

DIRECT DRILLING OF OILSEED RAPE

- Experiences of experimental work in Sweden

TORSTEN CEDELL - Agronomist

The Swedish Oil Plant Growers' Association, SOC
Box 84

S-291 21 KRISTIANSTAD, Sweden

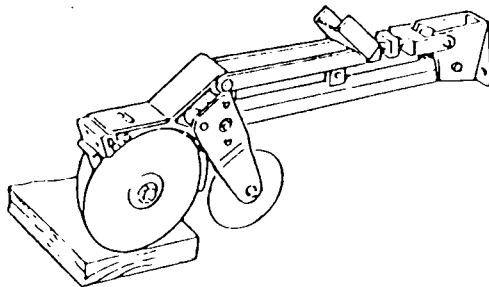
BACKGROUND

To obtain an adequate plant establishment and a sufficient growth in the autumn is the main problem in growing winter oilseed rape in Sweden. Generally sowing has to be done close after the harvest of the preceding crop, which in most cases is spring barley. The optimum date for sowing is about the 10th of August, a little earlier in the middle of Sweden and perhaps a little bit later in the southern districts. In that time dry conditions frequently complicate the normal way of preparing the soil and the obtaining of an ideal seedbed.

THE EXPERIMENTAL WORK

Since 1979 the method with direct drilling by using special seeders has been tested in experimental work. In most cases seeders with the triple-disc system as Massey Ferguson 130 and Bettinson, (Figure 1) have been used. Some of the field experiments have been carried out with the Irish seeder Moore Unidrill with which soil penetration and sowing are done with a single disc and without the hydraulic pressure of the tractor.

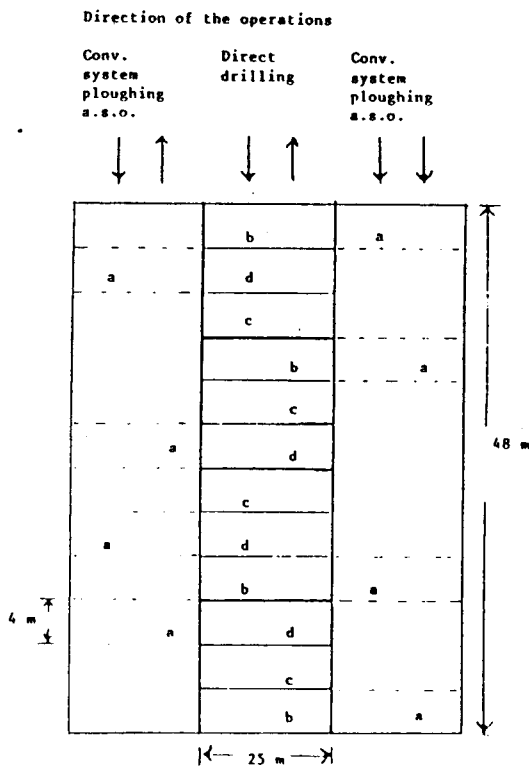
Figure 1. Coulter of a direct driller, type triple-disc



The new method was tested on different types of soils mainly in the south of Sweden but also in a province about 200 km south of Stockholm. In all field experiments direct drilling was compared with conventional cultivation including ploughing. With cereals as preceding crops also different ways of handling the crop residues before sowing were examined. The plan, used for such field experiments, is shown in figure 2 and it includes the following treatments:

- a. Conventional preparation of the seedbed; ploughing, cultivation and conventional drilling
- b. Direct drilling with the straw and the stubble burned
- c. Direct drilling with the straw removed
- d. Direct drilling with the straw chopped and spread in the field

Figure 2. Plan for the field experiment. Comparison of the methods for sowing Winter rape, direct drilling - conventional system.



The seed rate applied was at 7-8 kg/ha with a row space of 17 cm. Nutrients, phosphorus and potassium at usual rates and nitrogen at 60 kg/ha, were applied immediately after the sowing. Early in the spring the crops received nitrogen at 160-170 kg/ha as top-dressing. According to need a control of broad-leaved weeds was done with herbicides, (as benazolin + 3,6-dichloropicolinic acid), used post-emergence either in the autumn or in the spring. The plots in the experiments were of about 100 square metres with a harvested area of about 40 square metres. Each moment in the experimental plan was represented in at least four replications.

