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Band seeders for pasture establishment

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There are four ways to establish pasture:

- drilling into a prepared seed bed
- drilling with reduced cultivation
- direct drilling
- surface sowing.

Pasture establishes best when seeds are sown at a shallow depth and covered with soil. Provided the correct conditions of moisture and temperature are met, prepared seedbeds provide the best chance of placing the seed

at the correct depth and ensuring that seed is adequately covered. A band seeder, whether a stand-alone machine or mounted on a combine seeder or trailed behind it, can achieve this economically and successfully.

Specialised sowing machines have been designed to sow pasture seed into undisturbed soil. Generally, these are small units and are mainly used in the higher rainfall tableland areas which are steep and not suited to conventional cultivation.

A band seeder mounted close to the combine, with a levelling bar behind the last row of tines.
(Photo: J. Dellow)



Most pasture seeds are very small and cannot be easily metered through air seeders and combine seeders that are mainly designed to handle cereal seed. Pasture seed should be metered through a separate box that has finer tolerances and a more suitable metering system. Small seed boxes are therefore fitted to the back of combine seeders when pasture seed is to be sown, and air seeders are equipped with separate metering devices. Band seeders are not, however, well suited for use with air seeders, so this Agfact deals with band seeders in use principally with combines, both mounted and as independent trailing units, to establish pasture into a prepared seedbed.

The combination of an accurate, reliable seed box with a band seeder is a very successful method of pasture establishment. With pasture establishment being a relatively expensive operation, the band seeder has proved to be economically worthwhile.

WHAT IS A BAND SEEDER?

A band seeder is a mechanical aid that ensures seed is banded together in rows at a constant, shallow depth in prepared seedbeds. (seed emergence failure is most commonly the result of the seed being sown too deeply). It consists of a series of short lengths of pipe or angle iron (arms) hinged to a frame and attached to either the combine seeder's frame or an independent trailed unit with a small seed box.

The arms act as extensions to the drop tubes coming from the seed box and allow the seed to fall into a furrow that has been created by a small tongue on the underside of the arm. Each band seeder arm is hinged individually, which allows it to follow the contour of the ground and place the seed at an even depth across the whole machine. A light spring is used to keep the arms trailing on the ground. Links of chain can be welded to the ends of the arms. The dragging chain will cover the seed lightly with soil, making harrows unnecessary. By varying the position of the support frame you can place pasture seed where you want it in relation to the cover crop seed and fertiliser.

THE NEED FOR LEVELLING

There must be no further soil movement or levelling after the band seeder has passed, otherwise the sowing depth will be altered. For example, remove all the ridges created by the



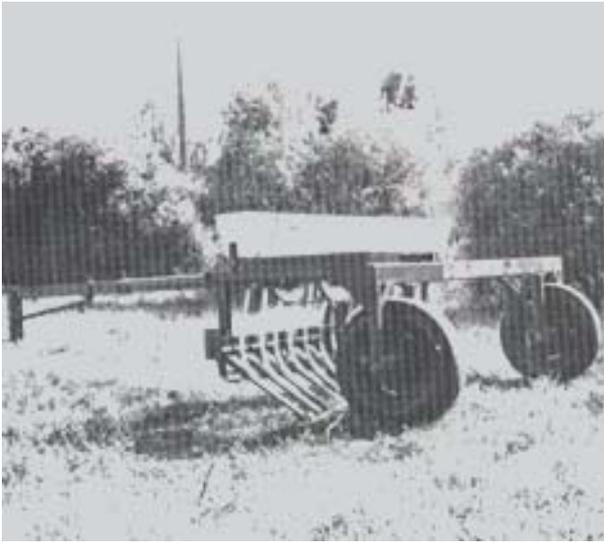
**A band seeder attachment mounted well to the rear of the combine to allow levelling to be done, in this case by both a ridge breaker and harrows.
(Photo: the author)**

combine before the band seeder moves over the ground. There are several ways of doing this, and the method chosen is generally determined by the positioning of the band seeder. A level surface can be produced by using a levelling bar, ridge breakers, existing harrows or a combination of all three.

