PRELIMINARY RESEARCH FOR THE PRESENCE OF PARASITES IN SWINE IN ALBANIA

JUKA EDITH[1], KUMBE ILIRJAN[2], BIZHGA BEJO[2], SOTIRI ESMERALDA[2], LAMAJ SHEMSHO[3],.

[1]Directory of Agriculture Durrës, Albania.

[2]Faculty of Veterinary Medicine A.U.Tirana, Albania.

[3]Directory of Agriculture Gjirokastër, Albania.

Author of correspondence; Email: jukaedith@yahoo.com

Abstract:

In this study we presented the results of 298 faecal samples and 42 post mortem pigs examination. In this study we included extensive, ½ intensive and intensive management farms in the different Albania districts such as: Gjirokastra, Tirana, Fier, Lac, Elbasan, Lushnjë, Lezhë etc. From 298 faeces samples, 198 belonged to piglets, and about 50% of animals were less and more than 6 months old, 38 sows before farrow, 30 uncastrated pigs and 32 samples were taken into slaughterhouses from imported pigs. The samples were collected randomly and were examined with the technique of simple and qualitative sedimentation for the evaluation of helminths and the technique of quantitative and qualitative fluctuation to evaluate the protozoans. In slaughterhouse we did post mortem examination on 42 piglets and we looked for the presence of parasites grown in gastro-intestinal tract (GIT). The results of this study showed that the most widespread helminth in pigs in Albania is *Ascaris suum*. It was present in more than 70 % of the examined samples, and in some cases was recorded as high as parasitic load up to 1200 e/g/f. In the economies of extensive menagement *M. hirudinaceus* was recorded in high level, particularly in farms located in north Albania. Both *M. hirudinaceus* and *A.suum* were most wudespread. In addition 28 % of the pig samples were positive for *M. Apri*. Copropositive results were found in 5,4 % of the faecal samples for *Oesophagostomum* spp, wheras 0,8 % of the faecal samples for were positive for *Ancylostoma caninum,* this was recorded mainly in extensive growth pig management. 21 % of the samples from piglets of extensive economies resulted positive for *Strongyloides ransoni*. For *Physocephalus sexalatus* 8,6 % of the samples resulted copropositive. *Trikuris suis* was founded in 5, 6 % of the samples. Protozoan forms were as cysts of *Balantidium coli* in 1.6 % from the total samples examined. In the post mortem examination frequency of *A.suum* was recorded in 75 % of pigs.

Keywords: Parasites, swine, examination, samples, Albania.

1. Introduction

Pig industry is an important source of the Albanian economy. In many areas of Central and Southern Albania pigs are managed in intensive system, while in most of the Northern part of Albania, pigs are keeping in backyard system as a tradition, and in some places are managed as small intensive herds. In many cases there is cohabitation of pigs with people. In general, in whole country there is a tendency of pig increasing, both as number and breeding. An increase in the number of economies has been noticed in a lot of areas, while in certain

areas there is a tendency to go towards intensive economies. Swine products in the economies of intensive growth go through the regular chain of production and control. In the economies of extensive growth the products, in most of the cases, are used within the family of the stockbreeder and only a low percentage of the total is shown. Generally there are no regular controls by veterinarians, especially in households. There is also a lack of antihelminths scheme and strategies to deal with parasitic disease. The lack of sanitary hygiene conditions favour the biology of parasites. Considering cohabitation with swine there is a risk of transmitting parasitic zoonoses. Albania has a Mediterranean climate, but it displays climatic and geographical variations. The altitude above the sea level has a lot of variations. Swine are grown in economies of extensive growth, not only in areas like Lezha lowland under the sea level, but even in the Albanian Alps at an altitude of 1500 – 2000 m. Parasitism is one of the elements that damages often and severely the productivity of swine. This material displays only the first part of the results of our work, which has been widespread all over the republic with the aim of diagnosing thoroughly the epidemiological parasitosis in swine.

