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# INVESTIGATION INTO PASTEURELLOSIS AMONG DOMESTIC RABBITS IN EXPANDING FARMING OPERATIONS

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**Abstract**: *The study presents findings from investigations conducted on 314 rabbits across 8 different locations, encompassing both female and male rabbits of various ages and breeds. The observed symptoms included sneezing, whitish nasal and ocular discharges, as well as subcutaneous abscesses primarily located in the head, neck, and forelimb regions. Additionally, abscesses on the nipple chain were noted in some lactating females, occurring intermittently. Otitis externa was reported in 9 rabbits, with 3 of them also exhibiting torticollis. During necropsy examinations, lesions indicative of pasteurellosis were identified, and confirmation was obtained through bacteriological analysis. Furthermore, antibiotic susceptibility testing was conducted to guide the selection of appropriate antimicrobial agents for therapy.*

## • Introduction

Respiratory infections pose a significant issue in rabbit populations, causing substantial damage to farms and rabbit farming operations. This damage is characterized by the loss of specimens and the financial burden of prophylaxis and control measures. The primary etiological agent responsible for these infections is *Pasteurella multocida.* This bacterium is frequently associated with respiratory infections but can also cause subcutaneous pyogenic infections, localize in various organs, and even lead to sepsis. It is a major cause of morbidity in rabbits (5, 12, 14, 18, 19, 20).

## • Material and method

In this study, we conducted a longitudinal examination of rabbits from eight different rabbit farms, encompassing a total of 314 animals, including both females and males of various ages and breeds. Epidemiological, clinical, and necropsy examinations were performed, and the presence of disease was confirmed through bacteriological analysis.

The breeds represented in the study included Checkered Giant, Rex, Panoniya, Miniature Papillon, Giant Flemish, Holland Lop, Lionhead Rabbit and German Lop rabbits, aged between 2 months and 3 years. For bacteriological examination, Brain Heart Infusion (BHI) broth and 5% ram's blood agar were used, with cultures incubated at 37°C for 24-48 hours. Bacterial identification and confirmation were achieved through Gram staining and biochemical methods. On blood agar plates, large, non-hemolytic, gray to gray-white mucoid colonies were observed after 48 hours of incubation. Final identification of isolates was conducted using the API 20NE kit (29).

Antibiotic sensitivity testing was performed using Kirby-Bauer's disk diffusion method with the following antimicrobial agents: amoxicillin (AML), ciprofloxacin (CIP), doxycycline (DO), enrofloxacin (ENR), florfenicol (FFC), gentamicin (GMN), neomycin (N), trimethoprim/sulfamethoxazole (SXT), tetracycline (TE), and penicillin (P). The diameters of inhibition zones were measured and classified as sensitive (S), intermediate (I), or resistant (R) according to the guidelines of the European Committee on Antimicrobial Susceptibility Testing (28).

## • Results and discussions

The rabbits exhibited a spectrum of clinical manifestations including sneezing, whitish nasal and ocular discharges, and subcutaneous abscess formation primarily localized to the head, neck, and forelimbs. Additionally, subcutaneous abscesses affecting the mammary gland chain were observed in lactating females, albeit less frequently, as well as during non-lactating periods. Otitis externa was also documented in 9 rabbits, with 3 of these cases further complicated by torticollis (refer to Table 1 and Figure 1).

Upon necropsy examination, characteristic lesions indicative of pasteurellosis were identified, with subsequent confirmation of diagnosis achieved through bacteriological analysis utilizing the API 20NE system. This diagnostic tool effectively identified all isolates obtained from afflicted rabbits, each of which exhibited biochemical properties consistent with Pasteurella multocida. It was noted that rabbits from farms where antibiotics were administered prophylactically exhibited the phenomenon of multiple antibiotic resistance (Table 2, Fig. 2).

## Conclusions

- Pasteurellosis manifested across various ages and breeds of rabbits within the studied locales. *Pasteurella multocida* emerged as the primary causative agent of respiratory infections in rabbits, alongside its capacity to induce pyogenic infections with diverse anatomical localizations.
- The isolated *Pasteurella multocida* strains from these outbreaks exhibited a notable phenomenon of antibiotic resistance, particularly towards tetracyclines (72%), doxycycline (72%), and amoxicillin (64%).
- Conversely, these strains demonstrated sensitivity, with a full susceptibility (100%) observed towards penicillin, florfenicol (68%), ciprofloxacin (64%), gentamicin (48%), and enrofloxacin (52%).

| Location | A | | B | | C | | D | | E | | F | | G | | H | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total number of rabbits | 71 | | 99 | | 57 | | 37 | | 26 | | 5 | | 14 | | 5 | | 314 | |
| Gender M/F | 15 | 56 | 38 | 61 | 10 | 47 | 7 | 30 | 6 | 20 | 2 | 3 | 3 | 11 | 1 | 4 | 82 | 232 |
| No of the affected rabbits | 8 | 12 | 5 | 18 | 3 | 5 | 3 | 2 | 1 | 7 | 1 | 0 | 1 | 4 | 0 | 1 | 22 | 49 |
| Pneumonia | 3 | 5 | 2 | 7 | 3 | 4 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 10 | 21 |
| Rhinitis | 5 | 8 | 3 | 12 | 2 | 4 | 3 | 2 | 1 | 5 | 1 | 0 | 1 | 3 | 0 | 1 | 16 | 35 |
| Sinusitis | 1 | 2 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 8 |
| Metritis | 0 | 4 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 8 |
| Otitis | 3 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | 4 |
| Subcutaneous abscess | 3 | 5 | 2 | 5 | 1 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 15 |
| Dental Abscess | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Number of Pasteurella isolates | 3 | 4 | 2 | 4 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 11 | 14 |

