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Detection and Identification of Some Helminth Parasites Affecting Camels

Nagwa E. Ahmed, Lubna M. El-Akabway, M.Y. Ramadan and Samah M. Abd El-Gawad
Department of Parasitology, Faculty of Veterinary Medicine, Benha University, Moshtohour, Qaluobia, Egypt.

A PARASITOLOGICAL survey of 98 slaughtered camels for gastrointestinal helminthes aged 1-5 and 6-10 years was carried out from the beginning of March 2011 to the end of February 2012 at Toukh abattoir. The result showed that50 camels (51.02%) were infected with different helminth parasites. The only recorded trematode worm was *Schistosomabovis* (2.04%). Small intestine of camels harboured three types of cestodes which were *Moniezia spp*. (8.16%), *Stieleziaglobipunctata* (17.36%) *and Avitellinacentripunctata* (1.02%).The collected nematodes were *Trichostrongylus spp*. (11.22%), *Haemonchuslongistipes and* Impalaia *tuberculata* were (2.04%) for each. The prevalence of *Camelostrongylus mentulatus and Cooperia spp.* was(1.02%) for each and *Trichuris spp.* (17.36%). Post mortumexamination of heart, liver and lung of the 98 slaughtered camels revealed presence of cysticercousdromedarii and hydatid cyst with percentage of 1.02 and 13.26, respectively. The single infection was observed in 40.81%, while mixed infection with two parasites recorded in 8.16% and triple infection was recorded in 2.04%.The prevalence of infection was higher in ages of 1-5 years than ages 6-10 years with percentage 65.96and 37.25, respectively. The helminthic infection rate was higher in spring followed by summer and winter season (73.9%, 72.2% and 40%, respectively), the lowest infection rate was in autumn (29.62%).

Keywords*:* Camel, Gastrointestinal helminthes, Post mortum.

Gastrointestinal parasitism appears to be the main problem for the production of camels. Gastrointestinal parasites reduce the feed intake, the efficiency of feed conversion and they are deterring the optimum functions of antibody –producing system of the infested camels (Pathak *et al.*, 1993) consequently parasitic infection is most important production constraint (Dia, 2006).

Dromedaries infected with wide variety of gastrointestinal helminth parasites as *Strongyloides*, *Trichostrongylus*, *Haemonchus*, *Nematodirus*, *Ostertagia*, *Cooperia*, *Chabertia*, *Oesophagostomum*, *Trichuris* and *Capillearia.*

Schistosomabovis is a ruminant haematic parasite that lives in the portal mesenteric system of their definitive host without being removed by the host defensive systems (Pearce and MacDonald, 2002).

Hydatidosisis a disease that infects animals with metacestode stage of *Echinococcus species*. It is recognized as being one of the world's major zoonosis especially in rural communities, where there is close contact between the dog and the intermediate hosts (Eckert and Deplazes, 2004).

Cysticercusdromedarii is the larval stage of *Taeniahyaena*a parasite of the small intestine of various species of hyena. These larvae developed in muscles of dromedary, cattle, and goat and rarely in sheep. It measure 12-18 mm in length. Infestation of muscle tissue by cysticerci is not usually manifested by any detectable clinical signs and it is not dangerous to man but their presence in the muscles is repugnant and the parasitized meat has to be condemned (Kaufmann, 1996).

The objective of this study is to determine spectrum of different species of helminth parasites infecting camels, their seasonal prevalence, reveal the effect of age of camels and seasons on their parasitic infection through post mortum examination.

Material and Methods

A total of 98 slaughtered camels (47 aged 1-5 and 51 aged 6-10 years) were collected from Toukh city abattoir. Post –mortum examination for the alimentary tracts, mesenteric blood vessels, liver, heart and lung of slaughtered camels was carried out during the period extended from the beginning of March 2011 to the end of February 2012.

