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WIND EROSION CONTROL—1

By D. J. FLEAY, B.Sc. (Agric.), Adviser, Soil Conservation Service

DESERTS have been formed in some parts of the world by the action of wind on once productive soils. This could happen to the light land areas of Western Australia if we do not profit by the lessons of the past and manage these soils with great care.

Wind erosion occurs when a sufficiently strong wind blows over a vulnerable soil. As it is not possible to control the wind it is necessary to concentrate on managing the soil in such a way as to protect it from wind action.

HOW WIND EROSION OCCURS

Experimental work has shown that nearer the ground level the wind velocity decreases until at the soil surface, there is a thin layer of stationary air. On a smooth surface this stationary layer is so thin that sand grains stick up through it and can be picked up and bounced along by the wind. A rough surface has the effect of increasing the thickness of the layer of still air. The rougher the surface the deeper the layer.

Particles larger than sand grains are not much affected by the wind. Smaller particles, “dust” will be unaffected directly by the wind, and will move only if stirred up by stock or blowing sand. However, dust consists of the fine clay and organic matter particles and, as these fractions contain the most important plant nutrients, they must be stopped from blowing away. Unfortunately, because the particles are so fine they are liable to be held in sus-
pension in the air and blown away completely. Thus, in regard to the soil itself it can be seen that prevention of sand movement will stop the loss of the other soil constituents by wind action.

Increased proportion of sand in the soil, therefore, greatly increases the wind erosion hazard, and as a general rule the more sandy the soil, the more carefully it should be managed.

**HOW CAN WIND EROSION BE AVOIDED?**

At the outset it should be realised that fertile soils are better able to resist erosion by wind and therefore all farm practices should aim at building up soil fertility.

Apart from this the best way to avoid wind drift is to leave the ground surface rough in order to have a deep layer of stationary air immediately over the soil. This can best be done by a plant cover, living or dead. As a temporary measure rough cultivation is of some value.

**Rough Cultivation.**

At the best, rough cultivation is only a temporary measure, for the wind can quickly cut off the tops of the soil ridges and all the furrows until eventually the whole surface is smooth. This then allows maximum drift to take place.

**Plant Cover.**

Any type of plant cover will prevent wind drift. When not under crop the most profitable cover available of course is a good pasture. This should include a legume to build up the fertility of the soil. A good pasture also acts as a cushion against the churn-
This is the seventh article of a series which commenced in the January-February, 1952, issue of the Journal—a series which outlines the principles of soil conservation and their main applications in Western Australia. It is hoped that the articles will help to impress upon farmers the need to conserve the soil and prevent erosion, and will point the way to the practical application of suitable soil conservation techniques.

The Soil Conservation Service exists to co-operate with farmers to this end. If you would like an officer of the Service to visit your property to discuss your soil conservation problems, write without delay to the Commissioner of Soil Conservation, Department of Agriculture, Perth.

There are very many small eroded areas which farmers can reclaim, or protect from further damage, with their present equipment.

Soil Conservation Schools lasting one day will be conducted for groups of farmers to show how they can do this work themselves. A district organisation can arrange this for a group as small as six or up to sixty or seventy.

Good Farm Practices.

1. With any cultivation, the aim should be to leave the surface as rough as possible, consistent with killing weeds and making a seed-bed.

2. Use longer rotations with a legume as the basis for pasture cover between cereal crops.

Fig. 2.—Removal of Soil—The wind has swept away about two feet of soil. The top of the root was once at ground level. Photo B. a'B. Marsh.
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3. Have adequate subdivision so that grazing can be controlled easily.

4. Watering points for stock should be placed so that no area is overgrazed.

5. Cultivation should be done on the contour as this gives an even spread of moisture and hence a better and more even plant cover.

**Poor Farm Practices.**

6. Avoid fallowing where any other practice is applicable and economical.

7. Do not break the soil down by overcultivation to the point where it is left in a fine powdery state.

8. Do not work the soil while it is dry.

9. Do not burn off except for pest and disease control.

10. Do not over-graze, especially if the pasture is thin. The cover can then make up in height for what it lacks in density.

