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A Few Words about the Diseases and Treatment of Pigs in Ancient Rome

Kilka słów o chorobach i leczeniu trzody chlewnej w starożytnym Rzymie

SUMMARY

In ancient Rome, pigs were widely bred animals. Breeders also paid attention to health issues because in the case of herd animals such as pigs, each disease posed a risk of large losses. Among the diseases of pigs, ancient authors mentioned fever, throat swelling, vomiting, pneumonia, coma-like condition or spleen pain. Some of the symptoms can be associated with currently known diseases. The ancients also tried to cure the observed diseases, but in most cases the treatments they offered had no chance of success. To date, some pig diseases are not treatable. One of the most effective methods of preventing them was to maintain appropriate zoohygienic conditions of which they were aware in ancient Rome. Many contemporary authors drew attention to this issue.

Keywords: ancient Rome; diseases; pigs; fever; throat swelling; vomiting

It is commonly assumed that pig was domesticated in the period between the 9th and the 6th millennium B.C.¹, even though the evidence from archaeozoo-

¹ Domestic pig (*Sus scrofa f. domestica*) is descended from a wild boar, a widespread species. Originally, it appeared throughout Europe, Asia, all the way to Java and northern Africa. The following division of wild boars into two groups is most often repeated in the sources: 1) western wild boar (*Sus scrofa ferus*), living in Western and Central Europe; 2) eastern wild boar (*Sus scrofa cristatus*), present in Eastern Europe and South Asia. The oldest remains of domesticated pigs come from Cemi Hallan, a site dated to the 9th/8th millennium B.C. See M. Rosenberg, M.R. Nesbitt, R.W. Redding, T.F. Strasser, *Hallan Çemi Tepesi: Some preliminary observations concerning early Neolithic subsistence behaviors in Eastern Anatolia*, "Anatolica" 1995, vol. 21(1–12), pp. 1–12.

logical material increasingly more often suggests that the first attempts at domestication could take place even in the 13th millennium B.C.² In the case of this species one can speak of polytopic domestication, thus it is not possible to unambiguously indicate specific centres where the domestication took place because it was a common process, happening wherever certain conditions were met³. The domesticated form gained many new morphological features. The skeletal system became smaller and more delicate, and the teeth also became smaller. The skull became wider, the facial part short, and the profile creased. The coat got changed, feathery hair faded, but in turn, patches and multicolour emerged, and striation disappeared in the young animals. As a result of domestication the ears became droopy and the tail lost its hair. A numerous physiological changes also took place⁴.

Pigs played a significant economic role in ancient Rome. It was clearly documented in *Rerum risticarum libri III* by Marcus Terrentius Varro. The Roman author noted: *quis enim fundum colit nostrum, quin sues habeat, et qui non audierit patres nostros dicere ignavum et sumptuosum esse, qui succidiam in carnario[s] suspenderit potius ab laniario quam e domestico fundo?*⁵ According to Varro, it was necessary for breeding to choose pigs of proper age, shapely size, and one-coloured⁶. First and foremost, ancient Romans valued fat, lard, and pork meat which were eagerly eaten throughout their feasts⁷. Pigs served as sacrificial ani-

Cf. M. Rosenberg, M.R. Nesbitt, R.W. Redding, B.I. Peasnell, *Hallan Çemi, pig husbandry, and post-Pleistocene adaptations along the Taurus-Zagros Arc (Turkey)*, "Paléorient" 1998, vol. 24(1), pp. 25–41; A. Ervynck, K. Dobney, H. Hongo, R. Meadow, *Born free? New evidence for the status of *Sus scrofa* at Neolithic Çayönü Tepesi (Southeastern Anatolia, Turkey)*, "Paléorient" 2001, vol. 27(2), pp. 47–73.

² Remains of pigs dated to 11,400 B.C. have been discovered in Cyprus. Cf. J.-D. Vinge, A. Zazzo, J.-F. Saliège, F. Poplin, J. Guilaine, A. Simmons, *Pre-Neolithic wild boar management and introduction to Cyprus more than 11,400 years ago*, "Proceedings of the National Academy of Sciences of the United States of America" 2009, vol. 106(38), pp. 16135–16138.

³ This concerns the wild boars' presence and peoples' willingness to undertake domestication. See G. Larson, K. Dobney, U. Albarella [et al.], *Worldwide Phylogeography of Wild Boar Reveals Multiple Centers of Pig Domestication*, "Science" 2005, vol. 307(5715), pp. 1618–1621; E. Giuffra, J.M.H. Kijas, V. Amarger, Ö. Carlborg, J.T. Jeon, L. Andersson, *The Origin of the Domestic Pig: Independent Domestication and Subsequent Introgression*, "Genetics" 2000, vol. 154(4), pp. 1785–1791.

⁴ Pubescence was accelerated, the number of piglets in one litter and the number of litters throughout the year increased, which proves that the seasonal cycle of reproduction disappeared. See G. Larson, K. Dobney, U. Albarella [et al.], *op. cit.*, pp. 1618–1621; G. Larson, U. Albarella, K. Dobney [et al.], *Ancient DNA, pig domestication, and the spread of the Neolithic into Europe*, "Proceedings of the National Academy of Sciences of the United States of America" 2007, vol. 104(39), pp. 15276–15281.

⁵ Varr. 2.4.3.

⁶ *Ibidem*.

⁷ Some researchers point out that pork was one of the most frequently eaten type of meat in Rome. See M. MacKinnon, *High on the Hog: Linking Zooarchaeological, Literary and Artistic*

mals⁸. Pork was also used as an ingredient of medications for some ailments⁹. Due to the economic importance of pigs, the means to handle these animals, methods of feeding them, and, in particular, the issue of providing veterinary care was of exceptional importance. As herd, animals pigs were at a risk of the spread of infectious diseases, which considerably increased the losses of breeders in the event of infection.

