

Appendix G

2019 George DeRuyter & Son/D&A

Dairies Off-Site Liquid Manure Transfer –
Field Soil Sample Results



Measuring Crop Needs for Greater Profits

Fertility Report

F19-0295
8472



Crop: Triticale-Forage Mix **Acres:** 9 **Sample Date:** 5/16/2019
Irrigation: Wheel Line **Previous Crop:** 2018 Alfalfa
Current Crop: 2019 Triticale-Forage Mix

Soil series: Warden silt loam **Leach Hazard:** **No. of Sites:** 12
Topography: Gentle Undulation **Avg Sampling Depth:** 2.0
Restrictive layer? N **Where?** **Residue Incorp?** N **Type?** Moderate stubble.

Comments: Sampled a two foot field composite, post harvest. At the time of sampling the soil surface was dry.

| Sample Area | Depth | ppm | | | | Mobile Nutrients (lbs/ac) | | Exch. / Soluble Bases (meq/100g) | | | | | | |
|-----------------|-------|-----------------|-----------------|-----------------|-----------------|---------------------------|---|----------------------------------|----|---|----|------|-----|--|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC | |
| Field Composite | 1' | 5.7 | 3.2 | 20 | 11 | | | | | | | | | |
| Field Composite | 2' | 9.1 | 1.9 | 32 | 7 | | | | | | | | | |
| Totals: | | | | 52 | 18 | | | | | | | | | |

Comments: The second foot nitrate level is below 45 ppm.
The two foot average nitrate plus ammonium level is below 25 ppm (9.95 ppm).

| Sample Area | Depth | Immobilized Nutrients (ppm) | | | | | | Chemical Data | | | | Other Data | |
|-----------------|-------|-----------------------------|-----|----|----|----|----|---------------|-----|-------------|-----------|------------|-----|
| | | P ^{P(ace)} | K | Zn | Mn | Fe | Cu | O.M. | pH | EC mmhos/cm | Eff/Calc. | VolWt | %AW |
| Field Composite | 1' | 73 | 724 | | | | | 1.4% | 8.7 | 0.47 | Yes | 1.30 | 80% |

Comments: _____

Comments: At the time of sampling the soil moisture profile was below field capacity.

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.



Measuring Crop Needs for Greater Profits

Fertility Report

F19-0437
8472

Crop: Alfalfa

Acres: 9
Irrigation: Wheel Line

Sample Date: 8/5/2019
Previous Crop: 2019 Triticale-Forage Mix
Current Crop: 2020 Alfalfa

Soil series: Warden silt loam
Topography: Gentle Undulation

Leach Hazard:

No. of Sites: 15
Avg Sampling Depth: 2.0

Restrictive layer? Y **Where?** Soil compaction.

Residue Incorp? N **Type?** Moderate stubble.

Comments: Sampled a two foot field composite post harvest. At the time of sampling the soil surface was dry. Very little weed growth.

| Sample Area | Depth | ppm Mobile Nutrients (lbs/ac) | | | | | | Exch. / Soluble Bases (meq/100g) | | | | | |
|-----------------|-------|-------------------------------|-----------------|-----------------|-----------------|-----------------|---|----------------------------------|----|------|----|------|-----|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC |
| Field Composite | 1' | 15.1 | 9.2 | 53 | 32 | | | | | 1.53 | | | |
| Field Composite | 2' | 8.2 | 4.8 | 29 | 17 | | | | | 1.26 | | | |
| Field Composite | 3' | 13.1 | 4.7 | 46 | 16 | | | | | 0.61 | | | |
| Totals: | | | | 127 | 65 | | | | | | | | |

Comments: Residual nitrates are low overall.
The two foot average nitrate plus ammonium level is below 25 ppm (18.65 ppm).

