ABSTRACT

Key words: pig, respiratory system, etiomorphopathology.

The doctoral thesis entitled **„The ethiomorphopathologie of the swine respiratory in the intensive exploitation system”** has a number of 227 pages and is structured according to current requirements into two parts: the first part of bibliographic study and the second of personal research.

The first part consists of a chapter entitled **"Swine respiratory pathology notions"** and was developed by consulting a number of 232 titles. In it are presented the fundamental pathological processes localized to the airways, lungs and pleural cavities and their classification in the main respiratory diseases localized as they are described in the literature. Fundamental pathological processes were classified into tissue growth disorders, circulatory disorders, volumetric dystrophy disorders, inflammation and tumors and have been described for all components of the respiratory system. Subchapter entitled **"The main respiratory diseases in pigs"** includes two categories of diseases: infectious and non-infectious. Infectious diseases are presented according to etiology. Thus in **"The viral pathology with respiratory impact"** the typical pathological lesions described are swine influence, porcine respiratory and reproductive syndrome (PRRS), porcine respiratory adenoviroza, respiratory coronavirosis, cytomegalovirus inclusions rhinitis.

Bacterial pathology with respiratory impact describe characteristic lesions for enzootic pneumonia, pasteurellosis, atrophic rhinitis, contagious pleuropneumonia and tuberculosis.

In the subchapter **"The respiratory system mycoses"** are presented lesions developed in Aspergillus infections in swine.

Among the most common parasitic infestation in the respiratory swine system are: ascariasis, hydatidosis and metastrongilosis.

Among non-infectious diseases are mentioned diripidilice herbicide, phyitotoxines and harmful gases poisoning.

The second part of personal contributions summarizes 120 pages and 174 figures and three chapters in which the study material, research methods and results are presesnted.

Chapter II presents the main purpose and objectives.

Chapter III details the material and working methods. In subsection 3.1. is shown the farm where the study material was procured, the material description, exploitation and animal health technologies in the establishment.

The material was represented by pigs from a closed circuit farm (SC Complexul de Porci SRL) from Braila county. The farm herd consisted in 550 PIC hybrid (Production Improvement Company) supplied by VASILAS-Ilfov farm and ranged in number in the 2006 to 2013 studied period. PIC hybrids were obtained by crossing the following races which were rated for their average daily gain, carcass percentage of lean meat etc: Large White, Landrace, Pietrain, Welsh, Duroc, the hybrid "Camborough" being recognized as parent.

Operating technologies aimed the increasing profitability and were based on three requirements management. So the areas were technological adequate provided, the material with high genetic potential, the quantity and quality of feed necessary were also provided by formulating recipes with high digestibility, balanced protein, vitamins and minerals.

Veterinary technologies aimed the compliance with biosecurity measures, the principle ,,all-in, all-out", reducing differences in piglets age which stay in the same compartment, the zoo-hygiene compliance and microclimate for each category of animals, application of the specific immunoprophylaxis.

In the chapter "Methods" have been described the steps for the necropsy and histological examination.

Necropsy examination was performed initially by opening and examination of the nasal cavity, followed by examination of the airways, the lungs and pleural cavities.

Inspection of the nasal cavities began with nasal septum, nasal concha, particularities of the mucosal surface deposits appearance.

To examine the airways was necessary to open the trachea and bronchi. The principales alterations in the volume of lumen, intraluminal pathological deposits, surface aspects of intrapulmonary airways mucousa was serched. The examination consisted basically in the externalization of inner content by light pressure surfaces section in the lung.

For lung examination was required prior gutting, metting in anatomical position, conducting and reviewing specific sections; the shape, the volume, the colour, the lobulation and any superficial changes aspects were observed. It was carefully examined sections and surface appearance expressed on the surface materials by light pressure section.

Lung examination ended with floating or docimasia test.

It was also necessary to distinguish changes due to injuries and hypostasis changes such as cadaverouse corpse, post-mortem clot, imbibing hemoglobin, autolysis.

For histologic examination, tissue fragments were prepared by paraffin permanent preparation histologic method. Main operators staiges of the method are: collection, fixation, inclusion in paraffin, sectioning, staining and mounting. Histological sections were stained using the following methods: hematoxylin - eosin - methylene blue (Masson trichrome) method, May - Grünwald - Giemsa (MGG) method, periodic acid - Schiff Fuxin (PAS).

Chapter IV presents the results and discussion obtained in own research. The fundamental swine respiratory pathological processes in the studied cases have been described.

Regarding to the extrapulmonary way lesions, nasal mucosa showed no macroscopic relevant changes, but histological examination revealed lesions which were classified into structural lesion of acute and chronic rhinitis.

If serous rhinitis infiltrating the epidermis appeared slightly displaced due to underlying structures serous exudation observed in histological examination by free gaps breakers; same dissociation was observed in the superficial dermis.

The lymph histiocytic rhinitis was found in 37 of the 550 studied cases were the rearrangement of tissue due to non-specific cell proliferation was observed, located in our study perivascular /periglandular and, more rarely, in a pseudo nodes form.

