

Soybean Inoculation

When to inoculate

- Acid or alkaline soils
- Very wet or very dry soils
- High soil temperatures
- Soils low in organic matter
- When soil analysis shows N deficiency
- When previous sowings have shown good nodulation but little evidence of nitrogen fixation

Functional Factors

- Survival and competition with existing strains and other microbes
- Association with the roots
- Nodule occupancy is the key

Functional Factors

- What effects nodule occupancy?
 - Who associates with the root
 - Who is capable of interacting
 - Rhizoplane competency - survival

Qualities of a good inoculant strain

- Nodulates and fixes N with all the varieties of legume for which it is recommended.
- Competes well with native rhizobia in the soil
- Persistent over time in the soil
- Tolerant of environmental conditions in the soil
- Genetically stable
- Grows well in simple and economic culture media

Legume inoculants

USE:

- In southern Africa almost 100% of farmers grow legumes, but less than 15% have ever used inoculants (Karanja et al., 2000).
- In the USA only 10-15% of farmers inoculate, and very few reinoculate: in Brazil inoculant use in soybean now ~90%

VALUE

- “Most of the inoculant produced in the world today is of relatively poor quality” with “90% of all inoculant has no practical effect (Brockwell & Bottomley, 1995)
- Gomez et al (Argentina) found only five of 18 inoculants tested to be of good quality

How can you be sure the plant is fixing well?



- The plant is growing well and deep green in color
- It has 50 -300 nodules, mostly at the crown
- The nodules are large and of good weight
- In section, the nodules are pink or red in color



Why can inoculation fail

- Delay between inoculation and planting
- Inappropriate materials used as stickers
- The strain used is wrong for the legume inoculated
- The inoculant is old or dried out
- Soil conditions (temperature or pH) are poor
- Contact between rhizobia and pesticide or fertilizer
- High soil N levels

TerraMax

Inoculant for Soybeans

Contains two strains of *Bradyrhizobium*

Aids nodulation

Fixes nitrogen

TerraMax Soybean Inoculants

- TerraMax Dry – Seed Treatment
 - 40 unit – 5 pounds
 - 10 unit – 20 ounces
- TerraMax Liquid – Seed Treatment
 - 150 unit – 2.5 gallon
 - 50 unit – 106 fluid ounces
- TerraMax IF – In Furrow
 - 2.5 gallon

TerraMax Soybean Inoculants

- Maximize
 - High count / Low volume
 - Liquid seed treatment
- Organic formulations

TerraMax Inoculant Attributes

- 90 plus days survival on seed
- No sticky extender
- Water like consistency



TerraMaxTM Liquid IF

Field Studies

TerraMax, Inc.

Nebraska Data 2001

Location

TerraMax had product tests conducted by a local farmer at this site in Geneva Nebraska. This site was treated with TerraMaxTM for inoculating soybeans

Description

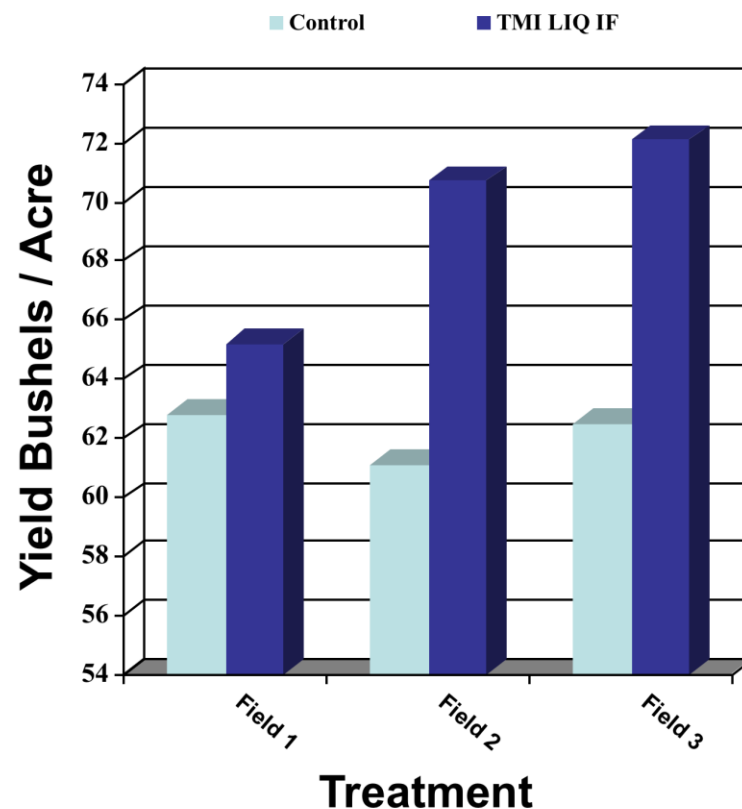
TerraMaxTM was applied in furrow at planting.