RESULTS

With spring barley as previous crop

Yields

Table 1 Different methods of drilling winter rape with spring barley as previous crop

Average of 13 experiments, harvested 1980-1982 in the south of Sweden

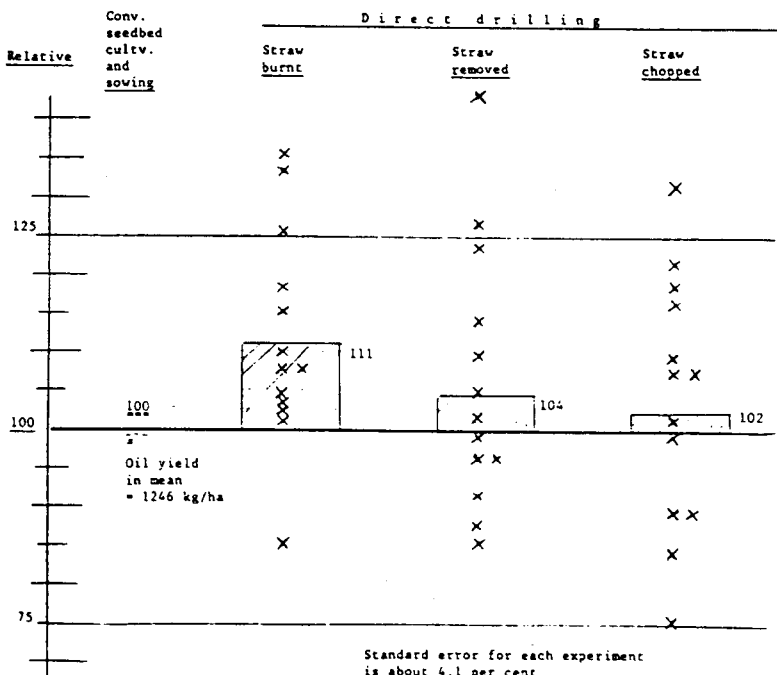
	Conventional seedbed pre- paration and sowing	<u>Direct drilling</u>		
		Straw burnt	Straw removed	Straw chopped and spread in the field
Seed yield, kg/ha at 18 % moisture content	3 217	3 551	3 335	3 269
Relative seed yield	<u>100</u>	110	104	102
% oil content of dry matter	42,5	45,7	45,6	45,6
Oil yield kg/ha	1 246	1 377	1 290	1 267
Relative oil yield	<u>100</u>	111	104	102
Chlorophyll, ppm	19	17	18	19

In four experiments, harvested 1982 in the district further to the north in Sweden, direct drilling increased the yield with in mean 2-4 percents.

The results in table 1 concerning the 13 experiments in the main region producing winter rapeseed in Sweden can also be described as shown in fig 3. For each experiment the oil yields of the three different methods of direct drilling are marked relative to the yield of the conventional system.

Figure 3. Winter rape, different methods for establishing plant stand with spring barley as previous crop. 13 field experiments in the south of Sweden 1980 - 1982.

Oil yields of different treatments in connection with direct drilling relative to the oil yield of the conventional sowing system in mean respectively for each of the 13 experiments.



As seen only in one of the 13 experiments the new method used on burnt stubble was inferior to the traditional system. Concerning the four experiments in the other district only in one experiment the yield of direct drilling decreased the yield of conventional sowing. The figures which form the means are more varying when drilling without a preceding burning of the straw. Decreased yields of direct drilling, when the straw is removed, may be explained by unfavourable tracks formed in connection with the harvest of the straw. The success of direct drilling when the straw is left in the field depends on how carefully and evenly the cutting and spreading of the straw have been done. In the experiments the actual chopping was done with a special cutter attached to the combine.

Results referring to soil types

Most of the experiments were placed on different types of moraine soils with a varying content of clay. Also heavy clay soils were represented. One field experiment was located to sand with not much humus and clay. In all the experiments the soil pH was about 6,5-7,5. It is generally difficult to find any connection between result and type soil. A decreased yield of about 15 per cent when direct drilled and independent of the way in handling the straw on the fine sand may however show that such soil is less suitable for direct drilling.

