unlikely to be important except in localized areas of suitable habitat.

C. incertus is a highly variable species with a wide geographic range. In Australia, it is most frequent on the northern slopes and plains of New South Wales on sandy and sandy loam soils. Unlike *C. longispinus*, dense infestations can be found in open 'native pastures', and are only slowly controlled once the pasture is sown and fertilized. It is also common in disturbed areas such as roadsides and river banks.

COMPETITIVE EFFECTS OF WILD OATS ON WHEAT UNDER FIELD AND GLASSHOUSE CONDITIONS

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It has been observed on the Darling Sowns that wheat crops may give grain yields of 30-45 bushels per acre (2,018-3,057 kg per hectare) even when wild oat populations are heavy (50 plants per sq yard, or 41.8 plants per sq metre). In most cases, however, there were no wild-oat-free areas from which grain could be harvested to assess the effect on yield of these weed populations.

A trial was commenced in which the interactions of five wheat populations (0-290 wheat per sq yard, 0-242 wheat per sq metre) and five low wild oat populations (0-50 wild oat per sq yard, 0-41.8 plants per sq metre) were investigated. It is in this range of wild oat populations that most interest lies. The trial has shown that only when the wheat to wild oat ratio was less than 1 did any significant reduction occur in wheat yields. Under these conditions, the proportionate reduction in dry matter per plant of the wild oats was greater than that of the wheat. It appeared that wheat was the stronger competitor.

Graphing dry matter per plant against log density showed that competition, either of wheat on wild oats or wheat on wheat, was greatest 6-8 weeks after emergence. It was also noted that, after each shower of rain, wild oats would continue to germinate even when the wheat was in full head. The late-germinated wild

oats gave weak plants, but they were able to produce 6-7 florets per plant. The question arose as to what affect the wild oats had on the wheat when the former germinated at different times in relation to the time of wheat germination.

A pot trial was set up in which a central wheat plant (cv.Gamut) was surrounded by a set number of competing plants ranging from all wheat to all wild oats. This gave an equivalent population of 180 plants per sq yard (150 per sq metre) with wheat (centre plant) to wild oat ratios of 1 to 1, 1 to 2, 1 to 3, and 1 to 4 and similar wheat (centre) to wheat ratios. The surrounding plants were sown 4 days before ('before' treatments), with ('with' treatments), and 4 days after ('after' treatments) the centre wheat plant. Nutrients and soil moisture were kept at an optimum. The centre wheat was harvested after 7 weeks, at which time it was in early shot blade. Tiller number, leaf number, and dry matter per plant were assessed.

The time of sowing affected the size of the centre plant, the 'before' treatments having the smallest (4 tillers) and the 'after' treatment the largest plants (5.4 tillers). In all cases, as the surrounding wheat plants were replaced by wild oats, i.e. as the proportion of surrounding wild oats increased, so tiller number, leaf number, and dry matter of the centre wheat plant increased. Yet the dry matter per wild oat plant in all population densities did not vary within the 'before', 'with', and 'after' treatments. It appeared that under these conditions the wheat on wheat competition was the dominant factor.

From observations on tiller number during the trial period, competitive effects were noted after 1.5 weeks in the 'before' treatments and 3 weeks in the 'with' and 'after' treatments. This competitive effect (assessed by lack of further tiller production) continued to increase as the trial progressed. In general, the data from the pot trial agreed with those from the field work.

Some controversy exists in the literature over the effect of wild oats on winter cereals. This is probably due to assigning general applicability to the results of experiments limited in district, seasonal, and competitive conditions. Time of wild oat emergence in respect to crop emergence, the number of wild oats emerging at that time, and the nutrient and moisture status of the soil appear to be the major factors concerned. Much of the difference in results from the wheat-wild oat work can possibly be explained by one or all of the above factors.

Results from current work on one Black Earth from the Darling Downs indicate that, when soil moisture and nutrients are near optimum for the initial part of the season (0-8 weeks), then

the increase in competitive effect from introducing increasing numbers of wild oats to a normal-density wheat crop (35-50 lb per acre, 39.2-56.1 kg per hectare) is only slight, and little wheat yield reduction can be expected from up to 50 wild oat plant per sq yard (41.8 plants per sq metre).

THE USE OF LODICULE SHAPE AS A MEANS OF SEPARATING WILD OAT STRAINS

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It is common knowledge that varieties of *Avena sativa* differ in their plant characteristics, growth pattern, and floret characteristics, and that these differences are used as a means of classification. Recent work has shown that wild oat types (*Avena* spp.) also differ in many plant and floret characteristics, but as with *A. sativa*, some of these differences are extremely difficult to assess with any degree of accuracy. Hence the need for further points of difference.

Baum (1969) was able to use lodicule shape to differentiate between *A. sativa* and *A. fatua*, and he was also able to tell whether supposed hybrids or fatuoids were the result of an *A. sativa* cross or an *A fatua* cross. It was thought that lodicule shape may be of use in differentiating wild oat types both within and between *A. fatua* and *A. ludoviciana*.

Early work by the author, in which 57 visually different florets were selected and grown for five generations to test the stability of floret characteristics, revealed the existence on this basis, of possibly 14 wild oat types. When the seedling characteristics, particularly the presence or absence of hairs, were noted, the number of wild oat types increased to 21.

Lodicules from ten florets of the original and fifth generation seed of all the wild oat types grown were examined and all but three showed fatua-type lodicules. Two of these three, a grey *A. ludoviciana* type and a brown *A. fatua* type could be differentiated from types with similar floret characteristics by