



# The role of TwinN, a microbial bio-fertiliser in avocado production

VII Avocado Congress  
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# What is a microbial bio-fertiliser?

## ¿Que es un bio-fertilizante microbiano

- A product that contains beneficial microbes

Un producto que contiene microbios beneficiosos

- Can be freeze dried or a liquid formulation

Puede ser liofilizado o liquido

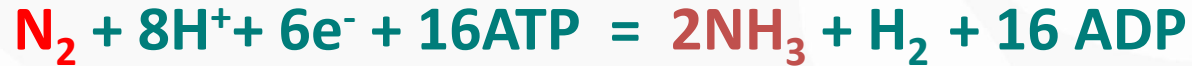
- Consistent quality of product is important for commercial avocado growers

Calidad consistente es importante para productores de aguacate comercial



# How do the microbes in bio-fertilisers work? ¿Cómo los microbios en bio-fertilizantes trabajo

- Microbes fix atmospheric nitrogen into the tree roots and leaves



Las bacterias fijan nitrógeno atmosférico en las raíces y ojas de la planta

- Microbes produce auxins that promote root growth

Los microbios producen auxinas que promueven el crecimiento de las raíces

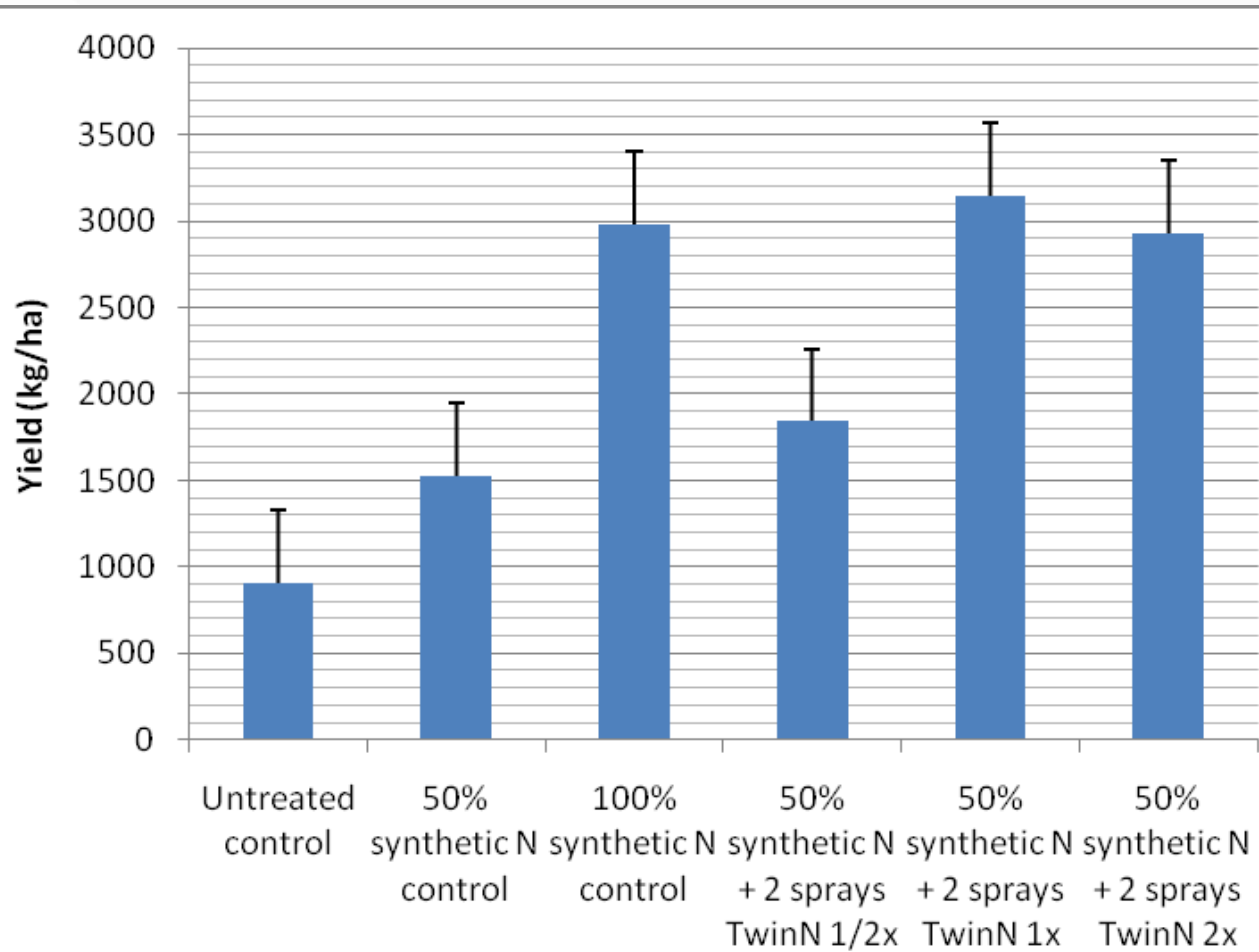
- Microbes improve soil/root health

Los microbios mejoran la salud de el suelo y raíces

# Wheat (Trigo) – Western Cape, South Africa - 2010

Independent registration trial

Ensayo independiente para registro



100% N = 112 kg/ha

50% N = 56 kg/ha

# Leaf N levels in citrus (Naranjas) & mango - South Africa

<b>Citrus in RSA:</b>		<b>N leaf analyses:</b>	