If the band seeder is mounted close to the back of the combine then generally only a levelling bar can be fitted between the last row of tines and the band seeder arms. The levelling bar must reduce the ridges so that the paddock is trafficable, crop emergence is not impaired if a cover crop is sown with the pasture and the surface on which to band the seed is even.

Levelling bars are commonly made from a 50 mm (or larger) heavy water pipe, but in heavy soils accumulation of soil on the pipe is a problem. In these cases a flat bar 100 mm x 15 mm (cross-section) is preferred. Hitching the bar high on this frame avoids the 'bulldozing' effect. On undulating ground the bar may have to be made in two sections to maximise levelling. Many farmers hitch the band seeders behind the conventional finger levelling harrows, so the band seeder is situated well to the rear. This places extra stress on the combine frame, so this configuration is recommended only for combine seeders with a strong frame.

By using a trailing band seeder the weight is not placed on the combine and the existing levelling system may be used because the long hitch from the combine clears the harrows.



A commercially available trailed band seeding unit. (Photo courtesy of Ag-Murf Engineering)

MOUNTED OR TRAILING UNITS?

Originally most band seeders were mounted on a combine seeder, but there is growing acceptance of trailed units. A trailed unit requires no modification to the levelling devices used. It can be disconnected when not required, thus protecting it from dust, dirt and vibration when not in use. It is more versatile than a mounted unit as it can also be pulled behind other cultivation equipment such as chisel ploughs, scarifiers and offset discs. However, the soil surface must still be levelled adequately if the pasture is to establish successfully. Trailed units can also be towed individually by a light tractor or 4WD after soil preparation or crop sowing, as the draught is extremely low. Band seeding after crop sowing as a separate operation does not, however, allow optimum placement of the seed near the fertiliser band. This is relevant when soil fertility is low.

Mounted units are much more manoeuvrable than trailed units, and cheaper to construct. Trailed units, unlike mounted units, can also get in the way if you are handling bulk grain and fertiliser and filling from the rear with a bulk bin.

BAND SEEDER CONSTRUCTION

Commercial versions of either mounted or trailed units are available. Existing small seed boxes may be mounted to a trailing unit if required. It is easy to construct a trailing or mounted unit in the farm workshop because the band seeder principle is so simple.

The arms should be 600 mm long and made from 25 mm inside diameter (i.d.) pipe or 30 x 30 x 5 mm angle iron. Each arm is

independently hinged and spaced by the width of the hinge so that the arm scores a sowing furrow centred between each row of the combine – that is, at 178 mm centres. Using rolled hollow section (RHS) and angle iron makes welding easier than using pipe. Generally 32 x 32 x 2.6 RHS and 24 mm bar are used for the hinge (see diagram 1). The hinge rod should be the width of the machine and supported at regular intervals by brackets on the frame (see diagram 2).

Tension applied to the arms will ensure they follow the ground contours and create the required furrow. The amount of tension will depend on the weight of the arms and on soil conditions. The tension will be maintained by a spring connecting each arm to a rod mounted under the arms. The rod can be rotated to increase the tension on the springs and locked at the desired position (see diagram 3) to make a furrow 15 mm deep.

On the underside of each arm at the trailing end is a tongue that makes a small furrow to take the seed. Generally this is made from a flat strap of steel 25–30 mm long and 3–5 mm thick and chamfered at one end (see diagram 1).

A run of hard facing weld on the leading edge is advisable to reduce wear.

Light chain attached to the end of the arm is usually sufficient to drag the soil and cover the seed. In situations where soil builds up on the chain it may be modified (see photo below) or replaced by light steel mesh or bags.

