

Table S1: Experimental design and plant size at the beginning of the experiment (mean diameter at the base, mean cross sectional area at the base of the stem (As), estimated mean leaf area (Al) and the ratio of the estimated mean leaf area to the cross sectional area (Al:As)) of the pines used in the experiment. Species and treatments with the same letter are not statistically significant at the 0.05 level.

| Species | Irrigation dose | Diameter (cm) | As (cm²) | Al (m²) | Al:As |
|----------------------|--------------------------|----------------------|----------------------------|---------------------------|--------------|
| <i>P. sylvestris</i> | 7 mm day ⁻¹ | 2.9 | 6.8 a | 1.9 | 3020.9 a |
| <i>P. halepensis</i> | 7 mm day ⁻¹ | 3.1 | 7.6 a | 1.8 | 2386.3 ab |
| <i>P. pinea</i> | 7 mm day ⁻¹ | 4.1 | 13.1 b | 1.6 | 1211.3 b |
| <i>P. sylvestris</i> | 3.5 mm day ⁻¹ | 3.0 | 7.0 a | 2.4 | 3626.8 a |
| <i>P. halepensis</i> | 3.5 mm day ⁻¹ | 2.6 | 5.4 a | 1.0 | 1881.5 ab |
| <i>P. pinea</i> | 3.5 mm day ⁻¹ | 4.4 | 15.3 b | 1.8 | 1248.3 b |

Table S2: Vegetation indices tested in *Pinus halepensis*, *P. pinea* and *P. sylvestris* plants

subjected to irrigation treatments.

| Index | Formula | Meaning | Reference |
|----------------------------------------------------------|--------------------------------------------|-----------------------------------------------|------------------------------------|
| Normalized Difference Vegetation Index (NDVI5) | $NDVI5 = (R1090 - R670) / (R1090 + R670)$ | photosynthetic capacity | Modified from Rouse et al. 1974 |
| Physiological (or Photochemical) Reflectance Index (PRI) | $PRI = (R531 - R570) / (R531 + R570)$ | light use efficiency, vegetation productivity | Garbulsky et al. 2011 |
| Normalized Difference Infrared Index (NDII) | $NDII = (R1090 - R2217) / (R1090 + R2217)$ | Vegetation water content | Modified from Hardisky et al. 1983 |
| Global Environmental Monitoring Index (GEMI) | eqn. 3 | Vegetation vigour | Pinty & Verstraete 1992 |
| SWIR1/SWIR2 | $SWIR1/SWIR2 = R1650/R2217$ | Water content | This study |
| SWIR1/Red | $SWIR1/Red = R1650/R670$ | Water content | This study |
| SWIR2/Red | $SWIR2/Red = R2217/R670$ | Water content | This study |

Table S3: Mean air temperature (T °C), rainfall (Rain mm) and air relative humidity (rH %) recorded from May to September 2012, compared with the corresponding averages of the 1981-2010 period. ETom: monthly reference Evapo-Transpiration (mm) recorded in 2012.

| MONTH | 2012 | | | | Averages 1981-2010 Period | | |
|--------------|------------------|----------------|-------------|----------------|----------------------------------|----------------|-------------|
| | mean T °C | Rain mm | rH % | ETom mm | mean T °C | Rain mm | rH % |
| May | 18.4 | 29.4 | 52.1 | 121.37 | 16.7 | 50 | 53 |
| June | 23.8 | 0.8 | 39.4 | 142.70 | 22.2 | 21 | 44 |
| July | 25.4 | 13.8 | 34.2 | 163.01 | 25.6 | 12 | 38 |
| August | 26.1 | 0.0 | 33.1 | 133.67 | 25.1 | 10 | 41 |
| September | 20.5 | 41.4 | 49.1 | 103.05 | 20.9 | 22 | 50 |

Figure S1: Daily mean meteorological data registered from June to September. Temp: temperature, °C, left axis; rH: relative humidity, %, left axis; ETo: reference evapo-transpiration, mm day⁻¹, right axis; VPD: Vapour Pressure Deficit, kPa, right axis.

