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HELMINTHIC INFECTION IN DIGESTIVE SYSTEM OF GOATS IN SLAUGHTERHOUSE, MANFALOUT, ASSIUT GOVERNORATE, EGYPT

By
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Abstract

A total of 90 goats digestive tracts were collected between May 2018 and end of September 2019 from private public abattoir in Beni-Adi (Manfalout) and examined for helminthes. They were *Fasciola hepatica & F. gigantica* 40%, *Moniezia expansa* (6.7%), *Avitellina centripunctata (*6.7%), *Haemonchus* spp. (16.7%)*, Trichostrongylus axei* (10%), *Ostertagia ostertagia* (6.7%), *Oe-sophagostomum venulosum* (10%), *Skrjabinema ovis* (10%) and 2 larval cestodes, *Cysticercus tenuicollis* (20%), and hydatid cyst (6.7%). Most of these parasites are zononosis.

Key words: Assiut Governorate, Slaughtered goats, helminthic infection.

Introduction

Goats are one of the most beneficial livestock. In Egypt, development of rural areas could be achieved depending on sheep and goat which is considered as one of the most promising animals to achieve the aims of meat production supplies for the human being (Sultan *et al,* 2010). They are one of the important sources of animal protein mainly in the Arabian Countries. Goats are used in ceremonial festivities throughout the country as well as production of cashmere and mohair fibers (Smith and Sherman, 1994). Such animals are a source of preparation of human and animal vaccines, manufacture of medical surgical threads from the small intestine and formation of manure fertilizers for soil from their fecal pellets (Mohammed, 2008). No doubt, parasitoses are risky for all domestic in terms of morbidity and mortality (Urquhart *et al,* 1996) as well as economic losses (Ensminger, 2002). Besides, unthrifty which included weight loss, low birth weights and difficulty in kidding due to zoonosis parasites causing morbidity and even mortality (Khalafahlla *et al,* 2011). Helminthiasis infections of goats are major factors for productivity reduction, and affected organs condemnation. Small-holders may not easily detect the effects of internal parasites on animals, because of the generally subclinical or chronic nature of the helminthic infections, So, the subclinical parasitic infections were responsible for significant economic loss, as once clinical disease occurred in edible animals due to productivity and meat processing (Kaplan, 2006). Some helminthes are zoonosis as hydatidosis, trichinosis and coenurosis (Wang *et al,* 2002). Thus, slaughtered animals must be examined for bacteria and parasites (Haridy *et al,* 2008) with eradication programs (Al-Qudah *et al,* 2008).

This work aimed to study the gasterointestinal parasites in slaughtered goats in Manfalout City, Assiut Governorate by postmortem macroscopic and microscopic examinations using simple and electron microscopic studies.

Material and Methods

Goats: A total 90 were examined for helminthic infection from the beginning of May 2018 to last September 2019, from private public abattoir in Beni-Adi village Manfalout City. Animals' age was identified by dental inspection, as young with temporary incisors (milk teeth) and adult with permanent incisors (Mekonnen, 2007).

Collection and examination: Body cavity of each goat carcasses was macroscopically examined as a routine abattoir post mortem. Liver was palpated and dissected for any parasites. Rumen and reticulum were examined after evacuating their contents to collect parasites. Abomasum, small and large intestines was ligated at both ends and safely carried directly to laboratory, Parasitology Department, Assiut Animal Health Research Institute. Each organ was opened with a scissor

and examined macroscopically for adults and parasitic nodules. Their contents were washed separately through a 90-mesh sieve (large intestine through a 250-mesh sieve), put in a clean bucket and allowed to stand for about one hour to allow sedimentation of worms. After that, the supernatant was discarded and the bucket was filled with water again for washing. The process of washing was repeated till the supernatant became clear. The sediments were carefully examined by the naked eyes as well as a hand lens, then diluted and examined under a stereomicroscope (Umur and Yukari, 2005).

Preparation: Worms were washed several times in normal physiological saline, and kept overnight in refrigerator for complete relaxation. Worms were flattened between two slides and placed in the fixative (10% formalin) for 24hrs. The fixed worms were washed several times in running tape water to remove the traces of formalin (Soulsby, 1988). Cestodes and trematodes were stained with acetic acid- alum carmine. Formula: Carmine 2gm, Acetic acid 25ml**,** Potassium alum 6gm & Distilled water 100ml. The dye and alum were boiled in water; 1hr cooled, acid added, left for ten days for ripening and then filtered.

