

LUMPY SKIN DISEASE (BRC) - OCCURRENCE, CAUSES, ECONOMIC LOSSES OF CATTLES IN PELAGONIA REGION OF R. MACEDONIA

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ABSTRACT

Lumpy skin disease (BRC, Lumpy Skin Disease, Neethling virus disease, Exantema nodularis bovis, Neethling) is infectious, enzootic, eruptive, and rarely fatal disease with acute or subacute course. Manifested by moderate to severe symptoms that include disseminated occurrence of cutaneous nodular lesions with a diameter of 2-5cm and lymphadenopathy followed by high temperatures to 41°S (*Babiuk et al., 2008*). It occurs in cattle and is characterized by a high rate of morbidity and mortality rate relatively low 1-3%, although may reach 40% (*Coetzer, 2004; Tuppurainen & Oura, 2012*).

Until 1989. emergence of BRC was limited only within the African continent. After 1989 spread to Madagascar in the Middle East. In 2013 BRC occurs in Turkey (*Sherrylin et al., 2013*) where it is transferred to Greece and Bulgaria. Greek first occurs in 2015, and the 2016 killing of three hotspots located in its northern parts, and later that year was passed in Bulgaria (*Smith, 2016*). In Macedonia, the first case of lumpy skin disease is determined on 21 April 2016 in the village of Chiflik (Demir Kapija). On April 27th BRC is set in the village Lakavica (Stip), on 28 April in the village Zleovo (Radovis) and Vetren (Delcevo) (*Dogani, 2016*).

Lumpy skin disease is caused by a DNA virus (LSDV-lumpy skin disease virus) family Poxviridea, family Capripoxvirus. The virus is closely correlated and high antigenic similarity to viruses sheep and goat pox (*Babiuk et al., 2008*). The virus is extremely stable and resistant to inactivation, surviving up to 35 days a necrotizing skin lesions up to 18 days in dried carcasses. In the environment, depending on conditions, can survive up to several months.

The aim of this work was to determine the number of cattle who have a Lumpy skin diseases in Pelagonia region of R. Macedonia. The researches were conducted in the producing conditions in animal breeding farm (ABF) in Bitola, Novaci and Mogila. In municipality of Bitola was infected 987 ABF with 15.767 cattle, in municipality of Novaci was infected 192 ABF with 7.414 cattle and in municipality of Mogila was infected 41 ABF with 5.138 cattle. Total of number of infected animals in Pelagonia region was 28.319 cattle in 1220 ABF. First cause of this disease in Pelagonia region was determined in July 2016 and in next month August 2016 were realized vaccination of all animals. Results of vaccination was 99.79% was success, 2% advisory and 0,1% positive. The economic losses of cattle in Pelagonia region from this disease is minimum, because on time was realized vaccination.

BRC no adequate therapy. They can use antibiotics but their role is not suppression of the cause, but preventing secondary bacterial infections. BRC causes significant economic losses as a result of temporary or permanent sterility, mastitis, reduced milk production, damage to the skin and flesh and mortality of about 20%. Secondary economic losses due to the restriction of trade in animals and animal products, and the establishment of control and eradication measures – vaccination campaigns (*Tuppurainen & Oura, 2012*), quarantine, depopulation of infected and exposed animals, disinfection and control of insects (*Rovid, 2008*).

Key words: Lumpy skin disease (BRC), infections, cattle, causes, economic losses

INTRODUCTION AND LITERATURE REVIEW

DEFINITION

Lumpy skin disease (BRC, Lumpy Skin Disease, Neethling virus disease, Exantema nodularis bovis, Neethling) is infectious, enzootic, eruptive, and rarely fatal disease with acute or subacute course. Manifested by moderate to severe symptoms that include disseminated occurrence of cutaneous nodular lesions with a diameter of 2-5 cm and lymphadenopathy followed by high temperatures to 41°S (*Babiuk et al., 2008*). It occurs in cattle and is characterized by a high rate of morbidity and mortality rate relatively low 1-3%, although may reach 40% (*Coetzer, 2004; Tuppurainen & Oura, 2012*).

