

A Cytotaxonomic Study of *Vicia unijuga* Complex in Korea

by

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I. Introduction

This study is a cytological treatment of the two-leaflet taxa of the genus *Vicia* in South Korea, which are *Vicia unijuga* Al. Braun, *Vicia unijuga* Al. Braun var. *minor* Nakai and *Vicia unijuga* Al. Braun forma. *angustifolia* Makino, in order to establish a phyletic relationship on the basis of the characteristics of epidermal patterns of leaf blades and gross morphology.

II. Materials and Methods

Materials

The following materials for the study mainly were collected by the author from different localities in Korea and then transplanted in the botanical garden of Ewha Womans University.

Materials

Localities

Vicia unijuga Al. Braun Kwangnung, Mt. Chunma, Kyonggido
V. unijuga Al. Braun var. *minor* Nakai Kuryongpo, Kyongsang Bukdo
V. unijuga Al. Braun forma. *angustifolia* Makino Tanyang, Chungchung Bukdo

Methods

For chromosome counts, root tips were observed with smear method and abaxial leaf epidermis were peeled with a razor blade and the observation was made under the microscope at magnification of X 100, X 1000.

III. Observation

The somatic chromosome numbers were observed as follow: *Vicia unijuga* Al. Braun $2n=24$, *Vicia unijuga* Al. Braun forma *angustifolia* Makino $2n=12$, *Vicia unijuga* Al. Braun var. *minor* Nakai $2n=24$.

The pollen fertility, size of the stomata and the size of leaves were investigated and result were obtained as shown in Table 1, 2, and 3.

Table 1. Pollen Fertility

<i>Vicia unijuga</i> Al. Braun 나 비 나 물		<i>V. unijuga</i> Al. Br. var. <i>minor</i> Nakai 애 기 나 비 나 물		<i>V. unijuga</i> Al. Br. forma <i>angustifolia</i> Makino 긴 앞 나 비 나 물	
F.	S.	F.	S.	F.	S.
7	1	23	7	26	2
17	3	21	12	35	1
45	21	36	22	26	0
23	11	35	7	34	0
24	8	42	3	50	1

<i>Vicia unijuga</i> Al. Braun 나비나물		<i>V. unijuga</i> Al. Br. var. <i>minor</i> Nakai 애기나비나물		<i>V. unijuga</i> Al. Br. forma <i>angustifolia</i> Makino 긴잎나비나물	
F	S	F	S	F	S
15	4	24	6	24	0.
25	5	17	6	33	1
14	2	16	1	26	0
9	2	6	1	21	2
17	4	5	1	19	0
186	61	225	71	294	7
75%	25%	76%	24%	98%	2%

Table 2. Size of Stomata

Species		<i>Vicia unijuga</i> Al. Braun 나비나물	<i>V. unijuga</i> Al. Br. var. <i>minor</i> Nakai 애기나비나물	<i>V. unijuga</i> Al. Br. forma <i>angustifolia</i> Makino 긴잎나비나물
No.	Size	length-width	length-width	length-width
1.		32-25 microns	39-32 microns	30-24 microns
2.		34-27	39-32	30-23
3.		32-25	39-32	30-25
4.		34-25	37-31	29-23
5.		36-25	39-32	31-24
6.		37-25	39-32	30-21
7.		32-25	36-32	32-23
8.		32-25	36-32	30-24
9.		32-25	39-32	32-21
10.		34-25	39-32	31-23
Average		34-25	38-32	31-23

Table 3. Size of Leaves

Species		<i>Vicia unijuga</i> Al. Braun 나비나물	<i>V. unijuga</i> Al. Br. var. <i>minor</i> Nakai 애기나비나물	<i>V. unijuga</i> Al. Br. forma <i>angustifolia</i> Makino 긴잎나비나물
No.	Size	length-width	length-width	length-width
1.		5-3cm	2.4-1.6cm	3.5-1.1cm
2.		4.7-2.3	2.5-1.6	3.5-1.2
3.		5.4-2.6	2.3-1.1	3.6-1.2
4.		5.1-2.7	2.2-1.8	3.8-1.1
5.		5.6-2.5	2.1-1.1	3.5-1.2
6.		4.8-2.7	2.4-1.4	3.5-1.2
7.		4.7-2.4	2.4-1.5	3.0-1.1
8.		5-2.5	1.9-1.3	2.4-0.9
9.		5.6-2.6	2.3-1.6	3.3-1.1
10.		6.1-2.9	2.4-1.1	3.4-1.1
Average		5.2-2.6	2.3-1.4	3.4-1.1

