

A pilot study exploring plasmid carriage and Antimicrobial Resistance Genes in *Campylobacter jejuni* and *Campylobacter coli* in Luxembourg

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Introduction

Campylobacter spp. contain well-characterised mutations conferring resistances to ciprofloxacin and erythromycin. However, isolates may also harbour antimicrobial resistance genes (ARG) on mobile genetic elements. Plasmids play a critical role in the horizontal transfer of accessory genes, yet their distribution and contribution to antimicrobial resistance across species and ecological niches remain underexplored.

Aim: to explore the diversity of plasmids present in our strains and to assess ARGs localization between 2 *Campylobacter* species using Nanopore long-read sequencing.

Results

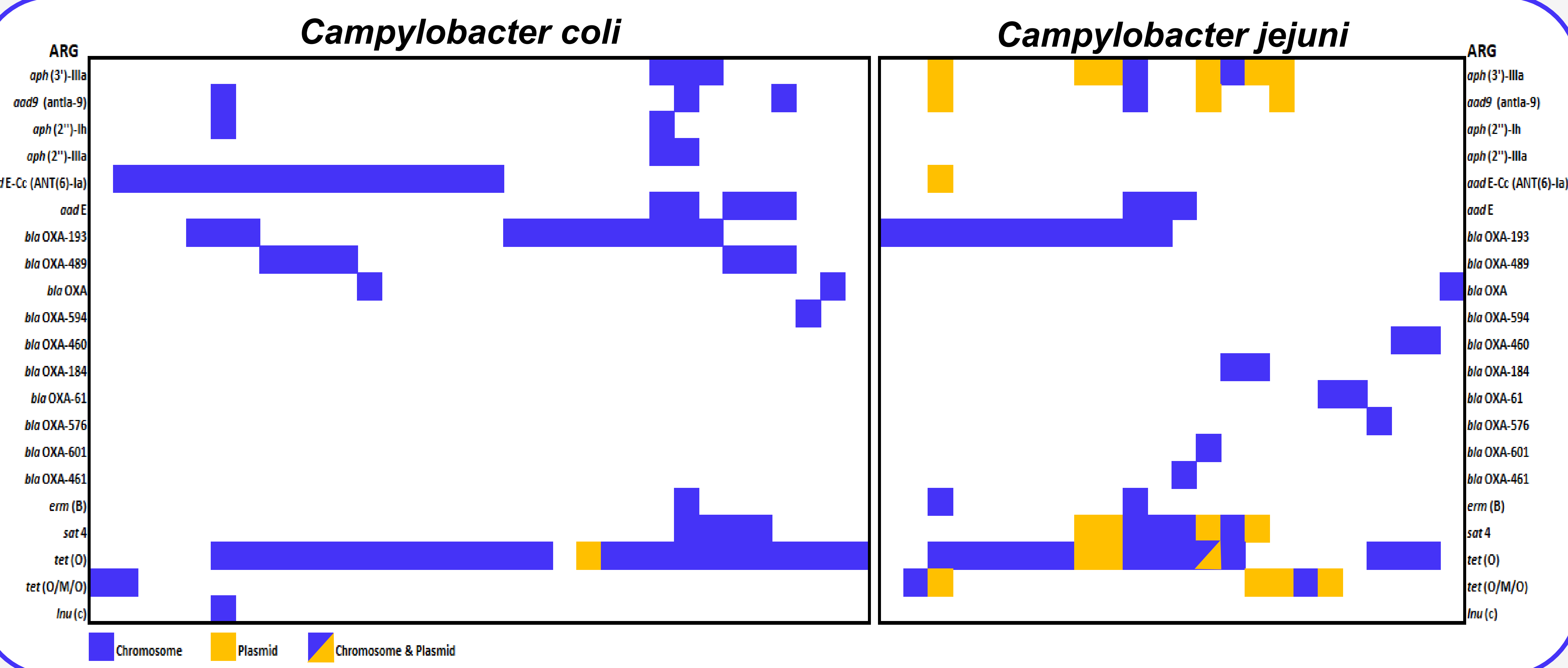


Figure 2: Localisation of ARG in the genome for both species *C. jejuni* and *C. coli*

