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FELINE DERMATOPHYTOSIS : EPIDEMIOLOGICAL, CLINICAL AND LABORATORY FEATURES IN BAGHDAD GOVERNORATE, IRAQ

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ABSTRACT : Feline dermatophytosis is a specific fungal disease of the epidermal tissues in the skin and these are the most common agents of fungal infections worldwide. During a period of 12 months from first January to last December, 407 asymptomatic and clinical domestic cats with different age, breed, sex, habitat and hair coat were examined clinically to detection of ringworm. Moreover, 170 of 407 domestic cats were suggested with cutaneous mycosis and 120 cases were resulted in positive cultures for feline dermatophytosis and 76 samples positive for saprobe fungi or non-dermatophytes sp. The mycological analyses were conducted by direct microscopy and by fungal culture on SDA supplemented with chloramphenicol & actidione and DTM agar. Our survey was identified two genera of dermatophytes *Microsporum* sp. (93.91%), represented *Microsporum canis* (79.3%); *M. audounii* (10.8%); *M. gypseum* (9.9%) and *Trichophyton* spp (7.5%) represented *Trichophyton ruburum* 12 (60.0%) and *T. terrestre* 8 (40.0%). Distribution of dermatophytosis and dermatomycosis from various parts region of Baghdad city were Al Kurkh district 45 of 60 (75.0%), 15 of 60 (25.0%) and Al Rusafa district 75 of 110 (68.18%), 35 of 101 (31.8%), respectively. A high prevalence rate of ringworm was recorded in young age (73.94%) and lower infection in old age (50.0%) significantly at P< 0.05. The effect of breeds on the prevalence of feline dermatophytosis show high percentage of infection in Shiraz Persian cats (75.47%) and Himalayan Persian (69.23%) and lower infection in local cats (54.55%). Ringworm in long hair coat was higher (96.12%) than short hair coat (57.14%) significantly. The study show no significant difference between the sex and infection while, recorded a high prevalence in shelters habitat (77.36%) and low (68.33%) in household habitat. Feline dermatophytosis was more frequently isolated in January (88.23%) and lower frequently isolated in November (25.0%). Moreover, the effect of season on the prevalence of dermatophytosis showed a higher prevalence rate of infection in winter (81.54%) and lower in autumn (48.15%). Other dermatomycosis isolated were *Chrysosporium ophiodiicola* (6.6%) *Malassezia pacydermatis* (7.9%) and saprobe fungi from domestic cats represented by *Alternaria alternate* (7.1%); *Aspergillus flavus* (23.3%); *Aspergillus fumigatus* (34.9%); *Aspergillus niger* (37.2%); *Aspergillus nidulus* (4.7%); *Penicillium* sp. (5.3%); *Rhizopus* sp (3.9%) and *Curvularia* sp (3.9%).

Key words : Dermatophytosis, *Microsporum*, cats.

INTRODUCTION

Feline dermatophytosis is a specific fungal disease of the epidermal tissues in the skin and these are the most common agents of fungal infections worldwide (Yuanwu, 2009). Chrysosporium is a keratinophilic filamentous fungus commonly isolated from soil where it lives on the remains of hairs and feathers. The most common zoophilic dermatophytes are pathogenic fungi belong to the *Microsporum* and *Trichophyton* genera and some species of them may cause dermatophytosis in humans (Moriello, 2014). Transmission of dermatophytosis occurs by direct contact with infective arthrospores and spores can start adhering to the skin within 2 h. Infections that can shed spores can develop in less than 7 days (Moriello, 2014). Therefore, the most common clinical signs include any combination of hair loss, scaling and erythema, with or without pruritus and clearly, these overlap with a wide range of non-dermatophyte skin diseases (Moriello, 2014). The prevalence of dermatophytes in cats has been reported with much variability, depending on season of sampling, geographical location and clinical and living conditions (Duarte *et al*, 2010).

There are lack data regarding the prevalence of zoophilic and geophilicdermatophytes in domestic cats in Iraq**.** The world prevalence of dermatophytes varies from 5% to 50% (Verbrugge *et al*, 2006 and Grills *et al*, 2007). Moreover, the most isolated dermatophyte in stray and domestic cats is *M. canis* and rarely isolated sp is *T. mentagrophytes* which prevalence varies from 0% to

47.4% and 0% to 11.9% respectively, in most worldwide (Verbrugge *et al*, 2006 and Grills *et al*, 2007). Direct microscopic examination of hair and scales allows for rapid identification of high-risk cats and a Wood lamp skin examination are good screening methods, although that the mycology cultivation is the most reliable and definitive method (Cafarchia *et al*, 2004; Moriello and Newbury, 2006; Nardoni *et al*, 2013 and Moriello, 2014).

The aims of this study was to improve the information regarding the epidemiological, clinical study and identification of dermatophytosis in domestic cats in different district of Baghdad governorate, Iraq since these areas have not previously been examined.

MATERIALS AND METHODS

Area and animal

During a period of 12 months from first January to 31 December, 407 domestic cats were from both sexes, different breeds, habitat and hair coat and from one months to more than seven years were examined clinically to detection of feline dermatomycosis. Moreover, 170 of 407 cats with cutaneous lesions suggesting mycoses. Of 170 samples, 120 resulted in positive cultures for feline dermatophytosis and 76 samples positive for saprobe fungi or non dermatophytes sp. Hair and skin scraping samples were collected from 170 domestic cats with clinical signs living in different region of AlKurkh and AlRusafa district of Baghdad, Iraqas (Tables 3, 4).

