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Weed Research...



by **G. A. PEARCE B. Sc. (Agric)**
BOTANIST, WEEDS & SEEDS BRANCH.

4.—Growth Stage in Cereal Crop Spraying

EACH year some 450,000 acres of cereal crops in Western Australia are sprayed for the control of weeds. Of this area more than two-thirds is treated from the air. During the present season 32 aircraft will be engaged in the weed spraying programme. This means that the aerial spraying capacity this year will be approximately double last season's operations.

The two most important weeds involved in this work are wild radish and wild turnip. Apart from making harvesting much easier, the removal of these weeds gives a considerable boost to grain yields. Increased yields of three or more bushels per acre can be expected. However, care is required because spraying during certain growth stages of the cereals can reduce yields by similar amounts.

TIME OF SPRAYING

It is generally known that the best time to spray a cereal crop for weed control is when it is from 6 to 10 in. tall. However, growing and seasonal conditions can vary so much that the need for weed control may not be apparent until the crop is well advanced.

Once the cereal has passed the tillering stage, careful timing of the application of



Fig. 1.—An unsprayed strip showing wild radish in a crop. The removal of such weeds give increased yields of grain as well as greatly facilitating the harvesting operation

the weedkilling chemical is required if the grain yield is not to be reduced.

RESULTS OF TRIALS

A number of trials have been undertaken in recent years to determine the effect on crop yields of spraying cereals at different stages of growth. The trials were carried out on wheat crops, completely free from weeds. Any reductions in yield were therefore due only to the treatment.

The following results were obtained by treating a wheat crop at the growth stages listed:—

Growth Stage.	Yield Per Acre. Bushels.
Seedling	15.4
Tillering	19.7
Boot and Flowering	13.1
Soft-Dough and Mature	17.6

These marked differences in yield illustrate the importance of avoiding spraying when the crop is at certain growth stages.

GROWTH STAGES

The above results show the importance of being able to recognise the different growth stages of cereals if it is intended to undertake spraying. For convenience these can be divided as follows:—

1. **Seedling Stage.**—This is the period from the time the seed germinates until it begins to stool or tiller. Each tiller produces one seed head. This growth stage occupies a period of some three to four weeks depending on growing conditions.

Spraying during this early growth period will cause reductions in yield depending on the actual size of the cereal plants when treated.

2. **Tillering Stage.**—The beginning of this growth stage is when the plants begin to stool or produce tillers. During this period the crop makes considerable growth and may be 18 in. tall before the next growth stage is reached.

This is probably the longest of the six growth stages and is the safest period in which to undertake crop spraying.

3. **Boot Stage.**—This is the comparatively short stage when the developing head is enclosed in the sheath of the flag leaf. The spraying of cereals in this growth stage causes considerable reductions in yield.

4. **Flowering Stage.**—At this stage the head has emerged from the sheath of the

