*Australian Journal of Botany* 64(5), 401-416

http://dx.doi.org/10.1071/BT16059_AC

## Supplementary material

# Overcoming physical seed dormancy in priority native species for use in arid-zone restoration programs

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**Table S1.** Seed and embryo characteristics for each of 12 PY species utilised in this study (data adapted from Erickson et al. 2016a; 2016b)

| Species | Family | Seeds per gram | Embryo type | E:S ratio |
|---|---|---|---|---|
| *Acacia ancistrocarpa* | Fabaceae | 26 (range 22-31) | Investing | 1.00 |
| *Acacia bivenosa* | Fabaceae | 58 (range 31-58) | Investing | 1.00 |
| *Acacia cowleana* | Fabaceae | 105 (range 76-105) | Investing | 1.00 |
| *Acacia inaequilatera* | Fabaceae | 17 (range 17-24) | Investing | 1.00 |
| *Acacia pyrifolia* | Fabaceae | 23 (range 17-27) | Investing | 1.00 |
| *Acacia tumida* | Fabaceae | 16 (range 16-23) | Investing | 1.00 |
| *Senna glutinosa* | Fabaceae | 51 (range 51-58) | Investing | 1.00 |
| *Abutilon otocarpum* | Malvaceae | 458 | Folded | 1.59 |
| *Androcalva luteiflora* | Malvaceae | 212 (range 182-212) | Spatulate, fully developed | 0.96 |
| *Corchorus lasiocarpus* | Malvaceae | 1422 | Spatulate, fully developed | 1.22 |
| *Hibiscus haynaldii* | Malvaceae | 153 | Folded | 1.66 |
| *Sida echinocarpa* | Malvaceae | Fruits = 167, seeds = 493 | Folded | 1.90 |

**Table S2.** Species level generalised linear modelling using a binomial distribution showing the main effects of heat shock type (wet or dry), duration of treatment (2-30 minutes), and temperature exposure (40-100°C) on germination of seven Fabaceae species (*Acacia ancistrocarpa*, *A. bivenosa*, *A. cowleana*, *A. inaequilatera*, *A. pyrifolia*, *A. tumida*, and *Senna glutinosa*). Post-treatment, all seeds were germination tested for 28 d on water agar at constant 25°C and compared to un-treated control seeds. Numeric values indicate the *Dunnett* single-step adjusted *P* value significance against the un-treated seeds (ns = not significant, dash = not tested, **bold** = optimal pre-treatment(s) based of the highest GLM parameter estimates – Table S4).