HISTORY

BRC like illness was first mentioned in the 1929 Zambia (*Morris, 1931*), which are referred to as a new skin disease – pseudo urticaria (*MacDonald, 1931*). At first it was thought that occurs as a result of poisoning or hypersensitivity caused by the bite of insects. Infectious nature of the disease is determined much later in the period 1943-1945, when occurs in several countries in southern Africa. Over the next few years through a series of epizootic disease has spread to the entire African continent (*House, 1990; Davies, 1991b*).

Until 1989. emergence of BRC was limited only within the African continent. After 1989 spread to Madagascar in the Middle East. In 2013 BRC occurs in Turkey (*Sherrylin et al., 2013*) where it is transferred to Greece and Bulgaria. Greek first occurs in 2015, and the 2016 killing of three hotspots located in its northern parts, and later that year was passed in Bulgaria (*Smith, 2016*). In Macedonia, the first case of lumpy skin disease is utrden 21 of April 2016 in the village of Chiflik (Demir Kapija). On April 27th BRC is set in the village Lakavica (Stip), on 28 April in the village Zleovo (Radovis) and Vetren (Delcevo) (*Dogani, 2016*).



ETIOLOGY

Lumpy skin disease is caused by a DNA virus (LSDV-lumpy skin disease virus) family Poxviridea, family Capripoxvirus. The virus is closely correlated and high antigenic similarity to viruses from sheep and goat pox (*Babiuk et al., 2008*). The virus is extremely stable and resistant to inactivation, surviving up to 35 days a necrotizing skin lesions up to 18 days in dried carcasses. In the environment, depending on conditions, can survive up to several months.

EPIDEMIOLOGY

Naturally suffer only cattle, water buffalo and zebu. Through artificial inoculation it is causing the BRC and some wild species such as impala (*Aepyceros melampus*), Gazelle (*Gazella thomsonii*) and giraffe (*Giraffa camelopardalis*) (*Young et al., 1968*). BRC usually occurs at regular intervals, within the endemic areas, but it is causing epidemics that spread with

exceptional speed (*Davies, 1991*). The disease most often transmitted non endemic areas through transport of animals infected with vector (*Kreindel et al., 2015*).

TRANSMISSION

Transmission virus BRC primarily takes place on vector way i.e by insects such as *Stomoxys* spp. (Stable flies), *Culex* spp. & *Aedes* spp. (Mosquitoes), Tabanidae (horse flies) and *Glossina* spp. (Tsetse flies). No doubt about the involvement of some species of ticks in transmission of the BRC, but they increasingly play the role of mechanical and not biological vector, although not completely ruled vertical transmission of triggers including ticks (*EFSA, 2015*). Secondary virus can be transmitted through direct contact with infected animals, indirect contact with contaminated animal products or iatrogenic, but secondary modes transmission are significantly less practical significance (*Carn & Kitching, 1995*).

PREDISPOSING FACTORS

Predisposing factors: geographical location, season (summer) and climate, general condition of the animal, nutritional status, immune status, age (young categories and cows in lactation), race (indigenous breeds of cattle with thick skin as africaner rare diseases in terms of modern breeds Frisian with thinner skin (*Coetzer & Tuppurainen, 2004*), of strain virulence, dissemination of the vector-insect population level and population density and general management of the farm.

PATHOGENESIS

Intradermal or subcutaneous inoculation of bovine virus BRC resulting in localized swelling at the site of inoculation, which occurs after 4-7 days and increase in local lymph nodes. Generalized eruption of cutaneous nodules usually occurs 7-19 days after inoculation. After penetration of the virus in the body the initial febrile reaction that persists 2 weeks is followed by the appearance of viremia. Viral replication in pericytes, endothelial cells and other cells of blood and lymphatic vessels and cause vasculitis limfagitis. In more serious cases are possible attacks.

