

## Geranium (Geraniaceae)의 종자산포형태에 따른 형태학적 연구

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(2002년 9월 5일 접수; 2002년 10월 4일 채택)

### A morphological study of *Geranium* (Geraniaceae) on the fruit-discharge type

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(Manuscript received 5 September, 2002; accepted 4 October, 2002)

Fruit-discharge type of forty species of Asian *Geranium* were examined and their evolutionary trends and taxonomic system were discussed. Two main types of seed discharge in *Geranium* are made the basis of its division into subgenera: *Geranium* subgenus *Geranium*, with a ballistic expulsion of the seed from mericarp, *Geranium* subgenus *Robertium*, with forcible discharge of the mericarp with the seed in it, separately from the awn. Variants of the seed ejecting type permit the division of *Geranium* subgenus *Geranium* into three sections. Section *Geranium*, these has bristles at the base of the mericarp for prevent the seed from dropping from the divergent mericarp. Section *Dissect*, these has prongs at the base of the mericarp for prevent the seed from dropping from the divergent mericarp. Section *Tuberosa*, these has no bristles and prongs at the base of the mericarp, instead, retained of seed in pre-explosive interval by twist. *Geranium* subgenus *Robertium* was divided into two sections, Section *Ruberta*, with deeply wrinkled on the surface of mericarp at the time of discharge. Section *Batrachioides*, and section *Trilopha*, without wrinkle on the surface of mericarp at the time of discharge. According to the seed discharge, subgenus *Geranium* is thought to be more advanced than subgenus *Robertium*.

Key words : *Geranium*, Fruit-discharge, Mericarp, Awn, Evolutionary trends

#### 1. 서 론

쥐손이풀아속(*Geranium* L.)은 쥐손이풀과(Geraniaceae), 쥐손이풀족(Geranieae), 쥐손이풀속(*Geranium*)에 속하는 식물로<sup>1)</sup>, 북반구 온대지역 및 열대의 고산지역을 중심으로 300

여종이 널리 분포하고 있으며,<sup>2~7)</sup> 일부 종은 관상과 약용으로서 가치가 매우 높아 연구 대상이 되어 왔다.<sup>8),9)</sup>

쥐손이풀아속(subgenus *Geranium*)에 대한 연구로 Knuth<sup>10)</sup>는 세계산 90여종에 대하여 잎형, 잎열편의 분지정도, 뿌리 형태, 줄기의 분지형태 등에 따

라, 30절과 3아절로 나누어 처음으로 속이하의 분류체계를 설정하였으며, Bobrov<sup>11)</sup>는 뿌리의 형태, 화판의 크기, 줄기의 분지정도, 화색, 탁엽과 잎열편의 형태 등에 의해 러시아산 55종을 13절 3아절로 구분하였으며, Yeo<sup>1)</sup>는 세계산 110종에 대하여 잎열편, 소열편의 형태, 화서, 생활사, 화판의 모양과 형태 등에 따라 3아속, 14절, 2아절, 25군으로 분류체계를 발표하였다. Park<sup>12)</sup>은 Yeo<sup>1)</sup>의 분류형질외에 꽃의 형태, 화분, 종자, 해부학적형질을 추가하여 아시아산을 2아속, 5절, 11군으로 세분하였다(table 2). 본속의 종자산포에 관한 연구는 Steinbrink<sup>13)</sup>, Hudlund<sup>14)</sup>, Knuth<sup>10)</sup>, Park<sup>12)</sup>에 의해 일부 분류군이 연구된 바 있고, 유럽과 캐나다 쥐손이풀속에 대한 종자산포 연구는 Tokarski<sup>15)</sup>가 기록한 바 있다. 쥐손이풀속의 속이하 분류군을 설정하는데는 종자산포형

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태가 중요한 형질로 이용되어 왔다. 그러나 아시아 산 전체에 관한 쥐손이풀속의 종자산포방식에 따른 연구는 미비하여, 이번 연구를 통하여 분류체계의 재검토 및 진화경향성을 유추하고자 하였다.

2. 재료 및 방법

실험재료중 생체재료는 1993년 5월부터 2001년 12월까지 채집하여 사용하였으며, 증거표본은 고려대학교 생물학과 표본실(KUS)과 영남대학교(YNUS)에 보관하였고, 연구표본은 각 대학 표본관에 소장된 표본 및 미국의 New York Botanical Garden (NY), Smithsonian Institute(US), Bailey Herbarium, Cornell University(BH), Missouri Botanical Garden (MO), Harvard University(GH), 영국의 Reading University(RNG), 중국의 Beijing(PE), Beijing Medical University(PEM), Chengdu, Sichuan Academy of Forestry(SCFI), 대만의 National Taiwan University(TAI), 프랑스의 Museum National d'His-toire Naturelle(P), 남아프리카의 Stellenbosch Herbarium Stellenbosch University(STEU), Bloemfontein, Orange Free State University(BLFU) 등의 외국 표본관에 소장된 기준표본(type specimen)을 포함한 1500여점의 표본과 사진재료를 관찰하였다. 재료의 종류 및 채집지는 appendix와 같다.

3. 결과 및 고찰

Seed Dispersal Types (종자산포형태)

*Geranium*속의 과실구조에 관한 용어들은 많은 혼란이 있어 왔지만 대체적으로 Robertson<sup>16)</sup>의 견해에 따라 정의되고 있고, 본인도 그 견해에 따랐다. 일반적으로 쥐손이풀속의 과실 및 종자는 5개의 심피로 구성된다. 그러나 각각 열개된 자방은 분리과(schizocarp)를 형성한다. 암술은 한 개로, 암술대 끝은 5개로 갈라지며, 각각의 심피는 2개의 배주를 포함하지만 그중 오직 하나만이 정상적인 종자가 된다. 성숙한 심피는 두부분으로 구성된다. 즉, 종자를 감싸고 있는 부분(분과, mericarp)과 분과에 연결되어 있는 리본과 같은 까락(awn)으로 되어 있다. 중심주(rostrum)는 암술대와 연결되어 있고, 종자산포시 5개로 갈라지며, 탄력적으로 위쪽으로 올라가면서 산포된다.

아시아산 쥐손이풀속의 종자산포기작은 크게 두가지로 나눌 수 있다(Table 1).

1) Seed Ejection Type(종자산포방식유형): 종자산포시 분과와 까락이 아치를 이루며, 탄력적으로 위로 올라가면서 종자가 산포되는 형으로 쥐손이풀속의 *Geranium*아속에서 관찰된다(Fig. 1: 1-3).

Table 1. Fate of parts of the carpel in the ripe fruit of *Geranium*

Destination of seed dispersal type	Carpel part			Means of seed retention in pre explosive interval
	Seed	Awn	Mericarp-body	
SE-G	Discharged	Retained	Retained	bristles
SE-D	Discharged	Retained	Retained	prong
SE-T	Discharged	Retained	Retained	mericarp distiled
CP-B	Discharged	Discharged	Discharged	closure of carpel orifice
CP-B	Discharged	Discharged	Discharged	closure of carpel orifice

Table 2. Comparison of system of *Geranium* in the Asia

Knuth(1912)	Yeo(1985)	Park(1997)
Section Palustria	Subgenus <i>Geranium</i>	Subgenus <i>Geran</i>
Section Striata	Section <i>Geranium</i>	Section <i>Geranium</i>
Section Sylvatica	Sylvaticum group	Sylvaticum group
Section Reflexa	Pratense group	Pratense group
Section Sanguinea	Erianthum group	Erianthum group
Section Palustria	Refractum group	Refractum group
Section Lucida	Palustr group	Palustr group
Section sibirica	Krameri group	Krameri group
	Sibiricum group	Sibiricum group
	Farreri group	Farreri group
	Maculatum group	Maculatum group
	Section Tuberosa	Wilfordii group
	Subgenus <i>Rovertinum</i>	Koreanum group
	Section <i>Trilophia</i>	Section <i>Tuberosa</i>
	Section <i>Batrachioides</i>	Subgenus <i>Rovertinum</i>
	Section <i>Ruberta</i>	Section <i>Trilophia</i>
	Section <i>Batrachioides</i>	Section <i>Ruberta</i>

2) Carpel Ejection Type(심피산포방식유형): 종자산포시 분과와 까락이 중심주로부터 완전히 분리되어 산포되는 형으로 쥐손이풀속의 *Robertium*아속에서 관찰된다(Fig. 1: 4).

Seed Ejection Type은 3가지 형태로 분류된다.

1) SE-D type (seed ejection dissect type): 분과의 부속체 형태가 포크형태와 같은 갈고리(prong)가 있는 형으로 *Geranium*아속의 *Dissect*절에서 관찰된다(Fig. 1: 1).

2) SE-G type (seed ejection geranium type): 분과의 부속체 끝에 강모(bristle)가 있는 형태로 *Geranium*아속의 *Geranium*절에서 관찰된다(Fig. 1: 2).

3) SE-T type (seed ejection tuberosa type): 분과의 부속체에 종자를 일시적으로 유지해주는 갈고리나 강모가 없는 형태로 분과가 비틀어지면서 종자를 유지해주는 형으로 *Geranium*아속의 *Tuberosa*절에서 관찰된다(Fig. 1: 3).