| | Heat Treatment | Temperature (°C) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| ***Acacia ancistrocarpa*** | Wet 2 mins | ns | ns | ns | ns | < 0.001 | < 0.001 | **< 0.001** |
| | Wet 5 mins | ns | ns | ns | ns | < 0.001 | **< 0.001** | **< 0.001** |
| | Dry 5 mins | ns | ns | ns | ns | ns | ns | ns |
| | Dry 10 mins | ns | ns | ns | ns | ns | ns | ns |
| | Dry 30 mins | ns | ns | ns | ns | ns | ns | ns |
| ***Acacia bivenosa*** | Wet 2 mins | ns | ns | ns | < 0.001 | < 0.001 | **< 0.001** | **< 0.001** |
| | Wet 5 mins | ns | ns | 0.02 | < 0.001 | < 0.001 | **< 0.001** | **< 0.001** |
| | Dry 5 mins | ns | ns | ns | ns | ns | 0.01 | < 0.01 |
| | Dry 10 mins | ns | ns | ns | ns | ns | 0.03 | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | ns | < 0.01 | < 0.001 |
| ***Acacia cowleana*** | Wet 2 mins | ns | 0.01 | 0.002 | < 0.001 | **< 0.001** | **< 0.001** | **< 0.001** |
| | Wet 5 mins | ns | 0.01 | 0.004 | < 0.001 | **< 0.001** | < 0.001 | < 0.001 |
| | Dry 5 mins | ns | ns | ns | 0.04 | < 0.001 | < 0.001 | < 0.001 |
| | Dry 10 mins | ns | ns | ns | ns | < 0.001 | < 0.001 | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | < 0.001 | < 0.001 | < 0.001 |
| ***Acacia inaequilatera*** | Wet 2 mins | ns | ns | ns | **< 0.001** | **< 0.001** | **< 0.001** | **< 0.001** |
| | Wet 5 mins | ns | ns | < 0.001 | **< 0.001** | **< 0.001** | **< 0.001** | **< 0.001** |
| | Dry 5 mins | ns | ns | ns | ns | ns | ns | < 0.001 |
| | Dry 10 mins | ns | ns | ns | ns | 0.01 | < 0.001 | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | < 0.001 | < 0.001 | < 0.001 |
| ***Acacia pyrifolia*** | Wet 2 mins | ns | ns | < 0.001 | < 0.001 | **< 0.001** | **< 0.001** | **< 0.001** |
| | Wet 5 mins | ns | ns | < 0.001 | **< 0.001** | **< 0.001** | **< 0.001** | **< 0.001** |
| | Dry 5 mins | ns | ns | ns | ns | ns | 0.003 | < 0.001 |
| | Dry 10 mins | ns | ns | ns | ns | 0.004 | < 0.001 | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | < 0.001 | < 0.001 | < 0.001 |
| ***Acacia tumida*** | Wet 2 mins | ns | ns | 0.004 | < 0.001 | < 0.001 | **< 0.001** | **< 0.001** |
| | Wet 5 mins | ns | ns | 0.002 | < 0.001 | < 0.001 | **< 0.001** | **< 0.001** |
| | Dry 5 mins | ns | ns | ns | ns | ns | ns | < 0.001 |
| | Dry 10 mins | ns | ns | ns | ns | ns | ns | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | ns | < 0.001 | < 0.001 |
| ***Senna glutinosa*** | Wet 2 mins | - | - | - | - | - | - | - |
| | Wet 5 mins | ns | ns | 0.002 | < 0.001 | **< 0.001** | < 0.001 | ns |
| | Dry 5 mins | ns | ns | ns | ns | ns | ns | ns |
| | Dry 10 mins | - | - | - | - | - | - | - |
| | Dry 30 mins | ns | ns | ns | ns | ns | ns | ns |

**Table S3.** Species level generalised linear modelling using a binomial distribution showing the main effects of heat shock type (wet or dry), duration of treatment (2-30 minutes), and temperature exposure (40-100°C) on germination of five Malvaceae species (*Abutilon otocarpum*, *Androcalva luteiflora, Corchorus lasiocarpus*, *Hibiscus haynaldii*, and *Sida echinocarpa*). Post-treatment, all seeds were germination tested for 28 d on water agar at constant 25°C and compared to un-treated control seeds. Numeric values indicate the *Dunnett* single-step adjusted *P* value significance against the un-treated seeds (ns = not significant, dash = not tested, **bold** = optimal pre-treatment based of the highest GLM parameter estimates – Table S4).

| | Heat Treatment | Temperature (°C) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| ***Abutilon otocarpum*** | Wet 2 mins | ns | ns | ns | ns | ns | 0.006 | 0.002 |
| | Wet 5 mins | ns | ns | ns | ns | 0.04 | < 0.001 | < 0.001 |
| | Dry 5 mins | ns | ns | ns | ns | ns | < 0.001 | < 0.001 |
| | Dry 10 mins | ns | ns | ns | ns | ns | **< 0.001** | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | 0.05 | < 0.001 | 0.004 |
| ***Androcalva luteiflora*** | Wet 2 mins | ns | ns | ns | 0.002 | < 0.001 | < 0.001 | **< 0.001** |
| | Wet 5 mins | ns | ns | ns | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| | Dry 5 mins | ns | ns | ns | ns | ns | ns | 0.02 |
| | Dry 10 mins | ns | ns | ns | ns | ns | ns | 0.002 |
| | Dry 30 mins | ns | ns | ns | ns | ns | ns | < 0.001 |
| ***Corchorus lasiocarpus*** | Wet 2 mins | ns | ns | < 0.001 | < 0.001 | < 0.001 | **< 0.001** | < 0.001 |
| | Wet 5 mins | ns | ns | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| | Dry 5 mins | ns | ns | ns | ns | 0.02 | < 0.001 | < 0.001 |
| | Dry 10 mins | ns | ns | ns | ns | ns | < 0.001 | < 0.001 |
| | Dry 30 mins | ns | ns | ns | ns | ns | < 0.001 | < 0.001 |
| ***Hibiscus haynaldii*** | Wet 2 mins | ns | ns | 0.01 | < 0.001 | < 0.001 | < 0.001 | 0.007 |
| | Wet 5 mins | ns | ns | 0.007 | **< 0.001** | < 0.001 | < 0.001 | ns |
| | Dry 5 mins | ns | ns | ns | 0.001 | < 0.001 | < 0.001 | 0.003 |
| | Dry 10 mins | - | - | - | - | - | - | - |
| | Dry 30 mins | ns | ns | ns | 0.02 | < 0.001 | < 0.001 | 0.04 |
| ***Sida echinocarpa*** | Wet 2 mins | ns | ns | ns | ns | ns | ns | ns |
| | Wet 5 mins | ns | ns | ns | ns | ns | ns | ns |
| | Dry 5 mins | ns | ns | ns | ns | ns | ns | ns |
| | Dry 10 mins | ns | ns | ns | ns | ns | ns | ns |
| | Dry 30 mins | ns | ns | ns | ns | ns | **0.04** | ns |

