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GERMINATION REPORT

The aim of this work was to determine the benefits of Fertum on the speed of germination, germination numbers and the overall health of the seedlings. This was measured in comparison to Seasol treated seeds and Untreated Control seeds.

The trial was carried out utilising commercially available seed raising mix (Debco) and seeds (Cherry Tomato, Marigold and Petunia). The Debco seed raising mix was selected due to it's composition which has minimal additives.

The three treatments were set-up in 72-well seedling trays. For each treatment nine seedling trays were created so that there were three replicates of each plant species. The products were applied as recommended by the manufacturers.

The trays were examined on a daily basis for the first fourteen days. Thereafter the trays were monitored in order to observe development.

GERMINATION RATE

Overall Fertum improved the rate of germination of all three species (Figures 1-3) above that of the Untreated Control. To a smaller and less consistent extent Seasol also improved the rate of germination above that of the Untreated Control. Generally the rate of Fertum treated seeds was higher than not only the Untreated Control but also the Seasol treated seeds.

In the case of the Cherry Tomatoes and the Petunias both products increased the final number of germinated seeds; statistically this was a significant improvement (Table 1).

The biggest difference noted between the germination of Fertum treated seeds and the Seasol treated seeds was the consistency of the results. Fertum consistently performed well; this can be visualised in Figures 1-3 and is supported by the statistical analysis (Table 1). In comparison the Seasol treated seeds at times were not statistically different to the Fertum treated seeds but at other times they were not statistically different to the Untreated Control seeds.

The increased rate of germination with Fertum treated seeds translated to faster seedling development (Figure 4). This is logical as the sooner seedlings emerge the more time that they have to develop in comparison to seedlings which are slower to emerge. The inconsistent germination results observed with seeds treated by Seasol also persisted with the development of the seedlings (Figure 4). In any plant growth studies there is likely to be some natural plant variation, however, in the case of the Seasol treated plants many were equivalent of the Untreated Control and many were similar to Fertum treated seedlings thereby displaying a higher degree of variation than seen with the other treatments.

Figure 1: Germination rate of Cherry Tomato seeds.

