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BACTERIAL LOAD FROM BIRDS FECES

AARYA FOKMARE AND ANIL FOKMARE *

Department of Microbiology, Fergusson College, Pune 411 004, M.S., India
*Chatrapati Sambhaji Nagar 431 001, M.S., India

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Abstract –The goal of this study was to quantify the bacterial load contributed by the different birds such as Parrots (*Psittacula krameria*) and Sparrows (*Passer domesticus*). The research work was conducted to isolate and identify the microflora from feces of healthy parrots *(Psittacula krameria)* and Sparrows (*Passer domesticus*). The bacteria isolated in this study from parrots (*Psittacula krameria*) and Sparrows (*Passer domesticus*) feces were *Escherichia coli, Salmonella* spp., *Staphylococcus* spp. A comparison of the bacterial loads showed that parrots (*Psittacula krameria*) and Sparrow (*Passer domesticus*) are the largest contributing birds source of gram-negative bacteria. The results of antibiotic sensitivity tests revealed that ampicillin and amoxicillin were completely resistant (no zone of inhibition) to *E. coli.* Ciprofloxacin was found to be consistently highly sensitive to all the bacterial isolates.

INTRODUCTION

Parrots (*Psittacula krameria*) and Sparrow (*Passer domesticus*) found all over the world from a long time. They are popular as pets due to their sociable and affectionate nature, intelligence, bright colors, and ability to imitate with human voices.

Parrots (*Psittacula krameria*) and Sparrows *(Passer domesticus)* often suffer from many bacterial diseases with the involvement of normal flora or environmental pathogens in response to stress and immunosuppressant (Akhter *et al*., 2010).

Bacterial enteritis is often a spontaneous stress associated disease caused mainly by *E. coli, Klebsiella, Salmonella, Pasteurella, Pseudomonas, Aeromonas* and *Citrobacter* (Altman and Robert, 1997). Most of the enteric *Salmonellae* (*Salmonella typhimurium, Salmonella enteritidis*) are motile and classified as paratyphoid organisms and the diseases they produce are termed paratyphoid infections (Kirk *et al*., 2002). As with bacterial enteritis, bacterial respiratory disease is also often a stress associated phenomenon where *Klebsiella, Escherichia coli, Enterobacter, Pseudomonas, Pasteurella and Mycoplasma* are commonly involved (Friend and Franson, 1999).

Many zoonotic diseases are transferred from cage or pet birds to human through direct or indirect contact of the diseased or carrier birds. Bacteria are one of the most common causes of zoonotic diseases. For this, proper isolation, identification and characterization of the bacteria are essential to control zoonotic diseases. Outbreaks of zoonoses have been traced to human interaction with and exposure to animals at fairs, petting zoos, and in other settings. In 2005, the Center for Disease Control and Prevention (CDC) issued an updated list of recommendations for preventing zoonoses transmission in public settings. The CDC recommendations, which were developed in conjunction with the National Association of State Public Health Veterinarians, include sections on the educational responsibilities of venue operators, managing public and animal contact, and animal care and management (CDC, 2005). In 2002, seven people became ill with *E. coli*: 0157117 infections after visiting a large agricultural fair in Ontario, Canada. Investigators of outbreak conducted a case-control study, which indicated that goats and sheep from apetting zoo were the source of the *E. coli* among fair visitors. Other indications were that the fencing and environment surrounding the petting zoo that could have been a source of transmission (Warshawsky, 2002).

Very few works have been studied on the isolation and identification of bacteria from birds.

(*Director GISM)

The present work was aimed to isolate and identify important species of bacteria from parrots (*Psittacula krameria*) and Sparrows (*Passer domesticus*) to determine antibiotic sensitivity pattern of the isolated bacteria.

MATERIALS AND METHODS

- A total of 24 feces samples, 06 of each, were carefully collected from two Male Parrots (*Psittacula krameria*) (Refer Photo: Mitthu and Poppu) 06 of each, were carefully collected from two sparrows (Male & Female) (*Passer domesticus*).
- Immediately after collection, each sample was inoculated into sterile nutrient broth (NB) and kept in ice box, and transported to the Microbiology Laboratory.
- The inoculated nutrient broths were incubated at 37 °C for 24 hrs and then streaked onto different bacteriological media such as Nutrient Agar (NA), Eosin Methylene Blue Agar (EMB), Macconkey agar (MA), Salmonella Shigella agar (SS), Mannitol Salt Agar (MSA), Triple Sugar Iron Agar (TSI) to obtain pure culture of the bacteria.
- Gram's staining was performed to study the morphology of bacterial isolates and motility test was performed to differentiate motile bacteria from non-motile ones
- Isolated bacteria from each sample was biochemically identified by sugar fermentation test, indole test, MR-VP test, catalase and coagulase tests.

Antibiotic sensitivity test

- Antibiotic sensitivity test was done using the disc diffusion test.
- One milliliter of fresh broth culture was poured on nutrient agar media and spread uniformly.
- Antibiotic discs were placed aseptically onto the surface of the inoculated plates with the help of sterile forceps and incubated at 37 °C for 24 hours.
- After incubation, the plates were examined and the diameters of the zone of inhibition were measured.