Sample collection

After the cats were caught by the owner or assistants were takenskin scraping (Hair or scales). Nevertheless, the catswere examined in a dark environment with the Wood's lamp for several minutes prior to sample collection for detection of infection. To evaluate seasonal trends in dermatophyte infection, the samples from each group were categorized according to the sampling period as either winter season samples (Dec.-Jan.-Feb.), spring (Mar.-Apr.-May), summer (Jun.-Jul.-Aug.) and autumn (Sep.-Oct.-Nov.).

Fungal culture

Take parts of sample hair, scales were preserved in sterile containers by sterile thumps and inoculated by gently imprinting onto the surface of 9 cm Petri dishes containing Sabouraud dextrose agar (supplemented with chloramphenicol 0.5% and actidione 0.4%). The Petri dishes were incubated upside down in an incubator in the dark at a constant temperature of 28^0C and examined daily for three weeks. After three weeks the colonies in the medium were macroscopically and microscopically examined and identified to dermatophytes species (Samanta, 2015).

RESULTS

Clinical examination

Domestic catsinfected by dermatophytosis clinically was representedby typical lesions of focal and multifocal alopecia variable in size about 1 to more than 3 cm in diameter with scales, crust, erythema, hyper pigmentation, stubble hair, in different area of body dogs typically on the face, head, ears, back, abdomen, feet, folliculitis, pustules (Table 1). Nevertheless, cats infected by mycosis lesions were examined by wood lamps represented positive fluoresce with a characteristic apple green colour suggested dermatophytes sp specially *Microsporium canis* and *M. audounii* (Fig. 2, D,E). Whenever, other dermatophyte species do not induce this fluorescence.

Laboratory Examination: Isolation and Identification

Direct microscopic examination

Examination of skin scraping (hair and scales) of domestic cats infected by dermatophytosis microscopically were showed the hair surface typically demonstrates clusters or chains of fungal spores in three kinds known as ectothrix (*Microsporum canis* and *Microsporum audouonii*), endothrix (*Trichophyton treasterea* and *Trichophyton ruburum*) and ecto-endotherix (*Microsporium gypseum*) as in Fig. (1, A, B, C, D). Whenever, cats infected by non-dermatophytes sp was represented as abnormalities in hair morphology as enlarged, roughage and irregular border as in Fig. 2, A, B, C, D.

Culture examination

Macroscopic and microscopic morphology examination of *Microsporum canis*, *M. audounii*, *Trichophyton ruburum*, *Trichophyton treasterea* and *Chrysosporium ophiodiicola* characteristic as in Figs. 5, 6, 7.

In our survey, the total number of *Dermetophytes* spp isolated were 120 of 170 cases of skin lesions (70.6%) represented *Microsporum* spp 111 (92.5%), *Microsporum canis* (79.3%), *M. audounii* (10.8%), *M. gypseum* (9.9%) and *Trichophyton* sp 9 (7.5%) as *Trichophyton ruburum* (55.6%) and *T. terrestre* (44.4%). Other dermatomycosis isolated were *Chrysosporium ophiodiicola* (6.6%), *Malassezia pacydermatis* (7.9%) and saprobe fungi from domestic cats represented by *Alternaria alternate* (7.1%), *Aspergillus flavus* (23.3%), *Aspergillus fumigatus* (34.9%), *Aspergillus niger* (37.2%), *Aspergillus nidulus* (4.7%), *Penicillium* sp. (5.3%), *Curvularia* sp (3.9%) and *Rhizopus* sp (3.9%) as in Table 2.

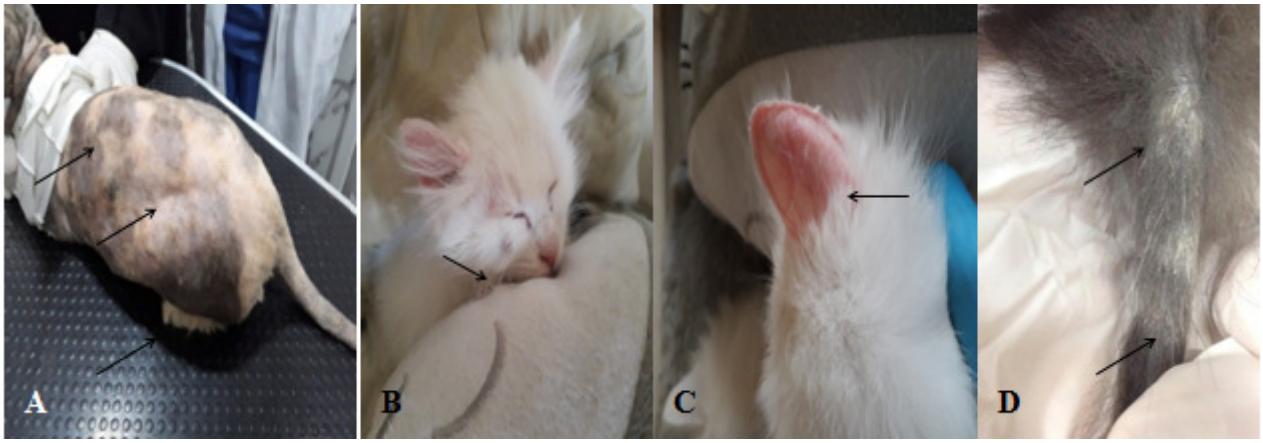

Fig. 1 : A, B, C, D) A: Multifocal circular patch of alopecia, erythematous, crust, scales, pustules and pruritus in Himalayan cat infected by *M. audounii*. B: A kitten with localize lesions on face non-inflammatory alopecic areas, with central desquamation. C: A kitten with localize lesions on ear, alopecic areas, erythematous, crust and scales. D: British cat 8 month old, with localize lesions on tail, inflammatory alopecic areas, with central desquamation, crust and scales.

