

The Potentiality and Strategy of Developing Hybrid Oil—type Sunflower in Triangular Region of Shanxi, Inner Mongolia, Ningxia (North of China)

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Abstract: The triangular region in this report means Yulin and Yanan prefectures in Shanxi Province, Yimeng, Bameng and Baotou cities in Inner Mongolia, as well as Ningxia Huizu Autonomous Region. It covers an area of 230,000 km², including 3,800,000 ha of cultivated lands, with 11,500,000 agricultural populations. The traditional crops are spring wheat, millet, soybean, corn, rice and potato. Since the end of 70ces, the growing areas of oil—type sunflower increased year by year, and reached 70,000 ha in 1995, which are half of the total sunflower area in that region. Because of the dry climate, no serious disease had appeared for many years. The potential growing areas of sunflower in the near future were estimated to reach 530,000 ha, including two—thirds of hybrid oil—type sunflower. Thus 2,000 tons of hybrid seeds were needed (that means 8.75 tons of parent seeds). The volume of trade of oil—type sunflower in this region will be one—third of the total volume of trade of sunflower in China in the year 2,000.

Key Words: triangular region, hybrid oil — type sunflower, potential advantage

The status of oil provision in our country were not always very good. Sometimes we have to import oil. Along with the increasing of our population and the developing of economics, the potential crisis will become even worse if we don't pay attention to it. According to our experience, developing hybrid oil-type sunflower in the triangular region of Shan—Mong—Ning will meet the demand of our country's oil provision and improve the level of our low-grade oil. At the same time, it will be meaningful for crop distribution, cultivated system and construction of energy basis in West China. It will also be an ideal choice for the peasants there to become rich.

1. Enjoying exceptional advantages of ecological resources in oil-type sunflower production

The triangular region of Shan—Mong—Ning include Yulin and Yanan prefectures in Shanxi, Yimeng, Bamengn and Baotou Cities in Inner Mongolia, as well as Ningxia Huizu Autonomous Region. The areas are 230,000 km², including 66 counties. The advantages for oil-type sunflower production are:

(1) Broad lands.

There are 3,800,000 ha of cultivated lands, with 11,500,000 agricultural population in the region right now. In recent years, the cultivated lands will increase about 440,000 ha while the area for oil-type sunflower is quite small (70,000 ha in 1995). Even in 2000 the area ratio between hybrid oil-type sunflower (350,000 ha) and the total cultivated land (4,200,000 ha) is still quite small. So there is no contradiction with other crops if peasants plant oil-type sunflower here. Moreover this crop was welcome because of its relatively extensive cultivations.

(2) Soil rich in potassium (K)

Except for some sand soil along the Great Wall, most others belong loess that easy to be cultivated. The content of organic matter is 0.2—0.8%.

According to general investigation of soil; the active potassium (K), which is needed for oil — type sunflower, reached 120 — 210 ppm despite of the shortage of nitrogen (N) and phosphorus (P). So a harvest is easy to get if N and P is available.

(3) Dry climate and less disease

For the whole region, the climate is dry and isn't suit for all kinds of disease. The production practice there during the years proved this.

(4) Sufficient quantity of heat

Total effective temperature were among 2800—3500 °C, compared with an average of 1770 °C suitable for oil — type sunflower. Meanwhile the total amount of radiation each year was 130—150 kilocalorie/cm² (7—15% higher than that of the south—east coasts). This indicated the potential of production of oil — type sunflower.

(5) High—oil production

The suitable temperature for oil formation of oil — type sunflower (21 — 24 °C) is that of the region, so the oil content of the same cultivar is higher than that of other regions. For Peredovik, 45.7% in Inner Mongolia, 41.8% in Songhuajiang, Heilongjiang, 40.3% in Shawan, Xinjiang, 36.8% in Baicheng, Jilin, 33% in Shenyang, Liaoning. The change of oil — content is: high content in high sea level region with the same latitude; high content in high latitude region with the same sea level. So the triangular region is high — oil production region in China.

2. Practice on production of hybrid oil — type sunflower G101

The traditional crops in the triangular region are spring wheat, millet, soybean, corn, rice and potato. Since the late 70s, the growing areas of oil — type sunflower increased year by year. At the beginning of 80s, the first lot of hybrid oil — type sunflower had used in this region. In 1987, Yulin Seed Corporation (Shanxi) introduced a hybrid oil — type sunflower G101 from

DEKALB Genetics corporation (USA). From then on, the total area had reached 70,000 ha. The main advantages of the hybrid are;

(1) Wide adaptability

Hybrid oil—type sunflower can be planted in every place, every field, every piece of soil in the region and grow very good. This can be proved by many years practice.

(2) high dry—resistance

In 1991 the production of hybrid oil—type sunflower reached 1500 kg/ha under the circumstances of an extraordinarily serious drought. Some field even reached 2250 kg/ha. This means in the region the hybrid has high dry—resistance.

(3) High disease—resistance

From the small seedling to the ripe plant with seeds, the whole plant was very "clean" (no disease). It was especially high disease—resistant to rust and downy mildew. Only in the late growing stage it had lightly sclerotinia wilt, which was uneffect to the yield.

(4) Tolerable to saline

According to the testment in 1994, the production of hybrid oil—type reached 4410 kg/ha in the soil containing 0.77% saline. This can also find an useful way for the large abandoned saline field in the triangular region.

(5) High yield

The yield was 1500—2250 kg/ha in the fields on a hill and 3000—3750 kg/ha in irrigating fields. This result increased production by 25—30% compared with Peredovik. The oil content in seed was 47—49%, 13% higher than that of Peredovik.

(6) High quality of oil

The content of linoleic was 66% and oleic acid 25.4%. The former was

one of the necessary fatty acid for human's body which is helpful for removal of extra blood cholesterol.

(7) A better way to occupy market

A lot of seed and oil of sunflower were wanted during these years. We can use the land and heat sources in the region to develop oil-type sunflower. Our oil products will go into the national and international markets if we can change the cover a little bit. Since potato was easily gained here, the fried potato pieces will be good—sale in the European and American markets.

(8) Flexibility of sowing time

The sowing time can last from April to June. Generally it was in late May. Thus the seedlings can avoid harm from chafer.

(9) Diversify in planting patterns

The hybrid was very capable in self-adjusting. If the land was dry and water and fertilizer were not sufficient, the plant became short-stalked, but still quite strong and uniform in height and no lodging. It can grow in all kinds of fields and interplant with other short stalked plants.

(10) High efficiency of input—output

At the same field, the input of the hybrid was $1/3$ — $1/2$ of that of wheat and corn, while the output was 50—100% more than the later. The actual practice was like this: 60,000 seedling/ha for irrigating field and 45,000 seedling/ha for dry field. One seed in one bunch.

3 The future strategies

In the near future, the year 2000, if the production of the hybrid reached 30,000 kg/ha and the percentage of oil was more than 40%, 420,000,000 kg oil/year would be available in the region. The volume of trade will be $1/3$ of the whole in Chinese sunflower market. The major strategies to develop hybrid oil-type sunflower are as follows: Try to get investments from the

Government as well as international society to solve the problems including shelling, stoving, grading, seed coating, etc.. Try to build a seed base for hybrid oil — type sunflower which produces 2000 tons seeds (8.75 tons of parent seed) in the region. Try to develop the work of breeding and introducing fine varieties to meet the need of different type of fields. Try to use better methods of cultivation to prevent the hybrid from all kinds of stress, such as diseases, pests, etc..