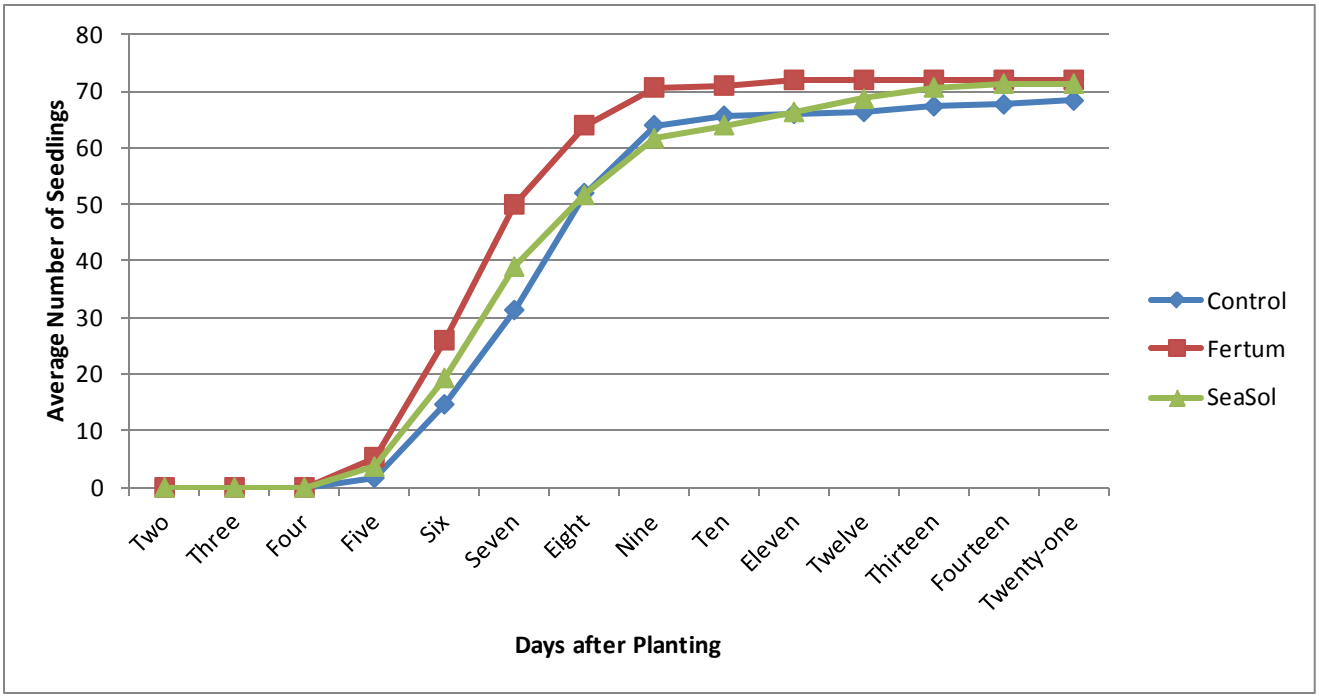

Figure 2: Germination rate of Marigold seeds.

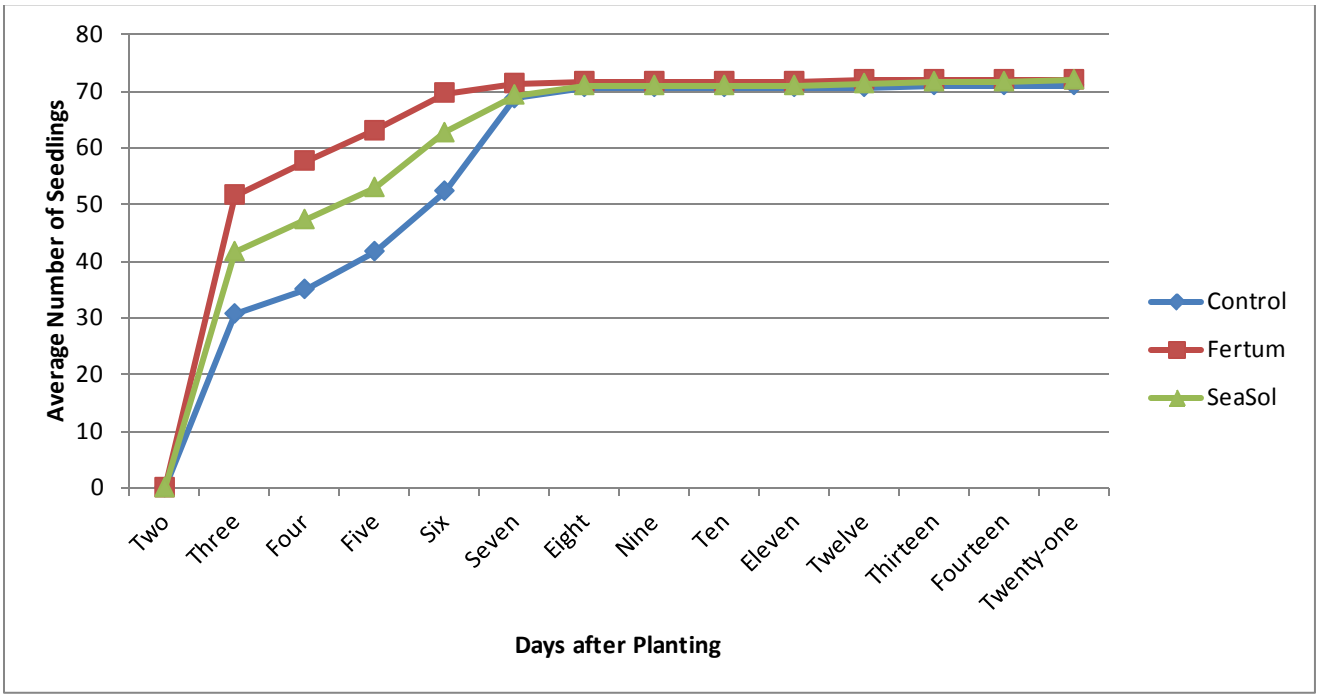

Figure 3: Germination rate of Petunia seeds.

