

STUDIES ON INTESTINAL HELMINTHES INFECTING FREE-RANGING RED FOX (*VULPES VULPES*) IN NORTH-WESTERN PART OF LIBYA

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SUMMARY

Eighteen free-ranging live red fox (*Vulpes vulpes*) captured during the period ranged from October 2007 to April 2008 from rural and semi-desert regions of North-Western part of Libya were investigated parasitologically for presence of intestinal helminthes . The study revealed that 2 foxes (11.1%) were free from intestinal helminthes and 16 foxes (88.9%) were infected with helminth parasites species. These helminthes were four cestodes: *Joyeuxiella echinorhynocoides* 5(31.25%), *Mesocestoides* spp. 6(37.5%), *Diplopylidium nolleri* 2(12.5%) and *Dipylidium caninum* 1(6.25%). Three nematodes: *Rictularia caherrsis* 3(18.7%), *Ancylostomacanthum* 3(18.7%) and *Toxocara canis* 2(12.5%). Only one Acanthocephala: *Moniliformis dubius* 4(25%). No

trematodes were found. All these helminthes were recovered and reported for the first time from red fox (*Vulpes vulpes*) in north-western part of Libya. Five helminthes of them has zoonotic important. Therefore, the study showed that the red fox (*Vulpes vulpes*) plays an important role in the investigated area as a reservoir host of a number of parasites of domesticated and wild animals or may have zoonotic importance. The results were discussed with reference to variations in the live behavior and diet in the rural areas of North-western part of Libya.

Key words: Helminthes, wild animals, red fox, Libya.

1. INTRODUCTION

Ecological imbalance in sub-Sahara of Libya due to climatic changes, desertification, shortage of food and water during latest twenty years led to

immigration of wild animals from their zone to near by rural and urban area. Wildlife are now recognized as an important source of emerging human pathogen, including parasites.

(Polly, 2005). Red fox (*Vulpes vulpes*) in Libya as in other regions of the world plays an important role in the transmission of disease agents to other wild, domesticated animals and humans. Red fox (*Vulpes vulpes*) is fairly common in the hill country of the coastal zone of eastern Libya (El-Jabal El-

Akhdar) but less in the hills and coastal zone of western (El-Jabal El-Gharbee). The available literature showed data concerning the population and geographical distribution of red fox in Libya. Consequently the diseases that occur in red foxes are also not well studied and documented.

2. MATERIAL AND METHODS

A. Area of study:

The study was conducted from October, 2007 – April 2008 in north-western part of Libya. The study area extended from municipality of Mosrata in the east to Tunisian border in the west and from mediterranean coast in north to depth of approx 400 km in south. This area constitutes about 7% of the total land mass of Libya. Vegetation in the studied area is more lush in the north and declines towards the south, changing first to sub-Sahara areas towards the south. The ambient temperature is generally mild to cold in winter and hot in late spring and summer. winter is the main season for rainfall

and is concentrated in the coastal strip and declines in its amount and frequency towards the south.

B. Collection of samples and methods of diagnosis:

A total of 18 free-ranging red foxes (*Vulpes vulpes*) were captured alive in their habitat using special nets, steel leg hold traps and steel cages. The captured live red foxes were kept in the special quarantine enclosure. Red foxes carcasses were dissected and eviscerated. The digestive tract of each animal was opened carefully with fine pointed scissors and examined by naked eye. The helminthes were collected in a petridish with saline and mounted according to (Soulsby, 1982).

3. RESULTS

The present study revealed that out of 18 examined adult red foxes, 16(88.9%) were infected with 8 helminthes species while 2 (11.1%) were free of the intestinal helminthes. The prevalence of helminthe parasites found in 16 infected red foxes (as shown in Table 1) were identified as 4 cestodes species recovered from 5 (*Joyeuxiellaechinorhynocoides*), 6 (*Mesocestoides* spp.), 2 (*Diplopylidium nolleri*) and 1 (*Dipylidium caninum*) infected red foxes with percentage of infection 31.25%, 37.5%, 12.5% and 6.25% respectively. Also, three nematodes species

identified as *Rictularia caherrsis*, *Ancylostoma caninum* and *Toxocara canis* were recorded in 3(18.75%), 3(18.75%), and 2(12.25%) infected red foxes respectively. Only one Acanthocephala, (*Moniliformis dubius*) was recorded from 4(25%) infected animals. Five parasites species out of the detected helminthes has of zoonotic importance. These five parasites were two cestodes (*Mesocestoides* spp. and *Dipylidium caninum*), two nematodes (*Toxocara canis* and *Ancylostoma caninum*) and one Acanthocephala (*Moniformis dubius*). No trematodes were recovered in this study. Mixed helminthes species infections were detected in most examined red foxes (Table 2).

