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## Data Integration and VISualization (DIVIS) : from large heterogeneous datasets to interpretable visualisations in plant science

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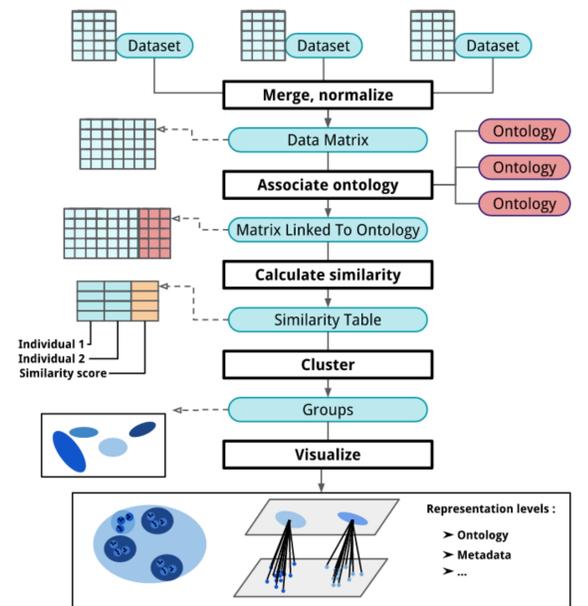
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## Introduction

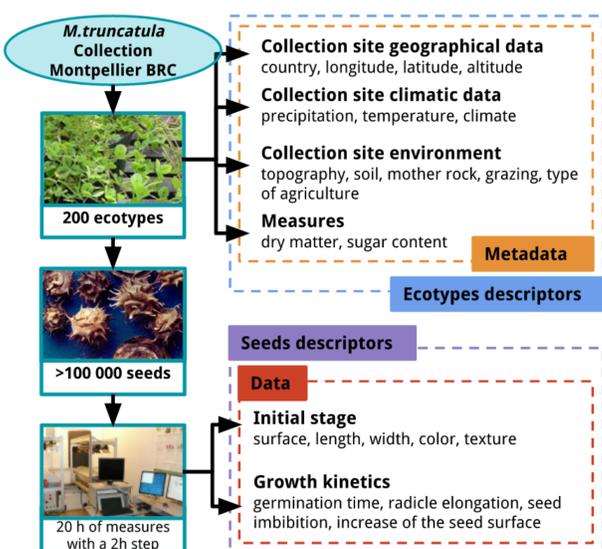
- The increase in the scale of experiments, the multiplication of experimental techniques used as part of one study and the generalized storage of past experimental datasets have led to the creation of large collections of heterogeneous datasets such as those stored by the IRHS teams in plant science.
- Currently, biologists are more and more interested in reusing and exploring these collections through integration and visualization techniques, but there is no user friendly tool addressing the whole problem, in particular in plant science [1-3].
- The DIVIS project aims to tackle the issue through a methodological exploration of a possible solution and the development of a directly usable prototype software on two test datasets, by combining the most promising integration and visualization approaches that are publicly available.

