

## Research Note

### An Abattoir-Based Study on Helminthes of Slaughtered goats (*Capra hircus* L., 1758) in Upper Egypt, Egypt

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#### Summary

The present study describes the occurrence of various gastrointestinal helminths and liver flukes in goats from post mortem examinations performed between 2010 and 2011. Forty five adult goats were euthanized necropsy examination and for identification of adult gastrointestinal helminths and liver flukes. Eleven animals (24.44 %) were found to be infected with one or more species of gastrointestinal helminth. *Haemonchus contortus* emerged as the most prevalent species (15.5 %), with *Moniezia expansa* and *Fasciola gigantica* also being common (11.11 % and 4.4 %, respectively). Additionally, *Haemonchus longistipes*, *Cysticercus tenuicollis*, and *Paramphistomum microbothrium* were present at low infection rates (2.2 %). Mixed infections were similarly most prevalent. *Haemonchus longistipes*; the most pathogenic Strongyle nematode of camels was reported for the first time infecting goats in Egypt. The present study indicates that abattoir surveys would reveal the prevalence of various species of problematic helminths, and thus appropriate measures can be adopted to control the respective worms.

Keywords: Endoparasite; goats; *Haemonchus longistipes*; prevalence

#### Introduction

Goats, although representing an important source of animal protein in third world countries including Egypt, seem to have benefited little from veterinary care and production improvement. Animals of this species are often the main source of daily meat, mohair production and play an important role in the rural economy. They also produce a considerable amount of manure, which is of special importance in areas where cattle are of lesser importance (Nawathe *et al.*, 1985).

Parasitic infections pose a serious health threat and limit the productivity of livestock due to the associated morbi-

dity and mortality. More specifically, plethora of parasitic diseases plays a detrimental role in hampering small ruminant production leading to serious economic loss (Nwosu *et al.*, 2007).

The economic impact of helminth diseases on livestock encompasses mortality losses, morbidity losses, enhanced susceptibility to bacterial and viral diseases, and losses resulting from condemnation of carcasses and organs, as well as the cost of drugs and veterinary care (Herlich, 1978).

Gastrointestinal nematodes of Trichostrongylidae family in particular are perhaps the most important parasites of small ruminants worldwide, causing significant morbidity and loss of production (Pawel *et al.*, 2004). Therefore, knowledge of prevalence of internal parasites and current species will help to minimize the economic losses in the goat industry, evaluate infection potential and control programs, especially for kids. Hence, the present study was designed to determine the infection rate of these parasites in slaughtered goats at Aswan abattoir, Egypt.

#### Material and Methods

##### Study area

The study was conducted on goats from the Aswan region that were slaughtered at Aswan abattoir. Aswan, the origin of the study animals, is located at 24°04 N 32°57 E in the south part of Egypt and is one of the driest inhabited city of the country.

Table 1. Prevalence of various helminthes infection among slaughtered goats

Total no. of examined goats	No. of infected cases (+ve)	Nematodes	Cestodes	Trematodes
45	11	8	6	3
%	24.44	17.77	13.3	6.6

Table 2. Prevalence of single and mixed helminthes infections among slaughtered goat

Total no. of examined goats	No. of infected cases (+ve)		Single Nematode infection		Mixed infection				Total	
			(Haemonchus contortus)		Haemonchus contortus + Moniezia expansa		Haemonchus longistipis + Moniezia expansa and Paramphistomum			
	No.	%	No.	%	No.	%	No.	%	No.	%
45	11	24.44	3	6.66	4	8.88	1	2.22	5	11.11

#### Study animals and sample collection

A total number of 45 goats viscera irrespective of sex and age were collected immediately after slaughtering. Different parts of the gastrointestinal tract were separated by ligature, to be examined and used to determine the prevalence and species of the recovered parasites at the laboratory of Parasitology department – Faculty of Veterinary Medicine- South Valley University. Then the Gastro-intestinal tract was brought to the laboratory packing in a polythene bag as soon as possible. After shifting to the laboratory, each part was cut longitudinally and the mucosa examined and scraped carefully to remove any adhering