Economic significance of pigs is confirmed by the works of agronomists, encyclopedists, and veterinarians on breeding, feeding, and reproduction¹⁰. The sources also report information regarding meals made of pork¹¹ and their role as sacrificial animals. Some works also address the issues of diagnosing diseases and treatments of pigs. While analyzing the Roman agronomic works and veterinary handbooks written between the 2nd c. B.C and the 5th c. A.D., it becomes clear that diseases and means of treating other farm animals, and horses in particular, were significantly more often described. This is interesting because already in Varro's times it was considered that the farm should have pigs, but the literary accounts paid them much less attention than other species¹². A limited number of sources makes the accounts preserved to these days even more valuable. While analyzing the works of ancient Roman authors in this article, I will try to answer a question regarding the types of swine diseases the breeders had to deal with at that time. Equally interesting seems to be the issue of treatments used in antiquity to cure sick animals and their effectiveness. The latter problem will be discussed in relation to modern veterinary knowledge.

In ancient times pigs were herd both in mountainous areas as well as on plains. Areas overgrown with oaks, cork trees, beech trees, terebinths, wild olives, and wild fruit trees, etc., were considered as particularly valuable¹³. It was also

Data for Pig Breed in Roman Italy, "American Journal of Archaeology" 2001, vol. 105, pp. 649–673; E. Champlin, *The Testament of the Piglet*, "Phoenix" 1987, vol. 41(2), pp. 174–183.

⁸ The *Suovetaurilia* required a sacrifice to gods. See Y. Hamilakis, E. Konsolaki, *Pigs for the gods: Burnt animal sacrifices as embodied rituals at a Mycenaean sanctuary*, "Oxford Journal of Archaeology" 2004, vol. 23(2), pp. 135–151; U.W. Scholz, *Suovetaurilia und Solitaurilia*, "Philologus" 1973, vol. 117(1–2), pp. 3–28

⁹ Plin. *HN*. 28.58; 28.60; 28.61.

¹⁰ Varr. 2.4.1–22, Col. 7.10.1–8; 7.11–3, Pallad. 14.36.1–6; 14.37.1–2; 14.38.1–3 devoted extensive fragments of their works to describe conditions in which specific animal species should be kept, how couples for reproduction should be selected, how sows should be dealt with, or the rules of feeding the animals.

¹¹ Apic. *De re coq.* 7.1–17.

¹² The majority of works in Latin devoted in whole or in part to the issue of animals' treatments focuses, first and foremost, on horses, while a small percentage refers to fragments on cattle and sheep. Information regarding swine diseases appears even less frequently, and some authors do not pay attention to diseases of these animals although they refer at length to other species of farm animals.

¹³ Col. 7.9.5.

believed that they could be pastured in wetlands. Areas overgrown with various types of grasses, bushes, and trees were chosen because fruits ripened at different times, due to which they provided food for the herd throughout the year. It was also recommended to choose wetlands so that pigs could nuzzle and dig up earthworms and roots of aquatic plants¹⁴. On the Roman farms, pigs spent the majority of the year outside of pigsty, which, on the one hand, gave them access to fresh food, but on the other hand, increased the risk of contact with various pathogenic factors¹⁵.

Due to the already mentioned popularity of breeding, the Romans focused on providing their pigs with proper care. Breeders and veterinarians wrote down their observations and experiences, paying a lot of attention to issues regarding the selection of right animals, their breeding, food and veterinarian treatment. One of the first Romans to describe swine diseases and methods of their treatment was Columella in *De agri culturae*¹⁶, and a few centuries later the same topic was addressed by Palladius in the fourteenth book of *Opus agriculturae*. In his work he introduced symptoms and treatments recommended in the case of a few various diseases, and the information included in his work came mainly from the treatise by Columella. It is difficult to state that Palladius presented new knowledge to the issue of treating pigs, nevertheless, his inclusion of information from such an old work allows to assume that it was still considered valid. Swine diseases were very briefly referred to also by Pliny the Elder in *Historia Naturalis*, but the subject was not more broadly addressed by other Roman authors.

In his work Columella initially describes the signs of fever in pigs¹⁷. They were identical to the case described by Palladius, which was characterised by

¹⁴ Col. 7.8.7.

¹⁵ K. Wolny, *Pastwiskowy chów świń*, "Hodowca Trzody Chlewnej" 2009, no. 1, pp. 32–35. Cf. K. Filus, *Badania warunków zoohigienicznych i wyników chowu świń utrzymywanych w chlewniach i na pastwisku*, "Acta Academiae Agriculturae ac Technicae Olstenensis. Zootechnica" 1998, vol. 48, pp. 55–61; K. Szulowski, W. Iwaniak, M. Welner, J. Złotnicka, M. Szymajda, Z. Zaręba, H. Czeplińska, *Diagnostyka i sytuacja epidemiologiczna brucelozy świń w Polsce*, "Życie Weterynaryjne" 2011, no. 86, pp. 368–370.

