

A new species of *Allium* sect. *Sacculiferum* (Alliaceae) from Korea: *A. linearifolium* H. J. Choi et B. U. Oh

Choi, Hyeok-Jae and Byoung-Un Oh*

(Department of Biology, Chungbuk National University,
Cheongju, Chungbuk 361-763, Korea)

Abstract

Here we described and illustrated a new endemic species of *Allium* sect. *Sacculiferum* (Alliaceae), namely *A. linearifolium* H. J. Choi et B. U. Oh. This species, from the central part of Korea, is clearly distinguished from other species of sect. *Sacculiferum*, especially its close relative, *A. thunbergii* G. Don by linear, terete, fistulous and long leaves. A key to these species is provided.

Key words: Alliaceae, *Allium* sect. *Sacculiferum*, new species, *A. linearifolium*

The genus *Allium* L., which traditionally belongs to the tribe Allieae under the Liliaceae (Bentham and Hooker, 1883; Vvedenskii, 1935; Lawrence, 1951; Xu, 2000), but recent many authors generally place in its own family Alliaceae (Dahlgren *et al.*, 1985; Takhtajan, 1997; Rahn, 1988; Judd *et al.*, 1999). *Allium* is distributed mainly in N. Hemisphere, especially in the temperate regions of Eurasia, and some species are known from S. Hemisphere such as Africa and Central and South America (Hutchinson, 1959; Ohwi, 1984; Rahn, 1988; Takhtajan, 1997; Xu, 2000). Most species of this genus with alliaceous odors and tunicated bulbs, and several species are economically important to vegetable, ornamental and medical use (Rahn, 1988; Judd *et al.*, 1999). Currently, as many as 5 subgenera, 46 sections and 11 subsections have been recognized within the genus

*Corresponding author: Phone: +82-43-261-2296, FAX: +82-43-271-5787,
e-mail: obutaxon@cbucc.chungbuk.ac.kr

(접수: 2003년 1월 19일, 완료: 2003년 2월 13일)

(Samoylov *et al.*, 1999).

Sect. *Sacculiferum* is a small group within subgenus *Rhizirideum* of *Allium*, but poorly delimited in boundary of species (Lee *et al.*, 2002). When Gritzenko (1979) proposed this section, he included two species, *A. sacculiferum* Maxim. and *A. komarovianum* Vved. from far eastern Russia. These two taxa were, however, synonymized and included in a rather broadly circumscribed *A. thunbergii* G. Don (Xu, 1980; Lee, 1996; Lee *et al.*, 2002). In the recent infrageneric classification of *Allium*, Hanelt and Fritsch (1994) broadened the concept of sect. *Sacculiferum* by including *A. chinense* G. Don and relative *A. virgunculae* F. Maek. & Kitam. This section characterized by globose to ovate bulbs, simple coriaceous bulb coat, more or less solid 3-5 angular or keeled flat leaves, subglobose rose or violet flowers, simple or 1-2 toothed filaments much longer than tepals, deep nectary grooves at the base of the ovary covered by hood-like projections, compressed obovate seeds and finally by phenologically extremely late flowering. About 4 species in the section including above mentioned 3 species and *A. taquetii* H. Lév., which has been misidentified as *A. cyaneum* Regel, are widely distributed in northeastern Asia.

On the basis of the results from our own observations of Korean *Allium* materials, 10 species, representing 3 subgenera and 9 sections, are now recognized (Lee, 1996; Xu, 2000; Lee *et al.*, 2002). Among these, Korean species of sect. *Sacculiferum* are *A. taquetii* and *A. thunbergii*.

In the present work, we described and illustrated one new species of *Allium* sect. *Sacculiferum* collected in 2002 from Mt. Woraksan, Jecheon-si, Chungcheongbuk-do, Korea. *A. linearifolium* H. J. Choi et B. U. Oh is distinctive from the others of sect. *Sacculiferum* in having linear, terete, fistulous and long leaves. Especially, this new species is morphologically very similar to *A. thunbergii*, but the former is clearly distinguished by size, cross section shape, and anatomical characteristics of leaf (Table 1, Figs. 1 and 2).

