

Crop-pasture rotations: are they the key to better crops in North-Western NSW?

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Cropping in the low rainfall environment of North-western New South Wales has preceded the development of a stable farming system. Total soil nitrogen, phosphorus and organic carbon levels have declined significantly under continuous cropping as compared with levels found in soils under natural pasture (I). A long-term experiment is underway to investigate the effects of a pasture phase on soil properties and subsequent wheat yield and quality in order to determine an optimum crop-pasture rotation.

Methods

The experiment was established in 1989 on two sites - a grey and brown cracking clay - east of Walgett, NSW. Both sites comprise an old cropping paddock (grey clay cropped 22 years and brown clay 12 years) alongside a natural pasture paddock - Curly Mitchell grass (*Astrelba lappacea*), naturalised medics and broad-leaved weeds. Wheat has been sown for three consecutive years on paddocks with both types of history (CC - old cropping paddock, PC -old pasture paddock). Grain yield, grain protein and total soil N have been measured annually.

Results and discussion

Over three years, grain protein levels were consistently higher (between 2-4%) in crops grown on pasture paddocks compared with crops from continuously cropped areas (Fig. 1). This represents a considerable financial advantage where premiums are paid for protein levels above 13%. This difference has been greatest on the brown clay site due to higher initial soil organic matter, with organic carbon levels and total soil N levels 31% and 26% greater respectively on PC than CC treatments. These trends presumably reflect good pasture composition with a large medic component (33% total pasture dryweight) on PC treatments on this site.

Late planting, disease and poor rainfall resulted in inconclusive yield trends in Years 1 and 3. Yields in Year 2, when moisture was adequate, were 25% higher on pasture areas at both sites as a result of a greater number of heads per plant.

Acknowledgements

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References

1. Chan. K.Y., Bellotti. W.D. and Roberts, W.P. 1988. Aust. J. Soil Res., 26, 509-18.