

PARASITES FAUNA OF SWINE AT ORGANIC BREEDING

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*SUMMARY: Parasites infection were permanent health problem at swine production at extensive and farm breeding. Organic breeding induced permanent contact of swine and intermeditae host of numerous parasites and those infection were more frequent at these breeding condition. In most cases there were presented biohelminths from genus *Metastrongylus*, nematode which cause gastritis verminosa (*Ascarops strongylinae*, *Physocephalus sexalatus* and *Hyostrongylus rubidus*), *Oesophagostomum* spp. and *Macracanthorhynchus hirudinaceus*. There were presented at lover rate of infection *Acaris suum*,. and other helminths.*

Key words: biohelminths, swine, extensive breeding.

INTRODUCTION

Parasitic infections are constant companions of pig production, irrespective of the manner of holding. (Pattison et al.1980., Pavlovic et al.1995, 1996.1997., Schiessl 1990). Disappearance of flow and disease of pigs caused by the presence of the agent, susceptible hosts and the environment condition. Organic farming, which greatly resembles the extensive breeding condition that the pigs have direct contact with many intermediate host of parasites and therefore are in them parasitic infections often (Babic et al.1942., Tričković, 1978., Perez-Brincones and Alvarez- Fernandez 1977., Loskot at al.1988., Pavlovic at al.1996) In this posture the number of parasite species is much higher and the morbidity and mortality caused by them. (Vujic 1976., Pavlovic at al.1997).

Nevertheless, at the organic breeding pigs in the foreground biohelminthe and the most important representatives of the genus *Metastrongylus*, verminoznog causes gas-

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tritis, *Oesophagostomum* spp., *Acaris suum* and *Macracanthorhynchus hirudinaceus* (Dunn et al. 1955, Dun, 1957., Kruse & Ferguson 1980., Pavlovic et al. 2005a, b, 2007, 2010).

METASTRONGYLIDOSIS

In world, a total of 6 *Metastrongylidae* species are established: *Metastrongylus elongatus*, *M.pudendotectus*, *M.salmi*, *M.confusus*, *M.madagascariensis* and *M.tschiauricus* (Ershov et al., in 1963., Soulsby 1977). In Serbia, we established *M.elongatus* and *M.pudendotectus*. Prevalence of both types varies from region to region (Ivancevic, 1963. Pavlovic et al. 2005a, b). *Metastrongylus* are biohelminths who belong to their own development using many types of *Lumbricidae* (rain worm). The eggs are resistant to the external environment and, depending on the external conditions of the eggs are released larvae that are infective for the real host infectivity but are only acquired when they eat earthworms (Dun et al., In 1955., Kruse, 1978). In Serbia, they are: *Eisenia foetida*, *E.rosea*, *Dandreobena rubida*, *Allopbophora caliginosa*, *A.jassyensis*, *Lubricus terrestris*, *L.rubbelus*, *Eisenia veneta*, *E.tetraedra*, *Allopbophora longa*, *Octolasion complanatum*, *O.lacteum*, *O.rebeli*, *Dendrobaena octaedra*, *D.subrubicunda*, *D.mariupoliensis*, *Bimastus tenius* and *Heledrillus* spp. (Tričković, 1978., Pavlović et al 2005a,b).

Infection occurs when pigs infected pigs eat worms. From the digestive tract of the larvae mature in the mesenteric lymph nodes where they molt. In the bronchi and bronchioles larvae grow and after 24 days reaching adult stage. Preparent period is lasts 24-37 days (Dunn et al. 1955., Tričković, 1978). Most susceptible to infection are young pigs aged 2-8 weeks. Maximum productions of parasite eggs are in 5-9 weeks after infection. In the future the number of parasites is reduced but a number remain especially in the distal parts of the lung (Kvachadze, 1975., Vujić, 1976, Pavlović et al. 2005a).

The clinical picture depends on the degree of infection. At low infection are poorly expressed - often present with a weak cough severe infections signs of dispnoea and frequent vesicular breathing. At the beginning of the present weak and hoarse cough that later in an attack when animals have stress (started running, etc...). Mucous membranes are pale, the appetite is reduced and the body temperature is elevated only when there are secondary infections (Pavlović et al. 2005a).