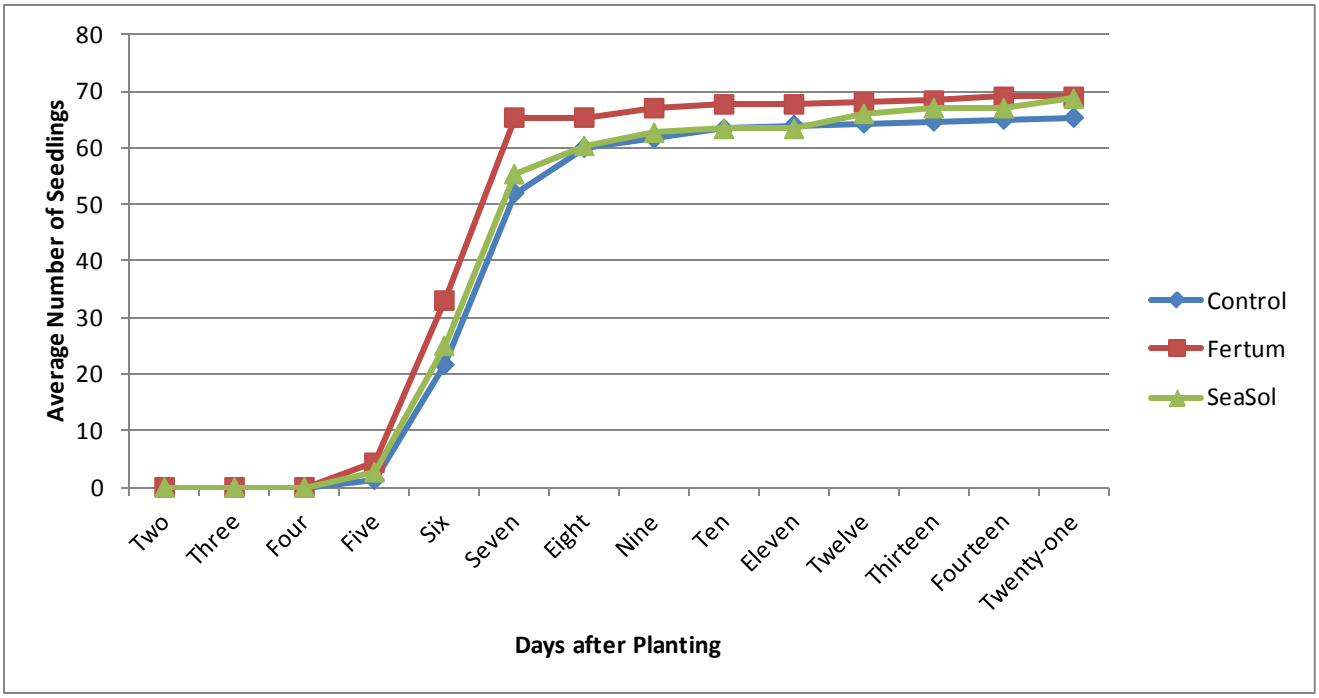

Table 1: Daily statistical analysis (one-way analysis of variance) between treatments. For each plant species on each day treatments with the same letter are not significantly different*.

