Data visualization in academic research

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The case of the **BAKERY** project

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What is the role of visualization in academic research?

- Publications
  - The exact representation of data in all their shades
  - Then people look at the figures first, so they have to be « sexy »

- For posters, orals ,presentations, etc.
  - As in any form of communication, the most important is the **message.**
    - Clarity
    - Efficiency

- Open Science
  - Data availability
  - Reproducibility of scripts for analyses AND graphs

The **Bakery** project

- It is a participative project, thus created with and animated by the actors of the field

- Sourdough bread

- Influence of practices on bread quality and microbial diversity

A lot of data !!

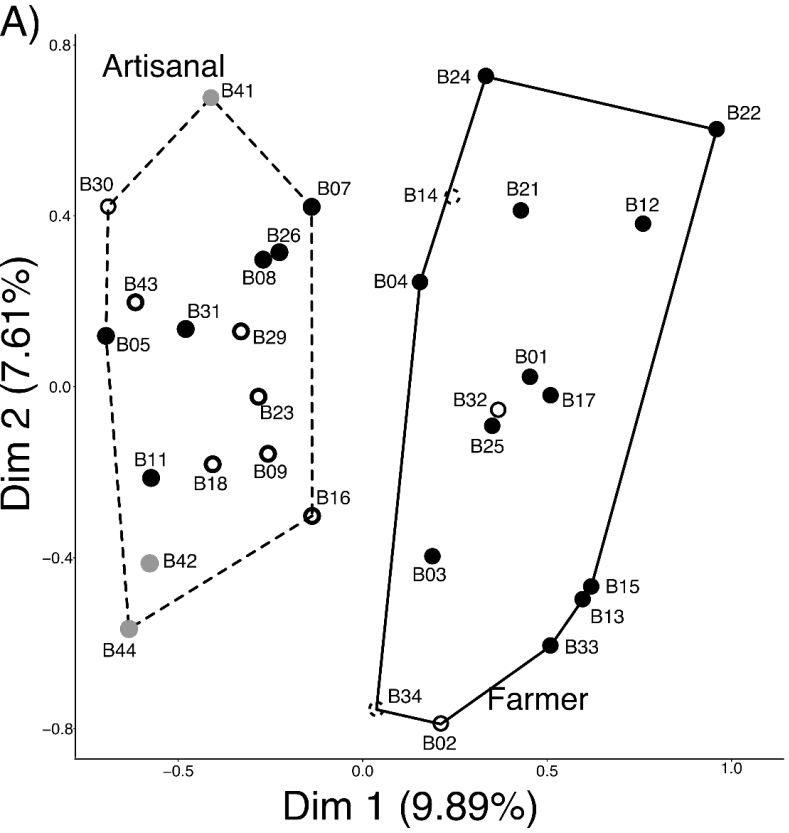
- Lots of bakers all over France
- Several types of flours, different types of practices
- Lots of measurements on bread and microbial diversity (yeasts and bacteria)

