

**STUDY OF SOME COPROPHILOUS ASCOMYCETES INCLUDING
TWO NEW SPECIES FOR MOROCCO : *SACCOBOLUS GLABER*
AND *PODOSPORA DAGOBERITII***

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ABSTRACT

Ten species of Coprophilous Ascomycetes have been encountered on cow dung collected in the Khmisset region (Northwest of Morocco). *Saccobolus glaber* and *Podospora dagobertii* are new to the fungal flora of Morocco. *Podospora curvula*, *Podospora pauciseta*, *Podospora minuta*, *Sporormia fimetaria*, *Sporormiella australis*, *Sporormiella grandispora*, *Sporormiella intermedia* and *Sporormiella minima*, cited previously, are described in this study.

Keywords: *Coprophilous fungi, Ascomycetes, herbivores dung, Morocco.*

RÉSUMÉ

Étude de quelques ascomycètes coprophiles incluant deux nouvelles espèces pour le Maroc : *Saccobolus glaber* et *Podospora dagobertii*

Dix espèces d'ascomycètes coprophiles ont été trouvées sur la bouse de vache recueillie dans la région de Khmisset (nord-ouest du Maroc). *Saccobolus glaber* et *Podospora dagobertii* sont nouveaux pour la flore fongique du Maroc.

Podospora curvula, *Podospora pauciseta*, *Podospora minuta*, *Sporormia fimetaria*, *Sporormiella australis*, *Sporormiella grandispora*, *Sporormiella intermedia* and *Sporormiella minima*, citées précédemment, sont décrites dans le présent travail.

Mots-clés : *Coprophile fongique, ascomycètes, bouse herbivore, Maroc.*

I - INTRODUCTION

Coprophilous Ascomycetes are commonly found on the dung of many herbivorous animals [1, 2]. The diversity and distribution have been recorded in many countries [3, 4].

In Morocco, Richardson [5], has recorded fifty seven species of coprophilous fungi from the Souss valley area of southern Morocco. Five species of coprophilous fungi have been encountered on cow dung collected in the Mamora forest (Northwest of Morocco) [6] : *Pilobolus kleinii*, *Ascobolus immersus*, *Ascobolus furfuraceus* are cited previously by Richardson [5], *Coprinopsis nivea* and *Coprinellus congregatus* are new to the fungal flora of Morocco.

The objectives of this research were to study the morphology of ten Ascomycetes found on various dung samples collected during a visit in Khmisset region (North west of Morocco).

II - MATERIALS AND METHODS

During a visit in the in Khmisset region (North West Morocco), herbivores dung was collected (May 2010). All samples collected were taken to the laboratory and were kept in a refrigerator in a dried state until they were rehydrated, placed in Petri dishes and incubated in a damp chamber, at ambient temperature (28° C). Samples were examined frequently at intervals of a few days. After 7-10 days, the coprophilous fungi that developed were recorded.

Two types of observations were made :

- Macroscopic observations focused on youthful appearance and adult fruiting bodies (ascomata).
- Microscopic observations concerned the mycelium, reproductive organs and spores to reproduce asexually and sexually.

Species identification was made by consulting the work of different authors [1-5,7-11].

III – RESULTS AND DISCUSSION

Twelve dung samples were collected from Khmisset region. After incubation, 20 species were isolated of which 10 were determined :

-*Saccobolus glaber* (Pers: Fr.) Lambotte

Apothecia scattered or gregarious, yellow, margin not differentiated. Excipulum composed of globose cells. Asci broadly clavate, 133-150 x 26-40

μm . Spore clusters arranged as pattern I according to Brummelen [12], with thick gelatinous sheath. Ascospores ellipsoid, violet to brownish purple, finely granulate and sometimes with cracks, $20\text{-}23 \times 8.32 - 10\mu\text{m}$. Paraphyses tips filled with yellow pigments, $106.5\text{-}123 \times 3.33\text{-}5 \mu\text{m}$ [10].

-*Podospora curvula* (de Bary ex winter) Niessl, Hed.