¹⁶ Older mentions of swine diseases come from the accounts of the Greek philosopher, Aristotle. In his work *Zoologia* he mentioned swine diseases that were known at that time. He referred to, e.g. 1) *branchos* which was to characterise with inflammation of lungs' air vessels and jaws; 2) *krauros* with aches and the feeling of head heaviness, and 3) characterized by diarrhoea in animals. The philosopher also described a disease the symptom of which was the presence of follicles on thighs, neck, and shoulder blades. The follicles were also supposed to appear on the tongue, see Arist. *HA*. 8.21. The works by Aristotle were known in ancient Rome, but in the case of information provided by the authors describing swine diseases, it is possible to get the impression that the philosopher's account regarding this issue was not important for them. Only in Pliny the Elder's work one can find information on one of the diseases described by Aristotle – tonsillitis (Plin. *HN*. 8.206).

¹⁷ Col. 7.10.2.

the tilting of the heads hanging to the side¹⁸. In the case of this disease, one could also observe dizziness leading to animals' falls¹⁹, which according to the author from the 4th century, was to indicate the fever²⁰. On the basis of the described symptoms, it is difficult to unequivocally determine what kind of disease, in this case, the Roman breeders were dealing with. In itself the fever is not a medical condition, but it accompanies many of them as one of the symptoms. The tilting of the head to the side and coordination disorder – described in the work – as well as repetitive circling which could have been interpreted by the breeder as “dizziness”, could indicate a neural case of listeriosis characteristic of older animals²¹. The disease is caused by bacteria, *Listeria monocytogenes*²², which is conditionally pathogenic and attacks animals in poor condition, improperly fed, and with decreased immunity. Pigs are infected through the gastrointestinal tract and the upper respiratory tract, but self-infection can also occur²³. The food is often the source of germ because this bacterium is capable of multiplying at the pH value above 5.0–5.5.

Both Columella and Palladius believed that in the case of the disease it was effective to drain blood from the auricle on the opposite side of the head tilting and to drain blood from the vein under the tail²⁴. After applying these, the animals were supposed to be locked indoors for 1–2 days, given moderately warm water and barley flour²⁵. In case of the actual occurrence of listeriosis among the herd,

¹⁸ Pallad. 14.36.1.

¹⁹ Col. 7.10.1.

²⁰ Pallad. 14.36.1.

²¹ The disease may occur as asymptomatic, septic or neural. See Z. Gliński, K. Kostro, *Choroby zakaźne zwierząt*, part 3: *Choroby trzody chlewnej z elementami zoonoz*, Lublin 2004, pp. 65–67.

²² *Listeria monocytogenes* is a facultative anaerobic bacterium. Infection with bacterium causes listeriosis, a disease which is dangerous for both animals and people. It is found all over the world, particularly in countries with a temperate climate. *Listeria* spreads quickly, being found in excrements, manure, soil, sewages, surface waters, and plants. See *Listeria. Listeriosis*, eds. E.T. Ryser, E.H. Marth, New York 1999; V. Ramaswamy, V. M. Cresence, J.S. Rejitha, M.U. Lekshmi, K.S. Dharsana, S.P. Prasad, H.M. Vijila, *Listeria – review of epidemiology and pathogenesis*, “Journal of Microbiology, Immunology and Infection” 2007, vol. 40(1), pp. 4–13; A. Jurkiewicz, W. Olszczak-Momot, *Listeria monocytogenes jako problem zdrowia publicznego*, “Medycyna Ogólna i Nauki o Zdrowiu” 2015, vol. 21(1), pp. 29–32; E. Wątecka-Zacharska, J. Bania, *Listeria monocytogenes – patogen, który wie, jak przetrwać*, “Życie Weterynaryjne” 2014, no. 89, pp. 917–918.

²³ Self-infection usually occurs because of the body's weakening. *Listeria*s living in the digestive system permeate into blood and lymph. The germ spreads in the body through blood, lymph, and nerves, causing infection without symptoms, sepsis or neural condition. For the purpose of their own development, the germs use monocytes' cytoplasm and granulocytes with multiform nucleus. See Z. Gliński, K. Kostro, *Listerioza współczesnym zagrożeniem*, “Życie Weterynaryjne” 2012, no. 87, pp. 577–581. Cf. *Choroby zakaźne zwierząt z elementami epidemiologii i zoonoz*, eds. Z. Gliński, K. Kostro, Warszawa 2011, p. 127.

²⁴ Pallad. 14.36.2.

²⁵ Pallad. 14.36.3.

the methods for treating the sick animals mentioned by Palladius had no chance to bring any effect. Even today's treatment is difficult because the disease is usually diagnosed too late. Effective treatment involves giving the penicillin for 7–14 days²⁶, but one of the most important methods of fighting listeriosis is still prevention²⁷.

Another disease of pigs mentioned by Columella was the one referred by him as *strumosis*²⁸. Exactly the same disease was mentioned by Palladius. It was supposed to be a swelling of dewlap, which – as in Columella's version – was treated with draining blood under the tongue, and after it was drawn, the muzzle was rubbed with salt with barley flour²⁹. However, both Romans noted that an effective medication was to pour *garum* to the sick animal's throat and to hang a cracked stem of asafetida on its neck³⁰. Information on the inflammation of dewlap was also given by Pliny the Elder³¹. According to the encyclopedist, the sign of the disease was the animal's tilted head and blood at the ends of bristles pulled from the back³².

The observed symptoms cannot be regarded as a separate medical condition, although the swelling – including those of dewlap – are symptoms of many diseases dangerous to pigs. The swelling of the neck mentioned by the author seems

²⁶ *Choroby zakaźne zwierząt...*, p. 129.

²⁷ It is fundamental to take care for the fodder which is the most frequent reason of infections, it is necessary to carry out a systematic deratization of rooms where animals stay, and cleaning and disinfecting the rooms, as well as protection against stress and other diseases. See J. Chmielewski, E.M. Galińska, T. Nagas, M. Trela, K. Anusz, J. Zagórski, *Środowiskowe zagrożenia biologiczne w praktyce weterynaryjnej*, "Życie Weterynaryjne" 2015, no. 90, pp. 353–357; A. Jurkiewicz, W. Oleszczak-Momot, *op. cit.*, pp. 29–32.

