

Multiple resonant frequency dynamic tests on Arabidopsis stem segments - dataset

Oleksandr Zhdanov, Michael R. Blatt, Andrea Cammarano, Hossein Zare-Behtash and Angela Busse

Background

Two types of the mechanical tests, namely dynamic multiple resonant frequency and static three-point bending, were used to characterise Arabidopsis primary inflorescence stems. Plants were grown under identical conditions and then separated randomly into two groups for different types of the tests. Tests were carried out on two different sections of the stem taken either from its basal or tip end. The detailed description of the test setups, preparation of the stem segments and results are discussed in the paper

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Contents of the database

The database contains the results of dynamic multiple resonant frequency dynamic tests and static three-point bending tests conducted on separate segments of Arabidopsis stems. The results are presented either in the form of transfer function (dynamic tests) or load-displacement curve (static tests). In addition, the average diameter of each tested stem segment is included in this database. For the dynamic tests mass of the tested stem segment is also given.

Transfer function from dynamic tests

For the segments cut from the top and bottom parts of the Arabidopsis stems a `.csv` file is provided that contains the transfer function (unscaled amplitude over frequency range) for each tested stem segment obtained from the dynamic tests. The first column contains the frequency range in Hz (Hertz), while columns 2-41 contain values of the unscaled amplitude corresponding to each frequency value from the first column for each tested stem segment. The following naming convention is adopted `stem_segments_*.f.csv`, where `*` is replaced by the corresponding part of the Arabidopsis stem (`bottom` or `top`).

Force-displacement curves from static tests

For the segments cut from the top and bottom parts of the Arabidopsis stem .csv files are provided that contain the load-displacement curves for each tested stem segment obtained from the static three-point bending tests. For each test a separate file is provided, where the first column contains the force in N (Newtons) and the second column contains values of the displacement in mm (millimetres). The following naming convention is adopted `3pts*_5_**.csv`, where `*` is replaced by the corresponding part of the Arabidopsis stem, `b` for bottom and `t` for top, and `**` is replaced by the tested stem number (01-31). The three-point bending test failed to provide valid results for the top part segments with indices 01, 02, 04, 05, 07, 08, 11, 13, 16, 20, 21, 23, 25 and 26. Data from these tests is not included in the database.

Average diameter of the tested segments

For the segments cut from the top and bottom parts of the Arabidopsis stems separate .csv files are provided that contain the averaged diameter of the stem segment in mm (millimetres) measured directly after the dynamic vibration tests and the three-point bending tests. The following naming convention is adopted `stem_segments_**.D.csv`, where `*` is replaced by the corresponding type of the mechanical tests (`vib` for vibration or `3pts` for three-point bending) and `**` is replaced by the corresponding part of the Arabidopsis stem (`bottom` or `top`). For the top part of the stems characterised with the three-point bending test, data for the segments with indices 01, 02, 04, 05, 07, 08, 11, 13, 16, 20, 21, 23, 25 and 26 is omitted since in these cases the test failed to provide valid results.

Mass of the tested segments

For the segments cut from the top and bottom parts of the Arabidopsis stems a .csv is provided that contains the mass in g (grams) of each 50 mm long stem segment measured directly after the vibration test. The following naming convention is adopted `stem_segments*_mass.csv`, where `*` is replaced by the corresponding part of the Arabidopsis stem (`bottom` or `top`).