Treatment –2001

Product: TerraMaxTM

Application rate: 12.8 ounces per acre

Soybean Yield





TerraMaxTM Liquid IF

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Location

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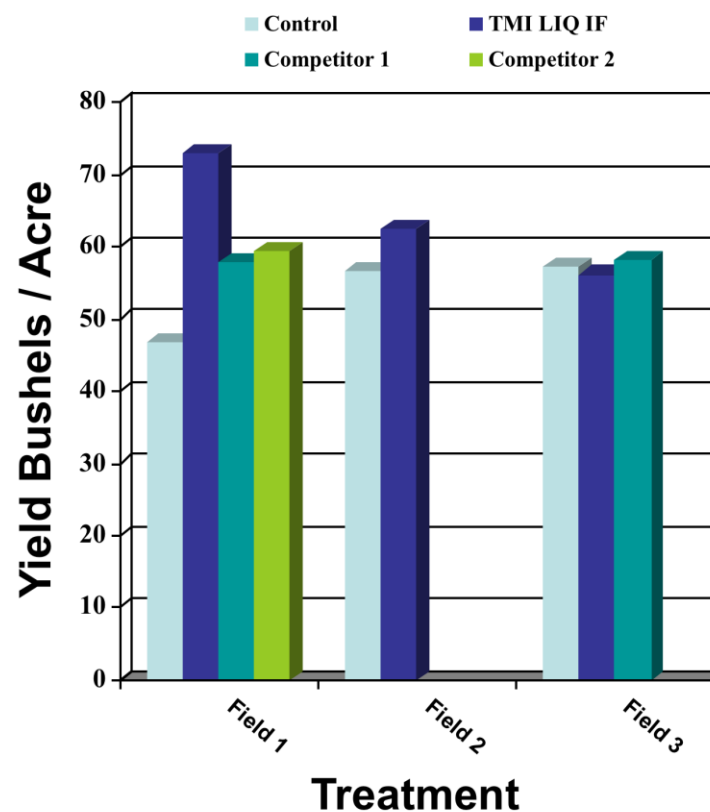
TerraMaxTM was applied in furrow at planting.

Treatment – Summer 2000

Product: TerraMaxTM

Application rate: 12.8 ounces per acre

Soybean Yield





TerraMaxTM Dry Field Studies

TerraMax, Inc.

KT Nebraska Data

Location

TerraMax had product tests conducted by a local farmer at this site in Geneva Nebraska. This site was treated with TerraMaxTM for inoculating soybeans. The seed was treated with 1% by weight with a dry formulation of TerraMaxTM.

