A centre of excellence for experimental plant research and plant biotechnology







A centre of excellence for experimental plant research and plant biotechnology

Research that spans from molecule to ecosystem

- One of the largest centres for experimental plant biology research in Europe
- Broad competence in plant and life sciences
- World leading in forest biotechnology
- State-of-the-art research infrastructure
- Pre-breeding and tools for tree breeding







A centre of excellence for experimental plant research and plant biotechnology







A centre of excellence for experimental plant research and plant biotechnology

Automatic tree phenotyping







Knut och Alice







A centre of excellence for experimental plant research and plant biotechnology

New Automatic Tree Phenotyping Platform



"WIWAM"

Weighing, Imaging & Watering Machines for Scientific research

SMO + VIB (Belgium)





A centre of excellence for experimental plant research and plant biotechnology

WIWAM conveyor features:

- 728 carriers, 26 belts with 28 carriers on each;
- 364 carriers in use, 364 spacers;
- Max height 2.5 meters
- Multiple experiments/treatments;
- 3 watering stations; watering: fixed volume or calculated based on the soil humidity;
- Weight recorded before/after watering;
- Height recorded;
- Two imaging cabinets: 3 RGB cameras and one FLIR camera;
- Typical experiment 8 weeks (average WT height-1.2 m)
- 4 runs/year





A centre of excellence for experimental plant research and plant biotechnology

Automatic Tree Phenotyping







A centre of excellence for experimental plant research and plant biotechnology

PIPPA – PSB Interface for Plant Phenotyping Analysis



Calendar Details Treatments ()



- Communicates with the platform and transfers the experiments created in PIPPA;
- Retrieves weighing, irrigation, height and environmental measurements;
- Raw images stored on the server are accessible to PIPPA
- Integrates analysis scripts





A centre of excellence for experimental plant research and plant biotechnology

The height measurements



The height of the plants is recorded as they pass through a light curtain placed at the entrance in the first photo booth.







A centre of excellence for experimental plant research and plant biotechnology

RGB cameras – Top, Side, Stem





The average height for T89 and SWAsp lines in a short day experiment - E11











A centre of excellence for experimental plant research and plant biotechnology



UPSC

Stem width analysis

Experiment	pot number	genotype	treatments	date in Europe/Brussels	stemWidth
E4_ME_TN_ON		6 PttPHYB RNAi 537 L12	WW_TH_1500_06-12_0-95DAS	27/05/2020 14:55:47	126.00
				29/05/2020 18:41:11	140.00
				31/05/2020 17:11:04	151.00
				04/06/2020 14:41:03	171.00
				06/06/2020 20:57:20	178.00
				08/06/2020 19:09:36	191.00
				10/06/2020 17:21:20	204.00
				12/06/2020 15:33:17	215.00
				14/06/2020 13:44:42	226.00

Stem width analysis is performed automatically on the photos taken on WIWAM Conveyor with Stem camera

The values for stem width are represented in pixels and can be downloaded as Excel csv. file



A centre of excellence for experimental plant research and plant biotechnology







A centre of excellence for experimental plant research and plant biotechnology

FLIR camera





FLIR Images of poplar trees in normal watering condition (1-3) and in different water regimes (4-6)



A centre of excellence for experimental plant research and plant biotechnology

Water added in different treatments/water regimes during the entire experiment





Acknowledgements

- Ove Nilsson (UPSC)
- Jan Karlsson (UPSC)
- SMO

Knut och Alice Wallenbergs Stiftelse

