

Oilseed Rape in Denmark

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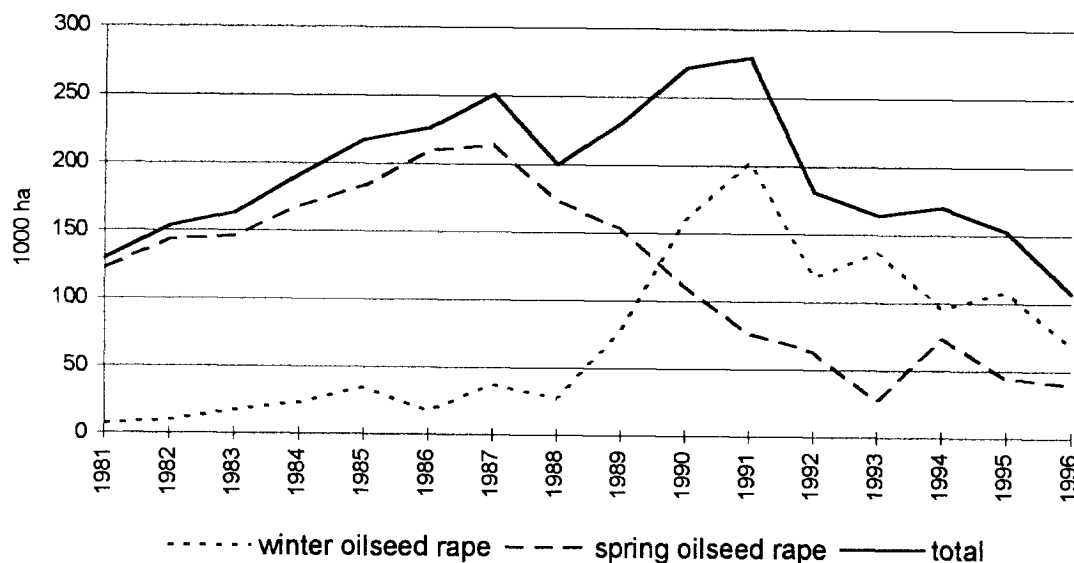
DLF-TRIFOLIUM A/S, Højerupvej 31 DK-4660 Store Heddinge

Cultivation

Double low spring oilseed rape varieties were grown on a large acreage in Denmark in the 1980ies. However, since the registration of double low winter oilseed rape varieties, these have dominated the Danish oilseed area (Fig. 1).

The Danish rape area reached its maximum in 1991 with more than 250 000 ha but has since declined to about 100 000 ha. This is mainly due to a decrease in the profit margin compared with other crops, especially winter wheat. The future area in Denmark will further mainly depend on the economical relation of oilseed rape to the cereal crops.

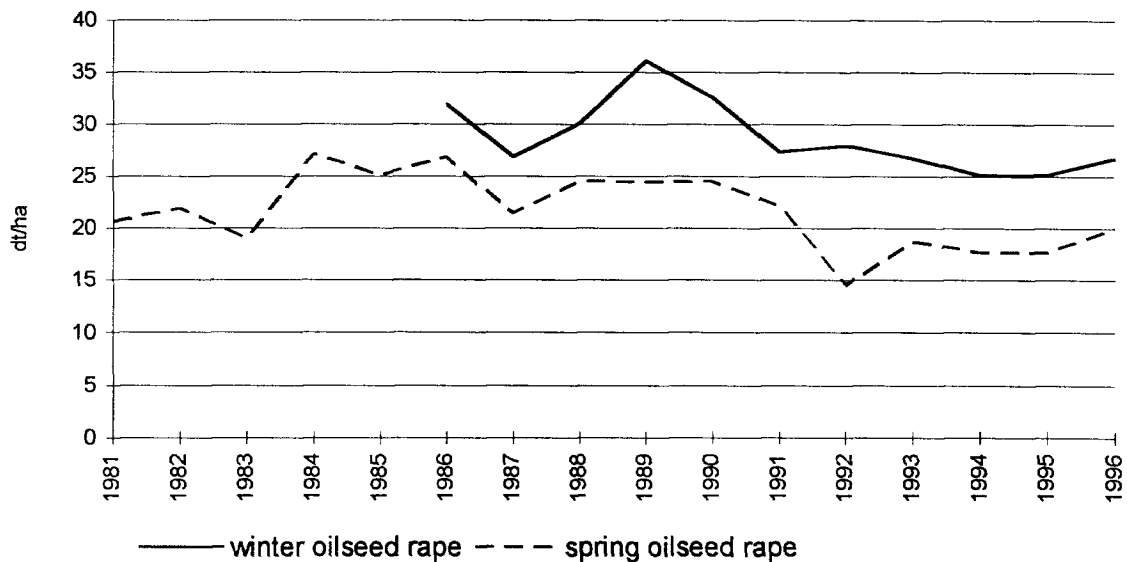
Fig.1: Oilseed rape area in Denmark



The average yields of oilseed rape have decreased in the last few years in spite of the availability of higher yielding varieties (Fig. 2). This is due to three main reasons. The European Union aid which was quantity-based until 1991 is now area-based, set aside rape yields normally lower and diseases of winter oilseed rape like blackleg and light leaf spot have become more important. They were not prominent until the area of winter rape increased in the 1990ies.