**Table S4.** Generalised linear model parameter estimates for all statistically significant heat treatments when compared against the untreated control seeds. Parameter estimates are ranked within species from highest to lowest to indicate the optimal pre-treatment to maximise germination (above dashed line for each species, or bold values in Table S1 and S2). Confidence intervals (95%) depict the lower and upper limits of each treatment.

| Species | Heat Treatment | Temperature (°C) | Parameter Estimate | Confidence Limits (95%) | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| ***Acacia ancistrocarpa*** | Wet 2 mins | 100 | 6.28 | 2.89 | 9.66 |
| | Wet 5 mins | 90 | 6.28 | 2.89 | 9.66 |
| | Wet 5 mins | 100 | 6.28 | 2.89 | 9.66 |
| | Wet 2 mins | 90 | 5.57 | 2.98 | 8.15 |
| | Wet 5 mins | 80 | 4.07 | 2.30 | 5.84 |
| | Wet 2 mins | 80 | 3.81 | 2.10 | 5.51 |
| ***Acacia bivenosa*** | Wet 2 mins | 90 | 9.19 | 5.09 | 13.29 |
| | Wet 2 mins | 100 | 9.19 | 5.09 | 13.29 |
| | Wet 5 mins | 90 | 9.19 | 5.09 | 13.29 |
| | Wet 5 mins | 100 | 9.19 | 5.09 | 13.29 |
| | Wet 5 mins | 80 | 7.35 | 4.20 | 10.49 |
| | Wet 2 mins | 80 | 7.04 | 3.95 | 10.13 |
| | Wet 5 mins | 70 | 5.54 | 2.57 | 8.51 |
| | Dry 30 mins | 100 | 5.21 | 2.25 | 8.18 |
| | Wet 2 mins | 70 | 4.84 | 1.88 | 7.79 |
| | Dry 10 mins | 100 | 4.68 | 1.72 | 7.63 |
| | Dry 30 mins | 90 | 4.02 | 1.06 | 6.98 |
| | Dry 5 mins | 100 | 3.93 | 0.97 | 6.90 |
| | Dry 5 mins | 90 | 3.44 | 0.46 | 6.42 |
| | Wet 5 mins | 60 | 3.33 | 0.35 | 6.31 |
| | Dry 10 mins | 90 | 3.15 | 0.15 | 6.14 |

