E. coli Antimicrobial Resistance in Spanish laying hens farms in 2018

J. Rivera-Gomis[1], C. Martínez[2], J. Otal[3], M.J. Jordán[2], J.A. Sotomayor[2], M.J. Cubero[1]

1. Animal Health Department, Veterinary Faculty, Campus Mare Nostrum International Excellence of Murcia University, Spain.
2. Department of Rural Development, Oenology and Sustainable Agriculture. Murcia Institute of Agri-Food Research and Development (IMIDA).
3. Animal Production Department, Veterinary Faculty, Campus Mare Nostrum International Excellence of Murcia University, Spain.

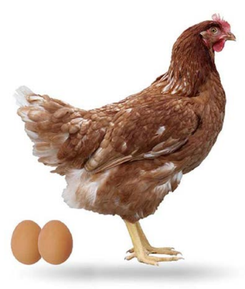
Corresponding author: J. Rivera-Gomis, email: jorge.rivera@um.es

INTRODUCTION.

Antimicrobial Resistance (AMR) poses a serious threat to animal and public health. Food from animal origin, including eggs, has a pivotal role in the transmission of genes and bacterial strains resistant to antibiotics (AB). However, few studies have been carried out regarding AMR profiles in commensal bacteria circulating in laying hens (1).

OBJECTIVES.

- To evaluate the AMR profile of commensal *E. coli* strains in laying hens farms in Spain.
- To quantify multiresistance to several AB in commensal *E. coli* strains.



MATERIALS & METHODS.

- 39 laying hens farms located in 12 provinces of 6 Spanish regions (Fig. 1) were sampled during the 40-50 laying weeks (2) from April to November 2018.
- *E. coli* commensal strains were isolated using Rapid'E.Coli2 (BIO-RAD) (ISO 16649-2) medium and PCR confirmation (ISO 22174:2005).
- MIC testing was carried out using EUVSEC plates (Sensititre™).
- EUCAST guidelines were followed to test 14 AB (3) (Fig. 2). EMA Classification (4) Category A ("Avoid"): Carbapenems (Meropenem, MER); Category B ("Restrict"): Cephalosporins (Cefotaxime, CTA; Ceftazidime, CTZ), Fluoroquinolones (Ciprofloxacin, CIP; Nalidixic acid, NAL), Polymyxines (Colistin, COL); Category C ("Caution"): Aminoglycosides (Gentamicin, GEN), Betalactamics (Ampicillin, AMP), Macrolides (Azithromycin, AZI), Amphenicols (Chloramphenicol, CHL); Category D ("Prudence"): Sulfonamides (Trimethoprim, TRI; Sulfamethoxazole, SME) and Tetracyclines (Tetracycline, TET; Tigecycline, TIG).
- ECOFF reference values were considered (3).

Figure 1. Spanish provinces where the farms were located

RESULTS.

- 195 *E. coli* commensal strains were isolated (5 strains from each farm).
- High levels of resistance to the mainly used AB in poultry production were found (Colistin, COL; Trimethoprim, TRI; Ciprofloxacin, CIP; Tetracycline, TET; Sulfamethoxazole, SME) (Fig. 2).
- Multiresistance profiles to several AB families were determined (Fig.3). Resistance to Sulfonamides, Tetracyclines and Fluoroquinolones were the most frequently associated.

Figure 2. Resistant strains to the 14 AB tested.

