

## Sero-prevalence of Canine Brucellosis in Urban and Peri-urban Areas of Guwahati

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**ABSTRACT:** Brucellosis is a contagious lingering zoonotic disease that has a massive impact on a wide range of animal species as well as humans. While circulation of brucellosis is evident in Assam, the role of dog in possible transmission of the disease remains unclear. Therefore, present study was envisaged in urban and peri urban areas of Guwahati, Assam over a period of 8 months to determine the sero-prevalence of canine brucellosis. A total of 240 serum samples were subjected to initial screening by rose bengal plate test (RBPT) and further confirmed by using standard tube agglutination (STAT) and lateral flow assay (LFA). The current study reveals that 12 samples were positive with RBPT having sero-prevalence of 5.00%. Further confirmation of the samples showed 10 samples to be positive in STAT and LFA, with an overall sero-prevalence of 4.16%. Sero-prevalence of canine brucellosis was higher in peri-urban (5.80%) than urban (2.50%) areas of Guwahati.

**Keywords:** Canine brucellosis, sero-prevalence, RBPT, STAT, LFA.

### INTRODUCTION

Brucellosis is caused by bacteria belonging to the genus *Brucella* is a infectious and neglected zoonotic disease which affects cattle, sheep, goat, pig, dog and humans (Mantur and Amarnath 2008). These organisms were recognized as a homogeneous group of small, non-motile, non-spore forming, non-capsulated, gram-negative facultatively intracellular coccobacilli in 19 century and named as genus *Brucella* in honor of David Bruce. *Brucella canis* was first observed by Carmichael in 1966 (Carmichael and Kenney 1968) in the U.S.A. in Beagle province. In India, the first incidence of *B. canis* infection in dogs was from a small animal clinic of the Madras Veterinary College, Chennai (Pillai *et al.*, 1991) and later presence of brucellosis in India had been accounted from almost all the states (Renukardhya *et al.*, 2001). Besides *B. canis*, dogs can also be infected by other species of *Brucella* i.e., *B. abortus*, *B. melitensis* and *B. suis* (Hollet, 2006; WHO, 2006).

Area with high humidity, low temperature and poor sunlight favours the survival of *Brucella* organism and they remain viable for several months in water, aborted fetuses and placental materials (Spickler, 2018). Infected animal can shed *Brucella* organism through vaginal discharges where they can persist for several weeks. They can also be shed in normal vaginal

secretions, particularly during oestrus. Organism is found post-partum in the fetus, placenta and lochia, where bacterial load can be around  $10^{10}$  per ml (Carmichael and Kenney 1970). For weeks, male sperm can contain a high concentration of organisms (Serikawa *et al.*, 1984). The increased ownership of canines by people who lack adequate awareness of brucellosis has worsened the problem, resulting in poor and catastrophic human health outcomes.

### MATERIAL AND METHOD

Based on preliminary survey, the study areas were identified. A total of 24 study locations comprising of 12 each in urban and peri-urban areas of Guwahati having pet or non-confined domestic dogs were selected. In peri-urban areas, 12 locations were selected based on the availability of dog in farm having cattle, pig or goat. From each location, 10 farms having in-contact or non-confined domestic dogs were selected comprising of a total of 120 farms. In urban areas, from each of the 12 locations, ten households admitting dogs to Veterinary Hospital and Clinics of Guwahati were selected comprising of a total of 120 households.

In current study whole blood samples of dogs from each of the 120 livestock farms and households encompassing to a total of 240 samples were collected from either cephalic or saphenous vein and left

undisturbed in a clot-activator vial.

During the present investigation, serum samples were screened for the presence of *Brucella* specific antibodies using Rose Bengal Plate Test (RBPT), which were further confirmed by Standard Tube Agglutination Test (STAT) and Lateral Flow Assay (LFA).

