

Finding the Sweet Spot between Protein and Yield for a Victorian wheat farmer.

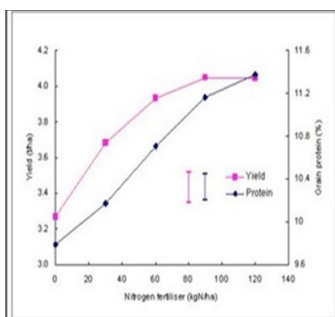
Introduction:

During the plant growth and development stages, Nitrogen is required in order to ensure that the optimum yield and protein contents are achieved. Yield is affected by moisture in the soil being available to drive the nutrients through the plant to the leaves and the flowers or heads. However Nitrogen is important because it is the building block for protein which makes up the plant's tissues.

If there is insufficient Nitrogen at the Tillering phase then the plant may not produce the full complement of tillers, i.e., 6-8 per plant. If the plant grows with only 4 or less tillers then plant can never achieved its full yield potential because there can only be a maximum of 4 or less heads of seeds.

If the plant develops with 6-8 heads, but there is insufficient water and Nitrogen available in the soil, then the plant will abort some of the heads and thereby reduce the yield. If the plant develops with 6-8 heads but there is insufficient Nitrogen at the flowering and filling phases, then the plant will not produce the correct level of protein.

The optimum yield for wheat and barley can be achieved when the protein is approximately 11.5-12.5%. At this protein level, the plant had enough Nitrogen to achieve the full growth potential. If the protein content does not reach this level then it indicates that there was insufficient Nitrogen at the filling stage.



Description:

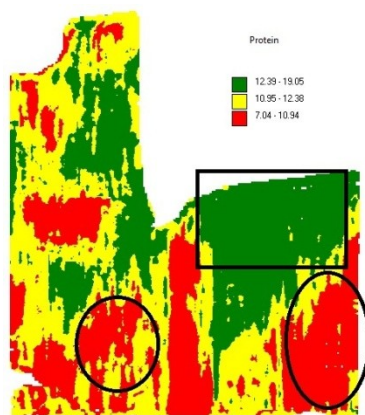
A farmer in Western Victoria has been using the CropScan 3000H On Combine Analyser to measure the Protein level in his wheat crops. A real-time Protein Map is displayed so that the operator can see where the protein concentrations are low and high.

By combining the Yield Map and the Protein Map, a Nitrogen Removal Map can be generated that shows how Nitrogen availability has affected the plants development. The following three maps are Protein, Yield and Nitrogen Removal for one paddock on this particular farm.

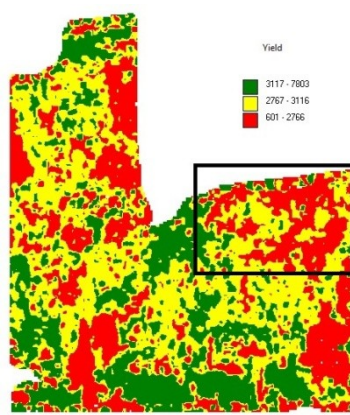
The two zones that are circled are where the protein and the yield are low. This indicates that the plant did not have sufficient nutrients available to achieve full yield and an optimum protein payment premium. Wheat stripped in these zones would have been graded as Feed or ASW, where as other parts of the paddock produced AWP, H2 and H2 grades.

In the zone that is marked by a rectangle, the protein is high yet the yield is low to medium. This shows that there was insufficient Nitrogen during the growth phases which resulted in a loss in yield. However there was sufficient Nitrogen during the filling phase whereby the plant produced higher protein in the final seeds.

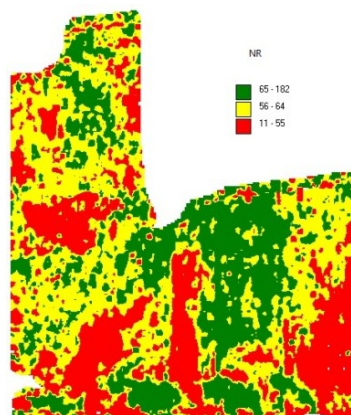
The Nitrogen Removal Map provides the farmer with the ability to develop a Variable Rate Nitrogen Fertilization prescription for the following year. As a minimum, the farmer should use the map to replace the Nitrogen in proportion to how it was taken up by the plant, however the correct action would be to increase the Nitrogen rate in the zones where the yield is lower and possibly decrease the Nitrogen in the zones where the protein is too high. This will provide the farmer with an optimum of yield and achieve the best protein premiums for their crop.



Protein map



Yield map



Nitrogen Removal map