Perithecia usually 0.5 -1mm, brown. Asci ($199.8 - 225.74 \times 23.31\text{-}26.64\mu\text{m}$), 8-spored, hyalin, cylindrical and clavate with longer pedoncul. This description is identical to that given by Malençon et Bertault [14] and Richardson [13].

-*Podospora dagobertii* Moreau

Perithecia with scales, hyaline ascus ($223.11\text{-}253 \times 40\text{-}43.29 \mu\text{m}$), fusiform, pointed at the upper end, containing 8 spores.

Primary appendage directed towards the base of the ascus. Spores ($32\text{-}40 \times 17\text{-}20 \mu\text{m}$) with a long but withering primary appendage, and two rings on secondary appendages, one inserted near the base of the primary appendage, the other at the apex of the spore. The individual appendages may be free, but often clump together to form an apparently broad single appendage [13].

-*Podospora minuta* (Fuckel) Niessl.

Perithecia with short bristles at the neck, black, usually smaller ($0.24\text{-}0.8\text{mm}$), sometimes with poorly developed scales [13]. Asci containing 8 spores. Spores $16\text{-}22 \times 8.4\text{-}13.4$. 4-spored forms frequently observed. Spores flattened, disc shaped, with a germ slit around the edges [5, 13, 14].

-*Podospora pauciseta* (Ces.) Traverso

Perithecial is arranged asymmetrically between tapering tufts of setae, composed of fascicles of non-inflated hyphae. Peridium membranaceous, semi-transparent olivaceous brown, except in the black, opaque neck, with angular rather thin walled, $5\text{-}14\mu\text{m}$ large outer cells. Paraphyses longer than the asci and mixed with them. Asci 4-spored, fusoid-clavate, tapering to a long sinuous stalk, $183\text{-}249.65 \times 20\text{-}30 \mu\text{m}$. Spores $30\text{-}33.3 \times 16.65 - \mu\text{m}$, with primary appendage $20\text{-}23.31 \times 4\text{-}5 \mu\text{m}$ [5].

-*Sporormia fimetaria* (De Not.) De Not.

A infrequent fungus on dung, characterized by the amalgamation of the eight to 16- celled spores into a bundle, resembling a maize cob, with terminal gelatinous appendages. Ascospores ($46.62 \times 3.33 \mu\text{m}$), brown yellow [5]. Ascus ($56.61 - 70 \times 13.32\text{-}16.65$) is hyaline and large [5].

-*Sporormiella australis* (Speg.) S.I. Ahmed & Cain

This species was described by Richardson [5]. Few pseudothecium contained asci with eight non septate, slightly curved spores with one diagonal germ slit along the length of the spore.

Ascospores 4 celled, 43.29- 46.62 x 8 μm ; end cells rounded, not tapering, each cell with a diagonal germ slit [5].

-*Sporormiella intermedia* (Auersw.) Ahmed & Cain 1969

Pseudothecia scattered, sunken but becoming superficial, pyriform, dark brown to black and opaque; ocriaceous or often slight brittle, covered even to the tip of the beak with simple, flexous or bristle-like, septate, smooth, pale brown hairs, the lower serving as rhizoids and being branched, or often with age the hairs disappear leaving only papillate projections as evidence of their presence. Paraphyse sparingly branched, filiform, numerous, longer than their asci and mixed with them, septate rather persistent. Asci clavate-cylindric, broadly round above and contracted below into a short, blunt, usually curved base [15].

Asci before expansion 123.21-176.49 X 20-26.64 μm . Ascospore 4-celled, 46.62-53.28 X 7 μm , each cell with a diagonal germ slit [5, 8].

-*Sporormiella minima* (Auersw.) S. I. Ahmed & Cain

Species cited by Richardson [5] in Souss valley area of southern Morocco

Sporormiella minima is characterized by small cylindrical ascospores (30-33 x 4-5 μm), 4-celled ascospores that tend to break into 2-celled halves in the ascus or after liberation [3].