The main problem for winter oilseed rape cultivation is the ability to establish the crop early enough (about mid of August) in years with a late cereal harvest. Too late a sowing and poor plant development in autumn, can cause winter damage or total winter kill. Here varieties with the possibility for late sowing are necessary. To solve this problem, alternative methods of establishing the crop, e.g. sowing in existing cereal crops in spring or summer has been tried with varying results. Nevertheless, these techniques require even more resistance to the above-mentioned diseases.

Fig. 2: Yield of oilseed rape in Denmark



For both spring and winter oilseed rape, *Sclerotinia* rot can cause significantly damage. Chemical treatments are available but are not economical in all years. Another problem for both crops is that the number of available herbicides is decreasing. To solve this, sowing in rows and mechanical weeding has been recommended.

Varieties

National List

Testing for addition to the National List, takes place over two years at five locations. Trials are conducted under control of the Danish Institute of Plant and Soil Science at their own sites and at breeder sites. After two years varieties can be listed if they show an improvement in the cultivation or use compared with other varieties on the Danish national List. The total costs of these trials are paid for by the variety agents.

Recommendation Trials

Besides National list trials, recommendation trials are organised from The National Committee on Crop Production. These are conducted at 10 to 20 locations. They are the basis for the national advisory system and have dominant influence on the farmers' choice of varieties.

In both National and recommendation trials varietal associations are tested separately from the fully fertile varieties with an isolated block of standards to prevent unrealistic high pollen availability.

Variety type

Up to now conventional varieties based on inbred lines or double haploids have dominated the market in both spring and winter oilseed rape. Hybrid varieties have been listed but have not reached a significant part of the rape area. This is because the varietal associations of winter oilseed rape showed no clear yield improvement compared with the best standard varieties. The fully fertile hybrids of both spring and winter oilseed rape have not been available for sowing on a farm scale in sufficient quantity.

Breeding

The breeding of new varieties of both spring and winter oilseed rape is done by two private companies: DANISCO Seed in Holeby (previous Maribo Seed) and DLF-TRIFOLIUM in Store Heddinge. Their effort is not only aimed at the home market, but mainly at the large oilseed rape areas in western Europe and Canada. To this aim, the companies carry out extensive testing in different countries throughout Europe and North America, partly at their own stations and partly at those of a third party.

Both breeders develop inbred and hybrid varieties. Systems for hybrid production are restored and unrestored cms-systems and the use of self-incompatibility. Beside standard double low quality varieties there are minor breeding programs for special fatty acid composition.

The long tradition in breeding spring oilseed rape has led to a dominant position of Danish varieties in Europe.

Main breeding aims are oriented towards the major problems in oilseed rape:

1. High oil yields

To compete economically with alternative crops, mainly cereals, higher yields of the most valued product, the oil, has the highest priority.

2. Yield stability

Yield variation over years. In most areas the year by year yield variability in rape is larger than for cereals and tuber crops but generally better than for pulses. This variation is affected by winter hardiness, tolerance to late sowing, maturity, and lodging.

3. Disease resistance

Blackleg, *Sclerotinia*, and light leaf spot are the main problems. Higher resistance would allow closer rotations and reduced use of agrochemicals.

4. Meal quality

Although double low rape meal is a very good quality feed for both ruminants and pigs, this could be improved by further reducing the glucosinolates and by improved digestibility, i.e. by lower fibre content.

Research

Beside direct varietal development by breeders a group of public research institutions work with oilseed rape. Work is done on cultivation, uses of oil and meal, variety development and basic research. The following list gives an indication of the institutes involved in research but this is not a comprehensive:

Risø National Laboratory: Disease resistance, molecular markers, risk assessment of GMO

Royal Veterinary and Agricultural University: Nitrogen metabolisms, diseases, breeding methods, nutritional value of oil and meal, new products

Århus University: Disease resistance genes, gene transformation

Danish Institute of Animal Science: Use of meal in feed

Danish Institute of Plant and Soil Science: Shatter resistance, transformation, cultivation techniques, diseases

Biotechnological Institute: Use of oil and meal

Danish Technical University: Oil refining

Århus business college: Use of oil