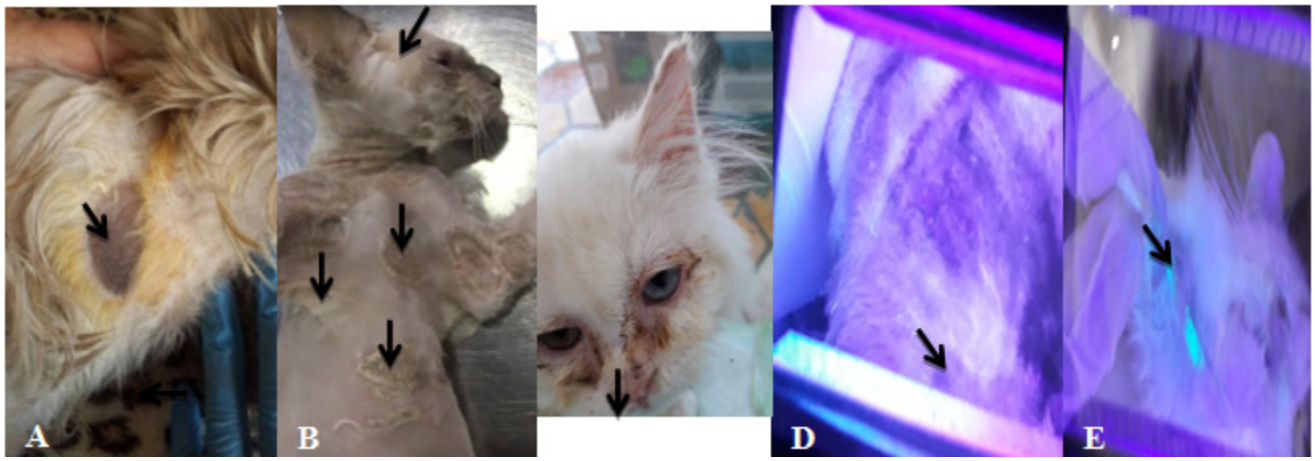

Fig. 2 : A: Himalaya cat 1 year old with hypopigmentation. B: Multifocal patchy alopecia, pustules, hyperkeratosis, crust scales, dermatitis, pruritus with bad condition in Persian cat. C: Shirazian cat 4 months old with multifocal lesion on face and ears, erythematous and scales. D: Himalaya cat 12 months infected by *Microsporum audounii* was examined by Wood lamps positive fluorescence apple green colour. E: Shirazian cat 12 months infected by *Microsporum canis* was examined by Wood lamps positive fluorescence apple green colour.

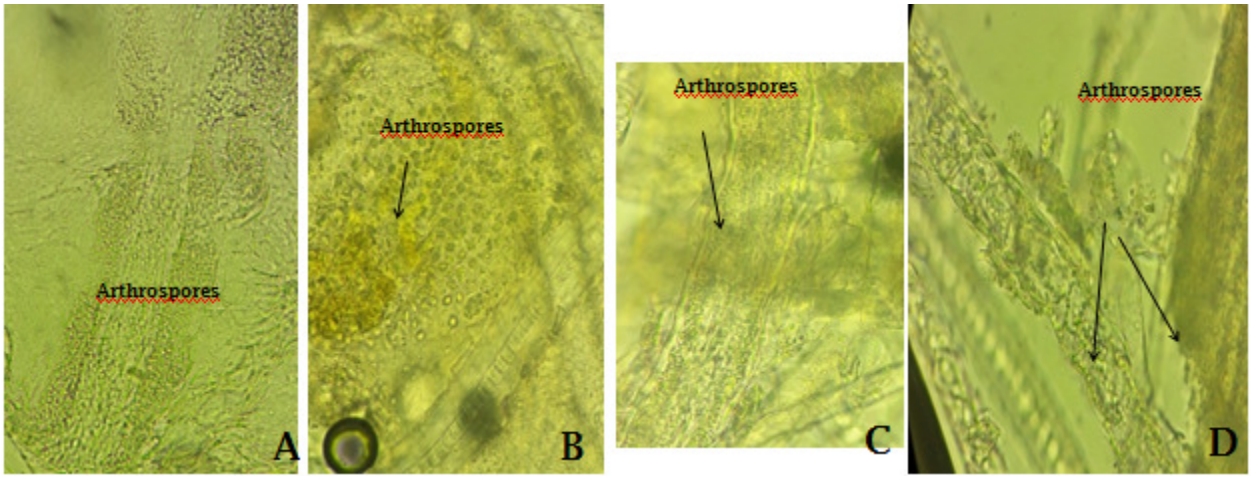

Fig. 3 : A: Ectothreix arrangement of small size arthrospors; Invasion outside of hair shaft of Shirazian cat infected by *Microsporium canis* (40X). B: Ectotherix arrangement of large size of arthorspors; Invasion outside of hair shaft Himalayan infected by dermatophytosis *Microsporium audouonii*. C: Endothreix arrangement of arthorspors (Invasion inside of hair shift) which have a large arthorspors in chains on the hair surface of dog infected by *Trichophyton* spp. D: Ecto-endotherix arrangement of medium to large size arthorspors; around and within hair shift of Sherasian cat infected by dermatophytosis *Microsporium gypseum* (40X).