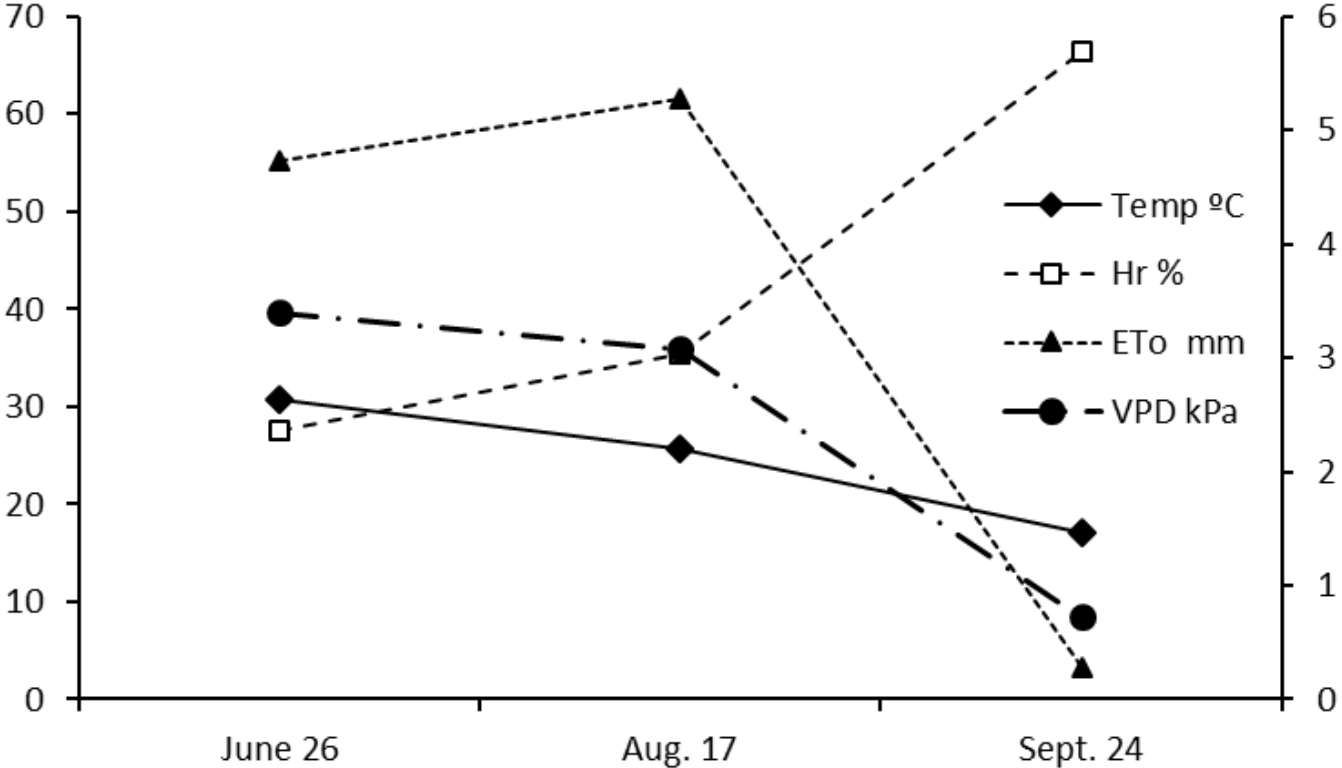


Figure S2: (a): Transpiration rate (E , $\text{mmol m}^{-2} \text{s}^{-1}$); and (b): Stomatal conductance (g_s , $\text{mmol m}^{-2} \text{s}^{-1}$) of *Pinus sylvestris*, *P. halepensis* and *P. pinea* subjected to two irrigation regimes, high irrigation (7 mm day^{-1}) and low irrigation (3.5 mm day^{-1}), measured in August 21 and October 3. Vertical bars represent 95% confidence intervals.