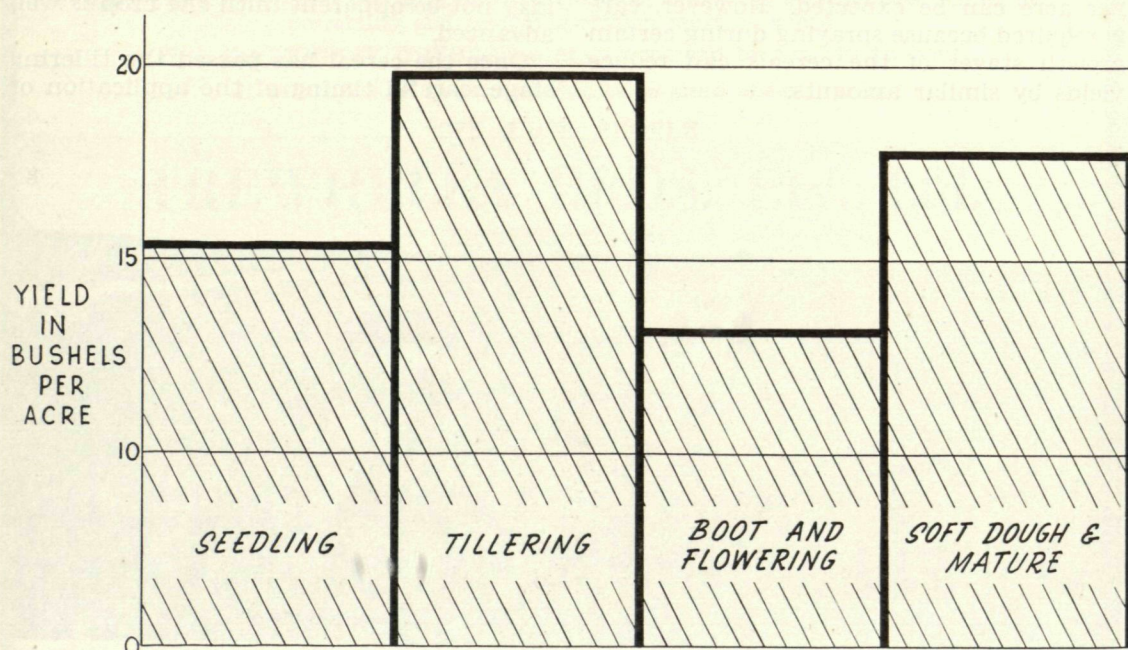


Fig. 2.—Graph showing effect on yields obtained by spraying a cereal crop at different stages of growth

flag leaf. The boot and flowering stages together only occupy a period of three to four weeks and crops in these growth stages should not be sprayed for weed control.

5. Soft-Dough Stage.—This growth stage is the period from when the grain actually begins to form until the crop matures.

From this time onwards cereal crops can be sprayed with comparative safety. How-

METHODS OF APPLICATION

1. Aerial Application.—In 1958 it is estimated that a little more than 300,000 acres of cereal crops were sprayed for weed control with aircraft. With the late opening to the present season, farmers were anxious to plant their crops as quickly as possible. Under these circumstances the weed problem is likely to be greater than usual so that a further expansion in aerial spraying is quite likely this year.



Fig. 3.—Spraying a cereal crop from the air. More than two-thirds of all crop spraying is undertaken by aircraft

ever, treatment during this growth stage can only be regarded as an emergency measure. The reduction in yield due to the presence of the weeds will not be affected and the only advantage will be to cause the weeds to recede below the level of the crop.

6. Mature Stage.—This is when the grain has ripened.

OTHER CEREALS

Although the trials mentioned were only undertaken on wheat, both oats and barley would be expected to behave in a similar manner. It is generally recognised that wheat is more resistant to hormone-like weedkillers than barley or oats. For this reason similar reductions in yields must be expected if either a barley or oat crop is sprayed during the susceptible stages of growth already mentioned.

Aerial operators in this State have developed very efficient techniques and results are remarkably consistent. Their technical efficiency is recognised as being the highest throughout Australia.

Aerial spraying has a number of advantages over ground spraying and the proportion of farmers making use of aircraft is steadily increasing.

2. Ground Application.—When cereal crop spraying was first commenced on a large scale in 1950, many farmers purchased their own spray units. With a 30-ft. boom fairly large areas can be covered in a short time with these machines. Great accuracy with rates of application can be obtained and any poor results are usually due to the faulty technique of the operator. However, despite the proven efficiency of ground spray units, many farmers have come to accept the idea that aircraft are the most practical means for crop spraying.