RESULTS AND DISCUSSION

- The bacteria isolated in this study were *Escherichia coli*, *Salmonella* spp., *Staphylococcus* spp. This finding is consistent with the findings of Sandra *et al*. (1998) and Doneley (2009).
- Among 12 different types of samples collected from Parrots (*Psittacula krameria*), a total of 10 (83.33%) samples were found positive for *Escherichia coli*; 07 (58.33%) samples were found positive for *Salmonella* spp., 06 (50%) samples were found positive for *Staphylococcus* spp., were isolated from feces of both parrots (*Psittacula krameria*), (Table 1).
- The bacteria most frequently isolated from both parrots (*Psittacula krameria*), was *E. coli* (83.33%) followed by *Salmonella* spp. (58.33%), *Staphylococcus* spp. (50%).
- Among 12 different types of samples collected from Sparrow (*Passer domesticus*) a total of 07 (58.33%) samples were found positive for *Escherichia coli*,; 04 (33.33%) samples were found positive for *Salmonella* spp., 6 (50%) samples were found positive for *Staphylococcus* spp., were isolated from feces of both sparrow; (Table 1).
- The bacteria most frequently isolated from sparrow was *Escherichia coli* (58.33%) followed by *Salmonella* spp. (33.33%), *Staphylococcus* spp. (50%).

Bowman and Jacobson (1980) and Bangert *et al*. (1988) also reported that *E. coli* was the most frequent isolate from clinically healthy psittacine birds.

- Antibiotic sensitivity pattern of the bacteria

Table 1. Overall percentages of different types of bacteria isolated from different types of samples collected from parrots (*Psittacula krameria*) and sparrow (*Passer domesticus*).

S. No.	Name of Bacteria	Number of samples (Parrot feces)			Number of samples (Sparrow feces)		
		Mitthu (Male) (n=6)	Poppu (Male) (n=6)	Total (n=12)	Male (n=6)	Female (n=6)	Total (n=12)
1	*E.coli*	5 (83.33%)	5(83.33%)	10(83.33%)	4(66.66%)	3(50%)	7(58.33%)
2	*Salmonella* species	4(66.66%)	3(50%)	7(58.33%)	2(33.33%)	2(33.33%)	4(33.33%)
3	*Staphylococcus* species	3(50%)	3(50%)	6(50%)	3(50%)	3(50%)	6(50%)

n= Number of examined samples

Table 2. Antibiotic sensitivity pattern of the bacteria isolated from parrots (*Psittacula krameria*) **and sparrow** (*Passer domesticus*).

S. No.	Name of Bacteria	Diameter of Zone inhibition (mm) of the bacterial isolates to various antibiotics							
		AMP	AML	GN	CIP	NOR	PEF	FR	ENR
1	*Escherichia coli*(Parrots)	00	00	05	20	20	10	10	20
	Escherichia coli (Sparrow)	00	00	05	20	20	08	10	20
2	*Salmonella* Species (Parrots)	08	08	10	20	20	10	00	20
	Salmonella Species (Sparrow)	08	08	10	**20**	**20**	10	***00***	**20**
3	*Staphylococcus* Species (Parrots)	08	10	10	**20**	**20**	08	10	**20**
	Staphylococcus Species (Sparrow)	08	10	10	**20**	**20**	10	10	**20**

AMP: Ampicillin, AML: Amoxicillin, GN: Gentamicin, CIP: Ciprofloxacin, NOR: Norfloxacin, PEF: Pefloxacin, FR: Furazolidone, ENR: Enrofloxacin

isolated from parrots*(Psittacula krameria)* and sparrow (*Passer domesticus*) noted in Table 2.

- No zone of inhibition found for *Escherichia coli* against Ampicillin (AMP) and Amoxicillin (AML)
- No zone of inhibition found for *Salmonella* species against Furazolidone.
- On the other hand, the antibiotics of Fluoroquinolone group such as Ciprofloxacin (CIP), Norfloxacin (NOR) and Enrofloxacin (ENR) showed zone of inhibition against almost all the bacterial isolates.

Which is consistent with the findings of Brahmbhatt and Anjaria (1991), Morishita *et al*. (1996) and Mukhopadhyay *et al*. (1998).

- Although, primary bacterial infections are not only a common cause of disease in parrots (*Psittacula krameria*) and sparrows (*Passer domesticus*), a better understanding of normal microbial flora may help in interpreting the significance of bacterial isolates in sick birds (Bangert *et al*., 1988; Lamberski *et al*., 2003).
- Knowledge of normal bacterial flora is also important for identifying potential pathogens that can cause disease during times of stress or immune suppression (Petrak, 1982).
- Thus, the results of this study may help pet clinicians to interpret bacterial culture and sensitivity results in Parrots (*Psittacula krameria*) and Sparrows (*Passer domesticus*).

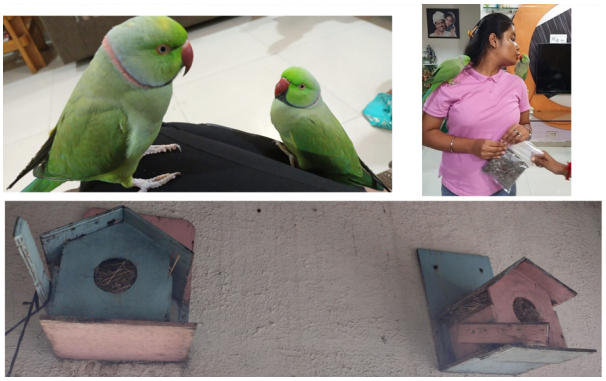

Photo: Feces Samples collected from two Male Parrots (*Psittacula krameria*) (Mitthu and Poppu).

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Conflict of Interest- None

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