#### Parasitological Examination

Collected parasites were washed several times in normal saline, and nematodes were preserved in luke-worm 70 % alcohol and glycerin; trematodes and cestodes were preserved in 10 % formalin. Nematodes were identified by preparing temporary slides by adding one drop of lactophenol (Cable, 1958), following the keys and descriptions given by Yamaguti (1961) and Soulsby (1982). Likewise trematodes and cestodes were identified by preparing permanent slides (Cable, 1957) by using the keys and descriptions of Yamaguti (1958, 1959) and Soulsby (1982). Regarding to *Haemonchus* species identification were

Table 3. Prevalence of helminthes species infections among slaughtered goat

Total no. of examined goats	Nematodes		Cestodes		Trematodes	
	<i>Haemonchus contortus</i>	<i>Haemonchus longistipes</i>	<i>Moniezia expansa</i>	<i>Cysticercus tenuicollis</i>	<i>Fasciola gigantica</i>	<i>Paramphistomum microbothrium</i>
45	7	1	5	1	2	1
%	15.5	2.22	11.11	2.22	4.44	2.22

worms. The abomasum contents were washed into a bucket up to a total volume of 2 liters from which an aliquot of 200 ml was transferred to a labeled graduated beaker and preserved in 10 % formalin. A sub sample of 20 ml was taken into a petri dish for examination of tract worms with a hand lens and a stereomicroscope. Small and large intestines were treated like the abomasum for recovery and counting of parasites. When worms were found, further morphological characterization was made under a binocular light microscope MAAF (1986).

performed according to descriptions of Jacquet (1995). Data were presented in tables.

## Results

#### Prevalence results

Out of 45 samples, 11 (24.44 %) were found to harbour various species of gastro-intestinal parasites.

The most prevalent helminthes species encountered was nematodes which had the highest incidence rate of 17.77 %, followed by cestode with an infection rate of

Table 4. Morphometric measurements of *Haemonchus* spp.

Worms	<i>Haemonchus contortus</i>		<i>Haemonchus longistipes</i>	
	Female	Male	Female	Male
Body length	20 – 25	18	21	16
Cervical papillae	0.5	0.4	0.3	0.2
Esophagus length	2.1	1.8	1.9	1.6
Spicules length	–	0.446	–	0.64
Vulva position	3.5 from tail end	–	4.4 from tail end	–
Tail length	–	Shuttle like 0.250	–	Spindle like 0.3
Vulvar flap	Linguiform 1.024	–	Sickle like 0.073	–