CLINICAL PICTURE

In cattle occurs biphasic febrile response. The first febrile phase is followed by hypersalivation, hiperlacrimation and mucous to mucopurulent nasal discharge. Hiperlacrimation can be sent with conjunctivitis, corneal changes, and in severe cases, blindness. Skin nodules characteristic of the disease, occurring during the second phase febrile. General condition of the animal is disrupted. Furthermore pirektion, occur and anorexia, emaciation, depression and agalactia. After limbs are formed edema, which impedes movement. Pregnant cows abortions and aborted fetuses are covered with nodules.

DIAGNOSTIC POST MORTEM CHANGES

Nodules that vary in terms of dimensions include not only skin but also subcutaneous tissue and even muscle. The number of nodules per animal varies from a few tens to a few thousand. Nodules uniform, protruding, solid, cirkumskriptni and clearly separated from the surrounding area. It is their konfluing in forming plaque. Left untreated nodules sequested leaving deep ulcers in the place where occurred or resolving and tissue undergoes induration. Nodules may occur on the mucous membranes of the alimentary tract (especially the rumen and the oral cavity) and the proximal parts of the respiratory tract (*El-Neweshy et al., 2012*), the vulva, perineum, and prepuce testicular parenchyma.

PATHOLOGICALLY CHANGED

Characteristic findings are eosinophilic intracytoplasmic inclusions consisting of viroplazmi. When grouping of virions, intracellularly may be seen tubular structures (*Prozesky & Barnard, 1982*).

DIFFERENTIAL DIAGNOSIS

Diferential diagnostic aspect of significant disease pseudo-lumpy skin, urticaria, photosensitivity reaction, skin lesions caused by Demodex bites, bovine dermatofiloza, onchocerciasis and besnoitiosis.

DIAGNOSIS

Effective control and eradication of the BRC in endemic regions and non endemic require quick and accurate diagnosis (*Tuppurainen et al., 2005*). Because clinical diagnosis is possible only in endemic countries where veterinarians have some degree of experience with the Red Cross in general preference is given to laboratory tests (ELISA, PCR, histopathology, ultrascopia, biopsy).

THERAPY

BRC no adequate therapy. They can use antibiotics but their role is not suppression of the cause, but preventing secondary bacterial infections.

PROPHYLAXIS

The absence of adequate therapy against BRC further emphasizes the essentiality of good prophylaxis. Prophylaxis may be sanitary and medical (*Wainwright, 2013*). Sanitary prophylaxis include: severe restrictions on import/export of live animals and their products originating in critical regions, implementation of strict quarantine measures, safe destruction of infected animals, regular disinfection of buildings and equipment on farms, controlling vectors raising public awareness about the disease, enhance capacity-building for monitoring and control of the disease and develop a plan that includes better management measures to combat the disease in case of its incidence. Medical prophylaxis comprises use of homologous or heterologous live attenuated vaccines.

MEANING

BRC causes significant economic losses as a result of emaciation, permanent sterility, mastitis, reduced milk production, damage to the skin and flesh and mortality of about 20%. Secondary economic losses due to the restriction of trade in animals and animal products, and the establishment of control and eradication measures- vaccination campaigns (*Tuppurainen & Oura, 2012*), quarantine, depopulation of infected and exposed animals, disinfection and control of insects (*Rovid, 2008*).

MATERIAL AND METHODS

The aim of this work was determinate the number of cattle who have a Lumpy skin diseases in Pelagonia region of R. Macedonia. The researches were conducted in the producing conditions in animal breeding farm (ABF) in Bitola, Novaci and Mogila. The number of infected cattle with BCR in Pelagonia region were taken from veterinarian company.

RESULTS AND DISSCUSION

In mancipality of Bitola was infected 987 ABF with 15.767 cattle, in mancipality of Novaci was infected 192 ABF with 7.414 cattle and in mancipality of Mogila was infected 41 ABF with 5.138 cattle. Total of number of infected animals in Pelagonia region was 28.319 cattle in 1220 ABF. First cause of this disease in Pelagonia region was determinate in July 2016

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and in next month August 2016 were realized vaccination of all animals. Results of vaccination was 98.99% was success, 1% suspicious and 0,01% positive.

