

# The Introduction of Rapeseed Production in P.R. China

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The planting acreages of rapeseed was about 1.5-2.5 million hectares in 1950s-1970s; about 3.5-5.0 million ha in 1980s, and about 5.7-6.8 million ha in 1990s in China. Data on Table 1 show that the planting acreages and the yield of rapeseed in China are both about one third of the world's.

Rapeseed is an important oil crop in China. According to the statistic data of 1992, the total

acreages of rapeseed is 6.0 million ha, just after cotton, being the sixth of the largest crops, i.e. rice (32.09 million ha), wheat (30.50 million ha), maize (21.04 million ha), soybean (7.22 million ha), cotton (6.84 million ha) and rapeseed. And among them, 91,5 % is autumn sowing (winter type or spring type) and 8.5 % is spring sowing (spring type) (Table 2).

Year	Planting area/ year (million ha)	yield (kg/ha)	Total production/ year (10 000 ton)
1949	1.515	487.5	73.87
1950-54	1.646	504.0	82.94
1955-59	2 226	423.0	94.16
1960-64	1.695	361.5	61.29
1965-69	1.767	596.3	105.35
1970-74	1.839	691.5	127.18
1975-79	2.414	621.8	150.12
1980-84	3.570	1 140.0	406.95
1985-89	4.921	1 164.0	572.84
1990-94*	5.740	1 266.7	726.56
1995*	6.5-6.8		

\* The numbers of 1994 and 1995 are estimated

Winter type				Spring type	
Yangtse River region		Other région			
Acreage	Yield	Acreage	Yield	Acreage	Yield
4.936	1 350.6	0.546	1 214.7	0.508	1 130.1

The Yangtse River region is the most important area of rapeseed production in China, and the planting acreages in this area amount to about 5 million ha, more than 80 % of the Chinese total rapeseed acreages and about 25 % of the world's. The Huazhong (Central China) Agricultural University and the Institute of Oil Crops, located in Wuhan City, the centre of Yangtse River, play an important part for rapeseed production in this region.

In the autumn sowing rapeseed-region, there are two crop rotation systems. One is based on a double harvest system, i.e. rice-rapeseed or cotton-rapeseed, and the other is based on a triple harvest system, i.e. rice-rice-rapeseed. Usually, rapeseed comes after rice. This is beneficial to rapeseed for reducing disease damage by *Sclerotinia*.

Now there are two reforms of Chinese rapeseed cultivars. One is that the cultivars with single low or double low qualities are replacing the cultivars with double high qualities. The other is that hybrids are replacing common cultivars.

The quality breeding programme only started in China in 1978-1980. Up to now, many single low (low erucic acid) or double low (low erucic acid and glucosinolates) cultivars have been released, but being compared to old double high cultivars, they usually have a

5-10 % lower yield and a weaker disease resistance ability. So the planting acreages of these single or double low cultivars are only about 15 % of the total of 1994 in China. Therefore, the aim of quality breeding at present in China is to improve the yield potential and disease resistance ability, and decrease further the glucosinolate content.

Since the discovery of Yi-3A dominant genic male sterility (Yibing Institute of Agricultural Science and Technology, 1974) and Polima cytoplasmic male sterility in 1972 (Fu, 1981), respectively, many institutes in China have started heterosis breeding programme. The first cytoplasmic male sterility (CMS) hybrid, Qinyou 2, was released in 1985. Until the end of 1994, there were 21 hybrids released, including 10 CMS hybrids, 4 genic male sterility (GMS) hybrids, 6 chemical induced male sterility (CH) hybrids and one self-incompatibility (SI) hybrid (Table 3), but CMS hybrids are the most important and GMS hybrids come second.

The quality hybrid breeding programme was started almost at the same time as the quality breeding of common cultivars in 1980. At present, much progress has been achieved.

Among the 21 hybrids released, 4 are double low, about 19 %, and among the 74 hybrids on regional trials, 38 are double low, about 51.38 %.

Hybrides	DH Hybrids	SL Hybrids	DL Hybrids	Total
Hybrids released	11	6	4	21
Hybrids on trials	15	21	38	74

Year	1992	1994	1995	1996 (Estimated)
The Total acreages of rapeseed	6.0	5.8	6.5 - 6.8	6.5 - 7.0
The acreages of hybrids	0.73	1.2	1.0	1.3 - 1.4
%	12.0	20.7	15.0	20.0

Since the first hybrid Qinyou 2 was released, the hybrid rapeseed planting acreages have increased rapidly.

The present acreages of rapeseed hybrid represent about 15 - 20 % of the total in China. In 2000, rapeseed acreages in China may be over 7.0 million hectares, among them about 45 % may be cultivated with hybrids.

The emphases of our rapeseed hybrid breeding in recent years have been to improve the yield potential and disease resistance ability of double low hybrids, and still decrease the content of glucosinolates ( $< 20 \mu\text{mol/g}$ ).

There are four ways, i.e. cytoplasmic male sterility, genic male sterility, self-incompatibility and chemical induced male sterility, of rapeseed heterosis breeding in China. At present, cytoplasmic male sterility is the most popular way, but as the recessive genic male sterility offers the advantage of having many restorers,

no negative cytoplasmic effect and a shorter breeding period, it could be the potential way with a promising future for rapeseed heterosis breeding if the problem of removing about 50 % of fertile plants in the genic male sterile line in hybrid seed production plots is resolved. Therefore, it is worthwhile to pay much attention to this question in the future.

#### References :

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