***Allium linearifolium* H. J. Choi et B. U. Oh, sp. nov. (Fig. 1, Fig. 2)**

Holotype: Korea. Chungcheongbuk-do, Jecheon-si, Mt. Woraksan, slopes of rocky area, 805-810m, 36°52'N, 128°06'E; 2. October 2002, H. J. Choi *et al.* 2002001, CBU.

Paratypes: H. J. Choi *et al.* 2002002 to 2002037 (CBU).

Table 1. Comparison of leaf characters between *A. linearifolium* and *A. thunbergii*.

Leaf characters	<i>A. linearifolium</i>			<i>A. thunbergii</i>		
	min.	mean	max.	min.	mean	max.
Number	3.0	4.6	10.0	3.0	4.0	8.0
Length (cm)	19.0	43.1	70.5	11.8	30.5	48.5
Width (mm)	1.0	2.0	3.2	2.8	4.5	11.0
Cross section	terete fistulous			flat to 3-angled usually solid		
Surface	lustrous dark green			not lustrous light green to green		
Abaxial midrib	absent			projected		

Bulbus subglobsus 8.0~19.0mm diametro. Folia 3~10 linearis teres fistulosa 19.0~70.5cm longa 1.0~3.2mm lata, petioli 4.2~13.2cm longe in vaginam clausam membranaceam. Scapus erectus vel ascendens 20.5~37.5cm longus 0.9~2.2mm diametro. Umbella 6~81 flora. Perianthii segmenta purpureo-rubra ovata apice abtusa 4.5~7.1mm longa. Stamina filamenta 5.1~11.0mm longa exserta. Ovarium viridis basi nectaris 3. Capsula 4.5~5.4mm longa 4.8~6.1mm lata.

Perennial bulbiferous herbs, growing from April to November. Roots with short and cylindrical rhizomes. Bulbs ovate, 8.0~19.0mm wide. Scapes erect or ascending, covered with leaf sheath at base, cylindrical and solid in cross section, 20.5~37.5cm long, 0.9~2.2mm wide. Leaves alternate at base, linear, terete and fistulous in cross section, conical at apex, midrib absent, 19.0~70.5cm long, 1.0~3.2mm wide. Inflorescences terminal, umbel, 6~81 flowered, spathe-like bract 1, membranaceous; pedicels slender, dark green or purple, 7.0~18.0mm long. Flowers bisexual; tepals 6, elliptic, rose to purple, with dark green or dark purple midrib, rounded at apex; outer tepals 3, 4.5~6.2mm long, 2.9~3.9mm wide; inner tepals 3, 5.5~7.1mm long, 3.1~4.0mm wide; stamens 6, inserted on lower part of tepals, anthers bilocular, filaments dilated at base, entire or toothed; carpels 3, locules 3, ovules 2 per locule, style 1, erect, filiform, stigma entire. Fruits capsules, 4.5~5.4mm long, 4.8~6.1mm wide. Seeds black, semi-elliptic, 2.7~4.2mm long, 1.8~3.0mm wide.

Korean name : Seon-bu-chu (선부추)

