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TWITCH CONTROL

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Crops are commonly reduced on every class of land in Canterbury by the presence of twitches. The loss extends even to pastures, for although the twitches cover the land with grass, it is grass of low production. Twitches increase working costs as well as diminishing production, and so cut into profits from both ends. All efforts to control twitch should as far as possible work in with the ordinary rotation of the farm operations, so that twitch control and crop production may proceed hand in hand.

Prevention is better than cure. Good management and the maintenance of a high state of fertility in both crop and grass land will prevent twitch infestation.

Description of Twitches.

All twitches are characterised by the possession of underground runners, which are hard to kill by ordinary methods of cultivation. These runners are really underground stems, and if they are left undisturbed for several years as in an old pasture, they invariably work to the surface.

There are five or six twitches common in various parts of Canterbury. Those species with thick runners and plentiful production of seed are much more difficult to control than those with thin runners or scanty seed.

Long Twitch, frequently called Old Man Twitch, White Twitch, English Twitch, or Couch, has thick runners, but produces only few seeds. Creeping Fog has thick runners and plentiful seed. Brown Top—both the dry land and the wet land form—has thin runners but plentiful seed. Poa pratensis, sometimes called Black Twitch, has thin runners, but not very much seed. Onion Rooted Twitch sometimes called Knot grass or Pearl grass, has knots about the size of peas or hazel nuts underneath the ground, and these are dragged about by grubbers and harrows. It grows tall in crops, and especially around hedges, and seeds freely. Finally there is Chewings Fescue, which has neither runners nor knots, but is able, by virtue of its underground tillers, to struggle to the surface again after it is ploughed in at ordinary depths.

Conditions Favouring Twitches.

A. On cropping lands the twitches spread most seriously under the following conditions:—

1. Where cropping has been excessive, so that the soil fertility has been depleted, the twitches thrive. They do not demand such a high level of fertility as most crops do, so that under high fertility conditions the crops beat the twitches, but under low fertility conditions the twitches take possession.

2. Where the cultivation has been bad or incomplete, twitches are encouraged. They are only partially checked by the cultivation, and so have a start on the crop sown with them, and thus assume control.

3. Where the seeding has been irregular or the drilling bad, the twitches get a start, for open spaces are left for the twitch to re-establish and spread.

4. Where weak seeds have been sown so that an open spindly crop results, the twitches then get an opportunity of spreading.

B. On grass lands twitches are encouraged:—

1. By imperfect preparation of the seed bed which leaves runners growing in the soil and so gives them a start over the sown grass.

2. By irregular seeding which leaves open spaces for the twitch to grow.

3. By the sowing of temporary strains which as they die out allow the twitches to spread.

4. By sowing unclean seed.

5. By over-grazing and the killing out of the better grasses.

In all paddocks, whether sown in rotational crops or in grass, the presence of twitch in fences and on sod banks, is a fertile source of infestation for larger and larger areas of the field.

Weaknesses of Twitches.

While twitches grow vigorously under favourable conditions they have certain vulnerable points, and attack is more likely to be successful if it is directed against these weaknesses. They are: (1) Their runners, when undisturbed, are very close to the surface. Measurements taken this autumn in pastures more than four years old disclosed no living runners at a greater depth than two inches in the cases of Long Twitch, Poa Pratensis, or Brown Top—while in Onion Rooted Twitch all the living knots were actually on the surface, although this

may not be true in all classes of soil. (2) The dormant period of most twitches is longer than that of many cultivated plants; their growth during autumn, winter, and early spring is very slow. (3) They are greatly depressed by the dense shade of strong growing crops.

Methods of Attack on Heavy or Medium Land.

On heavy or medium land the bare summer fallow is the most commonly employed method of control. The land is ploughed three or four inches and worked up in early summer, continuous cultivation follows, the twitch being worked to the top; harrowed into heaps and burnt or carted off. The method is efficient when thoroughly done, but it is expensive at all times, and is usually not carried to completion. Other work such as harvest intervenes, and the twitch is allowed to make headway; or moist weather comes keeping the twitch alive, so that in the end the twitch is sometimes more thoroughly distributed than it was at first. The real objection is, however, the expense of a great number of cultivations that are not directly productive.

The experience of the last 20 years at Canterbury Agricultural College has shown that fields badly infested with twitch—chiefly Long Twitch and Brown Top—may be effectively and cheaply cleaned by the four-fold process of (1) allowing the twitch runners to come to the surface; (2) deep ploughing; (3) suitable surface cultivation; (4) smothering.

