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# Characteristics of High Quality Rice Xiang 5 and the Supporting Cultivation Techniques

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**Abstract** The high quality rice, Xiang 5, is a new strain bred by Institute of Food Crops of Hubei Academy of Agricultural Sciences which first hybridizes Chinese scented rice with 9311, and then re-crosses it with Ezhong 5 for continuous generations. The strain has good quality, high yield, suitable maturity period, strong scent, strong combining ability and other features. This paper summarizes the appearance characteristics of Xiang 5 and main points of the supporting cultivation techniques, aimed at providing technical support and theoretical reference for its field production.

**Key words** High quality rice, Xiang 5, Characteristics, Cultivation techniques

## 1 Introduction

The high quality rice, Xiang 5 (Variety Publication No. : CNA009997E), is a new strain bred by Institute of Food Crops of Hubei Academy of Agricultural Sciences based on re-crossing combination of 9311, Ezhong 5 and Chinese scented rice. The transparent brown rice without chalkiness is selected after removing husk, and the molecular marker-assisted selection of fragrance gene is conducted. After 8 continuous generations of breeding, a high-quality, high-yielding and scented excellent rice strain was bred and named Xiang 5 in 2008, with strain field code of 08341. The strain has good quality, high yield, suitable maturity period, strong scent, strong combining ability and other features, so it wins a good reputation among the majority of farmers and rice processing enterprises. This paper summarizes the main cultivation techniques in order to provide reliable technical support for agricultural field production.

## 2 Variety characteristics

**2.1 Suitable maturity period** The whole growth period of Xiang 5 is 132d, and it is medium-flowering and medium-japonica rice. It was sown around May 10 in the surrounding areas of Wuhan and southeastern Hubei; the initial heading date was around August 10; the full heading date was around August 15; it was mature around September 22. In the rice-wheat and rice-rape rotation area, the sowing date can be delayed to around May 25, and it can realize full heading before September. During this period, generally there was no low temperature damage to ensure the safe heading and later grouting.

**2.2 Good agronomic characters** The number of leaves on main stem is 18 to 19, and the whole plant height is about 125 cm. The plant is compact and has strong tillering ability. There are many effective ears, and the blade is thick and straight. The flag leaf is wide in the middle part, and short and straight. The leaf is green and the kernel is yellow during the maturity stage. There is no late senescence of leaves for the ordinary dwarf varieties. The stem is flexible and coarse, with strong anti-lodging ability, so it is suitable for mechanical harvesting. The sheath and apiculus are colorless. This trait is conducive to close planting, mechanized rice transplanting and other cultivation techniques, and the agronomic adaptability is good.

**2.3 Strong suitability** It is suitable for mid-season rice cultivation in most of rice blast disease-free areas in Hubei Province as well as the similar ecological areas in the middle and lower reaches of Yangtze River.

**2.4 High rice quality and palatability** The rice is golden and the grain is long, with high degree of transparency. It has little chalkiness and the chalkiness rate is low. In 2009, the samples were sent to the Food Quality Supervision and Testing Center (Wuhan) of the Ministry of Agriculture for grain quality determination: fine rice rate of 72.3%; head rice yield of 55.7%; amylose of 16.5%; chalkiness rate of 1%; chalkiness degree of 0.1%; adhesive strength of 84 mm; grain length of 7.4 mm; length-width ratio of 3.3. The rice is scented and the main physical and chemical indicators reach the national standard II. The rice is white, transparent, shiny and tasty, and its appearance and taste can be comparable with the imported Thai rice.

**2.5 High and stable yield** Under the planting specification of 16.6 cm × 20.0 cm, the effective ears of Xiang 5 can be up to 2400000-2550000 per ha; the average ear length is about 24.6 cm; the average total grain number per panicle is about 160; the seed setting rate is more than 85%; the thousand kernel weight is about 27 g. Through many years of comparison experiment of vari-

ties and field production test at various points, the average yield of the plots with the middle level of fertility is about 8250 kg/ha. The comprehensive resistance is good, and by field observation, it is found that there is no bacterial blight, blast and other diseases, and the false smut is not serious. The plant is scented, easy to attract planthopper, rice thrips and other insects.

