



Swine movements in Belgium: network analysis and implications in disease spread and surveillance



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CONTEXT

- Swine industry in BE is 42% of LSU (Eurostat).
- Livestock movements between farms is one of the most important risk factor for the spread of infectious agents (Craft et al., 2015).



AIMS

- Use **Social Network Analysis** to **describe** the pattern of movements of domestic pigs in Belgium.
- Identify **target herds for surveillance**.
- Estimate the **risk of disease spread** via animal movement from specific provinces.

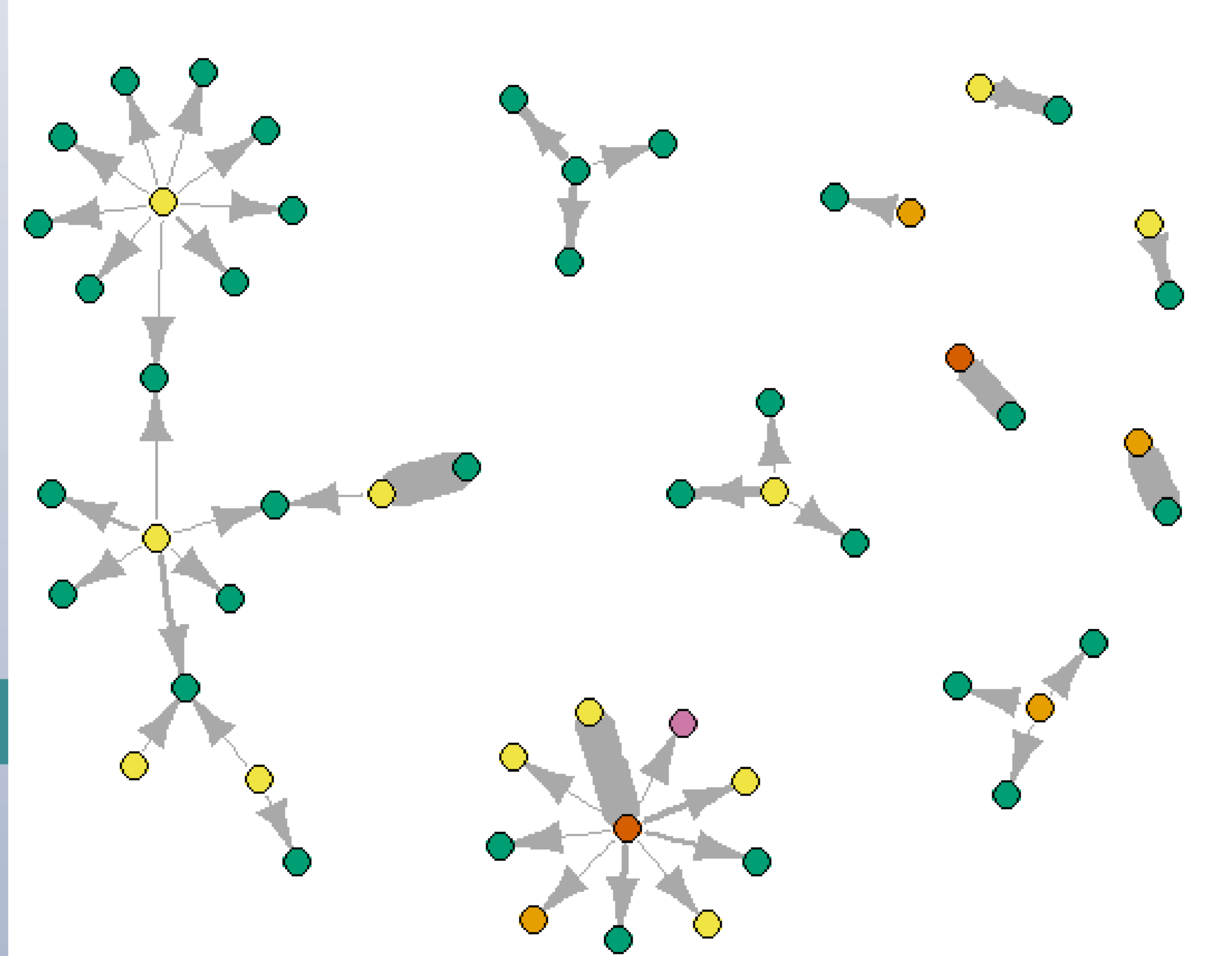
MATERIAL & METHODS

Data source:

- Swine movements data (2013 – 2015) from the National Registration Database.
- Herds (n=6300), herd types, animal types.
 - Geographic coordinates.