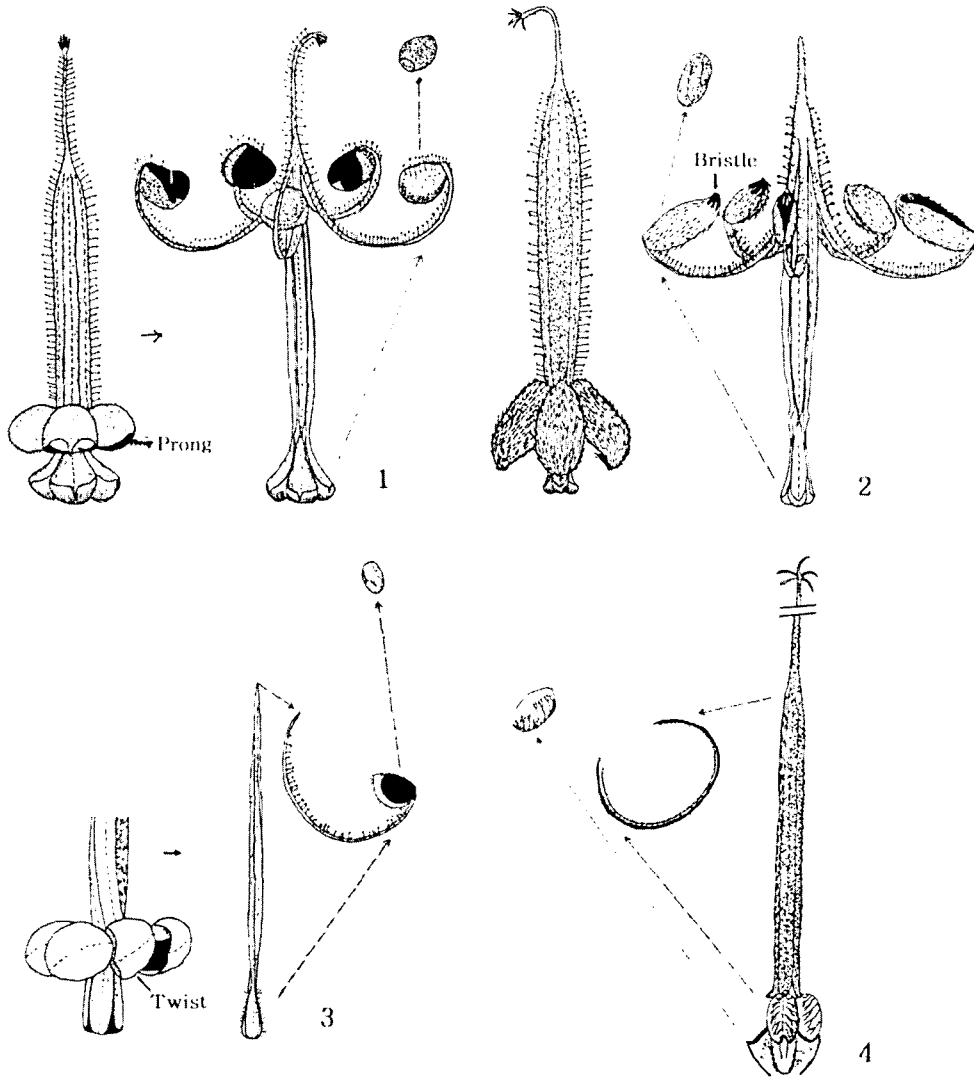


Fig. 1. Mature gynoecium and seed of *Geranium*. 1. SE-G type 2. SE-D type 3. SE-T type 4. CE-R type.

**Carpel Ejection Type**은 2가지 형태로 분류된다.

1) CE-R type (carpel ejection ruberta type): 종자산포시 종자가 까락과 중심주로부터 모두 분리되며, 분과의 표벽이 심하게 주름이지는 형으로 *Robertium*아속의 *Ruberosa*절에서 관찰된다(Fig. 1: 4).

2) CE-B type (carpel ejection batrachioids type): 종자산포시 종자가 까락과 중심주로부터 모두 분리되며, 분과의 표벽이 주름이지지 않는 형으로 *Robertium*아속의 *Batrachioides*절과 *Trilopha*절에서 관찰된다.

위의 연구에서 아시아산 쥐손이풀은 크게 두 개의 아속으로 분류되어진다. 첫째는 종자산포시 종자

는 분과로부터 분리되어 나오지만 분과와 연결되어 있는 까락은 중심주로부터 붙어있는 형태로 쥐손이풀아속에서 관찰되고, 둘째는 종자산포시 종자가 분과와 분리되고 까락은 중심주로부터 떨어져 나오는 형으로 *Robertium*아속에서 관찰된다. 또한 *Robertium*아속은 종자를 일시적으로 유지해주는 부속체의 형태에 따라 크게 두가지로 나누어진다. 첫째는 분과의 끝에 prong이라는 강력한 포크형태의 갈고리가 있어 종자가 산포되는 시기까지 일시적으로 유지해주는 구조를 가지고 있다. 두 번째는 분과의 끝에 강모(bristle)가 있어 이 역시 종자를 일시적으로 유지해주는 기능을 하고 있다. 세 번째는 강모나 갈고리(prong)가 존재하지 않지만 대신에 분과가 비

들어지면서 종자를 일시적으로 유지해준다. *Robertium*아속은 두가지 형태로 나뉘어지는데, 첫째는 종자산포시 분과의 표벽무늬가 심하게 주름이져 과도의 형태를 가지고 있는 *Robertium*아속의 *Ruberta*절과 분과의 표벽무늬가 밋밋한 *Robertium*아속의 *Batrachioides*절과 *Trilopha*절에서 관찰된다. 이렇게 5가지 형태의 종자산포기작에 따르면 아시아산 쥐손이풀속은 외부형태에 따라 2아속 5절로 구분한 Park<sup>12)</sup>의 견해와 일치함을 보여주고 있다. Park<sup>12)</sup>은 아시아산 쥐손이풀속을 2아속, 5절, 11군으로 규정하고 속에 대한 전반적인 생식기관의 해부학적 분류형질의 재검토를 수행한바, 종자산포시 까락이 분과와 부착되어 열매 자방돌기부의 윗부분으로 말려 올라가면서 종자가 산포되는 분류군은 열매 자방돌기부의 중축(central columella) 유관속이 2열로 되어있고, 종자 산포시 까락이 중심주와 분리되는 분류군은 열매 자방돌기부의 중축 유관속이 1열로 관찰되었다고 보고한 바 있다. 이를 종합하여 볼 때 *Geranium* 아속 중 *Geranium*절은 조직의 특수화로 인해 열매 자방돌기부 유관속이 2열로 발달되면서 종자 산포시 까락이 위로 말려지면서 먼 곳까지 종자를 산포하는 방식으로 까락의 탄력성을 증진시키는 형태이며, *Geranium*절과 *Robertium*아속은 열매 자방돌기부의 중축 유관속이 1열인 것은 까락의 탄력성을 약하게 하는 조직으로 발달한 것으로 생각되어 까락의 탄력성이 없어 종자 산포 거리가 짧은 것으로 관찰되었고, *Geranium*아속내에서는 종자를 일시적으로 유지해주는 강모나 갈고리를 가지고 있는 *Geranium*절과 *Dissect*절이 분과의 부속체를 가지고 있지 않은 *Tuberosa*절보다 종자산포거리에서 훨씬 멀리 분포하며, 조직의 분화상태 보아서 좀 더 분화한 분류군으로 생각된다. 이러한 것을 종합해 볼 때, *Geranium*아속이 *Robertium*아속보다 더 진화한 분류군이라고 생각된다.

본 속에서는 아속을 나누는 가장 중요하다고 생각되는 종자산포기작에 따른 분류체계의 재검토 및 진화 경향성의 추론이 가능하지만 절 이하의 형질의 중복으로 인하여 분류체계와 진화경향성을 논하기가 어려우며, 보다 확실한 사실의 언급을 위해서는 아직 다루지 못한 분자계통학적 연구가 뒷받침되어야 한다고 생각된다.

#### 4. 요 약

쥐손이풀속(Genus *Geranium*) 40분류군에 대하여 종자산포형태에 따른 생식형질을 조사하고, 이들의 분류체계 및 진화경향성을 논의하였다. 종자산포시 분과와 까락이 탄력적으로, 위로 감겨 올라가면서

종자가 산포되는 *Geranium*아속과 종자산포시 분과와 까락이 완전히 분리되어 종자가 산포되는 *Robertium*아속으로 구분된다. *Geranium*아속은 다시 종자를 일시적으로 유지해 주는 분과의 부속체 기저부에 강모가 있는 *Geranium*절, 포크형태와 같은 갈고리 모양의 *Dissect*절, 강모나 갈고리형의 부속체를 가지고 있지 않지만 분과가 비틀어지면서 종자를 유지해 주는 *Tuberosa*절로 분류되어진다. *Robertium*아속은 종자산포시 종자가 까락과 중심주로부터 모두 분리되면서 분과의 표벽이 심하게 주름이 지는 *Ruberta*절과 분과의 표벽에 주름이 없는 *Batrachioides*절과 *Trilopha*절로 나뉘어진다. 종자산포방식에 따르면 *Geranium*아속이 *Robertium*아속보다 더 진화한 분류군으로 생각된다.

#### 감사의 글

본 논문은 과학기술부 21세기 프론티어연구개발사업 / 자생식물이용기술사업(과제번호: PF001201-06)과 야생화 및 멸종위기식물 종자은행사업(과제번호 PF001301-01)의 일부 지원에 의해 수행되었습니다.

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### Appendix: Specimens examined

*G. carolinianum* L. : China; Nanjing : Jiangsu province, 5 May 1981, K. Yao 8071 (UC) ; Japan ; Hyogo : Kakogawa-shi, 4 June 1969, N. Kurosaki (NY) ; kakogawa-shi, 4 June 1969, N.Kurosaki s.n. (GH) ; Taiwan : Lushan-Mushe, Nantou Co., 5 May 1984, S.F. Huang 1562 (TAI) ; Taipei city, 5 May 1989, S.F. Huang 4453 (TAI) ; U.S.A. ; California : ?, Monterey Co., 1 April 1970 Ralph N. Philbrick s.n. (BH) ; Los Angeles county, 10 May 1902, Ernest Brauton 312 (BM) ; San Diego Co., 5 July 1927, Ira L. Wiggins 2518 (BH) ; Georgia : Glynn Co., Brunswick, 12 April 1936, L.H. Macdaniels s.n. (BH) ; McIntosh Co., 6 April 1978, P.A. Hyypio 2335 (BH) ; ; Mississippi : Hinds Co., 4 April 1962, J.R. Dunaway s.n. (BH) ; Missouri : Near Springfield, 12 May 1886, Stuart Weller s.n. (BH) ; New York : Chemung Cp., 28 Aug 1950, Stanley J. Smith, K. Ted Weaver 7701 (BH) ; Erie Co., Collins, 20 June 1932, Anne E. Perkins s.n. (BH) ; Long island, Suffolk Co., 19 May 1925, Roy Latham s.n. (BH) ; Long island, Suffolk Co., 1 June 1915, Roy Latham s.n. (BH) ; Onondaga Co., 12 June 1947, nettie M. Sadler s.n. (BM) ; Oraug Co., 6 June 1937, H.K. Svenson 8416 (BH) ; Tompkins Co., 21 June 1938, M.F. Barnus 19885 (BH) ; Washington D.C. : Near Washington D.C., 8 June 1924, L.H.B. s.n. (BH) ; Nevada : Humboldt Co., 24 June 1967, Johnnie L. Gentry Jr. 1629 (BH) ; New Jersey : Salim Co., 18 June 1921, H.B. Meredith s.n. (BH) ; North Carolina : Washington co., 15 May 1953, D.M. Porter & H.K. Svensin 894 (GH) ; Chatham County, 9. May. 1988, Edward C. Swab, 142 (GH) ; Ohio : Ottawa Co., 29 June 1940, W.C. Muenscher, Earl L. Core, 16136 (BH) ; Oklahoma : Leflore Co., 30 April 1937, M. Hopkins K.G.L. Cross 1525 (BH) ; Pennsylvania : Bucko Co., 29 May 1930, Walter M. Benner s.n. (BH) ; South Carolina : Charleston, Co., Jamesisland, 22 May 1973, Alma I. Moldenke & Harold N. Moldenke 26381 (BH) ; Tennessee : Hamilton Co., 5 May 1941, R.L. Crockett 1057 (BH)