Day	Cherry Tomato		Marigold		Petunia	
3	No significant difference		Control Seasol Fertum	a ab b	No significant difference	
4	No significant difference		Control Seasol Fertum	a b b	No significant difference	
5	Control Seasol Fertum	a ab b	Control Seasol Fertum	a ab b	Control Seasol Fertum	a a b
6	Control Seasol Fertum	a ab b	Control Seasol Fertum	a b b	Control Seasol Fertum	a a b
7	Control Seasol Fertum	a ab b	Control Seasol Fertum	a ab b	Control Seasol Fertum	a a b
8	Control Seasol Fertum	a a b	No significant difference		Control Seasol Fertum	a a b
9	Control Seasol Fertum	a a b	No significant difference		Control Seasol Fertum	a a b
10	Control Seasol Fertum	a a b	No significant difference		Control Seasol Fertum	a a b
11	Control Seasol Fertum	a a b	No significant difference		Control Seasol Fertum	a a b
12	Control Seasol Fertum	a a b	Control Seasol Fertum	a ab b	Control Seasol Fertum	a a b
13	Control Seasol Fertum	a b b	Control Seasol Fertum	a ab b	Control Seasol Fertum	a b b
14	Control Seasol Fertum	a b b	Control Seasol Fertum	a ab b	Control Seasol Fertum	a b b
21	Control Seasol Fertum	a b b	No significant difference		Control Seasol Fertum	a b b

* For example Marigold on day 3: Control is not significantly different to Seasol (they are both given the letter 'a') and Seasol is not significantly different to Fertum (they are both given the letter 'b'). The Control and Fertum are significantly different to each other therefore they do not have a letter in common.

Figure 4: Images showing variation in Petunia development between treatments (photos all taken on same day).

Control

Seasol

Fertum

DEVELOPMENT OF SEEDLINGS

At transplantation representative seedlings were selected, height was measured before the roots washed and the composite parts (stem and roots) were separated, weighed, oven-dried and re-weighed. This information was utilised to comment on the impact of treatments (Seasol and Fertum) on seedling development.

Application of either Seasol or Fertum improved the height of both the Cherry Tomatoes and Marigolds (Figures 5, 6, 11 and 12). Statistical analysis proved that both products significantly increased plant height compared to the Untreated Control. Statistical analysis also showed that the height of seedlings treated with Fertum was significantly better than plants treated with Seasol. The treatments therefore ranked in order from worst to best as Untreated Control, Seasol and Fertum. This trend was also exhibited in the dry plant stems and roots of the Cherry Tomatoes (Figure 7). The variation between treatments in terms of dry plant stems and roots of the Marigolds differed from this trend (Figure 8). Statistical analysis determined that Seasol treated Marigold seedlings did not differ significantly from the Untreated Control in terms of dry stem and dry root weights. In comparison the Fertum treated seedlings were significantly better than either the Seasol treated or Untreated Control Marigold seedlings.

In addition to the visible improved top growth there was considerable improvement in root development with the addition of Fertum (Figures 9 and 10). This would translate to healthier seedling development and is likely to result in enhanced growth at transplantation.

Figure 5: Average cherry tomato height at transplantation. Error bars represent standard deviation.