2. Material and Methods

In this study we used faeces samples, lungs and internal tissues, mostly of samples were from GIT. The faeces were collected and continuously during one year (2009-2010). When it was possible they were taken individually from the rectum (they were collected and transported in plastic containers, 20-50 grams), especially in grown pigs. Sometimes the samples were collected as pools, and each samples was about 200 gram. The faeces were collected as fresh samples, without being touched to the grounds parasites. The samples were transported to the Laboratory of Veterinary Parasitology, at the Faculty of Veterinary Medicine, in Tirana. The samples were examined as soon as possible, in sometimes they were preserved at 4^0C. In piglets 0-3 months old the samples were taken through the nose. In collaboration with the veterinarians there were performed post mortem examination, especially in the economies of ½ intensive growth. A lot of post mortem observations were done in slaughterhouses.

Laboratory techniques.

The faecal samples were examined for the presence of eggs, larvae and helminths, cysts, oocysts and protozoan trophozoites. Faecal samples were examined for eggs by using the qualitative and quantitative sedimentation method described by Urquhart [3, 8,11]. After obtaining a clear supernatant by repeated mixing of sediment with water we used the microscopic examinations of faecal slides. Sometimes we used rapid

sedimentation. We used the sedimentation method for nemathods, tremathods and some cestods. For some eggs, oocysts and trophozoids we used the swimming technique by using dip, full of NaCl, hypertonic dip of ZnCl2 according to the method described by Wade and Gaafar [3, 8, 11]. The McMaster Egg Counting Technique is a method for determining the number of nematode eggs per gram of faeces in order to estimate the worm burden in an animal. The advantage of this technique is that it is quick as the eggs float free of debris before counting. Weigh out 2 grams of faeces. Pass the faeces through a sieve into a dish containing 60 ml of ZnSO4 or saturated salt solution. Lift the sieve and hold over the dish. Push out any remaining solution from the faeces. While stirring vigorously (you may want to put the solution in a flask to prevent spillage), take a sample of the mixture with a pipette and transfer it to one of the chambers of the McMaster slide. Repeat the procedure and fill the other chamber. Wait 30 seconds then count the total number of eggs under both of the etched areas on the slide. Multiple the total number of eggs in the 2 chambers by 100, this is the eggs per gram (EPG). The mathematics: The volume under the etched area of each chamber is 0.15 ml (the etched area is 1 cm X 1 cm and the chamber is 0.15 cm deep), so the volume examined is 0.3 ml. This is 1/200 of 60 ml. Since you started with 2 grams of faeces and then multiplied by 100, the final result is "eggs per gram of faeces". We used the coproculture technique for the differentiation of L_3. The techniques we used were not only qualitative, but also quantitative. Preparations were placed between slide and cover glass and examined under microscope. For some parasites we used special parasitological methods. For example in addition, preparations obtained by concentration method were also stained, by using modified acid-fast staining method and *Cryptosporidium* oocyst were investigated. The sensitivity, specificity, positive and negative values in the faecal and other examination methods was determinated according to a general method from Galen and Gambino, Rodan and Gladen [3, 8, 11] using AGPT as the gold standard. Post mortum and coproscopic diagnosis was done in the imported swine in 10 representative samples in the district of Lushnja, GJirokastra and Korça. Postmortum diagnosis consisted in the survey carcasses, the intake and examination from the carcasses of the digestive tube and lungs. The samples were taken from the slaughterhouses by the swine HIT with direct current and vengeance. The samples were taken by means of a tampon in the noses of the swine especially in piglets. Based on them we prepared microscopic slides and observed in the microscope with 10-40 x to find invasive larvae. In the swine butchered in slaughterhouses the whole digestive tube was sampled. In the laboratory we anatomized the intestine and the grown parasites were gathered in it in case they were found. They were measured and differentiated [5, 10].

After evaluating the patient forms of the grown parasites, intestinal content and mucus was treated with physiological solution and further for the evaluation of invasive forms we continued with the technique agar-gel described by Slotved et al. [3, 8, 9, 11]. This technique was modified by incubating agar-gel every 3-hours. Samples were taken from the lungs and we searched for the presence of larvae according to the technique of Kapel and Gamble [3, 8, 11] in 70% ethanol. We also prepared and examined microscopic slides by the liquids and bronchial mucus. In lungs and liver it was observed post mortum for migration consequences and parasitic granulatiose glandular [2, 7, 8, 9].