Results

Gastrointestinal tract examination

Out of 98 slaughtered camels, 50 were infected (51.02%) with different helminth parasites they classified as trematodes which detected in (2.04%), cestodes in (26.53%) and nematodes in (34.69%). The only recorded trematode worm was *Schistosoma bovis* in mesenteric blood vessels of two camels (2.04%). Small intestine of camels harboured three types of cestodes which were *Moniezia spp*. (8.16%), *Stieleziaglobi punctata* (17.36%) *and Avitellinacentri punctata* (1.02%). The collected nematodes were *Trichostrongylus spp.* (11.22%), *Haemonchus longistipes and* Impalaia *tuberculata* were (2.04%) for each. prevalence of *Camelostrongylus mentulatus and Cooperia spp.*(1.02%) for each and *Trichuris spp.* (17.36%).

Incidence of single and mixed infection recorded by post mortum

Table 1 showed that 40 camels had single infection with one type of parasite giving prevalence of (40.81%), while the mixed infection with two parasites recorded in eight camels giving infection rate (8.16%). Triple infection recorded in two camels with prevalence of (2.04%).

TABLE 1. Incidence of helminth parasites recovered by necropsy.

Parasites		Infection status								Infected organ
		Inf.	%	Single		Double		Triple		
				I_1	%	I_2	%	I_3	%	
Trematodes	*Schistosomabovis*	2	2.04	2	2.04	0	0	0	0	Mesenteric bl. vessels
Cestodes	*Moniezia spp.*	8	8.16	6	6.12	2	2.04	0	0	Small intestine
	Monieziaexpansa	3	3.06	2	2.04	1	1.02	0	0	Small intestine
	Monieziatrigonophora	2	2.04	2	2.04	0	0	0	0	Small intestine
	Moniezia denticulate	2	2.04	1	1.02	1	1.02	0	0	Small intestine
	Monieziabenedeni	1	1.02	1	1.02	0	0	0	0	Small intestine
	Avitellinacentripunctata	1	1.02	0	0	0	0	1	1.02	Small intestine
	Stieleziaglobipunctata	17	17.36	12	12.24	4	4.08	1	1.02	Small intestine
Total of cestode		26	26.53							
Nematodes	*Trichostrongylus spp.*	11	11.22	4	4.08	5	5.1	2	2.04	Small intestine
	T. Colubriformis	7	7.14	3	3.06	3	306.	1	1.02	Abomasum
	T. longispicularis	1	1.02	0	0	1	1.02	0	0	Small intestine
	T. flaculatus	3	3.06	1	1.02	1	1.02	1	1.02	Small intestine
	Haemonchuslongistipes	2	2.04	2	2.04	0	0	0	0	Abomasum
	Cooperia spp.	1	1.02	0	0	1	1.02	0	0	Small intestine
	Impalaiatuberculata	2	2.04	1	1.02	1	1.02	0	0	Small intestine
	Camelostrongylus	1	1.02	0	0	1	1.02	0	0	Abomasum
	Trichuris spp.	17	17.36	14	14.28	2	2.04	1	1.02	Large intestine
	T. globulosa	12	12.24	11	11.22	0	0	1	1.02	Large intestine
	T. ovis	5	5.1	3	3.06	2	2.04	0	0	Large intestine
Total of nematode		34	34.69							
Total examined no.	98	50	51.02	40	40.81	8	8.16	2	2.04	

I_1= single infection with one type of helminth I_2 =Double infection with two types of helminth
I_3= Triple infection with three types of helminth

Infection rate in relation to ages of examined camels

Table 2 showed that camels of ages ranged from (1-5) years had higher infection rate than of ages ranged from (6-10) with infection rate 65.96%and 37.25%, respectively. Also the same table revealed that *Schistosoma spp*. and *Haemonchuslongistipes* were recorded only in camels above 5 years. *.Avitellinacentri punctata, Cooperia spp*., *Impalaia spp*. and *Camelostrongylus mentulatus* were detected only at ages ranged from1-5 years. *Moniezia spp*., *Stielezia* spp. *Trichostrongylus spp*. and *Trichuris spp.* were detected at all ages and the infection rate was higher at ages of (1-5) years which were (10.64%, 27.65%, 21.27% and 19.14%, respectively).

