Ecocast website "Case Study"

Title: Ecocast organic vermicast stimulates root growth and nutrient uptake in maize though plant growth stimulators

Author: Dr. Michael Quintern **08/07/2013**
Reviewed by Patricia Moore

ECOCAST Improves Maize Growth

By applying 20 tonnes of Ecocast vermicast per hectare, Whakatane maize grower Phil Brogden increased dry matter for maize silage by more than 25% over the 2013 growing year – in spite of the area being declared an official drought zone.

Brogden is just one of a group of growers whose use of Ecocast Wormicast resulted in maize crops that were still green and growing at the end of summer. Crops which had not been fertilised with vermicast were dry and needed to be harvested weeks earlier.

Brogden says when they examined the root systems the difference was amazing. "We found more than twice as many lateral roots on the maize fertilised with vermicast. Greater growth means more soil volume is available to the maize, increasing access to water and nutrients. Even with the limited rainfall we had, the maize was able to keep growing further into the dry period and of course, provide greater yields."

Let Phil Brogden explain how Ecocast vermicast increased his maize silage yield by more than 25%

Fig. 1: Phil Brogden, holds maize plants that demonstrate the results of fertilising 20 t/ha with Ecocast Wormicast. The plant on the left is from the fertilised crop and has a large cob and dark green growth; the one on the right, from the unfertilised control crop, has a significantly smaller cob and much dryer growth.

In order to further their understanding of how vermicast stimulates maize roots, the Ecocast research team has studied the latest international scientific publications and found vermicast is responsible for:

- Growing far more lateral roots (Fig. 2),
- Growing longer roots (Fig 2),
- Increasing root density (cm of roots per soil volume) (Fig. 2 and Fig 4),
- Growing many times more root hairs (Fig. 3), and
- Increasing nutrient uptake (H^+-ATPase) (Fig.4).

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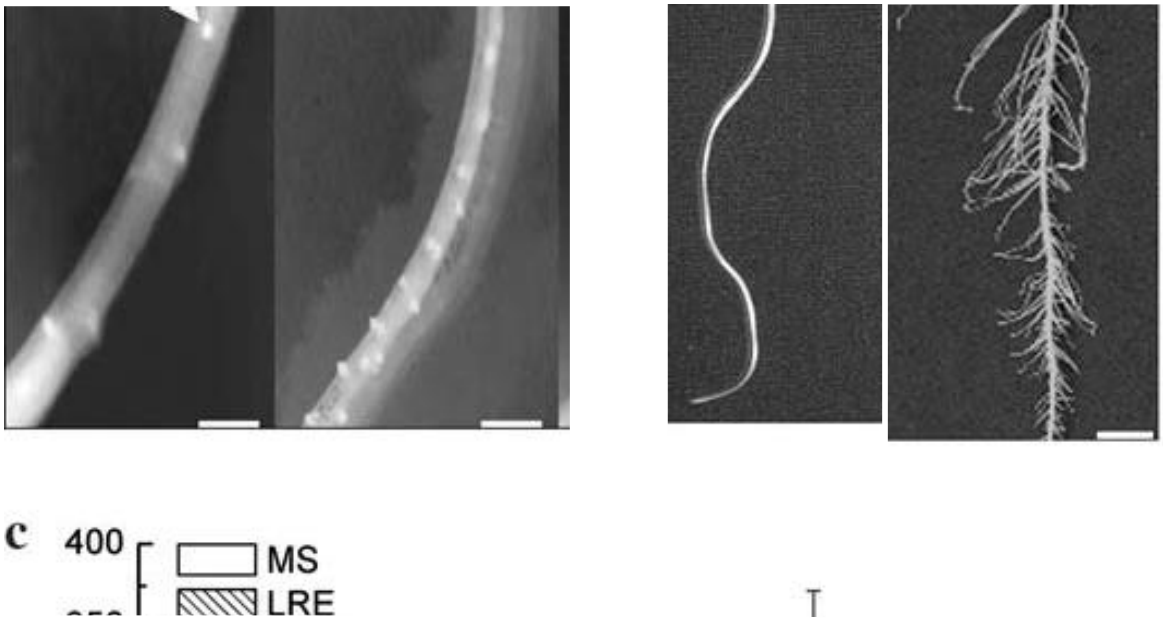

Fig. 2: Effect of humic acids from vermicast (HA) on maize root development compared to untreated control (CON).
a: Emerging lateral roots (white dots) from primary root (Bars 0.8 mm).
b: Lateral roots developed from primary maize root (Bar = 1.2 mm).
[*Source: Zandonadi et al. (2007) p. 1588*]