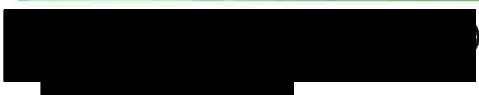
| Sample Area | Depth | Immobile Nutrients (ppm) | | | | | | Chemical Data | | | | Other Data | |
|-----------------|-------|--------------------------|-----|----|----|----|----|---------------|-----|-------------|-----------|------------|-----|
| | | P ^{P(ace)} | K | Zn | Mn | Fe | Cu | O.M. | pH | EC mmhos/cm | Eff/Calc. | VolWt | %AW |
| Field Composite | 1' | 69 | 596 | | | | | 1.7% | 8.7 | 0.53 | Yes | 1.30 | 75% |
| Field Composite | 2' | 46 | 493 | | | | | 1.0% | 8.8 | 0.53 | Yes | 1.30 | 80% |
| Field Composite | 3' | 34 | 238 | | | | | 1.1% | 8.7 | 0.67 | Yes | 1.30 | 85% |

Comments:

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.



Fertility Report



F19-0684
11679

Crop: Corn

Acres: 38.7

Sample Date: 9/27/2019

Irrigation: Rill

Previous Crop: 2019 Corn

Current Crop: 2020 Corn

Soil series: Silt Loam

Leach Hazard:

No. of Sites: 15

Topography: Moderately undulating

Avg Sampling Depth: 2.0

Restrictive layer? N *Where?*

Residue Incorp? N *Type?*

Comments: Sampled a two foot field composite and separate two foot composites in the Middle, Northwest, and Southeast areas. post harvest. At the time of sampling the soil surface was dry.

| Sample Area | Depth | ppm | | | | | | Mobile Nutrients (lbs/ac) | | | | | | Exch. / Soluble Bases (meq/100g) | | | | | |
|-------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|---|---------------------------|----|---|----|------|-----|----------------------------------|--|--|--|--|--|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC | | | | | | |
| Middle | 1' | 104.6 | 3.4 | 366 | 12 | | | | | | | 2.79 | | | | | | | |
| Middle | 2' | 70.0 | 3.7 | 245 | 13 | | | | | | | | | | | | | | |
| | | Totals: | | 611 | 25 | | | | | | | | | | | | | | |
| Northwest | 1' | 38.8 | 3.6 | 136 | 13 | | | | | | | 2.09 | | | | | | | |
| Northwest | 2' | 38.7 | 2.6 | 135 | 9 | | | | | | | | | | | | | | |
| | | Totals: | | 271 | 22 | | | | | | | | | | | | | | |
| Southeast | 1' | 183.6 | 4.9 | 643 | 17 | | | | | | | 3.70 | | | | | | | |
| Southeast | 2' | 194.8 | 2.8 | 682 | 10 | | | | | | | | | | | | | | |
| | | Totals: | | 1324 | 27 | | | | | | | | | | | | | | |

Comments: Residual nitrates are variable - with only the Northwest area below 45 ppm.

| Sample Area | Depth | Immobile Nutrients (ppm) | | | | | | Chemical Data | | | | Other Data | |
|-------------|-------|--------------------------|------|----|----|----|----|---------------|-----|-------------|-----------|------------|-----|
| | | P ^{P(ace)} | K | Zn | Mn | Fe | Cu | O.M. | pH | EC mmhos/cm | Eff/Calc. | VolWt | %AW |
| Middle | 1' | 231 | 1087 | | | | | 3.0% | 7.9 | 1.31 | Yes | 1.30 | 60% |
| Northwest | 1' | 177 | 816 | | | | | 2.5% | 7.9 | 0.54 | Yes | 1.30 | 65% |
| Southeast | 1' | 298 | 1442 | | | | | 2.8% | 8.4 | 1.98 | Yes | 1.30 | 65% |

Comments:

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.

FIELD SAMPLE GDS6 (E Pivot N Side)
FIELD SAMPLE GDS7 (W Pivot N Side)

Date: March 27, 2019
 Report No: S56435
 Grower: WS Farms
 Client: Nutrien Ag Solutions - Sunnyside
 Sampler: Lance W.