Table 1 : Clinical signs of domestic cats infected by pathogenic fungi *Dermatophytes* sp. and non *Dermatophytes* sp.

Clinical signs	No.C. P. for S.L.170	No. and (%) C. posi. for Derm.120 ()	No. and (%) C. posi. for Non-Derm.50()
Circular or patchy alopecia (Figs. 1, 2)	160	105(65.6%)	55 (52.4%)
Crusts (Figs. 1, 2)	152	120 (78.9 %)	32 (26.7%)
Scales (Figs. 1, 2)	152	120(78.9 %)	32 (26.7%)
Hyperpigmentation (Fig. 2, A)	8	8 (100.0%)	0 (0.0 %)
Pruritus (Fig. 1, A & 2, B)	148	108(72.9 %)	40 (37.0%)
Pustules (Fig. 2, B)	100	74(74.0 %)	26 (35.1%)
Erythematous	98	70(71.4 %)	28 (40.0%)
Localize lesion on	160	145 (90.6%)	15 (10.3%)
-Tail (Fig. 1,D)	90	82 (91.1%)	8 (9.8%)
-Paws	14	9 (64.3%)	5 (55.6%)
-Face (Fig. 1,B)	123	105 (85.4%	18 (17.1%)
-Pinnae (Fig. 1,C)	100	90 (90.0%)	10 (11.1%)
-Forelimbs (shoulder)	98	89 (90.8%)	9 (10.1%)
-Hind limbs, groin or trunk	84	78 (92.9%)	6 (35.3%)
-Back	100	90 (90.0%)	10 (11.1%)
Multifocal patchy alopecia (Fig. 2, B)	10	8 (80.0%)	2 (25.0 %)

No. = Number, C. = cases, P. = Positive, Derma. = Dermatophytes, S.L. = skin lesion.

Epidemiological study

Out of 407 domestic cats in different cases only 170 (25.3%) cats with dermatomycoses and 120 (41.77%) cats with dermatophytosis. During one year the overall prevalence of dermatomycosis and dermatophytosis from various parts region of Baghdad city were Al Kurkh district (32.0%) 60/195; (64.6%) 45/60 and Al Rusafa district (22.4%) 101/450 and (60.4%) 61/101, respectively as in Tables 3, 4.

Our survey shows no significant difference at P< 0.05 between sex of cat and percentage of infection of dermatophytosis as in Table 5.

Nevertheless, the study was recorded a high percentage of infection at young age (1-12 months) whenever, low percentage of infection at old age (3 – more than 7 years) with significant difference at P< 0.05 as in Table 6.

The relation of coat of domestic cats with prevalence of dermatophytosis showed a high percentage of infection in long hair cats (96.12%) than short hair cats (57.14%) significantly at P<0.05 (Table 7). Whenever, the relation of habitat with prevalence of dermatophytes sp. was showed that high percentage of infection in shelters habitat (77.36%) and low percentage of infection in household habitat (68.33%) with no significant difference as in Fig. 8.

The relation of breeds with the prevalence of feline mycosis and dermatophytosis show that a high percentage of infection in Shiraz Persian cats (75.71%) (75.47%) and lower infection inFrance shorthair cats (21.43%), local cats breed (54.55%) respectively, as in Table 9.

We found significant association between dermatophyte presence and months of year therefore, the prevalence of infection was showed a high percentage of infection in January (88.23%) and low percentage of infection in November (25.0%) of each as in Table 10.

Nevertheless, the effect of season on the prevalence of dermatophytosis recognized by a higherpercentage of infection in winter season (81.54%) and lower infection in autumn season (48.15%) statistical significant at P< 0.05 as in Table 11.

DISCUSSION

The ringworm or dermatophytes isa great importance superficial fungal disease in pets due to contagiousness among animal communities, high costof treatment, difficulty of control measures and the public health consequences of animal (Chermette, 2008).

Clinically, dependent on Table 1 the typical lesions observed in kittens and adult catswere non and inflammatory localize and multifocal alopecic areas, with central desquamation, hypopigmentation, scales, erythematous with pruritus that indicatedfeline are susceptible to dermatophytes infection. So, these data are in agreement with other studies (Cabanes, 2000 and Beraldo *et al*, 2014) those show the tendency of cats to be a natural reservoir and symptomatic and a systematic for dermatopytosis.

