

## Introduction:

The CropScan 2000G cereal tissue test has been developed to give wheat growers a relatively accurate indication of the nutrition status of their crop. More importantly, it provides a means of effective fertilizer management in order to produce the maximum yield of crop. Figure 1 shows the relationship between shoot nitrogen and growth stage in order to obtain a 90-100% yield potential. Crops with lower nitrogen values at a particular growth stage will require the addition of fertilizer to reach this potential.

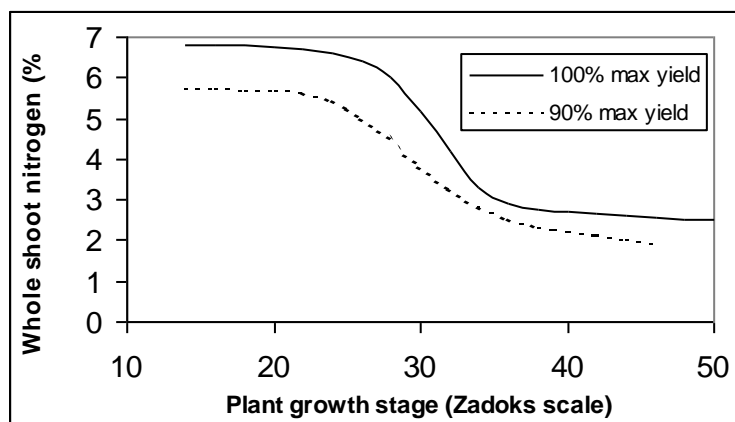


Figure 1 Shoot Nitrogen Window for 90-100% Maximum Crop Yield

As with all scientific testing procedures, care should be taken in every step of the process and the following outlines the necessary steps involved to obtain the best results from your instrument. It should also be stated that all results be assessed by your agronomist before any decisions are made.

## Procedure

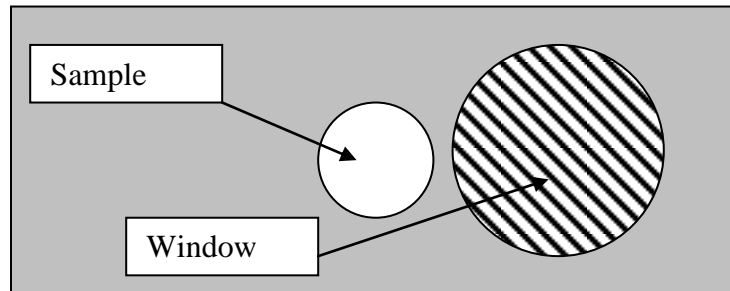
- 1) Plants are collected at the growth stages from early tillering (Z20) to stem elongation (Z30) as these best indicate yield response to nitrogen. The Zadoks Scale is provided in this report for convenience.
- 2) During the above growth stages, plants are collected from 3 randomly selected 1-meter drill rows in which the crops should be uniform in development and variety. The plants are cut approximately 1cm above ground level and dirt and

weeds are removed. The number of tillers (shoots) are counted and this number is recorded as the number of shoots per meter row.

- 3) Approximately 100 grams of fresh material is weighed out on a kitchen scale, cut into 50-75mm lengths and microwaved on high for approximately 5 minutes. Microwave oven power does vary from model to model, so for the first samples, dry them for about 3 minutes and check if they are brittle enough to crumble in the hands. If not, continue drying in one-minute intervals until brittle. The plants should lose about 80% of their weight at this stage.

Do not burn the material, as the results will not reflect the true nitrogen values. If burning occurs, repeat the above process with a fresh sample.

- 4) The dried material is then placed in a commercial coffee or spice grinder and ground in short intervals over a 3-minute period. Greener, finer powders usually result from plants at early growth stages whereas coarser powders result from later growth stages. Any large matter can be removed by screening the powder through a tea strainer.
- 5) Fill the sample well provided in the cell with the ground material and level it off with a flat object. This material is transferred to the window area by tapping the cell to ensure constant packing. It should be checked that no light holes are visible through the sample area.



- 6) Download the tissue calibration to the Cropscan 2000G following the procedure in the instruction manual. The sample is scanned on the instrument and the result for nitrogen is referred to an appropriate fertilizer recommendation table such as table 1.

## *Results*

Figure 2 shows the Predicted vs. Actual results for nitrogen content in 10 wheat crop samples grown in 2000 scanned on the Cropscan 2000G Whole Grain Analyser

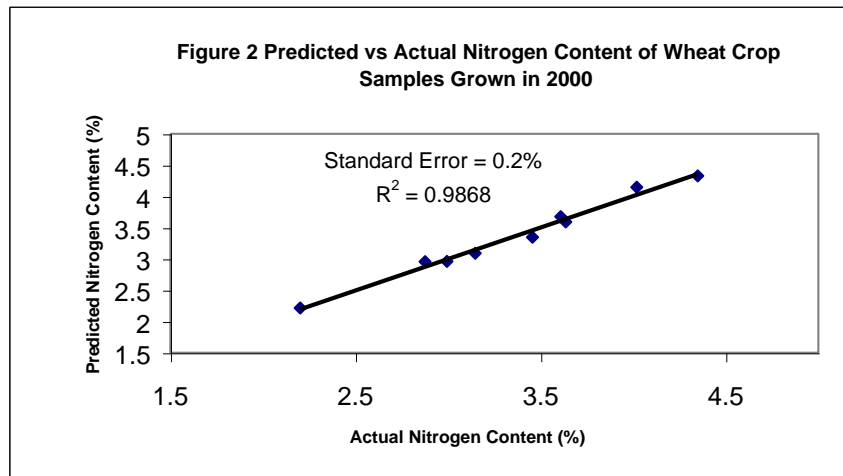


Figure 3 shows the Predicted vs. Actual results for fructan content in 10 wheat crop samples grown in 2000.