Description

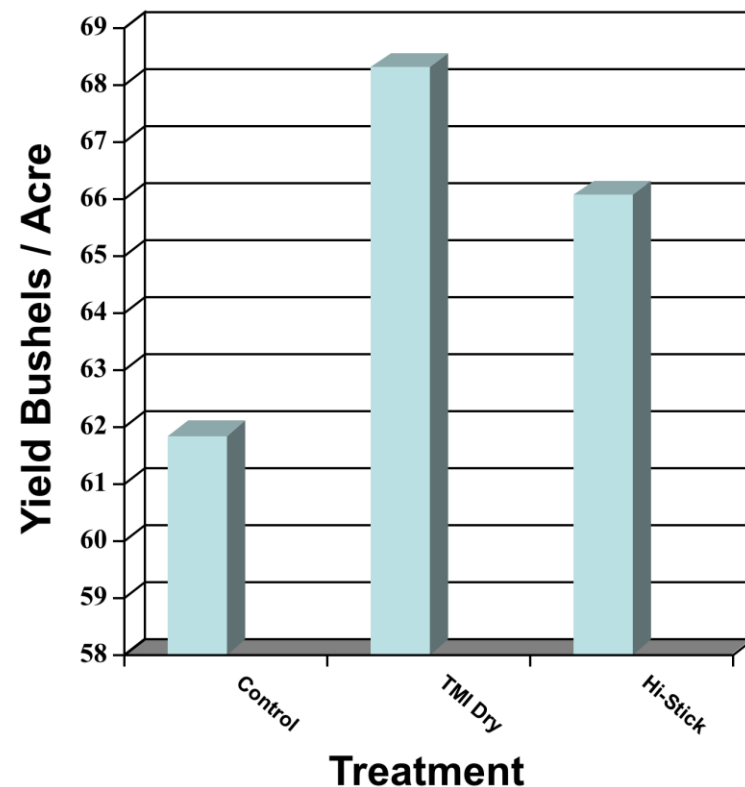
Variety NK-29-C9

Treatment – Summer 2003

Product: TerraMaxTM Dry

Application rate: 1 percent by weight of seed planted

Soybean Yield





TerraMaxTM Liquid IF Field Studies

TerraMax, Inc.

Iowa Data 2001

Location

TerraMax had product tests conducted by a local farmer at these sites in Central Iowa. This site was treated with TerraMaxTM for inoculating soybeans

Description

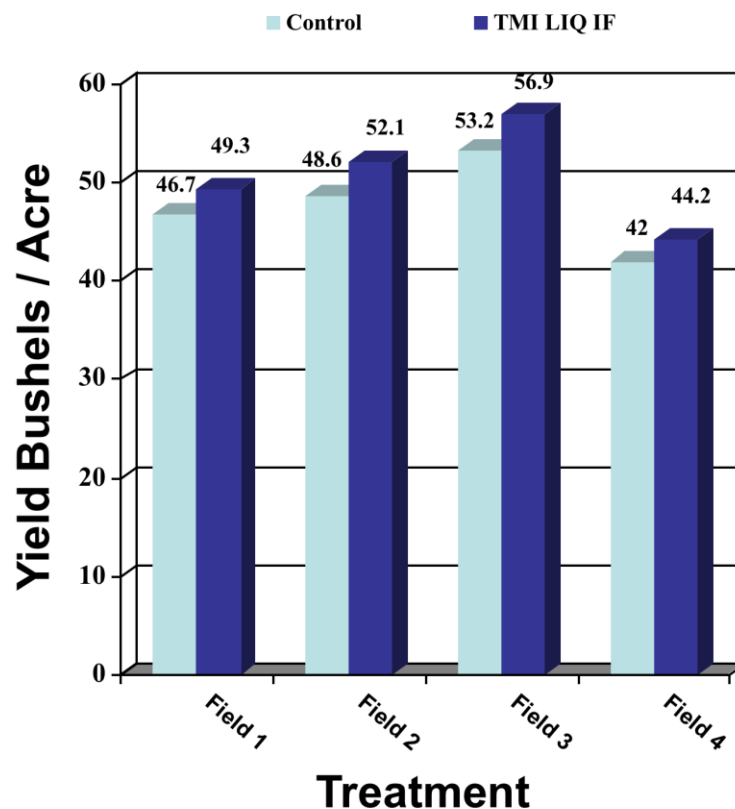
TerraMaxTM was applied in furrow at planting.

Treatment –2001

Product: TerraMaxTM

Application rate: 12.8 ounces per acre

Soybean Yield



“Maximizing Earth’s Potential”



TerraMaxTM Field Studies

TerraMax, Inc.

HR Nebraska Data 2003

Location

TerraMax had product tests conducted by a local farmer at this site in Milligan, Nebraska. This site was treated with TerraMaxTM Dry or Liquid for inoculating soybeans. The seed was treated with 1% by weight with a dry formulation and 12.8 ounces per acre of the liquid.

