

A ley farming system for the semi-arid tropics

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In semi-arid areas of northern Australia, land has largely been used for extensive grazing of native grasslands by cattle and for sporadic attempts at large scale cropping. A recent review of these cropping ventures stressed the importance of integrating cropping with beef production in the future (Bauer, 1977). Mixed farming was recognized by the pioneer researchers as the most feasible system for the region (Anon, 1959), and they studied many of the components. Nevertheless, an integrated system has yet to be tested. We are beginning such a test at Katherine, N.T. and this paper outlines our research strategy. Our hypothetical farming system consists of:

- a short rotation of a legume ley and either maize or grain sorghum.
- cattle grazing native pastures from the break of the season (Nov) until live-weight gain ceases (May), then deferred legume and crop residues for the rest of the dry.
- crops planted directly into pasture using zero tillage techniques.
- volunteer legume allowed to form an intercrop.
- land strip cropped on the contour.

The bases for this system are:

- tropical legume swards can fix 80-150 kg of nitrogen per ha (Wetselaar, 1967; Crack, 1972) which compares favourably with Mediterranean legumes (Greenland, 1971). Longer periods of well-fertilized legume pasture often result in increased grass invasion (Gillard and Fisher, 1978) which suggests that N is being released and that short periods under legume pasture followed by a cereal crop may form an efficient rotation which minimizes use of bag N.
- cattle grazing deferred legume pasture maintain or gain weight during normal dry seasons at Katherine (Norman, 1970). The standing pasture is spoiled by rain during the dry season is only one year in ten (McCown, unpublished).
- planting the grain crop directly into the pasture using a contact herbicide appears very promising. In our first season, we found that sorghum and maize crops planted with zero-tillage had better stands and higher yields than those with conventional tillage.
- water erosion of cultivated soils was a severe problem in past cropping ventures in this region. With zero-tillage and strip cropping, erosion will be greatly reduced and stable land use will be possible.
- Our main aim is to test what we think is an efficient farming system for semiarid regions. Much valuable research on components of the system has already been conducted by others; we are actively researching 'new' areas, e.g. zero tillage and the evaluation of new legumes. Since we have no local industry using this farming system. we are initiating our own 'whole system' experiment and plan to rely heavily on studies of this system to guide further research.

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