Staining and mounting: Fixed specimens were left to stain overnight. Stained specimens were washed several times with distilled water**.** Differentiation of the over-stained specimens was done in acidified 70% ethanol. Specimens were examined under dissecting microscope until they were well differentiated, and wash several times in 70% ethanol to remove residual HCl. Dehydration was done in ascending ethanol grades and absolute ethanol for 30 minutes in each change. Stained specimens were cleared in clove oil for few minutes, mounted in Canada balsam and left to dry in an oven at 37^{o}C.

Fixation and preservation: The nematodes were immersed in warm 70% ethanol (60^{o}C) and preserved in 70% ethanol with 5% glycerin. They were cleared in lactophenol for 24hrs (Watson, 1960) consisted of Glycerol (10.6ml), melted phenol (10ml), Lactic acid (8.2ml), distilled water (10ml), mounted in glycerin jelly [Gelatin granulated (10ml**)**, distilled water (60ml), Glycerin (70ml**)**, melted phenol (0.5ml**)]**. in small wide mouth bottles in refrigerator until needed use, to liquefy put in water bath at 56^{o}C,

Results

Post mortem examination: The digestive tracts were collected from May 2018 to the end of September 2019 from private public abattoir in Beni-Adi for helminthiasis. Species of helminthes in the digestive tract were *Fasciola* spp., *Moniezia expansa*, *Avitellina centripunctata, Haemonchus* spp.*, Trichostrongylus axei*, *Ostertagia ostertagia*, *Oesophagostomum venulosum*, *Skrjabinema ovis* and two larval cestodes; *Cysticercus tenuicollis* and hydatid cyst. Both genus and species were identified according to the morphological characteristics using the valid taxonomic keys.

Details were given in table (1) and figures **(**1 to 25).

Table 1: Prevalence of parasitic infection in 90 goats in post mortem examination.

Parasite recovered	Site	No. Infected	%
Trematodes: *Fasciola* spp.	bile ducts of liver	36	40
Cestodes: *Moniezia expansa*	Small intestine	6	6.7
Avitellina centripunctata	Small intestine	6	6.7
Cysticercus tenuicollis	Mesentery and liver	18	20
Hydatid cyst.	Liver	6	6.7
Nematodes: *Haemonchus* spp.	Abomasum	48	53.3
Trichostrongylus axei	Abomasum	15	16.7
Ostertagia ostertagia	Abomasum	9	10
O. venulosum	Large intestine	6	6.7
Skrjabinema ovis	Colon and Caecum	9	10

Discussion

In the present study, *Fasciola* spp. were in higher prevalence 40% than given by Bayu *et al.* (2013) in Ethiopia found (2.26%), Elshahawy *et al.* (2014) in Upper Egypt reported *F. gigantica* in (4.4%), Ezatpour *et*

al. (2015) in Iran reported 3.9%, ElKhtam and Khalafalla (2016) in Sadat City (Egypt) reported *F. hepatica* (0.41%), and *F. gigantica* (5.83%), as well as the role of donkeys and horses as zoonotic fascioliasis (Haridy *et al,* 2002) and high rate of Egyptian human fascioliasis were reported (Abo-Madyan *et al,* 2004). Variable in prevalence rates might be due to climatic variations, habitats, samples number, veterinarians follow-up and periodical control measures (Berhe *et al,* 2009), added by ecological factors favoring snail hosts (Chanie and Begashaw, 2012).

In Assiut Governorate the high infection rate might the old-aged slaughtered animals subjected to several exposures to infections or development of fasciolicidal resistance. This agreed with Khan *et al.* (2009) who found that high fascioliasis rate was due to improper control of animal fascialiasis and its snail hosts, as well as the opened drainage system**.**

In the present study, *Moniezia expansa* showed a rate of 6.7%. This was lower than 20% in Iceland (Kristmundsson and Richter, 2000), 17.04% in India (Pathak and Pal, 2008), 53% in Eastern Ethiopia (Sissay *et al,* 2008), and 18.3% in Giza Governorate (Hassan *et al,* 2019) but, higher than 0.1% in Darfur, Sudan (Almalaik *et al.* 2008). Also, El Shazly *et al.* (2004) in Dakahlia G. reported one zoonotic monisziasis.

