

ERUCIC ACID AND CULTIVATION TECHNIQUE

By Anders Bengtsson, Ingvar Ohlsson and Ingemar Tegnell
Swedish University of Agricultural Sciences, Uppsala, Sweden

Cultivation of winter rape with a reduced level of erucic acid was initiated in Sweden by the new variety Sinus. This variety was first sown in the autumn of 1971 and was grown during the following five years. The erucic acid content in the seed of Sinus was 8-12 per cent. However, in the yield the mean erucic acid content was 15-19 per cent. The increase is mainly supposed to be due to the influence of volunteer plants originating from seed of high erucic rape or turnip rape grown earlier in the field.

To get an idea of how different cultivation factors influence the increase of erucic acid, a survey of current cultivation practice among winter rape growers was carried out.

MATERIALS AND METHODS

In the autumn of 1975 Sinus winter rape, erucic acid content 8-10 per cent, was sown by 211 farmers in the province of Östergötland. All farmers were interviewed twice - in the winter and again after the harvest - on details of cultivation technique as well as concerning volunteer plants, winter survival and harvest. Yield and quality of the seed harvested was supplied by the Swedish Oilseed Association. This report is based on information received from 190 rape growers.

RESULTS AND DISCUSSION

Analyses of the harvested rapeseed are shown in Fig. 1. Erucic acid content ranged from 10 to 38 per cent with a mean value of 16 per cent. Most of the farmers harvested winter rape with a content of 14-15 per cent but more than 20 per cent erucic acid was obtained in many cases.

As follows from this survey the average erucic acid content increased 7 per cent from sowing to harvest. This increase may have been due to volunteer plants and the growers were asked to give their opinion of the frequency of these plants in the field. The results are listed in Table 1.

Although the majority of the farmers were of the opinion that there were no volunteers in their fields of winter rape, a mean value of 15 per cent erucic acid was stated, indicating about a 6 per cent higher value than in the seed. As one would expect, an increased frequency of volunteers increased the content of erucic acid. All six growers reporting high frequency of volunteer plants harvested winter rape with a high content of erucic acid.

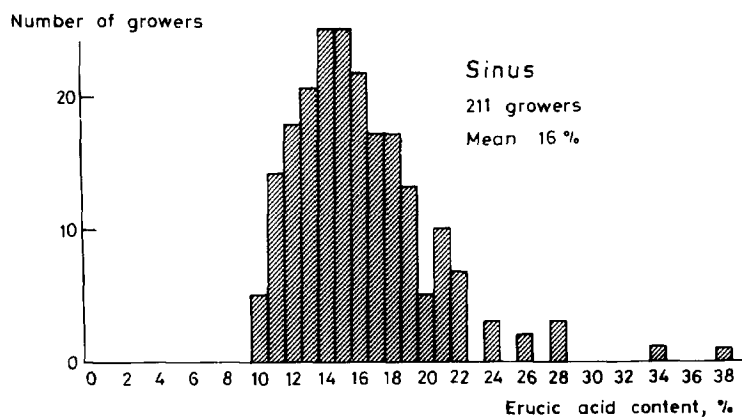


FIG. 1

CONTENT OF ERUCIC ACID IN THE YIELD OF SINUS WINTER RAPE IN ÖSTERGÖTLAND IN 1976

TABLE 1

VOLUNTEER PLANTS AND CONTENT OF ERUCIC ACID

Volunteer plants, % of all plants	Number of growers	Erucic acid, %
0	102	15
1 - 5	60	17
6 -30	6	24
> 30	0	-

Ley, fallow and barley were the most common preceding crops to winter rape. Surprisingly little difference was found between the crops as regards the effect on erucic acid. In the province of Östergötland the farmers grow both winter rape and winter turnip rape and **sometimes** turnip rape was a preceding crop to rape. It is clear from Table 2 that this combination of crops gave a yield with the highest content of erucic acid as compared with other preceding crops. In this case most volunteer plants derived from winter turnip rape, all varieties yielding seed of high erucic acid content.

It is also clear that the content of erucic acid was highest when winter turnip rape immediately preceded winter rape.

TABLE 2.
PRECEDING CROP AND CONTENT OF ERUCIC ACID

Preceding crop	Number of growers	Erucic acid, %
Fallow	53	15
Ley	69	16
Barley	35	17
Winter cereals	11	15
Winter turnip rape	10	23

On the average, the winter rape was sown in 1975, on August 13. Because of dry weather conditions many farmers delayed sowing that year. On grouping the results according to sowing dates (Table 3) there were very small and insignificant effects of the different sowing dates on the content of erucic acid.

TABLE 3.
SOWING TIME AND CONTENT OF ERUCIC ACID

Sowing date	Number of growers	Erucic acid, %
3 Aug.	18	16
4- 10 Aug.	60	16
11- 17 Aug.	37	17
18- 24 Aug.	50	17
25 Aug. -	9	14

Different row spaces were practised by farmers growing winter rape in 1975. Table 4 shows that either a narrow (ca 12 cm) or a wide (ca 48 cm) spacing was used by 87 per cent of the growers. When using the widest row space most farmers drilled at a seed rate of 7 kg per hectare and generally hoed in autumn and in spring. Mean seed rate at the narrowest row space was 12 kg per hectare. In spite of these different methods of sowing and inter-row cultivation no difference could be found between the three row spaces, all gave 16 per cent erucic acid. One possible explanation of the absence of higher contents of erucic acid obtained from fields with narrow row spaces may lie in the very effective competition of these stands against volunteers.

TABLE 4.
ROW SPACE AND CONTENT OF ERUCIC ACID

Row space, cm	Number of growers	Erucic acid, %
10-15	73	16
16-35	24	16
36-50	85	16

The general experience is that good winter survival of an autumn-sown oilseed crop is a requirement for a high yield of high seed quality. The farmers in the survey were asked to report the winter survival of the crop according to a scale ranging over good, medium or poor. In 1975 half the growers reported good winter survival (Table 5). However, ten per cent of the grown winter rape was badly damaged and revealed the highest content of erucic acid in the yield. This may be due to better survival of volunteer plants as compared with plants developed from the new variety sown. Besides, it is possible that plants with the highest erucic acid from Sinus had the best winter survival and thus increased the content of erucic acid.

To obtain yields with a low content of erucic acid the growers are advised to use seed with the lowest possible content of erucic acid, a rather high seed rate and under all circumstances to avoid sowing winter rape after winter turnip rape until a couple of years have passed.

TABLE 5.
WINTER SURVIVAL AND CONTENT OF ERUCIC ACID

Winter survival	Number of growers	Erucic acid, %
Good	87	15
Medium	60	16
Poor	16	18