POTENTIALITY OF OIL SUNFLOWER IN CHINA

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Summary:

The rate of the edible oil consumption increased more quickly than the production in China. The lack of vegetable oil is a serious problem for the future. The acreage of sunflower is influenced mainly by the grain production. The farmers determine the surface of sunflower according to the free market price during the previous year. But the hybrid oil sunflower becomes more and more competitive. The mid-north area has produced more than 50% of the total sunflower during last 10 years. The Northwest increases its surface via new oil sunflower hybrids, few disease and competitive profit. The experimental results in the north high-cold area, in the northwest region showed very promised oil productivity. Also, in the center of china sowing after winter wheat by the end of June and harvesting in mid September, the oil hybrid A15 decreased its cycle to 75-80 days, the achene yield of the variety attained 3135kg/ha.

Key words: Oil Sunflower, Development

1.Situation of the edible oil

The production of edible oil in China hasn't met the people's demands since a long time. The edible oil consumption/person-year in China has increased by about 11.9% for the total population, and 11.8% in the countryside during the last 20 years (see table 1).

Table 1. Consumption of edible oil in china

Year	total population Kg/person	Rural areas Kg/person
1980	3.69	2.49
1985	4.63	4.04
1990	6.12	5.17
1995	10.40	5.80
2000	12.50	8.37
Average increase per year	11.9%	11.8 %

On the other side, the production of edible oil increased only by 2.5% per year during the same period. If the consumption level goes on the same way as in recent years, the demand of vegetable oil will amount to 23,500 Kt in 2010 when Chinese population is

about 1.4 billion. The total production in the country is expected to be 13,100 Kt. Then the insufficiency would be 10400 Kt, which will take 44% of the total consumption. So, the production of oil plants is a very important goal in China for a long period in the future.

2.Evolution of sunflower in China

The sunflower in China takes about 6-9% of the total surface of oil plants. The surface varied from 680.000 ha to 920.000 ha during last 10 years (see Fig.1). The surface of sunflower was influenced mainly by the grain market in China. When the country emphasizes grain production, which means that the government pays more for grains, the sunflower growers decrease their surface. Secondly, when the country has a good harvest in oilseed rape one year, then sunflower decreases the year after. Chinese farmers determine the surface of sunflower according to the price of preceding year. This market has been free for 10 years. As the production of grains in China increased during recent years, sunflower became more competitive than corn. This explains the increase of sunflower since 1998. In addition, hybrid oil sunflower becomes more and more competitive in the challenge of the free market. For example, the price of corn was 0.6RMB(1$US=8.2RMB) per kilogram at the end of 1999 when the price of sunflower was 2RMB/kg.The yield of sunflower was variable from 1.56t/ha (in 1995) to 1.92t/ha (in 1996).

3.Important production area of Sunflower

Sunflower is planted in three main areas in China (see Fig.2). These areas occupy 98% of the total surface of sunflower. Because of the threatening by sclerotinia, the main producing area has been transferred from Heilongjiang, Jilin and Liaoning to mid-north and northwest. The acreage in the Northeast region will continue to decrease with the pressure of disease. The second unfavorable factor is that the politics in this region is to develop the Soya, which is the traditional and strategic plant for China. The mid-north area has been the most important region during the last 10 years. It produces more than 50% of the total sunflower. The Northwest area increases its surface mainly by using new oil sunflower hybrids. This region has a huge potential in the future because of favorable politics, few diseases and competitive profit compared to other crops.

The Mongolia autonomous region (in the mid-north) produces about 200 thousand hectares sunflower in China . The sunflower production represents 68% of all the oil production in the province. But diseases are more and more serious. Other big provinces are Shanxi, Heilongjiang, Xinjiang, Jinlin, Hebei and Shaanxi.

4.Potentiality of sunflower for the future

The oil content of sunflower in China was very limited ranging from 30 to 46%. So, there is a large potential for improvement. Recent experiment was organized by National Project for the Rural Development in the North of China, such as Inner-Mongolia, Shaanxi, Shanxi, Gansu, Hebei, Xinjiang, Jilin, Heilongjiang, etc. The experimental results in north high-cold area (Mongolia-Duolun County, see table 2) showed that the growth period is 99-114 days. Only the A7, A15, A18 and A27 are

early enough to mature. The A3, A26 and the control variety G101 were too late in this region. The yield of achenes showed a good potential and the oil content of seeds was about 52.5-64.93%.