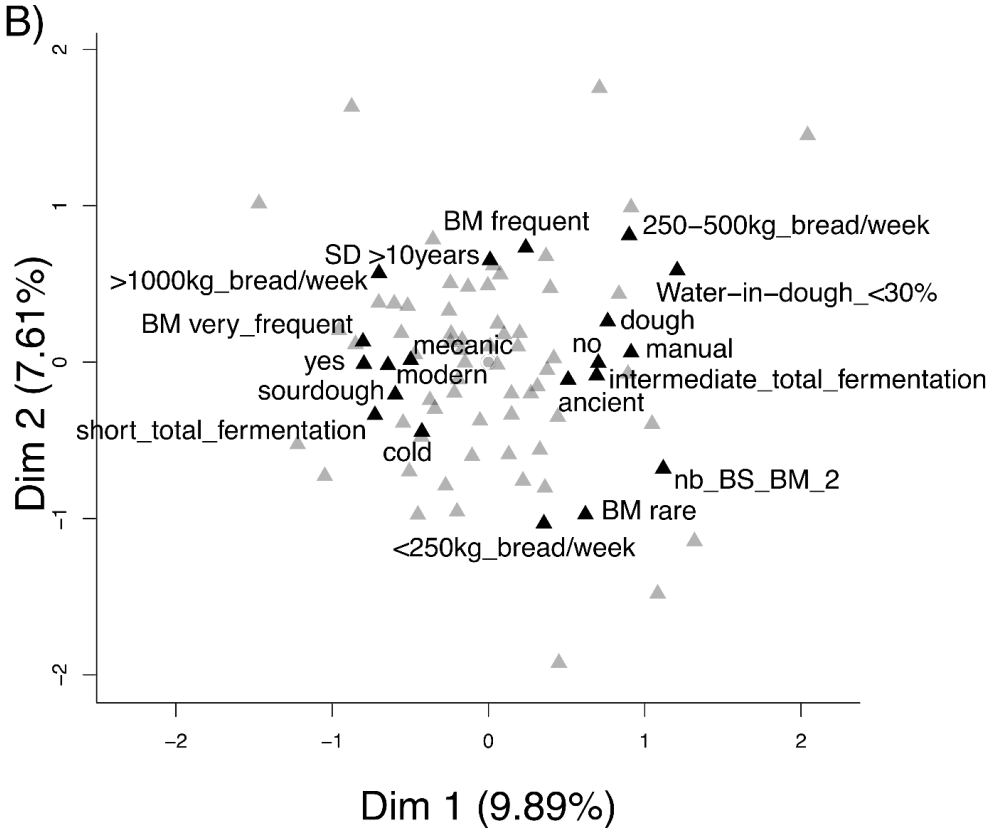
Visualization 1 - How are bakers' practices structured?

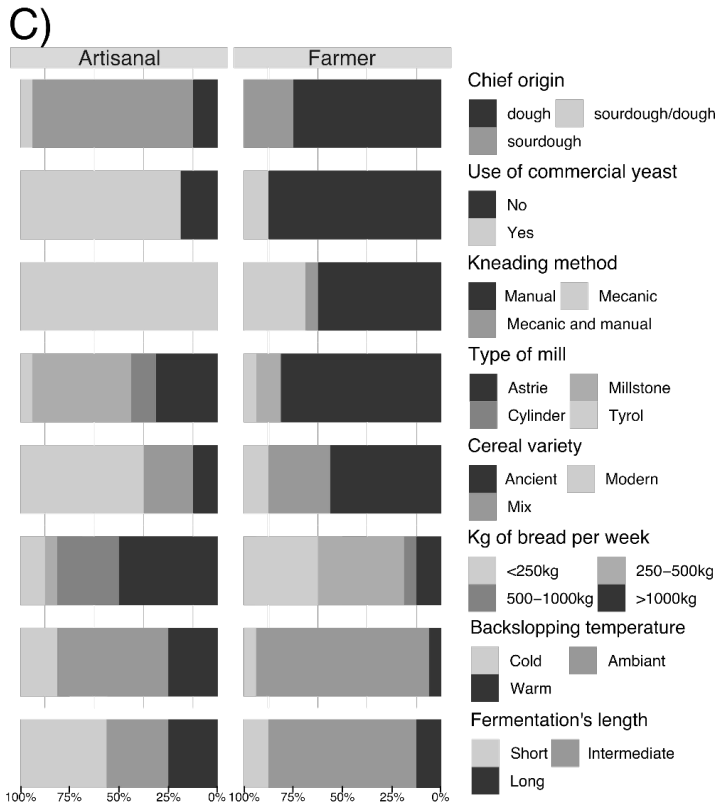
- Is there a structure?
- What are the most differentiating practices?

- This is a scientific paper, so it is mendatory to illustrate both methods and results.