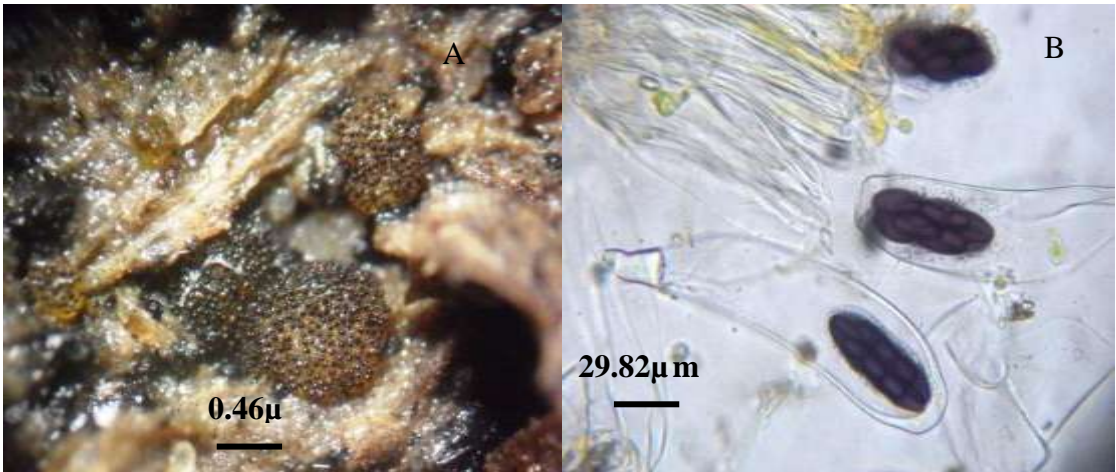
-*Sporormiella grandispora* S.I. Ahmed & Cain

Species described by Richardson [5] in Souss valley area of southern Morocco. Pseudothecia globular, dark brown to black. Asci (eight spores), 189.81 x 11.65 μm , hyaline, cylindrical, long stalked, tapering towards the base. Spores (53.28- 66.6 x 11.65 μm) consisting of four large cells, dark brown, with tapered terminal cells and parallel to oblique germ slits.