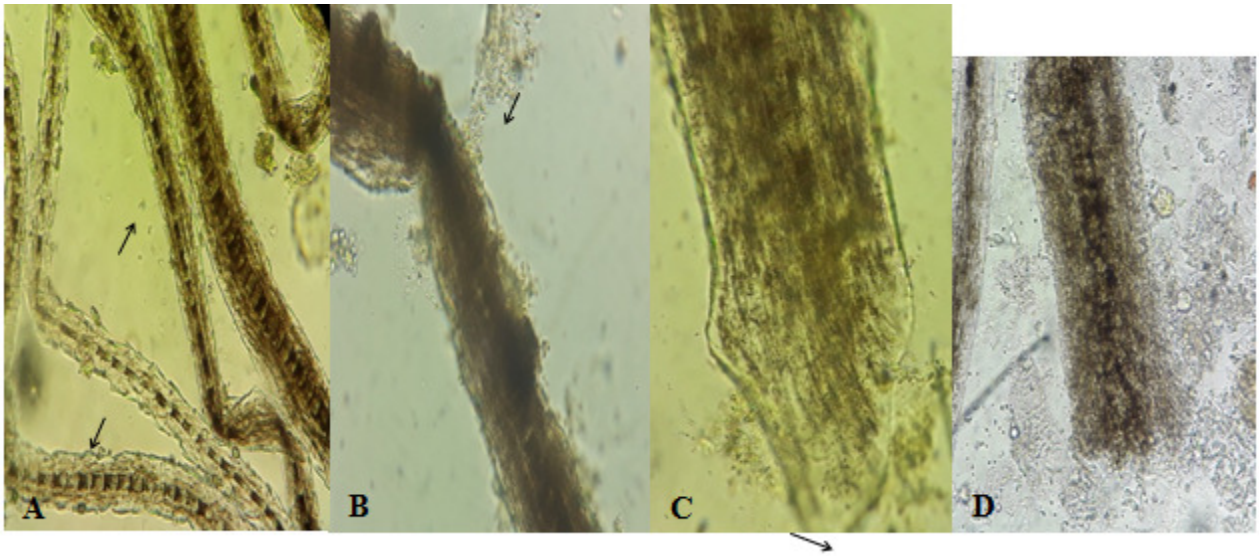

Fig. 4 : A: Abnormalities in hair of Shierazian cat infected by *Alternaria alternata* show enlarged, roughage and irregular border of hair (40 X). B: Ectotherix arrangement of arthrospors of Shierazian cat infected by *Chrysosporium* (40 X). C: Abnormalities in hair shift of Persian cat infected by Aspergillosis show enlarged and swollen structures with a ýrough and irregular surface and endotherixspors of *Aspergellus* sp. (40 X). D: Ectotherix arrangement of arthrospors in hair of Himalayan cat infected by *Malassezia pachdermatis* (40 X).

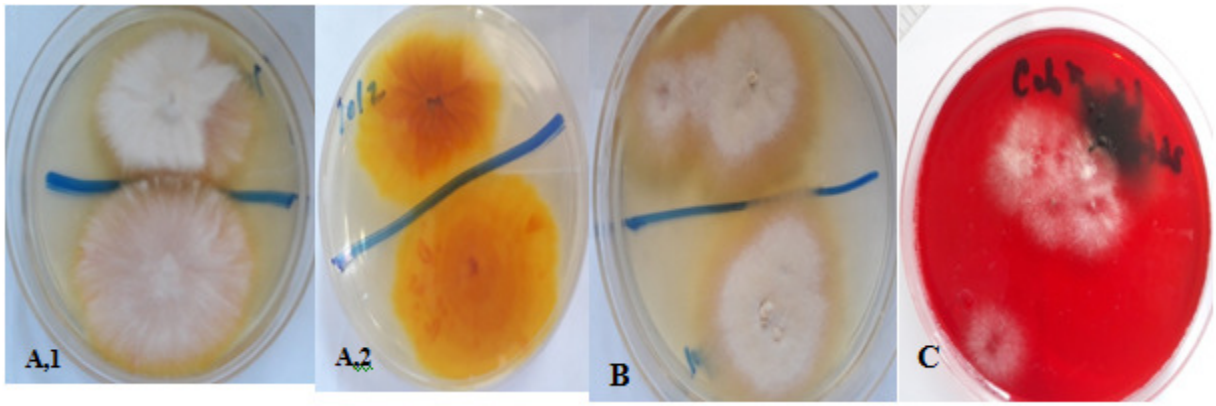

Fig. 5 : A: Morphology of *M. canis* on Sabouraud glucose agar characterized by white, soft and fluffy in the center with yellow or golden yellow border closely spaced radial grooves. B: *Microsporium audouonii* colonies was flat and spreading with a radiating margin with a greyish-white to tan to beige colouration with the reverse a salmon colour to rose-brown. C: Morphology of *M. canis* and *M. auduonii* on DTM agar at 28^{0}C 2 week characterized by white, soft and fluffy ýin the center dark red on the revers closely spaced radial grooves.

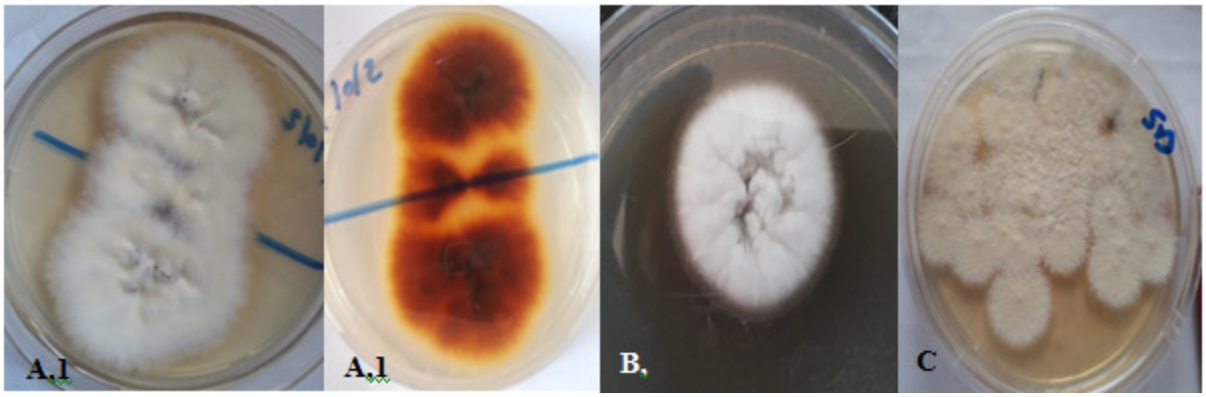

Fig. 6 : A: Macroscopic colony of *Trichopyton rubrum* is downy to cottony in texture with fine white aerial mycelium at the surface. A, 2:The reverse is typically tend to bring out the reddish-brown to yellow colours. B: Macroscopic morphology of *T. terrestreis* creamy white, downy colonies. C: Macroscopic morphology of *Chrysosporium ophiodiicolaon* on Sabouraud glucose agar characterized by ýwhite, soft and fluffy in the center (Top view) and yellow to brown and darker in center (reverse view).

