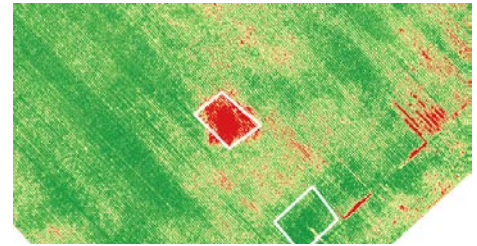


DRONE NDVI STRESS IMAGES AND SOIL HEALTH

SOLVITA CO₂-BURST AND SOLVITA SLAN COMPARED TO AERIAL NDVI

Solvita CO₂ and SLAN are soil tests designed to interface with routine nutrient tests to “complement” the fertilizer-nutrient data with biological information. Previous technical memos have suggested ranges for meaningful interpretation.¹ Interpretation of soil biology tests is a work-in-progress as these tests do not necessarily obey chemical-calibration models commonly used to “calibrate” soil nutrient results. An increasing number of studies are providing insight into including soil biology in routine farm assessments. Monitoring crop stress by aerial NDVI is an opportunity to examine how soil health may relate to stress zones.

A 15-farm study was conducted in 2016 in south-eastern Canada² with NDVI imaging to locate corn plant stress zones. Two differing types of stress images were used (simple vs complex- see Fig 1,2) and nutrient and biological soil parameters evaluated in samples GPS-mapped to within each stress zone from which 10-replicate tests were made.

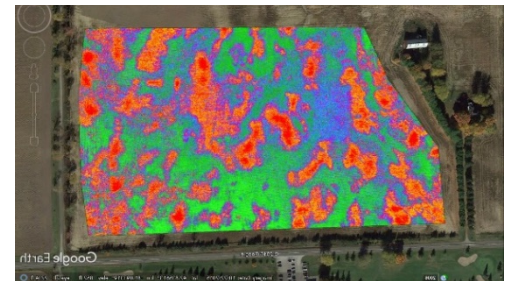


1 Farm Field N₂ with Distinct Stress zone

Table 1 presents the observed numerical differences in Solvita CO₂ and SLAN comparing high stress and non-stress areas.

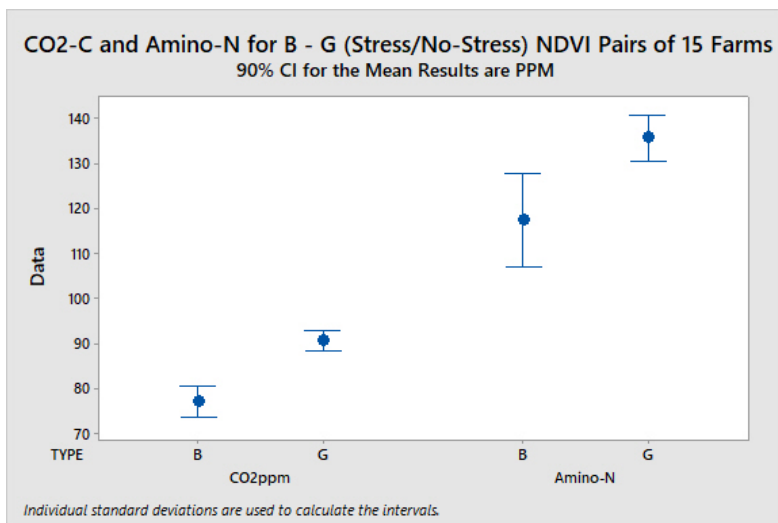
TABLE 1	CO ₂ - Burst (ppm)		SLAN Amino-N (ppm)	
	Stress (Red)	No Stress (Green)	Stress (Red)	No Stress (Green)
Pic 1-N ₂	14	90 ***	36	142 ***
Pic 2-N ₁₁	54	86 ***	71	137 ***

*** indicate results which are statistically significant at p < 0.001



2- Farm N₁₁ with complex stress pattern

Solvita tests detected differences, with more soil health in non-stress areas. ANOVA for all 15-farms (Fig. 3) showed non-stress locations had significantly more soil Solvita CO₂ (50%) and Solvita SLAN (35%) (p < 0.001).



No significant differences in soil test values were noted for P, K or OM but pH was significantly lower in non-stress zones (implicating Ca & Mg). Yields tracked stress. While the results don't prove that low soil biology is the cause of the crop stress, they do implicate soil health which may point to potentially long-term soil moisture and other issues. The findings show the usefulness of including soil biology tests in crop stress evaluation and should lead to innovative solutions beyond only altering soil nutrient additions for stress zones.

¹ Guidelines For Ranking Test Results Tech Memo 0317-3 2017 (Woods End Laboratories, Inc)

² Comparison of NDVI Stress zones and Biological Factors. Woods End Labs and A&L Canada manuscript 2016