'Senmao 1' Northern Highbush Blueberry

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'Senmao 1' (CNPVP 20180206) is a new northern highbush blueberry (*Vaccinium corymbosum* L.) cultivar developed by Dalian Senmao Modern Agriculture Co., Ltd., Dalian, China. The new cultivar has several desirable attributes for blueberry growers. Among these, the berry is large to very large and the average weight is 4.49 g (maximum of 6.55 g). It is an early-season cultivar with good flavor, a good balance between sweetness and acidity, and medium firmness. The plant is vigorous and the growth habit is semi-upright. 'Senmao 1' is self-fertile, but it likely benefits from cross-pollination. 'Senmao 1' is a promising new cultivar with great economic potential in the local, large-fruit, fresh berry market.

Origin

'Senmao 1' was selected from seedlings produced by open-pollination of 'Patriot'. 'Patriot' came from a cross of 'Earliblue' × 'US-3' (Hepler and Draper, 1976). 'Earliblue' was originated from a cross of 'Stanley' × 'Weymouth' (Darrow, 1952). 'US-3' was derived from the cross of 'Dixi' × 'Michigan Lowbush 1' (Johnston, 1956).

In July 2008, H. Wang collected the open-pollinated seed of 'Patriot' from the blueberry resources nursery of Dalian Senmao Modern Agriculture Co., Ltd. In Spring 2009, 156 seedlings were generated from this seed.

In Spring 2010, the seedlings were moved to the experimental station of Dalian Pushilan Agricultural Technology Co., Ltd. In mid-June 2013, G. Xu evaluated and selected from these progenies. Based on plant morphology, flowering and fruiting characteristics, fruit yield, and fruit quality, three superior offspring were selected, one of which was 'SMN-72'. In 2014, 10 clonally propagated plants each of 'SMN-72' and 'Patriot' were planted in the Jinzhou District, Dalian, for observation and evaluation. Subsequently, three randomly selected plants of 'SMN-72' and 'Patriot' were evaluated from 2015 to 2017 for three consecutive years. 'SMN-72' showed excellent performance, with vigorous plant growth, large to very large fruit size, medium firmness, a sub-acid sugar-to-acid ratio, and high yield. In Dec. 2018, this selection was certificated by the Plant Cultivar Rights Certificate of the National Forestry and Prairie Bureau and named 'Senmao 1'.

Description

In this experiment, a single factor randomized design was used. Three plants of the same age with no pests and diseases were selected as test plants for both 'Senmao 1' and 'Patriot' and tagged for experimental observation and evaluation. From 2017 to 2019, the plant yield and bloom and ripening dates were observed and measured (Table 1). The plant growth habit and fruit cluster density were evaluated subjectively. The com-

parison showed that the yields of 'Senmao 1' and 'Patriot' were similar, with yields of 'Senmao 1' ≈6% higher than that of 'Patriot'. From 2017 to 2019, the estimated date for 50% ripe fruit for 'Senmao 1' ranged from 15 June to 22 June (average, 16 June). That of 'Patriot' ranged from 13 June to 20 June (average, 15 June). Observations showed that 'Senmao 1' was a vigorous plant with a semi-upright bush structure and that of 'Patriot' was upright. The fruit cluster density of 'Patriot' was tighter than that of 'Senmao 1' (Fig. 1).