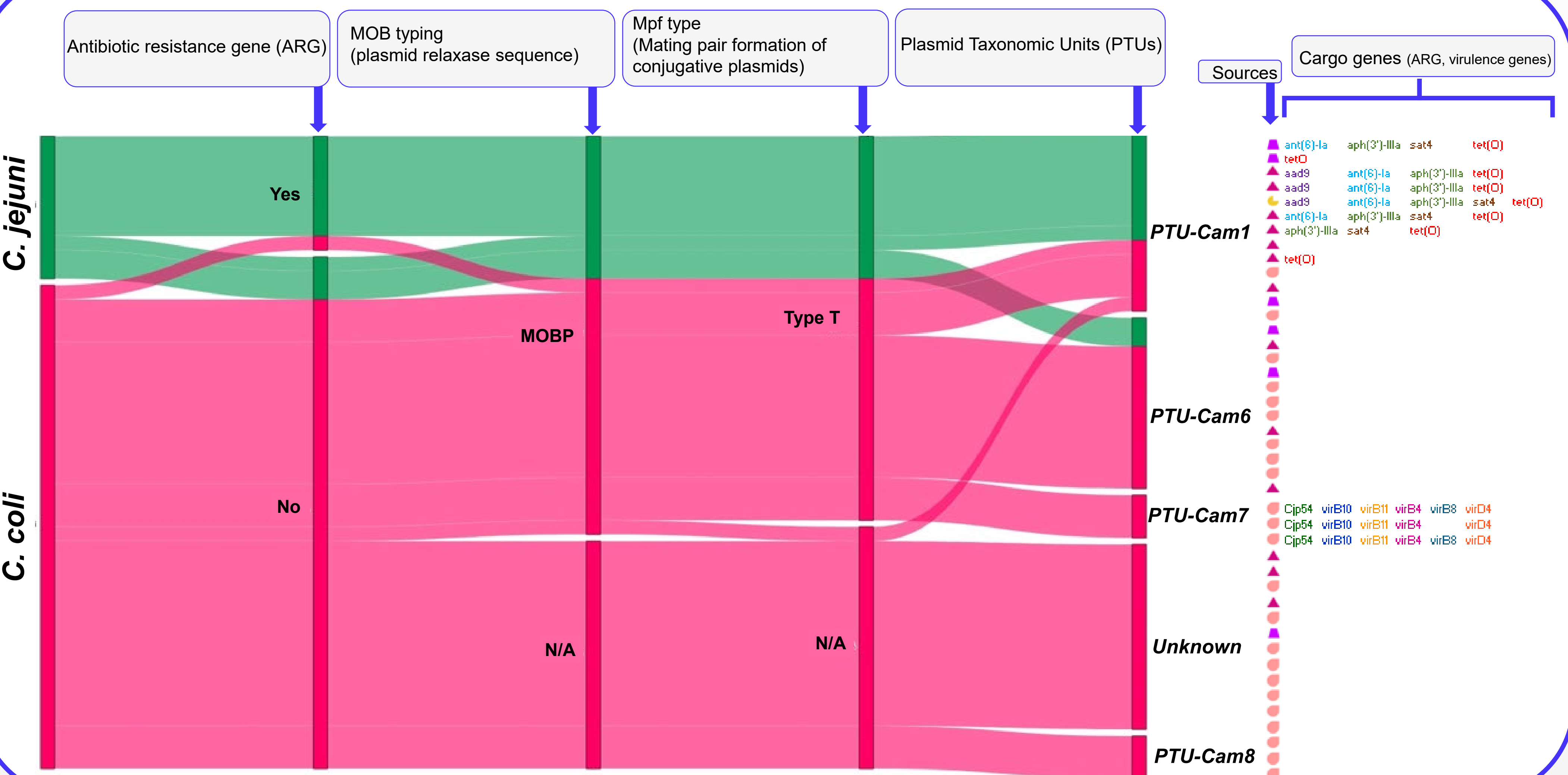


Figure 3: Sankey diagram comprised of 44 plasmids identified from 56 *Campylobacter* isolated from humans, animals and food, showing the relationship between the ARG context, the PTU, the MOB typing and Mpf results. Cargo genes detected are displayed for each plasmid.

