
Review of goat breeding and herds health status in Romania Évaluation de l'état de santé de troupeaux des chèvres en Roumanie

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Abstract

The interest in goat breeding in Romania is growing, our country ranked fourth in Europe, following countries with tradition in the field, such as United Kingdom, Spain and Greece. The goat population grew from 971830 animals in 2006 to 2057309 in 2017. As breeds, the most common are Carpathian and White Banat native goats, followed by French Alpine and Saanen, imported lately to improve milk production. To date, in Romanian literature had been reported researches on goat livestock development, optimization of breeding technologies, genetic improvement of milk production in Carpathian breed, evaluation of physical and chemical parameters of milk and meat, evaluation of goats reproductive function, etc. On the subject of diseases and health problems in goats, there are studies on white muscular disease, paratuberculosis, contagious ecthyma, infectious respiratory disorders, gangrenous mastitis, contagious agalactia, bluetongue, caprine arthritis and encephalitis, and parasitic infections as coccidiosis, tapeworm (Monezia, Cestoda) and round worms (Nematode - Trichostrongylus sp.) infestation, etc. The aspects of health problems in goat livestock, diagnosed and published during the last years, are few and constantly changing, unsystematic and insufficient, even though in Romania there is a national surveillance and control program for goat health status.

Keywords: goat, livestock, health status

Introduction

The aim of the present paper is to analyze the goats health status in Romania and to present the reported data on the subject of diagnosed diseases. From this point of view, it should be noted that in many areas of the country goat rearing enjoys attention from small farmers, given that the number of goats is increasing. The goat population grew from 971830 animals in 2006 to 2057309 in 2017. As breeds, the most common are Carpathian and White Banat native goats, followed by French Alpine and Saanen, imported lately to improve milk production.

In Romania the main goal of goat's breeding is meat production, especially kids and milk production. Goat's milk is commonly processed into cheese, and there is increasing demand of dairy industry for it. Goat farming is mainly organized into mini farms (30-60 goats), whose main product is milk, that is usually processed into cheese in family farms. Better use of underutilized pastures, the country holds 4.9 million hectares of pastures mostly situated in regions listed as less favoured areas, indicates significant development potential of goats in Romania. It requires a lot of work, with a commitment to increase the goats population. Significant investments in modernization and wider use of new technological procedure will raise productivity, improve welfare and quality of better monitoring the health of individual animals and goat herds and increase economic efficiency. An effective animal health program is an essential part of a successful dairy goat management program.

Metabolic disorders

Iodine deficiency determines the appearance of goiter, which is a characteristic of thyroid gland enlargement in all domestic mammals, birds and reptiles (Osame S. et al., 1994; Corradini P. et al., 2000; Garner M.M. et al., 2002; Fyfe J.C. et al., 2003). Sometimes, iodine deficiency

during pregnancy could be the cause and the kids surviving after birth develop goiter in later stages of life (Vijlder D., 2003). Goiter in utero is caused by either primary or secondary iodine deficiency (Maxi M.G. et al., 2007).

Among the incriminated cases in the appearance of kids goiter is the feeding of pregnant females with low iodine feed or goitrogenic compounds which interfere with thyroxinogenesis (brassica plants, soybean byproducts and water with high content of calcium and nitrates) (Blood D.C. et al., 2000; Radostits O.M. et al., 2007; Sing R. and Beigh S.A., 2013).

The last outbreak reported in Romania regarding iodine deficiency in kids, was recorded by Mihai I. et al. (2018) within an Anglo Nubian goat farm. According to Mihai I. et al. (2018), the pregnant goats were fed with goitrogenic plants (cabbage), but there was no palpable enlargement of the dams thyroid glands. Clinically, iodine deficiency is characterized by the presence in the upper third of the neck of a submandibular bilobata formation that overlays the trachea just below the larynx, symmetrical, united in the distal part (Liklater & Smith, 1993).