The pathological effects of parasites begin their larval migration movement from the pulmonary capillaries to the lung tissue during migration through the lung tissue, and activities during their adult longevity in the bronchi and aspiration of parasite eggs in the bronchioles and alveoli (Dunn et al. 1955., Drozd and Zalewska-Schönthaler 1987). It builds on the toxic effects of the metabolic products of the parasite by absorption in the blood can lead to a general intoxication. In weak predilection site infections are the last parts diaphragmatic lobe and in severe infections are caught in the other parts of the lung (Ivancevic, 1962, Tričković, 1978, Nakauchi et al. 1991). It can be seen bronchiolar, bronchitis, diffuse pneumonia, alveolar emphysema and connective tissue and cellular proliferation (Pavlovic et al. 2005). Pathological changes are wedge seems on whose basis are the bronchioles and bronchi in which we find parasites in different developmental stages were available in the mucous exudates or encircled cell infiltrate. The parenchyma look to gray nodules sized 0.6-2mm in which the central section notes yellow or yellow-green field surrounded by a brown zone of connective tissue (Nakauchi et al. 1991).

Gastritis Verminosa

Verminous gastritis is a common name for the disease caused by the increasing number of nematodes belonging to the orders and *Spiruridea* and *Trichostrongylidea*. (Pathison et al.1980, Pavlovic sar.2008). From among *Spiruridea* are represented *Ascarops* (*Ascarops strongyllinae*, *A.dentatum*) and *Physocephalus* (*Physocephalus sexalatus*)

Ascarops strongyllinae (syn.*Arduenna strongyllinae*) are the red parasite. Larval development takes place through the intermediate host, beetle *Aphodius castaneus*, *A.rufus*, *Ontophagus Hecate*, *Gymnopleurus spp.* and others. In them, the eggs release larvae in the body cavity of the beetle and then larvae molt into the second stage and pupate there. If an infected beetle eats random transient hosts - birds, small mammals, amphibians and reptiles, the larvae of the second degree of their digestive system migrated to the muscles where they pupate again. Infection occurs when the pigs eat the beetle's infectious or infected meat accidental intermediate host. Parasites graduate in host stomach, attaching to the lining of the stomach and that they are found in large amounts of mucus. In a large number can cause diffuse catarrhal gastritis and sometimes form pseudomembrans (Corwin i Stewart.1992).

Physocephalus sexalatus lives in the stomach, and less in small intestine. They infected pig and donkey, camels and cattle. The body of parasites is white more thinly in the front. Larval development takes place through the intermediate host beetles usually: *Scarabeus sacer*, *S.variolosus*, *Aphodius castaneus*, *A.rufus*, *Gymnopleurus Sturn*, *Geotrupes Doue*, *G.stercorarius*, *Onthophagus misery* and *O.hecate* (Pavlovic and sar.2008). Pigs and other good hosts become infected when they eat beetles or infectious flesh and organs of the infected intermediate host random.

In pigs only when infections are massive we can see inflammatory processes. Animals eat less or even stop to eat, restless and often drink water. At sector can be seen in the mucosa of the stomach ulcers and bleeding suffusion. Weak infections go almost unnoticed without visible pathological changes especially in older pigs.

From order *Trichostrongylidea* here represented genera *Hyostrongylus* (*Hyostrongylus rubidus*) and *Gnathostoma* (*Gnathostoma hispidum*) (Pavlović i sar.2008)

Hyostrongylus rubidus are the intense red or red-brown color parasite (Pavlovic and sar.1997). At the time of egg laying protoplasm is furrowed in blastomers. The external environment continues to develop in the first 24 hours caused rabbitoid larvae leaving the eggs after 48 hours. The outdoors larvae molt twice and become infective. The larvae require a moist environment to keep the pigs on in dry pens reduce the risk of infection to a minimum.

After oral infection larvae do not migrate from the stomach but remain there and become adult for 17-19 days after infection. Especially invaded are area around the pylorus and the funds. Pathological effects manifest themselves during their larval stage and then hystotrophic adults their mechanical and toxic effects. After infection larvae penetrate the gastric mucosa and glands causing minor bleeding. Later there is a hypertrophy of the gland which is manifested in the form of lumps the size of the lens. Initially flat and look like red spots from which to develop ever more clearly later raised islands of mucosa pearly shine. Later, these places are covered with 1-2 mm thick pseudomembrans that is easily removed. Below it are partially embedded in the mucus, parasites. Since *Hyostrongylus* bloodsucking host severe infections can cause anemia

in young animals

Gnathostoma hispidum lives in the walls of the stomach in pigs and cattle and less and man. It is a large nematode. The male is from 1.5 to 2.6 cm long and 1.1-2mm wide and the female is 2.1 to 4.5 cm long and 2.5 mm wide. Larval development takes place through the intermediate host. Eggs in the external environment due to the two developed blastomers in favorable environmental conditions in which they formed larvae after two coating leaves then penetrates the egg crabs of the genus *Cyclops* where twice molt In developing *Gnathostoma* there are occasional transient hosts - birds, amphibians and reptiles that are infected in the same manner in which larvae migrate to the organs and muscles.