### 3 The main points of the supporting cultivation techniques

**3.1 Timely sowing and seedling cultivating** Xiang 5 is as the middle-season rice for cultivation, which requires slightly high effective accumulated temperature. As the middle-season rice, it is sown in mid-May and transplanted in early June, then it can achieve the highest yield. And it can also make the heading period fall in mid-August which is the best period for producing high quality rice. In soaking of seeds, it is necessary to use TCCA to disinfect seeds and the seeds are soaked with clear water for 12 h. Then TCCA is mixed with water and soaked for 12 h in accordance with the ratio of 10 g of TCCA to 4 kg of water. After being rinsed with water, the wetting and drying cycle method is used for soaking of seeds and germination. The sowing must be sparse and even, so as to facilitate the cultivation of strong seedlings<sup>[1]</sup>. The ratio of seedling bed to field is 1: 10, and the seedling sowing rate is 225 kg/ha. The open field water is used for raising rice seedlings, and the seedling age is controlled at about 25 – 30 d. The maximum late maturing seedling age should not exceed 35 d. The tillering fertilizer needs to be applied as quickly as possible. 5 – 7 d after transplanting, 8 – 10 kg of urea, 8 – 10 kg of potassium chloride and 50 – 80 g of 10% paclobutrazol powder (reducing plant height, increasing tillering, preventing lodging) are as the tillering stage dressing to be applied for every 667 m<sup>2</sup> of seedlings, and the intertillage and scarification are conducted.

**3.2 Rational close planting** Wide row and short space between plants from east to west, increase of the main seedlings in each hole and sparse planting: the density of 16.6 cm × 20.0 cm, and 18000 holes for every 667 m<sup>2</sup> of seedlings. The early planting requires sparse seedlings while the late planting requires dense seedlings. 1 – 2 seedlings are for each hole, and there are 50000 – 80000 basic seedlings (including tillers), requiring light and uniform sticking and leaving a high yield ditch.

**3.3 Water management** The water should be managed rationally. It is necessary to irrigate frequently and lightly, and timely dry the field. The cultivar plant is large and tall, and in order to prevent lodging, it is necessary to achieve the effective tillering and dry the field. When the number of seedlings reaches 220000 per 667 m<sup>2</sup>, there is a need to drain water and dry the field, in order to control ineffective tillers and prevent late lodging. In the late period, the water should not be drained quickly, and the wa-

ter can be removed 7 d before harvest. The field drying must not be excessive, and the water must not be drained too early in the late period, so as not to affect the spike rate and quality of rice<sup>[2]</sup>.

**3.4 Scientific fertilization** Fertilization should be performed based on the principle of "promoting seedlings in the early period, controlling seedlings in the middle period, preventing premature senility in the late period"<sup>[3]</sup>. There is a need to apply enough field base fertilizer, apply tillering fertilizer early, and moderately add the head dressing. Xiang 5 is sensitive to the nitrogen fertilizer, and the application rate of nitrogen fertilizer must not exceed 180 kg/ha for the yield of 8250 kg/ha. The N, P, K application rate and ratio is similar to that of ordinary hybridization rice, taking the "smooth promotion method", and the nitrogen fertilizer should not be excessive in the late period<sup>[2]</sup>.

**3.5 Pest control** In general, the leaf roller and rice planthopper prevention is mainly based on the field checking, and the pesticide is timely used when necessary<sup>[4]</sup>. It is necessary to strengthen the pest control like the ordinary mid-season rice, and pay particular attention to the damage of borers and rice thrips in order to prevent blighted grain and improve the appearance quality. Due to the scent, it is necessary to prevent and control the rice thrips during the period of seedling establishment, and focus on the planthoppers in the late period. The variety root system is good, and the stems are hard with good lodging resistance, conducive to the mechanical harvesting and threshing.

**3.6 Strict impurity removing** The variety is Indica-type high quality rice, and it is necessary to choose the plots with good water conditions, and strengthen concentrated contiguous planting, so as to facilitate unified irrigation and management and prevent hybrid varieties.

**3.7 Scientific storage and post-maturation** After being harvested and dried, the rice should be stored for 60 – 90 d to strengthen the post-maturation of rice, which can increase the head rice rate to 60%.

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