**Table S1.** P values obtained from the ANOVA performed to evaluate the possible differences between the two experimental repetitions.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Experiment | Species | Variable | Treatment | Experimental  repetition | Interaction | Replicate |
| Burial depth | *C. cyanus* | Seedling emergence | < 0.0001 | 0.6334 | 0.6613 | 0.7927 |
|  |  | p10 | 0.0001 | 0.2719 | 0.5841 | 0.5883 |
|  |  | p50 | 0.0060 | 0.1157 | 0.5906 | 0.7428 |
|  |  | p90 | 0.1199 | 0.4019 | 0.6934 | 0.9212 |
|  | *C. diluta* | Seedling emergence | 0.0017 | 0.7718 | 0.9125 | 0.8675 |
|  |  | p10 | 0.0014 | 0.8909 | 0.3292 | 0.4644 |
|  |  | p50 | 0.4928 | 0.8431 | 0.6904 | 0.5584 |
|  |  | p90 | 0.3551 | 0.9805 | 0.9146 | 0.7187 |
|  | *G. segetum* | Seedling emergence |  | 0.2800 |  | 0.2260 |
|  |  | p10 |  | 0.9020 |  | 0.2830 |
|  |  | p50 |  | 0.4770 |  | 0.2640 |
|  |  | p90 |  | 0.2320 |  | 0.3380 |
|  | *L. rigidum* | Seedling emergence | < 0.0001 | 0.2415 | 0.0739 | 0.5933 |
|  |  | p10 | < 0.0001 | 0.7453 | 0.2599 | 0.7975 |
|  |  | p50 | < 0.0001 | 0.5036 | 0.9402 | 0.2780 |
|  |  | p90 | < 0.0001 | 0.5080 | 0.9033 | 0.6518 |
|  | *P. rhoeas* | Seedling emergence | 0.0015 | 0.8765 | 0.2295 | 0.2322 |
|  |  | p10 | 0.0048 | 0.2293 | 0.5718 | 0.4428 |
|  |  | p50 | 0.1766 | 0.8273 | 0.5642 | 0.4266 |
|  |  | p90 | 0.5062 | 0.5383 | 0.8189 | 0.4411 |
| Soil disturbance | *C. diluta* | Seedling emergence | 0.0020 | 0.6497 | 0.8439 | 0.8553 |
|  |  | p10 | 0.1566 | 0.7140 | 0.9208 | 0.8530 |
|  |  | p50 | 0.0025 | 0.5136 | 0.3328 | 0.9051 |
|  |  | p90 | < 0.0001 | 0.8397 | 0.8400 | 0.0608 |
|  | *G. segetum* | Seedling emergence | 0.0004 | 0.7134 | 0.9373 | 0.9964 |
|  |  | p10 | 0.0058 | 0.4710 | 0.8140 | 0.6820 |
|  |  | p50 | 0.0001 | 0.9885 | 0.2495 | 0.6409 |
|  |  | p90 | 0.0852 | 0.2035 | 0.9837 | 0.4512 |
|  | *L. rigidum* | Seedling emergence | 0.9383 | 0.8999 | 0.4283 | 0.3470 |
|  |  | p10 | 0.5620 | 0.2680 | 0.1370 | 0.2646 |
|  |  | p50 | 0.1547 | 0.9141 | 0.8949 | 0.5211 |
|  |  | p90 | 0.3706 | 0.2680 | 0.4399 | 0.5174 |
|  | *P. rhoeas* | Seedling emergence | 0.0001 | 0.9295 | 0.2706 | 0.9420 |
|  |  | p10 | 0.1579 | 0.5576 | 0.3022 | 0.7376 |
|  |  | p50 | < 0.0001 | 0.8339 | 0.6335 | 0.7966 |
|  |  | p90 | < 0.0001 | 0.5533 | 0.9150 | 0.8146 |

*Centaurea cyanus* was not included in the soil disturbance experiment due to limited seed availability. The treatment’s P values for *G. segetum* in burial depth experiment are not shown because this species only emerged at 2 cm, therefore only a comparison between experimental repetitions was performed.

**Table S2.** ANOVA requirements for each species and variable at both experiments.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Species | Variable | Burial depth Experiment | | |  | Soil disturbance Experiment | | |
| Normality1 | Homocerasticity2 | T3 |  | Normality2 | Homocerasticity3 | t4 |
| *C. cyanus* | Seedling emergence | 0.2696 | 0.1182 | *NA* |  |  |  |  |
|  | p10 | 0.1133 | 0.0527 | 0.5 |  |  |  |  |
|  | p50 | 0.1785 | 0.1154 | 0.1 |  |  |  |  |
|  | p90 | 0.0819 | 0.5044 | 2 |  |  |  |  |
| *C. diluta* | Seedling emergence | 0.0783 | 0.3713 | *NA* |  | 0.2003 | 0.484 | 0.1 |
|  | p10 | 0.1659 | 0.9025 | 0.5 |  | 0.4639 | 0.7925 | -1 |
|  | p50 | 0.4826 | 0.3189 | *NA* |  | 0.7537 | 0.1533 | *NA* |
|  | p90 | 0.1571 | 0.4799 | *NA* |  | 0.0001 | 0.0678 | -0.1 |
| *G. segetum* | Seedling emergence | 0.4058 | 0.5236 | 0.5 |  | 0.3206 | 0.1015 | *NA* |
|  | p10 | 0.7137 | 0.1277 | 0.1 |  | 0.26 | 0.1992 | *NA* |
|  | p50 | 0.1243 | 0.9108 | *NA* |  | 0.1196 | 0.3063 | 2 |
|  | p90 | 0.1011 | 0.7618 | *NA* |  | 0.3273 | 0.2776 | *NA* |
| *L. rigidum* | Seedling emergence | 0.8716 | 0.5216 | *NA* |  | 0.9217 | 0.6247 | *NA* |
|  | p10 | 0.8273 | 0.1235 | 0.5 |  | 0.002 | 0.2953 | -0.1 |
|  | p50 | 0.0952 | 0.1738 | 0.1 |  | 0.0891 | 0.6758 | 2 |
|  | p90 | 0.1582 | 0.069 | *NA* |  | 0.0739 | 0.9926 | -1 |
| *P. rhoeas* | Seedling emergence | 0.2246 | 0.3242 | 0.5 |  | 0.985 | 0.183 | *NA* |
|  | p10 | 0.9586 | 0.2693 | *NA* |  | 0.0001 | 0.4688 | -0.1 |
|  | p50 | 0.822 | 0.4891 | 0.5 |  | 0.0003 | 0.8495 | -0.1 |
|  | p90 | 0.9503 | 0.6086 | -1 |  | 0.0014 | 0.6298 | -0.1 |

1 Values of Shapiro-Wilks test

2 Values of Levene test

3 Values which data was raised to meet the ANOVA requirements.

*Centaurea cyanus* was not included in the soil disturbance experiment due to limited seed availability.