**Table S4.** (continued)

| Species | Heat Treatment | Temperature (°C) | Parameter Estimate | Confidence Limits | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| ***Acacia cowleana*** | Wet 2 mins | 80 | 8.49 | 4.94 | 12.04 |
| | Wet 2 mins | 90 | 8.49 | 4.94 | 12.04 |
| | Wet 2 mins | 100 | 8.49 | 4.94 | 12.04 |
| | Wet 5 mins | 80 | 8.49 | 4.94 | 12.04 |
| | Wet 5 mins | 90 | 7.37 | 4.71 | 10.03 |
| | Wet 5 mins | 100 | 7.37 | 4.71 | 10.03 |
| | Dry 30 mins | 100 | 6.33 | 4.02 | 8.65 |
| | Dry 5 mins | 100 | 6.21 | 3.92 | 8.49 |
| | Dry 10 mins | 100 | 5.98 | 3.73 | 8.24 |
| | Wet 5 mins | 70 | 5.63 | 3.42 | 7.83 |
| | Dry 30 mins | 90 | 4.84 | 2.68 | 6.99 |
| | Wet 2 mins | 70 | 4.79 | 2.64 | 6.94 |
| | Dry 10 mins | 90 | 4.79 | 2.64 | 6.94 |
| | Dry 5 mins | 90 | 4.09 | 1.96 | 6.23 |
| | Dry 30 mins | 80 | 3.81 | 1.68 | 5.95 |
| | Dry 10 mins | 80 | 3.49 | 1.35 | 5.62 |
| | Dry 5 mins | 80 | 3.27 | 1.13 | 5.42 |
| | Wet 2 mins | 60 | 2.90 | 0.74 | 5.05 |
| | Wet 5 mins | 60 | 2.74 | 0.58 | 4.90 |
| | Wet 2 mins | 50 | 2.51 | 0.33 | 4.68 |
| | Wet 5 mins | 50 | 2.51 | 0.33 | 4.68 |
| | Dry 5 mins | 70 | 2.23 | 0.03 | 4.43 |
| ***Acacia inaequilatera*** | Wet 2 mins | 70 | 6.41 | 3.19 | 9.63 |
| | Wet 2 mins | 80 | 6.41 | 3.19 | 9.63 |
| | Wet 2 mins | 90 | 6.41 | 3.19 | 9.63 |
| | Wet 2 mins | 100 | 6.41 | 3.19 | 9.63 |
| | Wet 5 mins | 70 | 6.41 | 3.19 | 9.63 |
| | Wet 5 mins | 80 | 6.41 | 3.19 | 9.63 |
| | Wet 5 mins | 90 | 6.41 | 3.19 | 9.63 |
| | Wet 5 mins | 100 | 6.41 | 3.19 | 9.63 |
| | Dry 30 mins | 100 | 3.55 | 2.31 | 4.79 |
| | Dry 10 mins | 100 | 2.39 | 1.30 | 3.49 |
| | Dry 30 mins | 90 | 2.22 | 1.13 | 3.31 |
| | Dry 10 mins | 90 | 1.82 | 0.74 | 2.89 |
| | Dry 30 mins | 80 | 1.82 | 0.74 | 2.89 |
| | Dry 5 mins | 100 | 1.70 | 0.62 | 2.78 |
| | Wet 5 mins | 60 | 1.66 | 0.57 | 2.74 |
| | Dry 10 mins | 80 | 1.24 | 0.15 | 2.33 |

**Table S4.** (Continued)

| Species | Heat Treatment | Temperature (°C) | Parameter Estimate | Confidence Limits | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| ***Acacia pyrifolia*** | Wet 2 mins | 80 | 7.77 | 4.45 | 11.10 |
| | Wet 2 mins | 90 | 7.77 | 4.45 | 11.10 |
| | Wet 2 mins | 100 | 7.77 | 4.45 | 11.10 |
| | Wet 5 mins | 70 | 7.77 | 4.45 | 11.10 |
| | Wet 5 mins | 80 | 7.77 | 4.45 | 11.10 |
| | Wet 5 mins | 90 | 7.77 | 4.45 | 11.10 |
| | Wet 5 mins | 100 | 7.77 | 4.45 | 11.10 |
| | Wet 2 mins | 70 | 4.84 | 3.13 | 6.54 |
| | Dry 30 mins | 90 | 3.18 | 1.56 | 4.80 |
| | Dry 30 mins | 100 | 2.98 | 1.36 | 4.60 |
| | Dry 10 mins | 100 | 2.90 | 1.28 | 4.52 |
| | Dry 30 mins | 80 | 2.86 | 1.23 | 4.48 |
| | Wet 5 mins | 60 | 2.73 | 1.11 | 4.35 |
| | Dry 5 mins | 100 | 2.65 | 1.02 | 4.27 |
| | Dry 10 mins | 90 | 2.56 | 0.93 | 4.19 |
| | Wet 2 mins | 60 | 2.33 | 0.69 | 3.97 |
| | Dry 5 mins | 90 | 2.13 | 0.48 | 3.78 |
| | Dry 10 mins | 80 | 2.08 | 0.43 | 3.73 |
| ***Acacia tumida*** | Wet 2 mins | 90 | 7.54 | 4.15 | 10.93 |
| | Wet 2 mins | 100 | 7.54 | 4.15 | 10.93 |
| | Wet 5 mins | 90 | 7.54 | 4.15 | 10.93 |
| | Wet 5 mins | 100 | 7.54 | 4.15 | 10.93 |
| | Wet 2 mins | 80 | 4.94 | 3.24 | 6.63 |
| | Wet 5 mins | 80 | 4.60 | 2.97 | 6.24 |
| | Wet 5 mins | 70 | 4.04 | 2.47 | 5.62 |
| | Dry 30 mins | 100 | 3.94 | 2.37 | 5.51 |
| | Wet 2 mins | 70 | 3.89 | 2.33 | 5.45 |
| | Dry 10 mins | 100 | 2.82 | 1.29 | 4.36 |
| | Dry 5 mins | 100 | 2.50 | 0.96 | 4.04 |
| | Dry 30 mins | 90 | 2.50 | 0.96 | 4.04 |
| | Wet 5 mins | 60 | 2.00 | 0.44 | 3.56 |
| | Wet 2 mins | 60 | 1.95 | 0.38 | 3.52 |
| ***Senna glutinosa*** | Wet 5 mins | 80 | 4.55 | 1.46 | 7.65 |
| | Wet 5 mins | 70 | 3.84 | 1.57 | 6.12 |
| | Wet 5 mins | 90 | 3.11 | 1.39 | 4.84 |
| | Wet 5 mins | 60 | 1.86 | 0.62 | 3.10 |

