

# TWINN CROP TRIAL



*TwinN Blueberry Results, 2016, British Columbia, Canada*

## INTRODUCTION

An on-farm demonstration was conducted on Fraser Berry Farms Ltd, in Abbotsford, British Columbia, Canada, by Pier Management's agronomists to test the capacity of TwinN to enable high yields and improved crop nutritional status. The test included a reduced nitrogen fertiliser rate for the TwinN treated rows.

## KEY RESULT

Initial leaf tissue analyses of the TwinN treated rows versus the untreated rows showed limited differences in nutritional status, indicating that the blocks had similar nutritional status following the initial mixed fertiliser application to all rows. A second leaf analysis approximately 12 weeks after the initial TwinN application showed a 5% higher N content despite the TwinN rows receiving 40.44 lb/ac (46 kg/ha) less nitrogen fertiliser. Most other elements were also higher in the TwinN rows. A third tissue analysis at 20 weeks after the initial TwinN application and 8 weeks after the second TwinN application showed the TwinN rows had a 12% higher N content and all other elements were significantly higher. Yield was not measured accurately but pickers noted that the first harvest volume was slightly lower in the TwinN rows but significantly higher in later harvests compared to untreated rows.

## CROP PROGRAM SUMMARY

- Rows 1-11 received an application of TwinN near the end of bloom on May 13 2016 and a second application on July 31. TwinN was applied via drip irrigation.
- Harvest started June 26 and the crop was harvested over four picks ending on July 24
- The fertiliser programs for the TwinN rows and Standard rows are shown in Table 1. TwinN rows received 40.44 lb/ac (46 kg/ha) less nitrogen fertiliser.
- Cultivar was Duke and the crop was 20 years old



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**Table 1**  
**Fertiliser program and tissue analysis results for TwinN rows and Standard rows**

April 13	Dry fertiliser applied to TwinN and Standard rows. N 158 lbs/ac (178 kg/ha), S 109 lbs/ac (123 kg/ha), Mg 28 lbs/ac (32kg/ha), K 172 lbs/ac (194 kg/ha), B 1.8 lbs/ac (2 kg/ha).											
May 5	Nitrogen 14.13 lbs/ac (16 kg/ha) applied to TwinN and Standard rows.											
May 13	Nitrogen 20.22 lbs/ac (23kg/ha) applied to <u>Standard rows only</u> . Rows 1-10 received one application of TwinN											
May 21	Nitrogen 20.22 lbs/ac (23kg/ha) applied to <u>Standard rows only</u>											
	<b>N</b>	<b>P</b>	<b>S</b>	<b>K</b>	<b>Ca</b>	<b>Mg</b>	<b>Fe</b>	<b>Mn</b>	<b>Cu</b>	<b>Zn</b>	<b>B</b>	
June 20 <b>TwinN</b>	2.34	0.17	0.17	0.51	0.45	0.18	36	43.4	2.8	24.3	30.3	
June 20 <b>Standard</b>	2.35	0.16	0.10	0.51	0.44	0.15	37	52.4	2.3	16.3	36.6	
Comment: Five weeks after TwinN application no major differences in tissue analysis												
July 31	Rows 1-10 received a second application of TwinN											
Aug 3 <b>TwinN</b>	1.68	0.12	0.15	0.49	0.75	0.24	66	88.2	3.0	18.6	71	
Aug 3 <b>Standard</b>	1.60	0.11	0.14	0.38	0.68	0.21	55	81.9	2.9	19.2	68	
Comment: TwinN plot shows N status 5% higher despite reduced N fertiliser, K status 29% higher, most other elements higher.												
Sept. 24 <b>TwinN</b>	1.83 +12%	0.12 +9%	0.10 +67%	0.62 +22%	0.7 +19%	0.20 +24%	43 +13%	55.2 +43%	72 +24%	51.1 +37%	145 +32%	
Sept. 24 <b>Standard</b>	1.64	0.11	0.06	0.51	0.59	0.16	38	38.7	58	37.3	110	
Comment: TwinN plot shows N status 11.6 % higher than Standard plot, all other elements significantly higher.												
Average <b>Twin N</b>	1.95	0.14	0.14	0.54	0.63	0.21	48	62.3	26	31.3	82	
Average <b>Standard</b>	1.86	0.13	0.10	0.47	0.57	0.17	43	57.7	21	24.3	72	
See page 4 for September Tissue Analysis Reports from The Plant Science Lab.												

DISCLAIMER: Any recommendations provided by Mapleton Agri Biotech (MAB) or its Distributors are advice only. As no control can be exercised over storage, handling, mixing application or use, or weather, plant or soil conditions before, during or after application (all of which may affect the performance of our product), no responsibility for, or liability for any failure in performance, losses, damages, or injuries (consequential or otherwise), arising from such storage, mixing, application, or use will be accepted under any circumstances whatsoever. MAB recommend you contact an Agronomist prior to product application. The buyer assumes all responsibility for the use of TwinN.



