

tolerance of wheat at emergence. There was no difference in grain yield between treated and untreated plots.

Other trials with other varieties in early growth stages likewise confirmed the tolerance of wheat - even though under unusually mild growing conditions wheat has yellowed for a short period beginning 7-10 days after spraying.

Many trials, some logarithmic, established that a wide variety of the broadleaf annual weeds of Australian wheat crops were susceptible to less than 1 lb Tribunil per acre (1.12 kg per hectare). Pre-emergence activity has been observed at rates of 0.75 lb per acre (0.82 kg per hectare).

Even though there is variation in specific weed susceptibility, one application of 0.75 lb per acre (0.82 kg per hectare) applied as soon as all weeds emerge has been recommended for amsinckia, capeweed, deadnettle, corn gromwell, spiny emex, stagger weed, spurry, variegated thistle, dwarf nettle, poppy, ice-plant, mustard, wild radish, and wild turnip.

However 8 oz per acre (0.56 kg per hectare) is recommended for very young wild turnip, spiny emex, and deadnettle.

Thus Tribunil provides a flexible management tool for annual broadleaf weed control in wheat because no longer is there need to adjust spray timing to a particular period of crop tolerance.

Furthermore any combination of the major annual broadleaf weeds can be controlled with one application rate at the earliest possible time to maximize benefits of removing weed competition.

WHEAT CULTIVAR TOLERANCE TO BARBAN

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It has been suggested that the reasons for the lack of wheat yield response in Victorian experiments where wild oats have been controlled by barban may have been associated with the use of the variety Olympic in the experiments. In comparisons at the Rutherglen Research Station in 1968 and 1969, the tolerance of Olympic, Sherpa, and Gamenya, (a variety of reputedly high tolerance) was assessed.

In both years the experiment was a randomized block design of four replicates with barban applied at 0, 2.5 (0.17), 5.0 (0.35), and 10.06 (0.70) oz a.i. per acre (kg a.i. per hectare) when the wheat was at the 1½-2½ leaf stage. In three additional treat-

ments, barban at 5.0 oz a.i. per acre (0.35 kg a.i. per hectare) was applied to all varieties at the 4-5 leaf stage to check the suggestion that some varieties are more susceptible to later application.

Although initially free of weeds when sprayed ($1\frac{1}{2}$ - $2\frac{1}{2}$ wheat leaf stage), the site in 1968 became infested with a late germination of Wimmera ryegrass, but pre-emergence control was obtained with barban, particularly at the highest rates of application. Although this affected interpretation of the yield data, it was clear that, at the 6 oz a.i. per acre (0.70 kg a.i. per hectare) rate, there was a differential variety effect. The yield of Olympic was reduced by 14.4 bus. per acre (970 kg per hectare), while the yields of Sherpa and Gamenya were reduced by 3.9 and 4.8 bus. per acre (260 and 300 kg per hectare). Olympic and Gamenya appeared more affected vegetatively than Sherpa. There was no evidence to suggest that the application of 5 oz a.i. per acre (0.35 kg a.i. per hectare) applied at the later growth stage was more damaging on any of the varieties.

In the 1969 experiment, yield reductions were caused by all rates of barban applied at the $1\frac{1}{2}$ - $2\frac{1}{2}$ leaf stage, but not with 5.0 oz a.i. per acre (0.35 kg a.i. per hectare) at the 4-leaf stage. There were no significant differential variety effects in yield or in vegetative response, although variety trends at the 10 oz a.i. per acre (0.70 kg a.i. per hectare) rate were similar to those in the 1968 data. The results were as shown in the Table.

TABLE
Average Yield bus. per acre
(kg per hectare) 1969

Barban - oz a.i. per acre (kg a.i. per hectare)	Olympic	Sherpa	Gamenya
At $1\frac{1}{2}$ - $2\frac{1}{2}$ leaf stage - 0	35.6 (2390)	33.9 (2280)	31.4 (2110)
2.5 (0.17)	32.3 (2170)	29.5 (1980)	29.2 (1960)
5.0 (0.35)	29.2 (1960)	31.4 (2110)	30.2 (2030)
10.0 (0.70)	19.0 (1280)	19.9 (1340)	22.3 (1500)
At 4-leaf stage			
-5.0 -(0.35)	32.7 (2200)	34.4 (2310)	32.9 (2210)

The data thus far obtained, while not conclusive, lend some support to the suggestion of greater susceptibility of Olympic to barban, and experiments are continuing to see whether this is confirmed at commercial rates. There was no confirmation that application at the later growth stage leads to greater damage or lower yields.

CHEMICAL VERSUS MECHANICAL FALLOWING METHODS FOR
WHEAT PRODUCTION ON THE DARLING DOWNS

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Approximately two-thirds of the total annual rainfall on the Darling Downs occurs during the summer months. For annual wheat cropping in the area, the traditional practice is the preparation and maintenance, by means of cultivating implements, of a bare fallow between successive crops to allow moisture and available nitrogen to accumulate. Stubble burning is commonly practised to provide for ease of cultivation.

Similar cultural practices have led, in many parts of the world, to a deterioration in soil structure and fertility. Accordingly, a long-term factorial experiment has been established on a non-sloping black-earth soil at Warwick. Zero tillage and conventional mechanical fallowing are each compared under conditions of both stubble burning and stubble retention. Each of these four combinations are compared at each of three rates of nitrogen fertilizer applied at sowing: application urea at nil, 45 lb per acre (20.4 kg per hectare) and 90 lb per acre (40.8 kg per hectare).

Tined implements have been used for weed control and seedbed preparation in the conventional fallow plots, while varying rates of diquat or paraquat or a mixture of the two have been applied for weed control in the zero tillage plots.

Treatment effects on soil physical, chemical, and microbiological properties as well as on weed flora and crop growth are being investigated. The experiment was initiated in December 1968. At time of writing, one cropping and two fallowing phases have been completed and short-term effects only can be described.

The outstanding feature of the trial to date has been the markedly superior moisture accumulation during the fallowing period as a result of zero tillage and especially under conditions of stubble retention.