**Table S4.** (Continued)

| Species | Heat Treatment | Temperature (°C) | Parameter Estimate | Confidence Limits | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| ***Abutilon otocarpum*** | Dry 10 mins | 90 | 4.80 | 1.86 | 7.74 |
| | Wet 5 mins | 100 | 4.64 | 1.70 | 7.58 |
| | Dry 5 mins | 90 | 4.48 | 1.54 | 7.42 |
| | Dry 10 mins | 100 | 4.48 | 1.54 | 7.42 |
| | Wet 5 mins | 90 | 4.39 | 1.45 | 7.34 |
| | Dry 5 mins | 100 | 4.39 | 1.45 | 7.34 |
| | Dry 30 mins | 90 | 4.39 | 1.45 | 7.34 |
| | Wet 2 mins | 100 | 4.02 | 1.08 | 6.97 |
| | Dry 30 mins | 100 | 3.75 | 0.80 | 6.70 |
| | Wet 2 mins | 90 | 3.65 | 0.70 | 6.60 |
| | Wet 5 mins | 80 | 3.08 | 0.10 | 6.06 |
| | Dry 30 mins | 80 | 3.01 | 0.03 | 5.99 |
| ***Androcalva luteiflora*** | Wet 2 mins | 100 | 7.04 | 3.93 | 10.14 |
| | Wet 5 mins | 100 | 6.41 | 3.38 | 9.44 |
| | Wet 5 mins | 90 | 6.25 | 3.23 | 9.27 |
| | Wet 2 mins | 90 | 5.86 | 2.86 | 8.86 |
| | Wet 2 mins | 80 | 5.75 | 2.76 | 8.74 |
| | Wet 5 mins | 80 | 5.49 | 2.51 | 8.47 |
| | Dry 30 mins | 100 | 4.72 | 1.74 | 7.69 |
| | Wet 5 mins | 70 | 4.35 | 1.38 | 7.33 |
| | Wet 2 mins | 70 | 4.02 | 1.04 | 7.00 |
| | Dry 10 mins | 100 | 3.93 | 0.95 | 6.91 |
| | Dry 5 mins | 100 | 3.27 | 0.27 | 6.27 |
| ***Corchorus lasiocarpus*** | Wet 2 mins | 90 | 7.77 | 4.39 | 11.15 |
| | Wet 2 mins | 80 | 7.07 | 4.44 | 9.70 |
| | Wet 5 mins | 70 | 6.65 | 4.32 | 8.99 |
| | Wet 2 mins | 70 | 5.93 | 3.95 | 7.91 |
| | Wet 5 mins | 80 | 5.93 | 3.95 | 7.91 |
| | Wet 2 mins | 100 | 5.27 | 3.46 | 7.08 |
| | Wet 5 mins | 90 | 5.08 | 3.31 | 6.85 |
| | Dry 30 mins | 90 | 4.56 | 2.86 | 6.27 |
| | Dry 5 mins | 100 | 4.07 | 2.41 | 5.74 |
| | Wet 5 mins | 60 | 3.75 | 2.10 | 5.41 |
| | Dry 10 mins | 100 | 3.67 | 2.02 | 5.32 |
| | Dry 30 mins | 100 | 3.42 | 1.77 | 5.07 |
| | Dry 10 mins | 90 | 3.22 | 1.57 | 4.86 |
| | Wet 2 mins | 60 | 3.18 | 1.53 | 4.82 |
| | Wet 5 mins | 100 | 2.98 | 1.33 | 4.62 |
| | Dry 5 mins | 90 | 2.28 | 0.62 | 3.95 |
| | Dry 5 mins | 80 | 1.85 | 0.15 | 3.55 |