According to Mihai I. et al. (2018), the most common cause of goiter in animals is an iodine deficiency. In order to reduce the economical wastage caused both the therapeutic expenses and an increased mortality rate, Mihai I. et al. (2018), recommended supplementing the iodized salt fodder ration as well as avoiding the goitrogenic feeding of goats in the last months of pregnancy.

Toxicologic disorders

Urea is part of simple fertilizers which contain a single fertilizer element, respectively nitrogen (Mierleșteanu I. et al., 2013). Urea and other non-protein nitrogenous substances have been introduced into ruminant feed as a source of protein nitrogen, whereby about 50% of the required protein for them can be substituted (Mierleșteanu I. et al., 2013).

In Romania, a case of urea poisoning in goats was recorded by Mierleșteanu I. et al. (2013). Thus, 16 goats from a herd of 126 common breed goats were poisoned after consuming urea, used as a fertilizer. According to Mierleșteanu I. et al. (2013), urea was used for crops fertilization and even if the therapeutic intervention was quick, from those 16 goats, 11 of them had a fatal outcome. Thus, according to Mierleșteanu I. et al. (2013), the accidentally consumption of urea by goats produces a hyperacute poisoning with clinical signs and fatal outcome. In the same study, the author claims that in case of accidentally ingestion of high doses of urea, the antidotal therapy becomes ineffective.

In conclusion, Mierleșteanu I. et al. (2013) recommends ruminants breeders that a particular attention is required in case of nitrate substances manipulation used in fertilization, taking into consideration that an accidentally urea consumption can lead to poisoning with serious consequences.

Respiratory and digestive disorders

Of all goat maladies, those affecting the respiratory system can cause substantial loss through high morbidity and mortality (Bordeanu A.D. et al., 2012). Most of the infectious agents that cause respiratory disease are usually common inhabitants of the respiratory system (Emikpe, 2009).

Also, most of carried bacterial flora is found in respiratory and digestive tracts of healthy animals or humans and exerts no pathogenic effect under physiological circumstances. When favoring factors induce immune suppression, apparently harmless strains can become highly pathogenic for animals and consumers or people who work in the animal sector (Bordeanu A.D. et al., 2013).

Regarding respiratory disorders in goats, Bordeanu A.D. et al. (2012) conducted a study on 20 goats raised in extensive conditions (Harghita County, Romania), in order to isolate and characterize bacteria from the nasal passageways of clinically healthy goats.

Thus, Bordeanu A.D. et al. (2012) identified that bacterial strains which normally are present within respiratory tract of healthy goats raised in shelters, but also bacterial strains with high pathogenicity can cause harm in some optimal conditions. Also, they observed notable differences in bacterial populations in different seasons (winter and spring), and a major cause can be the housing conditions.

In conclusion, Bordeanu A.D. et al. (2012) claims that all bacterial species isolated from goats in winter and spring season have a high risk of pathogenicity in proper conditions. Therefore, is necessary to take safety measures when handling goats and their kids but also to respect proper hygiene protocols for public health in general.

In 2013, Bordeanu A.D. et al. conducted another study regarding identification and comparison of ported digestive and respiratory bacterial strains from goats and sheep cohabiting in a mixed herd from Romania. Thus, the research was carried out on 30 healthy animals (15 goats and 15 sheep) belonging to the same herd (Bordeanu A.D. et al., 2013).

Interestingly, enterobacterial species such as *E. coli* have been identified in the respiratory system of goats, but not of sheeps, while *E. cloacae* strains were present in the respiratory tract of sheep but not of the goats. Although the flock consisted of mixed species, there were differences between the bacterial isolates, suggesting differentiated susceptibility and feeding behavior in these species (Bordeanu A.D. et al., 2013).

However, the bacterial isolates from clinically healthy goats and sheeps could exert pathogenic effects under stressful circumstances, underlining the importance of early identification of pathogens and the accurate sanitary management of the heard (Bordeanu A.D. et al., 2013).