TABLE 2. Incidence of helminthes detected by post mortem examination in relation to age.

Parasites	Age	(1-5 year)	(6-10 years)		Total exam	
	No. of exam.	(47)	(51)		98	
	No. of inf.	%	No. of inf.	%	Total	%
Schistosomabovis	0	0	2	3.92%	2	2.04%
Moniezia spp.	5	10.64%	3	5.88%	8	8.16%
Avitellinacentripunctata	1	2.13%	0	0	1	1.02%
Stieleziaglobipunctata	13	27.65%	4	7.84%	17	17.34%
Haemonchuslongistipes	0	0	2	3.92%	2	2.04%
Camelostrongylusmentulatus	1	2.13%	0	0	1	1.02%
Trichostrongylus spp.	10	21.27%	1	1.96%	11	11.22%
Cooperia spp.	1	2.13%	0	0	1	1.02%
Impalaiatuberculata	2	4.25%	0	0	2	2.04%
Trichuris spp.	9	19.14%	8	15.69%	17	17.34%

Number of examined= 98

Seasonal prevalence of helminth parasites

Data in Table 3 showed that the peak of helminthic infection were in spring and summer (73.9% and 72.2%, respectively). The lowest infection rate was in autumn (29.62%). The same table displayed that Schistosoma spp., *Haemonchus longistipes*, *Impalaia tuberculata* and *Camelostrongylus mentulatus* were recorded only in summer season, while *Avitellina spp.* and *Cooperia spp.* were recorded only in spring season. *Stielezia spp. And Moniezia spp.* were found all over the year with highest infection rate during spring (30.43% and 13.04%, respectively).*Trichostrongylus spp.* was found all over the year except in winter and its peak infection was recorded during spring (39.13%), while *Trichuris spp*. was prevailed all over the year with highest infection rate during winter and autumn (26.66% and 14.81%, respectively).

TABLE 3. Infection rate in relation to season after *post-mortum* examination.

Parasites	Spring 23*		Summer 18*		Autumn 27*		Winter 30*		Total	%
	Inf.	%	Inf.	%	Inf.	%	Inf.	%		
Schistosomabovis	0	0	2	11.1	0	0	0	0	2	2.04
Moniezia spp.	3	13.04	1	5.55	2	7.40	2	6.67	8	8.16
Avitellinacentripunctata	1	4.35	0	0	0	0	0	0	1	1.02
Stieleziaglobipunctata	7	30.43	5	27.7	3	11.1	2	6.66	17	17.34
Haemonchuslongistipes	0	0	2	11.1	0	0	0	0	2	2.04
Camelostrongylusmentulatus	0	0	1	5.55	0	0	0	0	1	1.02
Trichostrongylus spp.	9	39.13	1	5.55	1	3.70	0	0	11	11.22
Cooperia spp.	1	4.35	0	0	0	0	0	0	1	1.02
Impalaiatuberculata	0	0	2	11.1	0	0	0	0	2	2.04
Trichuris spp.	3	13.04	2	11.1	4	14.81	8	26.66	17	17.34

* = Number of examined animals

Incidence of Metacestodes (larval stages of cestode)

Table 4 cleared that 13lung and liver out of 98 slaughtered camels were infected with *hydatid cyst* with prevalence rate (13.26%). The same table displayed that higher infection rate was recorded in spring season (22.2%) followed by winter (17.34%) and summer (11.1%) and the lowest infection rate was recorded in autumn season (6.66%). The same table also displayed that the predilection site for *hydatid cyst* was the lung (8.16%) compared to liver (2.04%), while *hydatid cyst* was recorded in both lung and liver in three camels at rate of (3.06%). One heart of young camel out of 98 examined camels was infected with *Cysticercus dromedary* I (1.02%). It was recorded in spring season.