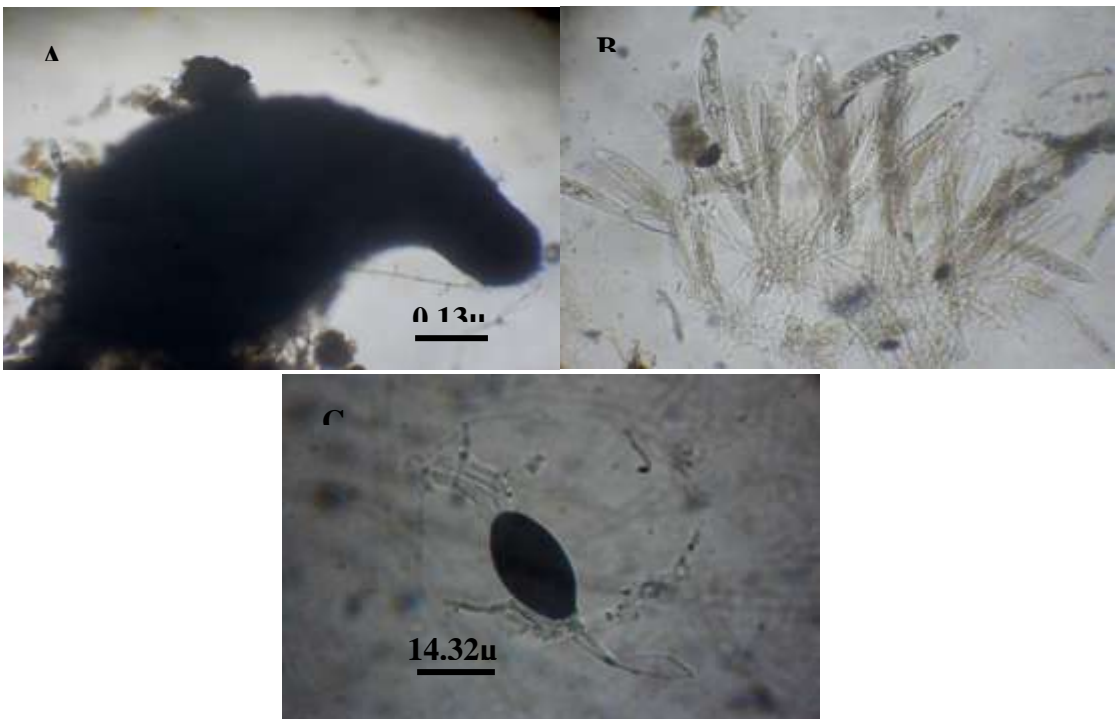
IV - CONCLUSION

Ten coprophilous Ascomycetes were studied from cow dung harvested in the Khmisset region (Morocco). Of these, four were perithecial Ascomycetes: *Podospora curvula*, *P. dagobertii*, *P. minuta* and *P. pauciseta*; five were pseudothecial: *Sporormiella australis*, *S. grandispora*, *S. intermedia* and *S. minima* and *Sporormia fimetaria* and one was apothecial Ascomycetes : *Saccobolus glaber*. Among these, two are new to the fungal flora of Morocco: *Saccobolus glaber* and *Podospora dagobertii*.