*G. columbicum* L. U.S.A. ; Idaho : Nez perces Co., 7 April 1896, A.A. and E. Gertrude Heller 3378 (BH) ; Indiana : Montgomery Co., ?, 1913, T.C. Davis s.n. (BH) ; Kansas : Johnson Co., 21 May 1991, Youngjune Chang 735 (BH) ; Kentucky : Fagette Co., lexington, 25 May 1942, Frank T. McFarland 74 (BH) ; Louisiana : ?, 14 Dec 1982, R. Dale Thomas, K. Kesseler, D. Moore 82759 (BM) ; ?, 23 Mar 1957, Anna Ashbey 0072 (BM) ; Saint Mary Co., Near morgan City, 17 April 1939, Anne E. Perkins, And J.M. Hall 2340 (BH) ; St. James Parish, 15 Mar 1992, Paul S. Taylor pt172 (BH) ; Massachusetts : ?, 13 July 1919, Fawie C. Raue (BH)

*G. dahuricum* DC. : Korea; Kangwon : Solaksan, 13. Aug. 1988, J.H.Lee 15749 (SKK) ; Solaksan, 11. July. 1977, B.K.Yun s.n. (GW) ; Solaksan, 13. Aug. 1988, J.H.Lee 15746 (SKK) ; Solaksan, 16. July. 1977, B.K.Yun s.n. (GW) ; Solaksan, 6. July. 1977, B.K.Yun s.n. (GW) ; Kyungbuk : Mt. Setsurei in Kampoku, 26. June. 1930, J. Ohcoi 1843

(DH) ; Kayasan, 2. Sept. 1991, W.T.Lee s.n. (GW) ; Kayasan, 31. Aug. 1994, S.J.Park s.n. (KUS) ; Cheju : Chejudo, 20. July. 1994, S.J.Park s.n. (KUS) ; Chejudo, Hallasan, 5. Aug. 1960, W.T.Lee 15713 (SKK) ; Hallasan, Aug. 1907, U. Faurie 1760 (BM) ; China : ? : ?, 3. Aug. 1953, ? s.n. (PE) ; Hopei : ?, 3. June. 1930, R. Arnacost 68 (NY) ; ?, 9. Aug. 1959, ? s.n. (PE) ; Hsiang shan, 10. Aug. 1932, H. Sheehan 261 (NY) ; Hsiao Wu Tai Shau, 28. Aug. 1929, J. C. Iiu L2315 (NY) ; Jirin : ?, July. 1911, F.H. chen, 133 (GH) ; Kilin : ?, 26. June. 1903, ? s.n. (NY) ; ?, 23. June. 1895, V. Komarov 993 (NY) ; ?, ? 1860, ? s.n. (BM) ; ? ; ? 1931, F. H. chen 331 (NY) ; ?, 15. Aug. 1931, F. H. Chen 331 (DH) ; Shansi : N. shausi, Ning-Wu Hsien, 12. Aug. 1929, T. Tang 1313 (NY) ; ? ; ? 1935, E. Licent 12119 (GH) ; Japan ; Nagano : ?, 25. Aug. 1930, M. Kume s.n. (GH) ; Yamagata : Ugo, 16. Aug. 1960, H. Ohashi 6793 (BM) ; Lithuania : Primorje, 23. July. 1975, 2938 (BM) ; Russia : Czita : ?, 2. Aug. 1902, G. Stakov s.n. (GH) ; Czita Prov., 2. Aug. 1902, ? s.n. (NY)

*G. delavayi* Franchet: China; Szechwan : Le-po hsien, 15. Aug. 1934, T.T. Yu 3778 (PE) ; Yunnan : ?, 1914, ? 2878 s.n. (GH) ; ? ; 1937, T.T. Yu 6117 (GH) ; ?, July. 1923-24, J.F. Rock 9453 (GH) ; ?, July. 1923-24, J.F. Rock 23119 (NY) ; Lichiang Rause, ? 1933, H.D. McLaren 172B (BM) ; Lijiang, 17. Aug. 1990, J. Murata, N. Kanayama, Y. Murakami, Z.S. Ren & S.W. Yu 581 (GH) ; N.W. Likitang, 25. June. 1939, R.C. Ching 20890 (GH) ; Wie-si hsien, Aug-Sept. 1935, C.W. Wang 67664 (GH) ; Yunnan-SouthEast Tibet, May-June. 1931, J.F. Rock 23051 (NY)

*G. donianum* Sweet: China; Yunnan : Wie-si hsien, Aug-Sept. 1935, C.W. Wang 67664 (GH) ; Yunnan-SouthEast Tibet, May-June. 1931, J.F. Rock 23051 (NY)

*G. farrei* Staft : China ; Gansu : ?, 12 July 1914, Tao s.n. ; ?, 10 Aug. 1925, Chabai s.n. ; Shaanxi : ?, 11, Aug. 1972, T.P. Shan s.n.

*G. erianthum* DC. : Japan; Hokkaido : Ishikari, Shicho, 17. Aug. 1977, D. E. Boufford and E. W. Wood s.n. ; Island Teuri 4. June. 1979, K. Mimoro s.n. (H) ; Mineoka, 20. June. 1978, Tsuguro s.n. (A) ; Rumoi, Nupurumapporo, 21. June. 1978, ? s.n. ; Toyoni, 3. July. 1953, M. Togasi s.n. ; Toyoni, 3. July. 1953, M. Togasi s.n. ; Toyoni, 3. July. 1953, M. Togasi s.n. ; Iwate : ?, 25. July. 1977, T. Yahara and E. Miki s.n. (BM) ; Shiota : Kenzo , 1. July. 1926, Z. Okada s.n. ; Nambu, . ? 1865, Tschonoski s.n. ; Hokkaido : ? 1905, Faurie s.n. (BM) ; Hidaka , 28. July. 1955, M. Furuse s.n. ; Ishikari 2. Aug. 1956, M. Furuse s.n. ; Nemuro, hanasaki, pensula, 3. July. 1954, T. Koyama s.n. ; Nemuro, 1. Aug. 1954, M. Furuse s.n. ; Russia : ? 19. June. 1753 s.n. ; Kamtchatka : ?, ? 1928, E. Hulten s.n. ; Siberia : ?, 12. July. 1901 E. Hulten s.n. ; ?, 3. July. 1901, N.G. Buxton s.n. ; Snezhnaya : Dolina, 22. July. 1988, Thomas S. Elias and D. Murray s.n. : U.S.A. ; Alaska : ?, 10. Aug. 1892, F. Funston s.n. ; ?, 10. Aug. 1949, L.L. Jordal s.n. ; ?, 11. Aug. ?, Miller

s.n. ; ?, 12. July. 1951, J.A. Calder s.n. ; ?, 17. July. 1892, Dutch s.n. ; ?, 18. June. 1950, Christine Heller s.n. ; ?, 23. July. 1950, Christine Heller s.n. ; ?, 6. Oct. 1948, H.E. Moore s.n. ; ?, 7. July. 1974, Michael K. Hein s.n. ; ?, 9. July. 1938, ? ; ?, 9. July. 1950, L. A. Viereck s.n. ; ?, ? 1890, H.P. Cushing s.n. ; Kodiak Is. 28, June, 1936 isobel W. Hutchison s.n. ; Aleutian, 30. Aug. 1949, Miller s.n. ; Aleutian Island, 19. Aug. 1949, L.H. Jordal s.n. : **United Kingdom** ; Royal Botanic Garden. 18. May. 1961, W.T.Szeam s.n.

*G. eriostemon* Fisher: **Korea**; **Kangwon** : Sulaksan, 16. June. 1977, B.G.Yun s.n. (GW) ; Sulaksan, 26. Aug. 1986, S.T.Lee 15739 (SKK) ; Sulaksan, 26. July. 1977, B.G.Yun, s.n. (GW) ; Sulaksan, 26. July. 1990, W.T.Lee s.n. (GW) ; Taebaeksan, 31. May. 1991, W.H.Chang 15769 (SKK) Hyunli, Kachilbong, 24. July, 1987, W. C. Lee s.n. (GW) **Kyunggi** : Kapyung, hwaaksan, 7. June. 1975, W.T.Lee s.n. (GW) **Kyungbuk** : Seisuria in Kampoku, 5. June. 1930, J. Ohwi 497 (BH) ; borealis Yuhyo in Kampoku, 19. June. 1930, s.n. (BH) ; Kyojo(Kyonson) in Kampoku, 26. May. 1930, J. Ohwi 114 (BH) ; **Chonbuk** : Muju. Dukyousan, 4. Aug. 1959, T.H.Chung 15716 15715 (SKK) ; **Cheju** : Hallasan, 5. Aug. 1960, W.T.Lee 15719 (SKK) ; Hallasan, 5. Aug. 1960, W.T.Lee 15722 (SKK) ; **Chungbuk** : Sobaeksan, 1. June. 1991, S.T.Lee et al 15733 (SKK) ; Sobaeksan, 4. July. 1990, Y.B.Chung et al 15723 (SKK) ; **China** : **Hebei** : Chihli, Hsian Wu tai Shan, 6. Aug. 1913, H. N. Meyer 1119 (GH) ; ?, 5. July. 64, ? (PE) ; ?, ?s.n. (PE) ; **Hsian** : Wu tai shan, 28. June. 1931, T. P. Wang 411 (NY)

*G. albiflorum* Ledebour: **China**; **Kansu** : ?, July. 1925, J. F. Rock 12575 (NY) ; **Kirin** : ?, 2. June. 1903, ?s.n. (NY) ; ?, 3. June. 1895, V Komarov s.n. (NY) ; ?, ?, M. Jankowski s.n. (NY) ; **North central china** : Kusan, 5. June. 1897, s.n. (BH) ; **Shansi** s.n. : ?, 1. July. 1962, s.n. (PE) ; **Japan** : Aomori : Mt. Shirakau, 12. July. 1975, H. ohba s.n. (GH) ; **Nagano** : Mt. Togakughi, 22. June. 1981, O. Shimoda 29. (GH) ; Mt. Yaysugatake, Kiyosato, 28. June. 1970, F. Yamazaki 106 (GH) ; **Shizuoka** : Mt. Fuji, 23. July. 1979, M. Togashi s.n. (GH) ; **Shinano** : Togakushi-shau, 19. Aug. 1893, s.n. (GH) ; Togakushi-shau, 10. June. 1894, s.n. (GH) ; **Lithuania** ; **Promorsk** : ?, 2. July. 1906, N Palczesky s.n. (NY) ; **Russia** ; **Czita** : ?, 13. July. 1906, G Stukov s.n. (NY) ; **United Kingdom** ; ?, 4. July. 1969, W. J. Dress 11215 (BH).

