

# *Study on the Feasibility of Planting Ryegrass in Alpine Regions*

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**Abstract:** Ryegrass has always been the main feed variety selected by milk producers in Europe and Oceania countries represented by the Netherlands. Therefore, ryegrass has become a very important feed raw material in the dairy industry. Ryegrass plays an important role in the rotation of fallow land and winter meadow, soil rotation pollution and restoration, high-yield cultivation, variety selection, silage processing, feed livestock raising, and can solve some common problems in production practice. We take ryegrass as the research object and ryegrass as the feed, and develop different breeding models to meet the needs of different enterprises and different pastures. The road of sustainable agriculture will also play a more important role in the development of grassland animal husbandry in different regions of China<sup>[1]</sup>. Ryegrass, as a high-quality forage grass, is planted in the high mountains of Heilongjiang Province, so further research is needed plant. This paper aims to explore whether large-scale production technology, mechanized management measures and fine management techniques can be used to reduce risks and losses, and whether it is feasible to further promote large-scale afforestation in Heilongjiang Province.

## **1. Current development status of forage industry in China**

At present, the state attaches great importance to the structural adjustment of planting industry structure, and has issued relevant policies to support planting industry and promote the growth of food crops and economy. Food and feed crops grow together. Feed crops include feed, concentrated feed and straw feed, among which the feed planting area is the largest, which plays an important role in the development of feed industry and the protection of ecological environment, but there are still many problems to be solved in the development of feed industry.

## **2. Application advantages of rye in developing forage industry**

### **2.1 Rich in nutrition**

Feed rye is rich in nutrition, high nutritional value and strong palatability. Rye grains contained

2.12% crude fat, 4.58% protein, and 33.18% crude fiber. Leaves contain 14% to 19% protein and 0.42% to 0.48% lysine. During the tillering stage, the stem and leaves contained 23%~26% lecithin protein and about 0.5% lysine. 6 – 11 days after flower, containing at least 14% protein and at least 0.4% lysine<sup>[2]</sup>. Compared with other herbage, rye has the advantages of strong stress resistance, high yield, fast growth rate and high nutritional value, which is also conducive to its development. It will not affect the normal production and planting of crops, but it will produce significant social and ecological and economic benefits. Rye has strong adaptability and high feed conversion rate, which plays an irreplaceable role in the development of feed industry in China.

## 2.2 With a high yield

In the whole growth cycle, ryegrass plant height reached 65 ~ 180cm, many tillers, lush stems and leaves, stem height, strong lodging resistance. Mechanical harvesting, the yield is about 49500kg / hm<sup>2</sup>, far higher than dong70 rye and hay. The protein content of rye stem and leaf is also relatively high, from 15.4% to 17.8%, rich in nutrients. Ryegrass value is rich, taste is very soft, delicious, pigs, cattle, sheep, poultry like to eat.

## 2.3 Strong disease resistance and cold resistance

Cold tolerance appears in all aspects, but first it has high cold tolerance and grows well even in climates of -30 to -20°C.

