A NEW DEVICE FOR DRILLING KNOWN NUMBERS OF SEED IN A PREDETERMINED LENGTH OF DRILL

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Summary

An attachment capable of being mounted on a "Planet Junior" hand propelled drill which will permit the sowing of a precounted number of seed or preweighed quantity of granules, either together or separately in a predetermined length of drill row, is described and illustrated. Examples of the pattern of distribution of seed within the row are also given.

INTRODUCTION

During the course of small plot experiments on the chemical control of pests of seedling brassicae it became evident that problems of assessment would be simplified if a known number of seeds were sown per unit length of row.

The treatments required in these tests were a wide range of seed treatments and the application of insecticidal granules either sown with the seed or as a band over the seed at drilling.

Initially a ten coulter drill was used. This was discarded since the numbers of seed sown per unit length of row varied too much for any practical assessment of plant survival unless loss from insects was very high. Each different seed treatment resulted in a different rate of seed flow from the hopper at any given setting and the difficulties of calibrating the flow accurately were almost insuperable.

A belt operated seed spacing drill was tested but was also unsuitable. Many of the different seed treatments required different belts, the experimentally treated seed were abraded, and no device could easily be constructed which would apply granules with the seed.

A locally constructed "cone seeder" was also tested but found to be unsatisfactory. The coulter was of the double disc type and tended to ride up over stones and clods of soil. There were also problems related to the even distribution of seed within the drill prior to sowing and some of the granules clogged the moving parts.

Thus the device described here was constructed to fit a standard "Planet Junior" hand propelled drill and fulfilled all the requirements.

THE PRINCIPLE

The essence of the device is two 5 cm wide moving belts which surmount the hopper of the "Planet Junior" hand propelled drill. They are driven by pulley and belt from the front wheel. When the drill is operated over a given distance the moving belts traverse from back to front over rollers. If seed and granules are distributed evenly along the length of one of the belts they pass forward as the drill moves and are dispensed down a funnel into the coulter. If granules are placed on the other belt they are dispersed down a separate funnel either in front of the coulter or to one side of the drill as a band if required.

FIG 1.

CONSTRUCTION

The front wheel of the drill is provided with a pulley which, through a belt drive, operates the front rollers which carry the wide moving belts (Fig. 1 A and B). These belts are constructed from 5 cm wide strips of rubber from the outer edge of bicycle inner tubing. This, because of its construction, remains dished except where it passes over the rollers.

To prevent the seed or granules from aggregating by vibration on the belts 2 mm strips of rubber are glued diagonally across the belts at 5 mm intervals.

When the drill is operated the seed and granules are carried forward to funnels from which they are directed through plastic hose either into the coulter, from one belt, or in front of the coulter (or to one side of the drill if required) from the other belt.

Provided the full length of a moving belt is utilised the length of row drilled will of course depend upon the ratios of the diameter of the front wheel, the drive pulley mounted on the front axle, the pulley driving the rollers, and the rollers themselves, and also upon the distance between the front and rear rollers over which the moving belt runs. In the device constructed which gave a drilled row length of 5.0 m the front wheel was 28 cm in diameter and the front drive pulley 2.5 cm. Whilst constructing the device it was found that belt slip to the pulley driving the rollers was eliminated by using a double drive pulley on the front axle with two rubber O rings to a double pulley (4 cm in diameter) driving the rollers which are 3.5 cm in diameter. The rollers are constructed of wood fitting snugly into rubber hose and no slip occurs between them and the moving belts. Finally the distance between the axles of the rollers is 42.0 cm. Shorter lengths of row may be drilled by blanking off a suitable portion at the rear end of the moving belts.

To facilitate the even distribution of seed and granules along the belt (Fig. 1, A) two overlapping spring loaded strips of perspex forming a trough are fixed along and over the belt: when the required numbers of seed are in position in this trough the flaps are depressed which allows the seed to fall on to the belt. This arrangement permits the relatively easy rearrangement of the seed by brush or finger so that seed is more evenly distributed on the belt and hence in the drill row.

To prevent windy conditions from hindering work an aluminium and perspex housing covers the whole device.

Application Techniques

OPERATION

The drill is placed in readiness at the end of the row which is to be sown. Seed, with a known weight of granules according to the length of row, are placed on the belt after being carefully spaced in the perspex trough over the belt. In practice, if insecticidal granules were not required for a treatment, inert blank granules were always added with seed since their presence helps even distribution of small seeds and stabilises their position on the belt.

The drill is then operated along the length of the row during which all the seed and granules are dispensed through the funnel into the coulter. Examples of the evenness of distribution of 100 seeds of turnips are shown in Fig. 2.

Peas, lupins, and a variety of small seeds have been successfully drilled with this device; care must be exercised in the construction of the funnels and tubing leading to the coulter to avoid blockage with large seed or those covered with hairs or spines.