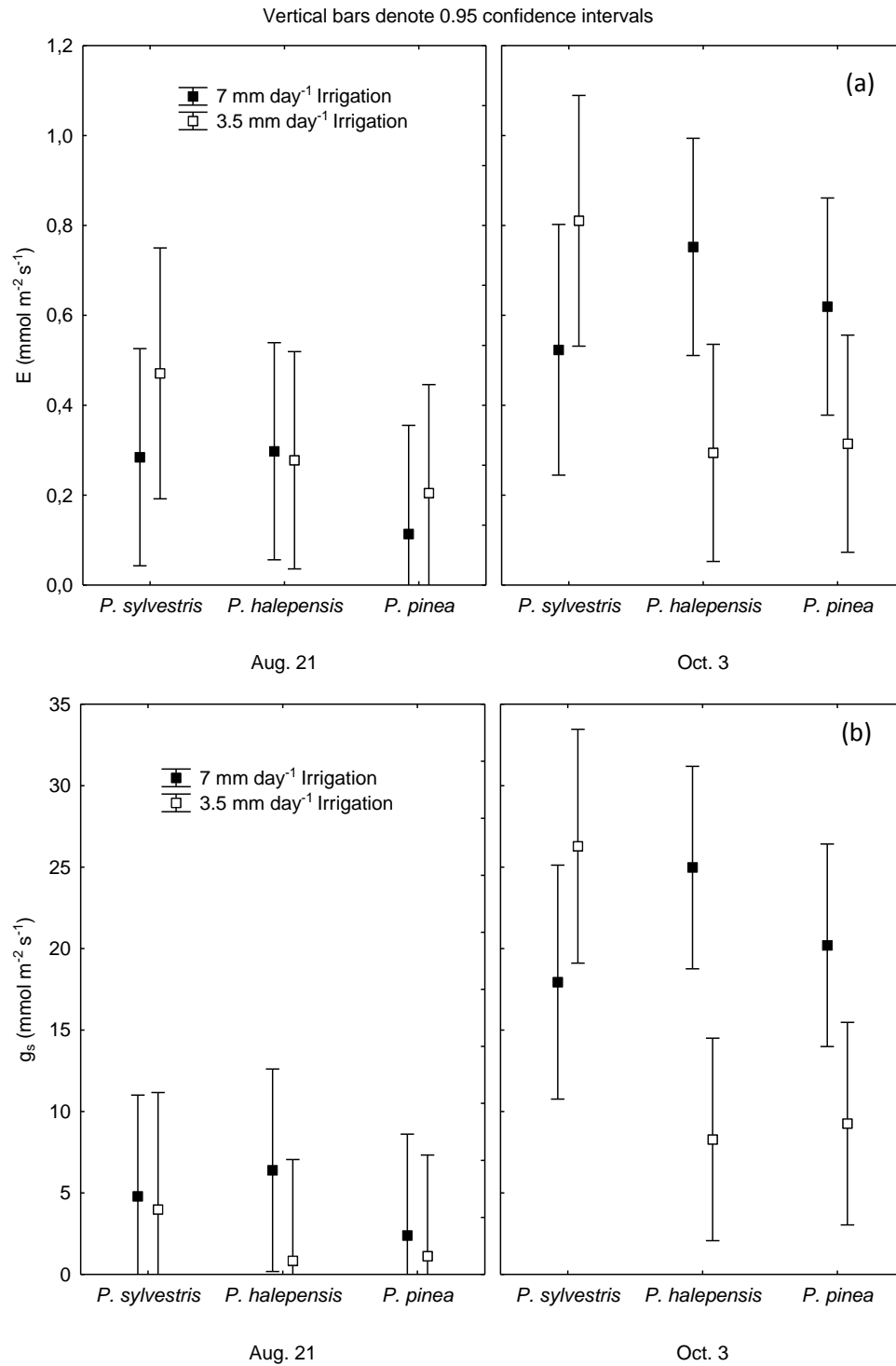


Figure S3: Mean spectral signatures of *P. sylvestris*, *P. halepensis* and *P. pinea* plants (four plants per species) subjected to high irrigation (HI: 7 mm day⁻¹) and low irrigation (LI: 3.5 mm day⁻¹).

