

archiDART is an R package allowing the automated **computation of plant root architectural traits** and the **topological analysis of root systems**

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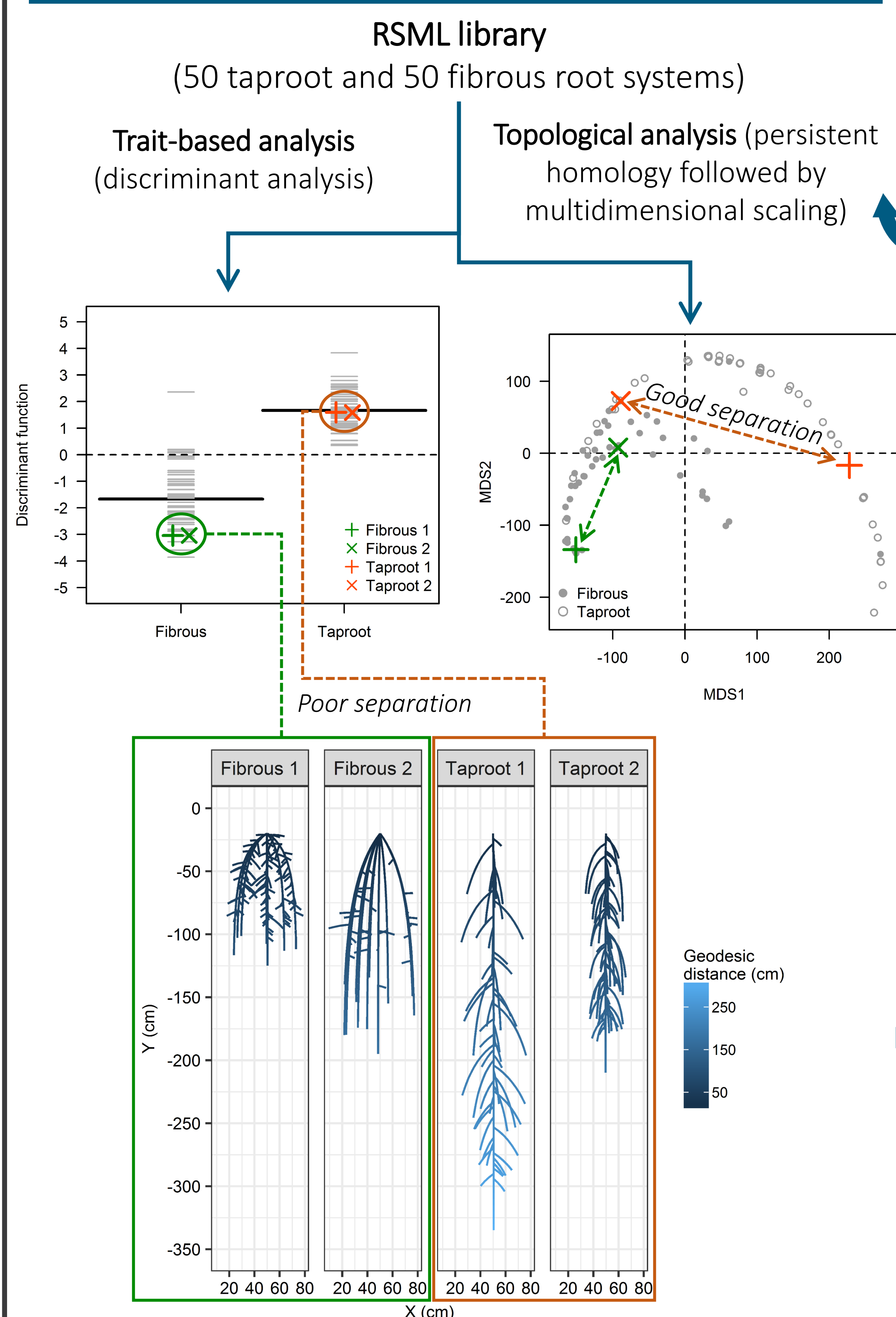
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What is archiDART?

- archiDART** is an R package developed for the automated computation of root architectural traits using Root System Markup Language (RSML; see Lobet *et al*, 2015) and Data Analysis of Root Tracings (DART, see Le Bot *et al*, 2010) files (Delory *et al*, 2016).
- Recently, **new functionalities** were developed to analyse the topology of plant root systems using Fitter indices and persistent homology (Delory *et al*, 2018).
- In this poster, we aim at:

- ✓ **Presenting the main functionalities of archiDART**
- ✓ **Showing that both geometry and topology are needed to analyse root system architectures**

Geometry and topology are complementary!



Functionalities available in archiDART

- A total of 11 functions** are available in the latest version (3.2).