Results referring to date of sowing and climate

Among the 13 field experiments in the south of Sweden there were 8, in which the dates of sowing were different between the traditional and the new method. Here the mean date for direct drilling was the 15th of Aug. and sowing by the conventional system after cultivation was done in mean the 21st of Aug. In 4 of the other experiments both of the two methods of drilling occurred at the same time, in average the 14th of Aug. In one experiment direct drilling was three days delayed compared to sowing by conv. system. When dividing the results into groups regarding to if the two systems were compared at the same date of sowing or sowing by the conv. system was delayed (in mean 6 days) the advantage of direct drilling is on the same level.

It is stated that the new system saves soil moisture for the germination. However for all the three actual experimental years there was rainfall in time and enough to guarantee germination also when the seed was planted after cultivation. With regard to wintering the climate was specially favourable during the season 1981/82. In the autumn of 1981 the weather permitted a long period of growth.

Nitrogen fertilizing, growth and diseases

The field experiments, harvested in 1981, also contained the different rates, 40 kg/ha and 80 kg/ha, of nitrogen, applicated in the autumn.

With regard to the results there was a little tendency of increased yields at the higher nitrogen rate when direct drilling was done without preceding burning of straw and specially by direct drilling in trash.

Independent of nitrogen rates in the autumn and in the spring the spring growth of the crop started more slowly, when it was established by direct drilling. Later in the summer the growth however became at least as vigorous as that of the plant stand sown in the conv. way. Plant stands established by direct drilling generally had a better resistance to lodging and in some cases it was noticed that the ripening of these plant stands was delayed. In 1981 some field experiments were examined with regard to attacks of diseases. Specially in the south of Sweden the yields of the rape crops often decrease because of attacks from the fungus *Verticillium dahliae*. It was found that the attack of that fungus was on a little lower level when the crop had been established by direct drilling in stubble without buring and specially when straw was not removed.

With ley as previous crop

In 1982 there were harvested 2 field experiments, where the rape crop followed ley of grass (*Poa pratensis*) for seed production. After the harvest of the grass seed the straw was removed. Three to four weeks later the regrowth of the grass was desiccated by spraying the chemical glyphosate (Roundup, 4 l/ha). Sowing took place one-two days after the desiccating treatment. As shown in table 2 the sowing date was about the same for the two different methods.

Table 2 Different methods of drilling winter rape with ley as previous crop. Two experiments in the south of Sweden 1981/82

	Conv. seedbed preparation and sowing	Direct drilling Grass regrowth desiccated just before drilling
A. Soil: moraine type, fine sand with a small content of clay		
Date of swing	Aug 14	Aug 15
Seed yield, kg/ha	3 420	3 162
Oil yield, kg/ha	1 375	1 295
Relative oil yield	<u>100</u>	94
B. Soil: the same as for A		
Date of sowing	Aug 17	Aug 18
Seed yield, kg/ha	3 479	3 635
Oil yield, kg/ha	1 334	1 387
Relative oil yield	<u>100</u>	104

DIRECT DRILLING WINTER RAPE IN PRACTICE

In 1982 the Swedish growers started to use the new method for establishing winter rape. Mainly by contractors about 2 500 ha of that crop were direct drilled in the autumn 1982. Generally the experiences are good. However we have also learnt that for a successful result direct drilling has great demands of suitable field conditions and capability of the operator of the driller.

The actual soil has to be well-draining and well-structured with neither any type of compaction nor deep tracks on the surface. Grass weeds and volunteer cereals, specially such of winter types, have to be controlled. Too high humidity in the top soil and too much of trash from the previous crop are things which can easily disturb the drilling and cause an unsatisfactory plant stand. The driving rate of the direct driller has to be rather rapid. The ideal sowing depth seems to be more shallow than in connection with conventional sowing. By suitable conditions and operations one has to attend to that the slits after the direct driller will be closed. A recently direct drilled and establishing crop must have a sufficient amount of easy available nitrogen.

In connection with direct drilling clay soils, trash and humid climate are factors, which seem to cause special problems with regard to attacks from slugs.