In the present study, *Avitellina centeripunctata* showed a rate of 6.7%, which was higher than 3.40% in India (Pathak and Pal, 2008), but lower than 21% in Ethiopia (Sissay *et al,* 2008).

In the present study, *Cysticercus tenuicollis* showed a rate of 20%. This went with 18.04% in Iran (Radfar *et al,* 2005), but lower than 53% in Ethiopia (Sissay *et al,* 2008), 6.86% Assiut Governorate (Arafa and Fouad, 2008), 24.2% in Aswan G. (Dyab *et al,* 2017). But, Soliman and Taha (2012) in Al-Madinah, Saudi Arabia reported 1.8%. Variation in infection rates with this larval stage may be attributed to abundance of its host, stray dogs in sheep and goats farms (Kilinc *et al,* 2019).

In the present study, hydatid cyst, larval of *E. granulosus* was detected in 6.7% of livers. This was higher than 2.57% in Ahwaz, Iran (Ahmadi and Meshkehkar, 2011), 0.16% in Al-Madinah, Saudi Arabia (Soliman and Taha, 2012), 1.39% in Addis Ababa, Ethiopia (Bayu *et al,* 2013) & 2.46% in El-Kharga, Egypt (Osman *et al*. (2014). But, the incidence was lower than 65% in eastern Ethiopia (Sissay *et al,* 2008), 10% in Shiraz, Iran (Oryan *et al,* 2012) and 10.7% in India (Moudgil *et al,* 2020). This variation may be due to genetic factors and immunity that affected infection susceptibility. But, zoonotic hydatidosis was a silent health problem (El-Shazly *et al*, 2007). Egyptian echinococcosis/ hydatidosis was reported in stray dogs (Sabry *et al,* 2012), edible animals (Haridy *et al,* 2000) and man (Mazyad *et al,* 1998; El-Sayed *et al,* 2020)

In the present study, nematodes prevalence was 53.3%. This more or less went with 43.8% in Saudi Arabia (El-Azazy, 1995), 52% in Nigeria (Nwosu *et al*, 2007), 54.3% in Kashmir (Tariq *et al,* 2010), but less than 93% in central Spain **(**Valcárcel and García Romero, 1999), and 83% in Sanliurfa, Turkey (Altaş *et al,* 2009). In general, these gastrointestinal nematodes remain one of the main constraints to ruminant production, caused reduction in skeletal growth, live-weight gain in milk yield and could affect the control strategies (van Houtert and Sykes, 2010), but expression of immune responses against them were less efficient in goats than sheep (Zanzani *et al,* 2014). The anthelmintic resistance phenomenon spread in many countries with differences in prevalence and developed rapid resistance in goats (Di Cerbo *et al,* 2010). Genera, *Haemonchus,* and *Trichostrongylus* were proved to be zoonosis (Bowman, 2020), and now what about other gastrointestinal nematodes of goats?

Conclusion

Approximately one-sixth of the worlds' population is infected with helminths and this class of parasite play a zoonosis major role

in the domestic livestock.

The intestinal helminths alter the intestinal physiology, permeability, mucous secretion and the antimicrobial peptides production, which may impact on bacterial survival and spatial organization. Consequently, the early diagnosis and the proper treatment of domestic animals is a must for human welfare.

The composition knowledge of the goats' gastrointestinal helminthic fauna of and their epidemiological parameters is a must to prevent the anthelminthic resistance.

