

Seasonal Dynamics and Antimicrobial Susceptibility Patterns of Bovine Mastitis in Dairy Cattle of Anuradhapura District, Sri Lanka

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Bovine mastitis is a major constraint to dairy production in Sri Lanka, particularly in dry-zone districts such as Anuradhapura. This study investigated mastitis occurrence, seasonal variation, and antimicrobial resistance patterns among dairy cattle in Anuradhapura District from 2023 to 2025. Data were obtained from routine laboratory records covering all 22 veterinary divisions (n=841). Mastitis was assessed using the California Mastitis Test (CMT). Seasonal effects were analyzed using binary logistic regression and chi-square tests, while antimicrobial susceptibility was evaluated using Fisher's exact test. Seasonal patterns varied across years. In 2023, cows examined during the rainy season showed higher odds of CMT positivity than those examined during the dry season (OR = 2.17; $p = 0.63$). In 2024, rainy-season cattle exhibited lower odds of CMT positivity (OR = 0.63; $p = 0.065$). In contrast, a significant seasonal effect was observed in 2025, with rainy-season cows having significantly higher odds of mastitis than dry-season cows (OR = 2.29; $p = 0.003$). When data from all three years were combined, rainy-season cattle showed slightly higher odds of mastitis (OR = 1.14), but this association was not statistically significant ($p = 0.35$). Antimicrobial susceptibility testing revealed complete resistance to penicillin and amoxicillin across all samples, indicating widespread ineffectiveness of beta-lactam antibiotics. In contrast, enrofloxacin and gentamicin showed significantly higher susceptibility compared to penicillin ($p < 0.0001$), with no significant difference between the two drugs ($p = 0.054$). In conclusion, while rainy-season conditions may increase mastitis risk in certain years, Overall, season was not significantly associated with mastitis occurrence. Similar to previous studies, high beta-lactam resistance emphasizes the need for rational antimicrobial use and evidence-based mastitis control strategies in Sri Lankan dairy systems.

Keywords: Antimicrobial resistance, Bovine mastitis, California Mastitis Test, Sri Lanka Dry Zone, Seasonality