Clear polythene hose connecting the small seed

A farmer-built trailing band seeder which uses the small seed box from a combine. (Photo: the author)

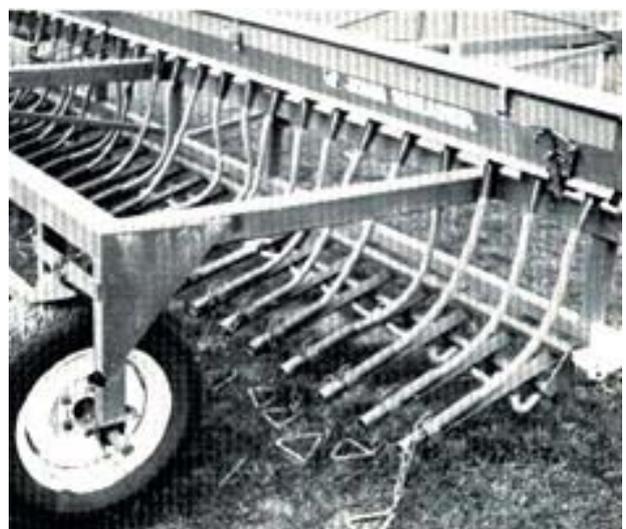


Diagram 1. Side view of hinge and arm arrangement