SUMMARY PAGE

| SOIL ANALYSIS REPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|-------|-----|----------------|------|--------|------|--------|------|-------|------|-----|------|-----|------|-------|------|-----|----|-----|----|-----|-----|---------------|------|---------------------|-------------|-----------------|------|-----|-----|
| Lab # | Depth | | Field ID | Crop | NO3-N | | NH4-N | | P | | K | Ca | Mg | Na | SO4-S | B | Zn | Mn | Cu | Fe | pH | SMP | Soluble Salts | OM | Efferve-scence Test | Total Bases | Base Saturation | | | |
| | Start | End | | | lbs/ac | ppm | lbs/ac | ppm | Olsen | Bray | | | | | | | | | | | | | | | | | ppm | ppm | ppm | ppm |
| 2232 | 0 | 12 | A | | 37 | 11.5 | 16 | 4.9 | 19 | | 204 | 22.1 | 3.2 | 0.21 | 7 | 0.57 | 2.8 | 7 | 1.2 | 11 | 8.1 | | 0.40 | 1.81 | Heavy | 26.0 | 84.9 | 12.3 | 2.0 | 0.8 |
| 2233 | 0 | 12 | BC | | 41 | 12.7 | 12 | 3.6 | 64 | | 311 | 20.7 | 3.7 | 0.25 | 9 | 0.74 | 4.0 | 10 | 1.4 | 11 | 8.3 | | 0.41 | 2.22 | Heavy | 25.4 | 81.4 | 14.5 | 3.1 | 1.0 |
| 2234 | 0 | 12 | D | | 39 | 12.3 | 15 | 4.6 | 76 | | 532 | 18.0 | 3.6 | 0.16 | 9 | 0.71 | 3.5 | 10 | 1.3 | 9 | 8.1 | | 0.42 | 2.16 | Heavy | 23.1 | 77.9 | 15.6 | 5.9 | 0.7 |
| 2235 | 0 | 12 | E | | 49 | 15.4 | 18 | 5.6 | 68 | | 387 | 16.5 | 3.8 | 0.26 | 7 | 0.43 | 3.3 | 8 | 1.3 | 14 | 8.0 | | 0.40 | 1.99 | Medium | 21.5 | 76.6 | 17.6 | 4.6 | 1.2 |
| 2236 | 0 | 12 | Alfalfa | | 59 | 18.4 | 12 | 3.7 | 29 | | 214 | 15.6 | 3.7 | 0.20 | 8 | 0.24 | 2.9 | 7 | 1.3 | 14 | 7.6 | | 0.41 | 1.66 | Slight | 20.0 | 77.8 | 18.5 | 2.7 | 1.0 |
| 2237 | 0 | 12 | E Pivot N Side | | 65 | 20.4 | 15 | 4.6 | 92 | | 440 | 16.1 | 4.2 | 0.19 | 10 | 0.45 | 3.3 | 6 | 1.4 | 11 | 8.0 | | 0.49 | 2.06 | Slight | 21.6 | 74.5 | 19.4 | 5.2 | 0.9 |
| 2238 | 0 | 12 | E Pivot S Side | | 40 | 12.4 | 32 | 10.1 | 62 | | 439 | 17.7 | 4.1 | 0.36 | 7 | 0.53 | 3.2 | 9 | 1.3 | 11 | 8.1 | | 0.43 | 2.15 | Heavy | 23.3 | 76.0 | 17.6 | 4.8 | 1.5 |
| 2239 | 0 | 12 | W Pivot N Side | | 109 | 34.0 | 29 | 9.2 | 71 | | 732 | 19.1 | 3.7 | 0.49 | 10 | 0.54 | 3.2 | 8 | 0.9 | 6 | 8.3 | | 0.61 | 2.40 | Heavy | 25.2 | 75.9 | 14.7 | 7.4 | 1.9 |
| 2240 | 0 | 12 | W Pivot S Side | | 131 | 40.9 | 26 | 8.2 | 84 | | 633 | 18.0 | 4.2 | 0.46 | 15 | 0.66 | 3.5 | 9 | 1.1 | 8 | 8.3 | | 0.65 | 2.11 | Heavy | 24.3 | 74.1 | 17.3 | 6.7 | 1.9 |

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KTL will make every effort to provide an accurate analysis. Liability is limited to the cost of the analysis and no other warranties, expressed or implied are given. Recommendations serve only as a general guide and should be adjusted to specific situations and conditions.

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Measuring Crop Needs for Greater Profits

Fertility Report

F19-0667
11664

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Acres: 63.8

Sample Date: 9/26/2019

Crop: Corn

Irrigation: Center Pivot

Previous Crop: 2019 Wheat

Current Crop: 2020 Corn

Soil series: Warden silt loam

Leach Hazard:

No. of Sites: 19

Topography: Moderately undulating

Avg Sampling Depth: 2.0

Restrictive layer? Y **Where?** Compaction at 14"

Residue Incorp? N **Type?** Moderate stubble.