Only to reach the stomach larvae penetrate the lining of the front end generally along the pylorus. At that sites of occurring damage look like a large as a grain of millet, round with sharp red edge. Depending on the number of parasites is the number of ulcers and severe infections of the mucous membranes seems riddled like a sieve. The lining is hemorrhagic and caused chronic inflammation with resultant thickening of the walls of the stomach lining which is rough and wrinkled.

Ascaridosis

Ascaridosis is the most common and most widespread parasitic infection of pig's causes by white and pink nematode *Ascaris suum*. The male is 12-25 cm long and 3 mm wide and the female is 30-35 cm long and 5-6 mm wide. Eggs are oval size 40-50 micrometers. The membrane consists of four layers, brown in color and thick, and the last layer is uneven edges and ascaris provides good protection and easy grip in the external environment. At the time of laying eggs are embryoned and what takes place in the external environment (Olsen, 1986, Rhodes et al.1997).

For infection of susceptible animals are up to one year of age, and over that age of infection might occur very rarely. Egg entered the digestive tract exits developed larvae that are starting hepatopulmonary migratory phase during which the molt four times (in the liver, lungs and intestines) (Douvres et.al.1969, Jakovljevic, 1974, Milivojevic, 1976). After 8-10 days of infection than those smears are swallowed and mature in the gut become adult parasites where there is a male and female mating and laying eggs in the intestinal lumen, where through the feces due to the external environment (Kulišić, 2002)

The clinical picture depends on the number of infective parasite eggs, the age and fitness of the animal. Pronounced clinical picture we have in piglets 4-5 months of age (in this group are possible and significant mortality intensity) in the form of cough, bronchopneumonia (due larvae migration of parasites), weight loss, poor promotion and diarrhea in piglets older than 5 months creates immunity eases and then reversed the clinical picture of the disease is primarily related to the migratory stage larvae. Pigs older than one year have developed immunity to this parasitic, analogous to self-cure mechanism in ruminants (Urban et al.1988).

Typical pathological changes showed liver provides that after the infection gets more continuous or discontinuous silver-gray color with the proviso that in some cases it occurs indurations of its surface is rough and uneven, with hard protuberances and depressions characteristic of interstitial processes of different ages. In young pigs during the larva liver is enlarged, and more or less bleeding beneath the capsule. Due to degenerative-necrotic changes on the surface of the liver can be observed not clearly

defined whitish spots that can conflation so this looks like a liver sprinkled with milky white freckles (Ivetić and sar.2007). In particular, there is a severe generalized infection of cirrhosis of the liver. In the lungs at the surface are visible numerous specks of bleeding especially on the tips of lobes (Milivojevic, 1976). The lungs are collapsed in places and filled with bloody foamy contents in which a large number of larvae. Found in the intestines of parasites and the resulting adults of catarrhal enteritis and possible rupture of the bowel due to blockage of a large number of parasites (Pavlovic and Andelic-Buzadžić, 2011). In the case of intestinal perforation peritonitis occurs. In severe infections the parasites seen in bile duct and excretory ducts of the pancreas and the pigs they can vomit.

Oesophagostomosis

The causes of this disease in Serbia are *Oesophagostomum dentatum* and *Oe.longicaudatum*. In India and North America are being met and *Oe.maplestoni*, *Oe.brevicaudum* and *Oe.georgianum*. Parasites are whitish in color, females are 7-14 mm long and male's 6-10 mm. parasite development is direct. From eggs to larvae outdoors out with the first dressing for 3-4 days and the other for 5-6 days occur when infective larvae. Pigs become infected when they eat larvae (Pavlovic and Andelic-Buzadžić, 2011)

Upon infection, the larvae come to the colon, there to rally in the lining and create nodes. Nodules consist of peripheral, reactive and central zones where detritus mass and eosinophyls occurred. After 5-10 days larvae leave the nodes, leaving the lumen of the intestine and become sexually mature parasites

Pathological changes in the intestinal mucosa which is red covered with a gray slime. Nodules protruding from the larvae after leaving in the intestine (Babic and sar.1943, Pavlovic sar.1997) also meet diphtheritic deposits sometimes with deep necrosis. The clinical picture depends on the degree of infection. At low rate of infection is poorly expressed - often present mucous diarrhea