SUMMARY

1. Spraying cereal crops for the control of weeds gives increased yields and facilitates harvesting.

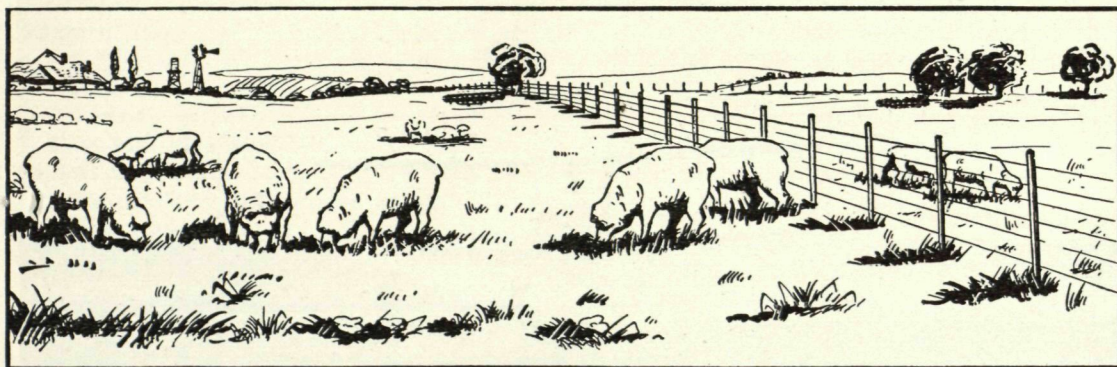
2. Crops treated with weedkilling chemicals when they are in certain growth stages are likely to give reduced grain yields.

3. The ideal time to spray crops is when they are in the tillering stage.

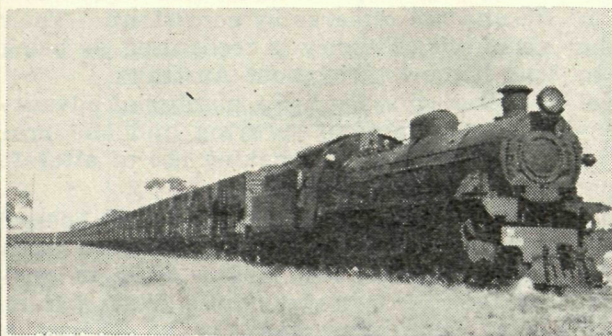
4. Where it is necessary to spray a cereal crop after it has passed the tillering stage, the treatment should be delayed until the crop has reached the soft-dough stage.

