Fertiliser N requirements for spring barley in Ireland

Description of Work

Inseason measurements that monitor the N status of a crop have the potential to allow fine-tuning of N recommendations during the season. Optical sensors, which principally measure the amount of particular wavelengths of light being reflected from a crop, have the potential to aid in determining N inputs. Numerous studies have indicated that these sensors can give a good indication of the nitrogen status of a crop and indicate whether a crop requires fertiliser N or not. However determining the amount of N required is less straightforward as it requires some indication of future conditions (soil N supply, crop growth and fertiliser N recovery). As a small part of a project looking at the effects of fertiliser N on malting barley yield and quality the potential of optical sensors is being examined. The objective of the work being carried out is to determine the reliability of sensors to indicate fertiliser N needs, both in terms of yield and protein content, under Irish conditions and determine the most appropriate crop growth stage to make measurements.

International Context

Internationally there is ongoing work examining sensor use for N management, particularly in relation to choice of wavelengths, choice of vegetation index and development of algorithms. Much, but not all, of the commercially available algorithm work would appear to be carried out by commercial companies where commercial considerations mean that the details of the algorithms are not publicly available and thus are difficult to assess. The linking of optical sensor data with other sources of data such as yield maps, soil measurements (actual or sensed, weather data) is also being investigated, with a view to better identifying the quantity of fertiliser N required. Within Teagasc very limited resources have been assigned to this work to date so limited progress has been made. However, with its capability in various scientific disciplines, particularly in the area of agronomy, at field and farm level Teagasc has the potential to add considerable value to development work in this area.

Opportunities

The key gap in this area is a reliable and scientifically validated means of converting sensor readings into reliable fertiliser advice, i.e. an algorithm that translates sensor readings, and other information, into fertiliser advice on a site specific basis. Teagasc is well positioned to conduct the required, independent, field and on-farm research in this area. In conjunction with equipment and service providers, as well as farm advisers, the results can be delivered to growers at farm level.