Parasitic diseases

Is well known that goats are very sensitive to internal parasitism, which can cause a decrease in fertility, abortion, an increased susceptibility to diseases and death.

In 2011, Iacob O.C. conducted a study on 1450 Carpathian breed goats, in order to reveal different aspects of their digestive and pulmonary parasitogram. Following examinations, the author claims that *Eimeria* genus was dominant to all age categories, with an extensivity of 90-100% and a value of OPG (oocysts per gram of faeces) between 0-2500.

According to Iacob O.C. (2011), nematodes of the family *Trichostrongylidae* were dominant in adult goats, with an extensivity of 100% and an OPG value between 2000-5100, which defines a strong infestation; in young goats and bucks (treated against parasites two weeks previous to going out to pasture), trichostrongylids had an extensivity of 0-10% and a 0-50 OPG value.

Pulmonary nematodes of the *Protostrongylus* genus and *Protostrongylus rufescens* species were dominant through unique infestation in adult goats and pregnant youth (Iacob O.C., 2011). Trematodes of the *Dicrocoelium* genus and *Dicrocoelium lanceatum* species were represented by rare invasional elements identified in young individuals and adult does (Iacob O.C., 2011).

Finally, Iacob O.C. (2011) claims that a medical prophylaxis applied selectively in the herd according to age and short-term economic interest, contributes to the infestation and disease of animals at their first grazing, to the parasitological pollution of grazing areas and to the recording of much higher economical losses.

Infectious diseases

Researches on contagious ecthyma (Sore Mouth) in goats were described in many counties of Romania. This infectious disease caused by an epitheliotropic virus (ORF, family *Poxviridae*), has usually an acute evolution. Clinically, ecthyma is characterized by a vesicle-pustular eruption, with predominant peribuccal and mouth localization, rarely being seen localization on foot, mammary gland and genitals. The disease was first recoded in Romania by Riegler in 1935, near Bucharest. Latest epidemiological investigations in Romania (during 2008-2012) on Sore Mouth

were made by Rusu R.O., highlighting the circulation of ORF virus in goat herds from Iași and Botoșani Counties, using molecular methods for viral detection and characterization (Rusu RO et al., 2014). The same author studied the efficacy of vaccine protection (Scabivax) on goat herds: in kids and adults (Rusu RO et al., 2014).

Studies on contagious ecthyma in Braila and Giurgiu Counties or undertaken by Constantin T. et al. (2012) were lesions observed only in young goats (12 out of 84). Lesions were located on lip's skin (100%), muzzle (91.66%), ears (66.66) and feet (50%). In Bistrița Năsăud County investigations were made by Bița et al. (2010) revealing that contagious ecthyma was affecting approximately 30-40% of lactating sheep and goats herd, leading to significant economic losses through decreased milk production and weight loss. Disease evolved throughout the year, but was prevalent during summer season, especially if the pastures are not changed annually. Also this disease had a higher incidence within goats population, which seem to be more sensitive.

Another infectious disease prevalent in goats reared in small farms is gangrenous mastitis caused by *Staphylococcus aureus*. Romania pays special attention to development of livestock sector growth through the introduction of goat breeds with high milk production and genetic improvement of indigenous characters. For this purpose, there were created optimal conditions for maintenance and proper nutrition, and the genetic potential of animals is scientifically directed towards high yields of milk and meat. These, would greatly increase profitability if the morbidity and mortality due to udder disease were reduced. The main consequence of an incorrectly milking is mastitis. These are inflammation affecting the secretory epithelium, the lining of milk ducts and interstitial tissue. Microbial etiology of mastitis in goats includes a wide range of bacterial species, the most important being *Staphylococcus spp.* and *Mycoplasma Spp.* Gangrenous mastitis, caused by *Staphylococcus aureus*, is the most severe reported in goats, resulting in the animal's death or in incomplete or partial sloughing of the udder. In Romania, recent studies were made by Velescu et al. (2009) and Tudose A. et al. (2010) highlighting the importance of the early treatment of this infection. Tudose A. et al. (2010) also evaluated the immune response after vaccination against gangrenous mastitis, by dynamic research of serum protein fractions in goats in vaccinated and unvaccinated groups, revealing the increasing concentration of γ -globulins and decreasing of albumin levels.