**RECLAMATION OF DRIFT AREAS**

The only sure way to stabilise a drift area permanently is to establish and maintain a permanent plant cover. In many cases, areas of wind drift have been stabilised with a crop of wheat or oats with an appropriate legume such as clover or lupins. In many cases, however, the drift is too severe and the soil too poor for successful stabilisation with these cereals and as an alternative cereal rye has proved invaluable.

Cereal rye has the ability to recover from severe sand-blasting occurring during its seedling stage and also grows on very poor soils, to give a tough resistant straw at maturity. It is usually sown at the rate of 30 to 50 lb. per acre with about 100 lb. of superphosphate. The area should not be grazed for the first year to allow for maximum reseeding.

After the area has become well stabilised it is worth sowing a legume and Wimmera ryegrass to improve the mixture of the pasture. Sub. clover and lupins are the most commonly used legumes for this purpose and are im-

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*Fig. 3.—Down to Bedrock.—The soil has been swept away by the wind exposing the limestone rock. Lupins and Cereal Rye which were used successfully to stabilise the area can be seen in the background.*

*Photo L. J. H. Teakle.*

*Fig. 4.—Wind Scald.—This is common on flat country in the outer wheatbelt. Note small stones and pebbles in the foreground which are too large to be moved by the wind.*

*Photo T. C. Stoneman.*
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AERIAL SPRAYING OF MESQUITE

EXPERIMENTAL applications of chemicals applied from an aircraft were carried out at Mardie Station near Onslow during October and November, in an attempt to destroy mesquite thickets.

Although it is too early to assess the effectiveness of the treatments, reports from Mr. R. D. Sharp, the owner of the station, suggest that the sprayings have given encouraging results. Mr. Sharp states that the sprayed trees have lost their leaves and the bark is showing signs of drying out.

A spineless form of mesquite was introduced into the North-West many years ago as it was thought that the seeds and pods would provide useful fodder for cattle. Unfortunately, many of the plants later developed spines and on Mardie Station the mesquite had tended to spread and form dense thickets, making its control difficult.

The chemicals used for the aerial spraying were those containing the 2, 4, 5-T type of hormone-like weedkiller which has been extensively used in America, particularly in Texas, for the control of mesquite. In America it was found that complete destruction did not usually result from a single treatment and the application of experience in that country to local conditions is difficult.

Conditions for aerial spraying are seldom favourable at Mardie Station, as a strong wind was usually in evidence together with high temperatures. The experimental sprayings were carried out in the early morning and three formulations of 2, 4, 5-T were used. One of these was sprayed at three different rates. The plots treated were each 25 acres in extent and four gallons of a water emulsion containing the chemical were applied per acre.
important as they fix a supply of nitrogen which is usually deficient in the lighter soils of Western Australia. Special fertiliser treatments, such as applying copper or zinc with superphosphate, are often needed to help establish these legumes, but these needs must be determined for the site. Nitrogen is very important especially on the scoured out areas and very often even cereal rye is unable to grow on such areas. Experiments have shown that an application of 56 lb. of sulphate of ammonia per acre at time of sowing will give excellent results and is well worth doing.

As a cover for poor and eroded soils, cereal rye is becoming more and more important and the grain is much more in demand. It has been used to good effect by many farmers as an early green feed and can be fed down several times in a season and still recover to give a good crop. Thus it can be quite an economic proposition to grow rye for grain, as well as for soil protection. Once an area of drift is stabilised, much care should be taken to keep it covered and free from further erosion.

This article has dealt mainly with control of inland sand drift and although the principles involved in controlling coastal sand drift are the same, the methods of tackling the problems are different. The control of coastal sand drift will be dealt with in a later issue of the Journal.

A REMINDER

H ave you registered your orchard? One fruit tree or a single vine is an orchard for the purposes of the Plant Diseases Act and must be registered accordingly. The registration fee for less than one acre of trees or vines is 1s. Apply Department of Agriculture, Perth.

Fig. 5.—Smoothing Action of the Wind—This sandplain fallow has been smoothed out by wind action and is in a very vulnerable state.

Fig. 6.—Control—Area reclaimed by sowing Cereal Rye. Note how the fence has been half covered by drift sand. Photo G. H. Burvill.
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