

Selection of Vegetable Soybean and Development of Year-round Production System in Korea

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Introduction and Methods

Vegetable soybean has been used mostly in Asia, such as Japan, China, Taiwan, and Thailand including South Korea. Its consumption has been increasing internationally by the development for food and industry. Immature soybean which having large and fat seed with light green pod has been used as snack, rice-mixed, and side dish of liquor by steaming the pod in Korea. Recently cultivation area for the soybean is increasing by the demand of that use. In addition, the cultivation has many advantages, such as increasing of land utilization and usefulness in cropping system, which will increase income of the farmer. Vegetable soybean has been cultivated 609ha, and yielded about 4,200ton of pod with stem. The seeds introduced from Japan were used for breeding. Seonheukkong was the first variety by cross breeding in 1999. It has been cultivated in only small-scale naked-field, but recently tunnel-mulching systems after soybean harvest are increased.

Selection of vegetable soybean for early seasonal cultivation

Korean 9 vegetable soybean lines or Japanese varieties were screened on the basis of early transplanting culture in Korea. A field experiment was conducted at Iksan, Chonbuk Province, Korea from 1993 to 1996. The planting density was 30×20 cm with two plants per hill. Fertilizers were applied before planting as 40-70-60 kg/ha of N, P₂O₅, and K₂O, respectively.

Development of year-round production system in vegetable soybean

Two vegetable soybean Japanese varieties, Dongya and Fukura, were cultivated in four different culturing patterns; plastic film house culture, plastic film tunnel, field and retarding culture of plastic film house. Their planting date was in Table 1.

Table 1. Different culturing pattern and their planting dates for year-round production system in two vegetable soybeans

Culturing pattern	Planting date							
	15 Feb	15 Mar	15 Apr	15 May	15 June	15(25)* July	25 Aug	25 Sep
Plastic film house	o	o						
Plastic film tunnel		o	o					
Field			o	o	o	o		
Retarding culture of plastic film house						o	o	o

* (); Retarding culture of plastic film house

Results

Selection of vegetable soybean for early transplanting cultivation

Table 2. Agronomic characters according to varieties of early seasonal cultivation

Varieties	Flowering date	Plant height (cm)	No. of branches/plant	No. of nodes/main-stem	No. of pods/plant	HDGP* (date)	R ₆ to R ₇ period (days)	Yield (ton/ha)
Dongya	May 10	33	3.9	9.5	25.1	June 16	7	13.7
Fukura	May 1	30	3.4	8.4	21.1	June 5	6	15.7
Baeksaja	Apr. 30	25	3.0	8.0	22.4	June 6	7	16.2
ES98	May 10	28	3.4	8.9	22.3	June 19	7	11.5
Suwon#180	May 13	38	4.7	9.5	27.7	June 25	8	20.3
YCS90014	Apr. 29	36	5.2	9.3	19.7	June 18	6	12.0
Keunolkong	May 17	28	3.8	8.7	26.0	June 30	6	15.4
Milyang#71	May 4	22	4.3	8.4	22.2	June 19	6	14.2
Seokryangputkong	May 11	30	4.1	7.5	28.1	July 3	11	20.1
Hwaecomputkong	May 14	39	4.5	9.4	27.4	June 25	8	20.3
C.V. (%)	-	-	-	-	-	-	-	8.2
LSD (5%)	-	-	-	-	-	-	-	2.4
(1%)	-	-	-	-	-	-	-	3.3

*; Harvesting date of green pod

Table 3. Changes of kernel per pod according to varieties of early seasonal cultivation

Maturity	Var.	Pod rate (%)			Merchandise rate*
		1/pod	2/pod	3/pod	
Early	Dongya	33.3	47.2	19.5	66.7
	Fukura	32.9	46.9	20.2	67.1
	Baeksaja	27.8	53.4	18.8	72.2
Late	Seokryangputkong	32.6	46.9	20.5	67.4
	Hwaecomputkong	33.0	47.5	19.5	67.0
	Suwon#180	36.0	48.2	15.8	64.0

*; ratio of two and three kernels per pod

Development of year-round production system in vegetable soybean

Table 4. Agronomic characters according to planting date in plastic film house culture

Planting date	Flowering date	Plant height (cm)	No. of branches/plant	No. of nodes/main-stem	No. of pods/plant	HDGP (date)	Marketable rate (%)	Yield (ton/ha)
Feb. 15	Apr. 22	22	3.5	8.1	22.4	May 25	68.7	15.3
Mar.15	May 10	18	2.6	7.0	18.5	June 16	68.3	12.2

Table 5. Agronomic characters according to planting date in plastic film tunnel culture

Planting date	Flowering date	Plant height (cm)	No. of branches/ plant	No. of nodes/ main-stem	No. of pods/ plant	HDGP (date)	Marketable rate (%)	Yield (ton/ha)
Mar. 15	May 20	22	3.3	8.1	21.7	July 1	66.2	11.5
Apr. 15	June 7	25	3.4	9.3	21.9	July 16	66.5	14.8

Table 6. Agronomic characters according to planting date in field culture

Planting date	Flowering date	Plant height (cm)	No. of branches/ plant	No. of nodes/ main-stem	No. of pods/ plant	HDGP(date)	Marketable rate (%)	Yield (ton/ha)
Apr. 15	June 18	43	3.1	10.6	18.6	July 27	63.9	15.3
May 15	June 30	35	2.9	10.5	16.7	Aug. 14	60.5	12.2
June 15	July 22	29	3.3	9.8	16.1	Sep. 2	63.7	12.1
July 15	Aug. 17	29	2.4	9.3	17.1	Sep. 24	59.4	11.5

Table 7. Agronomic characters according to repression culture in plastic film house

Planting date	Flowering date	Plant height (cm)	No. of branches/ plant	No. of nodes/ main-stem	No. of pods/ plant	HDGP(date)	Marketable rate (%)	Yield (ton/ha)
July 25	Aug. 25	37	2.5	8.9	14.2	Sep. 30	58.7	6.1
Aug. 25	Sep. 23	30	1.7	8.5	14.0	Nov. 4	56.3	5.9
Sep. 25	Oct. 27	25	0.5	7.0	9.0	Dec. 3	52.8	4.7

Summary

With the gradual increase for vegetable soybean production area, the importance of vegetable soybeans has been grown for export and for the domestic market in Korea. Korean vegetable soybean lines or Japanese varieties were screened on the basis of maturity, growth characters, marketable rate, yield, and the pod quality for export. Japanese varieties Fukura and Baeksaja were suitable for early transplanting cultivation as early-maturing type in Korea. Seokryangputkong, Hwaecomputkong and Suwon#180 of Korea varieties and lines were good as late-maturing types.

In plastic film house condition, the planting date of February 15 for vegetable soybean production was better than of March 15 on the basis of growth and yield of green pod produced. The ratios of pods having 2 and 3 kernels in a pod were 72.2% and 67.4% in Baeksaja and Seokryangputkong, respectively. In plastic film tunnel and field culture condition, April 15 was the best. As a result, the mid-April was suitable sowing time than any other seasons. In repression culture of plastic film house condition, yield was too lower than other culturing condition.

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