²⁸ Col. 7.10.3.

²⁹ Pallad. 14.36.4.

³⁰ Col. 7.10.3 cf. Pallad. 14.36.4. Both sources noted that asafetida's stem was supposed to be tied with a linen string and it should necessarily touch the sick animal's throat. Some scholars associate asafetida with silphium. See A. Bartnik, *Silphium: „tajemnicza” roślina na monetach starożytnej Cyreny*, "Magazyn Numizmatyczny" 2016, no. 42, pp. 5–12; K. Łuczak, *Silphium z Cyrene. Skarb antycznej medycyny*, "Kwartalnik Historii Kultury Materialnej" 2015, no. 63, pp. 1–14; A. Drozd-Lipińska, K. Łuczak, *Silphium – cudowny lek od Apollona dla starożytnego miasta Cyrene*, [in:] *Czystość i brud. Higiena w starożytności*, eds. W. Korpalska, W. Ślusarczyk, Bydgoszcz 2013; W.S. Wright, *Silphium Rediscovered*, "Celator" 2001, vol. 15(2), pp. 23–24; M. Tameanko, *The Silphium Plant: Wonder Drug of the Ancient World Depicted on Coins*, "Celator" 1992, vol. 6(4), pp. 26–28; C.L. Gemmill, *Silphium*, "Bulletin of the History of Medicine" 1966, vol. 40(4), pp. 295–313.

³¹ Plin. *HN*. 8.206.

³² Plin. *HN*. 8.207. The description referring to blood at the tips of bristles pulled out of the back appears also in Aristotle. In *Zoologia* he describes a disease characterised with the occurrence of blisters in the areas of thighs, neck, and shoulder blades, as well as the tongue. The mentioned symptoms of this disease were blood at the endings of plucked bristles, spoilage of the meat's taste, and problem with keeping the hind legs calm. See Arist. *HA*. 8.21.

to suggest that perhaps the Roman were dealing with the so-called edema disease caused by the strains of *Escherichia coli* enterohemorrhagic³³. One of the symptoms of the disease is the swelling of different parts of the head³⁴. Alternatively, they may have encountered Pasteurella, a bacterial disease caused by *Pasteurella multocida*³⁵. In the acute type of this disease one of the symptoms is the swelling near the throat. In case of both of the above-mentioned diseases, a properly selected antibiotics treatment was necessary³⁶, and thus the therapies used in ancient Rome had no chance of success.

Both Columella and Palladius also mentioned vomiting in their works³⁷, which were treated by them as a separate medical condition. Vomiting as a characteristic, domineering symptom is typical of a vomiting sickness and a debilitating porcine epidemic diarrhoea, as well as infectious gastroenteritis, but they also occur as one of the symptoms in the case of many other diseases³⁸. Considering the enigmatic nature of the remark of both Roman authors, it cannot be unequivocally indicated what disease they had in mind. Apart from the remark on vomiting, they do not give any detailed information regarding the course of this disease or the age of sick animals. Age remains an exceptionally significant factor in diagnosing the disease because the porcine vomiting and diarrhoea attacks young

³³ M. Truszczyński, Z. Pejsak, *Choroba obrzękowa świń, z uwzględnieniem osiągniętego postępu*, "Medycyna Weterynaryjna" 2014, vol. 70(7), pp. 387–390; P. Wróbel, *Escherichia coli i choroba obrzękowa*, "Hoduj z Głową – Świnie" 2014, no. 4, pp. 42–45.

³⁴ The disease is particularly dangerous for piglets between the 3rd and 14th week of life. Quickly-growing and well-fed animals get sick the most. Among the sick, the following neural symptoms may occur: unsteady gait, lameness, tripping, and head tilting. Frequently, one of the first symptoms is the lack of appetite, diarrhoea, and shortness of breath. The swelling of different parts of the head also occur. Mortality rate of pigs with swelling is 65%. The disease is treated with antibiotics. Effective treatment results are achieved by giving sulfonamides with trimethoprim. See Z. Gliński, K. Kostro, *Choroby...*, p. 107. Cf. M.A. Tarasiuk, *Choroba obrzękowa – problem nadal aktualny w tradycyjnym chowie świń*, "Weterynaria w Terenie" 2012, vol. 6(2), pp. 24–27.

³⁵ The disease presented itself as pneumonia which can also be accompanied by pericarditis and pleurisy. Clinical symptoms of the disease included the presence of shortness of breath, fever, lack of appetite, bruising of skin around ears and swelling of throat. The disease usually occurs as a secondary infection. The treatment usually consists of ampicillin, ceftiofur, erythromycin, oxytetracycline, and tylosin. See K. Kostro, Z.F. Gliński, E.G. Greła, Z. Grądzki, A. Kopczewski, *Choroby zakaźne i pasożyty trzody chlewnej. Podstawy żywienia, odporność, patologia, terapia zoonoz*, Lublin 2008, pp. 212–213.

³⁶ Z. Pejsak, M. Truszczyński, *Leki przeciwbakteryjne stosowane u świń*, "Życie Weterynaryjne" 2016, no. 91, pp. 254–257.

³⁷ Col. 7.10.4. Cf. Pallad. 14.36.5.

