

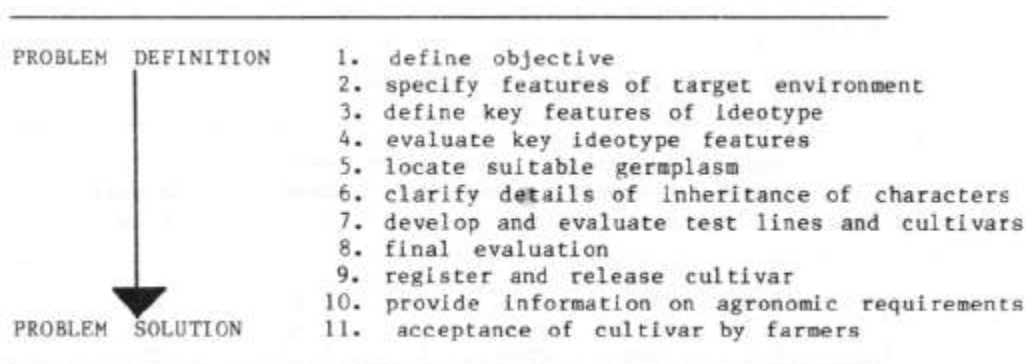
Ideotypes for the central wheatbelt of W.A. Part I - Approach

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It could be argued that crop improvement programmes in Australia tend to suffer from a lack of support in the form of environmental, physiological, and genetic studies. Pugsley (1) raises the criticism that many studies in the name of crop improvement have not yielded a new cultivar, and makes the point that a solution to a plant breeding problem is demonstrated only after the proposed solution, i.e. a new cultivar, has been accepted by the farmer. The ideotype approach, as outlined in Figure 1, and based on the ideotype concept (2), with its emphasis on a communal type plant with a high harvest index, defines a role for agronomists and specialists in crop improvement programmes.

Figure 1. A proposed sequence of steps in cultivar development.



Defining the most important features of the target environment and establishing the ideotype, as indicated in steps 2-4, in Figure 1, ensures that the phenotypic characters, associated with higher yields under a specified set of conditions, are clearly stated and, as a result, can be kept constantly in focus. Genetic studies dealing with the identification of major genes in steps 6 and 7 of Figure 1, provide the information link between characters and genes, which is necessary for efficient management of genes in plant breeding programmes.

The ideotype approach provides a framework for developing new cultivars. It indicates how the agronomist may contribute to crop improvement. This encourages a more systematic and consistent approach to cultivar development as it emphasises evaluation of characters before including them in breeding programmes. This should help to consolidate gains already made. The approach should have greatest scope where component characters of the ideotype are highly heritable.

Environmental and physiological studies, in coordination with plant breeding projects, are being applied to developing higher-yielding wheat and grain legume cultivars in the central wheatbelt of Western Australia, within the ideotype framework outlined in Figure 1. Parts II and III describe the progress towards establishing new wheat and grain legume ideotypes for the central wheatbelt of Western Australia.

1. Pugsley, A. 1986 In "Wheat Breeding Society of Australia. Proc. of the fifth Assembly. W. A. " 198 - 200.

2. Donald, C.M. 1968 Euphytica 17 385-403.