

Adjustment of Header Harvesters for Various Crops

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Bulletin

CHRISTCHURCH, JANUARY, 1942

No. 150

The previous bulletin dealt with the principles of threshing. It is proposed in this bulletin to discuss the application of these principles to particular crops, and at the same time make reference to methods of harvesting and after treatment, and other matters which are rendered necessary by the type of threshing that is adopted.

Ryegrass Seed

Direct Heading. A light crop of grass seed on dry, quick-maturing land may be direct headed. The crop should be allowed to become much riper than binder ripe and some of the seed may shake out. With direct headed crops, the seed will not be sufficiently dry to bag up in the ordinary way; it should be run into manure bags a quarter to half filled, hung on fences, once a day shaken up to avoid heating and sweating and rebagged when dry.

Windrowing. This is a most popular method of handling ryegrass seed. The crop should be cut at the binder ripe stage, i.e., the seed should be well developed but not fully ripe. It ripens very quickly on dry soil and during hot dry weather, while on moist land and in cool, calm weather, the crop may stand several days close to the cutting stage. The crop must not be mown until after the green tinge has disappeared from hand stripped seed; if cutting is started too early the seed will be light and shrivelled. The objective is to allow the seed to become well filled, while avoiding loss by shedding. As a general guide cutting should start when mature seed comes away readily on shaking the heads inside and against the sides of a hat. The actual ripeness can be tested by exposing the kernel of the grass seed with a penknife. If the kernels are about half firm the crop will be ready for cutting. Some of the danger of late cutting can be avoided by mowing at night.

There are several methods of windrowing which may be used with standard mowers or binders; alternatively, a windrower may be used.

With heavy crops the mower fitted with an extra inside grass board

does a satisfactory job. This puts the cut swathe into a sufficiently narrow windrow. If the windrow is too narrow the crop may not mature properly and may go into the drum in such bulk that seeds on the outside of the material may be skinned. It was mentioned in the previous bulletin that the size of the windrow determined the success of subsequent threshing. With a large windrow the threshing unit must travel slowly to thresh and dress the seed efficiently. This is difficult with many types of power take-off machines which cannot work efficiently unless travelling at full speed in second or third gear. On the other hand, the machine should not travel too fast. A thin windrow might encourage this and there is a chance that the pick-up attachment will knock out too much seed. As a general guide, in average crops, the windrow should contain all the material from a cut the width of the cutting unit on the thresher. The machine can then travel at a regular speed and handle the material efficiently. Ryegrass seed threshes readily, and, unless the windrow is too large or the material not fit, few difficulties present themselves.

In threshing grass seed, the drum should run at about half the speed required for wheat, and the concave should be opened wide. Too high a drum speed will crack seed, but a wide open concave is more important than reduction in speed of the drum. When goose grass or other weeds with long awns are present, hard threshing will break awns off and make separation of weed seeds difficult later.

The blast is the next important adjustment. Its setting can be tested by taking some seed from the bag and blowing lightly as it is tipped from hand to hand. If much chaff is blown out, the blast should be increased. Too much light material in the bags will increase subsequent dressing charges. A strong blast may result in good seed being blown off the cavings riddle and this can be tested by examining the discharge from that riddle. It is important to examine any

seed heads blown out to see if these are fully developed kernels and not empty heads. One of the difficulties met with in threshing grass-seed from the windrow is the separation of small pieces of straw, grass and clover leaves of a similar size and weight to the seed. This material, together with any clover seed, should go into the bags as it is not usual to separate clover seed from grass seed with the headers. This may be done later when the seed is machine dressed. When the header is used as a stationary mill, a ryegrass and white clover seed crop can be threshed twice: first for ryegrass and then later for white clover.

Italian Ryegrass

Italian ryegrass can be handled in the windrow exactly as for perennial ryegrass, but the seed shakes out very readily and extra care must be taken to avoid loss through shattering. To prevent breaking off of the awns Italian ryegrass must be threshed lightly.

Cocksfoot

This crop is usually cut with the binder, leaving a long stubble, and the sheaves stooked, although it may be windrowed or even direct headed under ideal conditions. If all the seed is to be saved it must be very fit when threshed and it is advisable to thresh only during the heat of the day. The drum speed must be high, somewhat as for wheat, and the concave set close but not so close as to break up the straw. Double seeds and parts of heads will be returned to the drum for re-threshing, but the amount of this material must be kept as low as possible by opening the blast to remove the empty seeds and lighter material.

Wheat

The binder is still a popular method of harvesting wheat in New Zealand but headers now handle over 60 per cent of the crop. Direct heading can be safely carried out with the so-called tight chaffed "heading wheats" namely Cross 7, Tuscan, and Fife Tuscan. Other varieties such as Hunters, Dreadnought, Jumbuck, and Marquis can be dealt with by windrowing.