³⁸ I.a. in the case of the African and classical swine fever and Aujeszky's disease. See A. Rudy, *Sytuacja epizootologiczna choroby Aujeszkyego u świń w Polsce*, "Życie Weterynaryjne" 2011, no. 86, pp. 272–275. Cf. G. Wittmann, H.-J. Rziha, *Aujeszky's Disease (Pseudorabies) in Pigs*, [in:] *Herpesvirus Diseases of Cattle, Horses and Pigs*, ed. G. Wittmann, New York 1989, pp. 230–325.

animals before the 4th week of life³⁹. However, ancient sources do not allow to determine the age of the sick pigs. Taking into consideration the lack of information regarding the age, the porcine epidemic diarrhoea – a viral disease particularly dangerous to piglets, but also occurring in all age groups – also seems probable⁴⁰. It is also not possible to unambiguously rule out the porcine infectious gastroenteritis, which makes pigs of all group ages sick⁴¹. The lack of appetite, mentioned in the next part of the article, sadness and severe diarrhoea, together with the above-mentioned vomiting can suggest that the Romans were dealing with the porcine gastroenteritis coronavirus⁴². The disease attacks animals of all ages, the infections usually occur in winter and then they are the most dangerous as the low temperature and limitations in sunlight allows the virus to survive in excrements and places contaminated with excrements. Vomiting, diarrhea, the lack of appetite and fever are among the symptoms that can be observed⁴³. According to both Columella and Palladius, an effective remedy for the above-mentioned disease was to use ivory filings mixed with salt and finely crushed fava beans. The mixture was recommended to be given on empty stomach before the animals go on pasture⁴⁴. The medication suggested by the Romans most assuredly could not harm, but it is difficult to accept it as effective. To this day no successful method of preventing this disease has been developed. All that can be done is to support the idiopathic healing by means of a fasting while, at the same time, watering of animals in abundance. It is also important to heat the pigsty to maximum in order to diminish the risk of the pathogens to survive in the environment⁴⁵.

In the case of *Opus agriculturae* the most interesting fragment seems to be the one in which the author described the weight loss, lack of appetite, and also falling asleep that was similar to a coma⁴⁶. In accordance with Palladius' account,

³⁹ Z. Gliński, K. Kostro, *Choroby...*, p. 114. Cf. K. Andries, M. Pensaert, *Vomiting and Wasting Disease, a Coronavirus Infection of Pigs*, "Biochemistry and Biology of Coronaviruses" 1981, vol. 142, pp. 399–408.

⁴⁰ M. Truszczyński, Z. Pejsak, *Epidemiczna biegunka świń, zagrożenie dla Europy*, "Życie Weterynaryjne" 2015, no. 90, pp. 360–363.

⁴¹ Z. Pejsak, M. Truszczyński, *Choroby świń o dużej dynamice szerzenia się oraz nowo odkrywane patogeny*, "Życie Weterynaryjne" 2014, no. 89, pp. 920–923.

⁴² The disease is caused by a virus from the *Coronaviridae* group. The infection occurs through oral transmission. Incubation period is around 12 hours. The virus is inactivated by detergents, fever, drying-out, and sun rays. The course of this disease is mild. See Z. Gliński, K. Kostro, *Choroby...*, pp. 107–112.

⁴³ K. Gliński, K. Kostro, *Koronawirusowe zapalenie żołądka i jelit [TGE]*, "Trzoda Chlewna" 2002, vol. 40(10), pp. 86–91.

⁴⁴ Col. 7.10.4. Cf. Pallad. 14.36.5.

⁴⁵ M. Truszczyński, Z. Pejsak, *Biegunki świń wywoływane przez wirusy warunkowo chorobotwórcze*, "Medycyna Weterynaryjna" 2012, vol. 68(1), pp. 9–14; *Choroby zakaźne zwierząt...*, pp. 261–265.

⁴⁶ Pallad. 14.36.6.

the entire herd lost weight and did not eat. When it was taken out to pasture, it would lie in the middle of the field, overcome by something like a coma and fell asleep in the sun⁴⁷. On the basis of the above-mentioned symptoms it can be speculated that the Romans faced a classical swine flu⁴⁸, an exceptionally dangerous and contagious disease caused by the virus of the genus *Pestivirus*⁴⁹. Pigs get infected with the virus through direct contact with the excreta, blood of animals, and via wastes of sick animals⁵⁰. The clinical symptoms of the acute swine fever include the lack of appetite, depression, infirmity, aversion to moving, lying down, and falling asleep⁵¹, what corresponds with the description of symptoms preserved in the works of Columella and Palladius. Additionally, the disease is highly contagious, usually the entire herd is sick, which also coincides with the ancient account. Providing the description of the symptoms, the Roman author unambiguously stated that the disease spread on the entire herd⁵². During the illness, the following symptoms may occur: constipation, diarrhoea, sometimes vomiting, and after around 7 days, disorders from the respiratory system such as: shortness of breath, cough, or nose bleedings. Sick animals die after 5–15 days from the onset of symptoms and the mortality reaches 100%⁵³. In Rome, in the case of the onset of symptoms mentioned by the two authors, the animals were locked in pigsty and they were given

⁴⁷ *Ibidem*.

⁴⁸ The classical swine fever is an infectious, contagious, viral disease of domesticated pigs and wild boars. It is included in the group of the most dangerous diseases of pigs. Until recently, it was found wherever pigs were bred. The virus which causes the disease belongs to *Pestivirus* genus, the group of *Flaviviridae*. The virus most frequently enters the body through nose and the tonsils remain the main gateway for it. The infection is also possible through the respiratory system, wounds, undamaged conjunctiva, and animal reproductive organs. See *Choroby zakaźne zwierząt...*, pp. 279–280. Cf. V. Moennig, G. Floegel-Niesmann, I. Greiser-Wilke, *Clinical Signs and Epidemiology of Classical Swine Fever: A Review of New Knowledge*, “The Veterinary Journal” 2003, vol. 165(1), pp. 11–20.