Table 2 : Species, frequency distribution of pathogenic fungi *Dermatophytes* sp. and associated Saprophytic fungal isolated from domestic cats.

Organisms		Percentage of infection (%)
120 *Dermatophytes* spp. of 170 Dermatomycosis (70.6%)	*Microsporum canis*	88 (79.3%)
	Microsporum audounii	12 (10.8%)
	Microsporumgypseum	11 (9.9%)
	Total	111 (92.5%)
	Trichophyton ruburum	5 (55.6%)
	Trichphyton terrestre	4 (44.4%)
	Total	9 (7.5%)
76 non *Dermatophytes* sp.of 170 Dermatomycosis		(44.7%)
5 *Chrysosporium* sp. of 76 cases of dermatomycosis	*Chrysosporium ophiodiicola*	5 (6.6 %)
6 *Malassezia* sp. of 76 cases of dermatomycosis	*Malassezia pacydermatis*	6 (7.9 %)
12 *Alternaria* sp of 76 of dermatomycosis	*Alternaria alternata*	12 (7.1%)
43 *Aspergillus* sp of 76 cases of dermatomycosis	*Aspergillus* sp	43 (27.38%)
	Aspergillus flavus	10(23.3%)
	Aspergillus fumigatus	15(34.9%)
	Aspergillus niger	16(37.2%)
	Aspergillus nidulus	2 (4.7%)
4 of 76 case of skin lesion	*Penicillium* sp.	4 (5.3%)
3 of 76 cases of skin lesions	*Curvularia* sp.	3 (3.9%)
3 of 76 cases of skin lesions	*Rhizopus* sp	3 (3.9 %)

The most lesions localize preferentially on face, nose, around eyes and ears can explain that areas are most in contact with the healthy carrier mother cat while feeding.

We found that a great number of feline dermatophytosis cases are caused by two genera of dermatophyte fungi *Microsporum* represented *M. canis*, *M. audounii* and *M. gypseum* and *Trichphyton* represented *T. ruburum*, *T. terrestre*. When compared result of the present study with result of other authors as Cabanes *et al* (2000) found *M. canis* as the most isolated species (77.8%), followed by *T. mentagrophytes* (13.3%); Khosravi and Mahmoud (2003), Brilhante *et al* (2003) and Beraldo *et al* (2014) in a researches about dermatophytosis in several species of domesticated animals in Iran and Brazil had related the most isolated species was *M. canis* (38.3%), (95%), 53.2%, *T. verrucosum* (31.8%); *T. mentagrophytes* (31.9%) respectively. Our results agree to those described previously mentioned researchers in that *M. canis* was isolated in a higher percentage than *Trichophyton ruburum*, *T. terrestre*, *M .audounii*, *M. gypseum* and being (79.3%), (55.6%), (44.4%), (10.8%), (9.9%) the respective values.

The epidemiology of dermatophytes in domestic cats is relatively higher than dogs, in different countries of the world such as Iran, Italy and Brazil (Khosravi and Mahmoud, 2003; Brilhante *et al*, 2003 and Beraldo *et al*, 2014). These data are accordance with the results obtained in our survey which are represented by higher percentage of feline dermatophytosis in different region of Baghdad city, Iraq, and un accordance to Hasoo (2007 & 2016) because very rarely epidemiological studies on pathogenic fungi infected domestic cats in area of study. These finding can explain by to the variation allegedly occurs due to difference in temperature, climate, relative humidity and precipitation among the geographical regions where the surveys were executed in Iraq. Moreover, high prevalence of ringworm in Al Khurk districts than Al Rusafa districts of Baghdad can be attributed to different geographical distribution of the pathogen in the study area.

No statistically significant difference ($p>0.05$) was found between sex of domestic cats and percentage of dermatophyte species even though males showed a higher isolation rate (74.0%), compared to females (67.74%).

Among domestic cats, the Shirazian Persian and Himalayan breed are most susceptible to high prevalence of infection by *M. canis* than other British, Cross and European breed cats may be explained by the fact that they are more likely to be kept together in large groups where *M. canis* may readily spread; these finding