Comments: Sampled a two foot field composite, post harvest. At the time of sampling field was disked. Soil surface dry. Light weeds.

| Sample Area | Depth | ppm | | | | | Mobile Nutrients (lbs/ac) | | | | | | Exch. / Soluble Bases (meq/100g) | | | | | |
|-----------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------------|----|----|---|----|------|----------------------------------|--|--|--|--|--|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC | | | | | |
| Field Composite | 1' | 20.2 | 4.1 | 71 | 14 | | | | | | | | | | | | | |
| Field Composite | 2' | 17.5 | 2.8 | 61 | 10 | | | | | | | | | | | | | |
| Totals: | | | | 132 | 24 | | | | | | | | | | | | | |

Comments: Residual nitrates are low overall.

Comments: _____

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.



Measuring Crop Needs for Greater Profits

Fertility Report

F19-0284

11106

Crop: Triticale-Forage Mix

Acres: 17

Sample Date: 5/15/2019

Irrigation: Wheel Line

Previous Crop: 2018 Alfalfa

Current Crop: 2019 Triticale-Forage Mix

Soil series: Warden Sinloc silt loams

Leach Hazard:

No. of Sites: 14

Topography: Very gentle S slope

Avg Sampling Depth: 2.0

Restrictive layer? N **Where?**

Residue Incorp? N **Type?** Moderae stubble.

Comments: Sampled a two foot field composite, post harvest. At the time of sampling the soil surface was dry.

| Sample Area | Depth | ppm | | | | | | Mobile Nutrients (lbs/ac) | | | | | | Exch. / Soluble Bases (meq/100g) | | | | | | |
|-----------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|---|---------------------------|----|---|----|------|-----|----------------------------------|--|--|--|--|--|--|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC | | | | | | | |
| Field Composite | 1' | 5.3 | 8.2 | 19 | 29 | | | | | | | | | | | | | | | |
| Field Composite | 2' | 1.4 | 5.8 | 5 | 20 | | | | | | | | | | | | | | | |
| Totals: | | 23 | | 49 | | | | | | | | | | | | | | | | |

Comments: The second foot nitrate level is below 45 ppm.

The two foot average nitrate plus ammonium level is below 25 ppm (10.35 ppm).

| Sample Area | Depth | Immobilized Nutrients (ppm) | | | | | | | Chemical Data | | | | Other Data | |
|-----------------|-------|-----------------------------|----|----|----|----|----|------|---------------|-------------|-----------|-------|------------|--|
| | | P ^{P(ace)} | K | Zn | Mn | Fe | Cu | O.M. | pH | EC mmhos/cm | Eff/Calc. | VolWt | %AW | |
| Field Composite | 1' | 13 | 85 | | | | | 1.9% | 8.1 | 0.33 | Yes | 1.30 | 75% | |

Comments: Soil P and K are low.
Soil pH remains alkaline.
Salts are favorably low.

Comments: At the time of sampling the soil moisture level was below field capacity.

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.



Measuring Crop Needs for Greater Profits

Fertility Report

[Redacted] 11106
Crop: Alfalfa **Acres:** 17 **Sample Date:** 8/5/2019
Irrigation: Wheel Line **Previous Crop:** 2019 Triticale-Forage Mix
Current Crop: 2020 Alfalfa

Soil series: Warden Sinloc silt loams **Leach Hazard:** **No. of Sites:** 15
Topography: Very gentle S slope **Avg Sampling Depth:** 2.0

Restrictive layer? Y **Where?** Soil compaction.

Residue Incorp? N **Type?** Moderate stubble.