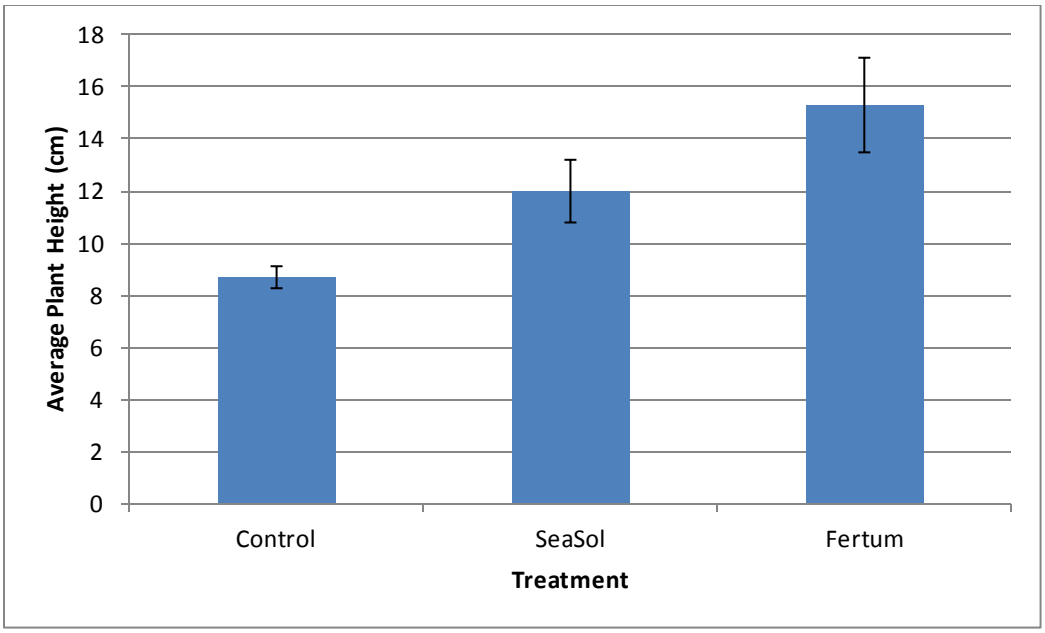

Figure 6: Average marigold height at transplantation. Error bars represent standard deviation.

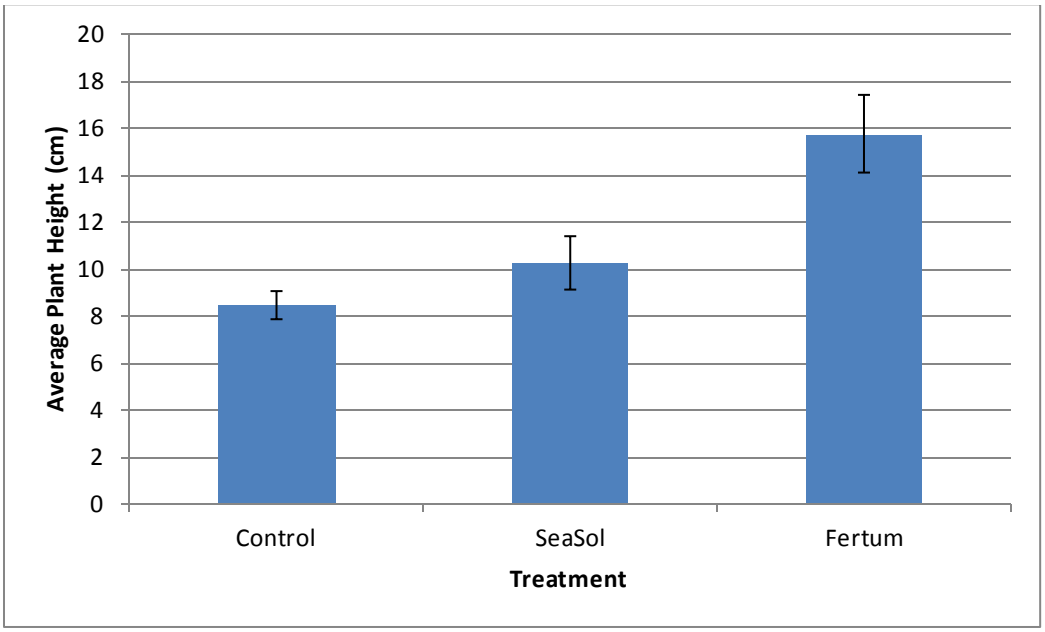

Figure 7: Average cherry tomato root and stem dry weight at transplantation. Error bars represent standard deviation.