*G. henry* Knuth: **China**; **Hupei** : ?, Aug. 25. 1980 B. Bartholomus s.n. (NY) ; **Szechwan** : ?, 5. Nov. 1990, L. Z. shue s.n. ; ?, (May. 28. 1957) s.n. (PE).

*G. ibericum* Cavanalis: **Russia**; ?, 12. Aug. 1923, Trovzanski s.n. ; ? 17. July. 1934, Gdrevjki s.n. ; ? 28. Aug. 1945, Hytrconsbi s.n. ; ? ? 1913, E. I. Khkoze s.n. ; ? 25. Aug. 1932, H. A. Eyw s.n.

*G. knuthii* Nakai: **Korea**; **Kangwon** : Chiaksan, 1. Aug. 1975, W.T.Lee s.n. ; Kongaksan, 11. Aug. 1977, K.M.Yoon s.n. ; 경기 : Hwayaksan, 2. Sept. 1979, W.T.Lee s.n. ; Kwannug, 12. June. 1954, T.K.Joo s.n. (SKK) ; Mt. Myoungji, 15. July. 1963, W.H.Lee s.n. ; Myongisan, 5. Aug. 1994, S.J.Park s.n. (KUS) ; Soyosan, 6. July. 1982; G.H.Song s.n. ; Soyosan, 11. Sept. 1960, Y.J.Oh s.n. (SKK) ; **Kyungbuk** : Kayasan, 25. Aug. 1971, W.T.Lee s.n. ; Ullung, 11. Aug. 1989, Y. J. Cheorg s.n. (SKK) ; **Chungnam** : Weyondo, 2. Sept. 1977, W.T.Lee s.n.

*G. koreanum* var. *koreanum*. Komarov: **korea**; **Kangwon** : Kyeongsan, 9. Aug. 1991, S.T.Lee s.n. (JKK) ; Dutasan, 15. May. 1990, S.T.Kim s.n. (JKK) ; Bangdaesan, 17. Aug. 1995, S.J.Park s.n. (KUS) ; Samyungsan, Hyangrobong, 22. Aug. 1989 s.n. ; Samyungsan, 27. Sept. 1995 S.J.Park s.n. (KUS) ; Solaksan, 27. May, 1993 S.J.Park s.n. (KUS) ; Odaesan, 14. June. 1986, S.T.Lee s.n. (JKK) ; Odaesan, 29. Aug. 1975, W.T.Lee s.n. (GW) ; Odaesan, 3. Aug. 1972, W.T.Lee s.n. (GW) ; Chumbongsan, 24. June. 1987, S.T.Lee s.n. (SKK) ; Chunsung, Taeryongsan, 10. Aug. 1975, W.T.Lee s.n. (GW) ; Taebaeksan, 23. July. 1986, W.T.Lee s.n. (GW) ; Taebaeksan, 25. Aug. 1994 S.J.Park s.n. (KUS) ; Taebaeksan, 25. Aug. 1994, S.J.Park s.n. (KUS) ; Taebaeksan, 14. Sept. 1995, S.J.Park s.n. (KUS) ; **Kyunggi** : Soyosan, 5. June. 1960,

T.H.Chung s.n. (JKK) ; Suraksan, 12. Aug. 1993, S.J.Park s.n. (KUS) ; Suraksan, 18. Aug. 1994, S.J.Park s.n. (KUS) ; Shiheung Kujummul, 21. May. 1991, J.S.Kim s.n. (JKK) ; **Kyungbuk** : Sobaeksan, 4. July. 1990, Y.J.Chung s.n. (JKK) ; **Chungbuk** : Soyosan, 23. May 1959, W.T.Lee s.n. (KUS) ; Chiaksan, 29. July. 1975, W.T.Lee s.n. (GW)

*G. koeanum* var. *hirsutum* Nakai: **Korea**; **Chunnam** : Jirisan, 5. Sept. 1993, S.J. Park s.n. (KUS) ; Jirisan, 13. Aug. 1994, S.J. Park s.n. (KUS) ; Jirisan, 30. July 1995, S.J.Park s.n. (KUS) ; Jirisan, 5. Aug. 1995, S.J.Park s.n. (KUS) ; Jirisan, 30. Sept. 1995, S.J. Park s.n. (KUS)

*G. kramerii* Franchet: **Korea**; ? : Jinnampo, Aug. 1906. Faurie 8. (BM) ; **Kyunggi** : Kanghwa, Kyodongdo, 29. Sept. 1991, S.J.Park s.n. (KUS) ; Kanghwa Kyodongdo. 7. Sept. 1994, S.J.Park s.n. (KUS) ; Soyosan, 11. Sept. 1960, C.K.Lee s.n. (SKK) ; Chungkyesan, 18. Sept. 1977, W.T.Lee s.n. (GW) ; Hwasung, Masanpo, 12. Sept. 1987 Y.J.Chung s.n. (SKK) ; **Kyungbuk** : Kayasan, 3. Sept. 1991. W.T.Lee s.n. (GW) ; Pungsan, Koduk, 10. Aug. 1959, S.T.Lee s.n. (SKK) ; **Seoul** : Guanaksan, 5. ? 1982, Y.J.Cho s.n. (SKK) ; **Chungbuk** : Kyesangun Kunjasan, 14. Aug. 1959, W.T.Lee s.n. (SKK) ; Chopyung, 13. Aug. 1960, W.T.Lee s.n. (SKK) ; **China** ; **Jiangsu** : Lian yun gang, 19. Sept. 1981. K.Yao 8345 (NY) ; **kirin** : ?, 7. Sept. 1950, ? 2377 (PE) ; ?, 13. July. 1896 V. Komarov 994 (BM) ; ?, Aug. 1987, Pierre Lobza s.n. (NY) ; **Peking** : ?, 13. July. 1917, E. Licent 3139 (BM) ; **Shantung** : ?, 4. Aug. 1936 T.Y.cheo & L.Yen 310 (BM) ; **Japan** ; ? : ?, 1879. C. Maries (BM) ; ? , Aug. 1887, Jame Bisset 4339 (BM) ; **Nagano** : Mt.kirigamine, Aug. 1951, Shigetaka Suzuki s.n. (CU) ; **Hokkaido** : Nemuro Yezo, Sept. 1904, U.Faurie 6151 (BM) ; **kanagawa** : ?, 6. July. 1879, James Bisset 1494 (BM) ; Yokohama, ? ,milne (BM) ; **Kochi** : Nobeyama, 15. Aug. 1955, M.Togasi 1206 (NY) ; **Nanokawa** : Tosa, 4. Aug. 1888, K Watanabe s.n. (GH) ; **Shimoosa** : ?, 12. Sept. 1945, M.Hiroe 1258 (CU) ; **Shiga** : Mt. Ibuki, 18. Aug. 1962. M.Hiroe. 16561, 16528 (CU) ; **Shinano** : Mt. Ontake. 11. Aug. 1911, J. Nakai s.n. (BM) ; **Nepal** ; **Kashmir** : N.W. Himalaya, 10-15 July. 1912-13, R-R Stewart 395a (NY)

*G. lucidum* L. : **U.S.A**; **Virginia** : Loudoun Co., 17 May 1953, H.A. Allard 21378 (BH) ; **Washington** : ?, 9 May 1896, J.B. Fillett s.n. (BH) ; ? : ? , 14 May 1958, ? s.n. (PE) ; ? , 18 June 1964, ? s.n. (PE) ; ? , <Photo> Sheet no. 858.78, 858.75 (BH) ; ? , Cult. gard of Jiangsu Bot. Inst., 7 May 1985, S. Tang 054 (NY) ; ? , Fla. Leon Co., Jalahassee, 26 April 1936, L.H. Macdaniels s.n. (BH) ; ? , Franklin Co., N.C., 10 Chattahoochee National Forest, 17 May 1982, S.A. Spongberg & D.E. Boufford 1794 (BM) ; ? , Jene 1874, Chas E. Bennett s.n. (BH) ; ? , May 1887. ? s.n. (BH) ; ? , Montgomery Co., 23 April 1941, O.L. Justice 189 (BH) ; ? , N. C., Madison Co, City of Hot Springs, 18 May 1974, D.E. Boufford 13179 (GH) ; ? , Raleigh, Wake Co., N.C., 20 May 1937, R.K. Godfrey s.n. (GH) ; ? , Taras, Brownswile, 3 May 1925. ? s.n. (BH)

*G. napuligerum* Franchet : **China**; **Kiukiang** : lungtaahmuru, 9 Aug. 1938, ? s.n. ; **Tibet** : E. Tibet, ? 1980. G. Forrest s.n. ; **Szechwan** : ? , 18 July 1931, Redung s.n. ; **Yunnan** : ?, 17 Aug. 1922, Lan Kong s.n. ; **Yunnan**, 27 Aug. 1886, Yen Tze Hay s.n. ; **Yunnan**, 9 Aug 1938, Yu s.n. ; ? : ? , 26 Aug. 1913, R.E. Cooper s.n.