Description

Irrigated

Treatment – 2003

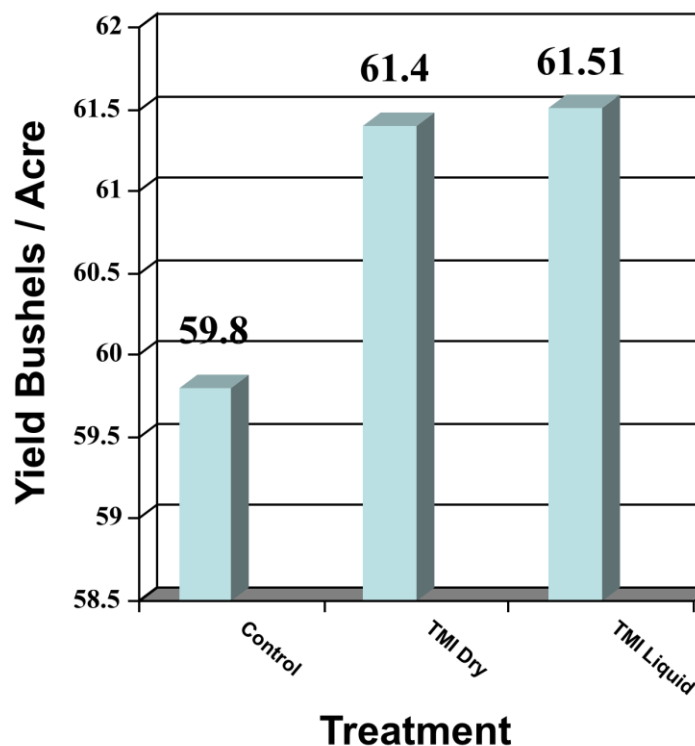
Product: **TerraMaxTM**

Application rate:

Dry - 1 percent by weight of seed planted

Liquid – 12.8 ounces per acre

Soybean Yield



Geneva, NE 2005



TerraMax Nodulation

CellTech



TerraMax



Field Summary Report

Grower: Brad Spinler
 Farm: Spinler Farm
 Field: MINSKE
 Year: 2008
 Operation: Grain Harvest
 Product: SOYBEANS
 Operational Instance: Harvest - 1



Dntaset	Area	Average Moisture	Estimated Weight (Wet)	Estimated Volume (Dry)	Average Yield (Dry)	Actual Weight (Wet)	Error	Date Logged
	ac	%	lb	bu	bu/ac	lb	%	
L1: (2001110598)	53.74	12.70	166,388	2,773.1	51.61	N/A	N/A	10/16/2008
L2: (2001110598)	0.952	12.00	3,502.5	58.38	61.34	N/A	N/A	10/16/2008
L3: (2001110598)	0.956	15.00	3,208.2	52.85	55.29	N/A	N/A	10/18/2008
L4: (2001110598)	0.937	15.20	3,326.2	54.66	58.36	N/A	N/A	10/18/2008
L5: (2001110598)	0.938	15.00	3,207.6	52.84	56.35	N/A	N/A	10/18/2008
L6: (2001110598)	0.931	14.90	3,397.2	56.03	60.19	N/A	N/A	10/18/2008
L7: (2001110598)	0.930	15.00	3,364.8	55.43	59.59	N/A	N/A	10/18/2008
L8: (2001110598)	0.927	14.80	3,387.2	55.93	60.31	N/A	N/A	10/18/2008
L9: (2001110598)	0.930	14.80	3,633.7	60.00	64.52	N/A	N/A	10/18/2008
L10: (2001110598)	0.923	14.80	3,595.0	59.36	64.31	N/A	N/A	10/18/2008
L11: (2001110598)	0.918	14.60	3,433.7	56.83	61.93	N/A	N/A	10/18/2008
L12: (2001110598)	0.916	14.70	3,857.4	63.77	69.63	N/A	N/A	10/18/2008
L13: (2001110598)	0.909	14.80	3,674.7	60.68	66.75	N/A	N/A	10/18/2008

Totals	64.90	13.03	207,976	3,459.9	53.31			
		Average		Average				

TM LIQ-IF

TerraMax Liquid IF

Morristown, MN

2008 Soybean Inoculant