MACRACANTHORHYNCHOSIS

Macracanthorhynchus hirudinaceus is the Acanthocephala whose body length response length names. These are roller parasites strong growth and clearly manifest sexual dimorphism. The front end of the proboscis is armed with a round shape hooks that are bent backwards. Females lay eggs long oval 60-100 and 50-56 microns wide, which is due feces in the external environment. They embryo is surrounded by four membranes, which is armed with several small hooks. Other parasite development are necessary transitory hosts, the beetle family *Scarabidae* - *Melolontha melolontha* and *M.vulgaris*, *Cetonia aurata* *Polyphylla fullo*, *Anomala vitis*, *Scarabeus (Ateuchus) sacer*, *Tropinota (Epicometis) hirta* *Poda Anisoplia segetum*, *Amphimallon solsititialis*, *Phylophaga Vehemens* et al. (Olsen, 1986; Crompton and Nickol, 1995) When the larvae eat eggs skarabida makrakantarhinhusa from them in the digestive tract, releasing larvae (acantor) and it will remain throughout the stages of metamorphosis beetle (Pavlovic and sar.2010).

Infection occurs when pigs ingest infected pigs beetle puppets, larvae or adults. In the digestive tract of pigs from acantela and adult parasites occur within two months. Parasites occurred in the small intestine, especially the duodenum and rarely in the

colon. They drilled their rostra bowel wall to the sub mucosa and in those places ulcer caused by grain size to millet head pins. Bottom of ulcus is necrotic and the edge is thickened due to chronic inflammation, which leads to the formation of visible lumps with external the bowel wall (Crompton, 1992).

Clinical symptoms of diseases are not specific. In severe infections observed digestive disorders, apathy, in appetite, vomiting, diarrhea, failure to thrive, weight loss and occasional quantity in pain. Diarrhea alternating with constipation what supplements tympanites. Then there is bloody diarrhea with cramps of abdominal muscle tremors. At this stage often leads to mortality of piglets. Acute course of the disease is seen in young and elderly chronic pigs. On dead animals are observed cachexia. At autopsy, noticed by dark yellow or dark brown nodules on the outside mucus cancer. They point to the place of fixation of parasites. Around each of the nodes is observed bright red hyperemic area causing a thickened bowel wall. In the inside of the intestine can be observed or catarrhal hemorrhagic enteritis and a number of parasites attached to the mucous membranes or free in the lumen. In the case of perforation of the intestinal wall is observed peritonitis.

PREVENTION AND THERAPY

Metastrongylidosis, gastritis verminosa, macracanthorhynchosis, oesophgostomosis and, *ascaridosis* are disease of pigs reared on pasture, in backyards and even at outlets or organic and extensively, but occur in farm animals kept in conditions where they are kept at the outlet. With free pig keeping the most important but least feasible preventive measure is keeping them separate different categories of animals. Preferably avoid contaminated pastures and considering the longevity of rain worm (live 2-7 years) it is also difficult to achieve and to avoid mixing of wild and domestic pigs as the peak even harder. The most effective preventive dehelminthization are autumn that is performed 3-4 weeks after withdrawal from the pasture and spring with the expulsion of the stall. From anthelmintics that interfere with neuromuscular coordination using cholinesterase inhibitors (organophosphate - coumaphos, dichlorovos, halokson, naphthalphos and trichlorophen), cholinergic antagonists (imidazole-levamisole, tetramisol, pyrimidine-morantel and pyrantel) and antagonists of mediators GABA (ivermectin, cyadectin, doramectin). We must treated all animals in infected herds (Pavlović et al.2002,2004).

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PARAZITSKA FAUNA SVINJA U ORGANSKOM DRŽANJU

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Izvod

Parazitske infekcije predstavljaju stalne pratioce svinjarske proizvodnje, nezavisno od načina držanja. Organsak proizvodnja i držanje uslovljavaju da svinje imaju direktan dodir sa mnoštvom prelaznih domaćina parazita a samim tim da su kod njih parazitske infekcije češće. U najvećoj meri ovde se javljaju biohelminti od kojih su najvažniji predstavnici roda *Metastrongylus*, uzročnici verminoznog gastrita (*Ascarops strongylinae*, *Physocephalus sexalatus* and *Hyostrongylus rubidus*), *Oesophagostomum* spp. i *Macracanthorhynchus hirudinaceus*. Ovde se takođe javljaju i *Acaris suum*, i drugi helminti u manjem obimu.

Ključne reči: biohelminti, svinje, ekstenzivno držanje.

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