A. thunbergii is widely known from the far east including Ussouri, Vladivostok,

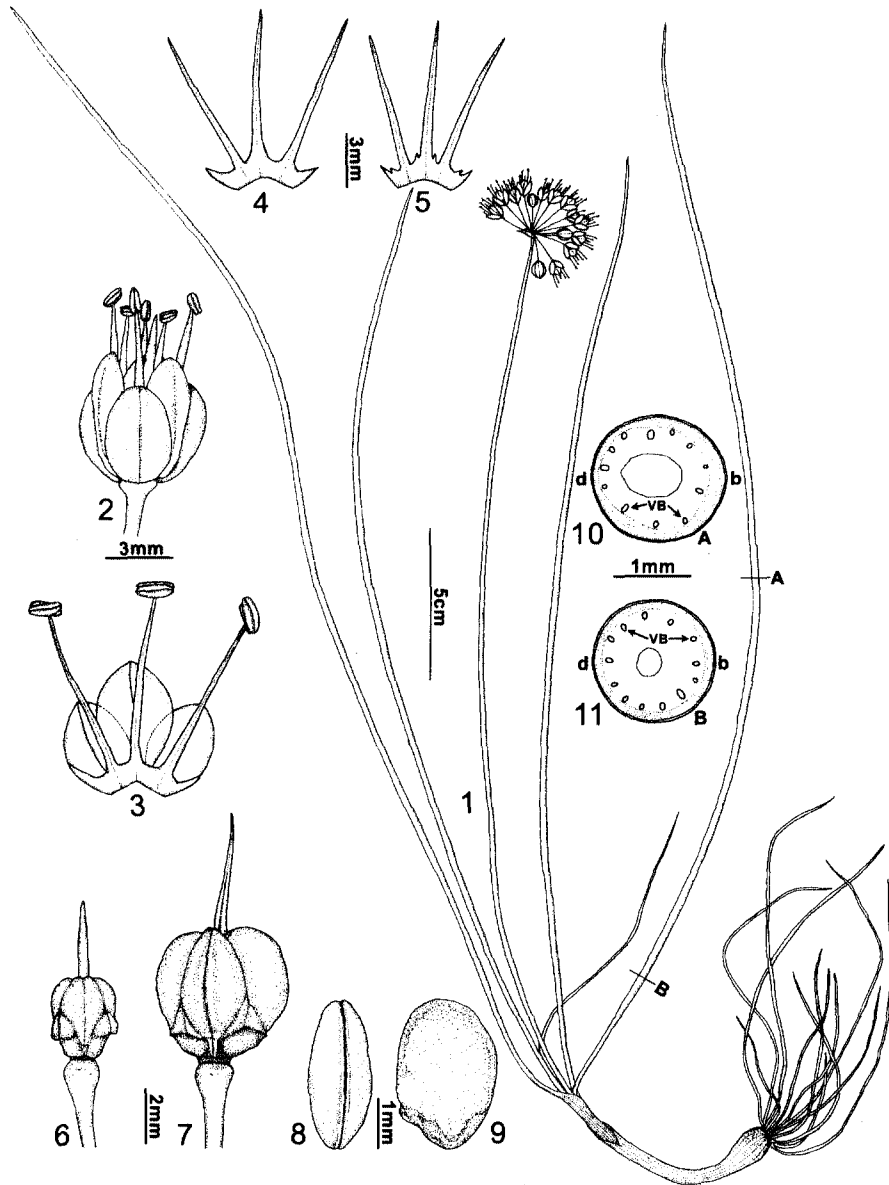


Fig. 1. *Allium linearifolium* (H. J. Choi et al 20020001). 1. Habit 2. Flower 3. Tepal and stamen arrangement 4, 5. Two types of filaments (4:entire, 5: toothed) 6. Pistil 7. Fruit 8. Side view of two seeds arranged in a locule 9. Ab-axial view of a seed 10, 11. Cross section shapes of leaf (10:Part A, 11:Part B, d; Adaxial, b; Abaxial, VB; Vascular bundles).