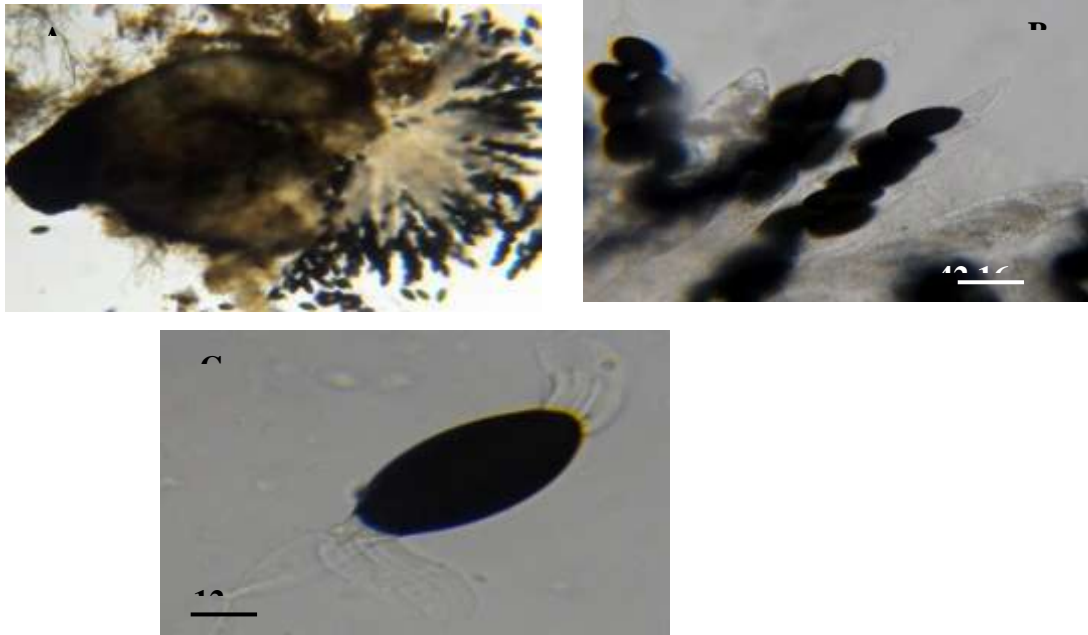
PICTURES



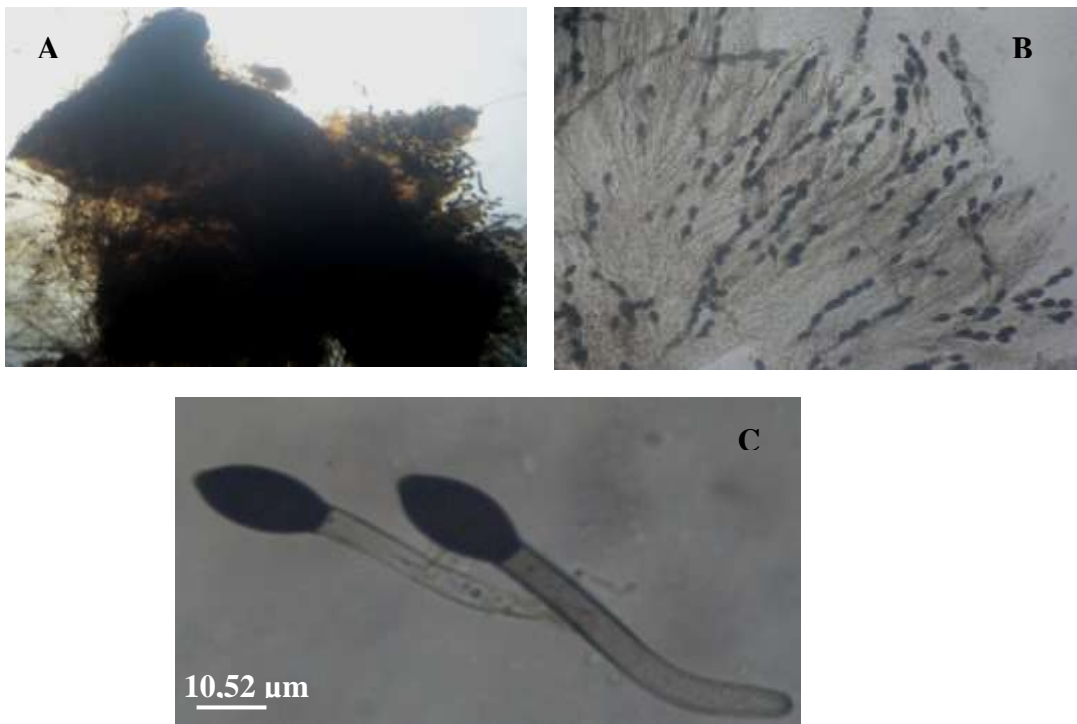
Picture 1: *Saccobolus glaber*; Apothecia; B: ascus, paraphyses and ascospores



Picture 2 : *Podospora curvula* ; A : Perithecia ; B : immature asci ; C : Ascospore.