The long period of 2-13 C is the active growing season for rye, and many parts of our country remain green even in winter<sup>[3]</sup>. Second, it is very disease-resistant, and because rye is a hybrid of rye and wheat, it resists powdery mildew and has excellent resistance to leaf rust, stem rust, and various pests. Little pesticide spraying is required throughout the growing season, not only effectively reducing planting costs, but also reducing environmental pollution. Third, strong regeneration, can be harvested in winter, winter death period can provide high-quality green feed for the growth of livestock and poultry. Relevant departments introduce cold-resistant rye in the alpine areas of Heilongjiang Province, make full use of snow resources and light and heat resources in winter and spring, produce forage, and supplement the roughage required for local yak breeding from early spring to early summer, which can promote economic and environmental benefits. Temperature is one of the key factors to control the normal growth and development of plants. Under cold stress, seedling development is delayed, and plant physiology, biochemistry and metabolism are affected to varying degrees, such as leaf yellowing, leaf wilting, leaf necrosis, including plant tissue seriously hindering the normal growth and development. The Qinghai-tibet plateau cold, natural conditions, short forage growth season, suitable for the growth of the region of low quality grass, the introduction of high yield, stable yield, cold grass varieties has become the urgent problem of forage animal husbandry development, presents the following advantages: high wheat yield, rye resistance, can be used in a variety of climate and environment, strong adaptability, high hybrid advantage, is a very promising grain and feed crops. Cold-resistant, and can withstand temperatures as low as -20 C in winter. The colder temperature of plant cells can cause ice freezing, and ice crystals are easier to form outside the cell than inside the cell. The water potential is much lower, the water cells flow out through the cell membrane, the temperature increases, and the relative water content of plant leaves is reduced. Under cold stress, the lower the temperature, the higher the proline content, indicating that the plants are more cold-tolerant. The accumulation of Pro maintains the cellular balance in the body and increases cell resistance to cold temperatures. This growth rate is closely related to the stress resistance of plants<sup>[4]</sup>. Plants become sensitive to cold environments due to the accumulation of soluble and soluble sugars. Under cold stress, all plant organs produce malondialdehyde through membrane lipid peroxidation, and the higher the content of

malondialdehyde produced by oxidation, the greater the damage is. Superoxide dismutase, peroxidase, and catalase are involved in plant membranes and are protective enzymes in the lipid peroxidase defense system. Under cold stress, plant SOD, POD and CAT activities, remove excess reactive oxygen species, avoid the membrane lipid peroxidation, reduce the damage of the cell membrane system, and play a very important role under stress. Plants have stress resistance and play an important role. At present, the cold resistance research of rye in China mainly focuses on plant survival rate, leaf morphology, physiological and biochemical indicators. Rye is a European rye cultivar suitable for transmission and cultivation in places with low altitude and abundant hydrothermal conditions. So far, no studies have been reported on its cold tolerance.

### **3. Key points of high-quality and high-yield cultivation techniques of forage rye**

#### **3.1 Site selection and preparation**

Rye has a good resistance to barren capacity, so it can be selected when planting rye medium fertile soil.rye

After the harvest, the previous crop prepares the ground in time, the plough is about 25 cm deep, the ditch is dried and the water is stored. In order to ensure that the soil for planting rye is fine and loose, it should be suppressed. Before planting ryegrass, growers should check the soil moisture to ensure that the soil is moist.

#### **3.2 Seed selection**

If grain and cereal feed are mainly used, choose as much grain variety as possible. The length reached 10 cm, the number of grains per ear of 52-10 cm, grain number of 56 grains, dry grain weight of 55-58 grams, plant height of 100-120 cm, strong lodging resistance. This facilitates mechanical harvesting.

#### **3.3 Appropriate sowing**

In spring, rye varieties can be sown when the soil is thawed to a depth of about 5 cm, and sowing begins in mid-to-late March every year. Winter rye varieties in northern China are sown from late September to early October, and the average temperature for rye sowing is usually 14-19°C. Small rye should be selected for sowing, row spacing of about 15.2 cm, sowing depth of about 2.5 cm<sup>[5]</sup>.When sowing rye, 6-8 kg of diammonium phosphate and 3-3.9 kg of urea are required for every 670 square meters of rye seeds to improve the yield and quality and provide sufficient nutrients for the germination and initial growth of rye seeds.

#### **3.4 Good field management**

Rye varieties were also grown, and field management was different.

Spring rye varieties should be watered three times in the clover, jointing and pregnancy stages of rye, and the irrigation amount of rye per 670 square meters should be controlled between 60 and 80 square meters. In order to save water resources, we must choose the drip irrigation method. Nitrogen fertilizer should be applied during the trilobage and grafting period according to irrigation conditions. We have to do a good job of weeding the rye. When the rye reaches three leaves, many weeds will compete with it for sunlight and nutrients. In order to ensure the growth quality of rye and improve the yield and quality, weeding must be done in time. Every 670 square meters of rye, 3 grams of gold scissors and 70 grams of pumas can be used to remove broad-leaved weeds and black

wheat fields from wild oats. The removal effect reached 98%, and the effect on the plants was also reduced. The surrounding environment is small, and there is no chemical pesticide accumulation and soil pollution problems.