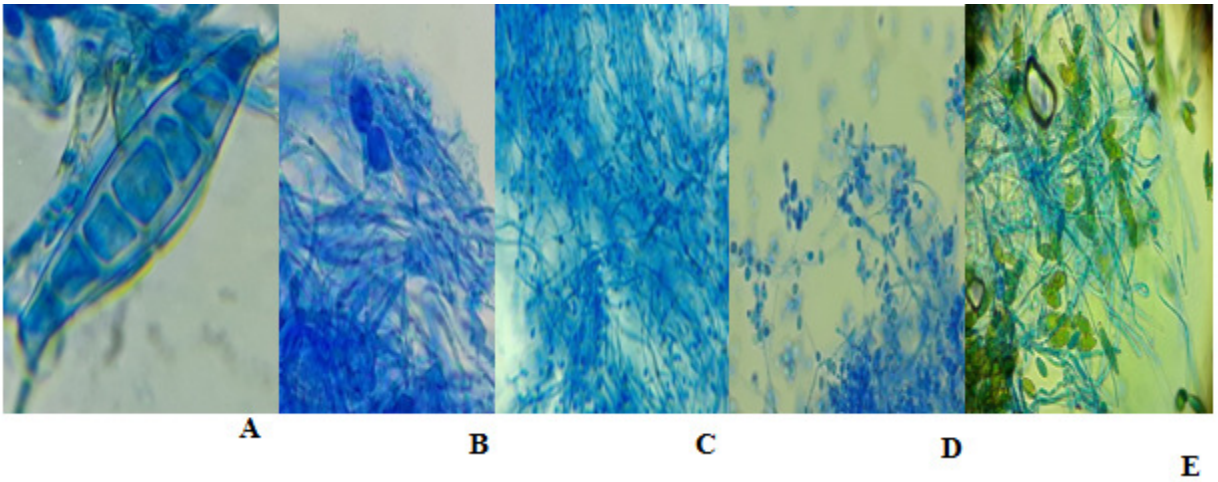

Fig. 7 : A: Macroconidia of *Microsporum canis* show a rough surface with knob-like end or boat like. B: *M. audouinii* starting the formation of racquet hyphae which appear somewhat like a tennis racquet. C: *Trichophyton rubrum* typical microconidaia which are clavate (club shaped) to pyriform (tear-drop shaped), undifferentiated hyphae. D: Morphology of *Chrysosporium ophiodiicola* tear drop or clavate shaped conidia attached to septate hyphae via delicate, (fertile hyphae and conidia). E: Macroconidia of *Alternaria alternata* in Shirazian cat.

Table 3 : Prevalence of felinedermatophytosis in area of study Al Kurkh district.

Area of study Al Kurkh district	No. C. Exa.195	No. C. P. for S.L. 60	No. and (%) C. posi. for Derm. 45(75.0%)
Al Kadmia	23	7	5 (71.43%)
Adaan Square	32	12	9 (75.0%)
Abo Ghraib	17	8	6(75.01%)
Al Amaria	16	7	4 (57.41%)
Al Dolaay	13	2	2 (100.0%)
Al Washiash	10	1	1(100.0%)
Al Mansour	11	2	2 (100.0%)
Al Ghazalia	10	4	3 (75.0%)
Al Shiala	9	2	1 (50.0%)
Al Alaawi	13	2	2 (100.0%)
Al Tobaji	14	3	2 (66.67%)
Hai Al Jamiaa	13	5	4 (80.0%)
Al Huria	14	5	4(80.0%)
Total	195	60(32.0%)	45(64.6%)

$\chi^2 = 3.77$, *P*- value = 0.87, P < 0.05, NSD
χ^2=Chi-Square, *P* value = Probability value, NSD = No significant difference, SD = significant difference.

Table 4 : Prevalence of felinedermatophytosis in area of study Al Rusafa district.

Area of study Al Rusafa district	No. C. Exa.	No.C. P. for S.L.	No. and (%) C. posi. for Derm.
Al Mushatil	32	17	12 (63.0%)
Al Adamiya	36	20	13 (65.0%)
Baghdad Aljadida	24	10	7 (70.0 %)
Al Zafrania	10	8	5 (62.5 %)
Al Mysaloon	28	18	13 (72.2 %)
Palastain Stre.	11	5	3 (60.0 %)
Al Zayouna	6	2	1 (50.0 %)
Al Oubaidy	8	3	2 (66.7 %)
Al Mashital	9	6	4(66.7%)
Al Hussainia	9	3	2 (66.7 %)
Al Shaab	10	8	6 (75.0 %)
Al Sadder city	7	3	1 (33.3%)
Al Doraa Bab	6	2	2 (100.0 %)
AlMuadum	6	2	2 (100.0 %)
Al Habebia	10	3	2(66.7%)
Total	450	101(22.4%)	61(60.4%)

$\chi^2 = 1.66$, P- value = 0.98, P < 0.05, NSD.

agreement with Frymus *et al* (2013) and Miller *et al* (2013) in a research that Persian cats are associated with their potential role as a reservoir and disseminator of zoonotic infections.

There are relationship between age of cats and infection because dermatophytesis directly dependent on age therefore, younger dogs (1-12 month) appear to be susceptible to dermatophytoses more than adult (1-3 years) and old age dogs (more than 3 years) this resultis agreement with result of other authors (Balda *et al*, 2007; d'Ovidio *et al*, (2014) they were found that the prevalence of this infection in cats and dogs less than a year old was more than twice that in older animals.

Relation of coat of domestic cats with prevalence of dermatophytosisshow high prevalence in long hair coat than short hair coat significantly (p>0.05).

Taking into account that the cages where cats were

Table 5 : Prevalence of dermatophytosis in relation to the sex of domestic cats.

Sex	No. C. Exa.	No.C. P. for S.L.	No. and (%) C. posi. for Derm.
Male	183	77(43.3%)	57 (74.0%)
Female	224	93(42.57%)	63 (67.74%)
Total	407	170	120(70.58%)

$\chi^2 = 0.01$, P- value = 0.92, P < 0.05, NSD.

Table 6 : Relation of age of domestic cats with prevalence of dermatophytosis.

Age	No. C. Exa.	No.C. P. for S.L.	No. and (%) C. posi. for Derm.
1 months to 12 months (Young age)	170	119(70.0%)	88(73.94%)
1 – 3 years (Adult age)	120	47(39.17%)	30(63.82%
3 – more than 7 years (Old age)	97	4 (4.12%)	2(50.0%)
Total	387	170	120(70.59%)

$\chi^2 = 2.85$, P- value = 0.24, P < 0.05, NSD.