Comments: Sampled a two foot field composite post harvest. At the time of sampling the soil surface was dry. Light weed growth.

| Sample Area | Depth | ppm Mobile Nutrients (lbs/ac) | | | | | | Exch. / Soluble Bases (meq/100g) | | | | | |
|-----------------|-------|-------------------------------|-----------------|-----------------|-----------------|-----------------|---|----------------------------------|----|------|----|------|-----|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC |
| Field Composite | 1' | 7.3 | 3.4 | 26 | 12 | | | | | 0.33 | | | |
| Field Composite | 2' | 10.0 | 7.0 | 35 | 25 | | | | | 0.33 | | | |
| Field Composite | 3' | 5.9 | 3.4 | 21 | 12 | | | | | 0.33 | | | |
| Totals: | | 81 | | 48 | | | | | | | | | |

Comments: The two foot average nitrate plus ammonium level is below 25 ppm (13.85 ppm).

| Sample Area | Depth | Immobile Nutrients (ppm) | | | | | | Chemical Data | | | | Other Data | |
|-----------------|-------|--------------------------|-----|----|----|----|----|---------------|-----|-------------|-----------|------------|-----|
| | | P ^{P(ace)} | K | Zn | Mn | Fe | Cu | O.M. | pH | EC mmhos/cm | Eff/Calc. | VolWt | %AW |
| Field Composite | 1' | 18 | 128 | | | | | 1.2% | 7.9 | 0.23 | Yes | 1.30 | 75% |
| Field Composite | 2' | 22 | 128 | | | | | 1.9% | 7.6 | 0.31 | Yes | 1.30 | 80% |
| Field Composite | 3' | 13 | 127 | | | | | 0.8% | 8.3 | 0.14 | Yes | 1.30 | 85% |

Comments: Soil P and K are low.

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.



Measuring Crop Needs for Greater Profits

Fertility Report

[Redacted] 11106
Crop: Alfalfa **Acres:** 17 **Sample Date:** 10/15/2019
Irrigation: Wheel Line **Previous Crop:** 2019 Triticale-Forage Mix
Current Crop: 2020 Alfalfa

Soil series: Warden Sinloc silt loams **Leach Hazard:** **No. of Sites:** 14
Topography: Very gentle S slope **Avg Sampling Depth:** 3.0
Restrictive layer? N **Where?**
Residue Incorp? Y **Type?** Moderate stubble.

Comments: Sampled a three foot field composite, post harvest. At the time of sampling the soil surface was dry, some irrigation underway.

| Sample Area | Depth | ppm | | | | | Mobile Nutrients (lbs/ac) | | | | | | Exch. / Soluble Bases (meq/100g) | | | | | |
|-----------------|-------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------------|----|------|---|----|------|----------------------------------|--|--|--|--|--|
| | | NO ₃ | NH ₄ | NO ₃ | NH ₄ | SO ₄ | B | Ca | Mg | K | Na | T.B. | CEC | | | | | |
| Field Composite | 1' | 29.0 | 1.7 | 102 | 6 | | | | 0.54 | | | | | | | | | |
| Field Composite | 2' | 31.7 | 1.8 | 111 | 6 | | | | 0.22 | | | | | | | | | |
| Field Composite | 3' | 15.7 | 1.8 | 55 | 6 | | | | 0.15 | | | | | | | | | |
| Totals: | | | | 267 | 19 | | | | | | | | | | | | | |

Comments: The two foot residual nitrate level is below 45 ppm.

| Sample Area | Depth | Immobilized Nutrients (ppm) | | | | | | | Chemical Data | | | | Other Data | |
|-----------------|-------|-----------------------------|-----|----|----|----|----|------|---------------|-------------|-----------|-------|------------|--|
| | | P ^{P(ace)} | K | Zn | Mn | Fe | Cu | O.M. | pH | EC mmhos/cm | Eff/Calc. | VolWt | %AW | |
| Field Composite | 1' | 29 | 210 | | | | | 1.8% | 8.0 | 0.48 | Yes | 1.30 | 85% | |
| Field Composite | 2' | 9 | 84 | | | | | 1.0% | 8.3 | 0.38 | Yes | 1.30 | 95% | |
| Field Composite | 3' | 5 | 60 | | | | | 0.7% | 8.3 | 0.48 | Yes | 1.30 | 100% | |

Comments: Soil P and K are adequate.
 Soil pH is alkaline.
 Salts are favorably low.

Comments: At the time of sampling, the soil moisture profile was below field capacity.

Fertility and chemical data used to formulate a recommendation was processed and reported by Soil Test, Inc.