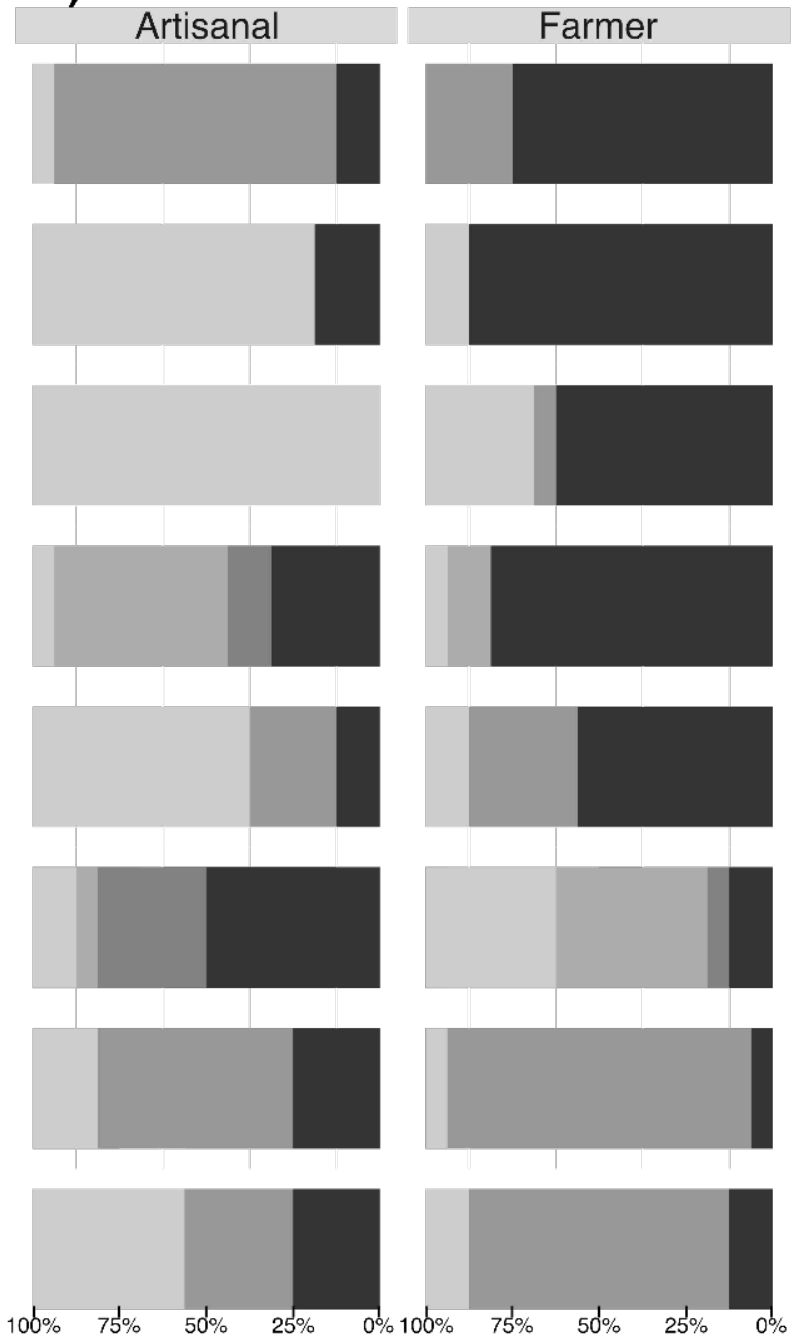
Visualization 1 - How are bakers' practices structured?







C)