Table 2.Essay of oil sunflower in high-cold area (1996,Liu et al. 1999)

Experimental code	Cycle after germination (days)	Yield of achenes (kg/ha)	Achene's density (g/cm3)	Hull %	Oil content of seed (%)
A3	114	2520*	0.287	36.88	52.50
A4	112	1830	0.342	33.42	56.34
A7	105*	1995	0.380*	26.58*	55.46
A11	108	2475*	0.390*	38.57	59.71*
A15	102*	2325*	0.361*	28.28*	64.93*
A18	99*	2250*	0.301	30.00	59.97*
A20	110	2190	0.366*	32.90	56.06
G101(CK)	113	2256*	0.323	32.23	54.63
A26	112	1740	0.352	27.49*	61.15
A27	101*	2115	0.304	29.05*	59.36*

The oil productivity was also shown in Lanzhou (table 3), located in the northwest region with a very dry climat, and where the land needs intensive irrigation. The sunflower is well considered for the local people because of higher oil production of sunflower compared to flax, that is largely planted in the region for human edible oil.

Table 3.Essay of oil sunflower in Lanzhou (1997-1998Liu et al. 1999)

Experimental code	Cycle after germination (days)	Yield of achene (kg/ha)	Oil content of achene(%)	Oil yield (kg/ha)
LG11349 (A15)	105	2910	52.93	1540
LG3311Z	109	2595	51.34	1178
G101 (CK1)	110	2295	50.36	1156
LGNANTIO	113	3195	49.39	1578
LG10437L	110	2325	52.05	1209

In the center of China (Shaanxi-Xi'an) sowing after winter wheat (end of June to beginning of July), the variety LG11349N (A15) decreased its life cycle to 75-80 days. The achene yield of the variety was about 3135kg/ha. It is resistant to drought, to saline stress, and to mildew. When planting A15 with high density at Bameng (Mongolia west), the yield was 4043Kg/ha, and the rate of oil production is 43-52%. But altenaria is heavy while planting in the South of Hebei and Shanxi,Beijing and Tianjin.

References

1. Statistic book of agriculture in China.1990-1998.Agricultural house, Beijing
2. Liu gs.et al., 1994. Research and development of sunflower. Sci. and Technology publish house. pp 240.
3. Liu gs.et al., 1999. Rural development in the semi-agricultural area of north China. Science and Technology publish house. pp 220.

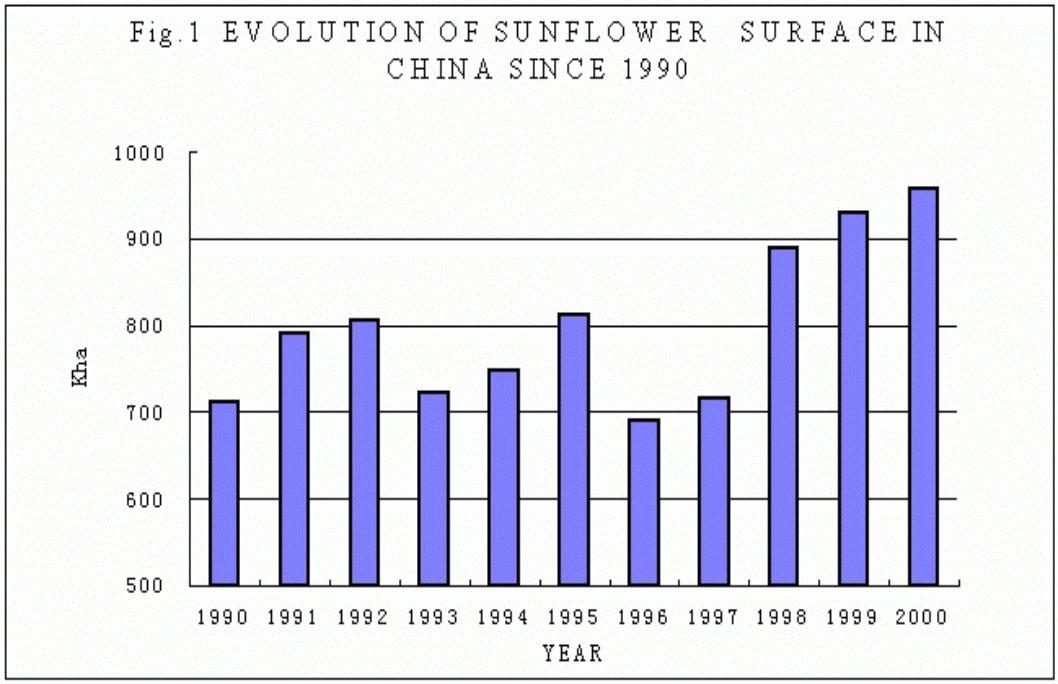
Fig.1 EVOLUTION OF SUNFLOWER SURFACE IN CHINA SINCE 1990
1000
900
800
700
600
500
Kha
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000
YEAR

Fig.2 MAIN PRODUCTION AREAS INCHINA(1990-2000)