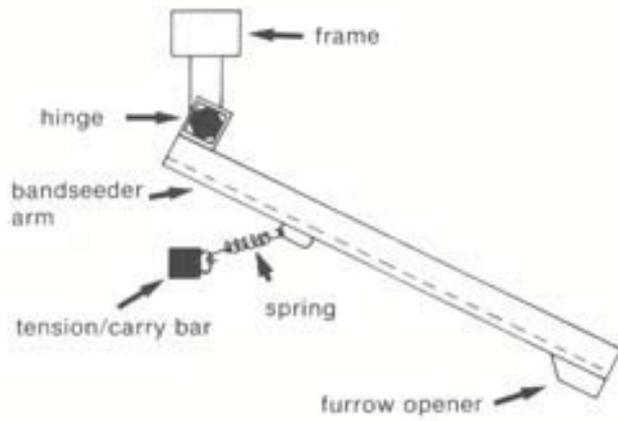


Diagram 2. View of frame and axle supports

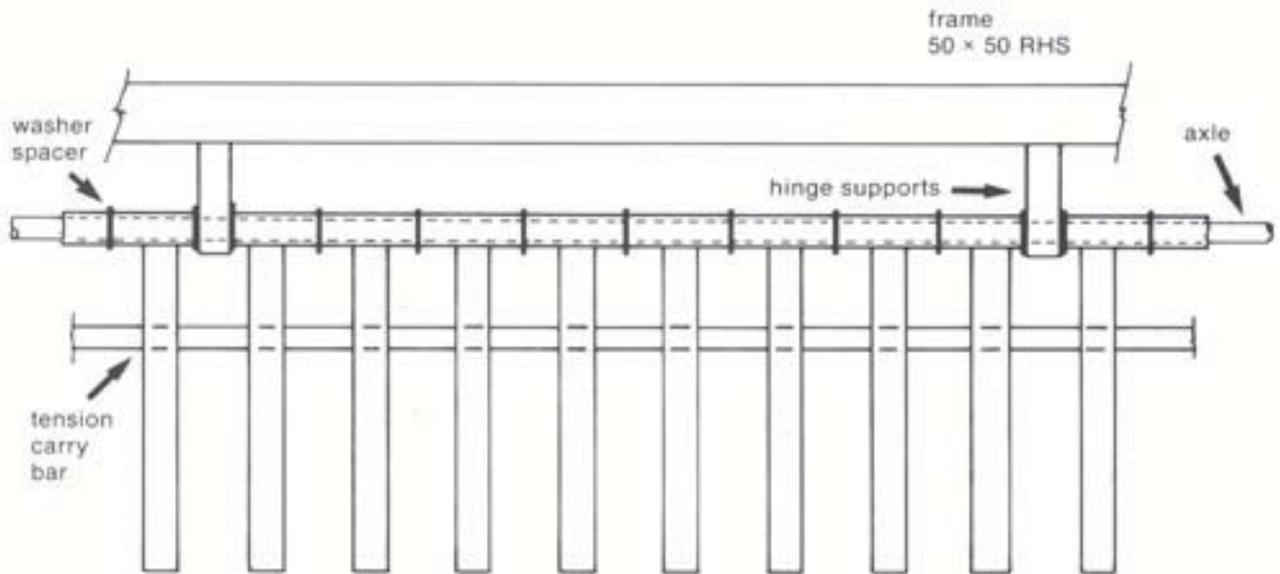


Diagram 3

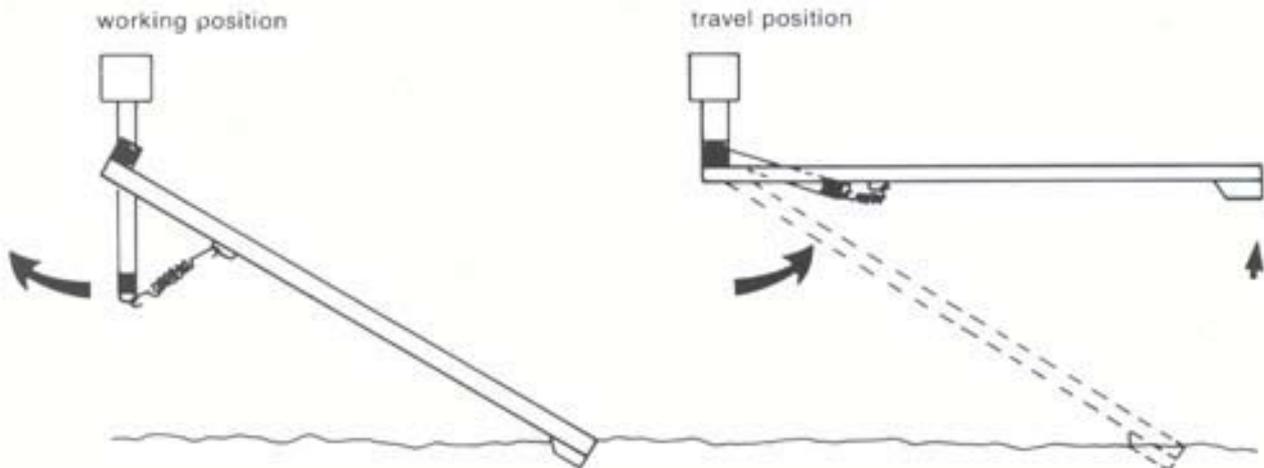
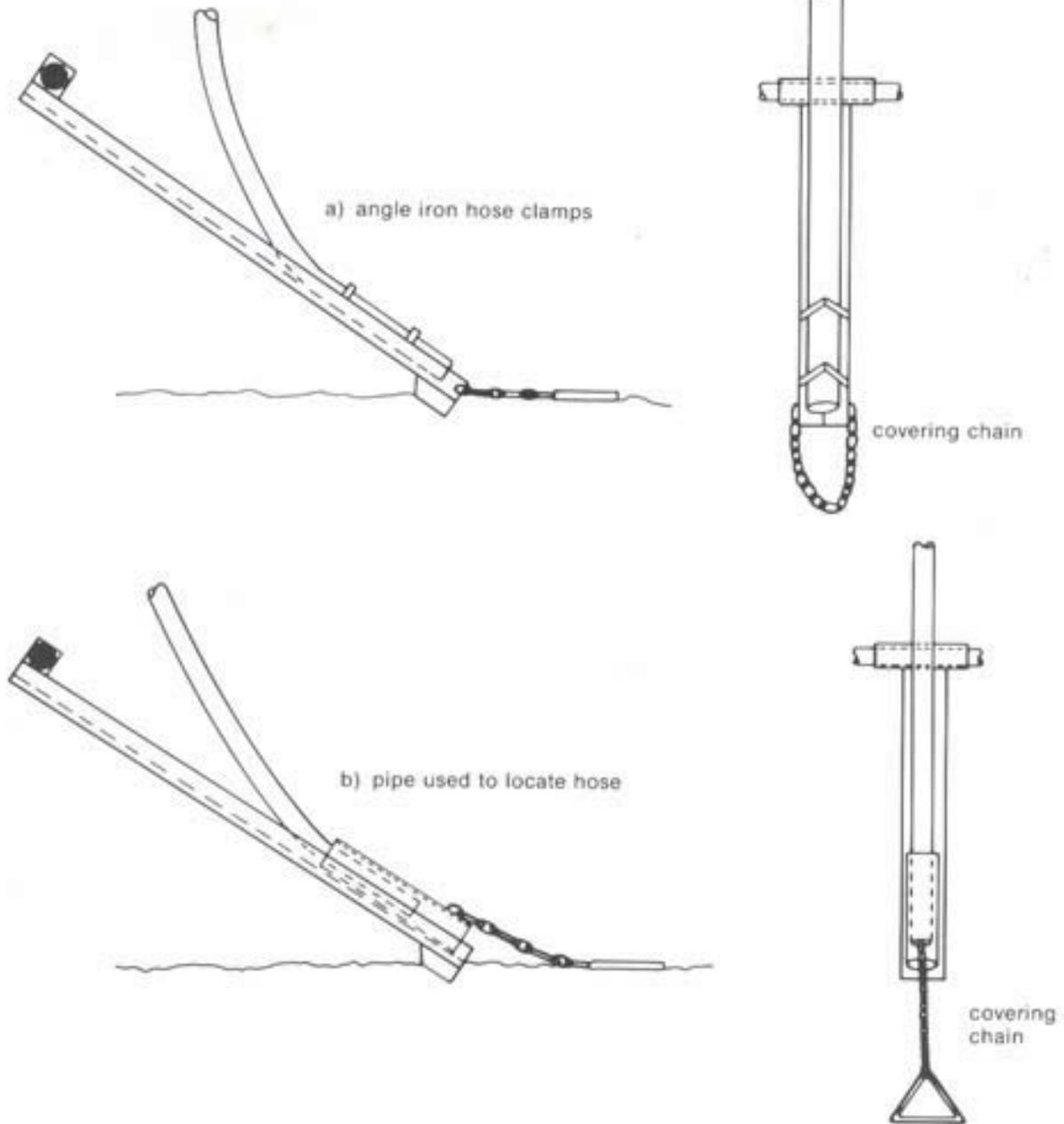