DIRECTED WEIGHTED NETWORKS

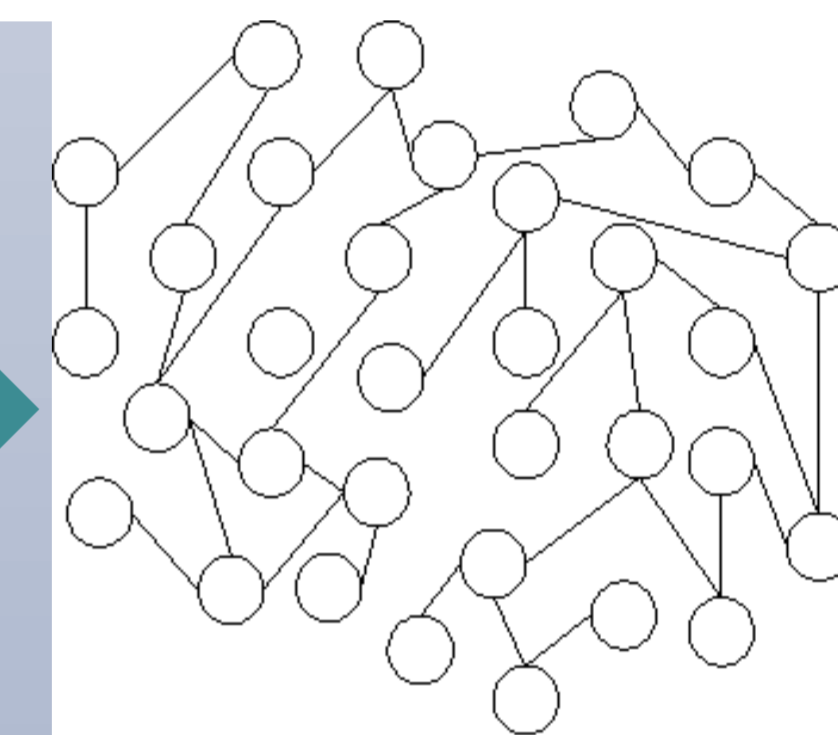


1 node = 1 farm

Farm types

- Farrow to finisher
- Rearing
- Fattening
- Mixed
- Hobby
- Breeding
- Piglet rearing