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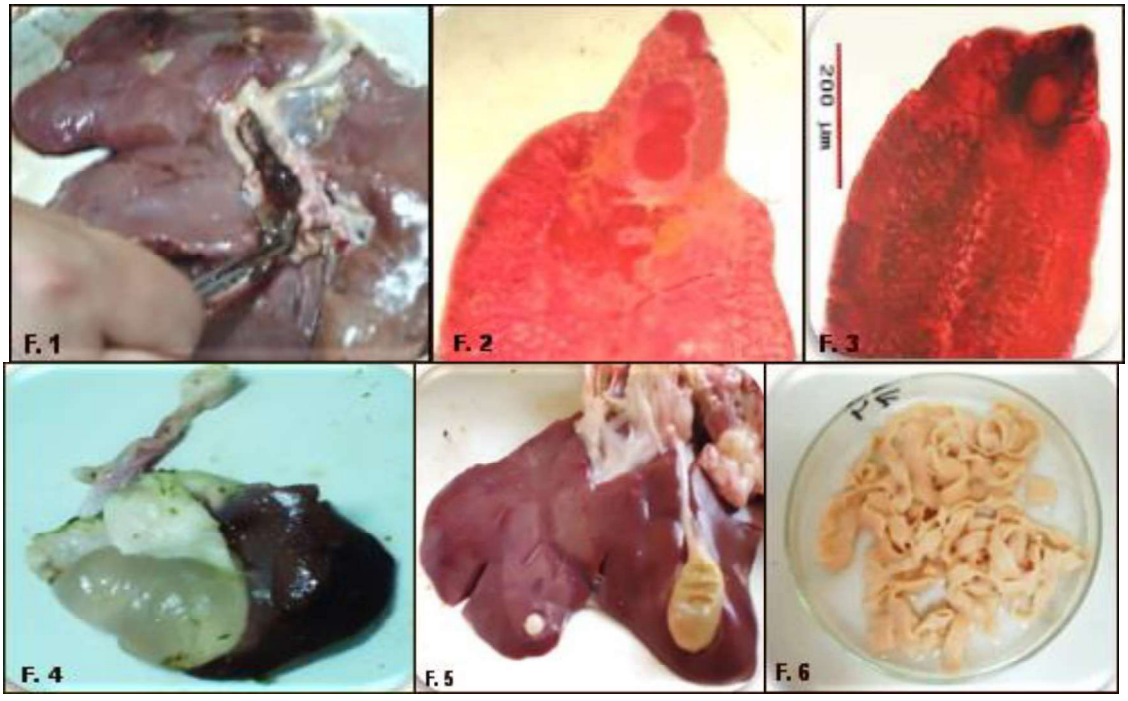
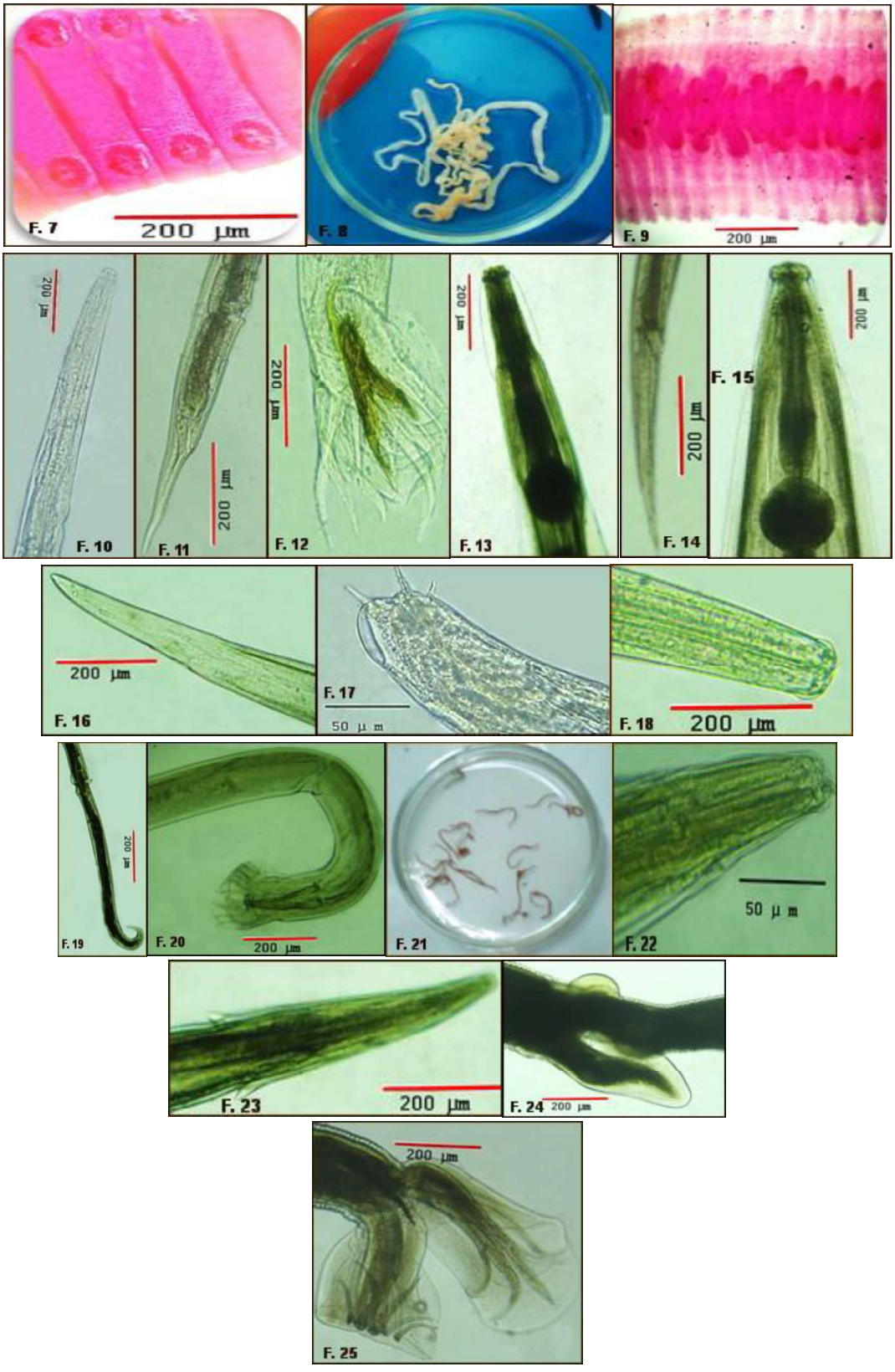
Explanation of figures