*G. nepalense* var. *nepalense*. **Korea**; **Kangwon** : Kariwangsan, Changgumokigol, 9. Aug. 1990, Y.J.Chung, J.H.Lee, S.T.Kim 15753, Myulwonli (Kilum)Kilga, 16. Aug. 1991, Y.J.Chung, S.W.Park 7576T (SKK) ; Samyungsan, 12. Aug. 1994, S.J.Park s.n. (KUS) ; Taekisan, 29. July. 1976. W.T.Lee. s.n. (GW) ; Taebaeksan, 19. July. 1993, S.J.Park s.n. (KUS) ; Taebaeksan, 19. July. 1993, S.J.Park s.n. (KUS) ; Taebaeksan, 20. July. 1993, S.J.Park s.n. (KUS) ; **Kyunggi** : Tobongsan, 20. Aug. 1955, T.H.Chung 15645, Myungjisan, 31. Aug. 1994, S.J.Park s.n. (KUS) ; **Chuklyungsan**, 16. Aug. 1980. Y.J.Oh s.n. (BH) ; **Chuklyungsan**, 16. Aug. 1980. Y.J.Oh s.n. (BH) ; **Inchon** : Dukjukdo, 10. sept. 1982. C.Lee s.n. (GW) ; **Yungjongdo**, 1. Oct. 1983, W.T.Lee s.n. (GW) ; **Yungjongdo**, 1. Oct. 1983, W.T.Lee s.n. (GW) ; **Kyungbuk** : Yasan, 31. Aug. 1994, S.J.Park s.n. (KUS) ; **Seoul** : Chungreung, 13. Aug. 1961, T.H.Chung

*Geranium* (Geraniaceae)의 종자산포형태에 따른 형태학적 연구

15636, Chungreung, 13. Aug. 1961, T.H.Chung 15637: Austria ; ?, J.Kerner s.n. (BH) ; ?, 29. Aug. 1932. ?, B.M.047158: Canada ; ?, 10, Aug. 1942, James Kucyniak s.n. (BH): China ; ? ; ?, 16. Sept. 1989, S.L.Liu 890043 (GH) ; ?, ?, J.C.Liu Uni. California ; ? Ho Lan Shan Mountains 1.Sept.1923. R.C.CHING s.n. (NY) ; Kwan Tso Ling 17. Aug. 1927. J.C.Liu s.n. (U.C) ; P.U.M.C.cultivated, 13. Oct. 1928, J.C.Liu s.n. (BH) ; P.U.M.C. 10. July. 1928, J.C.Liu Uni. of California ; Po Hua Shan, Hillside, 3. Aug. 1927, J.C. Liu s.n. (GW) ; Po Hua Shan, hillside 3. Aug. 1927, J.C.Liu s.n. (U.C) ; **Chekang** ; ?, Ren-chang ching 2342 (CU) ; **Chui-Hio-Louen** ; ? ; Sept. 1897, Jos. Giraldi, s.n. (GW) ; **Foochow** ; ? 18. April. 1925 H.H.Chung s.n. (GW) ; **Fu-ling-hsien** ; ? 5. Oct. 1925, T.F. Li s.n. (GW) ; **Hsian** ; Wu. Tal Shan 28. July. 1927, J.C.Liu Uni. of California ; **Hupch** ; ? 5. Feb. 1934, Ho-Ch'ang Chow. s.n. (NY) ; ? ; ? ; s.n. (NY) ; chihli, ? J.C.Liu, 1864 s.n. (CU) ; Pohuashan, 17. July. 1930, W.Y.Hsia s.n. (NY) ; Shenlung.kai 1976, K.S.Chow s.n. (NY) ; Shenlungkai, 1976, K.S. Chow, s.n. (76031) Arnold Aboretum ; **kiangsi** ; Kuling 8. July. 1917, L. H. Bailey s.n. (BHi) ; **Kih Shan** ; S. Nanking, 25. Aug. 1928, Y.L. King s.n. (GW) ; Nanking, 25. Aug. 1928 Y. L. King s.n. (U.C) ; **Kuan** ; Tso Ling, 17. Aug. 1927, J.C. Liu s.n. (GW) ; **Kwoh Chingsze** ; Tientai Shan, July-Aug. 1927 C.Y Chiao s.n. (U.C) ; Tientai Shan, July-Aug. 1927, C.Y. Chiac s.n. (GW) ; **Liang Feng** ; Yah Tsunyi Hsien 125 July. 1931, Albert N.Steward et al s.n. (NY) ; **LuShan** ; ? ; 22. July-Aug. A.N. Steward s.n. (GW) ; ? 18. July. 122 A.N.Steward(U.C) ; **kilin** ; Rhingan mts. Near ste. Rhingan. 17. Aug. 1902. P.Litoinov. s.n. (NY) ; **Ming Sha Tung** ; LaoShan, 14. Aug. 1930, Chiao s.n. (GW) ; Lao Shan. 14. Aug. 1930. C.Y. CHIAO s.n. (NY) ; **Shansi** ; ? 30. July. 1925, K. Ling 9419 (CU) ; ? 20. VII 1914, E.Licent 244 (BM) ; **Shennangjia** ; Forest District 17. Sept. 1980, B. Bartholomew et al s.n. (76031) ; **Shiao** ; Wu Tai Shan, 28. July. 1927, J.C. Liu, Univ. of California ; **Szechwan** ; ? 10. Aug. 1940, T. C. Lee 3243 (GH) ; ? 2. Apr 1941, W. P. Fang 16056 (GH) ; ? 3. April. 1942, C.L.Chow 5742 (GH) ; ? 1928, W. P. Fang 1393 (NYBG) ; ? 1928, W.P.Fang 834 (NY) ; Guan Xian, Jushouhemantan. 21. July. 1987 Wang - Zhong-tao etc. s.n. (NY) ; Guan Xian, Jushouhemantan 21. July. 1987, Cao Zi-yu, Arnold Aboretum ; Guan Xian, Longchi 1.Aug.1987. Wang Zhong-tao etc. s.n. (NY) ; S. szechwan. Kaushushan, Oct. 1932, T.F.Rock 24486 (NY) ; S.W.szechwan, may-June. 1932, T.F.Rock 23766 (NY) ; **Tibet** ; lhasa, 22. July. 1942, Ludloul Sherriff, no. 8816 Arnold Aboretum ; Lhasa 22/7/42 Ludlow&Sherriff. BM.47113 ; **Tung** ; TSA, 21. July. 1924, Co., Lee, Uni.of California ; **Yunnan** ; ? June. 1922, J.F.Rock 4789 (CU) ; E. of Wei Hsi, 23. VI 1922 J.W.C.J. Gregory s.n. (BM) ; Li-Jiang, 18. Aug. 1990, J.Murata 637 (GH) ; Lan-ping Hsien 17. Aug. 1933 P.F.Yeo. Arnold Aboretum.: **Germany** ; **Bayem** ; Schutzplätze bei Bamberg, 15. Aug. 1912. K. Harz. Uni. Reading ; Schutzplätze bei Bamberg 15. Aug. 1912. X. Harz. s.n. (BHi) ; **India** ; ? ; s.n. (NY) ; **Assam** ; ? ; 2d-30 sept. 1950, Thakur Rup eland 3742 (CU) ; **Kashmir** ; Baltistan 21. June. 1940, R. R. Stewart s.n. (NY) ; Baltistan 3. Aug. 1940 R.R.Stewart s.n. (NY) ; Baltistan 20. Aug. 1940, R. R. Stewart. s.n. (NY) ; godai Chillane gilgitRd. 25. Aug. 1939, R.R.Stewart. s.n. (NY) ; W. Himalaya, ? ; ? s.n. (CU) ; Skardu, Baltistan 5. Aug. 1940, R. R. Stewart. s.n. (NY) ; **Kerala** ; ? ; 3. Nov. 1980, Clifford G. Rice 187 (NY) ; **Madras** ; Madura, 2. April. 1914, ? s.n. (CU) ; **Timor** ; ? ; ? 2272 (NY) ; **Indochina** ; ? ; April. 1925, A. Petelof s.n. (NY) ; **Japan** ; ? ; ? 26. Oct. 1924, T.Tanaka 98 (CU) ; ? ; Aug. 1897, V.Faurie 550 (CU) ; ? ; Sept. 1904. V.Faurie 6151 (CU) ; **Fugushima** ; Samnai-gan, 27. July. 1955, Miyoshi Furuse s.n. (GW) ; Samnai-gan. 27. July. 1955, Miyoshi Furuse s.n. (UC) ; **Gifu** ; ? ; 13. Aug. 1957, M. Hiroe 12615 (CU) ; **Hakodate** ; ? ; 1861, Dr. Albrecht s.n. (NY) ; **Hokkaido** ; Nagano, Mt. kirigamine, Aug. 1951, Shigetaka Suzaki s.n. (CU) ; Nagano, ? ; 6. Aug. 1924, kotobaki I chickwa 221 (CU) ; Nemuro-shi to Hanasaki, 9. Sept. 1965 N.Naruhashi s.n. (NYG) ; Mursu, 18. Jun 1955, Miyoshi: Furuse s.n. (CU) ; Mt. Rishiri, 25. Aug. 1952, M. Hiroe 7513 (CU) ; ishikari, Sapporo, 21. Aug. 1981, H. Takahashi 1670 (CU) ; Shiga, 23. Sept. 1960, M. Hiroe 14696 (CU) ; ? ; 9. Sept. 1965, N. Naruhashi, Uni. of California s.n. (NY) ; Sapporo, June. 1880, K. Miyabe s.n. (NY) ; Sapporo. July. 1887, ? s.n. (GW) ; S.Hokkaido, ? 1884, W.P.Brooks 430 (CU) ; **Iwate** ; Mt. Yakeishi, Aug. 1952, Shigetaka Suzaki s.n. (CU) ; **Kushiro** ; Kawakami-gun, Shibecha-machi Kayanuma.