Picture 3 : *Podospora dagobertii*; A: perithecia; B: Ascus; C: Ascospore

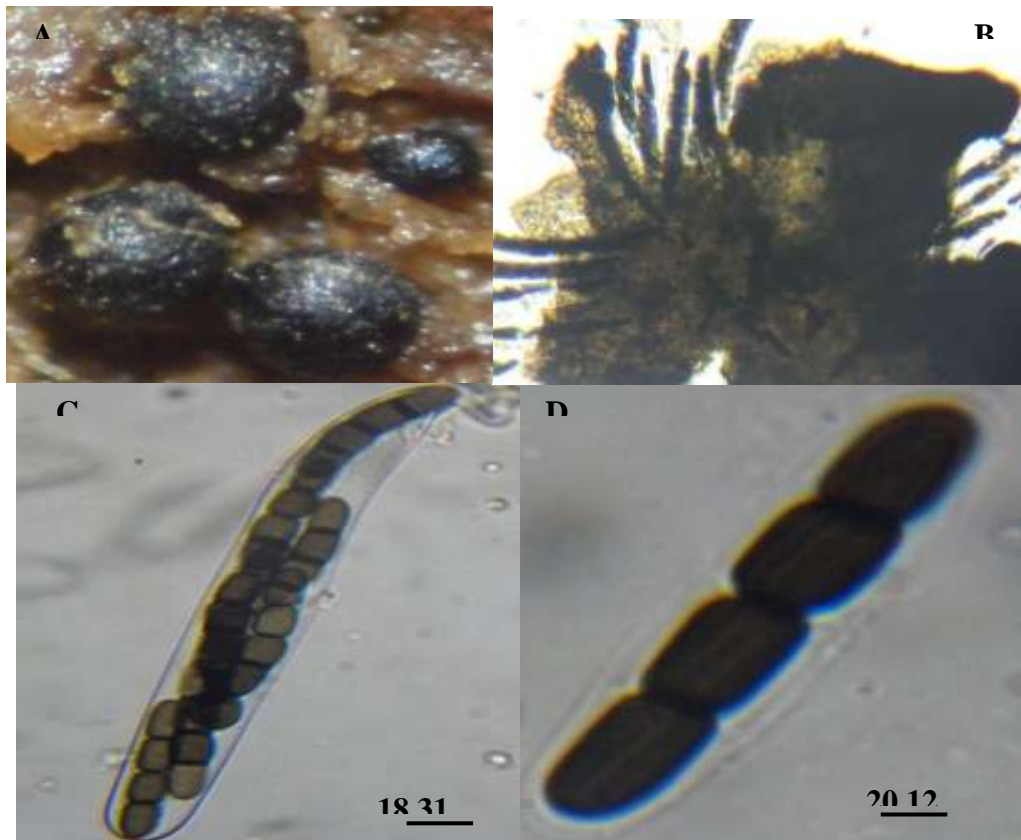


Picture 4 : *Podospora minuta*; A: perithecia; B: Ascus; C: Ascospores

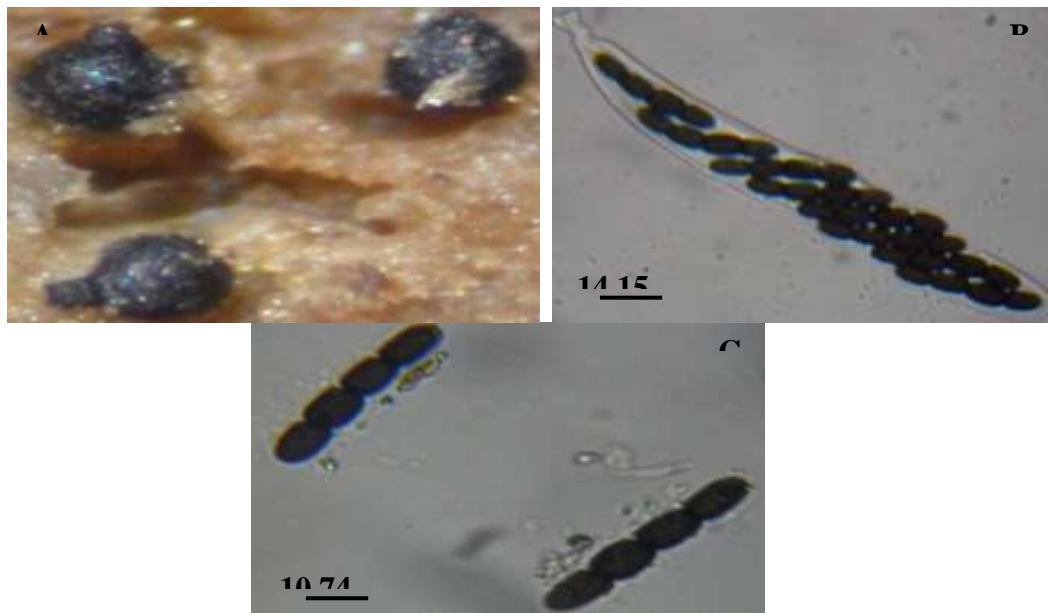
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Picture 5 : *Sporormia fimetaria* ; A : *Pseudothecia* and *ascus* ; B : *Asci* and *Ascospores*