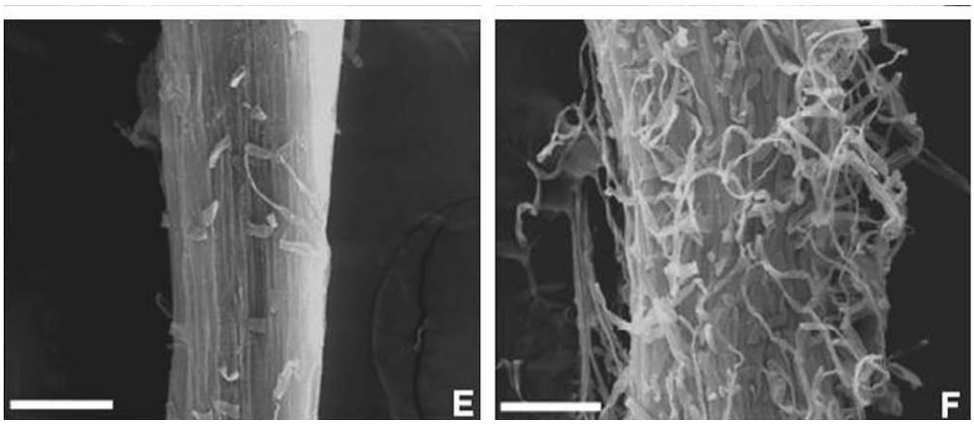

Fig. 3: Scanning electron microscopy of maize root segments showing the density, size and distribution of root hairs from maize seedlings (Bars = 0.1 mm). Untreated = control (A) and treated with humic acids from vermicast (B). [*Source: L.P. Canellas et al. (2010) p. 464*]

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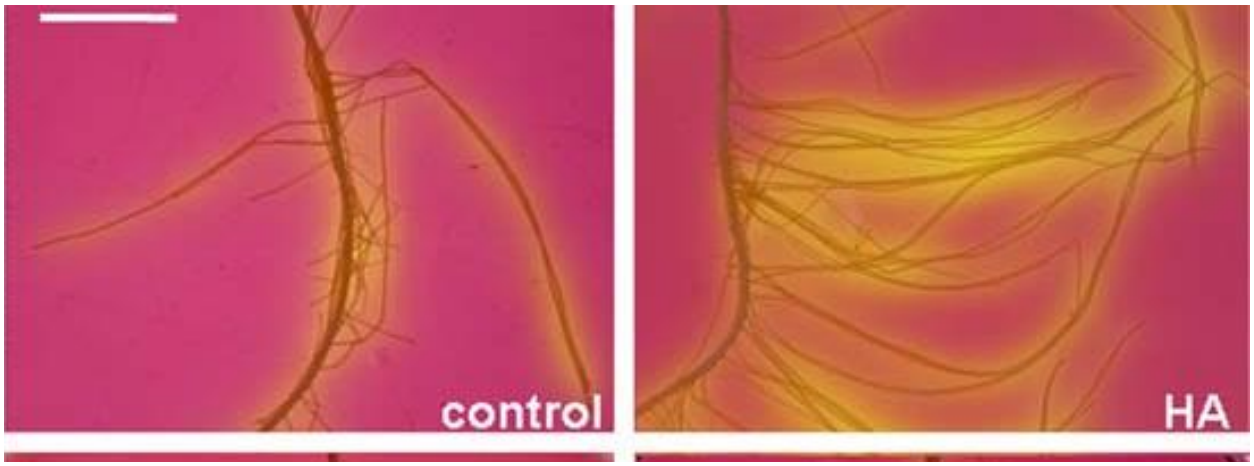

Fig. 4: Effect of humic acids from vermicast (HA) on maize root H^+-ATPase activity compared to untreated control (control). The vermicast treatment (HA) shows more and longer lateral roots. The yellow indicates areas with high root activity where the roots are releasing H^+.
[*Source: Zandonadi et al. (2010) p. 1031*]

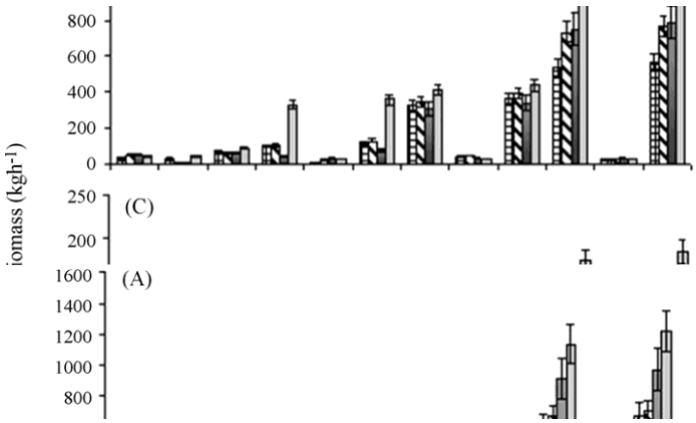

Fig. 5: Shoot and root biomass production (kg/ha) in maize using vermicompost and other treatments. After 60 days, the maize received vermicompost shows highest yields of shoot compared to mineral fertiliser (Control), mulching, compost
[*Source: Roy et al. (2010) p. 81*]

Vermicast (completely digested) and vermicompost (partly digested organic wastes from compost worms) are produced when earthworms break down wood fibre, fruit wastes and other organic waste materials. As this matter passes through the earthworm's gut it is ground down and the result is the familiar worm cast.

Ecocast Wormicast is made of pure, natural earthworm castings, and contains plant available nutrients. Even more important is the very high content in humus; one third of Ecocast Wormicast is actually humus, the soil's "battery" for plant nutrients and water. Ecocast earthworms have loaded the humus with calcium, magnesium, sulfur, and potassium.

References:

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