⁴⁹ P. Lowings, G. Ibata, J. Needham, D. Paton, *Classical swine fever virus diversity and evolution*, “Journal of General Virology” 1996, vol. 77(6), pp. 1311–1321. Cf. M. Beer, K.V. Goller, C. Staubach, S. Blome, *Genetic variability and distribution of classical swine fever*, “Animal Health Research Reviews” 2015, vol. 16(1), pp. 33–39.

⁵⁰ Abrasions and wounds are also gates for infection. The virus replicates in the vascular endothelium cells and lymphatic system, through which it reaches the blood and with its help it spreads throughout the entire body. Incubation period lasts 2–14 days. The virus transmission most likely involves rodents, birds, and dogs. See R. W. Loan, M.M. Storm, *Propagation and transmission of hog cholera virus in non-porcine hosts*, “American Journal of Veterinary Research” 1968, vol. 29(4), pp. 807–811.

⁵¹ Z. Pejsak, A. Lipowski, *Problemy związane ze zwalczaniem klasycznego pomoru świń w Europie*, “Życie Weterynaryjne” 2008, no. 83, pp. 561–563.

⁵² Pallad. 14.36.6.

⁵³ V. Moennig, G. Floegel-Niesmann, I. Greiser-Wilke, *op. cit.* Cf. V. Chander, S. Nandi, C. Ravishankar, V. Upmanyu, R. Verma, *Classical swine fever in pigs: Recent development and future perspectives*, “Animal Health Research Reviews” 2014, vol. 15(1), pp. 87–101.

neither food nor drink for one day. The next day they were given a cucumber juice with water⁵⁴, which was meant to cause vomiting that cleansed the body. Having removed the bile, they were fed with peas or fava beans sprinkled with a concentrated salt solution⁵⁵. Nowadays, pigs infected with the classical swine fever are not being treated not only due to the lack of an effective treatment, but also due to the possibility of spreading the plague⁵⁶.

In his work *De agri cultura*, Columella also mentions pneumonia which was supposedly attacking pigs that were unable to cool down in water or muddy ponds⁵⁷. The very same type of disease was described by Palladius in *Opus agriculturae*. The Roman author, similarly to his elder colleague, described a disease that was referred to as pneumonia⁵⁸. According to both authors, the disease was to “appear” during heat waves, and the animals were to be harmed by hot air⁵⁹. Due to this ailment, the animals had to be pastured during the hot weather near rivers, lakes or ponds with mud had to be prepared so that the animals could cool in them their bellies filled with food. According to both Roman authors, the hot air harmed animals with no access to cooling bathing. Even though the respiratory system diseases are one of the most commonly occurring in pigs and thus there is no doubt the Romans must have dealt with at least one of them, the etiology of the disease provided by Columella and Palladius by no means corresponds with the causes of most diseases of this type. A significant number of the respiratory system diseases could be triggered by both viruses and bacteria⁶⁰.

Columella also mentioned that pigs often suffered from spleen pains⁶¹. According to him, the disease, which attacked mainly in the summertime, could

⁵⁴ Col. 7.10.5. Cf. Pallad. 14.36.7. It probably refers to *Cucumis anguinus* L. = *Trichosanthes cucumerina* L. Cf. R. Armstrong, *Vergil's Cucumber: "Georgics" 4.121–2*, “The Classical Quarterly” 2008, vol. 58(1), pp. 366–368; J.H. Kirkbride, *Biosystematic monograph of the genus Cucumis (Cucurbitaceae)*. *Botanical Identification of Cucumbers and Melons*, Boone 1993, pp. 37–40.

⁵⁵ Col. 7.10.5. Cf. Pallad. 14.36.7.

⁵⁶ Treatment of the classical swine fever is prohibited in Poland. On the basis of the Journal of Law 08.213.1342, the Act of 11 March 2004 on health care and eradication of infectious diseases of animals, the classical swine flu belongs to diseases officially eradicated, and is on the OIE list of animal infectious diseases. See M. Białek, A. Borowski, J. Szarek, M. Lisiowska, *Postępowanie administracyjne w przypadku klasycznego pomoru świń*, “Medycyna Weterynaryjna” 2012, vol. 68(8), pp. 475–478.

⁵⁷ Col. 7.10.7.

⁵⁸ Pallad. 14.37.1.

⁵⁹ *Ibidem*.

⁶⁰ Problems with respiratory system can be caused by viruses such as: porcine reproductive and respiratory syndrome virus (PRRSV), swine influenza virus (SIV), porcine pulmonary coronavirus (PRCV), porcine circovirus (PCV), pseudorabies virus (PRV) or bacteria such as: *Mycoplasma hyopneumoniae* or *Actinobacillus pleuropneumoniae*. See M. Truszczyński, Z. Pejsak, *Mykoplazmy i mykoplazmozy świń*, “Życie Weterynaryjne” 2015, no. 90, pp. 94–97.