3. Results and Discussion

Swine were reported as infested in the cases when it was clearly typified and at least one egg, oocyst, cyst, trophozoite, or invasive larvae was found in the microscopic McMaster slide or Petri's plaque. The prevalence for swine category was calculated by the number of infested swine in proportion with the number of samples by controlled swine and was expressed in percentage [2, 5, 10, 11, 14].

In total we sampled and examined 298 faecal samples of swine of both sexes, divided in 5 age categories. The results are presented in the tables and graphics according to the areas of studies and categories of swine.

The data presented in table 1 and Figure 2 shown that *Ascaris suum* is the most frequent parasite on swine of our country. It was present on all over the country's areas with considerable variations among swine categories, different geographical regions and pig management system. We notice regional variations which are mainly due to hygienic sanitary conditions in piggeries and the anthelmintic treatment scheme application. In the intensive grown farms the highest contamination resulted in the region of Gjirokastra, its frequency was 84%, while the lowest level in the economies of intensive growth was noticed in the region of Fieri – 18%. We must emphasize that the results in the region of Fieri belongs to a model economy with extreme sanitary hygienic conditions and systematic anthelminthic treatments. In uncastrated of the pig intensive farms management it was found a heavy and often even alarming level of *Ascaris suum.* However piglets from 3-7 months old are at highest risk, and parasitic load was approximately 120 v/g/f. The gills used for replacement (more than 7-months old) shown an the average increasing parasitic load, and it was up to 20% higher. In gills the parasitic loads was estimate 148 e/g/f (it ranges from 78 to 206 e/g/f) and this is one of the main reasons of infestation source of piglets in to the nests.

Table 1. Results of coproscopic examination.

Parasite type	*Examined samples*	*Positive samples*	*Prevalence*	**Parasitic load**
Ascaris suum	298	208	70 %	40-1560
M. hirudinaceus	298	26	8,7 %	12-240
Verminous bronchopneumonia	42	30	75 %	32-112
Gastrointestinal strongyls	298	16	5.4 %	40-156
Bronchopulmonary strongyls	298	83	28 %	12-84
Balantidium coli	298	5	1.6 %	1-10
Ancylostoma caninum	298	2	0, 8 %	2-12
Trikuris suis	298	17	5.6 %	1-84
L 3 invasive	298	83	28 %	3-60

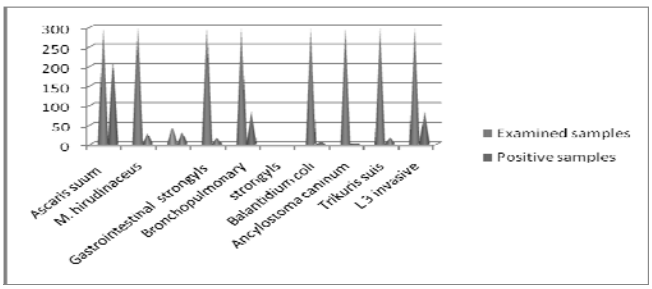

Figure 1. Results of swine examinations.

Table 2. Results of swine examinations according to categories.

Parasite type	*Sows before farrow (E-+)*	*Piglets less than 6 months old (E-+)*	*Piglets more than 6 months old (E-+)*	*Uncastrated pigs (E-+)*	*Imported pigs*	*Examined samples (E-+)*	**Prevalence %**
Ascaris suum	38-20	96-67	102-89	30-9	32-15	298-208	70
M. hirudinaceus	38-2	96-8	102-14	30-2	32-0	298-26	8.7
Verminous bronchopneumonia	0-0	20-16	22-14	0-0		42-30	75
Gastrointestinal Strongyls	38-1	96-0	102-8	30-6	32-1	298-16	5.4
Bronchopulmonary strongyls	38-19	96-3	102-53	30-3	32-5	298-83	28
Balantidium coli	38-0	96-1	102-4	30-0	32-0	298-5	1.6
Ancylostoma caninum	38-1	96-0	102-0	30-1	32-0	298-2	0, 8
Trikuris suis	38-4	96-0	102-3	30-4	32-6	298-17	5.6
L 3 invasive	38-23	96-4	102-18	30-15	32-23	298-83	28