Parasitism with one species only was found in 8 (50%), 2 species in 6 (37.5%) and 3 species in 2 (12.5%) infected red foxes. Eight intestinal helminth species (*Joyeuxiella echinorhyncooides*, *Mesocestoides* spp, *Diplopylidium nolleri*,

Dipylidium caninum, *Rictularia caherrsis*, *Ancylostoma caninum*, *Toxocara canis* and *Moniliformis dubius*) recovered in this study are first record in free-ranging red foxes (*Vulpes vulpes*) in North-Western part of Libya.

Table 1: Prevalence of helminth parasites species found in 16 infected red foxes in North-Western part of Libya.

| Parasites | Cestodes | | | | Nematodes | | | Acantocephala |
|-------------------------|--------------------------------------|---------------------------|------------------------------|---------------------------|-----------------------------|----------------------------|-----------------------|----------------------------|
| | <i>Joyeuxiella echinorhyncooides</i> | <i>Mesocestoides</i> spp. | <i>Diplopylidium nolleri</i> | <i>Dipylidium caninum</i> | <i>Rictularia caherrsis</i> | <i>Ancylostoma caninum</i> | <i>Toxocara canis</i> | <i>Moniliformis dubius</i> |
| No. of infected red fox | 5 | 6 | 2 | 1 | 3 | 3 | 2 | 4 |
| % of infection | 31.25 | 37.5 | 12.5 | 6.25 | 18.75 | 18.75 | 12.5 | 25 |

Table 2: Helminth species collected from each red foxes (*Vulpes vulpes*) in North-Western part of Libya.

| Case No. | Cestodes | | | | Nematodes | | | Acantocephala |
|----------|--------------------------------------|---------------------------|------------------------------|---------------------------|-----------------------------|----------------------------|-----------------------|----------------------------|
| | <i>Joyeuxiella echinorhyncooides</i> | <i>Mesocestoides</i> spp. | <i>Diplopylidium nolleri</i> | <i>Dipylidium caninum</i> | <i>Rictularia caherrsis</i> | <i>Ancylostoma caninum</i> | <i>Toxocara canis</i> | <i>Moniliformis dubius</i> |
| 1 | - | + | - | - | + | - | + | - |
| 2 | + | - | + | - | - | - | - | - |
| 3 | - | + | - | - | - | - | - | + |
| 4 | - | - | - | + | - | - | - | - |
| 5 | + | + | - | - | - | - | - | + |
| 6 | - | - | - | - | + | - | - | - |
| 7 | - | - | - | - | - | - | - | - |
| 8 | - | - | - | - | - | + | - | - |
| 9 | - | + | - | - | - | - | - | - |
| 10 | - | - | - | - | - | - | - | - |
| 11 | - | - | - | - | - | + | - | + |
| 12 | - | - | - | - | - | + | - | - |
| 13 | + | + | - | - | - | - | - | - |
| 14 | - | - | - | - | - | - | - | + |
| 15 | - | - | - | - | + | - | - | - |
| 16 | - | + | - | - | - | - | - | - |
| 17 | + | - | - | - | - | - | + | - |
| 18 | + | - | + | - | - | - | - | - |

4. DISCUSSION

The available literature showed scanty information on the population and geographical distribution of red fox (*Vulpes vulpes*) in Libya. Consequently the diseases occurring in this animal were also not well studied and documented.

In the present study the prevalence of helminth parasite was 16 (88.9%) out of 18 examined red foxes. 8 intestinal helminthes parasites were founded in red foxes Papadopoulos et al. (1997) in Greece, identified eighteen species of helminthes parasites from 314 red foxes(*Vulpes vulpes*).. These include the cestodes species (*Joyeuxiella echinorhyncooides*, *Mesocestoides spp* , *Diplopylidium nolleri* and *Dipylidium caninum*). *Joyeuxiella echinorhyncooides* recorded at prevalence 31.25%. nearly similar to that recorded by Papadopoules et al.(1997) 24.5% in Greece. On the other hand El-Shehabi et al. (1999) in Jordan and Amer (1984) in Egypt recorded *Joyeuxiella echinorhyncooides* in red foxes. *Mesocestoides spp*. In this study from 33.3% of the examined red foxes. It was higher than that mentioned by Jones and Walters (1992) in England 0.51%. Ballek et al. (1992b) in Germany 4.3% and Wessbecher et al. (1994) in Germany (16.6%) and lower than that recorded by "Papadopoules et al. (1997) in Greece

73.2% and Pfeifer et al.(1997b) in Germany 54.1%. Moreover, Loss-Frank (1991) in Germany, Boch and Schneidawind (1988) and El-Shehabi et al.(1999) in Jordan recorded *Mesocestoides spp*.

