



Poultry population in Jolly Island

Jolly Island is located in the Atlantic Ocean (Figure 1A) and belongs to the same archipelago as Merry Island, where an outbreak of African swine fever occurred a few years ago (Ezanno et al., 2022). Jolly Island's surface covers an area of approximately 33,667 km², roughly equivalent to the size of Belgium. The island is divided into 14 counties and 556 districts (Figure 1B). Unlike Merry Island, which predominantly produces pigs, poultry is the main farm animal production on Jolly Island. There are four types of poultry production systems on the island: laying hens, broiler chickens, organic meat ducks and conventional meat ducks.

Broiler chickens on Jolly Island belong to an endemic breed called the Jollian, and are traditionally raised in two stages. This unique tradition is featured on UNESCO's Lists of Intangible Cultural Heritage. The first stage, lasting three weeks, is conducted indoors as the immune system of the birds is not yet fully developed. The second stage lasts for four weeks and is conducted entirely outdoors on different farms. As a result, broiler chickens are moved between farms at the end of the first stage. Because chickens grow throughout the production cycle, the number of birds in chicken stage 2 farms is typically lower than in chicken stage 1 farms. This means that a batch at the end of the cycle in a chicken stage 1 farm can be split and sent to one or more chicken stage 2 farms. Organic meat ducks are raised on relatively small farms with outdoor access, whereas laying hens and conventional meat ducks are raised indoors on large commercial farms.

Because the island is quite small, there are no local breeder farms. All day-old chicks, ducklings and ready-to-lay hens are imported directly from operations with extremely high-biosecurity levels on a neighbouring island that is free from highly pathogenic avian influenza. All farmers operate under an all-in/all-out system, sending all animals to local slaughterhouses at the end of the production cycle. Before receiving a new batch, farmers clean and disinfect their facilities and leave them empty for a specified downtime period, which depends on the type of production. All between-farm animal movements and periods of farm activity are recorded and provided to the modelling teams.

Poultry farms are unevenly distributed across the island, with two densely populated poultry areas (one in the north and one in the south) where most of the farms are located. For historical reasons, there are more ducks than chickens in the northern area and more chickens than ducks in the southern area (Figure 1C). The east coast of the Island corresponds to the so-called high-risk zone (HRZ) which is a composite area where migratory birds commonly stop during their migration or where high concentrations of *Laridae* (gulls) are found (Figure 1D). This HRZ is therefore an area in which contacts between poultry and wild birds are more likely, leading to a higher risk of pathogen spillover between the two compartments, especially in outdoor farms.

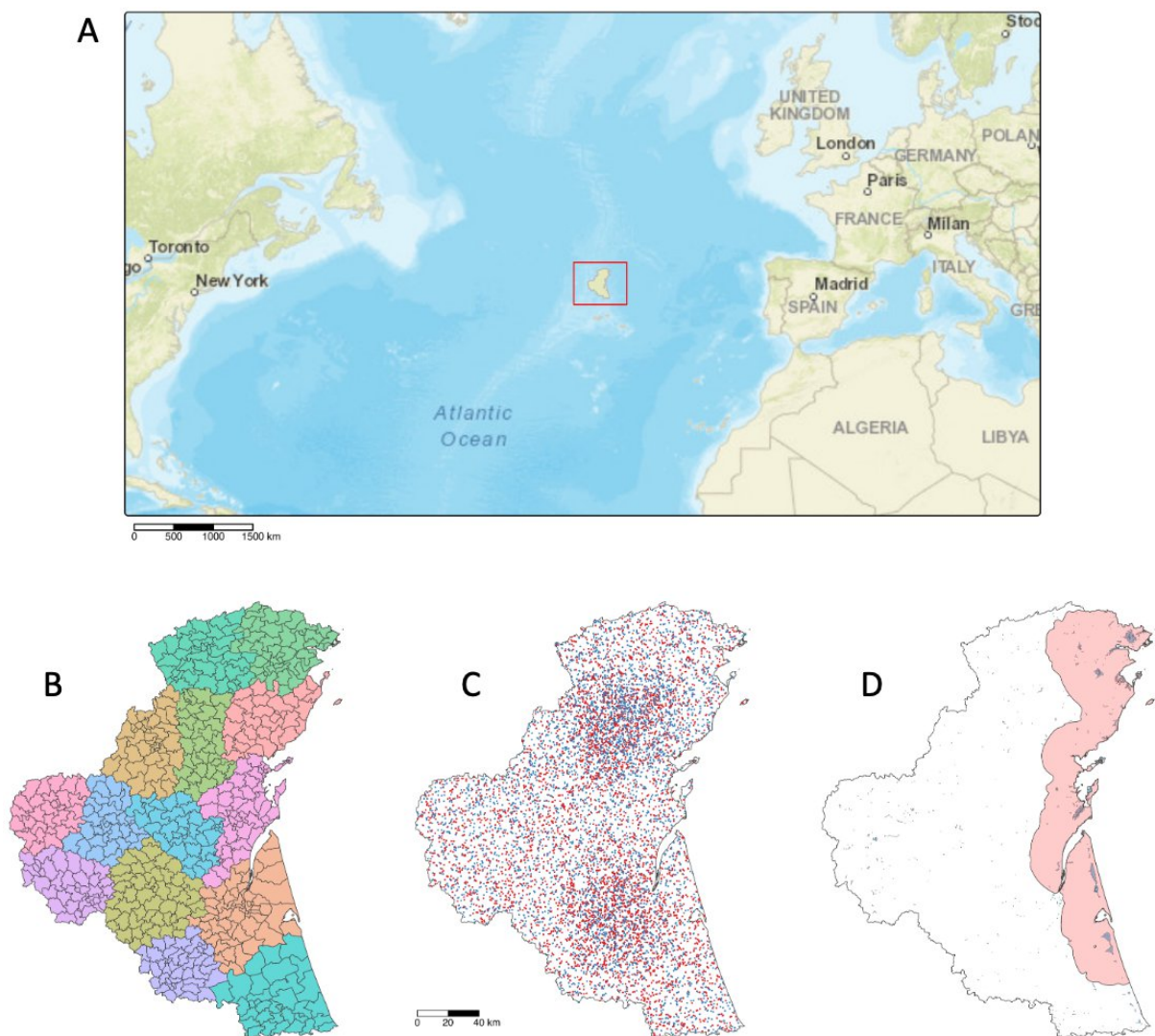


Figure 1: Spatial characteristics of Jolly Island. A: Location of Jolly Island in the Atlantic ocean; B: administrative divisions (counties and districts) of Jolly Island (each colour correspond to one of the fourteen counties in the island); C: spatial distribution of the poultry farms (red: chickens (including layer, stage 1 broiler, and stage 2 broiler farms); blue: ducks (including conventional meat and organic meat farms); D: spatial distribution of the high-risk zone (in pink).