Fig. 1: Adult *Fasciola* spp. in bile duct
Fig. 2: *Fasciola hepatica* showed oral and ventral sucker, vitelline glands (arrows) .
Fig. 3: *Fasciola gigantica* adult worm,with branched intestinal ceca.
Fig. 4: *Cysticercus tenuicollis* attached to liver.
Fig. 5: Hydatid cyst in liver.
Fig. 6: *Moniezia expansa* adult worm.
Fig. 7: *Moniezia expansa* mature segments showed double set of genital organs and intersegmental glands
Fig. 8: *Avitellina centripunctata* adult.
Fig. 9: *Avitellina centripunctata* gravid segments showed par-uterine organ.
Fig. 10: *Trichostrongylus axei* anterior end showed excretory notch.
Fig. 11: *Trichostrongylus axei* female caudal end showed vulvar region.
Fig. 12: *Trichostrongylus axei* male caudal end showed bursa, unequal spicules and gubernaculum.
Fig. 13: *Oesophagostomum venulosum* anterior end showed buccal capsule, cephalic vesicle, cervical groove & oesophagus.
Fig. 14: *Oesophagostomum venulosum* female caudal end showed anal pore.
Fig. 15: *Skrjabinema ovis* anterior end showed characteristic oesophagus with a large posterior bulb.
Fig. 16: *Skrjabinema ovis* female, tapered tail and anal pore.
Fig. 17: *Skrjabinema ovis* male caudal end characteristic spicule.
Fig. 18: *Ostertagia ostertagia* anterior end showed cervical papillae.
Fig. 19: *Ostertagia ostertagia* female posterior end showed anal pore.
Fig. 20: *Ostertagia ostertagia* male showed copulatory bursa, spicule.
Fig. 21: *Haemonchus* spp. adult.
Fig. 22: Anterior end of *Haemonchus contortus* showed buccal capsule with a lancet.
Fig. 23: Anterior end of *Haemonchus contortus* showing cervical papillae like spine.
Fig. 24: *Haemonchus contortus* female vulvar region showed thumb-like vulvar flap
Fig. 25: Posterior end of *Haemonchus contortus* male showed copulatory bursa

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