<b>Client</b>	<b>Ha</b>	<b>2009 (- TwinN)</b>	<b>2010 (+ TwinN)</b>
Piet Engelbrecht Drip	49	2.4	2.57
PLM	9	1.92	2.5
Schoonbee	13	1.82	1.97
Petrus Berg Groep 1	20	2.34 1.87	2.55 1.73
Bosveld Midnights	27	2.56 2.35 2.39 2.62 2.36 2.32	2.4 2.4 2.35 2.35 2.13 2.36
Bruwer LRochelle Afourer	104	3.07 2.01 2.49 1.57 2.13	2.41 2.16 2.45 2.05 2.18
MEsterhuizen	16	2.28 1.83	2.1 1.91
<b>Total Average</b>		<b>2.20</b>	<b>2.22</b>
<b>Mangoes in RSA:</b>			
Bavaria Mango	6	0.87	0.97
Grovedale			

Leaf analyses norms (RSA):	N
Delta (small fruit)	2.1-2.3
Lemon (oil)	2.2-2.6
Midnight Val	2.3-2.6
Navel	2.6-2.8
Delta (Large fruit)	2.3-2.6
Grapefruit	2.1-2.4
Midseasons	2.1-2.3
Young trees	2.3-2.6
Soft citrus	2.2-2.5
Lemon	2.2-2.6
Mango	1.1 - 1.3

- 2009 data is pre TwinN  
 - 2010 data is after ~20% N reduction + TwinN  
 - In blocks with **excess leaf N** the N reductions were larger

Low  
High



# How much do avocado growers cut their N fertiliser? ¿Cuanto Nitrogeno reducen los productores de aguacate

- Cut N by 25 – 50% but not more than 50 U of N/ha

Reducen de un 25 a 50% pero no mas de 50 U de N/ha

- Apply in spring and autumn to moist root zone

Aplicar en primavera y otoño a la zona radicular humeda

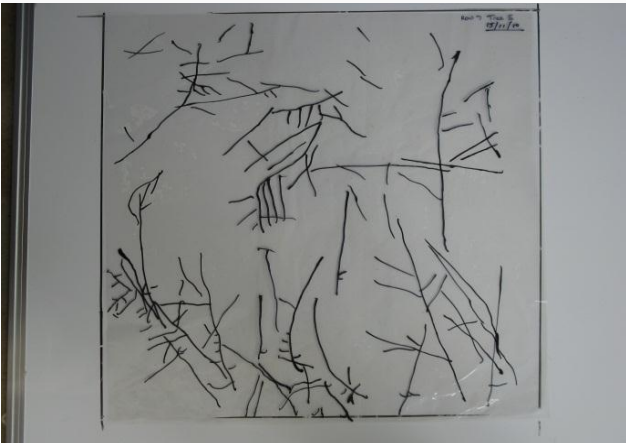
- Organic growers need to supply N by mulch/manure as well as from a bio-fertiliser

