

Development of the new soybean variety "Sudou 27"

Saline soils cover approximately 830 million hectares globally (FAO), with around 53% of this area located in Asia. Salinity problems lead to reduced crop productivity in these regions. Therefore, the development of crop varieties with high salt tolerance is necessary to adapt to saline soils. Previously, we identified the salt-tolerant gene *NcI* from a Brazilian soybean variety and demonstrated that soybean lines carrying *NcI* can maintain high seed yields in saline fields. *NcI* is now being used in soybean breeding practices in China, Vietnam, and India. "Sudou 27," a new soybean variety, was developed in collaboration between the Jiangsu Academy of Agricultural Sciences, China, and the Japan International Research Institute for Agricultural Sciences, Japan.

"Sudou 27" (Fig. 1) was selected from the progenies of a cross between soybean lines 1138-2 and NILs72-T. NILs72-T harbors the salt tolerance gene *NcI*. Based on three-year field evaluation results, "Sudou 27" was recognized for its excellent traits by the Crop New Variety Inquiry Committee of Jiangsu Province, China, and was registered as a new soybean variety in China on August 29, 2022. "Sudou 27" showed high seed yield and high seed quality characteristics, with a 6.9% higher seed yield (3.14 t/ha) and 1.4% higher seed oil content (22.4%) than the leading soybean cultivar in the northern region of Jiangsu Province, "Xudou 13," which was used as control variety in the new variety test and productivity test experiments (Table 1). In a salt tolerance evaluation test conducted by treating the seedlings with 120 mM NaCl solution for three weeks, "Sudou 27" showed higher salt tolerance than "Xudou 13" (Fig. 2). In addition, "Sudou 27" exhibited moderate resistance to soybean mosaic disease caused by the soybean mosaic virus (SMV) (Table 1).

"Sudou 27" is expected to become one of the leading soybean varieties in the northern area of Jiangsu Province, China, replacing the former leading variety "Xudou 13." The successful development of this new variety using the salt tolerance gene *NcI* has paved the way for breeding salt-tolerant varieties that are expected to contribute to the sustainability of soybean production in areas with salinity problems.

(D. Xu,

H. Chen [Jiangsu Academy of Agricultural Sciences (JAAS), P.R. China], X. Cui [JAAS],

H. Zhang [JAAS], X. Liu [JAAS], Q. Wang [JAAS], X. Chen [JAAS], H. Gu [JAAS])

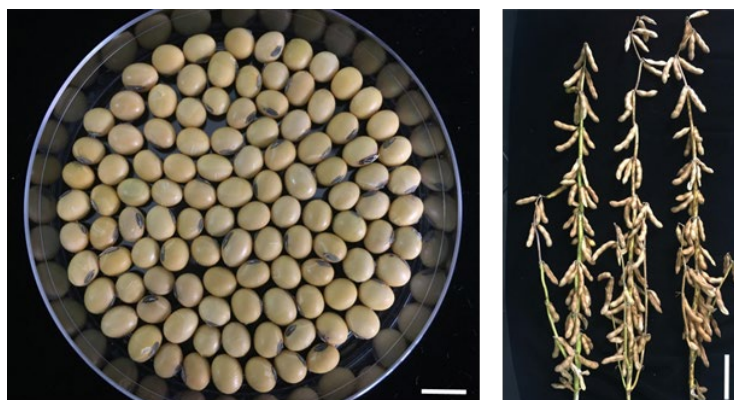


Fig. 1. "Sudou 27" seeds (left, scale bar = 1 cm) and mature plants (right, scale bar = 10 cm)

Table 1. Characteristics of "Sudou 27"

	New variety test experiment ^a (2019~2020, 6 test sites)						Productivity test ^b (2021, 7 test sites)	
	Grain yield (t/ha)	Growth period (day)	100-seed weight (g)	Seed quality		Resistance level to SMV ^c		Grain yield (t/ha)
				Oil content (%)	Protein content (%)	Race SC-3	Race SC-7	
Sudou 27	3.27	104.5	17.0	22.4	38.7	Moderate resistance	Moderate resistance	3.14
Xudou 13 ^d	3.14	101.0	25.6	21.0	40.3	Moderate susceptibility	Moderate susceptibility	2.94

^a New variety test experiment: The experiment was conducted for 2 years at 6 test sites. The plot area for each line (variety) was 9.6 m² with 3 replicates. ^b Productivity test: Productivity test was conducted for the new variety candidate lines that passed the new variety test experiment. It was conducted for 1 year at 7 test sites. The plot area for each line (variety) was 150 m² with 2 replicates. ^c SMV: Soybean mosaic disease. ^d Xudou 13: A leading soybean cultivar in the northern region of Jiangsu Province, China. It was used as control variety in the new variety test experiment and the productivity test experiment.

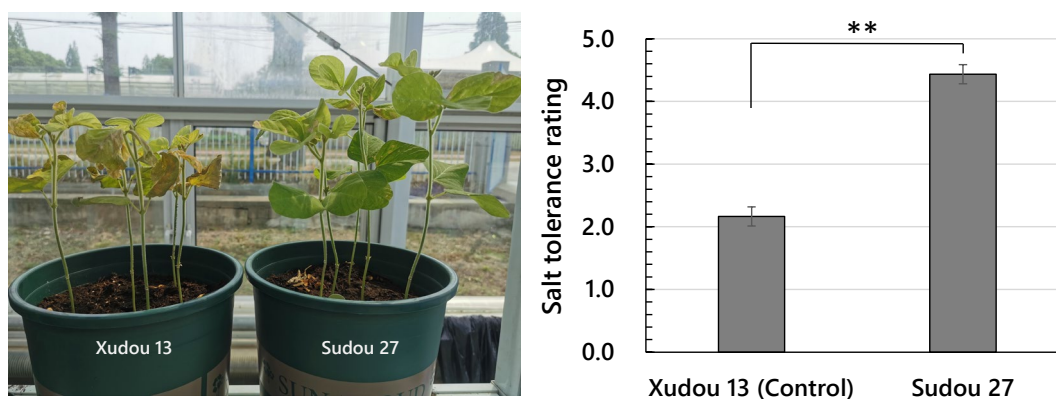


Fig. 2. Salt tolerance evaluation of "Sudou 27"

Left: Soybean plants treated with 120 mM NaCl solution for 3 weeks in seedling stage.

Right: Results of salt tolerance rating. The salt tolerance rating was classified into 5 grades, ranging from 1 (plants completely dead) to 5 (plants with normal health leaves). **: $P < 1\%$.

Reference: JIRCAS Press Release (2022-09-08) *Development of New Salt Tolerant Soybean Variety with High Yield and Disease Resistance—Contributing to Stable Soybean Production in Salt-affected Agricultural Areas—*
<https://www.jircas.go.jp/en/release/2022/press202207>