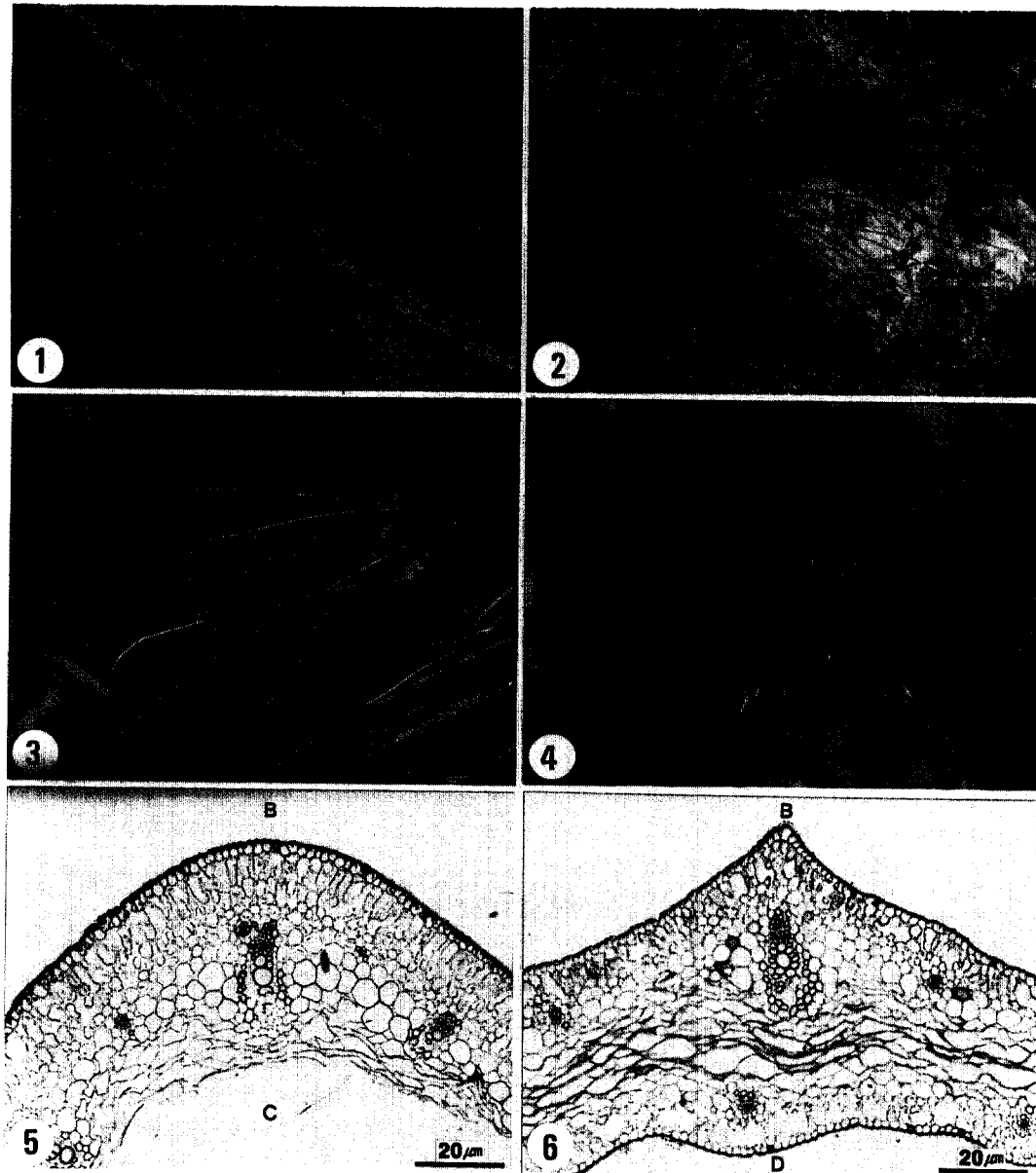


Fig. 2. 1~4. Photographs of *Allium linearifolium* (1: General view in habitat of type locality, 2: Suspended leaves and inflorescences of some individuals in habitat, 3: Linear leaves and a inflorescence, 4: Enlarged umbellate flowers) 5, 6. Cross section types of leaves (5: *A. linearifolium*, 6: *A. thunbergii*, D: Adaxial, B: Abaxial, C: Central cavity).

China, Taiwan, Japan and Korea (Vvedenskii, 1935). In contrast, Current distribution of *A. linearifolium* is very limited. This species is only found at the rocky mountain slopes above 700m of type locality and never been collected elsewhere. Therefore *A. linearifolium* is thought to be endemic to Korea. The two species of *Allium* sect. *Sacculiferum* can be distinguished by the following key.

A key to the two species of *Allium* sect. *Sacculiferum*

1. Leaves flat to 3-angular, usually solid, not lustrous, light green to green, 11.8~48.5cm long, 2.8~11.0mm wide; abaxial midrib projected; habitat lowland pastures to high mountain slopes*A. thunbergii*
1. Leaves terete, fistulous, lustrous, dark green, 19.0~70.5cm long, 1.0~3.2mm wide; abaxial midrib absent; habitat only rocky mountain slopes above 700m*A. linearifolium*

Acknowledgments

This research was supported by a grant (PF001302-00) from the Plant Diversity Research Center of the 21st Century Frontier Research Program, funded by the Ministry of Science and Technology of the Korean government. Especially, we deeply thanks to Dr. Woo-Tchul Lee for providing his invaluable materials.

