

감초 육성품종 '원감'의 연생에 따른 월별 생육 특성 비교 연구

Comparative Study on Montly Growth Characteristics of Licorice Breeding Variety 'Wongam' by Year

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ABSTRACT

Background : Licorice is one of the major herbal medicine material and is the most commonly used as herbal medicine and industrial material. However, in Korea, it is largely dependent on imports. Although there were attempt to cultivate licorice in domestic environment, it is a difficulty due to physiological disorder. Recently, RDA researchers have developed the domestic-optimized licorice vareity with high yield and quality. Thus, in this study, we evaluated the growth and yield characteristics of licorice variety on every month for 2 years.

Methods and Results : The stolon of *Glycyrrhiza korshinskyi* (breeding variety 'Wongam') were transplanted in the experimental field of NIHHS (Eumseong). *G. uralensis* (Manju) was used for comparison. All experiment plots were designed by the randomized block method with 3 independent replicates. The initial growth of *G. korshinskyi* was later than that of *G. korshinskyi*, but the growth period of *G. korshinskyi* had lasted two months longer than that of *G. uralensis* until September. The weight of above-ground part had increased until the end of July, however, it was gradually decreased in *G. korshinskyi* compared to *G. uralensis*. The main feature of root growth is that licorice significantly showed the growth in length in 1 year and in 2 years it showed the growth in volume. The root length had gradually increased every month and it stopped on November both *G. uralensis* and *G. korshinskyi*. The root thickness stopped growing after increasing until September in the 1 year, but continually increased both *G. korshinskyi* and *G. uralensis* in 2 years. The root weight of *G. uralensis* was increased until October in first year. The root weight was gradually increased until November both resources, showing that it was twice as large as that of a first year. The stolon weight has increased year by year both resources. The ingredients of underground part had increased on monthly in 1 year, whereas, in 2 years, they decreased once and then gradually increased.

Conclusion : *G. korshinskyi* grew better in the middle and late growth stages than *G. uralensis*. Root only showed the growth in length in 1 year, while in 2 years, it showed the growth in volume along with growth in length. The root yield of *G. korshinskyi* has gradually increased and stolon has developed from 2-years old. Furthermore, the ingredients of underground part has increased with year, but in spring season, they accumulate more in the stolon than in the root.

Results

Table 1. Growth characteristics of above-ground part on *Glycyrrhiza korshinskyi* (Wongam) in 2-years-old.

Resource	Time (Month)	Plant height (cm)	No. of branch (ea/plant)	No. of node (ea)	Stem thickness (mm)	Leaf				Fresh weight (g/plant)
						No (ea/plant)	Length (cm)	Width (mm)	Petiole length (cm)	
<i>G. uralensis</i> (Manju) ¹⁾	5	34.4	0.5	11.6	3.5	9.6	12.1	6.4	1.7	28.2
	7	70.2	4.0	25.1	5.8	18.1	16.2	8.8	2.9	72.5
	9	73.5	6.3	23.4	5.9	4.0	8.2	5.2	1.6	49.6
<i>G. korshinskyi</i> (Wongam)	5	55.2	4.6	2.6	6.0	15.8	13.5	6.7	1.4	55.8
	7	94.8	4.8	0.8	7.5	28.1	16.6	6.4	2.0	97.3
	9	101.1	7.6	1.2	8.0	6.8	11.8	5.4	2.2	78.9