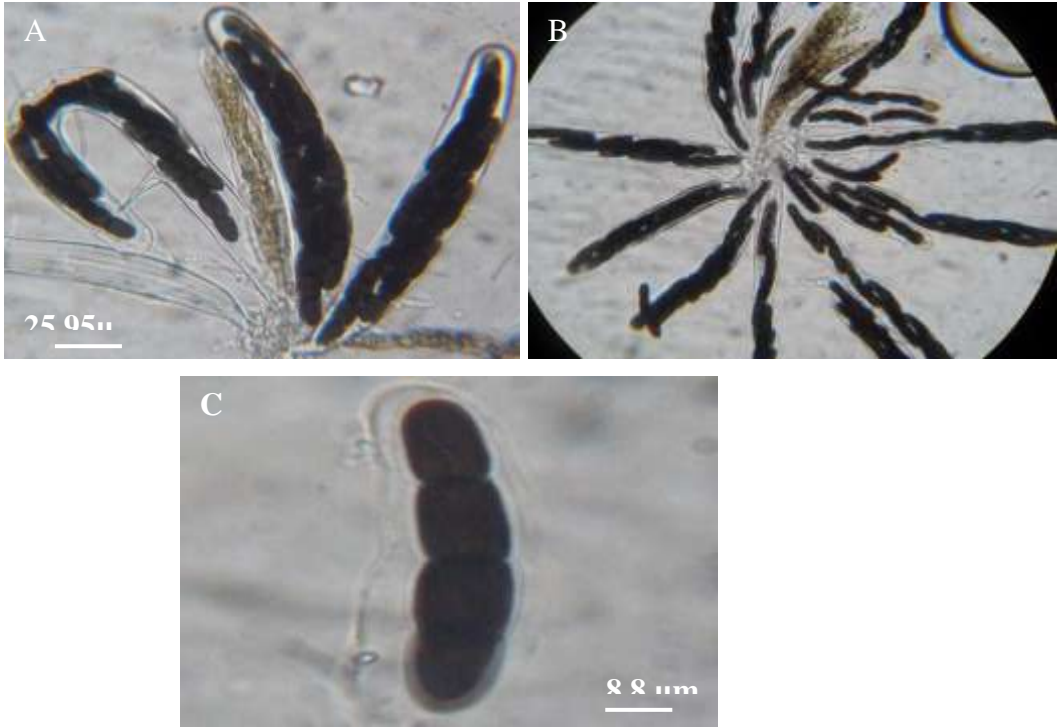
Picture 6 : *Podospora australis* ; A and B : *Pseudothecia*; C : *Asci*; D : *Ascospore* 4 celled



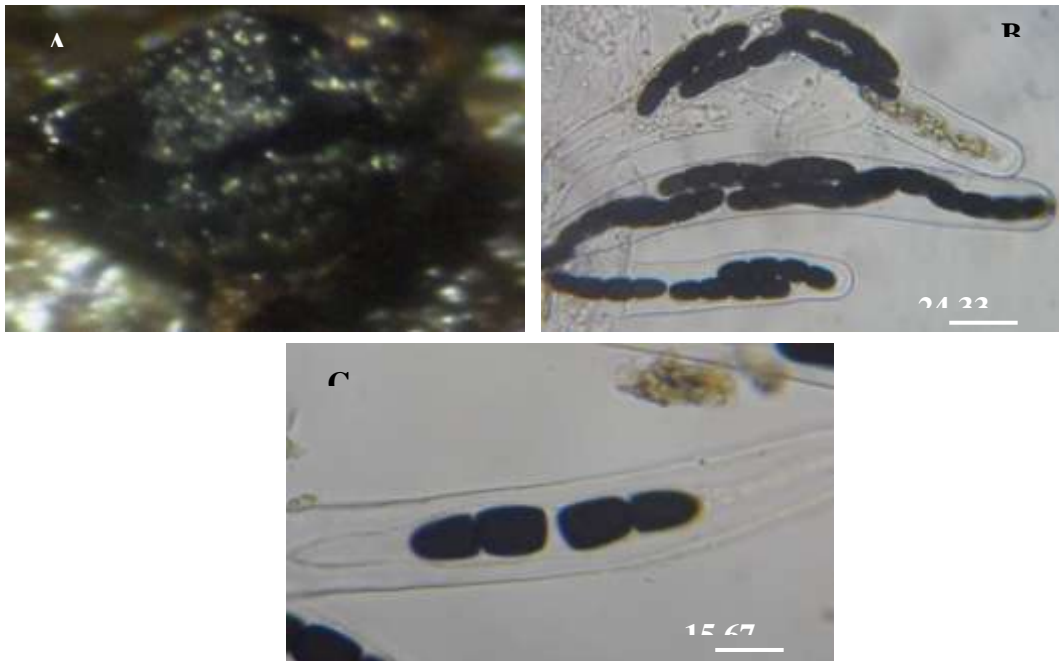
Picture 7 : *Sporormiella minima* ; A : Pseudothecia ; B : Asci ; C : Ascospores 4 celled.



Picture 8 : *Podospora pauciseta* ; A : Perithecia ; B : immature asci ; C : Asci and ascospores ; D : ascospores



Picture 9: *Sporormiella intermedia* (Auersw.) Ammed & Cain 1969; A : and B Asci; C : ascospore



Picture 10 : *Sporormiella grandispora* ; A : Pseudothecia ; B : Asci ; C :

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