

"A 50 cm row space in oilseed rape can reduce the use of pesticides"

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ABSTRACT

Growing winter oilseed rape at a 50 cm row space makes mechanical control of weed between the rows possible. Inter-row weeding should be carried out twice in autumn when the plants have germinated. Use chemical control in the rows for dicotyledonous weed is usually not necessary. Chemical control is necessary if there are more than ten voluntary cereal plants found per row metre. This means that chemical control of weed may be omitted in many oilseed rape fields. If chemical control is necessary, band spraying may be an option. In autumn band spraying is also a possibility in connection with pest and fungicide control. In comparison to overall spraying the use of band spraying can reduce the amount of pesticides used by 60 pct. Row spaces from 10 to 50 cm does not affect the choice of winter oilseed rape variety.

1. Introduction

In Denmark the Pesticide Action Plan demands for a reduction of the use of herbicides, growth regulators, fungicides, and pesticides, aiming at a treatment index of twice the full doses for the total agricultural area.

In winter oilseed rape field trials have been carried with the aim of comparing cultivation at 12 and 50 cm row space. Weed control was carried out both chemically, through inter-row weeding, and in a combination of both, where the oilseed rape was grown with 50 cm row space.

In oilseed rape weed control is usually necessary. The most common weed species that need control are: *Stellaria media*, *Capsella bursa-pastoris*, *Tripleurospermum inodorum*, *Sinapsis arvensis*, *Papaver rhoeas*, voluntary cereal plants, *Poa annua*, *Apera spica-venti*, and *Alopecurus myosuroides*.

In Denmark only few pesticides have been allowed for weed control in winter oilseed rape. In 1999 the pesticides allowed were: Devrinol (napropamid), Matrigon (clopyralid), Kerb 500 SC (propyzamid), Avadex BW (tri-allat), Gallant (haloxyfop), Fusilade-Xtra (fluazifop-p-butyl), and Agil (propaquizafop). In 2003 Command CS has been added to the list, while Avadex BW no longer is allowed.

Materials and methods

From 1995-2001 cultivation of oilseed rape with a row space of 50 cm and 12 cm has been compared in 48 national field trials.

The trials were sown with an ordinary drilling machine (radsåmaskine) and with a precision drill, with between 1.25 and 5 kg seeds per ha.

Weed was controlled either chemically, by inter-row weeding, or a combination of both. In the trials with 50 cm row space the nitrogen fertilizer was either broadcast or placed between the rows.

It was also examined if the same varieties gave the highest yields at both 12 and 50 cm row space.

Results

27 field trials have been conducted with the aim of comparing row space, seed amount, and weed control.

5 trials were conducted in 1995-96 with oilseed rape sown at 12 or 50 cm row space, with 2.5 og 5 kg seed per ha respectively, with either no weed control or chemical or mechanical control. Table 1 shows the results of the trials.

Table 1. Winter oilseed rape grown at differing row spaces with or without chemical weed control.

	Seed	Row space	Yield and extra yield
	kg per ha	cm	Seed per ha Standard quality
5 trials 1995-96			
Un-treated	5.0	12	30.0
0.5 l Matrigon 0,5 l Kerb F	5.0	12	1.8
0.5 l Matrigon 0,5 l Kerb F	2.5	12	1.8
0.5 l Matrigon 0,5 l Kerb F	2.5	50	-0.4
0.5 l Matrigon 0,5 l Kerb F 3 x inter-row weeding	2.5	50	1.6
3 x inter-row weeding	2.5	50	-0.8
<i>LSD</i>			<i>n.s.</i>

Table 2. Seed amount and different row spaces in winter oilseed rape

Winter oilseed rape	Amount of seed	Rape plants per m ²		Voluntary plants	Yield and extra yield
	kg per ha	Autumn	Spring	Autumn	Hkg per ha
More than 10 voluntary cereal 1998. 5 trails					
12 cm ordinary drill 1)	5.0	81	64	29	38.7
12 cm ordinary drill 1)	2.5	52	50	28	-2.7
12 cm ordinary drill 1)	1.25	32	31	29	-4.4
50 cm ordinary drill	2.5	32	26	28	-3.5
50 cm ordinary drill	1.25	16	14	31	-11.6
50 cm precision drill	2.5	35	28	28	-5.2
50 cm precision drill	1.25	17	15	32	-9.3
<i>LSD</i>					4.8
Les than 10 voluntary cereal 1998. 5 trails					
12 cm ordinary drill 1)	5.0	92	77	4	39.0
12 cm ordinary drill 1)	2.5	61	53	5	0.2
12 cm ordinary drill 1)	1.25	32	34	5	-1.6
50 cm ordinary drill	2.5	34	28	3	-1.8
50 cm ordinary drill	1.25	22	17	5	-3.0
50 cm precision drill	2.5	44	34	5	-1.4
50 cm precision drill	1.25	28	23	6	-0.1
<i>LSD</i>					<i>n.s.</i>
1) Chemical weed control.					

In 1998 trials more than 10 voluntary cereal plants were found per row metre in five out of ten trials in a 10 cm broad band. Table 2 shows the results of the trials.

The yield proportional for varieties grown at either 12 or 50 cm row distance is shown in table 3. The reason for showing the relativ yield proportional is that the trials at 12 and 50 cm have not been carried out in the same trial, but the trials were placed side by side in the same field.

Table 3. Winter oilseed rape grown at 12 and 50 cm row space.

Variety	Yield proportional	Variety	Yield proportional
Row space			
50 cm		12 cm	
4 trials 2001			
Dorado 1)	125	Canberra	122
Artus 1)	123	Dorado 1)	113
Canberra	122	Artus 1)	112
Recital	113	Recital	104
Capitol	106	Capitol	104
Livgard	106	Livgard	102
Bruno 1)	106	Contact	100
Contact	105	Express	100
Express	100	Bruno 1)	94
1) Hybrid			

Discussion

Trial have shown that equal yields can be obtained when winter oilseed rape is grown with a row distance between 12 and 50 cm. Yields are not effected of the amount of seed between 2.5 and 5 kg seed per ha, with minor weed occurrence, or where weed is controlled. A seed amount of 1.25 kg per ha may result in larger yield losses where weed is present. Substantial yield losses may occur especially where higly competitive species are present, such as voluntary cereal plants. With small seed amounts the best plant population has been obtained where sowing has been carried out with a precision drill.

With 50 cm row space in oilseed rape the use of herbicides can be reduced, because weed between the rows can be controlled with row cultivation. This is often sufficient because the rape plant population in the rows is so dense that it can outconcur the weed population. In areas where supplementary weed control is necessary the chemical control can be carried out as band spraying, which results in a 60 pct. reduction of the herbicide use. The band spray may also be an alternative for pest control while the plants are still small, f.ex. for control of *Psylliodes chrysocephala* Rape flea beetle.

The trials show no difference as to placing the fertilizer in the rows or broad spreading.

Trials have also shown, that it is the same varieties that give the highest yields, whether winter oilseed rape is grown at 12 or 50 cm row space.