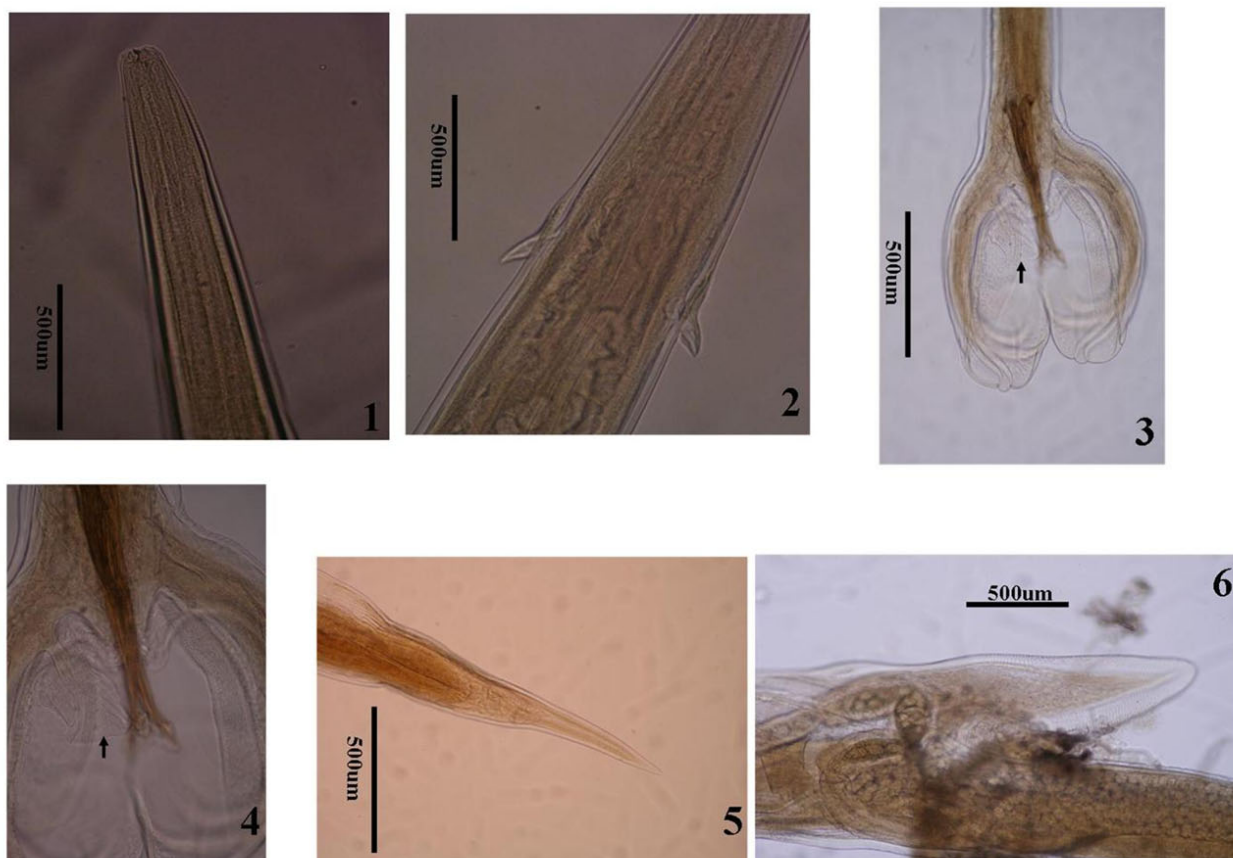


Fig. 1. *Haemonchus contortus* (Scale = 500µm)

- 1) Anterior end; 2) Anterior end showing cervical papillae; 3 & 4) Male posterior end showing a characteristic Y shaped dorsal ray (arrow); 5) Female posterior end; 6) Female vulvar flap with characteristic linguiform shape

13.33 %, while the trematode represented 6.66 % of the examined samples as depicted in (Table 1).

On the other hand, cases of single and multiple infection were observed, most of the samples were found with multiple infections than single, 5 (11.11 %) and 3 (6.6 %) respectively (Table 2).

In the present investigation two species of nematodes *Haemonchus contortus* and *Haemonchus longistipes*, two species of cestode *Moniezia expansa* and larval stage of *Taenia hydatigena* (*Cysticercus tenuicollis*) and two species of trematode parasites *Fasciola gigantica* and *Paramphistomum microbothrium* were identified.

Species-wise prevalence of *Haemonchus contortus*, *Haemonchus longistipes*, *Moniezia expansa*, *Cysticercus tenuicollis*, *Fasciola gigantica* and *Paramphistomum microbothrium* were recorded as 15.5 %, 2.2 %, 11.11 %, 2.2 %, 4.4 % and 2.2 % respectively (Table 3).

With special respect to *Haemonchus longistipes*, the most pathogenic strongyle nematode of camels was reported for the first time infecting goats in Aswan Governorate, Egypt.

#### Morphological results

Table (4) summarized the morphological description of the most prevalent species, particularly haemonchiasis; (Figs. 1 and 2).

#### Discussion

Present results revealed that the overall prevalence of helminthes parasites among slaughtered goats at Aswan governorate, Egypt were 24.44 %. These results differed from previous studies of Abebe & Esayas (2001) who reported more than 90 % prevalence of gastrointestinal parasites in the Eastern part of Ethiopia and Tefera et al. (2011) who found 95 % prevalence of gastrointestinal parasites in and around South-Western Ethiopia.

This study showed the occurrence of infection of goats of the area by gastrointestinal parasites during this study suggesting the existence of pasture contamination and the availability of infective larvae during months of the study period. Additionally, this was most probably due to the fact that goats of Aswan region are managed under extensive pastoralism with high stocking density where large numbers of animals graze together during all months of the year, inadequate nutritional status and poor veterinary infrastructure.

