enabled me easily to ascertain, after ample collection, the existence of the two species *Amaranthus powellii* and *A. quitensis*, previously unrecognized in Australia.

Recently the Japanese Association for the Advancement of Phyto-Regulators has produced a list of weeds in the Asian-Pacific Region. It is bewildering indeed, but little by little, if serious attention is paid to individual genera, we should be able, with the help of our colleagues, to build up a thoroughly satisfying list, the best and lasting basis for serious weeds research in this large diverse region.

Taxonomic studies of aliens must be international and much financial support is necessary. Such studies enable us to come to grips with the problems of distribution and relationships to environment, to clarify problems of history and to help in the resolution of disconcertingly different results in weed control or physiological experiments in various parts of the world. Environmental differences are unlikely to be solely responsible - different species or different forms of a very broad species may be involved.

TAXONOMY OF WILD OAT TYPES

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Three species of wild oat occur frequently in Australia - *Avena fatua, Avena ludoviciana (A. sterilis* subsp. *ludoviciana)* and *Avena barbata*. Worldwide, *A. fatua* appears as a weed more frequently than the other species. Within each species of wild oat morphological differences have been used to distinguish different types.

Types that are distinguished by a limited number of spikelet characters do differ in important agricultural characteristics, e.g. susceptibility to triallate (Watkins 1970*a, b*), dormancy status (Sexsmith 1967) and germination response to temperature changes (Quail and Carter 1969). To be of practical use the differentiation of wild oat types by morphological features

needs also to be correlated with agriculturally important differences. Alternatively, constant association of one morphological character with an agriculturally important characteristic would be valuable. This would appear to require gene linkage.

Many of the earlier workers (Lindsay 1956; Sexsmith 1967) accepted a classical taxonomic classification as a basis for their studies and attempted to relate agriculturally important characteristics to previously defined taxa. The deficiencies of these existing classifications for predicting the behaviour of wild oats in the field are easily demonstrated. Lindsay (1956), in studying wild oats from the Canadian prairies, recognized four varieties of *A. fatua* ssp. *fatua* classified according to the system of Malzew (1930). The varieties were distinguished by the length of callus hairs, lemma pubescence and grain colour. However, within each variety differences in vegetative growth habit and life cycle were found.

Other workers selected a limited number of key characters, usually associated with spikelets and seeds, to separate types (Thurston 1957; Quail and Carter 1968, 1969; Hack 1973) before studying variation within and among types. Thurston (1957) grouped selections of *A. fatua* and *A. ludoviciana* according to the same lemma characters as those used by Lindsay, plus colour of the callus hairs and hairiness of the awn. However, other characters that were not taken into account in the classification did vary within types, e.g. leaf hairiness. Thurston (1957) found that for *A. ludoviciana*, percentages of dormant grains and rate of maturity as expressed by dates of 50% panicle emergence varied within types. Hack (1973) showed that percentage kill by chlorphenpropmethyl varied within types of *A. fatua* distinguished by lemma characters. Therefore to conduct a trial on wild oats, such as susceptibility to herbicides, and to record the response of types distinguished by lemma characters, would appear to be of limited use. As shown by Hack (1973) the response of the same types in different areas may be quite different.

We have begun a project in an attempt to find an association between wild oat types or a single distinguishing character, and important agricultural characteristics such as length of dormancy and susceptibility to triallate. In this study no prior weighting of characters has been assumed nor has any previous classification been accepted.

Initially seed collected from the Queensland wheat belt is being used. More than 50 characters, both phenological and morphological, are being recorded from 600 plants grown in a glasshouse and tests are being conducted in the laboratory on