

## Response of barley varieties to nitrogen fertiliser under contrasting water availability

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Barley is often grown on soil low in mineral N, with little or no fertiliser input. This has largely been an attempt to obtain malting grade (low) grain protein. However, there is evidence that N deficiency can substantially reduce potential grain yield. The aim of this project was to determine the level of N fertiliser which maximises yield of feed and malting barley whilst maintaining appropriate grain protein level and grain size.

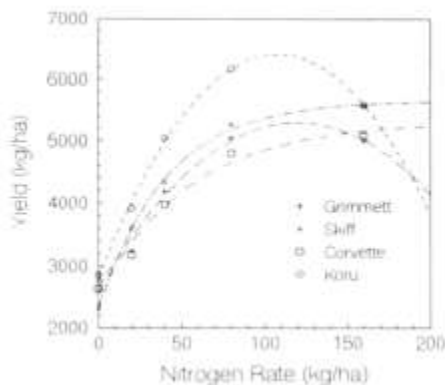
### Methods

The grain yield, protein and size of varieties Grimmatt (a malting type), Skiff, Corvette, and Koru were recorded over two years at four sites (irrigated and dryland) on the Darling Downs, with up to eight N rates. Other data collected included dry matter production, water use, N uptake, leaf area index, and root length density.

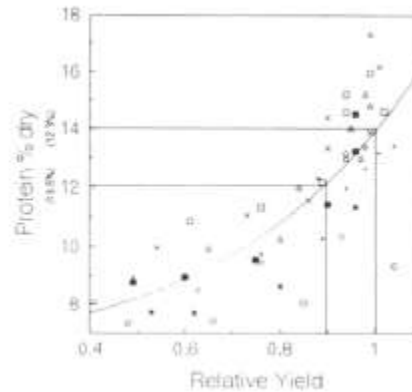
### Results and discussion

In all cultivars, grain yield was 2 to 3 t/ha without N application and responded almost linearly to 5 to 6 t/ha with 80 kg N/ha. Koru produced almost 1 t/ha more grain than the other varieties with 80 kg N/ha (Fig. 1). A rate of 80 kg N/ha promoted leaf area development, dry matter production and water extraction, resulting in higher yields.

Grain protein rose with increased N application but was acceptable for malting grade with Grimmatt with N applications at or greater than those which achieved optimum yield. This varied from 35 kg/ha for very low soil moisture conditions through to 100 kg/ha for irrigated crops. Over all varieties, the grain protein level at which the yield is economically optimised (90% of maximum yield) is approximately 11.9 % (Fig. 2).



**Figure 1. Grain yield response of four barley to applied nitrogen fertiliser.**



**Figure 2. Relative yield/protein varieties response at four trial sites.**