Winter rye varieties require winter watering, but after greening, greening watering should be carried out according to the soil humidity.

Generally speaking, by storing water and keeping it wet, it can both green rye and meet the demand for water. But in the scion and tassel period to pour enough water, every 670 square meters of water 70-80 cubic meters." When rye grows to the trilobage and grafting period, the appropriate amount of nitrogen fertilizer is applied with the irrigation water, and the amount of nitrogen fertilizer per 670 square meters is 4-5 kg. Every 670 square meters of rye should be applied urea 10~16 kg, ternary compound fertilizer 10~156 kg, potassium sulfate 3~6 kg. "At the same time, the beginning and end of rye growth should be applied in a short time and intensively, in order to improve the lodging resistance of rye, which is conducive to mechanical harvest. The dosage amount was 150-200g / 670m<sup>2</sup>.

### 3.5 Cutting grass

All rye used for silage had to be tightly controlled at harvest<sup>[6]</sup>. The best harvest time is 7 to 10 days after full rye flowering. For example, winter rye in autumn should be cut at the end of May of the following year, while rye in winter should be cut before mid-June, and rye in spring should be cut before mid-June. The first mowing of forage rye should be done at early heading, when rye silage is most effective. Rye can be regenerated after harvest, but the quality of the first cut is better than the second cut in terms of silage efficiency. The actual production of rye shows that if multiple spike are required in spring, each spike must be completed during grafting, which will affect the growth of the second crop, thus reducing the yield of rye. However, the stump height should be controlled at at least 15 cm. Otherwise, it will affect the normal growth cycle and will not help to improve the yield and quality of rye.

### 3.6 Silage technology

Fresh ryegrass is rich in vitamins and protein, which can be used as a high-quality green forage grass for cattle, sheep, rabbits and deer.

In addition, due to its relatively high concentration but low fiber content, fresh grass can be ground into mud for pigs. Winter hay season can also be used as a precious feed for lambs<sup>[7]</sup>. When the yield of fresh grass is too large to use, it can be dried into hay or crushed into dry powder combined with other feed, widely used and easy to store. When the rye harvest reaches 75% water, the whole grass was cut into 5-10 cm long strips and placed in a silo for silage. For rye with water content of more than 75%, it is necessary to add an appropriate amount of straw and other straw, and seal with plastic, to absorb water, control silage water, and improve silage quality. I have. Use cloth to form anaerobic fermentation environment, can be stored for 40 days, can be used to raise cattle, sheep. After each harvest, the pit should be sealed in time to avoid the introduction of excessive oxygen, resulting in silage deterioration.

## 4. Conclusion

Combining theory and practice, the cultivation technique of high quality and high yield feed rye is studied, and the results show that the feed industry in China is developing continuously.

Rye is in an important stage of development and plays an irreplaceable role in the development of China's feed industry. In addition, forage ryegrass also has high nutritional value, high plant, high

yield, good lodging resistance, strong adaptability, good planting, good growth and many other high-quality characteristics. In order to improve the quality and yield of forage rye, a set of reasonable cultivation techniques for managing seed selection, sowing, field management, utilization and cutting are necessary to be greatly improved. Relevant departments should improve the quality of feed rye and promote the sustainable and healthy development of China's feed industry. We can rely on the progress of science and technology, with the goal of improving quality and efficiency, vigorously develop the triolet feed industry, strictly formulate the development direction of high-quality forage, increase the planting area of triolet feed, constantly expand, continue to promote the pace of "grain to feed", and promote the rapid economic development of Heilongjiang Province.

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