Six species of gastrointestinal parasites of goats were prevalent namely, *Haemonchus contortus* (15.5 %), *Haemonchus longistipes* (2.2 %), *Moniezia expansa* (11.11 %), *Cysticercus tenuicollis* (2.2%), *Fasciola gigantica* (4.4 %) and *Paramphistomum microbothrium* (2.2 %).

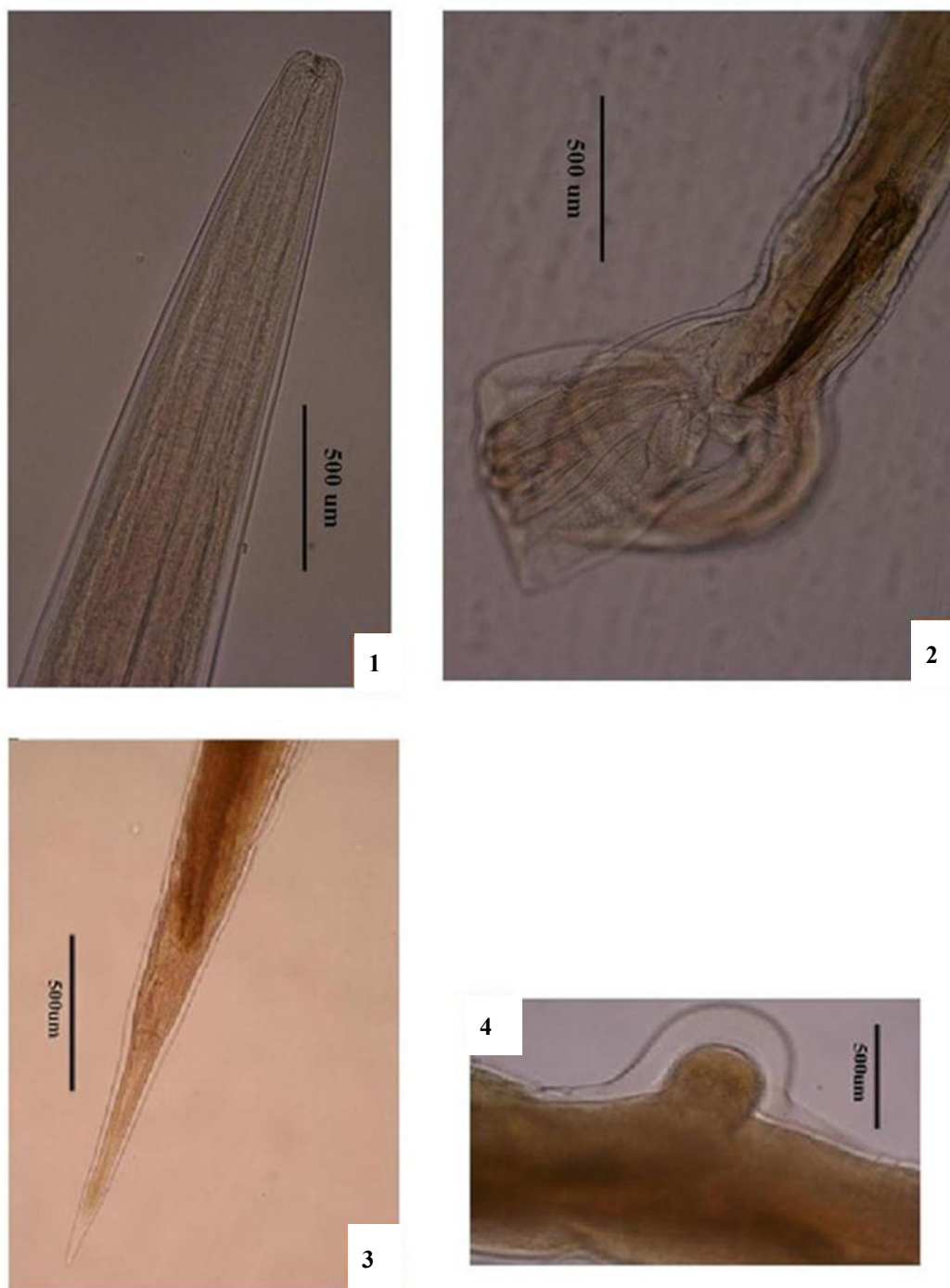


Fig. 2. *Haemonchus longistipes* (Scale = 500µm)

1) Anterior end; 2) Male copulatory bursa; 3) Female posterior end; 4) Female vulvar flap with characteristic knobbed shape

The variation in prevalence of gastro-intestinal helminthiasis in this study could be attributed to several factors including farmers level of education, age, religious belief, purpose of keeping goats, system of management and deworming schedules.