In the infected red foxes, *Diplopylidium nolleri* was found in 12.5% of infected animals. It was higher than obtained by Poglayen et al. (2003) 2.9% in Italy, Jones and Walters (1992) 2.86% in England, Wessbecher et al. (1994) 0.5% in Germany, Alvarez et al. (1995) 0.5% in Spain, Richards et al. (1995) 3.8% in England and Pfeifer et al.(1997b)0.2% in Germany. Also *Diplopylidium nolleri* was recorded by Niphadkar et al. (1989) in India, Abdel-Aal (1990) in Egypt and Boch and Schneidawind (1988) in the same wild life animal. *Dipylidium caninum* was recorded in the infected red fox at prevalence 6.25%. The present result was nearly similar to that obtained by Richards et al. (1995) 3.8% in England and Poglayen et al. (2003) 2.9% in Italy. On other hand the present result was higher than that obtained by Jones and Walters (1992) 0.51% in England, Wessbecher et al. (1994) 0.5% in Germany, Alvarez et al. (1995) 0.5% in Spain and Pfeifer et al.(1997a) 0.2% in Germany.

Rictularia cahersis, *Ancylostoma caninum* and *Toxocara canis* were recovered in this study. *Rictularia cahersis* was recorded at prevalence 16.7% out of the 16 infected red foxes. It was similar to that of Papadopoulos et al. (1997) 17.5% in Greece. *Ancylostoma caninum* was 18.75%. Lower prevalence rate was obtained by Ballek et al (1992a) 3.8% and Pfeifer et al. (1997a) 1.7% in Germany. Furthermore, El-Azzazy et al. (1984), Boch and Schneidawind (1988) in Germany recorded *Ancylostoma caninum* in red foxes. *Toxocara canis* was recorded in infected red fox at prevalence 12.5%. Our result was lower than the result recorded by Poglayen et al (2003) 45.6% in Italy, Ballek et al. (1992a) 32.7% in Germany, Alvarez et al. (1995) 23% in Spain, Richards et al.

4. CONCLUSION

In conclusion, the present study proved that free-ranging red foxes (*Vulpes vulpes*) in the study area infected by eight intestinal helminthes species (four species of cestodes, three nematodes and one acanthocephala), this indicate the importance of this wild life animal in being a host of and play a role in the life cycle of these parasites and their transmission, therefore infecting another wild

(1995) in England, Pfeifer et al. (1997a) 26.5% in Germany, Papadopoulos et al. (1997) 28.6% in Greece, Smith et al. (2003) 61.6% in England and Borgsteed (1984) 73.7% in Netherlands. On the other hand the present result was higher than that reported by Skirnisson et al. (1993) 2% in Iceland. *Moniliformis dubius* was the only Acanthocephala species recovered from infected red fox in this study with prevalence 25%. However, Skirnisson et al.(1993) in Iceland recorded Acanthocephalla: *Polymorphus meyei* 8% and *Corynosoma hadweni* 2%. Additionally Richards et al. (1995) in England recorded *Acanthocephala tranverses* 0.7% and *Maeracanthorhynchus catulinus* 0.1%. In Jordan, El-Shehabi et al. (1999) recorded *M.catulinus* in red foxes.

animal, domestic animals and man. Zoonotic parasite species were recorded in this study. The recovered parasites in present study negatively affect the numbers and survivability of red fox in the wild this due to the disease caused by these parasites. This is the first time in the north-western part of Libya eight intestinal helminthes species were recovered and reported in free-ranging red foxes (*Vulpes vulpes*).

