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Diagnostic values of clinical, pathological and serologic findings in cattle hypodermosis in Peştişani, Gorj County Romania

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Abstract. Were examined by clinical examination, by necropsy and by serology 74 cattle – cows (36) and heifers (38) – originating from Peştişani, Gorj slaughtered in a local slaughterhouse in March-May 2008. The prevalence of hypodermosis revealed by clinical examination was 16.21%; necropsy show a 18.91% prevalence, and seroprevalence was 27.27%. The average number of nodules was 6.4/animal and their average size between 12.6 to 34.6 mm/nodule, depending on the time of slaughter. Dorsal abdominal region was the preferential location of nodules.

Keywords: *Hypoderma sp.; Clinical exam; Necropsy; ELISA; Prevalence.*

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Introduction

Diagnosis of hypodermosis is of primary importance for treatment planning and eradication of disease in affected areas (Boulard et al., 1996; O'Brien, 1998; Otranto et al., 2001).

A simple clinical examination of nodules from dorsal and lumbar region in winter and spring seasons provide a reliable diagnosis (Şuteu and Cozma, 2004). However, diagnosis of long-term larval migration phase (up to 5 months) is difficult and impossible by clinical means. In this case, serology and allergic methods are efficent tools. Among serological methods, ELISA from serum or lactoser is the most commonly used (Boulard and Villejoubert, 1991). Necropsy confirms the disease in cattle, allowing highlighting of nodules in slaughtered animals.

The present study assessed the comparative diagnosis value of ELISA kits used in our country against hypodermosis compared with clinical examination and necropsy by highlighting and comparing the prevalence obtained by clinical examination and necropsy with seroprevalence.

Materials and methods

Were examined by clinical examination, by necropsy and by serology 74 cattle – cows (36) and heifers (38) – originating from Peştişani,

Gorj slaughtered in a local slaughterhouse in March-May 2008.

Clinical exam was performed 1-2 days prior to slaughter; blood samples were collected and skin of lumbar region examination performed.

The clinical diagnosis was made by inspection and palpation of characteristic nodules. The examination was performed individually for each animal and a specific individual clinical sheet was recorded. Nodules were counted and measured, calculating the average per lot and their average size; their location was also recorded, identifying their preferred location. The clinical prevalence of myiasis was established.

Necropsy diagnosis consisted of the inside part of the skin examination consecutive skinning, identifying and counting the existing nodules, establishing the prevalence of myiasis through the examination.

Serological examination was performed with ELISA kit MONOCUPULE HBS (Pourquier, France); its minimum threshold indicates positive values at 55 UDO. The seroprevalence of hypodermosis has been determined.

Results

Clinical examination performed in the mentioned period revealed nodules in 12 animals, the prevalence being 16.21%: the total number of nodules was 77, ranging from 3 to 12, with an average of 6.4 nodules/animal. Dorsal abdominal region was the preferential location of nodules. Nodule size ranged from 10 to 38 mm, with an average between 12.6 to 34.6 mm/nodule, depending on the time of slaughter, lower in March and higher in May, meaning a full morphological development of L3 larvae within them (table 1).

Necropsy revealed *Hypoderma* nodules from 14 animals, the prevalence revealed by this examination being 18.91%. The difference determined from clinical examination is due to incomplete morphological development of nodules from animals slaughtered in March, before nodels can be identified by inspection and palpation. Total number of nodules seen after skinning was 81.

Serological exam diagnosed the presence of anti-*Hypoderma* antibodies in 21 of the 74 animals examined, the prevalence being 27.27%. Optical density in these animals ranged from 76.1 to 243 UDO.

Table 1. Prevalence, mean number of nodules/animal and the average size of nodules in examined animals

Number of animals examined	Clinical diagnosis				Necropsy		Serological diagnosis	
	No	%	Mean number of nodules/animal	Average size of nodules (mm)	No	%	No	%
74	12	16.21	6.4	12.6 – 34.6	14	18.91	21	27.27

Discussion

Hypodermosis prevalence is assesed sporadically in our country in regional studies. Muntean (2002) clarified the hypodermosis epidemiological situation in Timiş County between February to June 1999, examining a herd of 1280 cattle in 10 villages, diagnosing 920 infected animals, representing a 71% regional prevalence. Cernea et al. (2001) established a prevalence between 22.2 to 66.6% in heifers and up to 100% in adult cattle in Cluj County.

In Europe there are different levels of prevalence revealed. In Spain, it ranges from 18.2 to 78.4% from a region to another, depending on climatic conditions (Martinez-Moreno et al., 1992; Panadero et al., 2006, 2007a, 2007b). In Italy, prevalence ranged between 35 and 91% depending on the type of examination performed and growth system (Tassi and Puccini, 1985; Puccini et al., 1992; Frangipane di Regalbono et al., 2003; Citterio et al., 2005). In the UK, in 1992, as a result of the eradication program started in 1978, previously registered global prevalence of 40% was reduced in 1991, apparently to zero, but was

followed by the diagnosis of 5 new cases (Tarry, 1992). France is one of European countries which have introduced a program to eradicate hypodermosis (Boulard et al., 2008). However, in the canton of Jura, in the summer of 2005, hypodermosis recorded a 15% prevalence, showing the need to introduce these programs on large areas for a greater effect (Lovis et al., 2008). In Belgium, earlier data showed a regional prevalence ranging from 36-92%; the risk factors that influence this parameter are the climate (daily minimum temperature, precipitation and relative humidity) and extent of grassland (Lonneux et al., 2001; Haine et al., 2004). In Germany, in 1992, data from 275 study collaborative veterinary offices confirmed that the 234 districts were hypodermosis free (Liebisch et al., 1992). Other recorded values in the European countries: 2.19% in Denmark (Jespersen, 1995), 80% in the Netherlands (Scholl, 1998), 100% in Ireland (O'Brien, 1998), from 8 to 25.5% in 1996, from 6.25 to 18.9% in 1997 and 7.77 to 23.23% in 1998, in Slovakia, from one areas to another (Curlik et al., 2001). Also in Slovakia, hypodermosis evolve only in the center and eastern Slovakia; between 1990-2000 the prevalence ranged from 2 to 10%. In the Czech Republic aren't *Hypoderma* sp infected cattle diagnosed (Minar, 2001).

Analyzing the prevalence obtained by us with those revealed in European countries we found close values to some countries or inferior to others. The breeding system, stable or pasture, and favorable climatic conditions are risk factors that favor the life cycle of parasites.

The differences noticed between those three types of tests performed were recorded by other authors; Panadero et al. (2007b) established a clinical prevalence of 21.9% and a seroprevalence of 24.8%, the difference being explained by the recent destruction of migrating larvae in some animals.

This lack of correlation between seropositivity and clinical prevalence is, actually, a normal phenomenon in the evolution of myiasis, explained by biology and antigenicity of *Hypoderma* larvae being found in other species, such as *Hypoderma tarandi*.

The superiority of ELISA method versus clinical examination, or other serological methods such as immuno-electrophoresis, double immuno-diffusion, passive hemo-agglutination, is supported by Gao et al. (2006) wich obtained, in their conducted studies, the high prevalence levels in cattle hypodermosis, by ELISA test. Vaillant et al. (1997) performed clinical exams of the cattle and obtained a prevalence of hypodermosis ranging between 36-60% below the level shown by serological examination.

Another advantage of serological diagnosis compared with clinical examination is the need of a single blood sample for examination; clinical examination requires inspection, palpation and registration of nodules number for each animal, which requires a much larger examination period (Boulard and Villejoubert, 1991).

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