¹⁾Comparative species

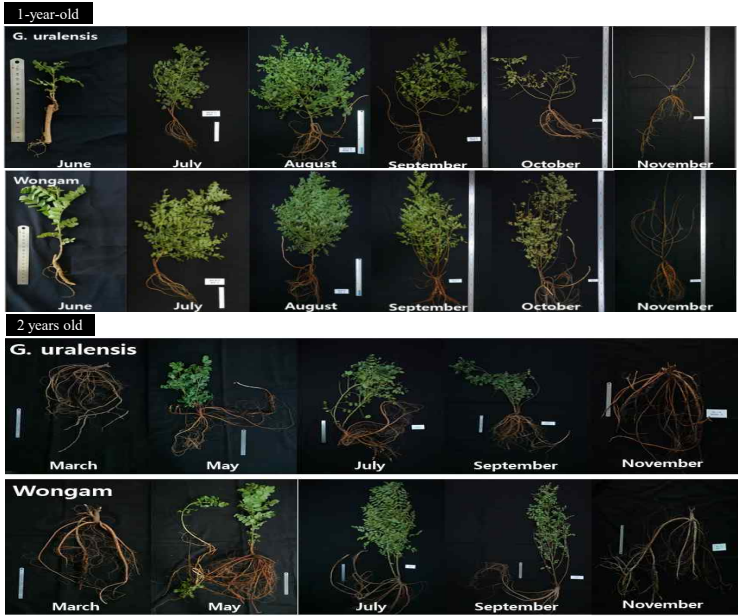


Figure 1. The appearance characteristics of *G. uralensis* (Manju; upper) and *G. korshinskyi* (Wongam, bottom).

Table 2. Growth characteristics of underground part (root) on *Glycyrrhiza korshinskyi* (Wongam) in 2-years old.

Resource	Time (Month)	No. of main root (ea/plant)	Main root thickness(mm)	Root		
				Length (cm)	Thickness (mm)	Fresh weight (g/plant)
<i>G. uralensis</i> (Manju) ¹⁾	([*] 19) 11	3.8	5.9	62.4*	13.6*	45.9*
	3	2.6	7.0	64.1	11.9	31.3
	5	2.5	7.2	58.5	12.6	36.3
	7	4.0	10.7	70.4	16.1	97.9
	9	3.9	11.0	68.0	14.4	69.9
<i>G. korshinskyi</i> (Wongam)	11	3.0	13.2	59.4	18.8	103.6
	([*] 19) 11	3.9	10.9	69.1*	18.5*	84.3*
	3	4.3	10.0	75.5	18.2	68.1
	5	4.2	8.3	68.8	17.4	68.1
	7	4.0	10.6	52.8	17.2	81.0
	9	3.6	13.5	81.1	18.5	85.8
	11	2.7	15.2	54.0	21.3	195.4

¹⁾Comparative species; *Asterisk means A on Duncan Grouping based on Duncan's Multiple Range Test (DMRT, $p < 0.05$)

Table 3. Growth characteristics of underground part (stolon) on *Glycyrrhiza korshinskyi* (Wongam) in 2-years old.

Resource	Time (Month)	Stolon			
		No (ea/plant)	Length (cm)	Thickness (mm)	Fresh weight (g/plant)
<i>G. uralensis</i> (Manju) ¹⁾	([*] 19) 11	1.2	64.5*	5.7*	53.6*
	3	1.8	44.8	4.1	14.0
	5	1.4	51.0	4.9	27.8
	7	1.8	83.8	7.6	120.6
	9	2.3	81.6	6.2	108.5
<i>G. korshinskyi</i> (Wongam)	11	2.8	60.1	6.5	107.4
	([*] 19) 11	2.2	74.3*	4.5*	51.5*
	3	1.3	38.2	4.1	11.3
	5	1.9	105.9	6.0	92.8
	7	2.3	82.7	6.8	113.6
	9	1.7	76.5	6.6	167.0
	11	1.6	58.4	7.2	112.6

¹⁾Comparative species; *Asterisk means A on Duncan Grouping based on Duncan's Multiple Range Test (DMRT, $p < 0.05$)

Table 4. Ingredient trait of underground part on *Glycyrrhiza korshinskyi* (Wongam) in 2-years-old.

Timing (Month)	Root				Stolon			
	Glycyrrhizic acid (%)		Liquiritigenin (%)		Glycyrrhizic acid (%)		Liquiritigenin (%)	
	Gu ¹⁾ (Manju)	Gk ²⁾ (Wongam)	Gu (Manju)	Gk (Wongam)	Gu (Manju)	Gk (Wongam)	Gu (Manju)	Gk (Wongam)
3	1.25	1.50	0.89	0.81	0.71	1.35	0.57	0.70
5	0.66	2.90	0.63	2.08	0.74	1.82	0.66	1.17
7	1.30	1.61	0.90	0.62	1.74	1.54	0.56	0.63
9	0.84	2.25	0.62	1.68	0.91	2.01	0.97	1.00
11	1.19	1.53	1.03	0.78	0.97	1.66	0.88	0.83

¹⁾Gu; *Glycyrrhiza uralensis* used for comparative species, ²⁾Gk; *Glycyrrhiza korshinskyi*