18. July, 1981, H.Takahashi s.n. (NY) ; **kagoshima** ; ? 26. Aug. 1924, Tyôzaburô Tanaka 30. (CU) ; **Musashi** ; koshigaya 10. Sept. 1950, J.Ohwi 93 (CU) ; **Kuriles** ; Ins.Shikotanzaki Sept, 3, 1931, J.Ohwi s.n. (BH) ; **Miyagi** ; 4. Oct. 1988, Hazime kobayashi 158 (GH) ; E.of Mt. Ryungadake, 29. Aug. 1989, Hazime kobayashi 298 (GH) ; Tamatsukurigun, 24. Sept. 1992, Junji Kamon s.n. (GH) ; **Nagasaki** ; ? ; 1863, ? s.n. (NY) ; **Oosaka** ; Takayama, 11. Oct. 1963, Y. Inamasu 135 (NY) ; **Kauagawa** ; ? ; 7. Oct. 1951, Shigetaka Suzuki s.n. (CU) ; **Kyoto** ; 10. Sept. 1965, F. Konta 5478 (NY) ; Mt. Daimonji, 2. Oct. 1963, M. Hiroe 16313 (CU) ; **Sendai** ; ? ; 20. Sept. 1926, Lisiba s.n. (CU) ; ? 20. Sept. 1926, Lisiba s.n. (CU) ; **Shizuoka** ; Fujinomiya-shi, 6. Oct. 1990, Y. Tateishi 16163 (GH) ; **Shorobeshi** ; Yezo, 25. July. 1955, Miyoshi Furune s.n. (CU) ; Yezo, Sept. 1904, U. Faurice 6152 (CU) ; Yezo in Hebidismoei, Sept. 1904, O. Faurie s.n. (GW) ; Nishiwada in Nemuro, Oct. 11. 1931, J.Ohwi s.n. (BH) ; **Tokyo** ; ? ; Sept. 1926, ? s.n. (CU) ; **Ubashiri** ; ? ; July. 1929, P.H.Dorsett 649 (NY) ; **Ugo** ; ? ; Sept. 1900, ? s.n. (NY) ; **Yakusima** ; ? ; 6. Sept. 1926, G. Masamune s.n. (NY) ; **Yamaguchi** ; ? ; 1. Aug. 1954, Leopold A.charette 1847 (CU) ; **Yokohama** ; 30. Aug. 1876, James Bisset 1473 (BM) ; **Kuba** ; Kyzyl-kaja et Sehach-dagh, 17. Aug. 1935 Ikarjagin s.n. (NY) ; **Mongolia** ; **Baga Bogdo** ; Altai Mts, 22. June. 1925, R.W. Chaney s.n. (GW) ; Altai Mts gun. 22.1925. R.W.CHANEY s.n. (U.C) ; **Kaigan** ; Champei to 25. Aug. 1938 J.Ohwi s.n. (BH) ; **Ulan** ; Bator and Vicinity, 30. July. 1970, C. Jeffrey Harold Univ., Arnold Aboretum Nepa ; Godavari, 30. Mar. 1962, D. D. Bhatt 131 (CU) ; Godavari, 5. Apr. 1963, D. D. Bhatt 319 (CU) ; Kuriya Gaon, 25. Apr. 1958, D. D. Bhatt 85 (CU) ; **Phillim**, 19. Sept. 1953, Pbs 386 (BM) ; Wabak khola, 20. Oct. 1975, L. W. Bear 25624 (BM) ; Western Himalaya Nima, Ladak, Kashmir, Along - Stream. 26. Aug. 1931 (NY)

**G. nepalens var. thunbergii** (Sieb. et Zucc.) Kudo: Korea; **Kangwon** ; Karisan, 2. Oct. 1977, W.T.Lee s.n. (GW) ; Kongjaksan. 4. Sept. 1979, W.T.Lee s.n. (GW) ; Gongjaksan, 4. Sept. 1979, W.T.Lee s.n. (GW) ; Kunjajon, Kunjabong, 18. July. 1982, S.P.Hong s.n. (SKK) ; Kunjajon, Kunjabong, 2. Oct. 1981, S.T.Lee s.n. (SKK) ; Taeryongsan, 27. Sept. 1986, W.T.Lee s.n. (GW) ; Yangyang, Gongsujunli, 25. July. 1987, W.T.Lee s.n. (GW) ; Yangyang, Naksunsa, 31. Aug. 1972, W.T.Lee s.n. (GW) ; Wonju, Sulimji, 19. Sept. 1976, W.T.Lee s.n. (GW) ; Wonju, Chiaksan, 29. July. 1975, W.T.Lee s.n. (GW) ; Chunsung, Taeryongsan, 8. Oct. 1975, W.T.Lee s.n. (GW) ; **Kyungi** ; Kapyung, 13. Aug. 1972, W.T.Lee s.n. (GW) ; Kuangrueng, 14. Oct. 1954, T.H.Chung s.n. (SKK) ; Kuangreung, 4. Oct. 1954, T.H.Chung s.n. (SKK) ; Taamsan, 16. Aug. 1985, W.K.Baek s.n. (GW) ; Tobongsan, 20. Aug. 1955, W.T.Lee s.n. (SKK) ; Tobongsan, 20. Aug. 1955, T.H.Chung s.n. (SKK) ; Tobongsan, 21. Oct. 1959, W.T.Lee s.n. (SKK) ; Boguangsa, 6. June. 1981, S.W.Cho, S.H.Choi s.n. (SKK) ; Siheungsi, Kujummul, 21. May. 1991, S.M.Oh s.n. (SKK) ; Yongmunsan, 29. July. 1955, T.H.Chung s.n. (SKK) ; Chunggyesan 17. Sept. 1977, W.T.Lee s.n. (GW) ; **Kyungnam** ; Kumundo, 7. Aug. 1965, T.H.Chung s.n. (SKK) ; Namhaedo, 13. Aug. 1955, T.H.Chung s.n. (SKK) ; Shinbulsan, 12. Aug. 1977, C.Lee s.n. (GW) ; Tongyung, Yokjido, 10. Aug. 1977, W.T.Lee s.n. (GW) ; Hapchon, Kayasan, 25. Aug. 1971, W.T.Lee s.n. (GW) ; **Kyungbuk** ; Ilwolsan, 24. Oct. 1961, W.C.Lee s.n. (SKK) ; **Seoul** ; Chungreung, 13. Aug. 1961, T.H.Chung s.n. (SKK) ; Chungreung, 13. Oct. 1961, T.H.Chung s.n. (SKK) ; **Inchon** ; Yungjongdo, 2. Aug. 1983, W.T.Lee s.n. (GW) ; **Chunnam** ; Koheung, Palyungsan, 19. Aug. 1976, W.T.Lee s.n. (GW) ; Muju, Manjujisan, 11. Aug. 1976, W.T.Lee s.n. (GW) ; Kunjado, 27Aug. 1976, W.T.Lee s.n. (GW) ; Jindo, 1. Aug. 1956, T.H.Chung s.n. (SKK) ; Jindo. Yoguian, 15. Aug. 1986, S.T.Lee s.n. (SKK) ; **Chunbuk** ; Donyousan, 22. July. 1988, Y.J.Chung s.n. (SKK) ; Muju, Dukyousan, 3. Aug. 1959, T.H.Chung s.n. (SKK) ; Biando, 23. Oct. 1958, C.D.Lee s.n. (SKK) ; **Cheju** ; Hallasan, 25. July. 1960, T.H.Chung s.n. (SKK) ; Hallasan, 9. Nov. 1964, W.T.Lee s.n. (SKK) ; Sangchuja, 27. July. 1964, W.T.Lee s.n. (SKK) ; Hallasan, 12. Nov. 1964, W.T.Lee s.n. (SKK) ; **Chungnam** ; ? ; 31. July. 1963, T.H.Chung, W.T.Lee s.n. (SKK) ; Kaya, 24. Aug. 1956, T.H.Chung s.n. (SKK) ; Kyeryongsan, 3. Aug. 1957, T.H.Chung s.n. (SKK) ; Kyeryongsan, 20. July. 1979, W.T.Lee s.n.

(GW) ; Kyeryongsan, 3. Aug. 1957, T.H.Chung s.n. (SKK) ; Taedunsan, 20. Aug. 1960, S.H.Park s.n. (SKK) ; Anmyundo, 20. Aug. 1956, T.H.Chung s.n. (SKK) ; Anmyundo, 30. July. 1963, T.H.Chung s.n. (SKK) ; Chilkapsan, 26. July. 1979, W.T.Lee s.n. (GW) ; **Chungbuk** : Sokrisan, 13. Aug. 1959, W.T.Lee s.n. (SKK) ; Sokrisan, 23. May. 1959, W.T.Lee s.n. (SKK) ; Sokrisan, 7. Aug. 1959, W.T.Lee s.n. (SKK) ; Jinchon, Manrisan, 30. July. 1977, W.T.Lee s.n. (GW) ; Taechon, Chopyungri, 26. Aug. 1983, S.T.Lee s.n. (SKK) ; ?, Papyungsan, 24. Aug. 1960, T.H.Chung s.n. (SKK) ; **China** ; **Hunan** : ?, 12. Nov. 1935, C.S. Fan & Y.Y. Li 462 (BM) ; **Kiangsi** : 6. Oct. 1958, ? s.n. (PE) ; **Szechwan** : GuanXian, 21. July. 1987, Wang Zhong-tao 870011 (NY) ; GuanXian, 21. July. 1987, Wang Zhong-tao 870026 (NY) ; ?. 4. June. 1936, K.L. Chu 2645 (BM) ; **Yunnan** : W-Yunnan, April-V 1906, ? s.n. (BM) ; **India** ; **Kashmir** : N-W. Himalaya, Pahlgam, 27. July. 1920, R.R. & T.D. Stewart 5601a (NY) ; N.W. Himalaya, Aug. 1939, R.R. Stewart s.n. (NY) ; Pahlgam, Aug. 1927, R.R. Stewart 13345 (NY) ; N.W. Himalaya, Pahlgam, July. 1925, R.R. Stewart 13332 (BH) ; ?, 2. July. 1892, J.F. Duthie s.n. (BM) ; ?, 18. July. 1940, R.R. Stewart 19467 (NY) ; ?, 4. Aug. 1917, R.R. Stewart 3215 (BH) ; **Khajjar** : Chamba State, 12. July. 1936, W. Koelz 8868 (NY) ; **Punjab** : ?, 14. July. 1918, R.R. Stewart 3813 (BH) ; ?, 17. May. 1917, R.R. Stewart 1868 (NY) ; ?, 19. May. 1917, R.R. Stewart 1911 (BH) ; N.W. Himalaya, Sept. 1913, R.R. Stewart 394a (NY) ; N.W. India, Bashar State, 2-8 Nov. 1933, Walter Koelz 7433 (NY) ; N.W. India, Kangra, July. 1930, Walter Koelz 1479 (NY) ; N.W. India, Kangra, 25. May. 1933, Walter Koelz 4637 (NY) ; **Japan** ; **Hakodate** : ?, 1861, Maximowicz s.n. (BM) ; **Iwaki** : Nakamura-machi, 3. Oct. 1937, M. Hayashi C s.n. (BH) ; **Kyoto** : Ky650 City, 19. Sept. 1984, D.E. Boufford & H. Koyama 23524 (BM) ; **Magasaki** : ?, 1863, Maximowicz s.n. (BM) ; **Musashi** : Koshigaya, 10. Sept. 1950, J. Ohwi s.n. (BH) ; **Rikuzen** : ?, 22. Aug. 1979, H. Takahashi 662 (NY) ; **Toyama** : ?, 3. Sept. 1991, J. Jutila & H. Fujino 746 (NY) ; **Wusashi** : Koshigaya, 10. Sept. 1950, J. Ohwi 93 (NY) ; **Yezo** : Nemuro, 10. Sept. 1931, J. Ohwi s.n. (BH) ; ?, Sept. 1904, U.Faurze 6152 (BM) ; **Nepal** : ?, 1821, ? s.n. (NY) ; W-Nepal, 27. April. 1927, Biskaru 319 (NY) ; **Taiwan** ; Chia-yi Co., 15. Oct. 1958, M.T. Kao 3328 (BH) ; Chiayi Co., Ali-Shan to Chu-Shan, 12. Aug. 1969, Chang-Son Kuo K 80396 (TAI) ; Yi Lau Co., Chi-li-ling to Nan-bu-shan-chuang, 21. Aug. 1969, Chien-chAug. Hsu 5899 (TAI) ; **Chi'ai Hsien** : Mt. Alishan, 10. Aug. 1969, Y.Ando et al 477 (GH) ; **Nantou** : Mayfong, 13. June. 1980, M.T. Kao 9475 (TAI) ; **Taipei** : Tsutzuhu, 19. Oct. 1982, M.T. Kao 10235 (TAI) ;

