

A New Watermelon Variety 'Longshengjiafeng' with High Quality and Resistance to Fusarium Wilt

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Abstract

Watermelon 'Longshengjiafeng' is a new hybrid with high fruit quality and resistance to Fusarium wilt. The fruit is oval shaped with a durable rind (1.0 cm thick), green skin and dark green stripes. The flesh is red and crisp, with Brix 13.2%. Fruit matures 95 days from sowing and 32 days post flowering. Average fruit weight is 12.0 kg, and the yield is about 60 ton/ha. The plant has high levels of resistance to Fusarium wilt race 1. This hybrid is suitable for production in the open field and plastic house in Northeast China.

Breeding Objectives

Northeast China is well known for organic production and high fruit quality watermelon. Fusarium wilt is a major soil-borne disease for watermelon production in Northeast China. A rotation of 7-8 years is needed for watermelon production (Liang Li et al., 2014). The availability of land in this area makes long rotation very challenging. Use of resistant varieties would allow cropping with shorter rotation time. The demanding of high quality by the market and consumers is ever increasing in recent years. Based on the urgent needs of producers and consumers our group has been focusing on development of high-quality large fruit watermelon varieties with high level resistance to Fusarium wilt.

Breeding Process

'Longshengjiafeng' is a new hybrid watermelon with large fruit size. It was bred by crossing two inbred lines 'K10197FR' and 'KJ1028'. Female parent KJ1028 is an inbred line derived from an F2 selection from the cross between Jingxin 1 and Calhoun Gray followed by 7 generations of self-pollination. This inbred line produces round fruit with red flesh, striped skin and wax on skin. It is resistant to Fusarium wilt race 1 based on phenotyping and genotyping. Male parent K10197FR is an inbred line derived from a cross between K10197 and Calhoun Gray followed by 4 generations of backcrossing and 4 generations of self-pollination. This inbred line produces oval shaped fruit with red flesh, striped skin and wax on skin. It is resistant to Fusarium wilt race 1 based on phenotyping and

genotyping.

In our trials the average yield of 'Longshengjiafeng' was 60.1 ton/ha, 10.1% higher than check variety 'Angdatianwang' (54.6 ton/ha), and the Brix was 13.2%, 21.0% higher than check 'Angdatianwang' (11.2%). During our Fusarium wilt test with sample size of 30 plants each, the disease incidences at seedling stage (Figure 2) for 'Longshengjiafeng', '8424' (susceptible control) and 'Xinong 8' (resistant control) were 3.62%, 83.51% and 8.97%, respectively. The disease severity indexes for 'Longshengjiafeng', '8424' and 'Xinong 8' were 1.45, 69.98 and 4.10, respectively. The Fusarium wilt resistance of 'Longshengjiafeng' reached high level. 'Longshengjiafeng' also performed well in disease nursery at late development stage (Figure 3). In the regional trials, 'Longshengjiafeng' demonstrated stable growth, high yield, high fruit quality and high level resistance to Fusarium wilt.

Variety Characteristics

The growth period of this variety is about 95 days, and the fruit development period is about 32 days. The fruit (Figure 1) has an oval shape and durable rind with green skin and dark green strips. The flesh is red and crisp with Brix 13.2%. The tough rind makes it suitable for long distance transportation and long shelf-life. The variety is highly resistant to Fusarium wilt. The average fruit weight is 12 Kg and average yield is 60 ton/ha.

Cultivation Technique

This hybrid is suitable for watermelon production in the open field and plastic house in Northeast China. The seedlings, 25 days post germination, are transplanted into soil covered with plastic film at spacing 0.55-0.66 m between plants and 2.00 m between rows, i.e. 500-600 plants per 667 m². Two tons of manure compost, 25 kg of ammonium phosphate, 40 kg of potassium sulfate and 10 kg of urea are recommended for every 667m². Plants are pruned to three or four branches per plant. The second or third female flowers on the plant are pollinated for fruit set.

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Literature Cited

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Figure 1. Fruit of watermelon 'Longshengjiafeng'.



Figure 2. Fusarium wilt test at the seedling stage. Left: resistant control 'Xinong 8'; Middle: 'Longshengjiafeng'; Right: susceptible control '8424'.



Figure 3. Performance of 'Longshengjiafeng' in disease nursery with 10 year mono cropping of watermelon. Left: susceptible control '8424'; Middle: resistant control 'Longsheng 9'; Right: 'Longshengjiafeng'.