## RESULT AND DISCUSSION

In sero-prevalence study of brucellosis, a total of 240 samples were collected randomly from dogs of urban households and peri-urban livestock farms of Guwahati which were screened for the presence of antibodies against *Brucella* spp. using Rose Bengal Plate Test (RBPT) and further confirmed by Standard Tube Agglutination Test (STAT) and Lateral Flow Assay (LFA). All three tests employed were found to be sensitive in detection of anti-*Brucella* antibodies in the test serum samples. Out of the total 240 samples tested, twelve

(12) Samples were found to be positive by RBPT (Fig. 1) with a sero-prevalence of 5.00%. However, false positive results may occur owing to less specificity of RBPT due to cross reacting antibodies from other Gram- negative organisms (Lucero *et al.*, 2005). Further confirmation of the samples showed 10 samples to be positive in STAT with a titer 1:40 and above (Fig. 2) and LFA (Fig. 3), with an overall sero-prevalence of 4.16%. Sadhu *et al.* (2015) reported the sensitivity of RBPT to be 71.59% and specificity to be 94.52%, for which STAT and LFA has been used as a complementary test to RBPT for serological evidence of brucellosis (Surucuoglu *et al.*, 2009). The sero-prevalence of canine brucellosis in peri-urban areas was recorded higher to be 7.50%, 5.83% and 5.83% when tested by RBPT, STAT and LFA, respectively than the urban areas showed a lower brucellosis sero-prevalence of 2.50% each, as evidenced by RBPT, STAT and LFA. Rural environment had considered to pose higher risk of infection through dogs because of their more frequent interactions with livestock as well as wildlife animals (Ghneim *et al.*, 2007). Poor economic status, improper hygiene and sanitation, illiteracy and lack of awareness of diseases transmission etc. have created conducive environment for the spread of disease which makes peri urban and rural people more vulnerable to brucellosis than those in urban areas (Kumar, 2010).

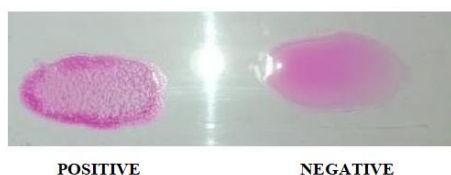


Fig. 1. RBPT for sero-prevalence of canine brucellosis.

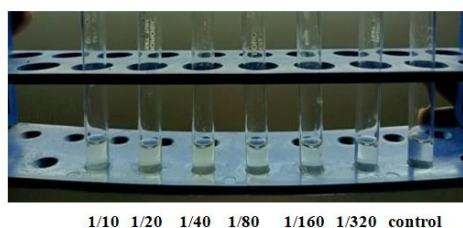


Fig. 2. STAT for sero-prevalence of canine brucellosis.

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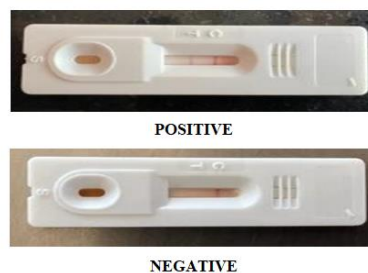


Fig. 3. LFA for sero-prevalence of canine brucellosis.

## CONCLUSIONS

The dogs were showing various symptoms of disease similar to brucellosis including infertility, abortion, still birth and fetal maceration. Sero-prevalence of canine brucellosis showed higher in peri-urban (5.80%) than urban (2.50%) areas of Guwahati with an overall sero-prevalence of (4.16%). A comprehensive molecular epidemiological study on brucellosis and implementation of one health approach for strategic disease control at the interface of human, animals and environment is a major challenge.

## FUTURE SCOPE

Raising awareness, training farmers and owners, and modern techniques are often recommended for improving disease control. There is a need to systematically identify disease hotspots for zoonotic disease. Simultaneously detection of brucellosis in other livestock in regards to correlate each other in transmission of disease.

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**Conflict of Interest.** None.

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