**G. orientaliibeticum Knuth** : **Russia** ; Siberia, 14. Aug. 1899, ? 237 (NYBG) ; U.S.A. : **New York** : Cultivated of N.Y., 29. July. 1973, W.J. Dress 10729 (BH) ; Cultivated of New York, 12. July. 1961, W.J. Dress 8460C (BH) ; **United Kingdom** : Cultivated at Kew, 18. Aug. 1975, W.T. Stearn s.n. (BH) ; Cultivated From: **India**, 13. Sept. 1966, F.G. Meyer s.n. (BH) ; Taiching Co., 5. Aug. 1959, T.I. Chuang et al 2631 (BH)

**G. palustre L.** : **Austria** ; Nr. Rinn, Innsbruck, 13. Sept. 1961, Kbn s.n. (R) ; **Bulgaria** ; **Borovets** : Rila Mountains, 25. July. 1990, H. J. M. Bowen s.n. (R) ; **Sofia** : Rila Planina, Musala, 28. July. 1985, M. F. & S. G Gardner s.n. (R) ; Rila Plannina, Musdla, 28. July. 1985, M. F. & S. G. Gardner s.n. (BM)

**G. regelii Nevski** : **Cecho** ; **Bohemia** : Centralis, Die. 1. ? 1948, J. Nitka s.n. ; **Denmark** ; East of Humlebjerget, Haraldsted S0, Ringsted, 19. June. 1969, Jeffe. Svendsen ; **France** ; Maritime Alps, Berre Des Alpes, 28. June. 1910, Geo. F. Atkinson ;

**G. polyonanthum Franchet** : **Nepal** ; Mt. Jorakot, Bheri Rwer, 10. July. 1952, O. Po. Lunain, W. R. Sykes & L. H. J. Williams s.n. (BM) ; **Sweden** ; Skane, Ringsiotrakten, Pinedalen, ? July. 1884, H. Thedehiw: U.S.S.R. ; ?, 29. July. 1964, B. heprdee s.n.

**G. pratense L.** : **Canada** ; **Newfoundland** : Labrador, 30. July. 1950, J. M. Gillett & W. I. Findlay 5528 (GH) ; Newfoundland coast, 17. Aug. 1903, J. D. Somborger s.n. (GH) ; Newfoundland coast, 20. July. 1937,

Betty Natt Brooks s.n. (GH) ; **Quebec** : ?, 27. July. 1905, J. R. Churchill s.n. (BM) ; Montreal, 25. June. 1935, E. Roy 3654 (BH) ; **Checho** ; **Bohemia** : **Bohemia centralis**, 14. Aug. 1958, J. Nitka 39 (BM) ; ?, M. Bresova, K. J. Hejna 13278 : **China** ; ?, E. H. Wilson 3301 (BM) ; **China**, **Hopei** : Chihli, ? 1853, J. C. Liu 1853 (CU) ; Hsao Wu Tai Shan, 7. July. 1936 Wu et Yang s.n. (PE) ; Hsiao Wu Tai shan, 7 Aug. 1928, J. C. Liu, 1853 (NY) ;

**G. pseudosibiricum Mayer** : **China** ; Sinkiang : ?, 20. Apr 1957, ? s.n. (PE) ; **India** ; **Kashmir** : Shigar, Baltistan, 8-9 Aug. 1940, R. P. Stewart 20514 (NY) ; Baltistan, 12. Aug. 1936, Walter Koelz 9611 (NY) **Japan** ; **Kanagawa** : Oct. 1886, James Bisset s.n. (BM) ; **Russia** ; **Siberia** : Eastern Siberia, Porv. Krasnojarsk, 3. July. 1903, ? s.n. (BM) ; Altaj, 1911, ? s.n. (NY) ; Irkutsk Prov. 25. June. 1908, A. Kryschtowitsch s.n. (CU) ; Krasnojarsk, 3. July. 1903, ? s.n. (NY) ; Kransnojabk, 12. May. 1919, A. P. Formolaeu s.n. (NYBG) ; Erissejsk, 31. May. 1928, V. Reverdatto s.n. (NY) ; **Soviet central Asia** : ?, 1. July 1908. R. J. Roshevitz 856 (BM)

**G. pusillum L.** **Russia** ; Hills Eof Slavyanka, 20. July. 1988, Thomas S.Elias. s.n. (NY) ; U.S.A. : ?, ? 18 · X · 50. ?, (BH) ; **Connecticut** : Litchfield country, 3. Aug. 1980, Rosa Porges s.n. (BH) ; **New Yrk** : Gneeve Country, Platt Clove 25. Aug. 1986, R.S.Mitchell s.n. (BH) ; Annacina 1867. ?, New York Botanical Garden ; Hortorium garden, Ithaca. 15. Aug. 1970, W. J. Dress Cornell uni ; ulster country, vic of Peekamoose, Town of Denning 26. Aug. 1985, KLB & Phil Caswell s.n. (BH) ; **Pennsylvania** : Centne · Country, 11. Sept. 1942, H.A.Wahl. s.n. (BH) **United Kingdom** ; Cultivated, Barenhurst, Kent, 12. 1978, M.C. Foster s.n. (BM) ; Cultivated from China at Berkeley, 23. Sept. 1905, Ro D. Jones s.n. (CU) ? ; ?, 1758, ? 27586 (BM) ; ?, Aug. 1881, A.H.q.V.F. Brotherus. 47015 (BM) ; ?, ? 1881, ? 47190 (BM) ; ?, ? 30. Aug. 1910, Blagowjeschtscensk, 1906, F. Karo s.n. (GW) ; ?, Ceylon, hakgala garden. 9. Aug. 1970, M.D. Dassanayake 185 D (NY) ; ?, Ctabpo Hallyrax. 12. July. 1906, s.n. (NY) ; ?, I.Akinfiev ; ?, Irkutsk prov.j vheriu. 26. July. 1906 (NY)

**G. pylozowianum Max.** **China** ; **Kansu** : Lichen, 4-8 July. 1923. R. C. Ching 396 (NY) ; S. W. Kansu, Tao riverbasin, July. 1925, J. F. Rock 14216 (NY) ; S. W. Kausu, July. 1925, T. F. Rock 12855 (GH)

**G. refractum Edgew. et Hook** : **China**, Qinghai, ? 1971, ? ; **Szechwan**, 13 July 1914, Zwischen s.n. (GH) ; **Yunnan**, July 1935, Wang s.n. (GH) ; 7 Aug. 1914, Mazzetti s.n. (GH) ; 27 July 1922, Gregory s.n. (GH) ; 27 Aug. 1938, Yu s.n. (GH) ; 19 Aug. 1938, Yu s.n. (GH) ; 14 July 1937, Yen s.n. (P) ; 11 ? 1938, Mo So Yn, Fang Yang Tchang s.n. (GH)

**G. sibiricum L.** : **Korea** ; **Kangwon** : Kariwangsan, 9 Aug. 1990, Y.J.Chung s.n. (SKK) ; Kariwangsan Changgumokigol. 9. Aug. 1990, Y.J.Chung, J.H.Lee, S.T.Kim. s.n. (SKK) ; Taeguanyung, 20. Aug. 1959, C.K.Kim s.n. (SKK) ; Myulwonri(Kileum), 16. Aug. 1991, Y.J.Chung s.n. (SKK) ; Myulwonri Kileum. 16. Aug. 1991, Y.J.Chung, S.W.Park. s.n. (SKK) ; Myulwonri, Kileum, 16. Aug. 1991, Y.J.Chung, S.W.Park s.n. (SKK) ; Myungju, Okkye, 20. July. 1977, W.T.Lee s.n. (GW) ; Myungju Okkye. 20. July. 1977, W.T.Lee. G.W.H. ; Samyungsan, 1. Sept. 1994, S.J.Park s.n. (KUS) ; Samyungsan, 30. Aug. 1994, S.J.Park s.n. (KUS) ; Solak, 31. July. 1962, T.H.Chung s.n. (SKK) ; Solaksan, 1. Aug. 1962, T.H.Chung s.n. (SKK) ; Solaksan, 26. July. 1990, W.T.Lee s.n. (GW) ; Solaksan. 26. July. 1990, W.T.Lee. G.W.H. ; Solaksan. 26. July. 1990, W.T.Lee. G.W.H. ; Sokyebangsan, 22. July. 1981, W.T.Lee s.n. (GW) ; Sokyebangsan. 22. July. 1981. W.T.Lee G.W.H. ; Yangu, Samyungsan, 10. Sept. 1977, W.T.Lee s.n. (GW) ; Yangu Samyungsan 10. Set. 1977, W.T.Lee G.W.H. ; Yonghwasan. 26. Aug. 1976, Y.B.Kil. G.W.H. ; Chulwon, Chunghyunri, 10. Aug. 1987, W.T.Lee s.n. (GW) ; Chulwon, Chunghyunri, 18. Aug. 1987, W.T.Lee s.n. (GW) ; Chulwon, Chunghyunri. 10. Aug. 1987, W.T.Lee. (GW) ; Chulwon, Chunghyunri 10. Aug. 1987, W.T.Lee G.W.H. ; Chunsung, Keumbyungsan, 4. Sept. 1977, S.Y.Oh s.n. (GW) ; Chunsung, Taeryongsan, 12. Aug. 1975, W.T.Lee s.n. (GW) ;