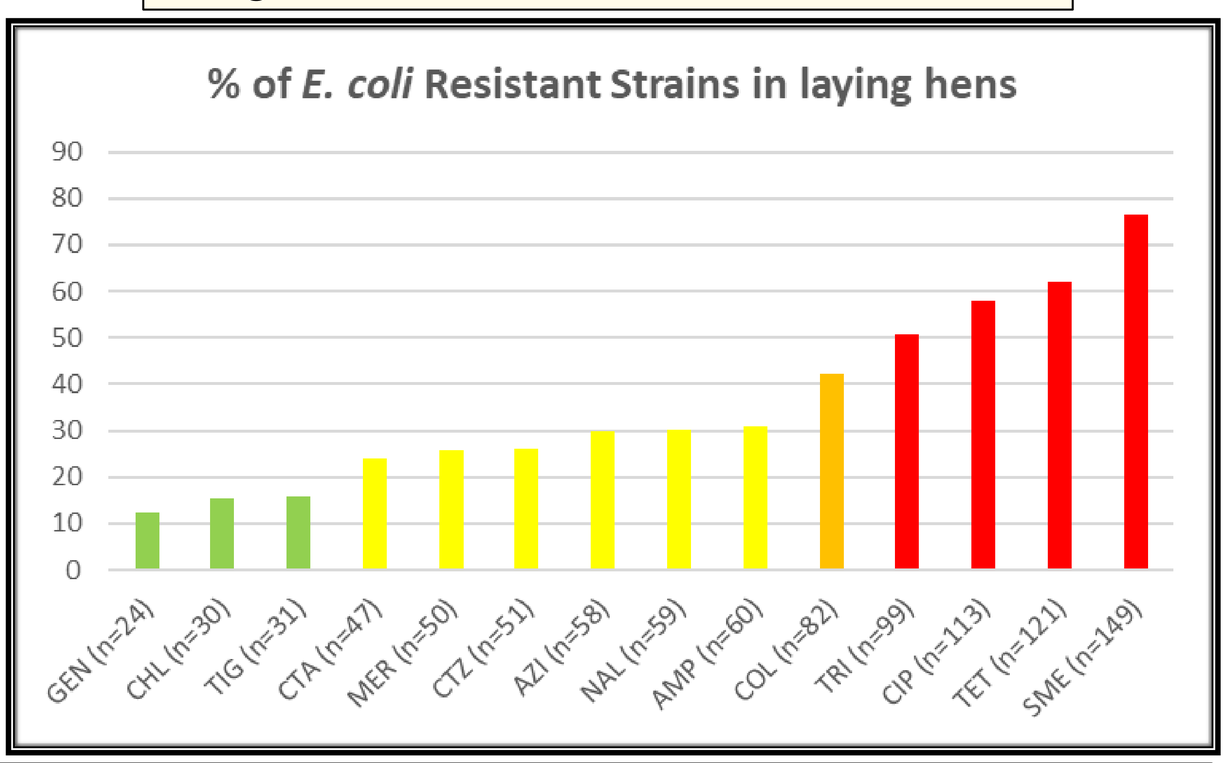
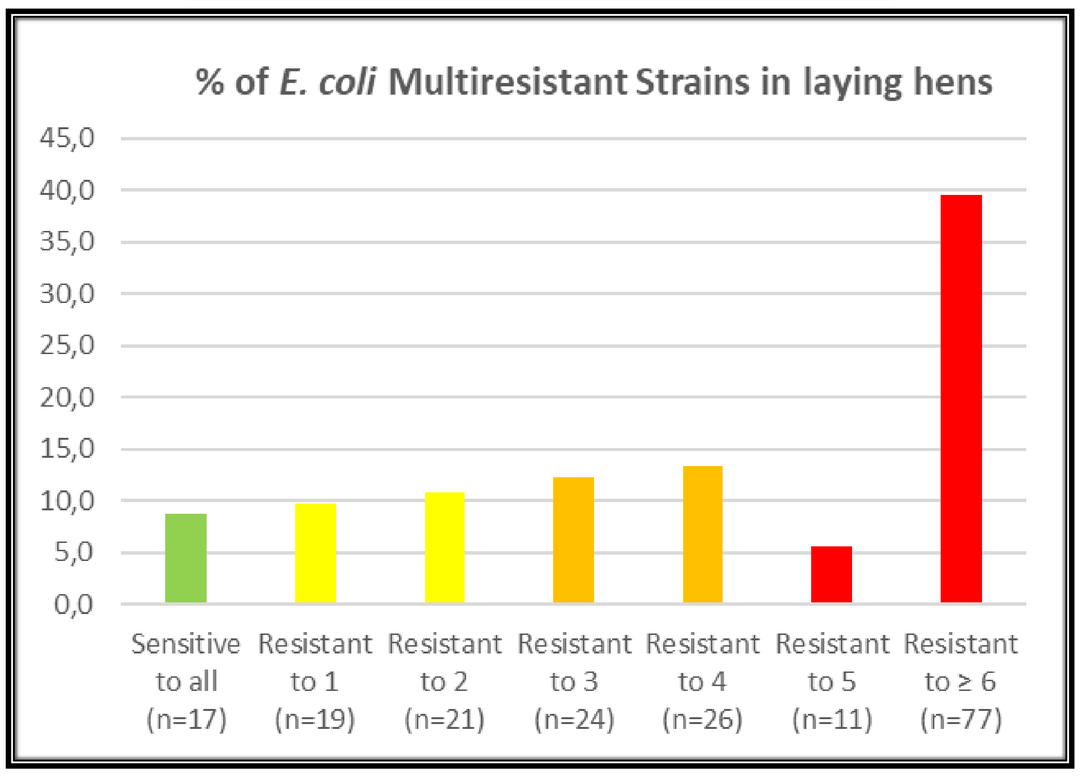


Figure 3. Profile of AB multiresistance.



CONCLUSSIONS.

- Laying hens are a reservoir of commensal *E. coli* resistant to AB. Multiresistance is common.
- There is a need to increase epidemiological surveillance and application of preventive measures against AMR insurgence.
- These preliminary results can be used as a reference for wider studies on AMR in laying hens.

REFERENCES.

1. MSSSI, AEMPS (2018). JIACRA Report. 05/2018
2. EU Parliament, EU Council. (2003). Regulation (EC) 2160/2003. OJ L 325, 12.12.2003, p. 1–15
3. EU Commission. (2013). Decision 2013/652/EU. OJ L 303, 14.11.2013, 26–39
4. EMA. (2019). Categorisation of antibiotics in the European Union. EMA/CVMP/CHMP/682198/2017

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