## Software Workflow

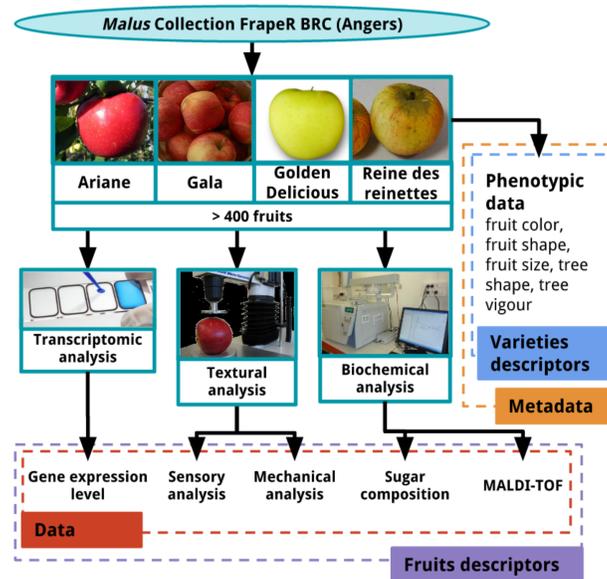


## Datasets

### Seed dataset



### Apple dataset

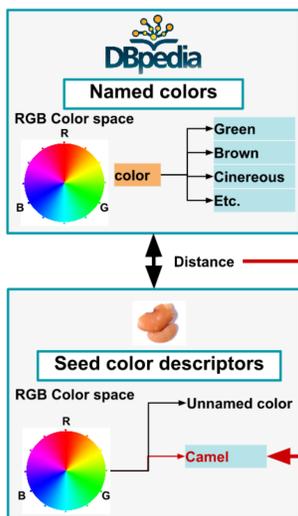


## Project status

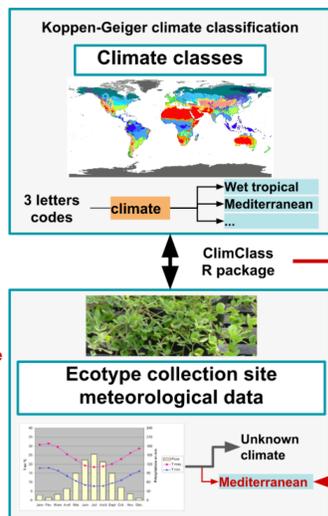
- Built the data matrices for both datasets.
- Performed basic statistical analyses to better understand the datasets.
- Performed some test visualizations with crude grouping approaches.
- Identified relevant existing ontologies and started designing missing ones.
- Current stage: associate metadata with ontologies and estimate their distribution [4-7].

## Seed dataset: ontologies

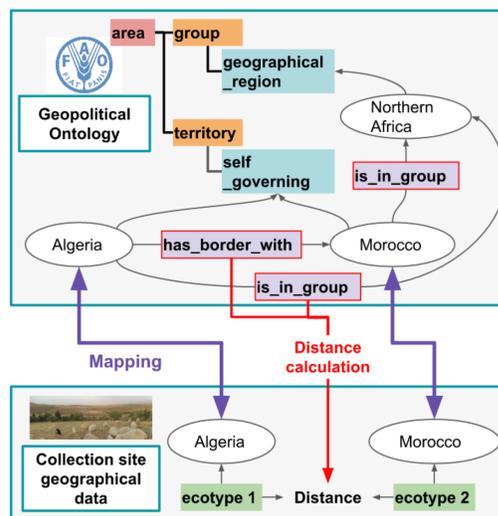
### Color



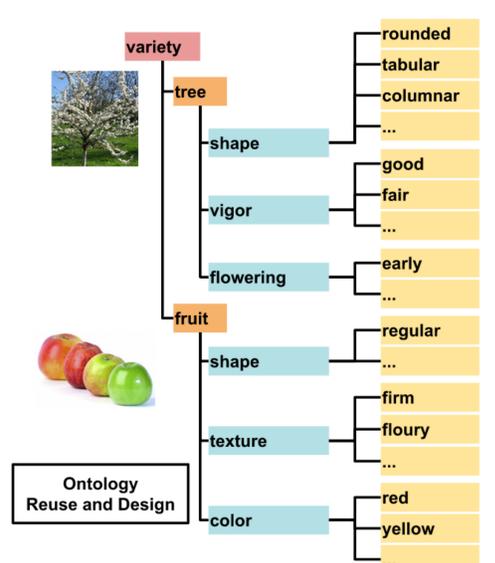
### Climate



### Country



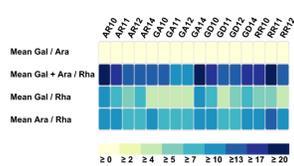
## Apple dataset: ontologies



## Visualization attempts

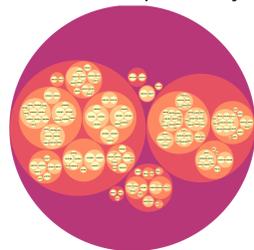
### Apple

Sugar contents



### Seed

Seed count plasticity



### Organization axes

- mean sugar ratio
- sample

► Biologists show interest in the displays.

### Limits

- Need to easily navigate in the variables and individuals spaces.
- More interactive visualization.

## Conclusion

- Preliminary operations in order to create a tool able to efficiently summarize and visualize large heterogeneous datasets.
- Limited variability for the current metadata variables in the test datasets.
  - Exploring other dimensions, such as shapes of seeds, might help to generate more different groups.
- Current visualization attempts performed using manually organized data files and as such predefined organization axes.
  - A strong need to select and order the organization axes, that is to say the metadata variables to consider, emerged, which is considered in the final tool.
  - Beyond the supervised approach, unsupervised clustering approaches might be of interest to drive the hierarchical organization of the individuals.

## References

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