For direct heading, the crop should be allowed to stand until it is ripe, i.e., approximately ten days after the binder ripe stage; all the knots of the straw will then be quite dry and the moisture content of the grain should not exceed 16 per cent. Heading does not present so many difficulties as windrowing as there is less straw for the machine to handle.

Wheat should be cut for windrowing when it is binder ripe, i.e., when the last tinge of green has

disappeared from most of the straws, the knots are still green and the grain is firm and tough so that it cannot be crushed between finger and thumb but can be cut with the thumb nail.

With windrowing too much straw can cause trouble. A windrow from a cut the width of the header will usually prove satisfactory. Should there be too great a bulk of straw, or too many weeds in the bottom, the crop should be cut high. When windrowing with a binder the crop should be discharged over the knotting table without tying. It may be an advantage when windrowing to lay the straw at an angle. This can be accomplished by bolting a strip of heavy hoop iron to the lower side of the table so as to project about 15 inches. The hoop iron, which is bent slightly downwards, momentarily supports the heads while the butts of the straws are falling to the ground.

In order to get all the grain some crops may require all the drum-speed available and a close set concave. Acrop which dries off quickly in hot, dry, windy weather is more difficult to thresh than one which ripens slowly. It is better to crack some of the seed and collect it in the seconds than to have grain going out with the straw. As threshing becomes easier during the heat of the day the concave can be opened up and closed again towards evening as threshing becomes more difficult.

The straw walkers are not adjustable on all machines and where grain is not shaken out freely, either the crop is not fit or too much straw is being handled and the machine will have to travel more slowly. A smaller windrow with less straw is indicated. This condition may be further aggravated by breaking of the straw through having the concave set too close.

The blast should be opened up and all chaff, broken straw and empty heads blown off the cavings riddle without blowing out grain or white or broken heads. The cavings riddle should be opened up to make sure the seed falls through as soon as possible. To facilitate the seed falling through at the outset a lifting tendency in the blast, rather than a direct blast, should be used. This can be effected by using more bottom blast and shutting down the top of the blast. All white heads and broken heads, together with the threshed grain should be shaken through the cavings riddle to be delivered to the top grain riddle. Any white heads which may pass through the cavings riddle are sorted out by the grain riddle and returned to the drum.

Where too many white heads have to be dealt with, the setting of the concave is at fault and it will require closing up to rub the seed out more effectively. After the grain has passed over the grain riddles it goes to the screen where broken and shrivelled grains are separated as seconds.

Barley

The crop can be windrowed when the grain is past the doughy stage but not yet hard. Windrowing can be done as suggested for wheat. High grade malting barley must not contain more than 2 per cent of broken and skinned grains. To reach this standard and secure all the grain from the straw requires experience and favourable threshing conditions. In hot, dry conditions it may be preferable to stop threshing for two or three hours in the middle of the day. Before threshing barley for malting purposes the farmer should contact the local agent for his particular make of header, when particulars of special drum and header adjustments, suitable for the particular variety of barley handled, will be provided. The rate of feeding is important. With barley, only light windrows should be laid down.

As a general guide, the drum speed should be very low as the beat of the drum may break the end of the barley and spoil the germination. The concave should be opened as wide as possible provided all the grain is being threshed. It is better to leave a pickle or two in the straw, and particularly any shrivelled heads, than to skin or break the grain. Adjustment of the concave may require attention throughout the day.

The setting of the cavings riddle can be somewhat more open than for wheat and the blast stronger. The object is to float the seed and, while dropping the drum speed, to try and maintain speed on the shakers. Only a fraction of unthreshed heads should require returning to the drum for re-threshing. The slots in the cavings riddle should be fully opened. Where the riddles are heavily loaded, it may be desirable to remove the bottom riddle or use very large or wide open bottom riddles. This helps to reduce cracking by reducing the amount of seed being returned to the drum.

Peas

Partridge and white ivory peas can be direct headed by allowing the crop to become dead ripe before threshing. All other varieties should be windrowed. The blue field and varieties of garden pea are cut on the green side to keep a greenish colour in the seed. Windrowing can be done with the mower, mow-

er and forkers, or side delivery mower.

The crop must be dry for threshing as the peas will not shake readily through the straw walkers if it is damp. The drum speed should vary from 400 to 800 R.P.M. and the concave should be opened sufficiently to ensure shelling all the peas without cracking them. Peas thresh very readily when fit and splitting can be avoided by reducing drum speed. The cavings riddle should be opened up and the blast adjusted to blow out all chaff but not to blow seed over the end of the cavings riddle. The fewer riddles that require to be used, the better.

Lupins

Lupin is a difficult crop to handle under any conditions and no matter how they are harvested, it is normal to lose 5 to 10 bushels per acre, or more.