TABLE 4. Incidence of Hydatid cyst in different organs in relation to season.

Season	No. exam.	Inf.	%	Lung		liver		Lung & liver	
				Inf.	%	Inf.	%	Inf.	%
Winter	23	4	17.39	3	13.04	0	0	1	4.34
Spring	18	4	22.2	2	11.1	0	0	2	11.1
Summer	27	3	11.1	2	7.40	1	3.70	0	0
Autumn	30	2	6.66	1	3.33	1	3.33	0	0
Total	98	13	13.26	8	8.16	2	2.04	3	3.06

No. exam= Number of examined camel

Discussion

The Post mortum examination of 98 slaughtered camels of different ages revealed that 50 camel were infected with different helminth parasites (51.02%) which were Trematodes 2.04%, Cestodes 26.53% and Nematodes 34.69%. The rate of infection in the present study was nearly similar to that mentioned by Eid *et al.* (1997) in Egypt (58.2%) and Abdel-Aal and Sahlab (1998) in Suez Canal (45%), while the infection rate was lower than that of Al- Ani *et al.* (1998) in Jordan (98%), Siddig and El-Hussein (1998) in Sudan (85.4%) and Abd El-Maogood (2001) in Egypt (90.4%). These differences in infection rate might be contributed to the breed differences and host susceptibility in relation to hygiene and manage mental factors.

Trematode worms in the present study were recorded from two camels out of 98 with percentage of (2.04). This infection rate was nearly similar to that observed by Anwar and Hayat (1999) in Pakistan (4.3%). Several workers did not recorded detectable any trematodes during their studies as Haroun *et al.* (1996) in Saudi Arabia , Al-Ani *et al.* (1998) in Jordan , Abd El-Maogood (2001) in Egypt and Borji *et al*. (2010) in Iran.

The only detected trematode worm was *Schistosoma bovis* which found in the mesenteric blood vessels of two camels (2.04%). It was recorded only in summer season and in camels above 5 years .Similar result detected by Nafady *et al.* (1995) in Egypt (2.8%).

In the present study, cestode worms were recovered from 26 intestinal tracts out of 98 examined camels with infection rate (26.53%). Nearly similar result obtained by Anwer and Hayat (1999) in Pakistan (22.5%). Lower infection rates were observed by Nafie*et al.* (1992) in north Sinai (13.3%) and Hayat *et al.* (1998) in Pakistan (8%), while high infection rate mentioned by Abd El-Maogood(2001) in Egypt (40%). The detected cestodes were *Monieziaexpansa (3.06%), Monieziatrigonophora (2.04%), Monieziabenedeni (1.02%), Moniezia denticulate (2.o4%), Avitellinacentripunctata (1.02%)* and *Stilesiaglobipunctata* (17.36%).

With respect to *Moniezia spp*., it was detected in small intestine of eight slaughtered camels with percentage of 8.16 and it was detected at all ages with higher infection rate at ages of (1-5 years) .Also it was found all over the year with highest infection rate during spring. lower infection rates were mentioned by Egbe–Nwiyi and Chaudhry (1994) in Nigeria (4.7%), Nafady (1995) in Egypt (4.1%) and Magzoub *et al.* (1997) in Saudi Arabia (5.8%), While Higher rates of infection were detected by Sharrif *et al*. (1997) in Jordan (33%), Al-Qudah *et al.* (1999) in Jordan (17.3%), Abd El-Maogood (2001) in Egypt (19.13%) and Tekle and Abebe (2001) in Ethiopia (36.84%).

