



SHORT COMMUNICATION

## Cross Sectional Study on Bovine Tuberculosis Status in the Selected North-Eastern Agro-Climatic Zone of Tamil Nadu

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### ABSTRACT

A cross sectional study was conducted to determine the dynamic prevalence of bovine tuberculosis amongst bovine using single intra dermal cervical comparable test (SICCT or CIDT) in North-Eastern agro-climatic zone of Tamil Nadu. In the present study, Out of 1119 blood samples tested from four selected districts of North-Eastern agro-climatic zone of Tamil Nadu, the overall prevalence of *M. bovis* infection in North-Eastern agro-climatic zones of Tamil Nadu was found to be 8.46 per cent by CIDT and highest prevalence was noticed in Vellore (10.86%) district followed by Kancheepuram (8.20%), Thiruvallur (7.92%) and Chennai (6.86%) districts, which shows the potential to increase the incidence as well as prevalence of the disease since the “test and slaughter” or “culling policy” are yet to be strengthened intensively or warranting the calf-hood immunization against tuberculosis.

**Keywords:** Bovine Tuberculosis, Prevalence, CIDT (SICCT), Tamil Nadu

Bovine tuberculosis (bTB) caused by *Mycobacterium bovis* remains one of the most globally serious infectious agents for bovine morbidity and mortality as well as zoonosis, but with significant differences in prevalence across the globe, National and even State level. It is a major problem causing massive economic loss to livestock stakeholders and farming community. In developing countries, increase of bTB infection in bovines is creating the panic of public health problem specifically in people who are associated with animal husbandry activities, malnourished child and geriatric groups and this crisis has been related to the fact that in developing countries domesticated animals and humans share the same habitat. India is endemic to bovine tuberculosis and a high prevalence is reported in Tamil Nadu (Ganesan, 2012). Currently single intra dermal tuberculin test is commonly employed for screening of bovine TB in India where as the comparable intra dermal tuberculin test (CIDT or SICCT) is recognised by the World Organization of Animal Health (OIE) and the European Commission as the primary screening test for detection of tuberculosis in cattle (Karolemeas *et al.*, 2012). Advantages of the

intra dermal tuberculin test and reasons for its wide use are low cost, low logistical demands, well-documented use. The intra dermal tuberculin test measures dermal swelling primarily because of a cell-mediated immune response (CMI) 72 hours after intra dermal injection of purified protein derivative (PPD) in the skin of the neck which is considered more sensitive to a tuberculin-related hypersensitivity reaction. Hence the cross sectional study has been undertaken with this OIE approved method to determine the current dynamic prevalence status of bTB in four selected districts of North-Eastern agro-climatic zone of Tamil Nadu.

One thousand one hundred and nineteen (1119) animals of bovine population with different age group of organized and unorganized were subjected to cross sectional study randomly from four districts (Chennai, Kancheepuram, Thiruvallur and Vellore) of North-Eastern agro-climatic zone.

Purified protein derivatives of *Mycobacterium bovis* (PPD-B, 3000 IU/dose) and *Mycobacterium avium* sub

*sp. avium* (PPD-A, 2500 IU/dose) for *in vivo* comparative intradermal skin test (CIDT) was procured from Prionics AG (Wagistrasse, Schlieren-Zurich, Switzerland).

The test procedure was followed as described by the OIE (2009). The injection site was clipped and cleansed and then the initial skin fold thickness was measured using a caliper and recorded. The tuberculin was injected using McLintock syringes. A small pea-like swelling in each site was palpated to confirm the correct intradermal injection. When both avian and bovine PPDs were injected in the same animal, the site for injection of avian PPD was kept about 10cm from the crest of the neck and the site for the injection of bovine PPD and about 12.5cm lower on a line roughly parallel with the line of the shoulder. These injection sites are recommended to ensure equivalent test. Se at both avian and bovine sites, it has been suggested that both PPDs should be located on a line that is parallel to the angle of the shoulder (Good *et al.*, 2011b). After 72 hours ( $\pm 4$  hours), the skin fold thickness at each injection site was again measured and the difference of swelling thickness between PPD (Bovine) and PDD (Avian) was calculated ( $\Delta$ PPD (Bovine-Avian)) and interpreted as positive based on increasing in skin thickness of  $\geq 4$  mm to bovine PPD than to avian PPD.