Diagram 4



box to the arms allows any blockages to be detected quickly. The tube is located on the arm by a short section of pipe or two short sections of angle iron welded upside down onto the top of the arm (see diagram 4).

Generally the small seed box that accompanies the combine is used with the band seeder, but commercial units other than those marketed by combine manufacturers are available. The seed box should be suitable for all pasture seeds and readily adjustable for calibration down to very low rates. Baffles are often required in the seed

box to stop the seed from vibrating towards one end. This is more the case on trailing units.

The seed box should be large enough so that, when being used in conjunction with a combine seeder, it requires refilling only when the main seed or fertiliser box is being refilled.

When band seeders are mounted at the rear of the combine an extended chain drive must be used. Use an idler/tensioner cog to keep the chain tight and in line. Disconnect the drive when the seed box is not in use.

ROLLING

Many band seeders are used in conjunction with rubber-tyred rollers. These are relatively easy to make and details can be obtained from your local Advisory Officer. Rolling ensures good compaction of the soil around the seed, resulting in better germination.

Rubber-tyred rollers are not recommended on soils prone to erosion. This is because rolling can increase erosion should heavy rain fall following the rolling of fine seedbeds. In this situation, erosion can be reduced by using a loose ring roller or coil packer roller trailed behind the band seeder.

The response from rolling is greatest where good moisture is available at sowing depth but the soil is dry above this depth. Rolling improves contact between the seed and moist soil, and hence improves establishment under such conditions.

FURTHER INFORMATION

Further information on the construction of band seeders can be obtained from your local departmental Advisory Officer.

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