Monieziaexpansa was detected in three camels with percentage of 3.06%. This result agreed with the results mentioned by Magzoub *et al*. (1997) in Saudi Arabia, Hayat *et al.* (1998) in Pakistan and Radfar *et al.* (2006) in Iran which were 5.83%, 3.33%and 5 % respectively. Higher infection rate (20%) recorded by Soliman (1992) in Egypt. *Monieziabenedeni* was detected in one slaughtered camel with percentage of 1.02%.This infection rate was similar to that recorded by Hayat *et al.* (1998) in Pakistan (2%). Higher infection rate was mentioned by Bekele (2002) in Ethiopia (31%). *Monieziatrigonophora* recovered from small intestine of two slaughtered camel with percentage (2.04). This result was lower than that mentioned by Soliman (1992) which was (30%).

Avitellina spp. was recorded from small intestine of one slaughtered camel with prevalence of 1.02% at spring season in camels of ages ranged from1-5 years. Our result fall in the same range that recorded by Soliman (1992) in Egypt (1.2%), slightly higher result was observed by Abdel-Aal and Sahlab (1998) in Suez Canal (3%).Our result was lower than the results mentioned by Abd El-Maogood(2001) in Egypt (19.13%), Tekele and Abebe (2001) (23.68%) and Bekele (2002) in Ethiopia (25%).

The adult worms of *Stilesia spp*. were found in small intestine (17.36%) of investigated camels. It was detected at all ages but the infection rate was higher at ages of 1-5 years and it was found all over the year, the highest infection rate during spring. Higher results were observed by Tekele and Abebe (2001) in Ethiopia and Borji *et al*. (2010) in Iran which were 31.05% and 30%, respectively, While lower infection rates were recorded by Magzoub *et al.* (1997) in Saudi Arabia ,Abdel-Aal and Sahlab (1998) in Assuit and Radfar *et al.* (2006) in Iran which were 2.9%, 1% and 8.3%, respectively. These differences in the

infection rates among camels might be explained by different circumstances and number of examined camels.

The present result showed that hydatid cyst was recorded in 13 out of 98 investigated camels with percentage of 13.26%. Nearly similar result was recorded by Woelldemesk *et al.* (2001) in Ethiopia (18.75%). Higher prevalence rate was mentioned by Tekele and Abebe (2001) in Ethiopia (21%) and Ahmadi (2005) in Iran (35.2%). Low infection rates were observed by Tembly *et al.* (1992) in Northern Mali and Kassem and Gdoura (2006) in Libya which were 9.09% and 3.62 %, respectively. Also the present result showed that the highest infection rate of hydatid cyst was recorded in spring (22.2%) followed by winter and summer (17.39% and 11.1%) and the lowest infection rate was recorded in autumn (6.66%).

The predilection site for hydatid cyst was the lung (8.16%), while in liver was recorded in (2.04%), infection in both liver and lung was recorded in (3.06%). Our result was agreed with Sharrif *et al.* (1997) in Jordan ,Ahmadi (2005) and Kassem and Gdoura (2006) showed that predilection site for hydatid cyst was the lung. This may be attributed to the fact that the lung tissue may supply the nutrients, P.H. and tissue space for development of such cyst (Wagdi and Naser 1983), in addition to the circulatory way of migration from camel gut to narrow size lung capillaries render the *onchospheres* remain and developed to hydatid cyst (Hassieb *et al.,* 1995 and Shahat, 2000).

With respect to *Cysticercous dromedarii*, it was recorded in heart of one camel out of 98 investigated camels with percentage of (1.02%). This result agreed with that of Taher (2005) in Egypt who found that the infection rate with *Cysticercusdromedarii* was (0.57%).On the other hand Onyali and Onwuliri (1989) in Nigeria and Eid *et al.* (1998) in Egypt detected *Cysticercous dromedarii* from the liver only with percentage of (10% and 0.26%, respectively). Lower incidence of *Cysticercous dromedarii* attributed to the scarcity of the definitive host (Hyaenahyaena) in Egypt (Hoogstral, 1964).