With a uniform crop direct heading is possible. This method is particularly suitable where the seed lost is to be used as a self sown crop or for green feed. The major risk with direct heading occurs because there is such a brief interval between the time when the crop is fit to head and when large losses occur through shattering. Adjustment of the drum and threshing technique are somewhat the same as for peas.

White Clover

Shutting up for clover seed is usually left to a slightly later date than for ryegrass. In order to reduce bulk, avoid weeds and obtain an even crop, it is usual to top the paddock just prior to shutting up. This can be done, without checking the white clover, by such an extra adjustment of the mower as will enable it to cut high. A good crop may be cut with the mower and brought into a narrow row by the use of inside as well as outside dividers. If the crop is light the side delivery mower may be used or special adjustments of the ordinary mower made. Unless reasonably good harvest conditions are experienced it may be better to stack the material and thresh with a clover huller after the seed has matured in the stack. Many tined sweeps, low trolleys, wheeled sledges or sheets of bags or canvas dragged along the ground may be used for conveying the material to the stack. Stacks should be made relatively narrow to prevent heating and allow drying out. The stacks require to be covered if rain falls. However, where suitable harvest conditions are experienced the material may be picked up by the header. It is very important that the windrow should not be too heavy for the header to handle conveniently. Once

the windrows have been formed they should not be turned or raked even though growth comes up through them. Clover is difficult to thresh and it must be thoroughly dry and brittle before threshing commences. It may be necessary to thresh only during the heat of the day. The drum speed should be as fast as possible and the concave set close to ensure rubbing out all the seed. When white clover is being saved in a ryegrass crop, the concave cannot be set close enough to rub out all the clover seed without injury to the grass so it may be necessary to allow unthreshed clover cobs to be bagged and re-threshed later.

Red Clover

Shutting up for red clover seed should be planned so that flowering will coincide with the maximum number of bumble bees. Counts made at Canterbury Agricultural College showed that these bees reached maximum numbers between mid-January and mid-February. The surplus spring growth is usually removed either by grazing and topping, or by mowing for hay and silage. The method of cutting and gathering is similar to that for white clover except that the crop can usually be cut much higher. Direct heading is done more frequently and more successfully in the case of red than in the case of white clover. In other respects the crop is handled as detailed for white clover.

Lucerne

The proper stage for shutting up for lucerne is similar to that for red clover, viz., as early as possible, provided the bumble bees have increased to a maximum by the time the lucerne is in full flower. Excessive rain near harvest may sprout the seed and excessive wind may cause the riper seeds to fall to the ground. Provided excessive rain is not experienced, the crop may be reaped and tied in sheaves with the binder and later threshed from the stook. The crop may also be direct headed but if green material or green seeds are present strict attention to drying out in small part bags is necessary. Windrowing is more common than direct heading. The crop is very easily threshed when fit. The drum speed should be 600-800 R.P.M. and the other settings of the thresher similar to those for red clover.

Rape, Chou Moellier and Turnips

The most satisfactory way to handle rape is to cut and tie the crop with the binder. The crop

should be cut when the greater number of pods are of a golden colour and the seeds in the pods at the bottom of the heads are nearly all black and the top pods are still green. If the crop is cut with a very high stubble the sheaves may be left lying singly on the stubble to ripen or they may be stooked. The sheaves can then be carted for threshing on a waggon provided with sheets to collect falling seed. If the header is used as a stationary thresher it should be stood upon sheets to recover seed from shattered heads. Rape can also be windrowed and later picked up with the header, but the losses by this method are usually greater than when the crop is handled in sheaves. For heavy crops of both rape and chou moellier, the power binder working on a small cut is preferable to the horse drawn binder. Since the crop is extremely easy to thresh, the drum speed and blast should be reduced to a minimum and the concave opened wide.

Some blocking material to reduce the blast may be necessary. When special riddles and screens are not available a satisfactory sample can be obtained by the use of wheat and red clover riddles and screens.

The foregoing special points are intended to be additional to but not to supersede the other instructional data available. With all types of machines it is necessary to maintain contact with the local agent and follow the directions as set out in the instruction book. It is particularly necessary that the adjustments specified in the instruction book should be made as weather conditions change and on each occasion that a transfer is made from one type or variety of crop to another. It is advisable to record in the instruction book actual settings used for each crop. The machine can be quickly set in subsequent seasons and thus only slight modifications need be made for the special conditions prevailing.

It is particularly important to see that all bolts and nuts are kept tight, rubber belts kept free from mineral oil, all bearings lubricated, and the header protected from the weather when not in use. All grease and dust should be removed when threshing is finished and the machine cleaned thoroughly, as if this is not done the dirt will hold moisture and cause rusting. Belts should be cleaned and stored away in a cool, dry place, the tension removed from the springs and the weight taken off the tyres.

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