

Stubble retention study in grain sorghum in Central Queensland

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In central Queensland, the main time of planting for summer crops is during the December-February period. Land prepared for planting at this time under a conventional bare fallow system is very susceptible to water runoff and soil erosion from heavy summer rainfall, despite the use of structural and cultural soil conservation methods. Practices such as stubble mulching and zero or minimum tillage, which retain stubble on the soil surface over the fallow period, provide a means of reducing the effects of raindrop impact on the soil, thereby reducing water runoff and soil erosion. However, little local information is available on the effect of such practices on crop growth and yield.

An experiment was commenced in the Biloela area (latitude 24° 22'S, longitude 150° 31'E) in June 1978 to determine the effects of stubble retention and tillage method on water entry and storage in the soil, soil nutrient status, crop establishment and productivity of grain sorghum. Conventional cultivation, minimum tillage and stubble mulch treatments are being compared, each under conditions where stubble is either retained over the fallow period or removed from plots before tillage operations commence. Conventional cultivation involves the use of a disc plough for initial cultivations and tined implements for subsequent workings. Minimum tillage involves the use of herbicides e.g. gramoxone, glyphosate, to control weeds and sorghum regrowth over the fallow period. In stubble mulch treatments, a blade plough and rod weeder are used for cultivation, with a view to maintaining stubble on the soil surface. Trial design is a 6 x 4 randomized block with plot size of 25 m x 15 m. Soil type is a brigalow, cracking clay, Ug 5.24.

In the 1978/79 season, rainfall was above average during the fallow period but below average during the period of crop growth. No marked treatment differences were apparent in soil moisture accumulation over the fallow period or in soil moisture levels at planting. In mid-February 1979. No significant ($P < .05$) treatment differences occurred in soil nitrate level changes over the fallow period. In all treatments, there was evidence of movement of water and leaching of nitrate and chloride through the profile to below a depth of 1.8 m. No significant ($P < .05$) differences in grain yield occurred between conventional cultivation and stubble mulch treatments. Minimum tillage gave lower yields than cultivated treatments, mainly because of plant establishment problems in the former treatments.

The experiment is to be continued at the same location for a number of years.