Table 1: Distribution of rabbits by location, lesions, and number of isolated *Pasteurella* strains

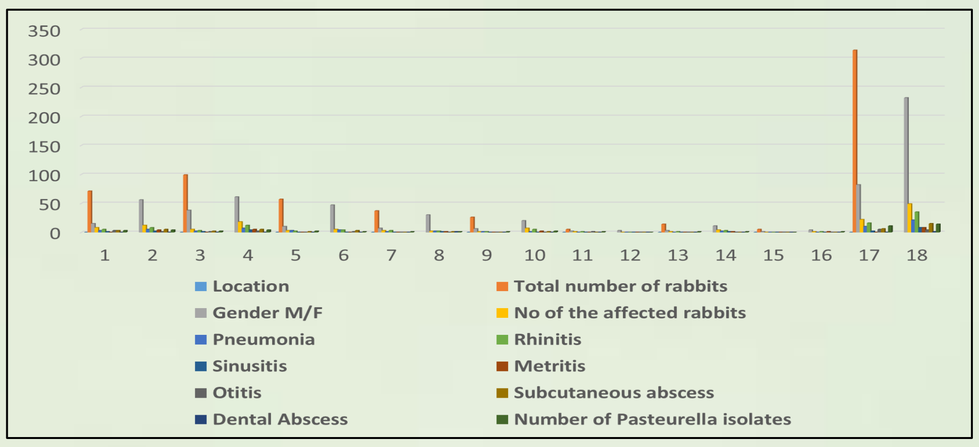


Fig 1: Distribution of lesions on the locations

| Antibiotics | Sensitive (S) | | Intermediate (I) | | Resistant (R) | |
|---|---|---|---|---|---|---|
| | No strains | (%) | No strains | (%) | No strains | (%) |
| Gentamicin (GMN) 10 µg | 12 | 48% | 6 | 24% | 7 | 28% |
| Trimethoprim/sulfamethoxazole (SXT) 30 µg | 10 | 40% | 9 | 36% | 6 | 24% |
| Enrofloxacin (ENR) 5 µg | 13 | 52% | 4 | 16% | 8 | 32% |
| Neomycin (N) 10 µg | 3 | 12% | 15 | 60% | 7 | 28% |
| Amoxicillin (AML) 10 µg | 4 | 16% | 5 | 20% | 16 | 64% |
| Ciprofloxacin (CIP) 30 µg | 16 | 64% | 6 | 24% | 3 | 12% |
| Doxycycline (DO) 10 µg | 5 | 20% | 2 | 8% | 18 | 72% |
| Tetracycline (TE) 30 µg | 6 | 24% | 1 | 4% | 18 | 72% |
| Penicillin (P) 10 µg | 25 | 100% | 0 | 0% | 0 | % |
| Florfenicol (FFC) 10 µg | 17 | 68% | 5 | 20% | 3 | 12% |

Table 2: Summary of antibiotic susceptibility for 25 isolates of *Pasteurella multocida*

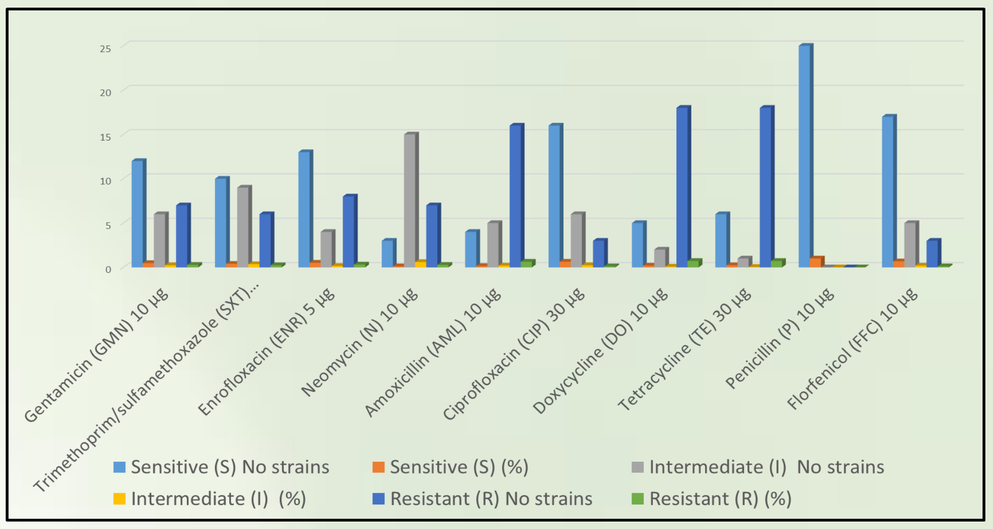


Fig. 2. Changes in antibiotic susceptibility of 25 *Pasteurella multocida* strains over time