding, from a cultivated soil at Ismailia.

269. *N. crassa* Shear & B.O. Dodge, J. Agric. Res. 34: 1019 (1927) – isolated by Moubasher & Abdel-Hafez (1978) from cultivated soil.

- ➔ 270. *N. seminuda* (Cailleux) Dania García, Stchigel & Guarro, Mycol. Res. 108: 1119-1142 (2004) – isolated by Abdel-Azeem (2003), as *Gelasinospora seminuda* Cailleux, from a desert soil in Sinai Peninsula.

271. *N. sitophila* Shear & B.O. Dodge, J. Agric. Res. 34: 1019 (1927) – isolated from cultivated soil (after El-Abyad, 1997).

- ➔ 272. *N. tetrasperma* Shear & B.O. Dodge, J. Agric. Res. 34: 1019 (1927) isolated from the air of *Citrus* plantation by Moubasher *et al.* (2010).

273. *Sordaria fimicola* (Roberge ex Desm.) Ces. & De Not., Comm. Soc. Crittog. Ital. 1: 226 (1863) – isolated by Moubasher & Moustafa (1970) from cultivated soil; reported by Bagy *et al.* (1986) from camel dung, and by Abdel-Azeem (2003) from camel & donkey dung and soil.

274. *S. superba* De Not., Comm. Soc. crittog. Ital. 2: 479 (1867) – reported by Lundqvist (1972).

#### Genera with uncertain family position (*incertae sedis*)

275. *Melanocarpus albomyces* (Cooney & R. Emers.) Arx, Stud. Mycol. 8: 17 (1975) – isolated by Moubasher *et al.* (1982), as *Myriococcum albomyces* Cooney & Emerson, from wheat and broad-bean composts.

276. *Phaeosporis melasperma* (Nyl.) Clem., The Genera of Fungi, p. 173 (1909) – isolated by Krug *et al.* (1994b), as *Areolospora bosensis* (A.C. Das) D. Hawksw., from soil sample collected by Hollett in 1987 near an irrigation canal in Dakhleh Oasis.

#### Trichosphaeriales

##### Trichosphaeriaceae

277. *Trichosphaeria pilosa* (Pers.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 145 (1870) – isolated by Sabet (1939) from cultivated soil at Giza.

#### Genera with uncertain family position (*incertae sedis*)

278. *Khuskia oryzae* H.J. Huds., Trans. Brit. Mycol. Soc. 46: 358 (1963) – isolated by Ess El-Din (1988) from saline soil.

#### Xylariales

##### Xylariaceae

279. *Ascotricha chartarum* Berk., Ann. Mag. Nat. Hist. 1: 257 (1838) – isolated by Abdul-Wahid (1990) from a cultivated soil at Ismailia.

280. *A. congoensis* L.M. Ames, Mycologia 43: 30 (1951) – isolated by Abdel-Mallek *et al.* (1988) from floor dust and by Abdel-Hafez, S. *et al.* (2000) from desert soil.

281. *A. erinacea* Zambett, Bull. Soc. Bot. Fr. 102: 2 (1955) – isolated from sandy soil (after El-Abyad, 1997).

282. *A. guamensis* L.M. Ames, Mycologia 43: 30 (1951) – isolated by Ismail (1990) from dust sediments at Assiut and by Abdul-Wahid (1990) from cultivated soil at Ismailia.

#### Genera with uncertain family position (*incertae sedis*)

283. *Monosporascus cannonballus* Pollack & Uecker, Mycologia 66: 348 (1974) – isolated by Veenbaas-Rijks (1993 at IMI) from roots of *Cucumis melo*.

#### Apothecial taxa including Truffles and Morels

#### Pezizales

##### Ascobolaceae

284. *Ascobolus americanus* (Cooke & Ellis) Seaver, North American Cup-fungi, p. 85. (1928) – reported by Bagy *et al.* (1986), as *A. amoenus* Oudem., from camel dung.

- ➔ 285. *A. cervinus* Berk. & Broome, Fungi Ceylon, no. 1209 (1876) – reported by Abdel-Azeem (2003) from cow and donkey dung.

286. *A. elegans* J. Klein, Verh. Zool.-Bot. Ges. Wein 20: 566, 1870 – reported by Bagy *et al.* (1986) from camel dung, Assiut.

287. *A. immersus* Pers., Neues Mag. Bot. 1: 115 (1794) – reported by Bagy *et al.* (1986) from camel dung, Assiut and by Abdel-Azeem (2003) from cow, donkey, and goat dung.

288. *A. xylophilus* Seaver, Mycologia 3: 61 (1911) – isolated by Krug & Khan (1999) from soil sample collected by Hollett

(1987) near an irrigation canal in Dakhleh Oasis.