Productores organicos necesitan el aporte de N por abono/  
estiércol asi como de un bio-fertilizante

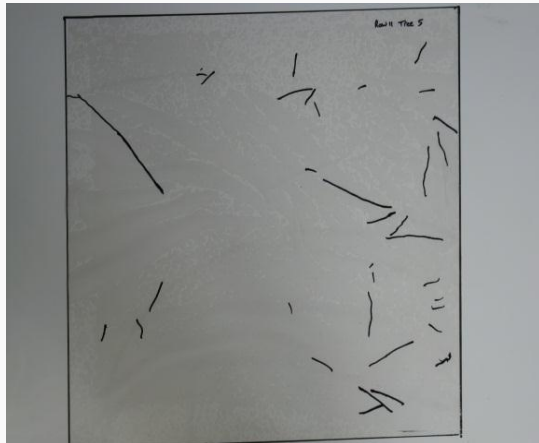


- TwinN soil application 2 months previous  
Aplicación de TwinN dos meses antes
- Perspex windows to monitor root growth  
Perspex ventanas para controlar el crecimiento de raíces
- Avocado Australia trial  
Demostración de en Australia Aguacate

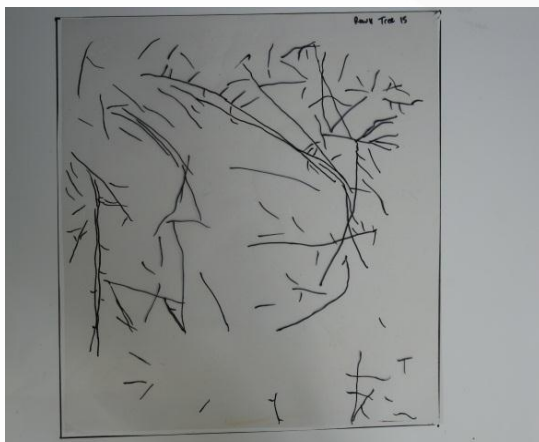
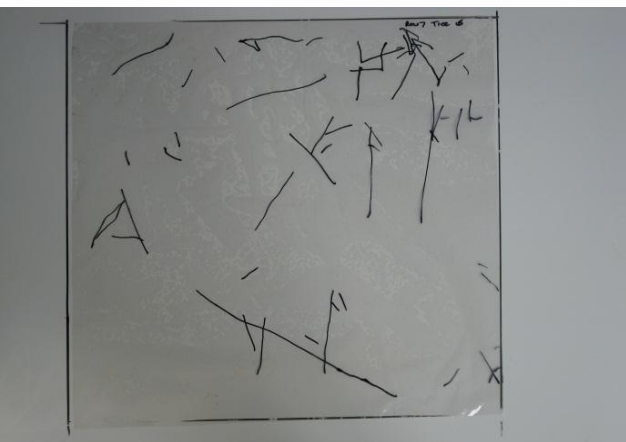
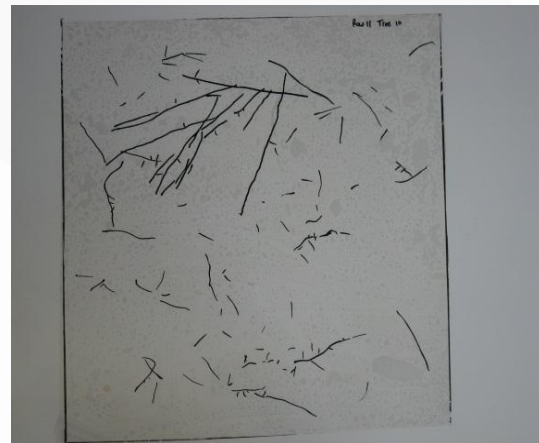
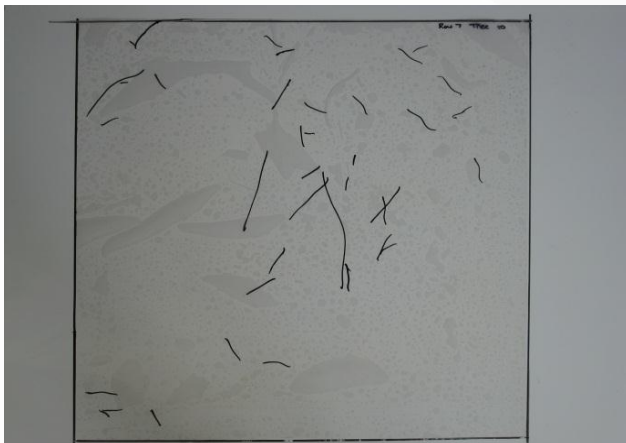
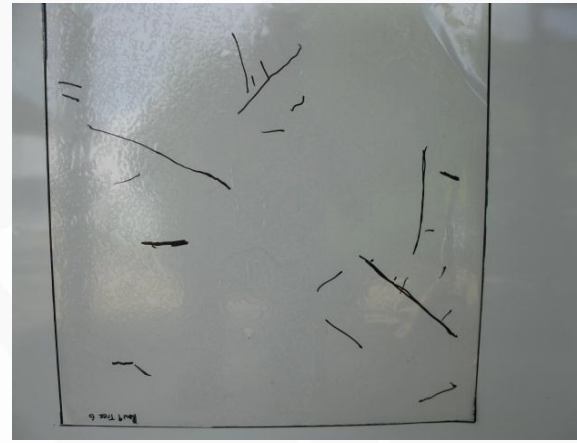
**TwinN**



