



A Preliminary Study of Coprophilous Fungi in North of Jordan

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Abstract:

Coprophilous fungi are a diverse group of fungi that live in herbivore dung and have unique life cycle, this group of fungi produces many important metabolites, which may be used in medical or agriculture fields.

Eighteen dung samples were collected from four domestic animals from North area of Jordan. Moist chamber method at room temperature for each sample was used to demonstrate the fungal fruiting bodies and identify the fungal types.

24 species of coprophilous fungi have been identified belong to four fungal classes. The majority of isolated species were belonging to Ascomycetes followed by Deutromycetes, Zygomycetes and Basidiomycetes, respectively. The highest number of isolated species was found associated with sheep's dung and the lowest number with donkey's dung.

Key words: Coprophilous fungi, saprophytic fungi, Jordan, moist chamber, dung.

Introduction:

Coprophilous (dung-loving) fungi are unique large group of saprobic fungi adapted to grow and develop in herbivore dung [1].

They have a limited and unique life cycle in that they help to break down the dung of animals into metabolites [2].

Herbivorous animals (sheep, cows, horses and goats, etc.) ingest large quantities of fungal spores during grazing on grass; many of the fungal spores were destroyed by the animal's digestive enzymes [3].

The coprophilous fungi spores pass through herbivore animal gut and again are deposited with the animal dung, after that they grow, reproduce and release their spores in

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surrounding environment to repeat the whole cycle again [3-5].

The dung of herbivores is rich with different types of nutrients especially undigested plant remains, so it is a suitable medium for fungal activities. Chemical components and physical structure of animal dung contribute to its suitability for coprophilous fungi growth and development [4, 6].

Coprophilous fungi play an important role in the ecosystem, responsible for recycling the nutrients in animal dung and they are used as useful indicators of habitat diversity [7]. This group is an important source of antibiotics, enzymes, and biological control agents [8].

Many studies about coprophilous fungi were done in Iraq [9, 10], Kuwait [11], Oman [12], Yemen [13], Thailand [14], and Brazil [7] and other countries around the world [15]. So far, studies on coprophilous fungi were not done in Jordan.

The present study aims to study the coprophilous mycoflora from the dung of some herbivore animals lived in the North area of Jordan.

Material and Methods:

Eighteen dung samples were collected during the study period from four domestic animals which normally lived in the North area of Jordan, namely sheep (*Ovis aries*), donkey (*Equus asinus*), goat (*Capra hircus*) and cow (*Bos taurus*).

Each dung sample from animals was collected in a labeled clean paper bag. The samples were sent immediately to the laboratory for studies. All dung samples were air dried and stored in covered paper containers at room temperature.

From each collection, dung pieces were selected randomly and placed on sterile filter paper after moistened by sterile distilled water in Petri dishes (15 cm), then incubated at room temperature [10, 13, 14].

Dung samples were kept moistened by adding sterile distilled water from time to time and examined for fruiting bodies by dissecting microscope after a few days. Sabouraud Dextrose Agar (SDA) and Potato Carrot Agar (PCA) were used to identify and isolate any fungal species if necessary.

The frequency percent of each type of coprophilous fungi appeared during the study period was recorded according to the appearance of their fruiting bodies according to [1, 14, 16].

Results and Discussion:

In the present study, 24 species of coprophilous fungi belong to four fungal classes have been found fruiting bodies for all collected dung samples in a moist chamber at room temperature (Table 1). The majority of isolated species are belonging to Ascomycetes (17 species) followed by Deuteromycetes (4 species), Zygomycetes (2 species), Basidiomycetes (1 species). Our results were agreed with Caretta *et al* results [17] and Moghalles and Al-Bader (2014) [13].

The highest number of isolated species (19) was found associated with sheep dung's. Sheep dung is one of the best animal dungs supported fungal growth [15]. 17, 9 and 4 species were isolated from goat, cow and donkey, respectively. The results of this study are agreed with many other studies [1, 9, 12].