Sources: ■ Poultry ■ Food ■ Pig ■ Human

Materials & Methods

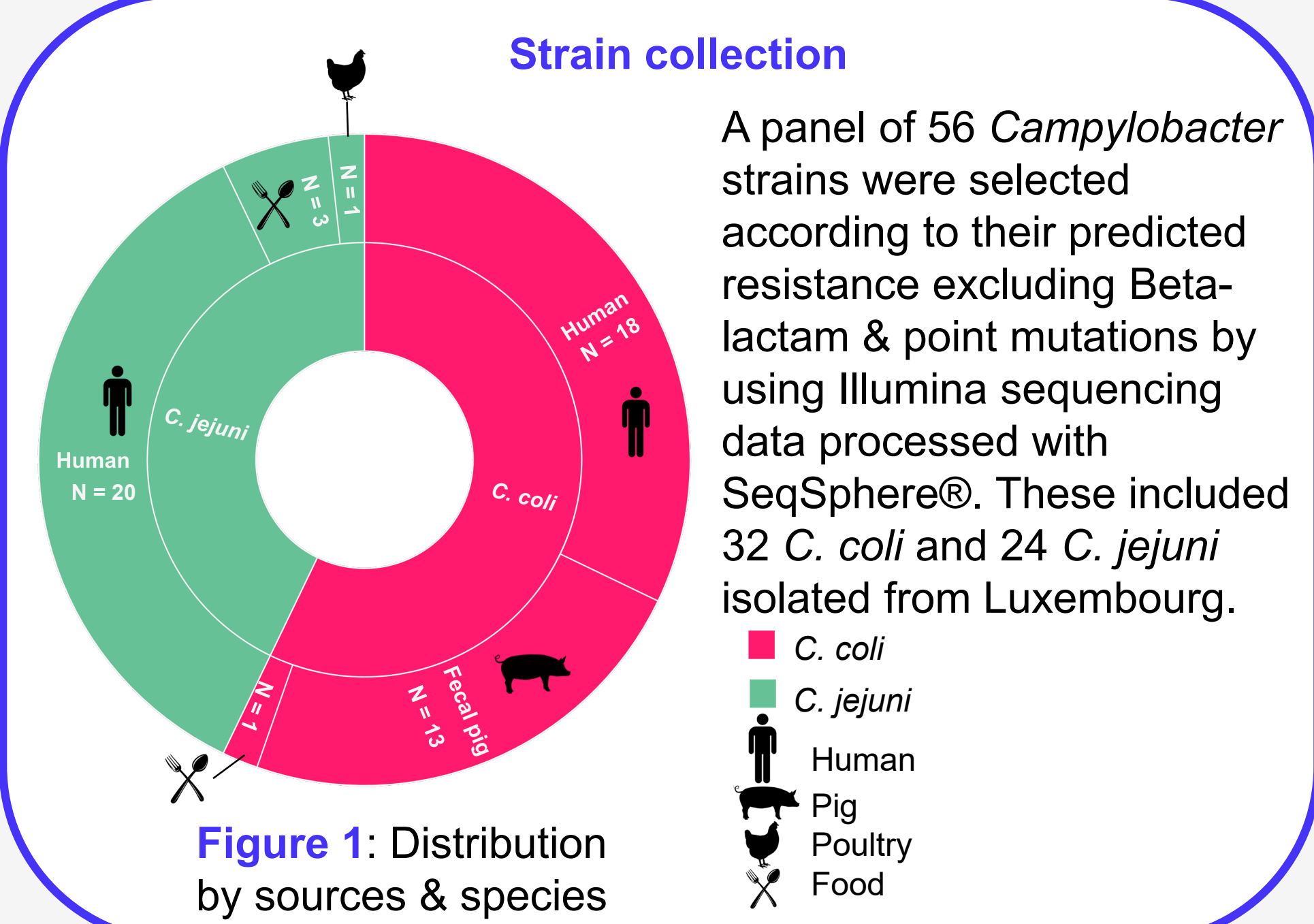
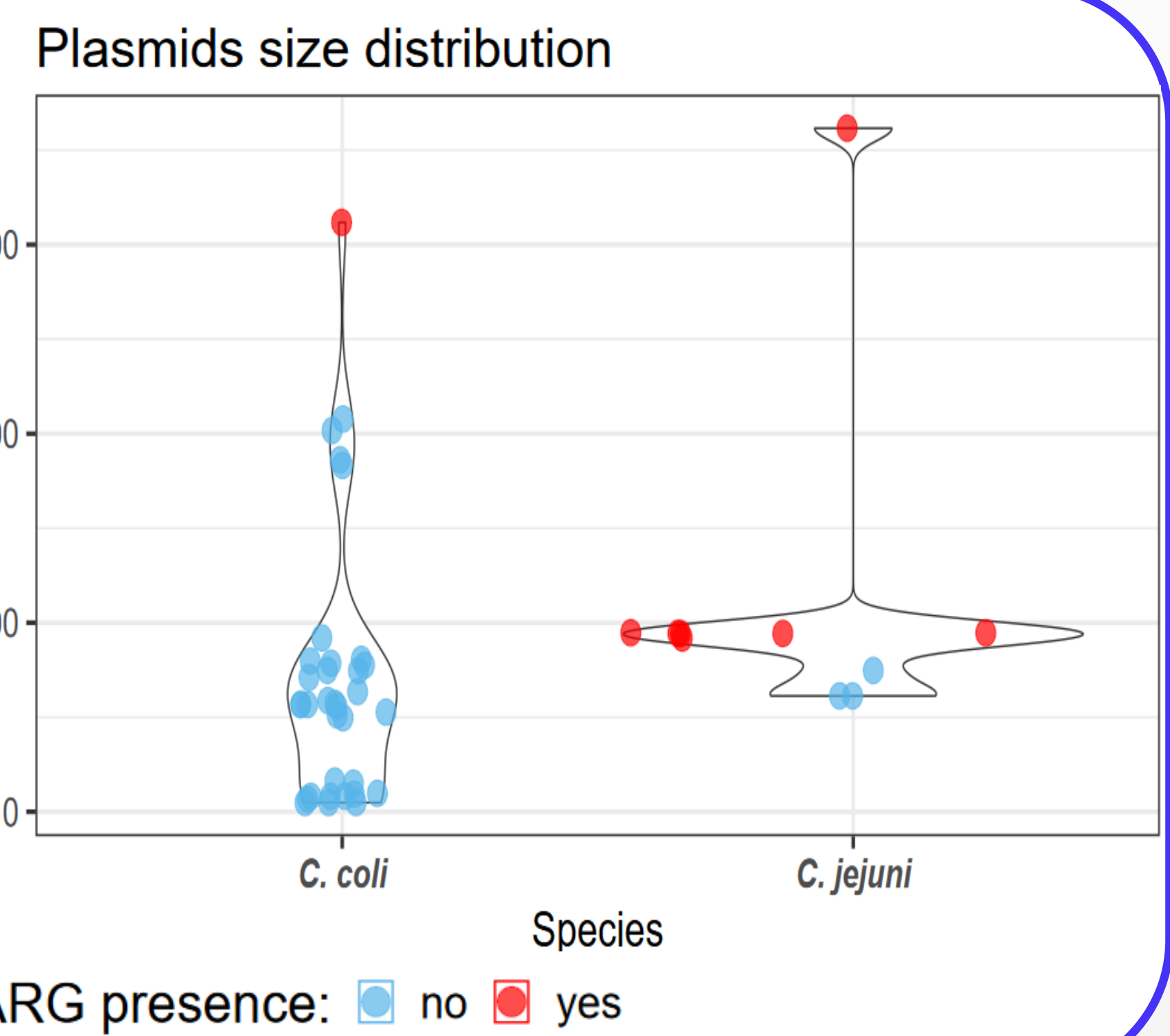
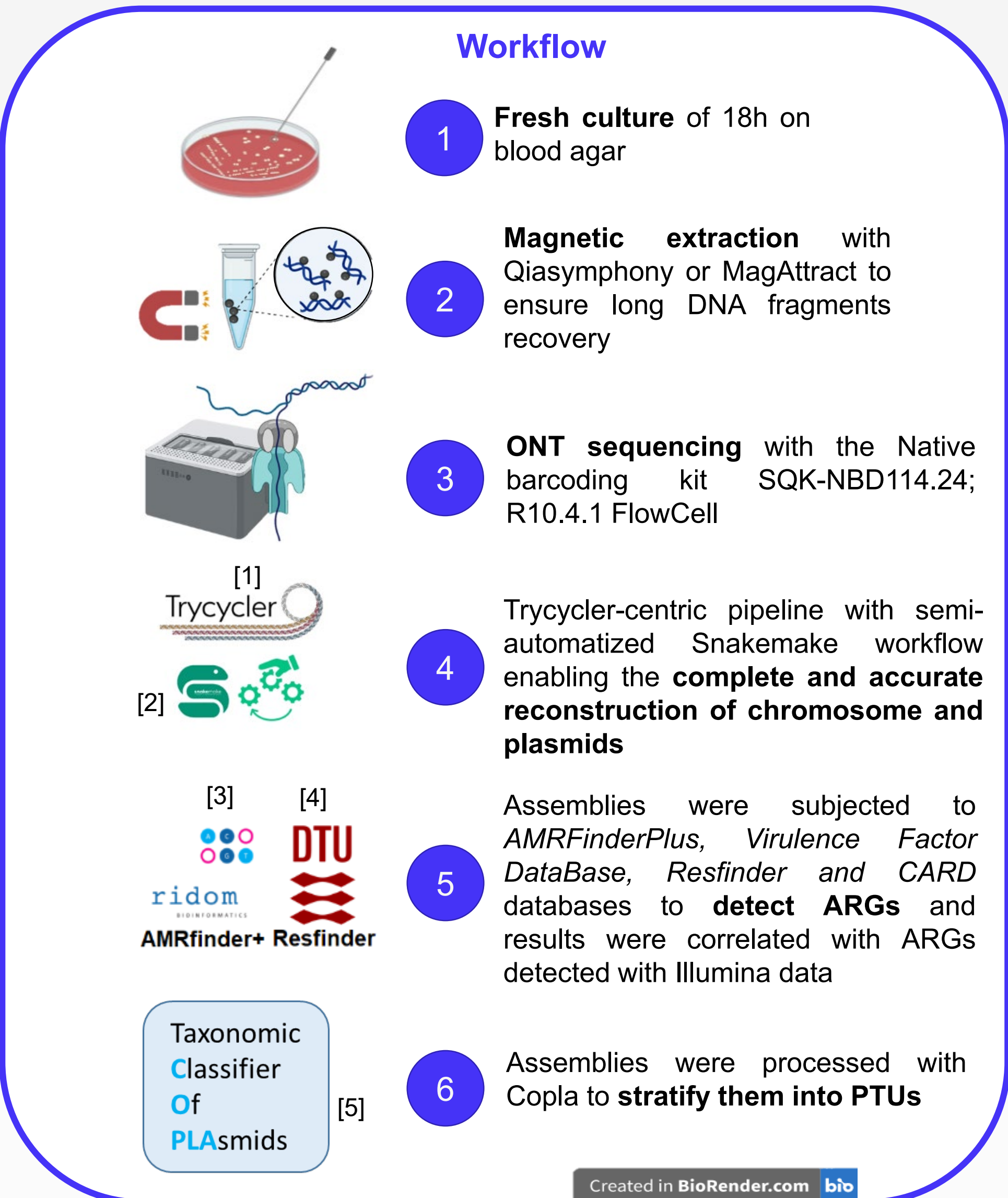


Figure 1: Distribution by sources & species



ARG presence: ■ no ■ yes

Figure 4: Size distribution of the 44 plasmids identified from 56 *Campylobacter* strains showing the ARG presence with a color code

Discussion and conclusion

Comparative genomic analyses showed that blaOXA gene family is always located on the chromosome. Interestingly, we observed a marked difference at the species level in both the prevalence and composition of plasmid encoded resistance genes. *C. coli* exhibited a higher frequency of chromosomally encoded ARGs, with 19 strains carrying 34 plasmids, of which only one contained an ARG. Conversely, out of the total 47 ARGs detected in *C. jejuni*, 25 were encoded on different plasmids. Overall, 33 plasmids out of 44 were classified in 5 PTUs. The most frequently identified PTUs in *C. jejuni* (8/11) and *C. coli* (10/34) were cam1_MOBP and cam6_MOBP respectively. Plasmid sizes ranged from 2,426 bp to 103,863 bp and nearly 60 % were conjugative. These findings provide insight into plasmid-mediated ARGs in *Campylobacter* species.

References

[1] Wick RR *et al.* (2021) *Genome Biology* **22**, 266.

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