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REFERENCE

- Abdel-Aal A.(1990): Some studies on helminth parasites of wild animals in Sinai area. M.V.Sc. Thesis (Parasitology).Suez Canal Uni.
- Alvarez M.F., Iglesias R., Garcia J., Paniagua E. and Sanmartin M.L. (1995): Intestinal helminthes of red fox (*Vulpes vulpes* L.) in Galicia (Northwest Spain). *Waid Parazytol.* 41(4): 42-49.
- Amer O.H. (1984): Some studies on helminth parasites of some wild animals M.V.Sc. Zagazig Uni.
- Ballek D., Talka M., Ising-Volmer S. and Stoye M.(1992a): The wild helminth fauna of the red fox (*Vulpes vulpes* LINNE,1758) in Nordhessen and east westphalia. 2. Nematodes. *Dtsch Tierärztl Wochenschr* 99 (11): 435-7.
- Ballek D., Talka M., Ising-Volmer S. and Stoye M.(1992b): The wild helminth fauna of the red fox (*Vulpes vulpes* LINNE,1758) in Nordhessen and east westphalia. 1. Cestodes. *Dtsch Tierärztl Wochenschr* 99 (9): 362.
- Boch Y. and Schneidawind H. (1988): *Krankheitendes Jagdbaren wilde fuchs (Vulpes vulpes)*. Verlag Paul Parey, 551-268 Hamburg and Berlin.
- Borgsteed F.H.M. (1984): Helminth parasites of wild foxes (*Vulpes vulpes*) in Netherlands. *Z. Parasitenkd*, 70:281-285.
- El-Azzazy O., Ahmed B., Nada S., Fayek S. and Amer O. (1984): Some studies on nematodes infesting wild meat eater with reference to their epidemiology in Egypt. *Vet. Med. J. Giza* 32(3): 45.
- El-Shehabi F.S., Abdel- Hafez, S.K. and Kamhawi S.A. (1999): Prevalence of intestinal helminthes of dogs and foxes from Jordan. *Parasit.Res.* 85 (11): 928-934.
- Jones A. and Walters T.M. (1992): The cestodes of foxhounds and foxes in Powys, mid-Wales. *Ann.Trop. Med. Parasitol.* 86 (2):143-150.
- Loss-Frank B. (1991): One or two intermediate hosts in the life cycle of *Mesocestoides* (Cyclophyllidae, Mesocestoididae) *J. Parasitology Research* 77(8): 726-728.
- Niphadkar S., Narsapur V., Deshpamed V., and Nehete K. (1989): Parasitic infection of zoo animals in Bombay. *J. Bombay. Vet. College* (1):87-90.
- Papadopoulos H. Himonas, C. and Papazahariadou, M.(1997): Helminths of foxes and other wild carnivores from rural areas in Greece. *J.Helminthol.* 71(3): 227-231.
- Pfeifer, F., Kuschfeldt S., and Stoye, M. (1997a): Helminths fauna of red fox (*Vulpes vulpes*) in southern Saxony-2 Nematodes. *Dtsch Tierärztl Wochenschr.* 104 (11): 475-477.
- Pfeifer F., Kuschfeldt, S., and Stoye, M. (1997b): Helminths fauna of red fox (*Vulpes vulpes*) in south Sachsen-Anhalt-1 Cestodes. *Dtsch Tierärztl Wochenschr.* 104 (10): 445-448.
- Poglayen G., Giannetto S., Scala A., Garippa G., Scaravelli D., Brianti E. and Reeve N. J. (2003): Helminths found in hedgehogs (*Erinaceus europaeus*) in three areas of Italy. *Vet. Rec.* 152(1): 22-4.
- Polly L. (2005): Navigation parasite webs and parasite-flow emerging and remerging parasitic zoonoses of wildlife origin. *Int. Parasitol.* 35(11-12): 1279-1294.

Richards D. T., Harris S. and Lewis J. W. (1995): Epidemiological studies on intestinal helminth parasites of rural and urban red foxes (*Vulpes vulpes*) in the United Kingdom. *Vet. Parasitology* 59: 39-51.

Skirnisson K., Eydal, M. Gunnarsson, E and Hersteinsson, P. (1993): Parasites of the arctic fox (*Alopex lagopus*) in Iceland. *J. Wildl. Dis.* 29 (3): 440-446.

Smith G. C., Gangadharan, B., Taylor, Z., Laurenson M. K. Bradshaw, H., Hide, G.,

Hughes J. M., Dinkel A., Romig T. and Craig, P.S. (2003): Prevalence of zoonotic important parasites in red fox (*Vulpes vulpes*) in Great Britain. *Vet. Parasitol.* 118 (1-2): 133-142.

Soulsby E. J. L. (1982): *Helminths, Arthropods and Protozoa of Domesticated animals* 7th edition London Balliere Tindal Lea and Febiger.

Wessbecher H., Dalchow W. and Stoye M. (1994): The helminth fauna of the red fox (*Vulpes vulpes*) in the administrative district of Karlsruhe 1. Cestodes. *Dtsch Tierärztl Wochenschr* 101 (8): 322-326.

دراسات على الديدان المعوية التي تصيب الثعلب الأحمر الطليق في شمال غرب ليبيا

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أجريت هذه الدراسة على عدد ١٨ ثعلب أحمر، تم صيدهم من مناطق صحراوية وشبه صحراوية في شمال غرب ليبيا بين الفترة أكتوبر ٢٠٠٧ - إبريل ٢٠٠٨ للتعرف على الديدان المعوية. أوضحت الدراسة أن عدد ٢ (١١,١%) ثعلب أحمر خالية من الديدان أما ١٦ (٨٨,٩%) منهم كانت مصابة بالطفيليات الداخلية، ٤ أنواع من الديدان الشريطية و ٣ أنواع من الديدان الخيطية و واحد فقط بأكانتوسيفالا. كل هذه الديدان تم التعرف عليها لأول مرة في الثعلب الأحمر في شمال غرب ليبيا ومنهم ٥ أنواع ذات الأهمية المشتركة.