Literature cited

- Bentham, G. and Hooker, J. D. 1883. *Genera Plantarum* Vol. III. Part 2. L. Reeve, Williams and Norgate, London. Pp. 748-804.
- Vvedenskii, A. I. 1935. *Allium* L. In *Flora U.S.S.R.* Vol. 4. Komarov V. A. (ed.), Botanical Institute of Academy of Science, Leningrad. Pp. 112-280.
- Lawrence, G. H. M. 1951. *Taxonomy of Vascular Plants*. Macmillan Publishing Co, New York. Pp. 413-416.
- Hutchinson, J. 1959. *The Families of Flowering Plants*. vol. II. Monocotyledons. Clarendon Press, Oxford. Pp. 639-643.
- Xu, J. M. 1980. *Allium* L. In *Flora Reipublicae Popularis Sinicae* Vol. 14. F. T. Wang and T. Tang (eds.), Science Press, Beijing. Pp. 170-272 (in Chinese).
- Ohwi, J. 1984. *Flora of Japan*. Smithsonian Institution, Washington, D. C. Pp. 279

-296.

- Dahlgren, R. M. T., H. T. Clifford and F. T. Yeo. 1985. *The Families of the Monocotyledons* Springer-Verlag, Berlin, Heidelberg, New York, Tokyo. Pp. 193-196.
- Hanelt, P. and R. Fritsch, 1994. Note on some infrageneric taxa in *Allium* L. *Kew Bull.* 49:559-564.
- Lee, W. T. 1996. *Lineamenta Florae Koreae*. Academy Press, Seoul. Pp. 1240-1242 (in Korean).
- Takhtajan, A. 1997. *Diversity and Classification of Flowering Plants*. Columbia University Press, New York. Pp. 500-506.
- Rahn, K. 1998. *Alliaceae*. In *The Families and Genera of Vascular Plants III. Monocotyledons*. Kubitzki K. (ed.), Springer, Berlin and Heidelberg. Pp. 70-76.
- Judd, W. S., C. S. Cambell, E. A. Kellogg, and P. F. Stevens. 1999. *Plant Systematics*. Sinauer Associates, Inc., Sunderland, Massachusetts. Pp. 189-190.
- Samoylov, A., N. Friesen, S. Pollner and P. Hanelt. 1999. Use of chloroplast DNA polymorphisms for the phylogenetic study of *Allium* subgenus *Amerallium* and subgenus *Bromatorrhiza* (Alliaceae) II. *Feddes Repert.* 110:1-2, 103-109.
- Xu, J. M. 2000. *Allium* L. In *Flora of China*. Vol. 24. Raven P. H. (ed.), Science Press and Missouri Botanical Garden Press, Beijing, St. Louis. Pp. 95-133.
- Lee, N. S., D. H. Lee, J. S. Lee, and G. Hao. 2002. A study of taxonomical relationship among species of Korean *Allium* sect. *Sacculiferum* (Alliaceae) and related species using inter-simple sequence repeat (ISSR) markers. *Bot. Bull. Acad. Sin.* 43:63~68.

부추속 부추절의 1신종 : 선부추

최희재 · 오병운*

(충북대학교 생물학과)

한국의 중부지방에서 발견된 부추속 산부추절(파과)의 1신종, 선부추(*A. linearifolium* H. J. Choi et B. U. Oh)를 기재하였다. 선부추는 단면이 둥글고 속이 비었으며, 길고 곧게 뻗은 잎의 특징으로 동북아시아에 분포하는 산부추절 내 다른 종들, 특히 근연인 산부추(*A. thunbergii*)와 뚜렷이 구별되었다. 한국과 동북아시아에 분포하는 것으로 알려진, 이들 두 종의 검색표를 제시하였다.

주요어 : 파과, 부추속 산부추절, 신종, 선부추

*교신저자 : 전화 : 043-261-2296, 전송 : 043-271-5787,

전자우편 : obutaxon@cbucc.chungbuk.ac.kr