Nematodes were recovered from 34 gastrointestinal tracts out of 98 examined camels (34.69%). Slightly higher results were observed by Maqbool *et al.* (1994) in Pakistan (40%) and Anwar and Hayat (1999) in Pakistan (42.3%). Higher infection rates were recorded by Naife *et al.* (1992) in North Sinai (81.3%) and Partani *et al.* (1996) in India (85.39%). High infection rate with nematode worms could be attributed to their adaptation and the high resistance of their larvae to the hot dry condition (Abdel Salam and Farah, 1988).

The detected nematodes in the present study were *Haemonchus longistipes*, *Camelostrongylus mentulatus*, *Trichostrongylus* spp., *Impalaia tuberculata*, *Cooperia spp*. and *Trichuris spp*.

Haemonchus longistipes was observed in two abomasa with percentage of (2.04%). It was recorded in camels aged above 5 years and only in summer season. Nearly similar result was recorded by Abdel Salam and Farah (1988) in Kuwait (1.7%) and higher result was mentioned by Abdel-Aal and Sahlab (1998) in Assuit (5%) and Siddig and El-Hussein (1998) in Sudan (45.7%).

Camelostrongylus mentulatus was detected only in one camel with percentage of (1.02) during summer season and in young aged (1-5) years .Higher incidences were reported by Abdel-Salam and Farah (1988) in Kuwait and Borji *et al.* (2010) in Iran which were (59.6% and 38%, respectively).

Trichostrongylus spp. was recorded form small intestine of 11 (11.22%) out of 98 examined camels. Higher prevalence rates for *Trichostrongylus spp*. were observed by Nafady *et al.* (1995) in Egypt and Tekle and Abebe (2001) in Ethiopia which were (68.5% and 36.84% respectively). However lower prevalence rates were recorded by Abdel-Aal and Sahlab (1998) and Abd El-Maogood (2001) in Egypt which were (6% and 6.08% respectively).The detected species were identified as *Trichostrongylus colubriformis*, *Trichostrongylus longispicularis* and *Trichostrongylus falculatus*, the most predominant one was *Trichostrongylus colubriformis*. It was detected at all ages but the infection rate was higher at ages of (1-5) years and it was found all over the year except in winter and its peak infection was recorded during spring.

Cooperia spp. was recorded only from small intestine of one camel (1.02%), during spring season only and from young ages (1-5) years. Our result was in accordance with results of Abd El-Maogood (2001) in Egypt, as the author mentioned that *Cooperia spp*. was recovered only from the small intestine of one camel with percentage of (0.8%).Higher prevalence rates were detected by Soliman (1992) in Egypt and Sharrif *et al.* (1997) in Jordan which were (28.3%, and 10%, respectively).

The present results showed that *Impalaia spp*. was detected from small intestine of two camels out of 98 camels giving prevalence of (2.04%). The low incidence was recorded by Eid *et al*. (1997) in Egypt (4.3%). High prevalence rates were mentioned by Soliman (1992) and Abd El-Maogood (2001) in Egypt which were (10% and 63%, respectively).Impalaia spp. was also recorded from camels by Sharma (1991) in Qatar, Tembly *et al.* (1992) in Northern Mali and Kauffman (1996) in Germany without referring to their incidence.

Trichuris spp. was recorded from 17out of 98 examined camels with prevalence of (17.36%). The present rate of infection was nearly similar to that observed by Nafady *et al*. (1995) in Egypt (18.5%). Our result was lower than result of Magzoub *et al*. (2000) in Saudi Arabia (38.88%) and Tekle and Abebe (2001) in Ethiopia which was (72.3%), while our result was higher than results of Magzoub *et al.* (1997) in Saudi Arabia (5%), Abdel-Aal and Sahlab (1998) in Egypt (1%), Hayat *et al*. (1998) in Pakistan (1.5% for *Trichurisglobulosa* and 2% for *Trichurisovis*). The detected species were identified as *Trichurisglobulosa*

which was the most predominant one (12.24%) and *Trichurisovis* (5.1%). It was detected at all ages but the infection rate was higher at ages of (1-5) and it was prevailed all over the year with highest infection rate during winter and autumn.