IV. Result and Discussion

The somatic chromosome numbers of *Vicia unijuga* and *Vicia unijuga* var. *minor* were twenty-four while that of *Vicia unijuga* forma *angustifolia* was twelve (Plate: 1-2).

Vicia unijuga var. *angustifolia* was observed to have highest pollen fertility among the three taxa. (Table 1).

However, the stomata size of *Vicia unijuga* forma *angustifolia* was smaller than those of the other two taxa (Plate: 3-5, Table 2, Fig. 1).

The leaf blade size of *Vicia unijuga* was larger than those of the other two taxa. The leaf blades of *Vicia unijuga* var. *minor* and *Vicia unijuga* forma *angustifolia* were similar to each other and *Vicia unijuga* var. *minor* was observed to have the smallest leaf blade among the three which was considered as a morphological characteristics (Table 3, Fig. 2-3).

The author presumably considered that *Vicia unijuga* and *Vicia unijuga* var. *minor* had descended from *Vicia unijuga* forma *angustifolia*. The notes on three taxa are as follow:

Vicia unijuga Al. Braun in Ind. Sem. Berol. APP 12, 1853, Korea, Japan, Siberia, China.

Vicia unijuga Al. Braun var. *angustifolia* Makino in Bot. Mag. Tokyo, XX11, 163p, 1903.

Vicia unijuga Al. Braun var. *angustifolia* Nakai in Bot. Mag. Tokyo, 37p, 1923, Tangyang, Chungbuk.

Vicia unijuga Al. Braun var. *minor* Nakai in Veg. Quelpaert, Kuryongpo, Kyungbuk, Chejudo.

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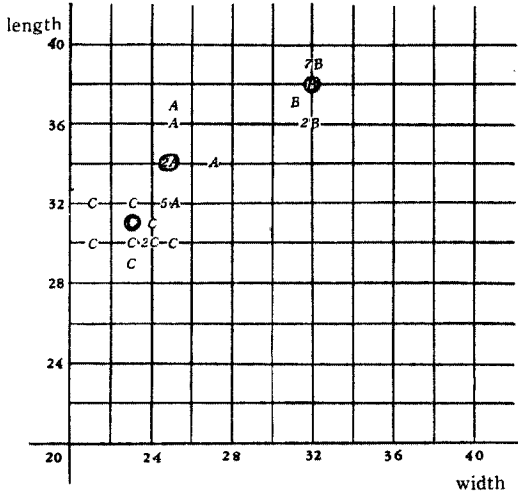


Fig. 1. Size of Stomata in microns
 A. *V. unijuga* Al. Braun B. *V. unijuga* Al. Braun var. *minor* Nakai C. *V. unijuga* Al. Braun for *angustifolia* Makino (O: Average)

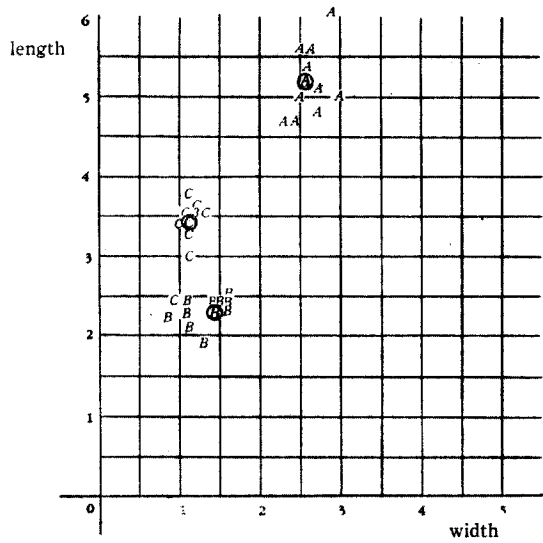


Fig. 2. Size of Leaves in Cm
 A. *V. unijuga* Al. Braun B. *V. unijuga* Al. Braun var. *minor* Nakai C. *V. unijuga* Al. Braun for *angustifolia* Makino (O: Average)

