

# ANTIBIOTIC RESISTANCE IN BACTERIA OF NESTLING AMERICAN & FISH CROWS

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## What are Antibiotics?

- Compounds used to kill or slow the growth of bacteria commonly used in both human and veterinary medicine
- Kill indiscriminately
- Overuse has led to the evolution of bacterial strands that are resistant to antibiotics

## What is Antibiotic Resistance (ABR)?

- The ability of a bacteria or microbe to escape the 'killing curse' of an antibiotics
- When antibiotics are present, sensitive bacteria die but resistant bacteria survive
- ABR naturally occurs in bacteria as a protective measurement
- Transferred between bacterial species
- Transferred between animals
- Bacterial transfer within species
  - Vertical: mom to offspring
  - Horizontal : between individuals

## Why study Crows?

- Close association with humans
- Thrive in rapidly-urbanizing environment
- Urban night roosts can have up to 40,000 birds
- **Fecal waste represents a potential health hazard to humans**

## Methods

- Cloacal samples were taken from crow nestlings using a sterile swab
- Sample contents streaked onto TSA plates for 36-48 hours
- Bacterial colonies were isolated and cultured in nutrient broth for 36-48 hours
- Bacterial isolates were assessed for antibiotic susceptibility using the Kirby-Bauer Method (Fig. 3)
- 12 antibiotics were tested: Amoxicillin, Ciprofloxacin, Enrofloxacin, Erythromycin, Gentamycin, Oxacillin, Polymyxin B, Sulfadiazine, Sulfamethoxazole, Sulfathiazole, Tetracycline, Vancomycin.

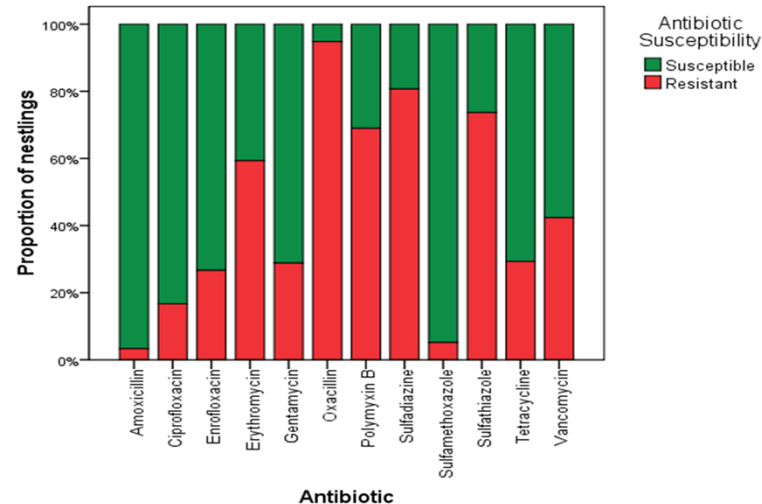


Fig.4. Results from antibiotic resistance testing of 74 bacterial isolates from 24 American Crow (*Corvus brachyrhynchos*) and 3 Fish Crow (*Corvus ossifragus*) nestlings. About 95% of bacteria samples were resistant to Oxacillin while only about 5% were resistant to Sulfadiazine.



Fig.1. ECAL11 nestlings prior to marking and banding.



Fig. 2. Nestling American and Fish Crows are marked with wing tags and leg bands for future identification (pictured: GH ECAL11).



Fig.3. Results from Kirby-Bauer antibiotic susceptibility test for GH ECAL11.

## Results

- 74 bacterial samples were isolated from 24 American Crow and 3 Fish Crow nestlings
- At least one isolate was resistant to an antibiotic in each family
- >50% of all isolates had resistance to 5 of 12 antibiotics (Fig. 4)
- American Crow nestlings had 2.6 isolates/ind/family compared with 1.5 in Fish Crow nestlings
- Every individual carried bacteria that were resistant to at least 3 antibiotics (mean=6.7, standard dev=2.25; range=3-11)

## Implications

- Crows may serve as a reservoir for antibiotic resistant bacteria in the environment
- If the unknown bacteria isolates are pathogenic spp., this might be a health hazard to humans

## Future Plans

- Increase the number of nests (and nestlings!) assessed
- Include Common Ravens (*Corvus corax*) nesting on Mohonk Preserve
- Use different types of agar to increase the diversity of bacterial isolated from the cloaca
- Collect fecal samples from crow winter night roosts for comparison to nestling cloaca samples

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