The obtained results in the present study indicated that:

- The most common parasites affecting camels were: Stielezia, Moniezia, *Trichostrongylus* and *Trichuris.*
- ages of (1-5) years more susceptible to the infection than ages of (6-10) years.
- Native breed had higher infection rate than Sudani breed.
- High infection rate was recorded in spring season.

The study recommends using broad-spectrum anthelmintics twice a year in spring, again in winter is necessary.

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التعرف على الديدان الطفيلية المختلفة التى تصيب الجمال وتصنيفها

نجوى عيد أحمد، لبنى محمد العقباوى، محمد يوسف رمضان وسماح محمد عبد الجواد
قسم الطفيليات - كلية الطب البيطرى - مشتهر - جامعة بنها - القليوبية - مصر.

أجريت هذه الدراسة للتعرف على الديدان التى تصيب الجمال من خلال إجراء الصفة التشريحية على معدة وأمعاء ٩٨ من الابل المذبوحة بمجزر مدينة طوخ وكذلك الأوعية الدموية لأمعائهم, وكانت أعمارهم تتراوح ما بين١-٥ و ٦-١٠ سنوات فى الفترة ما بين بداية مارس ٢٠١١ حتى نهاية يناير ٢٠١٢. أوضحت النتائج أن ٥٠ جمل كانوا مصابين بانواع مختلفة من الديدان بنسبة ٥١,٠٢٪. الديدان المثقبة الوحيدة التى تم التعرف عليها هى الشستوسوما بوفيس (٢,٠٤٪). وجد ثلاث أنواع من الديدان الشريطية داخل الامعاء الصغيرة وهى المونيزيا ٨,١٦٪ ,افيتلينا سننتربننكتاتا١٧,٣٦٪, ستيلزيا جلوبيبنكتاتا ١,٠٢٪ . اما بالنسبة للديدان الخيطية فقد تم التعرف على الأنواع التالية هيمونكسلونجيستبس ٢,٠٤٪ , كاميلوسترونجيلسمينتيلاتس ١,٠٢٪ , تريكوسترونجليس١١,٢٢ ٪ , امبالاياتيوبركلاتا ٢,٠٤٪ , كوبريا ١,٠٢٪, تريكيورس ١٧,٣٦٪ . أوضحت نتائج فحص القلب والرئة والكبد لهذه الجمال المذبوحة وجود سيستسيركس دروميدارى (الأكياس المائية لتنيا الضبع) والحويصلات القنفدية بنسبة ١,٠٢٪ و١٣,٢٦ ٪ على التوالى وكانت نسبة الإصابة بهذه الحويصلات أكثر تواجدا في الرئة عن الكبد حيث كانت نسبة الإصابة (٨,١٦٪ و ٢,٠٤٪) على التوالي, بينما وجد عدد من الجمال مصاب بهذه الحويصلات في كلا من الرئة والكبد بنسبة ٣,٠٦٪. كانت نسبة الإصابة بنوع واحد من البويضات أعلى من الإصابة المختلطة بنوعين وثلاث أنواع من البويضات حيث كانوا ٤٠,٨١٪ , ٨,١٦٪ و ٢,٠٤ ٪ على التوالى. أظهرت الدراسة أن نسبة الإصابة كانت أعلى في الأعمار ما بين (١ الى ٥) سنوات عن الأعمار التي تتراوح ما بين (٦ إلى ١٠) سنوات حيث كانت نسب الإصابة ٦٥,٩٦٪ و ٣٧,٢٥٪ على التوالى كما أظهرت الدراسة أن نسبة الاصابة كانت أعلى في فصلى الربيع والصيف (٧٣,٩٪ و ٧٢,٢٪) بينما كانت الاصابة أقل فى فصلى الشتاء والخريف (٤٠٪ و ٢٩,٦٢٪).