⁶¹ Col. 7.10.8.

have derived from the pigs' fondness of all kinds of sweet food, including fruits⁶². Palladius also wrote about problems with this organ. He noted the enlargement of the spleen as a result of an excessive consumption of apples⁶³. As a remedy, both authors recommended water from troughs made of tamarisk since it was believed that juice from wood reduced swelling. Undoubtedly, inadequately balanced diet and consuming too much food, including apples, is a threat for the health, and even life, of animals, but it is questionable whether it contributed to problems with spleen. Although it is doubtful that only the fruits caused the above-mentioned disease, we cannot rule out other factors. It is likely that in this case the spleen pains could have been caused by one of the parasites in the body, i.e. tapeworm of the *Echinococcus* genus that causes Echinococcosis⁶⁴. The disease was already known in antiquity. The first cases of the *Echinococcus granulosus* were already described by Hippocrates⁶⁵. The parasite which attacks both people and animals can be contracted by eating berries, fruits, mushrooms, or grass, to which the *echinococcus* eggs might be attached⁶⁶. The symptoms of this disease include the aches of organs affected by the parasite⁶⁷. The cysts usually develop in liver, lungs and brain, but they can also attack kidneys, spleen, bones, and eyes. Treatment is largely dependent on the number, size and location of cysts. Large cysts are treated surgically, while the smaller ones by precautionary usage of albendazolum in a few monthly doses⁶⁸. It was difficult to diagnose *echinococcus* in antiquity.

⁶² *Ibidem*.

⁶³ Pallad. 14 37.2.

⁶⁴ H. Lis, K. Górski, *Bąbłowica – echinokokoza świń*, “Życie Weterynaryjne” 2012, no. 87, pp. 241–242; M. Nakao, D.P. McManus, P.M. Schantz, P.S. Craig, A. Ito, *A molecular phylogeny of the genus Echinococcus inferred from complete mitochondrial genomes*, “Parasitology” 2007, vol. 134(5), pp. 713–722; J. Eckert, P. Deplazes, *Biological, epidemiological, and clinical aspects of echinococcosis, a zoonosis of increasing concern*, “Clinical Microbiology Review” 2004, vol. 17, pp. 107–135.

⁶⁵ S. Nowak, *Bąbłowica wielojamowa: od pierwszego opisu Virchowa do transplantacji wątroby*, “Acta Medicorum Polonorum” 2015, vol. 6, pp. 14–21.

⁶⁶ The disease is caused by two types of tapeworm 1) single-chamber tapeworm, typical of dogs; 2) multi-chamber tapeworm, typical of foxes. Mature forms of these tapeworm live in the bodies of carnivorous forest animals. Tapeworms' eggs are found in water, soil, or on forest fruit, etc. contaminated with excrements of sick animals. See A. Lass, B. Szostakowska, P. Myjak, K. Korzeniewski, *Fresh fruits, vegetables and mushrooms as transmission vehicles for Echinococcus multilocularis in highly endemic areas of Poland: Reply to concerns*, “Parasitology Research” 2016, vol. 115, pp. 3637–3642; S. Nowak, *op. cit.*; J. Popow, *Bąbłowiec wielkocomorowy wątroby i płuc*, “Wiadomości Parazytologiczne” 1959, vol. 5(6), pp. 563–567.

⁶⁷ M. Samorek-Pieróg, J. Karamon, T. Cencek, *Echinococcus granulosus – globalny problem zoonotyczny oraz możliwości diagnostyki inwazji u zwierząt*, “Medycyna Weterynaryjna” 2016, vol. 72(12), pp. 728–734; H. Lis, K. Górski, *op. cit.*

⁶⁸ The treatment is used in people. The complete recovery is achieved in 30% of sick patients, while in the remaining 70%, one can observe the reduction of the cysts' size. See D. Bielińska-Ogrodnik, M. Lichodziejewska-Niemierko, M. Żurawska, *Bąbłowica wątroby u chorego diagnozowanego otrzewnowo – opis przypadku*, “Forum Nefrologiczne” 2015, vol. 8(2), pp. 93–96.

The only visible symptoms are aches of the organs affected by the parasite – which can be interpreted as a symptom of other diseases. Even nowadays, the diagnosis is not simple and it is usually obtained accidentally through ultrasound or X-ray tests⁶⁹. Sometimes it is also possible to notice an extended eosinophilia, increase in the activity of liver enzymes, bilirubin or decrease in the concentration of proteins in the blood. Even if ancient physicians suspected parasitic disease, they had no effective medications at their disposal.

The accounts by Columella and Palladius are not substantially different from each other because the younger author based his work on the older work, using its extensive fragments. Diseases and treatment methods described in both works are nearly identical. Slightly different is the brief account by Pliny the Elder on swine diseases. Although we know from the declaration of the encyclopedist that he used the works by Columella, he also used Aristotle's writings, and it is their influence that can be seen in a fragment regarding diseases of pigs. Pliny shortly mentioned that pigs contracted rabies, tonsillitis, and dewlap inflammation⁷⁰.

Rabies was a relatively well-known disease in antiquity⁷¹. Although the ancient authors usually wrote about it in the context of dogs, they nevertheless realised that it also attacked other animals and people⁷². Already in the oldest medical works we find information on this disease and thus it is possible to assume that ancient Romans should not have any major problems with recognising the disease. On the other hand, the disease must have been rare among pigs because other authors do not mention cases of rabies in pigs, or – in the case of pigs – they made erroneous diagnosis, confusing rabies with other diseases⁷³.

Tonsillitis mentioned by the encyclopedist had probably been described already by Aristotle in *Historia Animalium*. Referring to the disease, the philosopher used

⁶⁹ M. Skuza, T. Stachowicz-Stencel, *Ocena przydatności diagnostyki ultrasonograficznej w różnicowaniu zmian ogniskowych wątroby*, "Forum Medycyny Rodzinnej" 2015, vol. 9(4), pp. 318–325.

⁷⁰ Plin. *HN*. 8.206.

