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RESEARCH ARTICLE

EVALUATION OF COLIFORMS AS INDICATORS OF WATER QUALITY IN FREE-RANGING WILDLIFE REGIONS OF TAMIL NADU STATE

***Vimalraj, P. G. and Jayathangaraj, M. G.**

Department of Wildlife Science, Madras Veterinary College, Chennai, Tamilnadu, India

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ABSTRACT

Many conservation measures aim the control of poaching and new threats to wildlife in India; but on the other hand, many infectious diseases and clinical problems taking upper hand in many of the wild animals are always given less significance than they actually deserve. Considering all these, in order to add more essence to the conservation biology, the present work may act as a tool for successful conservation in India. Water samples from Mudumalai Wildlife Sanctuary, Anamalai Wildlife Sanctuary and forest divisions of Sathyamangalam-Erode regions were collected in a 250 ml sterile, clear air tight container and sealed using parafilm and tests were carried out in the laboratory. Results obtained on 24 and 48 hours incubation at 37°c were compiled. The present research paper communicates the evidence of coliforms in the water samples collected from the Free-Raging Wildlife regions of Tamilnadu state during dry seasons of February- June, 2010.

INTRODUCTION

"Water the Elixir of life" is the most essential one, not only for the human beings but also for the wild populations. Amongst the bacterial pathogens, coliforms are given more significance throughout the world including the forest-ecosystem because coliforms in drinking water indicate the fresh fecal pollution. Bacteriological examination of water for coliforms is also a valid key point, pertaining to the wildlife regions due to the fact that the contaminated drinking water source often acts as a carrier for most of the wildlife species. Thus, we rely on tests that reflect the presence of commensal bacteria of intestinal origin such as those of the coliform group, which are most reliable indicators of fecal pollution. Fecal pollution of drinking water produces fatal dysentery, diarrhoea, cholera and gastro-enteritis, in addition to opportunist diseases (Sarwar *et al.,* 2004). Entero-pathogens, such as *Escherischia coli* were generally present at very low concentrations in environmental water within a diversified microflora and coliforms but were generally detected in higher concentrations than pathogenic bacteria and were used as an index of the significantly present entero-pathogens in water environment (Rompre *et al.,* 2002).

MATERIALS AND METHODS

Water samples were collected in a 250 ml sterile, clear airtight container and sealed using parafilm in order to avoid the contamination and brought to the laboratory. Coliform count was carried out in the water samples obtained using standard microbiological media and techniques like Presumptive coliform count, Confirmatory test and Completed test were carried out using the water samples obtained from free-ranging wildlife areas are as follows.

A. Procedure for Presumptive coliform count

The following amounts of sampled water were added
5- 10 ml quantities each to 10ml double strength medium
5- 1ml quantities each to 10ml single strength medium
5- 0.1 ml quantities each to 10ml single strength medium
The tubes were incubated at 37^0C and examined after 24 hours and negative tubes were reincubated subsequently for another 24 hours. Brilliant green bile broth was used during this study.

B. Procedure for Confirmatory Test using Eosin-methylene blue agar (EMB Agar)

One ml of water sample was placed using pipette in a petridish. Pour five to eight ml of EMB agar was also placed in the same petridish containing water sample. Thoroughly, the sample and the medium were mixed and solidifying was allowed. Then, it was incubated at 37ºC for 18-24 hours. In positive samples, *E.coli* produced dark centered colonies with greenish metallic sheen.

C. Procedure for Completed Test for Indole

1% tryptone agar was taken in a test tube. Then, 1 ml of water sample was added to the same test tube. The tubes were

Corresponding author: Vimalraj, P. G.
Department of Wildlife Science, Madras Veterinary College, Chennai, Tamilnadu, India.

incubated at two different temperatures (37ºC and 44ºC) for 24 hours. Kovac's reagent was added to both tubes. Reddish pink colour production at 37ºC indicated the presence of mild pathogenic *E.coli.* Pink colour production at 44ºC indicated the presence of highly pathogenic *E.coli*.

RESULTS AND DISCUSSION

Quantitative Examination of fifteen water samples obtained from all the three free-ranging wildlife regions revealed presence of coliforms in 80 per cent of samples in case of Mudumalai wildlife sanctuary and in 60 per cent of samples in case of Anamalai wildlife sanctuary, as well as in Sathyamangalam-Erode forest divisions. The mean value of positivity was 66.67 all the positive samples for coliforms reacted favourably with presumptive count, Eosin-Methylene blue (pour plate) method and Indole ring test at 37°C but not at 44°C.

Evidence of coliform found out in water samples under study indicated the higher possibilities of contamination of water-resources with possible contaminants like faecal materials of different species of wild animals. Supported by Yanez *et al.* (2006) and Luby *et al.* (1999) quoted about the linkage between the occurrence of contamination of *Escherchia coli* organism and the degree of recent faecal pollution. Senthilkumar *et al.* (2000) reported that the presumptive coliform count served as an index and the index of the degree of pollution was assessed, based on the evidence of coliforms.
Occurrence of collibacillosis especially the enteric infection caused by *Escherchia coli* in various wild animal species was documented by Alotaibi (2009) and Agrawal *et al.* (2007), who encountered the common serotype of *E.coli* organisms, it was linked to their shared food, fodder and habitat is the main source of contamination. Ramteke *et al.* (1992) quoted that the evaluation of coliforms as indicators of water quality. The existence of mildly pathogenic strains coliforms was revealed in this study especially by the indole ring test done at 37ºC.

The evidence of coliforms in the water samples of free-ranging regions emphasized the need of periodic monitoring of majority of samples from different water resources especially the water resources which are stagnant, with possibilities of utilization by wild animals of multiple species, in-addition to the quantification of the total coliforms as well as the identification of various genera of the coliforms.

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