**Table S4.** (Continued)

| Species | Heat Treatment | Temperature (°C) | Parameter Estimate | Confidence Limits | |
|---|---|---|---|---|---|
| | | | | Lower | Upper |
| ***Corchorus lasiocarpus*** | Wet 2 mins | 90 | 7.77 | 4.39 | 11.15 |
| | Wet 2 mins | 80 | 7.07 | 4.44 | 9.70 |
| | Wet 5 mins | 70 | 6.65 | 4.32 | 8.99 |
| | Wet 2 mins | 70 | 5.93 | 3.95 | 7.91 |
| | Wet 5 mins | 80 | 5.93 | 3.95 | 7.91 |
| | Wet 2 mins | 100 | 5.27 | 3.46 | 7.08 |
| | Wet 5 mins | 90 | 5.08 | 3.31 | 6.85 |
| | Dry 30 mins | 90 | 4.56 | 2.86 | 6.27 |
| | Dry 5 mins | 100 | 4.07 | 2.41 | 5.74 |
| | Wet 5 mins | 60 | 3.75 | 2.10 | 5.41 |
| | Dry 10 mins | 100 | 3.67 | 2.02 | 5.32 |
| | Dry 30 mins | 100 | 3.42 | 1.77 | 5.07 |
| | Dry 10 mins | 90 | 3.22 | 1.57 | 4.86 |
| | Wet 2 mins | 60 | 3.18 | 1.53 | 4.82 |
| | Wet 5 mins | 100 | 2.98 | 1.33 | 4.62 |
| | Dry 5 mins | 90 | 2.28 | 0.62 | 3.95 |
| | Dry 5 mins | 80 | 1.85 | 0.15 | 3.55 |
| ***Hibiscus haynaldii*** | Wet 5 mins | 70 | 5.46 | 2.61 | 8.32 |
| | Wet 2 mins | 80 | 5.27 | 2.42 | 8.11 |
| | Wet 2 mins | 70 | 5.18 | 2.34 | 8.02 |
| | Dry 5 mins | 80 | 5.18 | 2.34 | 8.02 |
| | Dry 30 mins | 80 | 5.01 | 2.18 | 7.84 |
| | Wet 2 mins | 90 | 4.85 | 2.02 | 7.67 |
| | Wet 5 mins | 90 | 4.70 | 1.88 | 7.52 |
| | Wet 5 mins | 80 | 4.28 | 1.47 | 7.09 |
| | Dry 5 mins | 90 | 4.28 | 1.47 | 7.09 |
| | Dry 30 mins | 90 | 4.21 | 1.40 | 7.02 |
| | Dry 5 mins | 70 | 4.08 | 1.27 | 6.89 |
| | Dry 5 mins | 100 | 3.81 | 1.00 | 6.62 |
| | Wet 2 mins | 100 | 3.53 | 0.71 | 6.35 |
| | Wet 5 mins | 60 | 3.53 | 0.71 | 6.35 |
| | Dry 30 mins | 70 | 3.38 | 0.29 | 6.48 |
| | Wet 2 mins | 60 | 3.31 | 0.48 | 6.13 |
| | Dry 30 mins | 100 | 2.89 | 0.04 | 5.73 |
| ***Sida echinocarpa*** | Dry 30 mins | 90 | 1.41 | 0.06 | 2.76 |