Increasing apple leaf litter decomposition with the application of soil biostimulant Digester

Stephen Wrigley BioStart Limited Auckland
Gerard Besamusca AgConsult Waihi
Karin Watson BioCult Lab Cambridge
Tim Herman Fruitfed Supplies Hastings
Brian McLay Hastings

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Key words
Leaf litter, Digester, Mycorrhizae, Nitrogen

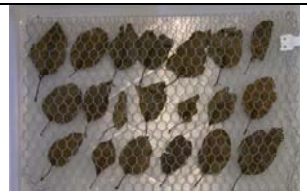
Overview

- The trial was run in a block of mature Fuji in Twyford, Hawke's Bay. The block was split into five plots with four plots being 2.5 rows of trees by approximately 50 m long. The fifth plot was 2 rows of trees and was approximately 100 m long.
- Leaves were collected on 18 July 2003 and spread between wire mesh cages which were put back onto the orchard floor and pinned to the ground. Four cages were set up in each plot.
- Treatments used were
  Control
  Nitrogen 30kg/ha
  Digester 2lt/ha
  Digester 4lt/ha
  Digester 2lt/ha + Nitrogen 30kg/ha
  Treatments applied 23 July. Water rate was 250 L/ha.
- Photos were taken of the cages 3, 44, and 100 days after application
- Root samples were collected from 6 trees in each treatment and send to BioCult Laboratories to determine mycorrhizal colonisation rates.

Digester is being applied at 4lt/ha, the cage containing the leaves (pink tag) is just about to be passes by the sprayer

Results

Leaf breakdown

	Control	30kg/ha Nitrogen	2lt/ha Digester	4lt/ha Digester	2lt/ha Digester + 30kg/ha Nitrogen
3 days					
44 days					
100days					

- The results show that 3 days after application there was no difference between the various treatments and control.
- At the end of the trail 100 days after treatment there were some clear differences. The 4lt/ha Digester and the 2lt/ha Digester + 30kg/ha Nitrogen had clearly increased the rate of breakdown
- Both the 4lt/ha Digester and 2lt/ha Digester + 30kg/ha Nitrogen were statistically significant.

Mycorrhizal responses

Treatment	Root branches/gm	% Ecto colonization	% VAM colonization	Comments
Control	~80	50%	13%	No EM layer on fine roots, only some on thicker roots . No clusters
30kg/ha Nitrogen	~100	50%	27%	Again thinner layer of EM. Some loose clusters
2lt/ha Digester	~150	100% on fine roots	27% hard to assess with thick EM	Dese cluster of pine like EM antlers growing directly off main roots
4lt/ha Digester	~120	72%	53%	Less dense clusters, long fine roots , thinner EM layer
2lt/ha Digester + 30kg/ha Nitrogen	~80	60%	7%	Much thinner layer of EM on fine end roots. No clusters

- Both Digester treatments have had a significant mycorrhizal response
- The addition of Nitrogen has suppressed the mycorrhizal response caused by the Digester.

Conclusion

- 4lt/ha Digester and 2lt/ha Digester + 30kg/ha Nitrogen accelerated leaf litter decomposition.
- 4lt/ha Digesterand 2lt/ha Digester increased Mycorrhizla colonization and root branches.