Bovine tuberculosis is an important disease of dairy cattle; it is more regarded nowadays as an economic problem for livestock industry in developing countries of the world where schemes for tuberculosis control and eradication have considerably reduced the prevalence of the disease. India is endowed with great genetic diversity in animals and as such there is a wide range of animals affected with tubercle bacilli in both domesticated and wild animal population.

Since the incidence of the disease represents significant problem to livestock production because of the fast dissemination of the disease. In most countries, eradication programmes are based on regular testing and removal strategy of reactors, using the single intra dermal tuberculin test with tuberculin purified protein derivative (PPD) to detect infected animals. Since, the single intra dermal tuberculin test is more commonly practiced in India, we have undertaken this cross sectional study to assess the prevalence of bovine tuberculosis in the selected districts of North-eastern agro-climatic zones of Tamil Nadu. Animals in the target population were screened by

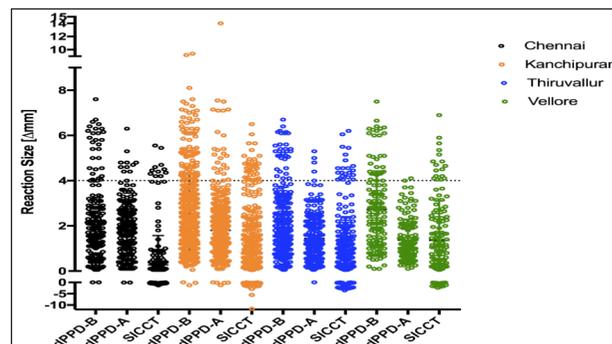
Comparable Intradermal Skin Test (CIDT) using *in vivo* PPDs (Bovine and Avian).

In the present study, overall prevalence of *M. bovis* infection in the selected districts of North-Eastern agro-climatic zones of Tamil Nadu was found to be 8.46 per cent by CIDT. But, Yesuf (2012) reported the low overall prevalence of 4.1 per cent by single intradermal comparative cervical tuberculin test (SICCT) in and around Chennai. Selvam (2009) reported the higher overall prevalence of 16.66 per cent in Tamil Nadu by SID. Thakur *et al.* (2010) also recorded the higher prevalence of 16.67 per cent by SID in an organized dairy farms maintained at Himachal Pradesh. The reason for higher prevalence in SID might be due to more number of false positive as a result from exposure to environmental mycobacteria (Koo *et al.*, 2005).

District-wise prevalence showed that highest prevalence in Vellore (10.86%), Kancheepuram (8.20%), Thiruvallur (7.92%) and Chennai(6.86%) districts (Table 1 & Fig. 1). The possible reasons for variation in prevalence among districts under the study districts might be due to malnutrition (Griffin *et al.*, 1993), production types, poor management practices, cattle movement, existence of a wildlife reservoir like deer, primates and elephants (Michel *et al.*, 2010).

**Table 1:** Positive cases of tuberculosis PPD *per se* and  $\Delta$  PPD (B-A)

District	PPD-B (Positive) (Nos)	PPD-A (Positive) (Nos)	$\Delta$ PPD (B-A) Positive (Nos)
Chennai	31	12	14
Kanchipuram	94	21	42
Thiruvallur	25	7	21
Vellore	34	6	15



**Fig. 1:** Prevalence status of *M. bovis*

## CONCLUSION

The prevalence study of bTB shall be of great importance in view of aiding the policy decision thereby reducing the potential risk of zoonoses. In North-eastern agro-climatic zones of Tamil Nadu, higher percentage of *M. bovis* infection was observed than the earlier reports and indicates that strict strategic measures are warranted. Moreover, prevalence study can be performed for the entire Tamil Nadu to depict the true status of the state and help the policy maker to take appropriate steps for containment of economic loss due to bTB as well as human infection.

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