289. *Saccobolus citrinus* Boud. & Torrend, Bull. Trimestriel Soc. Mycol. France 27: 131 (1911) – reported by Bagy *et al.* (1986) from camel dung and by Abdel-Azeem (2003) from goat and donkey dung.

➔ 290. *S. glaber* (Pers.) Lambotte, Flora Myc. Belg., Supplement 1, 284. (1887) – reported by Abdel-Azeem (2003) from cow, goat, camel, and donkey dung.

291. *S. truncatus* Velen., Monogr. Discom. Bohem. (Prague), p. 370 (1934) – isolated from sandy soil (after El-Abyad, 1997).

#### Ascodesmidaceae

➔ 292. *Ascodesmis microscopica* (P. Crouan & H. Crouan) Le Gal, Revue Mycol. (Paris) 14: 85 (1949) – reported by Abdel-Azeem (2003) on cow dung.

#### Morchellaceae

293. *Morchella esculenta* (L.) Pers., Syn. meth. fung. (Göttingen) 2: 618 (1801)- reported from garden soil in Cairo (after Melchers, 1931).

294. *M. vulgaris* (Pers.) Boud., (1897) – reported as *M. conica* Pers. from soil in park at Giza (after Melchers, 1931).

#### Pezizaceae

295. *Iodophanus testaceus* (Moug.) Korf, Am. J. Bot. 54: 19 (1967) – reported by Bagy *et al.* (1986) from camel dung.

296. *Terfezia arenaria* (Moris) Trappe, Trans. Br. Mycol. Soc. 57(1): 90 (1971) – reported as *Terfezia leonis* (Tul. & C. Tul.) Tul. from Bir El-Abd and Cairo (after Melchers, 1931).

297. *T. boudieri* Chatin, La Truffe: 74 (1892)- reported by Ibrahim (1995) from El-Arish.

298. *T. claveryi* Chatin, La Truffe: 74 (1892) – reported by Ibrahim (1995) from El-Salloum, Sidi Barani, El-Alaamin and El-Arish.

299. *T. deflersii* Pat., Journal de Bot., Paris 8: 154 (1894)- reported from from El-Arish (after Melchers, 1931).

300. *T. ovalispora* Pat., in Dybowski, L'extr. sud Alger: 54 (1892) – reported from Mariut as *Tirmania ovalispora* (after Melchers, 1931).

301. *Tirmania africana* Chatin, La Truffe: 74 (1892) – reported from Mariut (after Melchers, 1931).

302. *T. nivea* (Desf.) Trappe, Trans. Br. mycol. Soc. 57(1): 88 (1971) – reported by Ibrahim (1995) from El-Salloum, Sidi Barani and El-Arish.

303. *T. pinoyi* (Maire) Malençon, Persoonia 7(2): 277 (1973) – reported by Ibrahim (1995) from El-Salloum and El-Arish.

#### Thelebolales

##### Thelebolaceae

304. *Coprotus aurora* (Crouan & Crouan) K.S. Thind & Waraitch, Res. Bull. Punjab Univ., n.s. 21(1-2): 145 (1971)[1970] – reported by Abdel-Azeem (2003) on cow dung.

#### Families with uncertain order position (*incertae sedis*)

##### Monascaceae

305. *Monascus ruber* Tiegh. Bull. Soc. bot. Fr. 31: 226 (1884)- isolated by Shindia (1997) from soil.

306. *M. purpureus* Went, *Annls Sci. Nat., Bot.*, sér. 8 (1895)- isolated by Ragab (1956) from soft chesse.

##### Myxotrichaceae

➔ 307. *Myxotrichum chartarum* Kunze, Mykologische Hefte 2: 108 (1823) – reported by Abdel-Azeem (2003) on camel dung.

308. *Pseudogymnoascus roseus* Raullo, ZentBl. Bakt. ParasitKde, Abt. 2, 78: 520 (1929) – isolated as *Pseudogymnoascus vinaceus* Raullo from sandy soil (after El-Abyad, 1997).

##### Pseudeurotiaceae

309. *Pseudeurotium zonatum* J.F.H. Beyma, Zentralbl. Bakteriologie, Parasitenk., Abt. 2, 96: 411 (1937) – isolated by Moubasher *et al.* (1990b) from Nile water.

##### Testudinaceae

310. *Neotestudina rosutii* Segretain & Destombes, C. R. Acad. Sci. (Paris) 253: 2579, (1961) – isolated by Mouchacca (1974 at CBS) from sandy soil.

\* According to Gams (personal communication), taxa belonging to Hypocreales (except *Neocosmospora vasinfecta*) and Pleosporales (except *Pleospora herbarum*) would not be included because only the anamorphs have been reported by the authors.

**Alphabetic list of treated taxa**

For space saving, author's and species names are omitted (for name authorities please see text).

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