

# THE INFLUENCE OF DIFFERENT MATING SYSTEMS ON SOME FEATURES IN ARTIFICIAL RAPE /*Brassica napus* L./

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## Introduction

In the natural propagation of rape /*Brassica napus*/ self-pollination can reach over 60%. Oilseed rape is a species in which a wide range exists in the percentage of self-pollination for individual plants or lines. According to Robbelen /1985/ the natural selfing rate varies considerably depending on the genotype and the environment. Progenies from selfing exhibit inbreeding effects.

The aim of the present work was to evaluate three strains of artificial oilseed rape under four mating systems.

## Material and method

The material used for study consisted of three strains of artificial oilseed rape from interspecific crosses *B. campestris* x *B. oleracea*. In the course of six years the strains were reproduced in four mating systems: 1. inbreeding, 2. sib-pollination, 3. inbreeding alternated with sib-pollination every year, 4. inbreeding alternated with sib-pollination every two years. In the sixth year of experiment some agricultural features were

evaluated in three strains of artificial rape depend on the mating system. Data were recorded on the height of plants, size of petals and pollen grains, ovules per ovary, length of siliques, silique set, seeds per silique, 1000- seed weight, seed yield per plant and oil content in seeds. Such features as silique set, seeds per silique, length of siliques and 1000- seed weight were recorded under self- and cross- pollination.

### Results and discussion

Breeding investigations /Andersson and Olsson 1961; Schuster 1969; Robbelen 1985/ suggest that self-pollination predominates in the natural propagation of rape. In spite of high self-fertility of rape, progenies from selfing exhibit inbred depression. The latter affects many features, e.g. fertility, vigour of progeny, length of siliques and yielding capacity /Kloen 1950; Wagner 1954; Grabiec 1967/.

Observations presented in this study indicate that fertility of rape, expressed in the ratio of the number of siliques to the number of flowers was markedly lower in conditions of self-pollination than in conditions of cross-pollination /Table 1/. Also, such features as seeds per silique and length of siliques showed lower values under self-pollination than under cross-pollination.

Data contained in the table 1 show the response of particular strains to mating systems to be similar with respect to: seeds per silique, ovules per ovary, height

of plants, length of siliques and seed yield per plant. It is worth noticing that the lowest values were found under the third mating system /inbreeding alternated with sib-pollination every year/.

The remaining features: silique set, size of petals, 1000- seed weight and oil content exhibited different response of strains to mating systems. E.g. size of petals. Two strains viz. 207/8/3 and 215/207 showed positive correlation between the reduction of size of petals and the depth of inbreeding. In this respect the smallest size of petals has been found under the first mating system /inbreeding/. In strain 207/5/1 the smallest petals were under the second mating system /sib-pollination/ and the largest under the first mating system. The different response of particular strains to mating system, may be due to large genetic differences between the analysed strains, synthesised from interspecific crosses. The latter being in agreement with findings in the literature /Olsson 1960; Thompson 1979; Röbbelen 1985/.

#### Summary

In the course of six years three strains of artificial oilseed rape, from interspecific crosses *B. campestris* x *B. oleracea*, were reproduced in four mating systems. In the sixth year of the experiment some agricultural features were evaluated in three strains of artificial rape depend on the mating system. Data were recorded on the height of plants, size of petals and pollen grains, ovules per ovary, length of siliques, silique set, seeds per silique, 1000-

seed weight, seed yield per plant and oil content in seeds.

The data indicated different response of strains to mating system with respect to the following features: silique set, size of petals and pollen grains, 1000- seed weight and oil content. The remaining features exhibited similar response of strains to mating systems. Such features as silique set, seeds per silique and length of siliques showed lower values under self-pollination than under cross-pollination.

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Table 1. Mean values of analysed features in three strains of artificial oilseed rape under four different mating systems

Strain	Mating system	Height of plants cm/	Size of petals mm/	Diameter of pollen grains/micra/	Ovules per ovary	Length of siliques		% siliques set		Seeds per siliques		1000-seed weight		Seed yield per plant g/	Oil content in seeds %
						selfing	outcross-	selfing	outcross-	selfing	outcross-	selfing	outcross-		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
207/5/1	1	114.1	130.8	27.9	28.4	6.9	7.5	49.0	62.0	13.6	19.8	5.5	5.3	4.6	48.0
	2	112.3	108.8	30.3	21.9	6.3	7.7	36.0	57.0	15.0	21.9	7.7	5.1	5.4	45.2
	3	101.9	115.5	27.4	19.6	5.6	6.8	22.0	37.0	12.3	18.8	5.6	5.9	1.8	43.4
	4	118.2	115.7	27.7	20.4	6.4	7.4	33.0	54.0	14.6	20.4	7.4	5.4	5.2	46.3
207/8/3	1	112.5	83.1	27.9	26.4	5.9	7.0	63.0	54.0	14.0	20.3	7.0	5.0	4.1	46.4
	2	110.4	103.7	30.4	27.3	6.4	7.3	43.0	58.0	15.7	19.4	7.3	5.3	3.7	46.5
	3	96.7	126.3	28.9	18.8	5.6	6.5	39.0	54.0	13.1	15.5	6.5	5.2	2.2	43.6
	4	116.9	107.2	29.6	26.8	6.3	7.3	37.0	54.0	14.7	18.4	7.3	6.7	5.0	48.7
215/207	1	103.3	97.1	28.3	19.6	5.7	6.7	26.0	41.0	12.5	19.4	6.7	4.5	2.5	41.7
	2	114.5	113.7	28.2	28.4	7.2	7.4	55.0	44.0	16.8	21.1	7.4	5.1	3.5	41.6
	3	101.2	108.8	29.8	16.9	5.0	6.3	21.0	54.0	8.8	16.0	6.3	4.2	2.0	45.5
	4	103.7	102.7	28.7	27.5	6.3	7.4	39.0	56.0	15.8	20.6	7.4	5.2	3.0	41.6

x/ 1. inbreeding, 2. sib-pollination, 3. inbreeding alternated with sib-pollination every year, 4. inbreeding alternated with sib-pollination every two years