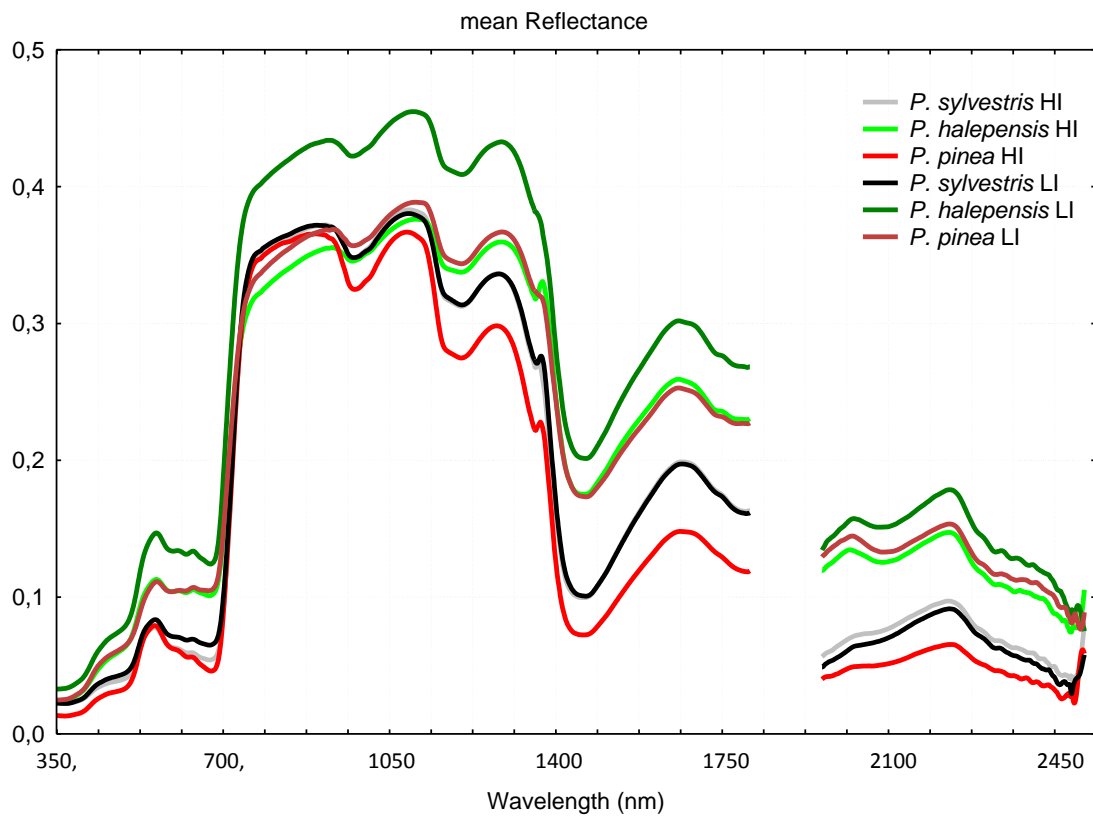


Figure S4: (a): Yellow reflectance (570 nm); (b): Red reflectance (670 nm); and (c): Near Infra-Red reflectance (NIR6, 1190 nm), of *Pinus sylvestris*, *P. halepensis* and *P. pinea* subjected to high (7 mm day⁻¹) and low (3.5 mm day⁻¹) irrigation treatments. Vertical bars represent 95% Least Significant Difference (LSD) intervals.