1. Surface Rooting.—As mentioned before, twitch runners will work to the surface if undisturbed for a sufficient length of time, and thus put themselves into a position to be buried by deep ploughing. The cheapest and best way is to attack the twitch on ground that has been in grass for some years, so that the twitch runners are already on the surface, and thus easily buried. It is obviously useless to try to bury them by ploughing if they are already scattered through the soil to a depth of six inches or so. They can, of course, be partially grubbed or harrowed to the surface, but that process cannot be completely efficient, and is always expensive.

2. Deep Ploughing.—On heavy or medium land a furrow seven to eight inches deep where this is possible,

worked in conjunction with a skim coulter, will effectively bury all the runners. While the digger plough with skim coulter attachment was specifically designed for this purpose, the ordinary New Zealand plough and skim coulter serves the purpose quite efficiently. The burying may be done either by one early deep ploughing or by skim ploughing early with a two or three inch furrow, working down the surface, and finally burying the surface tilth with a deep furrow and skim coulter.

3. Suitable Surface Cultivation.—Where the land is first skim ploughed the second ploughing must be deeper than if the twitch is buried from the lea. In either case the after cultivation must be such as not to drag the runners to the surface again, and must be careful and complete so as to allow efficient application of the third step in the process.

4. Smothering.—No matter how carefully the deep-ploughing has been done, some plants of twitch will come up between the furrows, and these plants, further weakened by surface cultivation, may be suppressed almost entirely by smothering. A smothering crop may also be used with any other preliminary treatment to weaken the twitch. Repeated trials at Canterbury Agricultural College during the past 20 years have definitely proved that smothering crops can control twitch and finally eradicate it, so long as the smothering crop is properly grown. It must really smother. To attain this end a heavy crop must be secured. The land must be well cultivated, the manuring must be liberal, the crop must reach its full growth early in the spring before the twitch starts into life, the seed and the sowing must be good, and a crop that establishes early must be selected. It is essential to encourage a vigorous growth of the crop to compete with the twitch. Good farming in itself, then, by producing heavy crops tends to control twitch at the time—while farming on a low level of production tends to encourage it.

Selection of Smother.

Any crop that provides a dense shade will smother twitch that has been weakened by previous treatment. The ideal crop for the purpose is oats and tares. It covers the ground completely and it has the great advantages of being sown at the end of summer so that it is growing while the twitch is dormant, and has attained an abundant growth before the twitch starts into life in late spring. Autumn sown Italian Rye and Red Clover is quite good. Peas, rape, turnips, or oats on heavy land, are good shades, but they are not so useful as the tares because they are sown at a time when the twitch is vigorous and do not get the same start over the twitch as the autumn sown crops do. At the other end of the scale, are the open growing crops such as wheat, barley, linseed, and under average conditions potatoes, which do not shade the ground.

Actual Mode of Attack.

Start in a pasture four or more years old, and if possible plough 7 to 8 inches deep in December or early in January. If it is preferred the first ploughing may be 2 or 3 inches deep and the land worked till the end of February or early March and then ploughed deep. In March work the land down to a firm compact tilth, without bringing up the twitch. Late in March or early in April sow oats and tares at the rate of one to one and a quarter bushels of oats, and one and a half bushels of tares. The seeding must be carefully done, as missing coulters and blank spaces defeat the object in view. Cross drilling is sometimes recommended, in order to be quite sure that there are no gaps. Apply with the seed one and a half to two cwt. of super. to promote the most vigorous growth of the tares. Cut the crop for hay in late November or early December, and plough immediately. If the land is clean it may be used for any desired crop, but, if some twitch remains, complete its smother by sow-

ing Italian Rye and Red Clover in February, using 35 pounds of grass seed and 4 to 5 pounds of Clover. When the Italian and Red Clover are past their flush the twitch should be sufficiently controlled for any crop it is desired to grow. Where this rotation is not practicable the deep ploughing may be followed by a thick crop of oats, well manured, and sown at 2½ to 3 bushels per acre. Immediately after harvest the stubble should be ploughed, and worked up to kill any runners of twitch remaining on the surface. Green feed oats may then be sown about the end of March and ploughed down in September, followed by peas sown in October—a bag to the acre. If a thick strike is not secured it is wiser to plough the peas down, work the land again and sow Italian Rye and Red Clover in February.

Numerous modifications of these rotations may be adopted, but the guiding principle always is to plough the twitch well down and get strong, thick smothering crops to follow. The question of twitch eradication on the light land and foothills will be dealt with in a later bulletin.

Summary.

Twitches grow to the surface and can be buried by deep ploughing.

Twitches have a long dormant period and so can be beaten by rapidly growing crops.

Twitches require light and heat and so can be smothered by dense growing crops.

On either heavy or medium land twitches can be controlled while crops are still being produced if the twitches are attacked in their weak spots. If the cultivation and manuring are sufficient to grow good crops, then the vigorous top shade and root competition set up will kill the twitch.

Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.