*Haemonchus contortus* was identified as the dominant *Haemonchus* spp. in goats (15.5 %) suggesting that small ruminants are most susceptible and usual host of *H. contortus* than *H. longistipes*. This result supports the work of Achi *et al.* (2003), Gelaye & Abebe (2001), Jacutet *et al.*

(1992, 1995), Thomas *et al.* (2007) all of which reported the dominance of *H. contortus* in small ruminants.

Additionally, the present study also imply that goats could also host *H. longistipes*, which was reported for the first time infecting goats at upper Egypt region; and it is in agreement with previous studies conducted by Jacutet *et al.* (1992). In the current study the presence of *Haemonchus* species in small ruminants disclosed the coexistence and sympatry of two *Haemonchus* species in a single goat host that share the same grazing pastures with zebu cattle and

one humped dromedaries under field condition in Aswan region in upper Egypt. This finding suggests the occurrence of circulation of *Haemonchus* spp. among heterologous domestic ruminant hosts in the area. Morphological studies of these two helminthes revealed no significant changes in all of the morphological characteristics previously described.

Regarding to cestode and trematode infection, the present investigation showed low prevalence of infestation with *C. tenuicollis* in goats in the study area (2.2 %). Grazing behaviour and management can be considered as the major reasons (Radfar *et al.*, 2005). On the contrary, *Moniezia expansa* infection being common in the study area, as concurred with previous studies conducted by Soulsby (1982), Hansen & Perry (1994), Urquhart *et al.* (1996) reported helminthes infections in small ruminants depends on many variables including the presence of suitable intermediate host as well as favorable climatic and ecological conditions for them. While the infection rate of *F. gigantica* in Aswan region found to be 4.44 % was moderately low, and it is in line with previous observation conducted by Ali *et al.* (2011) who mentioned that the total infection rate of *Fasciola* spp. among slaughtered goats in Iran was 4.1 %. The low rate observed in this study which recently could be attributed to many factors which include better management of goat.

## Conclusion

The results of the present survey implies that infections of goats with various gastrointestinal helminths are responsible for condemnation of substantial quantities of affected organs and muscles and therefore of direct economic importance. Additionally, *H. longistipes* was reported for the first time infecting goats at upper Egypt region.

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## References

ABEBE, W., ESAYAS, G. (2001): Survey of Ovine and Caprine Gastrointestinal Helminthosis in Eastern part of Ethiopia During the Dry Season of the year. *Revue Méd. Vét.*, 152(5): 379 – 384

ACHI, Y. L., ZINSSTAG, J., YAO, K., YEO, N., DORCHIES, P., JACQUIET, P. (2003): Host specificity of *Haemonchus* species for domestic ruminants in the Savanna in northern Ivory Coast. *Vet. Parasitol.*, 116: 151 – 158. DOI: 10.1016/S0304-4017(03)00258-9

ALI, T., ZARICHEHR, V., REZA, T., AMROALLAH, B., HOSSIN, T., AMIR, T., AKBAR, T., HOSSIN, H., TOURAG, R., HASSAN, E. (2011): Prevalence of liver flukes infections in slaughtered animals in Kashan, Isfahan province, Central Iran. *The IIOAB Journal*, 2: 14 – 18

CABLE, R.M. (1958): *An Illustrated Laboratory Manual of Parasitology*, 4<sup>th</sup> Edition. Burges Publishing Co., Minneapolis 15, Minnesota, USA, p.156

GELAYE, E., WOSSENE, A. (2003): Small ruminant Haemonchosis: Morphological and prolificacy study in Eastern Ethiopia. *Bull. Anim. Hlth. Prod. Afr.*, 51: 67 – 73

