

CASE STUDY I: MAINTAINING SOIL COVER & MANAGING PHOSPHATE TO REDUCE EROSION & RUNOFF

Hummocky landscapes often have eroded hilltops, caused by many years by tillage, wind, and water erosion. This eroded soil results in challenges with good seed placement and emergence, often resulting in low plant populations and exposed soil that increases susceptibility to further erosion.

One successful solution has been to increase seed rates in these areas to ensure crop establishment, protect soil, and allow the plant roots to regenerate the soil. Over a period of 2-4 years, the increased crop roots and biomass returned to the soil improves soil health, lowering seedling mortality rates. Eventually seeding rates can return to normal. One modest example of this is shown below (Figure 1) for canola, where

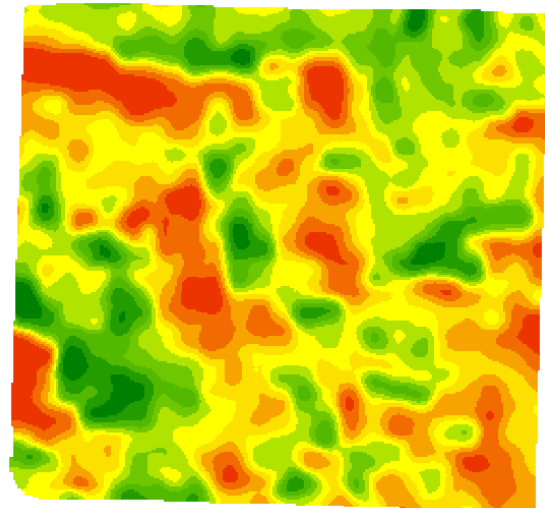
the seeding rate was increased 6% to partially compensate for the expected higher mortality rates (actual mortality rates in zone 1 were 24% vs. field average of 18%). Rates were also increased in zones 7 to 10 due to poor soil structure and salts; the goal being to establish enough canola to achieve ground cover, use water, and protect the soil from further degradation. To minimize excessive phosphate accumulation, potential runoff, and help minimize any additional salt toxicity in the seed row, phosphate rates were adjusted in SWAT zones based on expected soil P supply and yield removal. This combination of VR seed and phosphate is easy to execute with modern air seeder technology.

APPLICATION SUMMARY

| Zone | Area Acres | Yield Goal bu/ac | Layer 1 Canola | Layer 2 MAP | Layer 3 Urea | Layer 4 PS | Applied Actuals |
|------|---------------|---------------------|-------------------|----------------|-----------------|---------------|-----------------|
| 1 | 3.8 | 40 | 5.3 | 40 | 175 | 140 | 110-45-0-23 |
| 2 | 8.4 | 45 | 5.1 | 40 | 180 | 140 | 112-45-0-23 |
| 3 | 10.1 | 50 | 4.9 | 40 | 185 | 130 | 113-43-0-21 |
| 4 | 11.4 | 55 | 4.9 | 40 | 180 | 120 | 108-41-0-19 |
| 5 | 10.9 | 60 | 4.9 | 40 | 175 | 110 | 104-40-0-18 |
| 6 | 9.6 | 65 | 5 | 40 | 165 | 100 | 98-38-0-16 |
| 7 | 6.3 | 55 | 5.1 | 35 | 140 | 80 | 82-32-0-13 |
| 8 | 6.6 | 45 | 5.2 | 25 | 110 | 50 | 62-22-0-8 |
| 9 | 2.3 | 30 | 5.4 | 25 | 85 | 35 | 48-19-0-6 |
| 10 | 1.1 | 10 | 5.6 | 15 | 60 | 35 | 35-14-0-6 |
| | 70.5 | 52 | 5 | 37.3 | 162.5 | 106.4 | 98-38-0-17 |

SOIL TESTS

| Zone | Area % | N '19 | OM % | pH | P Olsen | K | S | Cl | Zn | Cu | EC |
|------|-----------|----------|---------|-----|------------|-----|-----|----|-----|-----|------|
| 1-2 | 17 | 17 | 4.5 | 7.1 | 7 | 394 | 29 | 7 | 1.2 | 0.6 | 0.33 |
| 3-4 | 30 | 27 | 5.6 | 7.6 | 8 | 443 | 160 | 16 | 1.2 | 0.6 | 1.93 |
| 5-6 | 29 | 19 | 4.4 | 7.3 | 9 | 491 | 160 | 16 | 1.2 | 0.7 | 0.90 |
| 7-8 | 18 | 63 | 4.1 | 7.0 | 10 | 445 | 160 | 80 | 1.1 | 0.7 | 2.34 |
| 9-10 | 5 | 29 | 5.0 | 7.7 | 31 | 458 | 160 | 61 | 1.6 | 0.9 | 3.19 |



Acres: 20 (17.8 GPS)

Date Checked: 19/06/2020

Canola-Liberty(PV 681 LC)

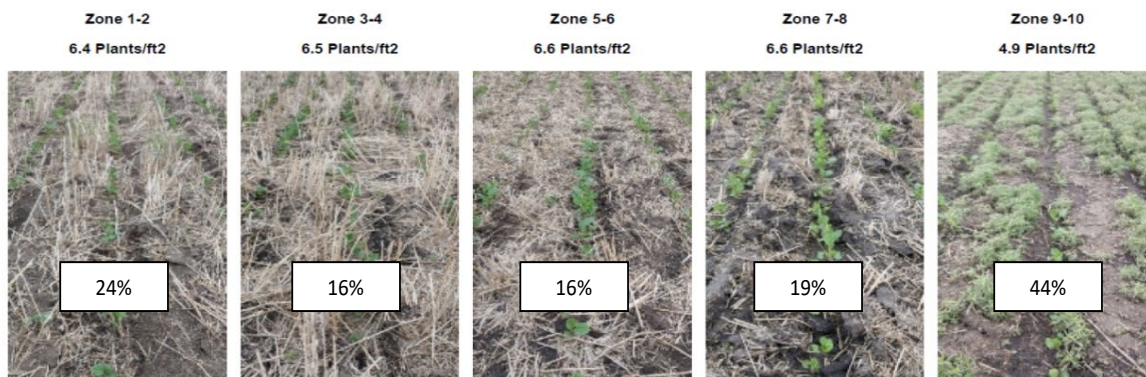


Figure 1. VR prescription (top, seed rates in Layer 1) and soil tests (middle) and resulting plant populations (bottom) in five SWAT zones, including calculated mortality rates in white text boxes (field average: 6.5 plants/ft2 and 18% mortality).