E- Examinated, +- positive

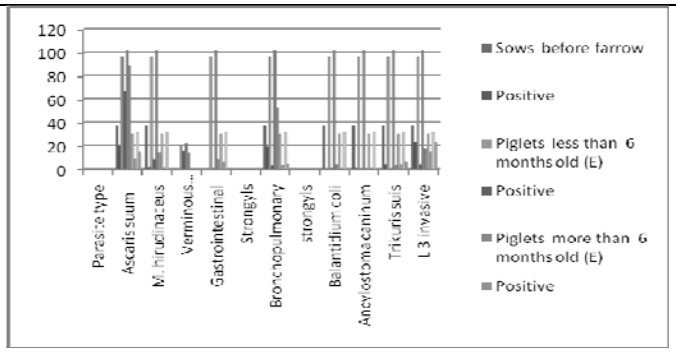

Figure 2. Parasite variations in swine.

The parasitic load of the category of sows during lactation resulted 246 eggs/g/f (minimum 64 – maximum 460). We notice a high parasitic load of lactating sows which is explained by the decrease of their condition during lactation and lack of veterinary and zootechnic care for this category. Results of high contamination with *Ascaris suum* were noticed in the economies of ½ extensive and intensive. From the economies of extensive growth the least contaminated resulted to be the region of Tirana and Shkodra, while the most contaminated resulted the regions of Lezha, Puka and Malesia e Madhe.

Ascaris eggs were noticed in sows before farrow, but also in piglets 8–10 weeks old. There was also a high number of eggs even in sows during lactation [11], higher than in other swine categories. The average parasitic load resulted high, exactly 600 v/g/f in the region of Lezha, 520 v/g/f in the region of Shkodra, 800 (300-1500) v/g/f in the region of Puka and 700 v/g/f in Malësia e Madhe. There were migratory larvas of *Ascaris suum* of in the nose stream of piglets especially 0-3 months old. Verminous pneumonia of *Ascaris suum* was noticed, excluding sows and uncastrated pigs in all the area of studies. Such a high prevalence and parasitic load of *Ascaris suum* is the result of the failure to dehelminth, especially the routine dehelminth in sows 1-2 weeks before farrow.

Macracanthorhyncus hirudinaceus was present all over the area only in north Albania. It was also evident in all the swine categories in the area of Lezha, Puka and Malësia e Madhe (extensive economies), excluding only the uncastrated pigs at a prevalence 73 % with an average of number of eggs 140 (80-230) v/g/f. In the other part where the study took place there was not a single sample of *Macracanthorhyncus hirudinaceus*. In our opinion this is influenced by the better hygienic sanitary conditions of swine breeding in intensive economies. In the area of Puka we noticed a prevalence of 33 % with a parasitic load of 86 v/gf. The considerable lack of hygienic conditions, the daubing of the foods with koleopterans explains the prevalence of 73 %

in extensive economies (most of which households).

In the gastrointestinal strongyls we included 4 species which were observed in swine, especially in the big categories in all the study areas. These species were observed widespread all over the territory. In none of the samples in both categories of piglets we identified these parasites. According to Lin et al., (unpublished data) strongylide eggs in swine more often include the eggs of *Oesophagostomum dentatum* or *Oesophagostomum quadrispinulatum* and more rarely *Hyostrongylus rubidus* and *Trichostrongylus axei*, which we found in our study, although in values that we think do not influence the economic indices, comparing this to the data of the literature which suggest economic risk when *Oesophagostomum* spp., varies in values 50 % , *T. suis*, 40-50 %, *B. coli* and coccidia 50-55 % [1, 15, 18] . For this reason we considered as low and riskless the infestation prevalence by gastro-intestinal strongyls.