Tab 1. Number of cattle-BRC in Pelagonia region of R. Macedonia

Number of cattle-BRC	N	%
Pelagonia region-total	28 319	100%
Mancipality Bitola	15 767	55.68%
Mancipality Novaci	7 414	26.18%
Mancipality Mogila	5 138	18.14%

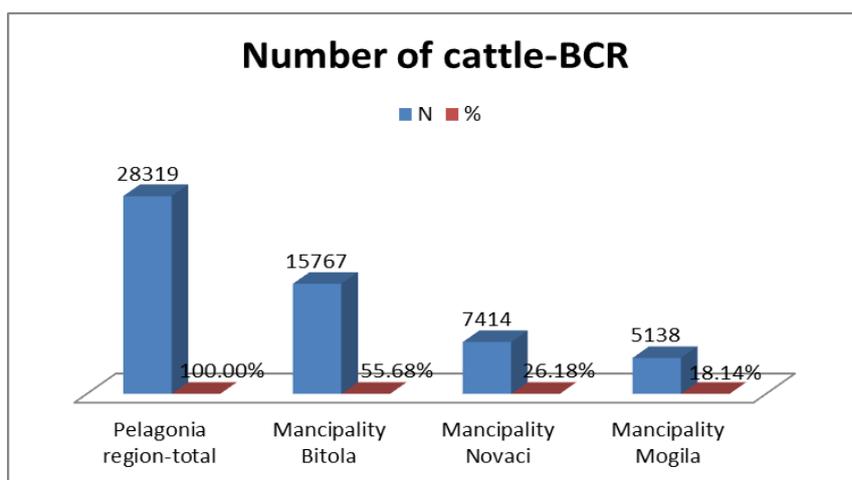


Fig. 1 Number of cattle in Pelagonia region of R. Macedonia

Tab 2. Number of cattle-BRC after vaccination in Pelagonia region of R. Macedonia

Number of cattle-BRC-after vaccination	N	%
Pelagonia region-total	28 319	100%
negative	28 033	98.99%
suspicious	283	1.00%
positive	3	0.01%

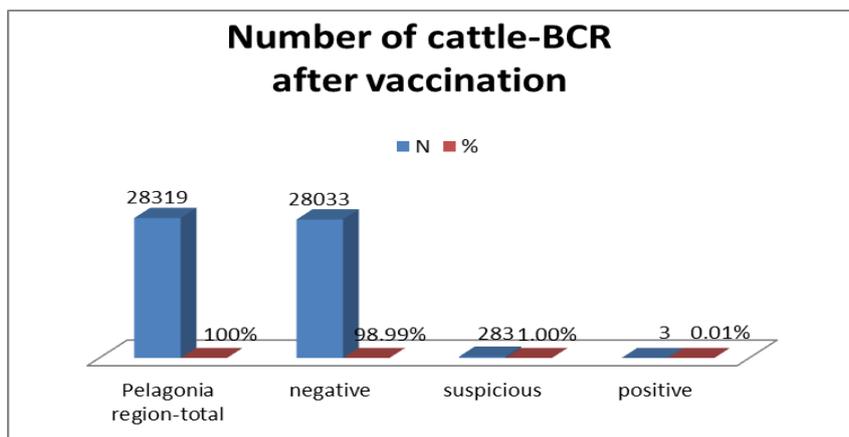


Fig. 2. Number of cattle-BCR after vaccination in Pelagonia region of R. Macedonia

CONCLUSION

BRC no adequate therapy. They can use antibiotics but their role is not suppression of the cause, but preventing secondary bacterial infections. BRC causes significant economic losses as a result of temporary or permanent sterility, mastitis, reduced milk production, damage to the skin and flesh and mortality of about 20%. Secondary economic losses due to the restriction of trade in animals and animal products, and the establishment of control and eradication measures-vaccination campaigns, quarantine, depopulation of infected and exposed animals, disinfection and control of insects. The economic losses of cattle in Pelagonia region from BRC disease is minimum, because on time was realized vaccination.

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