5. Spraying should not be undertaken in crops when they are in the seedling, boot or flowering stages.

6. Most cereal crop spraying is undertaken by aircraft although some is done by land units.



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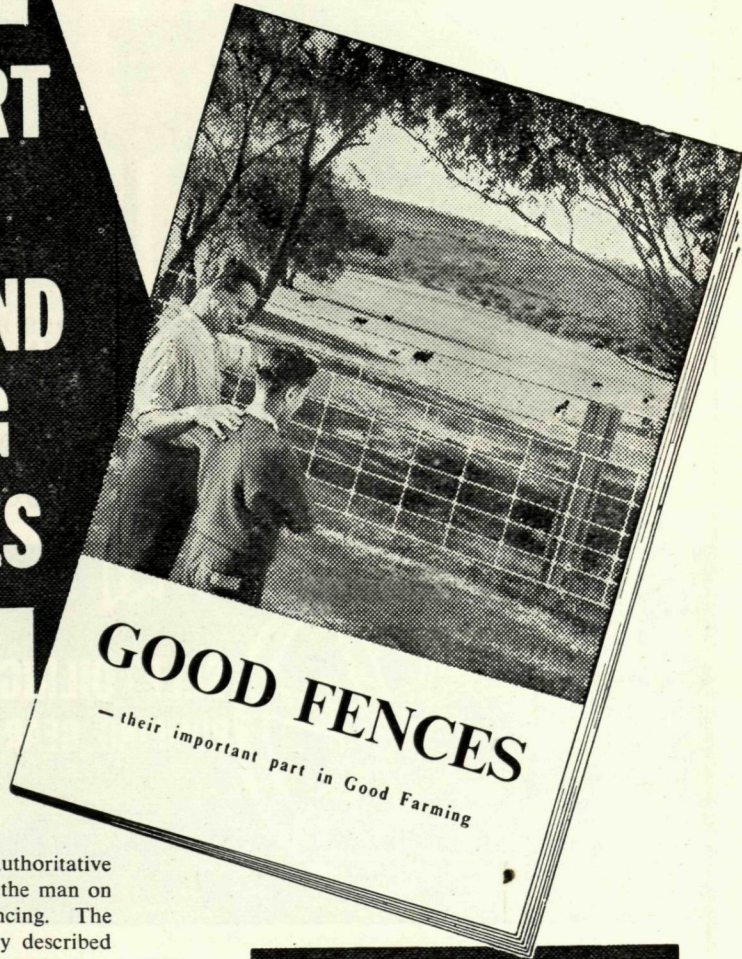
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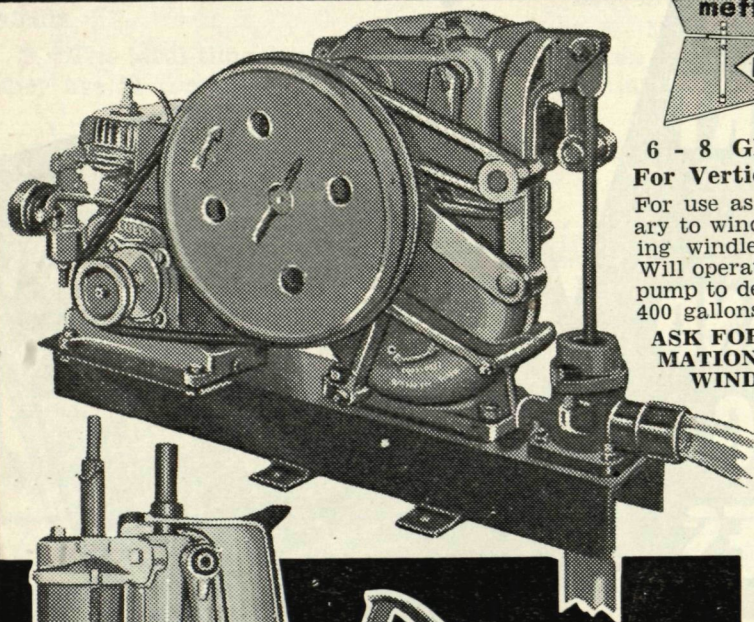
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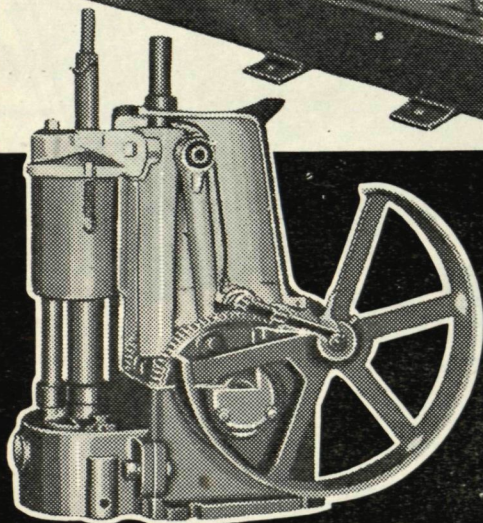
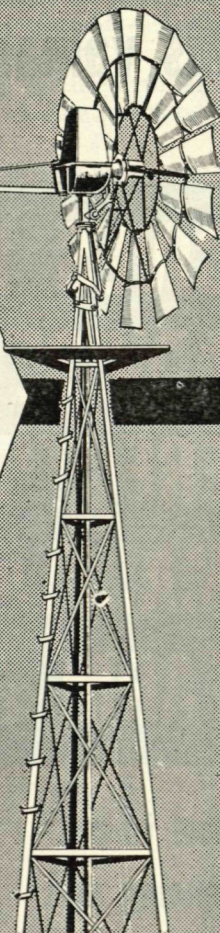
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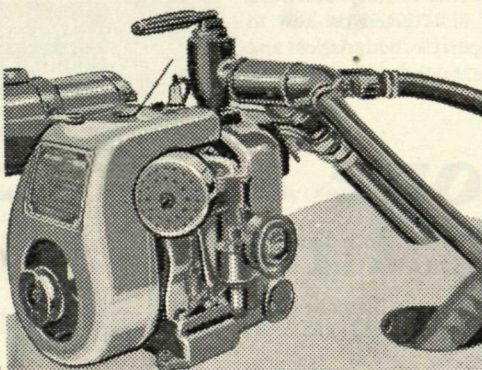
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