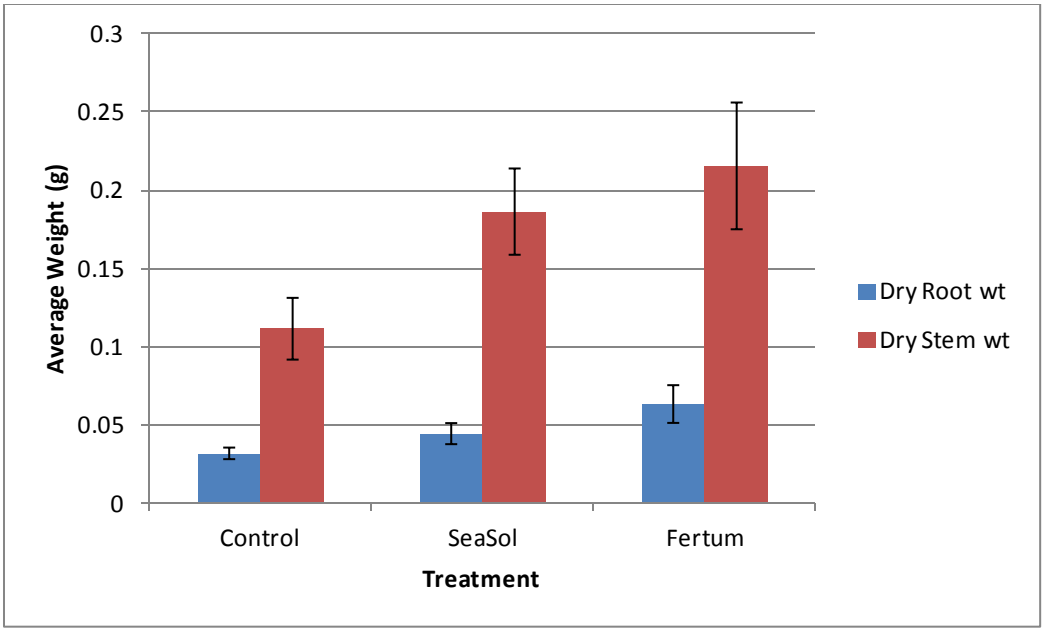

Figure 8: Average marigold root and stem dry weight at transplantation. Error bars represent standard deviation.

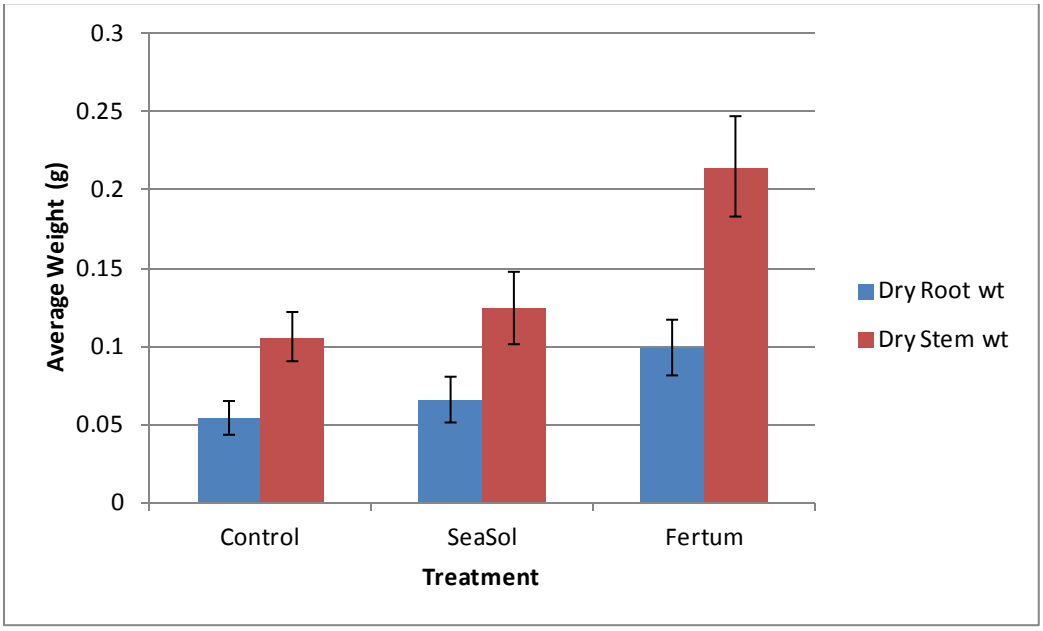

Figure 9: Comparison of the root development of the Cherry Tomato seedlings. Treatments from left to right; Fertum, Seasol and Control.

Figure 10: Comparison of the root development of the Marigold seedlings. Treatments from left to right; Fertum, Seasol and Control.

Figure 11: Comparison of the shoot and root development of the Cherry Tomato seedlings. Treatments from left to right; Fertum, Seasol and Control.

Figure 12: Comparison of the shoot and root development of the Cherry Tomato seedlings. Treatments from left to right; Fertum, Seasol and Control.