Compare to 100 randomly simulated networks of same size and density

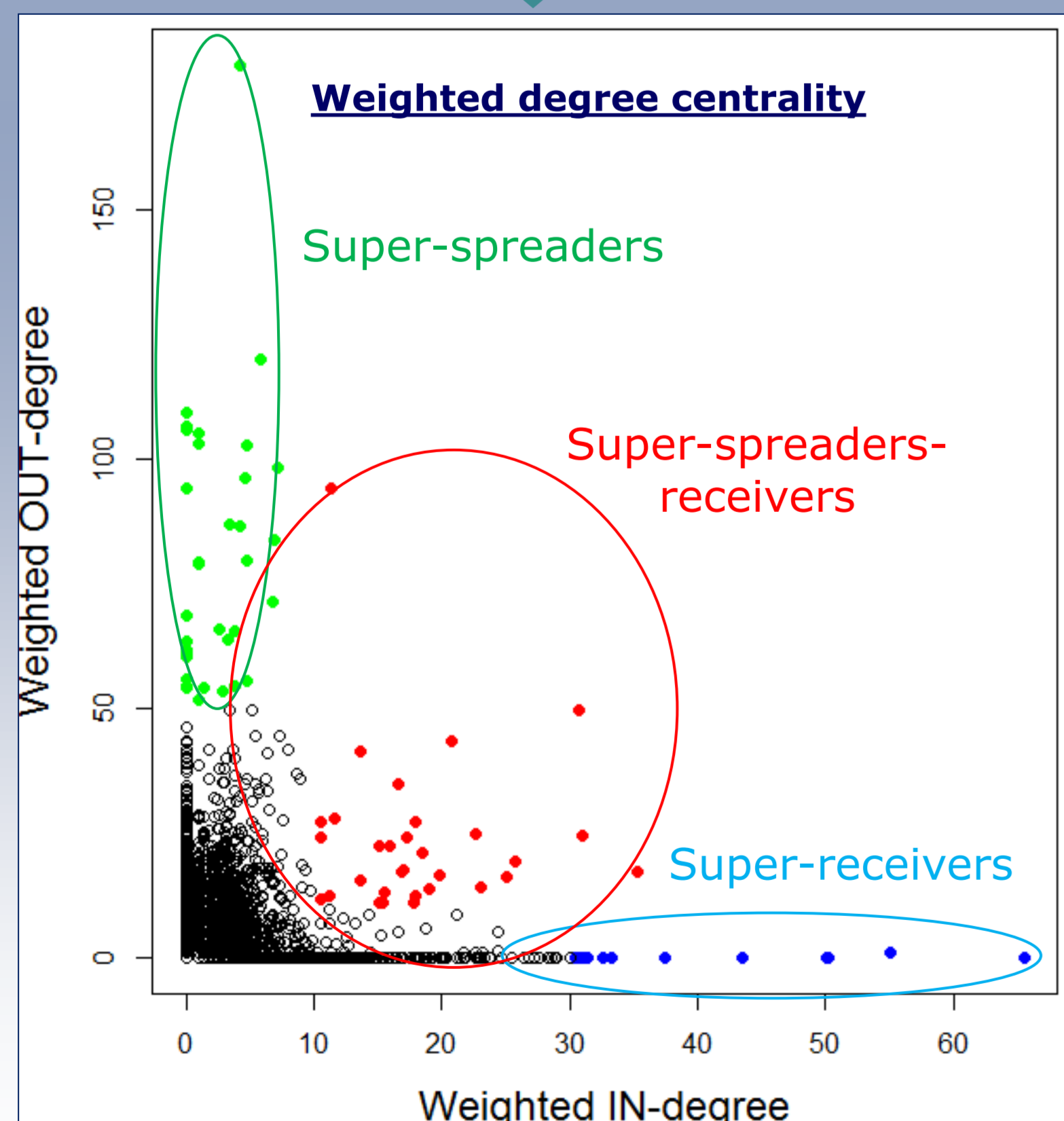


Edge weight = frequency of the movement during the year

RESULTS & DISCUSSION

Target herds for better surveillance and contingency planning could be identified :