A common infection of the respiratory tract of goats throughout the world is parainfluenza type 3 (PI-3). As with other respiratory viruses, PI-3 virus infection impairs the function of the alveolar macrophages and destroys cilia on the bronchial mucosa. This compromises the animal's natural clearance mechanism (defense mechanism) for removing pathogenic organisms from the lower respiratory tract making them susceptible to secondary bacterial infection particularly *P. haemolytica* infection. Uncomplicated PI-3 virus infection doesn't appear to be an important cause of death, but it may result in death because of bacterial pneumonia frequently in kids. In Romania Anița et al., (2015), tested the immunodetection suitability of viral antigens in routinely fixed tissue specimens as a diagnostic tool for PI-3 infection in goats. Results of this study demonstrate that PI-3 infection should be considered as a possible cause of pneumonia in goats, along with respiratory syncytial virus and bacterial infections (*Mycoplasma* and *Mannhiemia spp.*).

Caprine arthritis-encephalitis (CAE) is a goat viral disease caused by a lentivirus belonging to the Family *Retroviridae*. The virus induces a persistent infection by incorporation of the CAEV genome into the DNA of host cell. The monocyte-macrophage cells are the main target of this virus. In clinical cases were described arthritis, mastitis, pneumonia, weight loss and encephalitis. Investigations on this infection in Romania were conducted by Gurău M. et al. (2015) in southeastern Romanian farm and by Mihai I. et al. (2017) in northeastern counties. The investigation results in southeastern farm revealed a high prevalence of CAEV-infection (38.46%),

proved by serological investigation (active surveillance by ELISA-Ab exams), associated with low clinical cases of CAE, supporting the assertion that most of CAEV infected animals remains asymptomatic. The second study (Mihai I. et al., 2017) purpose was the detection of CAEV antibodies among goat populations from Vaslui County. During 2014-2016, blood samples were collected both from healthy animals and with clinical signs of disease. All serum samples were tested for CAEV antibody by agar gel immunodiffusion (AGID) test. The results of the investigation revealed a 31.86% (94 out of 295) seroprevalence.

Regarding the bacterial infection detected in goats with high economic impact because of the lack of treatment, is paratuberculosis (Johne's disease). *Mycobacterium avium subsp. paratuberculosis* (basonym *M. paratuberculosis*) is the etiological agent of a severe gastroenteritis in goats, considered to be one of the most serious diseases affecting ruminants. In Romania studies on paratuberculosis in goats were undertaken by Papastergiu D. et al. (2009) and Macovei I.I. et al. (2012). The serologic investigation of paratuberculosis in small ruminants in Cluj County revealed in 2007 an annual prevalence of 1.28% and in 2008 an annual prevalence of 1.72%. Out of 83 Veterinary District from County Cluj, in 2007 positive cases were detected in 55 (66.26%), and in 2008 in 56 (68.7%). Studies made on dynamic of goats paratuberculosis in Iași County (Macovei I.I. et al, 2012) revealed a seroprevalence of 33,33%.

An effective animal health program is an essential part of a successful dairy goat management program. Good feeding and breeding will not result in maximum production if goats are not kept in good health. Goat's herd health starts with a detailed plan designed to keep the herd healthy and free of disease and debilitating conditions. It is more economical and effective to prevent a disease than to eliminate it by treatment. Overall herd health is the cornerstone to an effective herd health plan. The goal of a preventive based program is to prevent the introduction of pathogens or hazards, and to prevent their spread. The best way to accomplish this is to ensure that the majority of the herd is protected so that disease organisms cannot get a foothold into the herd.

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