This was the reason why we evaluated the gastrointestinal strongyls as homogenous with *Oesophagostomum* spp.. We think that the prevalence 5.6 % of *Trichuris suis* and 1.8 % of *Balantidium coli* in our study might be considered as acceptable. A really interesting point in our study appears the high prevalence and parasitic load of *Metastrongylus apri.* We noticed a high level in all the area, thus we think that the reason is related to the stimulation of parasite biology. In a fecal sample in Puka, another one in Lezha and one lactation sow in Gjirokastra we evidenced in the faeces eggs of *Fasciola hepatica*. However by evaluating the low parasitic load we considered it as a coincidence (it is known that *Fasciola hepatica* rarely parasites in swine) and this is the reason that *Fasciola hepatica* has not been presented to the summerized tables. Despite the data that the study offered we must pinpoint that the data is still considered preliminary. By considering the voluminous work and other results there will be changes, but with some changes considering protozoans (*Issospora* spp., *Cryptosporidium* spp.) there will be no considerable changes in the trend of results for helminths in Albania.

We examined 10 samples representing imported swine in the slaughterhouses in the regions of Lushnja, Gjirokastra and Korça, as well as swine from all the categories imported from Greece and Macedonia where coproscopic examinations showed that all the swine were positive to

Ascaris suum. Parasitic load often resulted equal with the results of the economies of intensive growth. We think that the reason is because dehelminth schemes are not executed for swine by the economies that export in our country. Only 12 samples were diagnosed with *Oesophagostomum* spp. and *Trichuris suis* in one individual. We did not examine *Macracanthorhyncus hirudinaceus* in any of the samples. Post mortum diagnosis was identified in 42 head piglets, in most of the cases 7 months old piglets or those to be substituted. For the samples we examined

macroscopically the content of the intestines and we differentiated and counted the grown parasites. 90% of the samples resulted positive for the presence of *Ascaris suum* in the intestine. In 4 samples or approximately 10% of them we counted more than 40 *Ascaris suum* grown within the intestine. In 32 samples taken by the nose, the bronchial liquid and mucus and the lungs parenchyma we found migratory larvae. In 7 head we evidenced signs of parasitic bronchopulmonary and in 6 head signs of migration in the liver and changes in lymphonodules.

4. Conclusions

- The results of this study shown that the most widespread helminth among swine in Albania is *A.suum,* but there are also other helminths, although in lower levels. *A.suum* was noticed in more than 70 % of the examined samples, and in most of them were with high parasitic load, thei level was up to 1200 egg/g/f. Another helminth found in the economies of extensive management is *M.hirudinaceus*. It was found mainly in the north of Albania and resulted to be the most widespread helminth which together with *A.suum* is the most maleficent. In the examined swine 28 % of the samples resulted positive for *M. Apri*. Copropositive results were 5,4 % of the swine for *Oesophagostomum* spp., 0,8 % of the samples and mainly swine of extensive growth resulted copropositive for *Ancylostoma caninum*. 21 % of the samples from piglets of extensive economies resulted positive for *Strongyloides ransoni*. For *Physocephalus sexalatus* 8,6 % of the samples resulted copropositive. For *Trikuris suis* 5, 6 % of the samples resulted copropositive. Form the protozoans we only found cysts in *Balantidium coli* in 1.6 % of the total of the examined samples.
- Polyparasitism was an evident phenomenon almost in all the economies, mainly in those of swine ½ intensive and extensive. By evaluating parasite species in one individual in most of the cases it was represented by *A.suum, Macracanthorhyncus hirudinaceus, Oesophagostomum* spp. and *Metastrongylus apri.*
- According to the results the most infested categories are piglets and sows during lactation. The main interest for the application of dehelminth strategies must focus on these categories. The preliminary results showed that parasitic infestations are very important in the economies of swine growth. Thus the responsibility of the stockbreeders, technicians and veterinarians considering the hygiene sanitary precautions and regular dehelminths might lead to acceptable parameters for the level of parasitism.

- Except *Macracanthorhyncus hirudinaceus* which was found only in the economies of extensive growth that was found mostly in the north of the country, all the other parasites there were not significantly differences based on study areas.
- As conclusion, we recommend regularly treatment of the pigs, based on scientific scheme. Beyond this there should be prophylactic treatment of gill before their farrowing, and to all the piglets, particularly those for replacement purpose. There must be periodic laboratory diagnosis to evaluate the efficiency of treatment and level of infection.
- In addition, the prophylactic treatment must be providing to the sows before the farrowing period, piglets and sows during lactation. Active surveillance based on regularly laboratory testing for efficiency of medical treatment and estimation of parasitic level of infection must be put in place, in order for control of above mention parasitic disease.

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