## DISCUSSION

TwinN is used in blueberry production in the USA, Australia and Chile. The microbe species in TwinN act to fix nitrogen from the atmosphere into plant available  $\text{NH}_3$ . Nitrogen use efficiency is also improved via the production of plant growth factors (particularly auxins) by the microbes which drives the development of increased secondary root structure. The effect of nitrogen fixation and increased capture of nitrogen fertiliser allows improved nitrogen status with reduced nitrogen fertiliser rates. In this demonstration, the TwinN rows received 40.44 lb/ac (46 kg/ha) less nitrogen fertiliser than the Standard rows. The tissue analysis results (Table 1. June 20) show very similar N status soon after the initial TwinN application followed by a steady increase in the TwinN rows versus the Standard rows. By 12 weeks post-TwinN application the TwinN rows has 5% higher leaf N content and by 20 weeks after the initial application and 8 weeks after the second application this difference had increased to almost 12%.

Other elements followed a similar pattern with very significant increases in the TwinN rows by the last tissue analysis in September. These increases results from improved nutrient availability associated with increased soil/root microflora after TwinN application, combined with increased secondary root development and fine root hair density.

Yield was not quantified but pickers noted a slight delay in fruit development in the TwinN rows, probably due to a slightly longer growth stage associated with higher nitrogen status. In the next three harvests the TwinN rows yielded higher per pick than the untreated rows because of the delayed ripening of the fruit.

## RECOMMENDED APPLICATION SCHEDULE.



First application - early spring or as soon as active growth commences.



Second application - at petal-fall



Third application is midway through harvest.\*

For fruit bearing crops follow a similar nitrogen reduction schedule as described in this demonstration. No nitrogen reductions should be made to the start of season fertiliser program. For new plantings use a standard fertiliser program plus TwinN to maximise early growth and increase initial crop yields. For organic growers apply TwinN over the top of existing nitrogen sources\*. Do not reduce these.

\* Please consult with your local distributor for detailed advice on how to integrate TwinN into your specific nutrition program

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# The Plant Science Lab

Plant Tissue Analysis Results

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Grower Name: Fraser Berry Farms	Date Received: 22/9/2016
Field ID --- Crop: Site 2 1 to 10 --- Blueberry	Lab Report Date: 24/9/2016
Lab ID: 38570	Disposal Date: 6/10/2016
Lab Report Number: T38570-1	Sales Rep: Mike H

Analyte	Units	Results	Method	Target Range	Very Low	Low	Medium	High	Very High
Nitrogen	%	1.83	Combustion	1.50 - 2.30					
Phosphorous	%	0.123	ICP	0.09 - 0.40					
Sulfur	%	0.10	Combustion	0.05 - 0.20					
Sodium	%	0.010	ICP		No Interpretation				
Potassium	%	0.62	ICP	0.40 - 0.65					
Calcium	%	0.70	ICP	0.30 - 0.80					
Magnesium	%	0.200	ICP	0.10 - 0.30					
Iron	ppm	43	ICP	40.0 - 150.0					
Manganese	ppm	55.2	ICP	50.0 - 350.0					
Copper	ppm	72.3	ICP	2.00 - 15.00					
Zinc	ppm	51.1	ICP	8.00 - 30.00					
Boron	ppm	145.2	ICP	30.00 - 90.00					
Aluminum	ppm	79	ICP		No Interpretation				

Tissue analysis Sept 24 2016 for rows 1-10 treated with **TwinN** and receiving 40.44 lb/ac (46 kg/ha) less nitrogen.

Fraser Berry Farms	Date Received: 22/9/2016
Field ID --- Crop: Site 2 --- Blueberry	Lab Report Date: 24/9/2016
Lab ID: 38572	Disposal Date: 6/10/2016
Lab Report Number: T38572-1	Sales Rep: Mike H

Analyte	Units	Results	Method	Target Range	Very Low	Low	Medium	High	Very High
Nitrogen	%	1.64	Combustion	1.50 - 2.30					
Phosphorous	%	0.113	ICP	0.09 - 0.40					
Sulfur	%	0.06	Combustion	0.05 - 0.20					
Sodium	%	0.008	ICP		No Interpretation				
Potassium	%	0.51	ICP	0.40 - 0.65					
Calcium	%	0.59	ICP	0.30 - 0.80					
Magnesium	%	0.161	ICP	0.10 - 0.30					
Iron	ppm	38	ICP	40.0 - 150.0					
Manganese	ppm	38.7	ICP	50.0 - 350.0					
Copper	ppm	58.1	ICP	2.00 - 15.00					
Zinc	ppm	37.3	ICP	8.00 - 30.00					
Boron	ppm	110.1	ICP	30.00 - 90.00					
Aluminum	ppm	71	ICP		No Interpretation				

Tissue analysis Sept 24 2016 for rows 11-51 treated with **no TwinN** applied and receiving 40.44 lb/ac (46 kg/ha) more nitrogen.

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