⁷¹ Mentions regarding rabies appeared already in the Mesopotamian sources, i.e. the Laws of Eshnunna, the disease was also mentioned by Hippocrates (*Pror.* 1.16), Aristotle (Arist. *HA.* 604a), Celsus (Cels. 5.27.2), Scribonius Largus (*Comp. Med.* 163, 172, 175–177), Columella (7. 12–13), Pliny the Elder (*HN.* 2.40, 8.105–106, 7.15, 8.63, 8.109, 24.57, 25.17, 28.7, 29.98–102), Pedanius Dioscorides (Diosc. 2.10, 2.47, 2.182), Galenus (*Antid.* 1.6, 2.11; *Art. Med.* 19), Aretaios (Aret. *CD.* 1.7.2; 6.24), Philumenus (*Ven. Anim.* 1.1, 1.3, 1.4.4, 2.4, 3.1, 4.14, 5.1), Cassius Felix (*Cas. Fel. med.* 73), Oribasius (*Ecl. Med.* 117.1, 117.2–4, 117.7–9), Pelagonius (405), Vegetius Renatus (*Art. Vet.* 3.31), Aetius of Amida (Aet. 6.1) and Paul of Aegina (5.3.2).

⁷² A. Bartnik, *Hydrophobia, λύσσα, λυττα, rabies. Kilka słów o tym jak starożytni próbowali leczyć wściekliznę*, "Studia Antiquitatis et Medii Aevii Inchoantis" 2016, no. 1, pp. 49–63.

⁷³ Rabies in pigs is manifested through excitement, fearfulness, hoarse grunts, cramping head movements, biting the litter, numbness, and paralysis. There is also the frenzy form. The disease symptoms may also be erroneously considered as symptoms of, i.a., Aujeszky's disease, listeriosis, toxoplasmosis, vitamin B₁ deficiency, and in the case of pigs, the table salt poisoning.

the term *branchos*⁷⁴, which means “scratchy throat” or “hoarseness”. Information on the existence of this disease in pigs was most likely taken from his work. Columella, as well as Palladius who used his account, did not mention this disease. Pliny mentioned it only by name in a sentence, in which he referred to swine diseases.

Efforts were made in ancient Rome to fight the diseases of pigs. Infections caused great financial loss, particularly since many swine diseases are of a very contagious nature resulting in the infection of the entire herd, escalating the losses of breeders. While analysing the ancient authors’ accounts, it can be assumed that the Romans came into contact and tried to treat listeriosis, respiratory system diseases, and probably the symptoms of parasitic diseases. Due to the enigmatic information present in the ancient works, in some cases it is difficult to unambiguously determine the medical condition. Some information suggests that breeders and veterinarians came to contact with the swelling disease, pasteurellosis, vomiting and wasting disease, or infectious enteritis. Nowadays, all the discussed diseases are treated with antibiotic therapy with greater or lesser success. The methods of treatments recommended by the Romans could not bring the desired effect. In the cases of diseases with lower mortality rate percentage, some animals recovered spontaneously, which could have been interpreted in favour of the used medications. The only effective method of preventing and diminishing the range of some diseases was introducing hygiene in pigsties by the Romans. Although pigs spent the majority of time out on pastures, the breeders nevertheless took care of a suitable preparation of rooms for these animals. Already Terentius Varro ordered the construction of adequately large pigsties, paying attention to the ground to be covered in sand and built in a way that that no damp would remain on it⁷⁵. Recommendations concerning the spaciousness of rooms were also repeated by Columella⁷⁶, and Palladius⁷⁷ ordered to separate rooms for each sow, which reduced the risk of injuries, particularly with numerous litters. The above-mentioned recommendations and construction of shelters allowing for the observation of animals had positive effects on the conditions in which pigs lived, diminishing the risk of injuries and diseases spreading in rooms that were damp and contaminated with excrements. Also nowadays, the basic method of fighting with some of the pigs’ diseases is to maintain proper standards of hygiene. This is attained by placing the animals in pigsties, in which one can control air humidity, temperature, and provide adequate living conditions for the bred animals. Breeding in the pasture system which was popular in Rome is not practiced these days in the modern high-efficiency production of pig carcasses⁷⁸.

⁷⁴ Arist. *HA*. 8.21.

⁷⁵ Varro 2.4.14.

⁷⁶ Col. 7.9.10.

⁷⁷ Pallad. 3.26.4.

⁷⁸ In the pasture mode, the animals are sometimes kept on small ecological farms. Eventually, in some countries, the old local breeds are bred this way, i.e. the Mangalica in Hungary.

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STRESZCZENIE

W starożytnym Rzymie świnie były powszechnie hodowanymi zwierzętami. Hodowcy zwracali uwagę także na kwestie zdrowotne, ponieważ w przypadku zwierząt stadnych, jakimi są świnie, każda choroba rodziła ryzyko dużych strat. Wśród chorób świń starożytni autorzy wymieniali: gorączkę, obrzęk podgardla, wymioty, zapalenie płuc, stan podobny do śpiączki czy ból śledziony. Niektóre z objawów można powiązać ze znanymi współcześnie chorobami. Starożytni starali się też leczyć zaobserwowane choroby, niemniej w większości przypadków proponowane przez nich kuracje nie miały szans na powodzenie. Część chorób trzody chlewnej wciąż nie podlega leczeniu. Jedną z najskuteczniejszych metod ich zapobiegania było zachowanie odpowiednich warunków zoohigienicznych, z czego zdawano sobie sprawę w starożytnym Rzymie. Wielu ówczesnych autorów to podkreślało.

Słowa kluczowe: starożytny Rzym; choroby; świnie; gorączka; obrzęk podgardla; wymioty