

# What is the role of landfills on the development and dissemination of antimicrobial resistant *Salmonella* on the environment?

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## INTRODUCTION

The raise of antimicrobial resistance (AMR) during last years has become one of the most important threats for public health worldwide. In fact, the presence of multi-resistant *Salmonella* strains in animals, humans, and environment complicates bacteria control in both veterinary and human medicine [1].

The incorrect waste management could be a source of AMR bacteria for wildlife which can spread the bacteria to other regions, and even to other countries or continents. In this sense urban wildlife should be considered as sentinels of AMR *Salmonella*, as they play an important role as a bridge between cities and rural areas [2].

Therefore, the aim of this study was to evaluate the presence of *Salmonella* in two species related to landfills in Madrid region (Spain): white stork (WS, *Ciconia ciconia*) and lesser black-backed gull (LBBG, *Larus fuscus*).



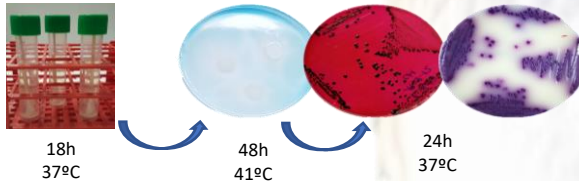
## MATERIAL AND METHODS

### 1. Sample collection:

- Juny 2018-January 2019.
- Cloacal swabs.



### 2. *Salmonella* detection: ISO 6579-1:2017.



### 3. *Salmonella* serotyping:

White-Kauffman-Le Minor.

### 4. Antimicrobial susceptibility test: Mueller-Hinton broth micro-dilution test (ISO 20776-1:2006).

- Antimicrobials selected: 2013/652/EU.
- Epidemiological cut-off points EUCAST.

Ciprofloxacin	Chloramphenicol	Ceftazidime
Nalidixic acid	Trimethoprim	Azithromycin
Gentamicin	Ampicillin	Colistin
Trimethoprim-Sulfamethoxazole	Cefotaxime	Tigecycline

### 5. Statistical analysis: (SPSS 21 0 software package).

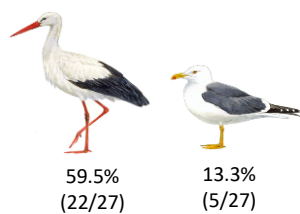
GLM was performed to assess the re-relationship between *Salmonella* and different species, the serovars, and AMR.

A  $p$ -value  $\leq 0.05$  was considered to indicate a statistically significant difference

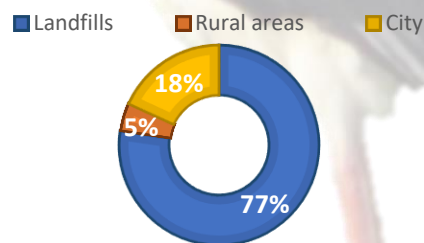


## RESULTS AND DISCUSSION

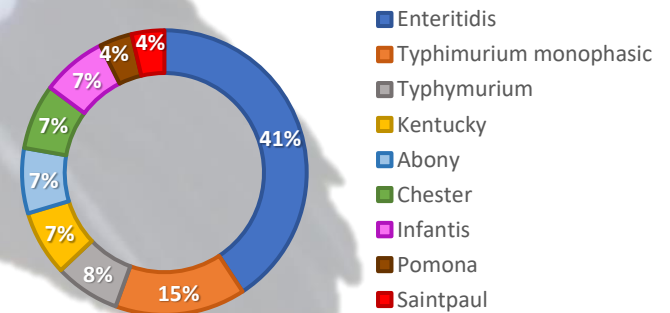
### *Salmonella* had been isolated from 21.6% of birds (27/125):



$p < 0.01$



Origin of WS positive to *Salmonella* ( $p < 0.01$ )



*Salmonella* serovars isolated from WS and LBBG

Finally, AMR testing revealed a higher proportion of resistance to quinolones and colistin. 62.5% of *S. enterica* ser. Enteritidis isolates from WS with access to landfills were considered multidrug-resistant with the same AMR pattern (CIP-NA-COL), three key antimicrobials for salmonellosis treatment.

Birds with close contact with humans could be considered as good sentinels for AMR bacteria presence in environment. Moreover, the results of this study highlight that the role of landfills is noteworthy in the potentiation of wild birds as reservoirs, amplifiers and disseminators of *Salmonella*, being a constant source of food [2,3].

## CONCLUSIONS

The acquisition of AMR *Salmonella* seems to be amplified in WS with access to urban residues. This condition is of the most importance as WS is considered a large-distance migrating bird species strongly related to landfills in Spain.

## REFERENCES:

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2. Tizard, Salmonellosis in wild birds, Semin. Avian Exotic Pet Med. 13 (2004)50–66
3. Martín-Maldonado B, Vega S, Mencía-Gutiérrez A, Lorenzo-Rebenaque L, Frutos C de, González F, et al. Urban birds: An important source of antimicrobial resistant *Salmonella* strains in Central Spain. Comp Immunol Microbiol Infect Dis; 72.