Fibrous or sclerosing rhinitis was described in 35 of the 550 studied cases and it was characterized by the presence of collagen secreted by fibroblasts accumulated in the extracellular space, leading to enrichment of the backing stromal tissue of the submucosa or the dermis in the skin region of the nasal cavity. Fibrous proliferation had a circumscribed appearance of normal structural vortices formations such as glands, nerves, vessels.

Catarrhal bronchitis was the most common and nonspecific exudative inflammation of mucous membranes and it was observed in 85 of the cases. In the initial phase of inflammation was observed the serous mucous and subsequently the less fluid and less opaque sero mucous catarrh, and white appearance viscous mucous-cellular catarrh and in advanced stages of inflammation, diapedesis and migration of leukocytes, especially neutrophil granulocytes to the mucosal surface which have given the mucopurulent exudate and purulent catarrhs characters.

Edematous bronchitis was found in 15 of the 550 studied cases, the serous exudate which deployed epithelial fragments that have floated the bronchial lumen was histologically observed in the lamina propria.

Hyperplastic bronchitis, also called lympho hystio plasma cell bronchitis, the most simple and most widely inflammation presented in the compared pathology, being found in 120 of the 550 cases studied.

Hyperplasia was observed around the blood vessels and bronchi of the lungs; a slightly compressed appeareance of the vessels and pulmonary acini being observed.

Chronic bronchitis finalized fiber or other sclerosing inflammation and was found in 10 cases.

This was characterized by bronchial wall colagenisation that led to his retraction, which appeared histologically as a narrow band of connective tissue fragments, distinguishing Reissessen muscle and showing internal face, in alternation, areas without epithelium and areas with epithelium hyperplasia.

Volumetric lung disorders were classified as secondary tissue disorders and their etiology varied.

Acquires pulmonary atelectasis of lung volume regression disorder was observed in one pig cadaver aged 1 month. Histologically, the lumen of the pulmonary alveoli, bronchi and bronchioles intrapulmonary had flattened appearance.

Emphysema was noted in young piglets (2-3 months) in the form of subpleural air vesicles, sometimes accompanied by hemorrhagic infiltration, observing associated with severe thoracic concussion, rib fractures and cracks. Alveolar rupture and air penetretation into the interlobular spaces which determined their distension was histologically observed.

Prelevant blood circulatory disorders in the lungs of pigs in intensive system were: active and passive congestion (venous / stasis), bleeding, thrombosis and infarction.

Active congestion was a relatively common phenomenon in lungs noting various causes and characterized by the vivid red color. Histologically, relaxation of the alveolar septa determined by the pronounced dilatation of capillaries, arterioles and venules as became evident and loaded with red blood cells was noted.

Pulmonary haemorrhages were rarely diagnosed. There appeared generally as small red-violet outbreaks (ecchymosis or suffusions), beneath the pleura or lung tissue mass. Histologically, capillary haemorrhages corresponded to capillar, arterial or venous breaks, with haematic infiltration of alveolar septa and filled with red blood cells. The presence of haemophages is also observed.

Pulmonary thrombosis was microscopically observed and revealed the presence of thrombotic masses occupying all or part of the lumen of blood vessels in the lungs.

Pulmonary infarction was observed in one case and secondary to venous stasis caused by torsion of the left diaphragmatic lobe. On histological examination ischemic devitalization area and blood invasion by collateral circulation was observed.

Pulmonary oedema was diagnosed as a lesion less independent, often being the result of a passive congestion phase or onset of inflammatory lesions in the lungs. Macroscopically, the lung showed obvious lobulation and microscopic alveolar septa were more or less hyperemia and alveolar lumen was blocked with a transudate.

In mucinous dystrophy a glossy macroscopic deposit was observed on the surface of bronchial lumen. On histological examination, goblet cells were overloaded with product discharge and mucous deposits accumulated on surface.

Hemosiderosis was recorded at histological level, but the lungs showed no macroscopic changes.

Necrotizing bronchopneumonia was identified in 8 cases, among them 4 cases by macroscopic examination when the lung was slightly expanded, with a red- cherry colour, strewn with gray-yellowish foci of necrosis. Foci of necrosis with variable stretching and tissue reaction shaped peri focal were observed at the histological level.

Catarrhal bronchopneumonia was originally noted by an inflammatory oedema which was macroscopic translated by outbreaks of red-purple compaction, consistent, bright and positive docimazia, located predominantly in the lobes of the lung previous and histologically by septal hyperemia and filling alveolar lumens with epithelial exfoliate migrated from the interstitium cells.

For the 45 subjects with fibrinous bronchopneumonia were observed macroscopically inflamed relaxed lung territories, dry surface section with a polychrome marble or mosaic specific look. Histologically, the lesion was discovered in the first three phases.

Purulent bronchopneumonia was observed in both morphological variants: diffuse and with abcesses. Bronchopneumonia with abcesses was macroscopic manifested by the presence of varying sizes disseminated abscesses in the lungs. Histologic examination of the lesions in bronchopneumonia with abcesses form showed predominant a three-layer wall and a pus filled abcess cavity. In diffuse purulent bronchopneumonia, inflamed territories showed gray, firm, slightly granular appearance on the surface of section.