Ascobolus immerses has been found in all types of examined dung (table 2), while *Rhizopus nigricans*, *Kerria nitida* and *Fusarium oxysporum* were found in three types of dung.

Chaetomium cochloides and *Sacopolus depauperatus* were found in sheep dung and disappear from other types.

Similar to *Chaetomium* species that isolated in this study Pornsuriy et al (2008) isolated same species from Thailand soil [18]. The secondary metabolites of *Chaetomium* species can be used in some medical and agriculture applications [10].

Similar to isolated species in this study, many different species of coprophilous fungi were isolated around the world, such as *Sacopolus depauperatus* and *Podospora spp.* were isolated from animal dung in Brazil [7]. *Ascobolus spp* and *Podospora spp.* from Falkland Islands [6]. *Chaetomium spp.*, *Ascobolus spp.*, *Scopiularopsis spp.* and *Podospora spp.* from Thailand [14]. *Kerina spp.* from Taiwan [19] and *Fusarium oxysporam* from Yemen [13].

In Thilagam et al (2015) study, *Aspergillus* species were dominant in cow dung, while in our *Aspergillus niger* did not isolated from this type of dung [1]. In other hand, hyphomycetes such as *Aspergillus spp.*, *Rhizopus spp.* and *Mucor spp.* are saprophytic fungi, so this species can isolated from different sources such as soil and air [20, 21], and can be contaminant the dung after deposited in the ground [1, 13].

The lowest number of coprophilous fungi was isolated from donkey dung; these results may be due to low number of donkeys dung sample that collected during the study period or due to physiochemical structure of this type of dung [4, 12, 14].

More and wide taxonomic studies are recommended on coprophilous fungi in Jordan were.

Table 1: Number of species and related classes.

Fungal Classes		Fungal Family	Numer of species
Class 1		Zygomycetes	2
Class 2		Ascomycetes	
	Series A	Plectomycetes	8
	Series B	Pyrenomycetes	4
	Series C	Discomycetes	5
Class 3		Deutromycetes	4
Class 4		Basidiomycetes	1
Total			24

Table 2: the frequency and distribution of isolated fungal species.

Fungal species	Frequency (%)	Sheep	Cow	Donkey	Goat
<i>Rhizopus nigerces</i>	8.2	+	+	-	+
<i>Mucor spp.</i>	9.1	+	-	-	+
<i>Chaetomium bostrychodes</i>	4.6	+	-	-	+
<i>Chaetomium cochloides</i>	3.2	+	-	-	-
<i>Kerina nitida</i>	1.1	+	+	-	+
<i>Ascobolus immerses</i>	2	+	+	+	+
<i>Ascobolus michaudii</i>	3.2	+	+	-	-
<i>Ascobolus furfuraceus</i>	1.7	+	-	-	+
<i>Sacopolus depauperatus</i>	4.5	+	-	-	-
<i>Sacopolus minimus</i>	3.4	-	-	+	+
<i>Graphium spp.</i>	5.2	+	+	-	-
<i>Lasiobolidium spp.</i>	3.9	+	-	-	+
<i>Microascus sirosus</i>	4.6	+	-	-	-
<i>Aspergillus fumigatus</i>	9.7	+	+	-	-
<i>Aspergillus niger</i>	11.2	+	-	-	+
<i>Trichurus spiralis</i>	1.2	+	-	-	+
<i>Fusarium oxysporam</i>	2.6	-	+	+	+
<i>Thelivia spp.</i>	1.3	+	-	-	+
<i>Sordaria fimicola</i>	1.1	+	-	-	+
<i>Scopiularopsis spp.</i>	2.5	-	+	-	+
<i>Glimanella hamicala</i>	3.4	+	-	-	+
<i>Podospora spp.</i>	1.9	-	-	-	+
<i>Zopfiella spp.</i>	1.3	+	-	-	+
<i>Basidiomycetes spp</i>	9.1	-	+	+	-

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