

17 November 2004

Greenwaste Fertilizer Performance Trial

Aim:

Compare the performance of two granular fertilizers with similar nutrient analysis, one fully synthetic (BC) and one a hybrid organic fertilizer based on composted greenwaste (ME).

Method:

The fertilizers were evaluated in two pots trials.

Trial 1 – Spinach in soil

English spinach seedlings were transplanted into 7” pots containing a red basaltic soil.

The following fertilizer treatments were applied:

1. Nil fertilizer
2. Fertilizer A - BC (8.0 - 3.7 - 10.0)
3. Fertilizer B - ME (8.0 - 3.7 - 9.9)

The fertilizers were incorporated into the top 50mm of soil at a rate of 8g/pot.

Pots were hand watered according to need.

All treatments were replicated by 4 pots and these were arranged in a randomized block design.

The seedlings were transplanted into the pots on the 27/8/04.

The first fertilizer application was made as soon as the plants were established on the 2/9/04.

A second application of fertilizer was made on the 2/10/04.

The trial was harvested on the 13/11/04.

Trial 2 – Tomato in potting mix

This trial was planned because of the small fertilizer response obtained in the soil trial. The purpose was to determine whether the fertilizer or the growing medium was responsible for the poor growth.

Tomato seedlings were transplanted into 7” pots containing a coir bark potting mix.

The same three fertilizer treatments were applied:

1. Nil fertilizer
2. Fertilizer A - BC (8.0 - 3.7 - 10.0)
3. Fertilizer B - ME (8.0 - 3.7 - 9.9)

The fertilizers were incorporated into the top 50mm of potting mix at a rate of 8g/pot.

Pots were hand watered according to need.

All treatments were replicated by 4 pots and these were arranged in a randomized block design.

The seedlings were transplanted into the pots on the 8/10/04 and the first fertilizer applied two days later.

A second application of fertilizer was made on the 22/10/04.

The trial was harvested on the 13/11/04.

Results:

Trial 1 – Spinach in soil

The spinach seedlings were very slow to establish.

Plants receiving either fertilizer grew faster and had darker green foliage than those in the unfertilized soil which were pale and stunted.

The slow growth and general appearance of the fertilized plants (Plate 1) suggested that nitrogen supply was limiting and so fertilizer was applied for a second time. The response to this treatment was also poor.

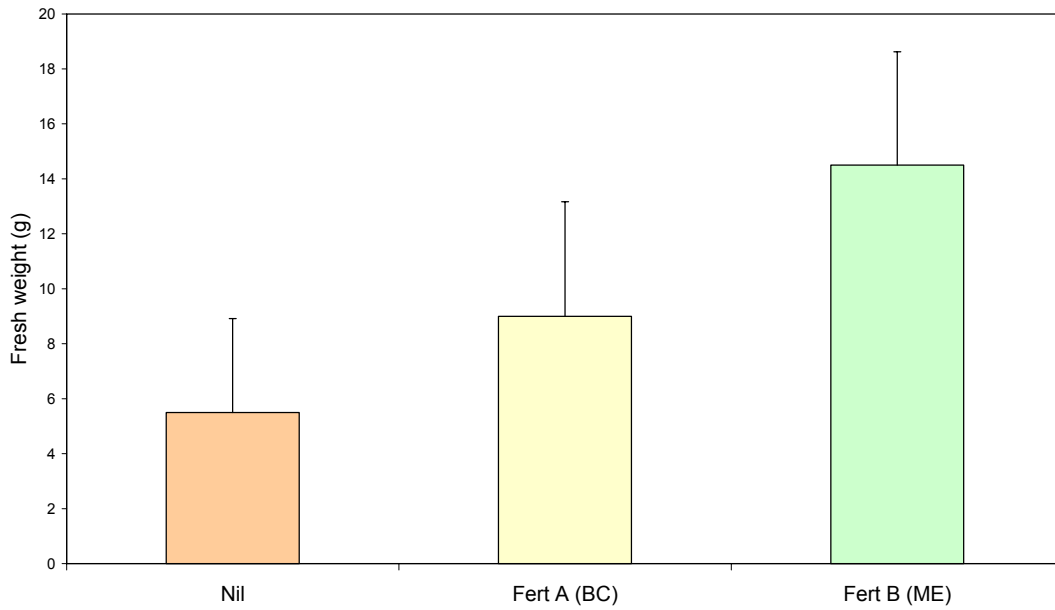


Plate 1 Spinach plants grown in soil. From left to right, Nil fertilizer, fertilizer A (BC) and hybrid organic fertilizer B (ME).

