

Rhizotron field observations

Observations and measurements involving architecture and root growth in date palms
Phoenix dactylifera L., at villa Ormond in Sanremo (Italy)

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PROJECT

The rhizotron, built to observe root development in *Phoenix dactylifera* palms, as part of a research activity within the MOCAF network, dedicated to architectural modelling in date palms, also covering the aerial vegetation part and floral organization. The purpose of the observations consists in better understanding architecture dynamics, ontogeny and spatial distribution of the root system in *Phoenix dactylifera* palms. The results achieved through the following modeling stage, and the acquired knowledge, may be useful for agronomic purposes involving water resources management and intercropping planning.



CONSTRUCTION

The rhizotron was built in the public gardens of Villa Ormond in Sanremo (Italy).

The research focused on a mature *Phoenix dactylifera* palm, 20-30 years old, male and in good vegetation condition. A rhizotron measuring 2 m by 2 m was placed vertically at 30 cm from the trunk (see pictures). A transparent Plexiglas panel (150 x 150 cm) 8 mm thick was set vertically in contact with roots.

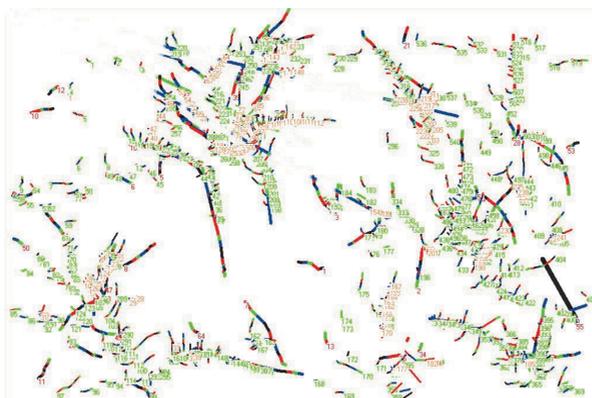
The gap between the Plexiglas panel and the natural was filled with soil and sand substrate. A transparent plastic of 1 mm thick was placed over the Plexiglas panel. In order to protect the roots from the sun during their growth, the recording sheet was covered with a 1 mm-thick black plastic sheet. Digital probe thermometers were inserted into the substrate cm 25, 75 and 150 deep, to detect any temperature differences.

Boards have been raised on the rhizotron walls around the observation window, construction was covered with a two slopes roof coated with roofing tar paper protecting it from rain. Access to rhizotron is allowed by a wood ladder.

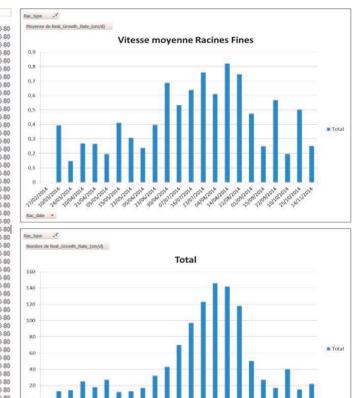
DATA COLLECTION

Data were collected every 15-20 days. The root growth transcript was drawn on the plastic sheet covering the observation window, using black, red, green and blue permanent felt-tip marker pens. Variation in colors represent a repeatable series following the observation chronology. Informations on the timeline (series number, date, color, and name of researcher) was written in a frame on the record sheet.

The first root growth data were collected by tracing, in red, the visible path followed by the young roots, from the point where they first appeared to the root cap. The information of each measurement series are listed close to the root path. RI and RII were distinguished from RIII and RIV using different thickness of markers while keeping the same color. The observation cycle began in September 2013 and last until February 2014. The sheet of root growth records was then replaced by a new transparent plastic sheet in order to continue collecting data. The data collection cycle continued until April 2015 where again, a third recording sheet was installed. All the sheets were scanned in laboratory with RhizoDigit software.



Row	Col	Series	Date	Color	Thickness	Start X	Start Y	End X	End Y
1	1	01	15/09/2013	Red	1	100	100	110	110
2	1	02	15/09/2013	Red	1	100	100	110	110
3	1	03	15/09/2013	Red	1	100	100	110	110
4	1	04	15/09/2013	Red	1	100	100	110	110
5	1	05	15/09/2013	Red	1	100	100	110	110
6	1	06	15/09/2013	Red	1	100	100	110	110
7	1	07	15/09/2013	Red	1	100	100	110	110
8	1	08	15/09/2013	Red	1	100	100	110	110
9	1	09	15/09/2013	Red	1	100	100	110	110
10	1	10	15/09/2013	Red	1	100	100	110	110
11	1	11	15/09/2013	Red	1	100	100	110	110
12	1	12	15/09/2013	Red	1	100	100	110	110
13	1	13	15/09/2013	Red	1	100	100	110	110
14	1	14	15/09/2013	Red	1	100	100	110	110
15	1	15	15/09/2013	Red	1	100	100	110	110
16	1	16	15/09/2013	Red	1	100	100	110	110
17	1	17	15/09/2013	Red	1	100	100	110	110
18	1	18	15/09/2013	Red	1	100	100	110	110
19	1	19	15/09/2013	Red	1	100	100	110	110
20	1	20	15/09/2013	Red	1	100	100	110	110
21	1	21	15/09/2013	Red	1	100	100	110	110
22	1	22	15/09/2013	Red	1	100	100	110	110
23	1	23	15/09/2013	Red	1	100	100	110	110
24	1	24	15/09/2013	Red	1	100	100	110	110
25	1	25	15/09/2013	Red	1	100	100	110	110
26	1	26	15/09/2013	Red	1	100	100	110	110
27	1	27	15/09/2013	Red	1	100	100	110	110
28	1	28	15/09/2013	Red	1	100	100	110	110
29	1	29	15/09/2013	Red	1	100	100	110	110
30	1	30	15/09/2013	Red	1	100	100	110	110
31	1	31	15/09/2013	Red	1	100	100	110	110
32	1	32	15/09/2013	Red	1	100	100	110	110
33	1	33	15/09/2013	Red	1	100	100	110	110
34	1	34	15/09/2013	Red	1	100	100	110	110
35	1	35	15/09/2013	Red	1	100	100	110	110
36	1	36	15/09/2013	Red	1	100	100	110	110
37	1	37	15/09/2013	Red	1	100	100	110	110
38	1	38	15/09/2013	Red	1	100	100	110	110
39	1	39	15/09/2013	Red	1	100	100	110	110
40	1	40	15/09/2013	Red	1	100	100	110	110
41	1	41	15/09/2013	Red	1	100	100	110	110
42	1	42	15/09/2013	Red	1	100	100	110	110
43	1	43	15/09/2013	Red	1	100	100	110	110
44	1	44	15/09/2013	Red	1	100	100	110	110
45	1	45	15/09/2013	Red	1	100	100	110	110
46	1	46	15/09/2013	Red	1	100	100	110	110
47	1	47	15/09/2013	Red	1	100	100	110	110



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