From 2017 to 2019, the numerical rating data of clonally propagated plants of 'Senmao 1' and 'Patriot' were collected during the fruit harvest period, including berry size, color, picking scar, firmness, soluble solids (°Brix), and titratable acidity (% citric acid) (Table 2). Berry size was determined by weighing 30 berries of each cultivar and calculating the average berry weight. The results showed that the berries of 'Senmao 1' were ≈2.0-times larger than those of 'Patriot'. The average berry size of 'Senmao 1' was 2.47 cm × 2.43 cm, the average berry weight was 4.49 g, and the maximum berry weight observed was 6.55 g. For 'Patriot', the average berry size was 0.87 cm × 0.88 cm, the average berry weight was 2.34 g, and the maximum berry weight was 3.32 g. We took 30 berries from each cultivar and used the Royal Horticultural Society Color Chart to determine fruit color. Berry colors of 'Senmao 1' and 'Patriot' were dark blue (103-C measured value). However, it was observed that 'Senmao 1' berries were covered with a thick waxy layer when ripe, whereas the layer on 'Patriot' berries appeared thinner. Regarding the picking scar, 'Senmao 1' showed a better score than 'Patriot' (7.4 vs. 7.1), with the picking scar of 'Senmao 1' drier than 'Patriot'. Berry firmness measurements were performed for 30 berry samples by using the GY-4 Digital Fruit Sclerometer (Edburg Instruments Corp., Zhejiang, China). 'Senmao 1' had a firmness similar to that of 'Patriot' (3.2 vs. 3.0 N), and both berries possessed good storage properties. Soluble solids and titratable acidity were determined by using a blueberry pocket Brix acidity meter (PAL-BXIACID7; Atago Corp., Tokyo, Japan). The soluble solids levels of 'Senmao 1' were higher than those of 'Patriot' (12.2 vs. 10.7 °Brix), and its titratable acidity was lower than that of 'Patriot' (0.46 vs. 0.68% citric acid).

The prominent attributes of 'Senmao 1' are early maturity, large to very large berry size, and dry picking scar. It also has the characteristics of good flavor, medium sweetness, medium to high acidity, medium firmness, and good storage capacity. 'Senmao 1' is vigorous and recommended for hand harvest.

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Table 1. Yield values and fruit ripening dates of 'Senmao 1' and 'Patriot', 2017–19.

Cultivars	Yield (kg/plant ± sd)			50% fruit ripening date (date range)	
	2017 (4 years old) ^a	2018 (5 years old) ^a	2019 (6 years old) ^a	3-yr avg	3-yr avg
Senmao 1	4.1 ± 0.5	2.5 ± 0.7	3.7 ± 0.2	3.4 ± 0.5	16 June (15 June–22 June)
Patriot	3.5 ± 0.7	2.9 ± 0.6	3.2 ± 0.2	3.2 ± 0.5	15 June (13 June–20 June)

^aThe age of the test plants for 2017–19.

Fig. 1. Fruit of ‘Senmao 1’ northern highbush blueberry.

It should be a commercially valuable cultivar for the local large-fruit fresh market. It is expected that ‘Senmao 1’ will perform well in Dalian, Liaoning Province, and produce good economic returns in other northern areas of China with high chilling conditions (800–1000 h, <7.2 °C). No disease symptoms were observed on ‘Senmao 1’ during the evaluation period.

Availability

‘Senmao 1’ was authorized by the National Forestry and Prairie Bureau in Dec.

2018, under certificate number 20180206. The cultivar is owned by Dalian Senmao Modern Agriculture Co., Ltd., Dalian, China. Propagation rights have been offered to Dalian Senmao Modern Agriculture Co., Ltd. Growers may request information on how to obtain propagules by contacting H. Wang and G. Xu at Dalian Senmao Modern Agriculture Co., Ltd., Xinshi Village, Huajia Street, Jinzhou New District, Dalian. This published genetic material has been deposited at Dalian Senmao Modern Agriculture Co., Ltd., and is available for research purposes, including the development and commercialization of new cultivars.

Literature Cited

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Table 2. Fruit quality attributes ($\pm$ SD) of ‘Senmao 1’ and ‘Patriot’ (the age range of the tested plants was 4–6 years), 2017–19.

Cultivars	Berry wt (g) ^z	Scar (1–9) ^y	Firmness (N) ^x	Soluble solids (°Brix) ^w	Titrateable acidity (% citric acid) ^w
Senmao 1	4.49 $\pm$ 0.4	7.4 $\pm$ 0.3	3.2 $\pm$ 0.1	12.2 $\pm$ 0.1	0.46 $\pm$ 0.06
Patriot	2.34 $\pm$ 0.6	7.1 $\pm$ 0.2	3.0 $\pm$ 0.2	10.7 $\pm$ 0.3	0.68 $\pm$ 0.04

^zAverage berry weight from 30 berry samples.

^y1 = worst and 9 = best.

^xThe firmness was measured in Newtons as the force value (kg) of 1 cm², with an average of 30 intact fruits.

^wSoluble solids and titrateable acidity were determined using one blended cup of sample fruit.