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# THE DIAGNOSIS OF BOVINE TUBERCULOSIS IN BISTRIȚA-NĂȘĂUD COUNTY DURING 2013-2017

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## **Abstract**

*Bovine tuberculosis is still a problem, both in terms of economic losses, animal health and the increased risk of human infections. Limited possibilities of veterinarians to diagnose and control tuberculosis could result in a rapid spread of this disease in cattle herds and making the eradication procedures longer and less efficient. Correct and accurate diagnosis of positive animals in the database and their culling could lead to the eradication of bovine tuberculosis from Romania. The aim of this study was the epidemiological and microbiological evaluation of bovine tuberculosis status on a 5 year interval (2013-2017) in Bistrița-Năsăud County. Laboratory techniques have highlighted the presence of *Mycobacterium bovis* on microscopic fields, tuberculosis lesions in the organs using histological preparations and the growth on Löwenstein-Jensen medium. The most important screening technique for the diagnosis is the tuberculin test. From the total number of 375644 cattle tested over the 5-year interval, 364558 (97.04%) have been the subject of this tuberculin intradermal reaction. A total of 757 animals have shown an inconclusive result to the initial single test, all these have been retested 42 days later with the comparative simultaneous test, and just 27 came positive. From the total of 225 cattle diagnosed as positive, just 19 have been confirmed by pathological, cultural and experimental infection on guinea pigs.*

**Keywords:** *cattle, tuberculosis, intradermal test, eradication.*

## **Introduction**

Bovine tuberculosis (bTB) is one of the most serious economic animal health problems affecting the cattle industry worldwide, with incidence in cattle herds increasing since the mid-1980s. The single intradermal comparative cervical tuberculin (SICCT) test is the primary screening test in the bTB surveillance and control programme in most countries (Karolemeas, 2012). The official technique for diagnosis of bovine tuberculosis (bTB) worldwide is the tuberculin skin test, based on the evaluation of the skin thickness increase after the intradermal inoculation of a purified protein derivative (PPD) in cattle. (Casal, 2007).

Bovine TB in infected herd may occur due to the persistence of the microorganism in the environment or because of its introduction in a previously free herd. Furthermore, indirect transmission due to the presence of infected goats in the farm could contribute to the recirculation of bovine TB within the cattle herd (O'Hagan, 2018). The purchase of infected animals and the interaction with infected cattle or goats at common pastures could be the external sources of bovine TB (Filia, 2016).

In Romania, in the previous years, the single test was carried out on cattle over 6 months of age twice a year by intradermal inoculation of 0.1 ml bovine tuberculin in the neck area in a square with the 5 cm side. Currently testing is represented by the simultaneous comparative test, which is performed once a year for all cattle and buffaloes over 6 weeks of age, prior to vaccination procedures and involves inoculation of bovine and avian tuberculin at a dose of 0.1 ml administered strictly intradermally in two squares with the 5 cm side.

Field surveillance of British cattle using the single intradermal comparative cervical tuberculin (SICCT) test shows a higher incidence rate of bovine tuberculosis (bTB) in dairy

compared to beef herds, but a lower probability of post-mortem examination confirmed (PMC) *Mycobacterium bovis* infection in dairy herds (Downs, 2016).

The aim of this study was the epidemiological and microbiological evaluation of bovine tuberculosis status on a 5 year interval (2013-2017) in Bistrița-Năsăud County.

### Materials and methods

The study was conducted in Bistrița-Năsăud County, is a retrospective observational study, and a total number of 364,558 cattle have been the subject of intradermal tuberculin test. The procedure involved the administration of strictly intradermal of avian and bovine tuberculin in two distinct squares on the side of the neck. The two areas were previously prepared, skin fold was measured on both areas and avian tuberculin was injected in the upper square while bovine tuberculin in the lower square. The administered amount was 0.1 ml in both cases.

The interpretation was performed 72 hours after the administration by measuring the skin fold in both squares. Cattles with positive results were culled while inconclusive results were retested 42 days after the first tuberculin test and 21 days after deworming. If both these tests are positive, animals are considered positive and culled. The disease was confirmed using microscopic examination using Ziehl-Neelsen staining method, cultivation on Löwenstein-Jensen medium, histopathological examination of the tuberculous granuloma and experimental infection on guinea pigs.

### Results and discussions

Laboratory techniques have highlighted the presence of *Mycobacterium bovis* on microscopic fields, tuberculosis lesions in the organs using histological preparations and the growth on Löwenstein-Jensen medium. The most important screening technique for the diagnosis is the tuberculin test. From the total number of 375644 cattle tested over the 5-year interval, 364558 (97.04%) have been the subject of this tuberculin intradermal reaction. A total of 757 animals have shown an inconclusive result to the initial single test, all these have been retested 42 days later with the comparative simultaneous test, and just 27 came positive. From the total of 225 cattle diagnosed as positive, just 19 have been confirmed by pathological, cultural and experimental infection on guinea pigs.

**Table 1**

Positive cattle to the tuberculin test

| Interval | Total number of cattle | Total number of cattle tested | Positive |
|----------|------------------------|-------------------------------|----------|
| 2013     | 74439                  | 70887                         | 119      |
| 2014     | 75542                  | 72115                         | 18       |
| 2015     | 78758                  | 77656                         | 18       |
| 2016     | 71226                  | 71919                         | 20       |
| 2017     | 75679                  | 72900                         | 50       |
| Total    | 357644                 | 365477                        | 225      |

The confirmation of the positive cases revealed by the tuberculin test only validated an average of 8% (19 confirmed from 225).

**Table 2****Confirmed cases of positive cattle to the tuberculin test**

| Interval | Positive to the tuberculin test | Confirmed | % confirmed |
|----------|---------------------------------|-----------|-------------|
| 2013     | 119                             | 12        | 10%         |
| 2014     | 18                              | 5         | 28%         |
| 2015     | 18                              | 0         | 0           |
| 2016     | 20                              | 0         | 0           |
| 2017     | 50                              | 2         | 4%          |
| Total    | 225                             | 19        | 8%          |

**Conclusions**

The study concerning the diagnostic of bovine tuberculosis in Bistrița-Năsăud County during 2013-2017 concluded that:

- the incidence of tuberculosis evaluated by both positive and confirmed cases dropped over a five year period;
- mandatory screening of bovine tuberculosis is an important measure that will have an important contribution to the eradication of the disease;

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