Gangrenous bronchopneumonia areas identified by macroscopic volume increased and turgid, pale bluish-green or greenish-brown, crackles on palpation lung areas. On histological examination, normal tissue has been "melted" and replaced with cellular detritus mixed with fibrin, plasma and bacterial colonies.

In our study, lymph histiocytic bronchopneumonia was found in 22 cases framed in the context of swine enzootic pneumonia caused by *Mycoplasma suipneumoniae*.

Fibrous interstitial bronchopneumonia was macroscopically characterized by lower volume and higher consistency and a pearly white color. Histologically, the lesions were grouped as interlobular and intralobular interstitial brohopneumonia or as peribronchitis and peribronchiolitis.

Among the pleural cavity lesions, the fibrinous pleurisy was macroscopically noted by the presence of fibrin deposits both on the visceral and parietal pleura. The presence of fibrin deposits with reticular appearance was histologically observed on visceral pleura surface.

Fibrous pleurisy certainly represented the final form of the exudative serous and fibrinous pleural inflamation, standing out by the formation of fibrous (connective) adhesions between the serous pleural lesions (adhesives fibrous pleuritis). The histology was observed on the surface of the pleura presence of collagen fibers and cells.

In the section "Main respiratory diseases diagnosed in pigs" are presented infectious and parasitic diseases found in our cases.

In a total of 15 of the 550 studied cases swine influenza characteristic lesions were observed. Characteristic in the benign evolution (the most common form of the swine influenza)- was the emergence of a marked pulmonary hyperemia and stressed developmenet oedema.

Sectioning the lungs and opening the trachea and large bronchi was observed the presence of abundant foamy. Aerofore spaces and hematosis area were reduced to extinction. Alveolar epithelium was flattened under high pressure of the liquid accumulated and then peeled, floating freely within the alveoli.

Typical syncytial morphology of the giant Langhans cell was observed: round or slightly oval shape well defined cytoplasm, nuclei ring or horseshoe arranged under the cell membrane, intensely Masson colored basophilic and homogeneous in PAS staining cytoplasm.

Porcine respiratory and reproductive syndrome- PRRS was observed in 38 cases, especially for pregnant sows and piglets. Cyanosis was macroscopically observed in ears, nose, eyelids, vulva in females or scrotal skin in males.

Histologically in all age groups was observed type II pneumocytes hyperplasia, concurrently or sequentially with intestitial lymphocyte macrophage pneumonia.

A total of 215 of the 550 studied cases, the characteristic lesions of swine micoplasmosis were noted. From the macroscopic point of view, there have been areas of

densification and compaction in the front third of the lung. Histologically, the bronchial mucosal surface epithelium was marked by the goblet cell hyperplasia and the hyperfunction that have given rise to intense accumulation of PAS-positive mucus. In advanced stages of the disease process were noted lymph histiocytic bronchopneumonia aspects and mucous deposits became less abundant, accompanied by vascular ectasia in the lamina propria.

For a total of 84 of the 550 studied cases were noted lesions characteristic of swine pasteurellosis. For this disease the macroscopic appearance of fibrinous bronchopneumonia is one of the most characteristic feature. Histological, the disease process staging at lobular and even sublobular levels explains the macroscopic mosaic noted appearance.

Atrophic rhinitis characteristic changes have been identified in a number of five from the 550 individuals included in the study. Morphoclinical, the disease was initial characterized by the appearance of acute rhinitis, 1-3 months after infection the nose deviation occured, aspect known in the literature as "crooked nose ringing disease". Histologically, there was observed the nodular lymphoid hyperplasia of the mucosa, infiltration of neutrophils and eosinophils and the presence of serous exudate.

Contagious pleuropneumonia was noted in a number of 22 from the 550 studied studied and it evolved as a severe necrotic haemorrhagic pneumonia, associated with a fibrinous pleurisy, and sometimes with purulent abcesses. Histological the lesions corresponded to the necrosis outbreaks, to abscess, and in advanced stages reparative phenomena characterized by the secretion of connective fibers that have replaced the destroyed parenchyma areas appeared.

In 106 from the 550 studied cases were observed piobacillosis characteristic lesions. Characteristic of lung piobacillosis progress was the bronchopneumonia with numerous abscesses sometimes adjacent. The puss had a yellowish and creamy aspect. The purulent exudate was histological observed at the airways, bronchi and medium bronchioles which were blocked with a mixture of exudate leukocyte cellular debris and mucus.

Ascariasis has been identified in a number of 10 from the 550 studied cases, in which the characteristic lesions of eosinophilic bronchopneumonia were noted. The histological performed sections did not identify larvae in migration, but the presence of adult ascarids in the intestine combined with eosinophils migrated in the interalveolar and perialveolare spaces and lung parenchyma and the hypersecretion of surfactant within the alveoli guided the diagnosis for this parasitosis.