**TwinN**



**No TwinN**





# Microbial biofertilisers can reduce root disease pressure

Los microbios pueden reducir la presión de enfermedades en la raíz

• Soybean (soja) – Illinois – US Department of Ag trial, 2008 (repeated in 2009)

Treatment	Fusarium root colonisation	Root pseudomonads (beneficial) (beneficiosa)
No herbicide	67.5 a	116.9 a
+ Roundup	106.4 b	28.2 b
+ TwinN + Roundup	64.0 a	80.0 a
LSD (0.05)	19.2	62.9

- Increased beneficial microbes  
Incremento de microbios beneficiosos
- Decreased *Fusarium solani* infection  
Disminución de infección por *Fusarium solani*

# *Phytophthora* levels in soil under pineapples in a TwinN trial

Demostración de la acción de TwinN en los niveles de *Phytophthora* en pina

## Lupin baiting tests for *Phytophthora cinnamomi*

Performed by DEEDI QLD

Treatment	% Mortality 10/3/10	Chlamyospore counts 14/7/10
Standard Farm Practice	66.7	2.34
Twin N every 3 months + 50% N	46.7	Not tested
Twin every 6 weeks + 25% N	40.0	0.56

Direct TwinN effect or reduced N?

¿Efecto directo de TwinN o N reducido

# Avocado Australia trial results

Treatment	No. of fruit	Yield (kg/tree)	Av. Fruit wt. (g)
Grower treatment	248	68.5	277
TwinN foliar standard N	277	75.2	273
TwinN soil standard N	251	69.8	279
TwinN foliar reduced N	297	80.7	272
TwinN soil reduced N	259	72.2	287
Stat. significance	NS	NS	NS

- Trial ran for 12 months (harvested Aug 2011 and trial is ongoing)
- Tested reduced N rates
- Tested Twin foliar versus soil drench

- High variability in yield data makes statistical significance difficult to achieve
- TwinN yields were all higher than grower treatment (trend)
- Reduced N did not reduce yields in TwinN treated trees
- Longer term benefits on tree health will be measured in Year 2

**Trial by J Leonardi, Avocado Australia**



# Conclusion

Microbial biofertilisers can help avocado growers by:

Bio-fertilizante microbiano puede ayudar a los productores de aguacate en:

- Reducing nitrogen costs

Reduccion del costo de Nitrogeno

- Increasing root vigour

Incremento de masa radicular y vigor en la raíz

- Improving root/soil health

Mejorar la salud del suelo y la raiz

Appreciation to Avocado Australia for trials and advice





Thank you

Gracias