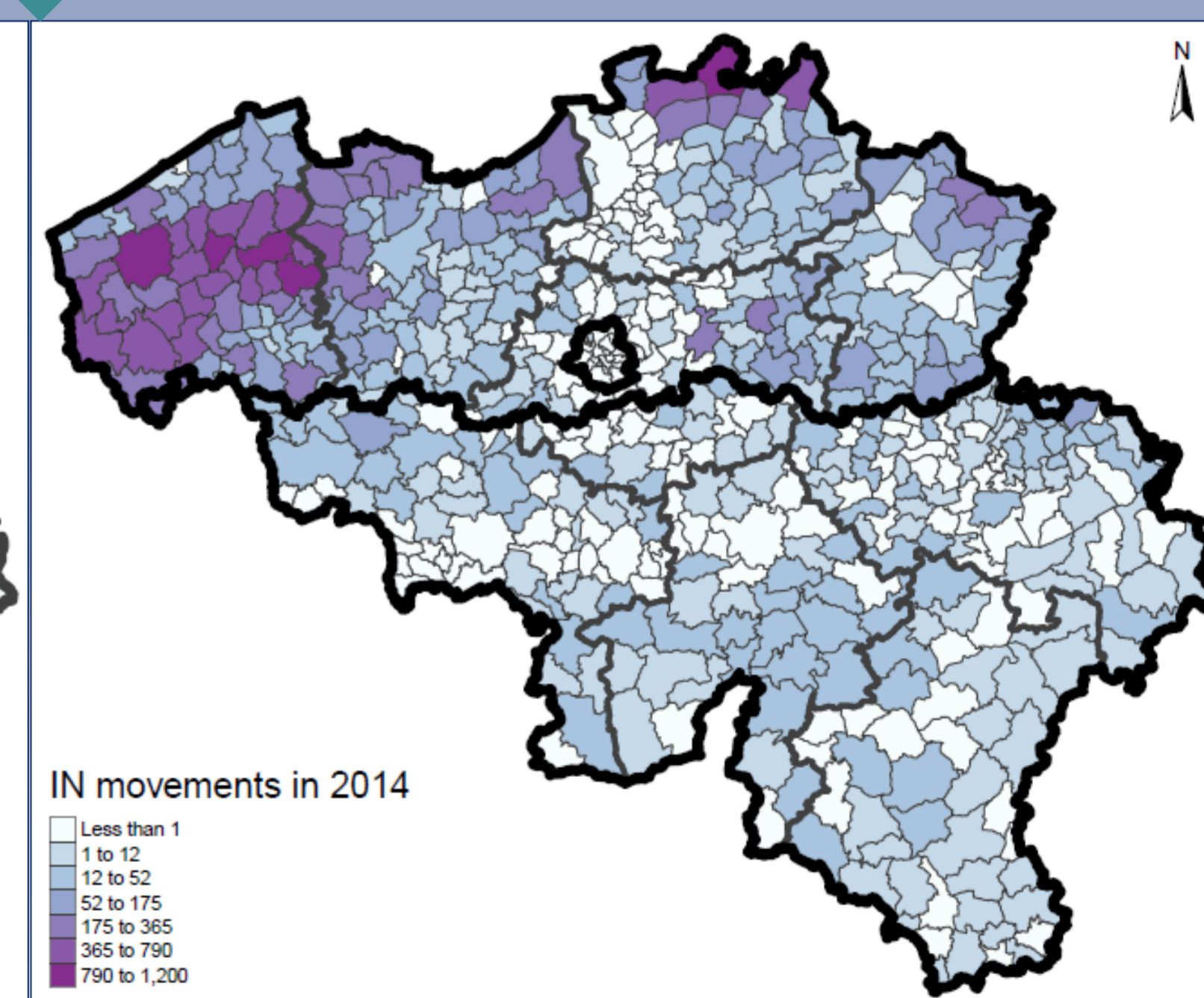
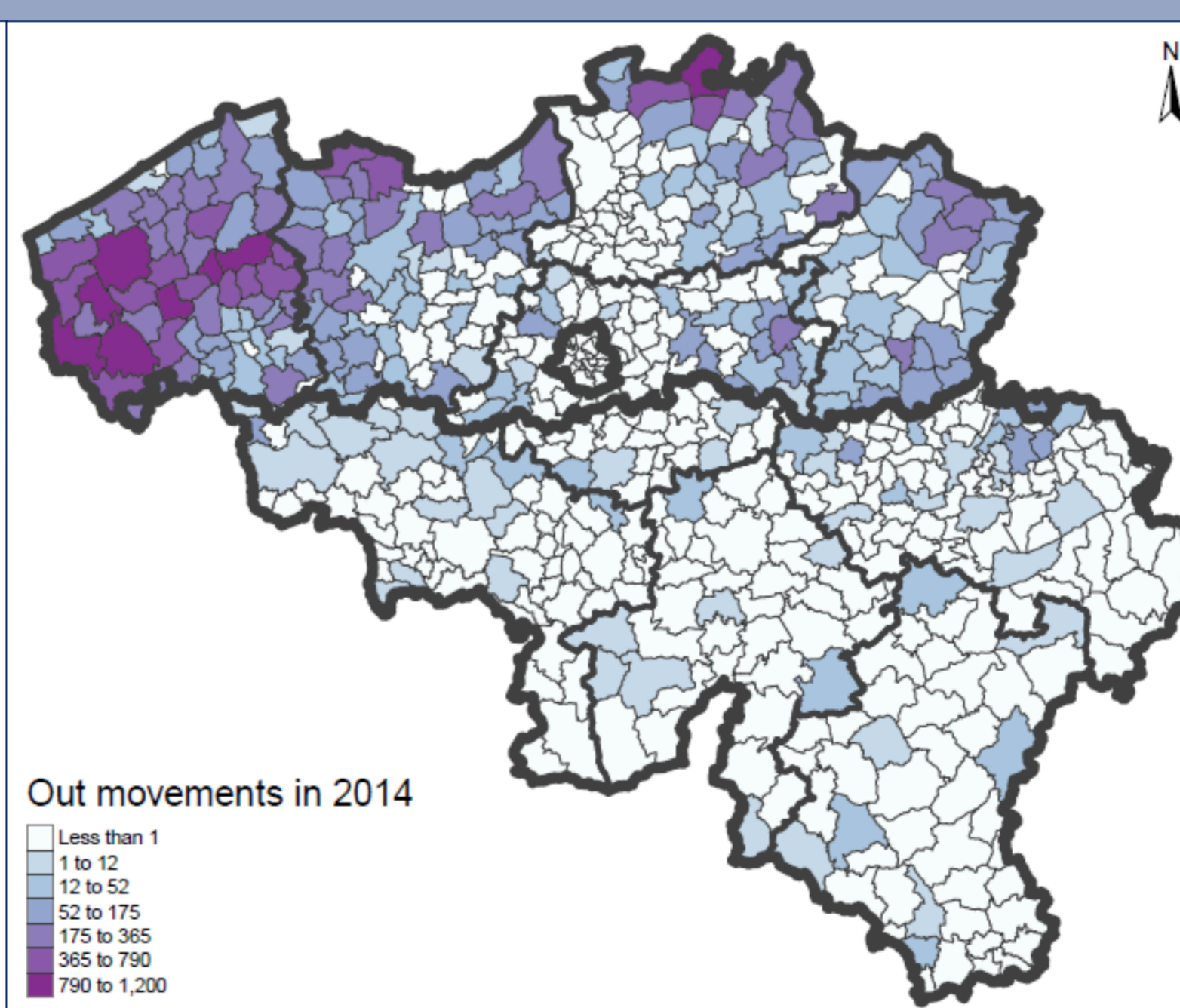
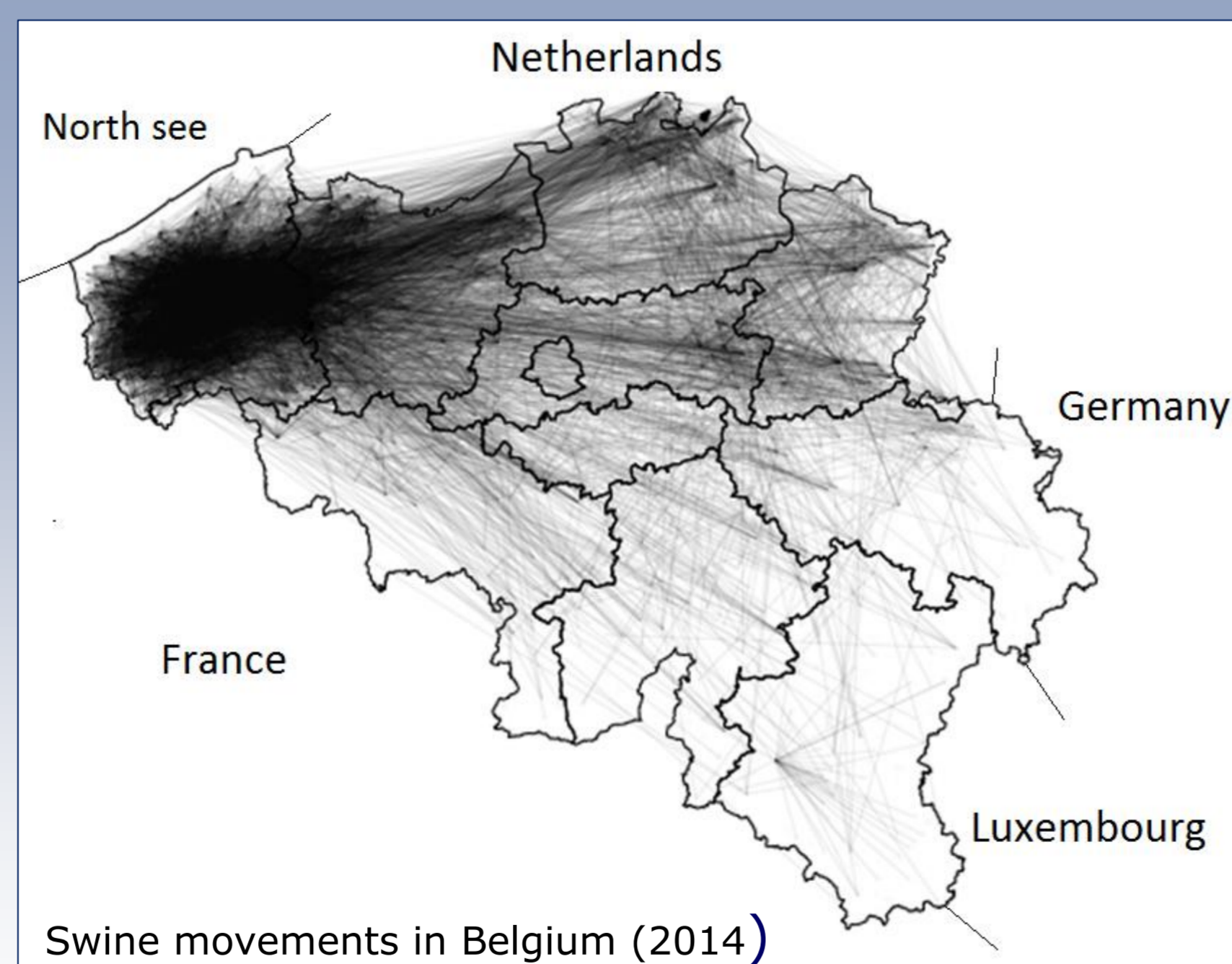
- Many batches sent and/or received.
- Many different contact herds.



The south (Wallonia) received batches of pigs from the north (Flanders) but sent very few batches.

→ Risk of disease spread via animal movements :

- Lower risk from the south.
- Higher risk from the north.



Useful for refining **spread modeling** of possible exotic disease introduction.

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