It now seems likely that the soil physical conditions restricted growth far more than did nutrient supply. Mineral soils do not drain adequately in pots and because more of the soil is saturated the availability of oxygen to roots is reduced. Under these conditions, root elongation and nutrient uptake are inhibited which has a secondary influence on nutrient absorption. When watering is intentionally restricted to dry down the soil, shallow rooted plants can experience a water stress which further inhibits growth.

Under these difficult soil conditions, the best growth was obtained with the hybrid organic fertilizer (ME) (Figure 1).

Figure 1 Top growth of spinach plants receiving different fertilizers - soil in containers



The better performance of the ME fertilizer in the soil trial can be attributed to the greater residual value of the organic nitrogen. Leaching and denitrification losses of nitrogen would have been much greater from the more soluble inorganic fertilizer.

Trial 2 – Tomato in potting mix

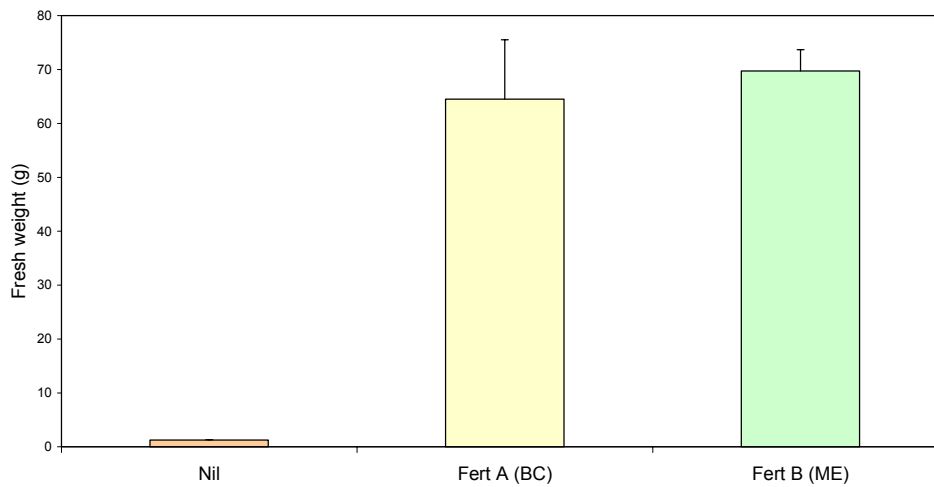
Both fertilizers supported rapid healthy growth of the tomato plants (Plate 2). For most of the trial there was little visible difference between the two treatments. However, by the end some plants receiving Fertilizer B (ME) were pale. Plants in the unfertilized potting mix were pale and stunted indicating that the medium was nutrient deficient.



Plate 2 Tomato plants growing in potting mix. From left to right, Fertilizer A (BC), Nil fertilizer and Fertilizer B (ME).

The final shoot weights of plants in the two fertilizer treatments were not significantly different (Figure 2).

Figure 2 Top growth of tomato plants receiving different fertilizers after 5 weeks - potting mix



Conclusions

The hybrid fertilizer (ME) performed as well as or better than the solely inorganic fertilizer.

Under conditions of low nutrient supply, erratic fertilizer use or high leaching, the slow release characteristics of the organic nutrient source are an advantage. The product may have application in tree establishment programs.

Under conditions of luxury supply, the hybrid may not perform as well as the synthetic product. Managed correctly, the high solubility of nutrients in the synthetic fertilizer will ensure maximum growth.

The mixture of organic and inorganic nutrient sources provides some protection against fertilizer burn and this with the residual characteristics makes it ideal for home gardeners.

The hybrid fertilizer did not produce any unpleasant odours. However, this may not be the case if the product is used in a confined area such as a greenhouse or indoors.

8g/7" pot proved to be an acceptable rate of application for tomato. This is much higher than the 100g/m² that was recommended.