No-tillage in Australia - some implications from overseas

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The concept of no-tillage has greatest potential in areas considered too steep for conventional seedbed preparation methods (mulch retention reduces the erosion risk), and where rainfall is sufficient to sustain adequate growth. For these reasons, no-till seems most suited to the tablelands and adjoining slopes of eastern Australia (1). Use of the system can improve the productivity of traditional grazing enterprises by reducing seasonal feed gaps with no-till forages, and in addition, permit cash crop alternatives to be considered on a regular (2) or opportunistic basis, depending on seasonal conditions.

A common factor limiting yield of crops grown under dryland conditions is inadequate soil moisture (3). Despite limitations of rainfall, soil moisture can be increased by surface residues which aid infiltration and reduce evaporation (4), resulting in superior maize yields on no-till treatments (5). There are however, some negative aspects associated with the retention of surface residues on the soil surface (6). Over 15 years of no-till experience in the U.S.A. and U.K. has shown that where mulch is present, crop and pasture species are subjected to increased pest and disease pressures (7) because of the greater number and diversity of organisms found in no-till seedbeds (8). Numbers of soil organisms vary with season (9) but are also influenced by the field history, and in particular, the preceding crop (10). While these associations have been useful in enabling predictions of potential stress for some specific pests to be made, generally this approach has not been practicable, and preventative measures have been necessary (10). The history of conservation tillage in its various forms in Australia is considerably less than that overseas, and reported pest and disease problems are relatively minor. But with time, there is good reason to believe that similar problems will also occur here (1). Australia can benefit from experiences elsewhere by adopting a coordinated approach to assessment of likely pest and disease damage under the no-till system. Such an approach is necessary since there is no reliable estimate of soil organisms available (11). This would involve collection of background counts of soil and above ground organisms in a wide variety of cropping situations. Interactions between the groups of organisms present, and their fluctuations with time and treatment may indicate the conditions under which a particular pest or disease may become a problem in no-till seedbeds. In this way, specific pesticides could be applied only when necessary. Such soundly based pesticide use can satisfy both environmental and agronomic objectives.

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