Import DART and RSML files

dartToTable: import DART files

rsmlToTable: import RSML files

At the plant level

architect: computing traits describing the global root system architecture (RSA)

archidraw: plot RSA

archigrow: computing growth rates and plot RSA

latdist: lateral root length and density distribution

At the root level

root: computing traits for each individual root

trajectory: root growth directions and trajectories

Topology

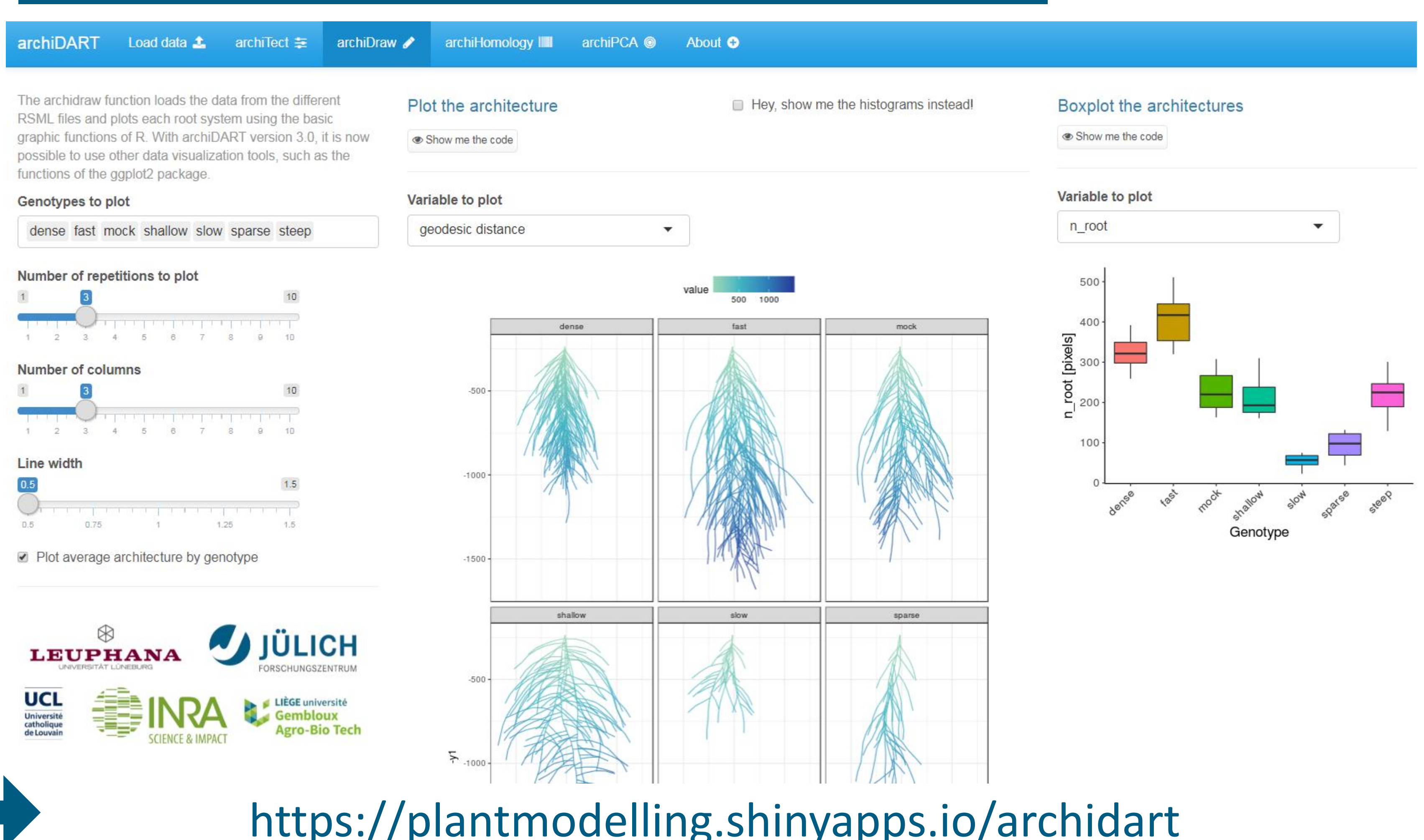
architect: computing Fitter indices

perhomology: computing persistence barcodes

plot.barcode: plot persistence barcodes

bottleneckdist: compute a pairwise bottleneck distance matrix

Try out our web app and play with archiDART!



References

- Delory BM, Baudson C, Brostaux Y, Lobet G, du Jardin P, Pagès L, Delaplace P (2016). archiDART: an R package for the automated computation of plant root architectural traits. *Plant and Soil*, 398, 351-365.
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- Le Bot J, Serra V, Fabre J, Draye X, Adamowicz S, Pagès L (2010). DART: a software to analyse root system architecture and development from captured images. *Plant and Soil*, 326, 261-273.
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