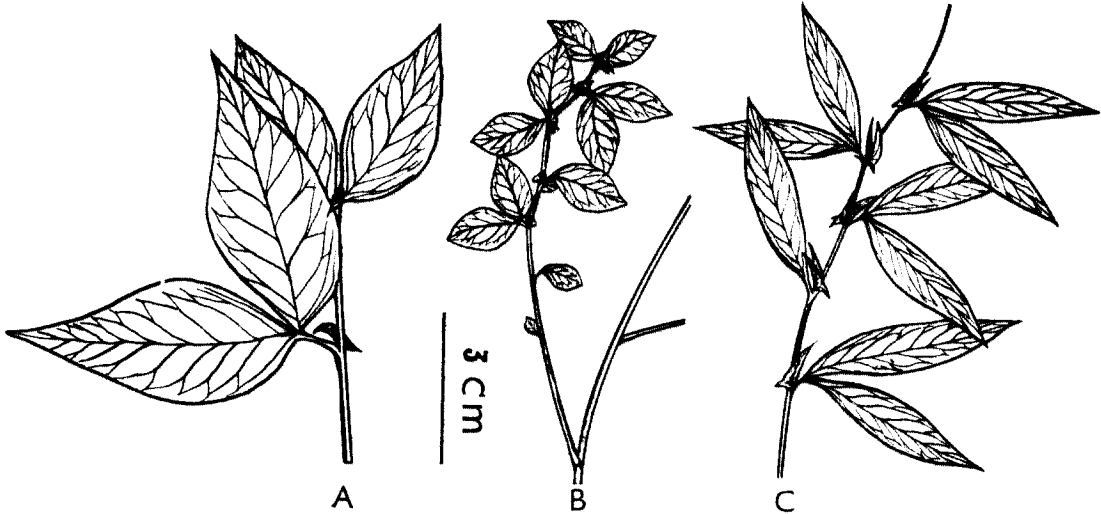


Fig. 3. Morphology of Leaves
 A. *Vicia unijuga* Al. Braun B. *V. unijuga* Al. Br. var. *minor* Nakai
 C. *V. unijuga* Al. Br. forma *angustifolia* Makino

<요 약>

나비나물類의 細胞分類學의 研究

이 영 노

(이화여대·생물학과)

韓國産 *Vicia* 속 중에서 2小葉으로 된 나비나물(*V. unijuga*), 애기나비나물(*V. unijuga* var. *minor*)

Plate. 1-2. Chromosome numbers of *Vicia* ($\times 1000$)

1. *Vicia unijuga* Al. Braun $2n=24$
2. *V. unijuga* Al. Br. forma *angustifolia* Makino $2n=12$

Plate. 3-5. Epidermal patterns of Leaf Blades of *Vicia* ($\times 200$)

3. *V. unijuga* Al. Braun
4. *V. unijuga* Al. Br. var. *minor* Nakai
5. *V. unijuga* Al. Br. forma *angustifolia* Makino

및 긴잎나비나물(*V. unijuga* forma *angustifolia*)에 對해 染色體數와 花粉의 稔性 그리고 잎의 크기와 기공의 크기를 서로 비교하여 그 계통관계를 밝힌 것이다. 결과적으로 보아 나비나물과 애기나비나물은 $2n=24$ 이고, 긴잎나비나물은 $2n=12$ 이다. 화분의 열성은 긴잎나비나물이 가장 높았으며 기공의 크기는 긴잎나비나물이 가장 적고 나비나물 다음에 애기나비나물이 크나 잎의 크기에 있어서는 애기나물이 가장 적고 긴잎나비나물 다음에 나비나물이 크다.

以上の 여러 형질로 미루워 보아 긴잎나비나물을 원시형으로 하여 애기나비나물과 나비나물이 분화된 것이라고 볼 수 있다.