Chief origin
dough
sourdough/dough
sourdough

Use of commercial yeast
No
Yes

Kneading method
Manual
Mecanic
Mecanic and manual

Type of mill
Astrie
Millstone
Cylinder
Tyrol

Cereal variety
Ancient
Modern
Mix

Kg of bread per week
<250kg
250–500kg
500–1000kg
>1000kg

Backslopping temperature
Cold
Ambiant
Warm

Fermentation's length
Short
Intermediate
Long

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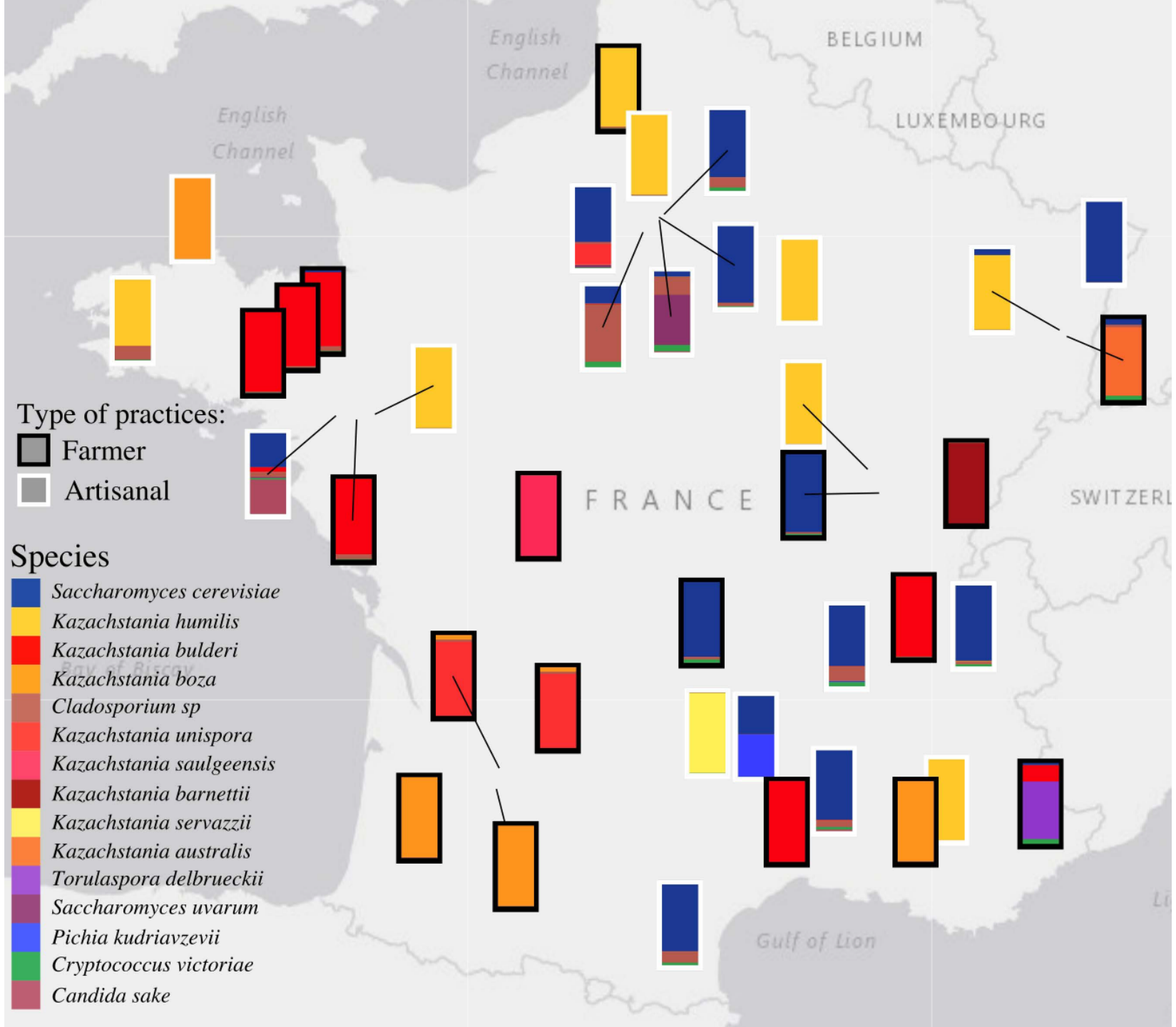
Visualization 2 - What does structure microbial diversity?

- The type of baker
- The microbial diversity
- The Geography


English Channel
BELGIUM
LUXEMBOURG
FRANCE
Gulf of Lion
Type of practices:
Farmer
Artisanal
Species
Saccharomyces cerevisiae
Kazachstania humilis
Kazachstania bulderi
Kazachstania boza
Cladosporium sp
Kazachstania unispora
Kazachstania saulgeensis
Kazachstania barnettii
Kazachstania servazzii
Kazachstania australis
Torulaspora delbrueckii
Saccharomyces uvarum
Pichia kudriavzevii
Cryptococcus victoriae
Candida sake

What's the big deal?

- Translate complex analyses into clear visualizations
  - We quickly come across trade-offs
    - Complexity/understanding
    - Variability/Message

- Reproducibility of analyses and graphs
  - Here the graphs are 95% made with R - with some finishing under a vectorial drawing software (inkscape or Affinity Designer).

- The diversity of questions and scientific methods force us to always look for the most adequate representation.

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