Table 7 : Relation of coat of domestic cats with prevalence of dermatophytosis.

Coat	No. C. Exa.	No.C. P. for S.L.	No. and (%) C. posi. for Derm.
Short hair	172	40 (23.26%)	21 (57.14%)
Long hair	235	130 (55.32%)	99 (96.12%)
Total	407	170 (41.77%)	120(70.59%)

$\chi^2 = 6.66$, P- value = 0.009, P < 0.05, SD

Table 8 : Prevalence of dermatophytosis in relation to the Habit of domestic cats.

Habit	No. C. Exa.	No.C. P. for S.L.	No. and (%) C. posi. for Derm.
Household	136	60 (44.12%)	41(68.33%)
Shelters	67	53(79.1 %)	41(77.36%)
Plantation	204	57(27.94 %)	38(71.15%)
Total	407	170(41.77%)	120(66.67%)

$\chi^2 = 1.4$, P- value = 0.49, P < 0.05, NSD.

housed have been previously inhabited by cats with skin mycosis,we assume that the contact with surface contaminated with *M. canis* spores was the natural route of this dermatophyte infection. Therefore, the higher prevalence of dermatophytes isolated from dogs were habitat in shelter and plantation habitat compared with housed cats. These result can be explain by the role of the stress due to the high population density;pregnancies; successive lactations; and frequent participation in

Table 9 : Prevalence of dermatophytosis in relation to the breeds of domestic cats.

Breeds of dogs	No. C. Exa.407	No. C. P. for S.L. 170(41.8%)	No. and (%) C. posi. for Derm.120 (70.6%)
Himalayan persian	63	26(41.27%)	18(69.23%)
Shiraz	140	106(75.71%)	80(75.47%)
Persian	24	5 (20.83%)	3(60.0%)
British shorthair	81	22(27.16%)	12(54.55%)
Local Cross	71	5(7.0 %)	3(60.0%)
France shorthair	28	6(21.43%)	4(66.67%)

$\chi^2 = 2.85$,P- value = 0.24 ,P < 0.05 ,NSD

Table 10 : Prevalence of dermatophytosis in relation to the months of years.

Months of year	No. C. Exa.	No.C. P. for S.L.	No. and (%) C. posi. for Derm.
January 2018	74	34	30 (88.23%)
February	61	26	20(76.92%)
March	35	14	11 (78.57%)
April	30	15	10 (66.66%)
May	21	10	7 (70.0%)
June	20	12	9 (75.0%)
July	41	17	11 (64.7%)
August	38	10	6 (60.0%)
September	22	9	5 (55.55%)
October	24	10	6 (60.0%)
November	21	8	2 (25.0%)
December 2018	25	5	3 (50.0%)

$\chi^2 = 13.8$, *P*-value = 0.13, P < 0.05, NSD.

exhibitions is also a predisposing factor (Miller *et al*, 2013 and Nitta *et al,* 2016). Also cats kept in shelters or commercial catteries are important predisposing factorto carriers of ringworm due to the environment and sanitary management (Nitta *et al*, 2016).

The effect of season on the carriage rate of dermatophytes was high in winter and spring, than autumn. This could be related effect of year season, climate, temperature, humidity, the health of the cat, stress factors, number of spores, hygieneon the prevalence of infection.

Chrysosporium ophiodiicola was isolated from some domestic cats were housed in shelter and plantation habitat can be explained that the cages where cats were housed have been previously inhabited by snake, hedge hogs which are a potential sourceof spores transmission to dogs.

Table 11 : Prevalence of dermatophytosis in relation to the seasons of years.

Seasons of year	No. C. Exa.	No. C.P. for S.L.	No. and (%) C. P. for Derm.
Winter (Dec.-Jan. -Feb.)	185	65	53(81.54%)
Spring (Mar.-Apr. -May)	86	39	28(71.79%)
Summer (Jun.-Jul. -Aug.)	99	39	26(66.66%)
Autumn (Sep.-Oct.-Nov.)	67	27	13(48.15%)

$\chi^2 = 10.49$, *P*-value = 0.005, P < 0.05, SD

The presence of *Alternaria* spp, which is non dermatophyte contaminant fungal flora may be due to their ubiquitous nature of their spores in the environment. Saprobe fungi also recovered contaminant fungal flora from pets, which are commonly found in the environment (Nichita *et al*, 2010). The occurrence of a great variety of saprobe fungi in cats with superficial lesions beside dermatophytes such as *Malassezia pacydermatis* (7.9%), *Alternaria alternate* (7.1%)*, Aspergillus* spp (27.38%), *Penicillium* sp. (5.3%), *Curvulariasp* (3.9%) and *Rhizopu* ssp (3.9%) could be explain by the environmental contamination provided constant exposure to a large source of organisms which contributed to the eventual relapse of the infection.

These finding areagreement with result of Nichita *et al* (2010), they were showed that these fungi are commonly found in soil, air, plants and on other materials, which are in a constant contact with animals and can proliferate and elicit an infection.

CONCLUSION

1. The most common dermatophyte sp in domestic cats are *M. canis* and *T. ruburum*.
2. This is the first study in Iraq to describe feline dermatophytosis caused by *Chrysosporium ophiodiicola* of keratinophilic filamentous fungi.
3. Seasons changing has a prominent role on the prevalencerate offeline dermatophytosis.
4. The prevalence offeline dermatophytosis is effected by some factors represented by age, breed, coat and habitat.

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