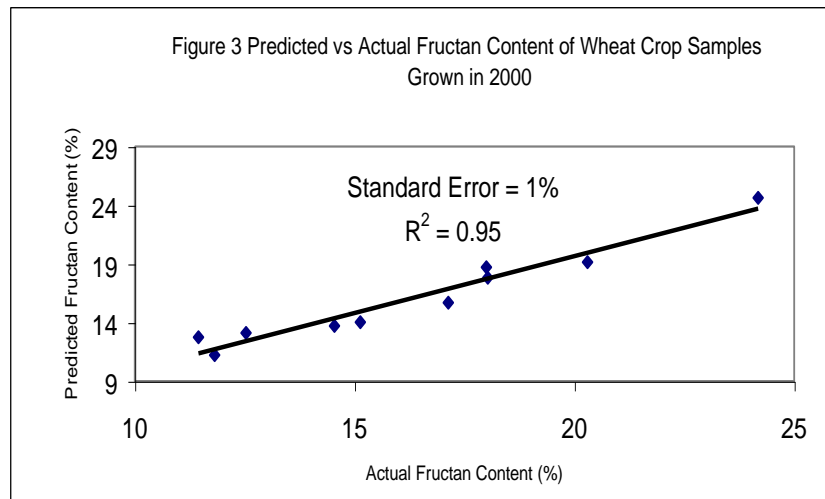


Figure 4 shows the relationship between fructan and tissue nitrogen in wheat. Samples with a nutrient energy index (NEIDX)  $\geq \pm 4$  indicate that the growth of these crops may be limited by some factor other than nitrogen, for example: water stress, frost damage or phosphorous and sulfur deficiency.

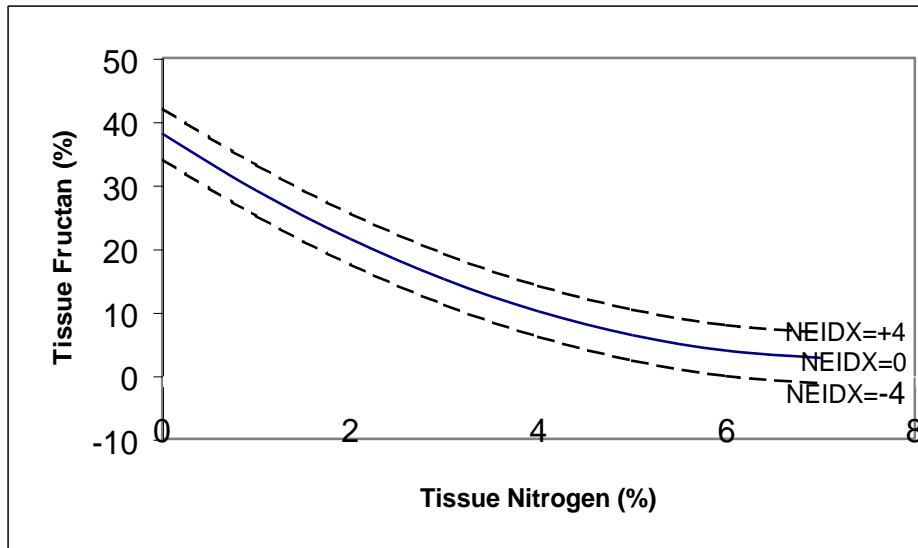


Figure 4. The relationship between Nitrogen and Fructan for Wheat Crops.

### *Crop Growth Stages*

<i>Growth Stage</i>	<i>Zadoks</i>	<i>Description</i>
Early Tillering	21	Main shoot and 1 tiller
	22	Main shoot and 2 tillers
	23	Main shoot and 3 tillers
Mid Tillering	24	Main shoot and 4 tillers
	25	Main shoot and 5 tillers
	26	Main shoot and 6 tillers
Late Tillering	27	Main shoot and 7 tillers
	28	Main shoot and 8 tillers
	29	Main shoot and 9 or more tillers
Stem Elongation	30	Ear at 1cm
	31	First node detectable
	32	Second node detectable

		Growth Stage			
Total Tissue	Early	Mid Tillering	Late Tillering	1 <sup>st</sup> Node on	2 <sup>nd</sup> Node on

%N	Tillering			Main Stem	Main Stem
>5.3	0				
5.0-5.3	30 or 40				
4.5-5.0	40 or 50				
4.0-4.5	50 or 70				
<4.0	70 or 90				
>5.0		0			
4.5-5.0		30 or 40			
4.0-4.5		40 or 50			
3.5-4.0		50 or 70			
<3.5		70 or 90			
>4.3			0		
4.0-4.3			30 or 40		
3.0-4.0			40 or 50		
<3.0			50 or 60		
>3.5				0	
3.0-3.5				20 or 30	
2.5-3.0				30 or 40	
<2.5				40 or 60	
>3.0					0
2.0-3.0					20 or 30
<2.0					30 or 40

**Table 1 Nitrogen Fertilizer Recommendations (KgN/ha) for Dryland Wheat (1996 data)**