HANSEN, J., PERRY, B. (1994): *The epidemiology, diagnosis and control of helminth parasites of ruminants. A handbook 2<sup>nd</sup> Edition*. ILRAD (International Laboratory for research on animal diseases), Nairobi, Kenya., p. 171

HERLICH, H. (1978): The importance of helminth infections in ruminants. *World Anim. Rev.*, 26: 22 – 26

JACQUIET, P., CABARET, J., COLAS, F., DIA, M. L., CHEIKH, D., THIAM, A. (1992): Helminths of sheep and goats in desert areas of Southwest Mauritania (Trarza). *Vet. Res. Commun.*, 16: 437 – 444. DOI 10.1007/BF01839021

JACQUIET, P., HUMBERT, J. F., COMES, A. M., CABARET, J., THIAM, A., CHEIKH, D. (1995): Ecological, morphological and genetic characterization of sympatric *Haemonchus* spp. Parasites of domestic ruminants in Mauritania. *Parasitology*, 110: 483 – 492. DOI: 10.1017/S0031182000064829

MAFF (1986): *Manual of veterinary parasitological laboratory techniques*. Reference Book 418, 3rd ed. HMSO, London, p. 129.

NAWATHE, D. R., SOHAEL, A. S., UMO, I. (1985): Health towards secondary infection. The sexwise prevalence management of a dairy herd on the Jos plateau of helminth parasites of GIT shows higher prevalence (Nigeria). *Bull. Anim. Health Prod. Afr.*, 33:199 – 205

NWOSU, C. O., MADU, P. P., RICHARDS, W. S. (2007): Prevalence and seasonal changes in the population of gastrointestinal nematodes of small ruminants in the semi-arid zone of north-eastern Nigeria. *Vet. Parasitol.*, 144: 118 – 124. DOI: 10.1016/j.vetpar. 2006.09.004

PAWEL, G., NIZNIKOWSKI, R., STRZELEC, E., POPIELARCZYK, D., GAJEWSKA, A., WEDRYCHOWTCH, H. (2004): Prevalence of protozoan and helminth internal parasite infections in goat and sheep flocks in Poland. *Arch. Tierzucht*, 47: 43 – 49

RADFAR, M. H., TAJALLI, S., JALALZADEH, M. (2005): Prevalence and morphological characterization of *Cysticercus tenuicollis* (*Taenia hydatigena* cysticerci) from sheep and goats in Iran. *Veterinarski Arhiv*, 75, 469 – 476.

SOULSBY, E. J. L. (1982): *Helminth, Arthropod and Protozoa of Domesticated Animals*. 7<sup>th</sup> Edition. Bailliere Tindall, London, pp. 809

TEFERA, M., BATU, G., BITEW, M. (2011): Prevalence of gastrointestinal parasites of sheep and goats in and around Bedelle, South-Western Ethiopia. *Internet J. Vet. Med.*, 8: 2

THOMAS, N., TESHAE, S., KUMSA, B. (2007): Abomasal nematodes of sheep and goats slaughtered in Awassa (Ethiopia): species composition, prevalence and vulvar morphology. *Helminthologia*, 44 (2): 70 – 75. DOI: 10.2478/s11687-007-0006-8

URQUHART, G. M., AREMOUR, J., DUNCHAN, J. L., DUNN, A. M., JENINIS, F. W. (1996): *Veterinary parasitology 2<sup>nd</sup> Edition*. The University of Glasgow, Blackwell Sciences, Scotland, pp. 3 – 137

YAMAGUTI, S. (1958): *Systema Helminthum: vol I partII. (The digenetic trematodes of veretebrates)*. Interscience Publishers, Inc. New York, p.1575

YAMAGUTI, S. (1959): *Systema Helminthum: vol. I part II.*

*(The cestodes of vertebrates)*. Interscience Publishers, Inc. New York, p.880.

YAMAGUTI, S. (1961): *Systema Helminthum, vol. III. (The nematodes of vertebrates)*. Interscience Publishers, Inc. New York, p. 681 – 1261

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