*Geranium* (Geraniaceae)의 종자산포형태에 따른 형태학적 연구

Chungung, Obongsan, 4. Sept. 1977, S.S.Song s.n. (GW) ; Chungung, Taedongsan, 12. Aug. 1935, W.T.Lee. (GW) ; Chungung Keumbyongsan, 4. Sept. 1977, S.Y.Oh. s.n. (GW) ; Chungung Obongsan, 7. Sept. 1977, S.S.Song. s.n. (GW) ; Chunchun, Samhaksan, 7. Aug. 1975, W.T.Lee s.n. (GW) ; Chunchun Samaksan, 7. Aug. 1975, W.T.Lee (GW) ; Taekisan, 29. July. 1976, W.T.Lee s.n. (GW) ; Taekisan, 29. July. 1976. W.T.Lee s.n. (GW) ; Taebaeksan, 25, Aug, 1994, S.J.Park s.n. (KUS) ; Taebaeksan, 25, Aug, 1994, S.J.Park s.n. (KUS) ; Hongchon, Kongjaksan, 11. Aug. 1977, K.M.Yun s.n. (GW) ; Hongchon, Kongjaksan 11. Aug. 1977, K.M.Yun. (GW) ; **Kyungi** : Gwangrung, 14. Oct. 1954, s.n. (SKK) ; Gwangrung, 14. Oct. 1954, T.H.Chung s.n. (SKK) ; Gwangrung 14. Oct. 1954, T.H.Chung s.n. (SKK) ; Ir.Dukjuk, 2. Aug. 1958, T.H.Chung. s.n. (SKK) ; Ir.Dukjuk, 2. Aug. 1958, T.H.Chung s.n. (SKK) ; Iri Ganghwa, 27. July. 1958, T.H.Chung s.n. (SKK) ; Mt.So'ga, 27. June. 1959, W.T.Lee s.n. (SKK) ; Mt. Seolak, 31. July. 1962, T.H.Chung. s.n. (SKK) ; Mt.Seolak, 1. Aug. 1962, T.H.Chung s.n. (SKK) ; Kanghwado, 27. July. 1958, T.H.Chung s.n. (SKK) ; Guangreung, 14. Oct. 1954, T.H.Chung s.n. (SKK) ; Dukjukdo, 20. Sept. 1982, W.T.Lee s.n. (GW) ; Dukjukdo, 2. Aug. 1958, T.H.Chung s.n. (SKK) ; Dukjukdo, 2. Aug. 1958, T.H.Chung s.n. (SKK) ; Myungjisan, 20, Aug, 1994, S.J.Park s.n. (KUS) ; Myungjisan, 20, Aug, 1994, S.J.Park s.n. (KUS) ; Soyosan, 27. June. 1957, W.T.Lee s.n. (SKK) ; Yongmasan, 26. Aug. 1976, Y.B.Kim s.n. (GW) ; Chonmasan, 25. June. 1959, T.H.Chung s.n. (SKK) ; Chukryungsan, 16. Aug. 1980, Y.J.Oh 206, 221 (BM) ; Chukryungsan, 16. Aug. 1980, Y.J.Oh 221 206 (BH) ; **Kyungbuk** : Kayasan, ? ; Ulungdo, 24. June. 1973, W.T.Lee s.n. (GW) ; Ulungdo, 24. July. 1973, W.T.Lee s.n. (GW) ; **Seoul** : Beewon 22. July. 1959, T.H.Chung s.n. (SKK) ; Chongmyo, 25. July. 1959, T.H.Chung. s.n. (SKK) ; Mt.Bukhan, 17. Sept. 1961, W.T.Lee s.n. (SKK) ; Bukhansan, 17. Sept. 1961, W.T.Lee s.n. (SKK) ; Biwon, 22. Junly 1957, T.H.Chung s.n. (SKK) ; **Inchon** : Yungjongdo, 1. Oct. 1983, W.T.Lee s.n. (GW) ; **Chungnam** : Mt.Geryoung, 3. Aug. 1957, T.H.Chung. s.n. (SKK) ; Mt.Geryoung, 3. Aug. 1957, T.H.Chung. s.n. (SKK) ; Mt. Tae-doon, 23. July. 1959, S.H.Park. s.n. (SKK) ; Kyeryongsan, 3. Aug. 1957, s.n. (SKK) ; Kyeryongsan, 3. Aug. 1957, T.H.Chung s.n. (SKK) ; Taedunsan, 23. July. 1959, S.H.Park s.n. (SKK) ; **Kyungnam** : helidis chuinampa Aug. 1908. Faurie BM s.n. (47048) ; Jinnampo, Aug. 1906, U. Faurie 580 (BM) ; **Kyungbuk** : kangkai, 7. Oct. 1910, ? s.n. (CU) ; Kangkye, 7. Oct. 1910, ? s.n. (CU) ; **Austria** : ? , J. Kerner s.n. (BH) ? , 29. Aug. 1932, Rechinger s.n. (BM) ; **Tirolia Orientalis**, 29. Aug. 1932, Rechinger s.n. (BM) ; **Canada** ; **Montreal** : Cultivated at Montreal, 10. Aug. 1942, James Kucyniak 3036-36 (BH) ; ? , 10. Aug. 1942, james kucyniak 3036-36 (BH) ; **China** : ? , 1928, W.P.Fang N.B.G. ; **Altai**, 4. IX 1931 , B.Schischkin et al s.n. (NY) ; **Jilin** : Changbaishan, alt.goom. about the house. 1981, Wan&Chow. s.n. (NY) ; Changbaikshan, alt.goom. 1981, Wan&Chow BM 47200 ; Changbaksan, ? , 1981, B.B. Wan& K.S. Chow 81111 (NYBG)(BM) ; **chekiang** : ? , July-Aug. 1927, C.Y.Chiao 14276 (CU) ; Tien Tai Shan, July-Aug. 1927, C.Y. Chiao 14276 (CU) ; **Dahuria** : ? , 1890, F. Karo 211 (CU) ; **Gebüsch** : Dahurical. Nertschinsk, in nassen. 1889, J.Freyne. BM.47086 ; **Foochow** : ? , 18. April. 1925, H.H.Chung 3157 (CU) ; **Fuhien** : ? , 18. April. 1925, H.H. Chung 3157 (CU) ; **Hanan** : ? , 8. May. 1914, ? s.n. (PE) ; **Honan** : ? , 8. May. 1954, ? 4273 (PE) ; **Hopeh** : Pohuashan, 17. July. 1930, W.Y. Hsia 2210 (NYBG) ; Hsiao Wu T'ai Shan, 29. Aug. 1929, J.C.Liu L.2354 (NyBG) ; Hsiao Wu T'ai Shan, 29. Aug. 1929, J.C. Liu L. 2354 (NYBG) ; Hpei, Hsiowutaishan, Aug. 1929, C.F. Li 10757 (NYBG) ; Pohuashan, 17. July. 1930, W.Y.Hsia 2110 (NyBG) ; chihli, 10. July. 1928, J.C.Liu, 1713 (CU) ; Chihli, 10. July. 1928, J.C. Liu 1713 (CU) ; ChihLi, 13. Oct.1928, J.C.Liu L2074 (BM) ; Chihli, 17. Aug. 1927, J.C.Liu LI220 (CU) ; Chihli, 30. Aug. 1927, J.C. Liu 1320 (CU) ; Chihli, 3. Aug. 1927, J.C.Liu LI098 (CU) ; Chihli, Aug. 1928, J.C.Liu LI726 (CU) ; Chihli, Fu-ling-Hsien, 5. Oct. 1925, T.F. Li 10867 (CU) ; Chihli, Hsiao Wu T'ai shan, 28. July. 1927, J.C.Liu L964 (CU) ; chihli, Nanking, 5. Oct. 1925, T.F.Li 10867 (CU) ; Chihli, 13. Oct. 1928, J.C. Liu L 2074 (BH) ; Chihli, 17. Aug. 1927, J.C. Liu 1220 (CU) ; Chihli, 3. Aug. 1927, J.C. Liu 1098 (CU) ; Chihli, 5. Aug. 1928, J.C. Liu 1726 (CU) ; Chihli, ? , J.C. Liu, L 964 (CU) ; **Patung Hsien**, 5. May. 1934, Ho-Chang Chow 61 (NY) ;

Haiowutaishan. Province Aug. 1929, C.F.Li. s.n.(NY) ; Shenlungkai, ? 1976. K. S. Chow 76031 (GH) ; **Hupei** : ? , 1885-88, A. Henry 1772 (NY) ; ? , Aug. 1885-88, Henry 2406 (BM) ; ? , 1895-88, A. Henry 1772 (NY) ; ? , Patung Hsien, 5. May. 1934, Ho-Ch'ang chow 61 (NY) ; Hupei, Shenjungkai, ? 1976, K.S. Chow 76031 (NY) ; Shenlungkai, ? 1976, K.S. Chow 76031 (GH) ; Shenlungkai, ? 1976, K.S.Chow 76031 (NY) ; **Kansu** : ? , 1. Sept.1923, R.C.Ching 1092 (NY) ; Ho Lan Shan, 1. Sept. 1923, R.C. Ching 1092 (NY) ; Kiangsi ; Kuling, 8. July. 1917, L.H.Bailey s.n. (BH) ; Kuling, 8. July. 1917, L.H. Bailey s.n. (BH) ; Lushan, 8July. 1922, A.N. Steward 2462 (CU) ; **Nanking** : ? , Aug. 1922, A.N.Steward 2462 (CU) ; **Kweichow** : ? , 25. July. 1931, A.N. Steward et al 79 (NY) ; ? , 25. July. 1931, Albert N.Steward et al 79 (NY) ; **Kilin** : W. Manshuria, 17. Aug. 1902, D.LitviNov. 677 (NY) ; W. Manshria, 17. Aug. 1902, ? 677 (NY) ; austro - orientalis 1860. ? BM 47120. ; ? , Aug. 1905 Ficarò 47089 ; ? , 4. Aug. 1896 V.Komaròv. N.B.G. ; ? , I. VII. 1903. J. LitviNov. 3032 (NY) ; ? , 1860, Maximowicz s.n. (BM) ; **Chimensis**, Kirin, 9. Aug. 1896, V. Komaro 990 (NY) ; Rossica, 1. July. 1905, F. Karo 990 (BM) ; ? , 1. July. 1903, ? 3032 (NY) ; **Nanking** : ? , Aug. 1928, Y.L.King 1905 (CU) ; ? , Aug. 1928, Y.L. king 1905 (CU) ; **Shansi** : ? , 29. July. 1914, E. Licont 524 (BM) ; ? , 21. July. 1924, C.O. Lee 5516 (CU) ; ? , 21. July. 1924, Co. O. Lee 5516 (CU) ; ? , 9. Oct. 1897, J. Giraldi s.n. (CU) ; ? , 11. May. 1959, ? s.n. (PE) ; ? , 11. May. 1959, ? 00159 (PE) ; ? , 9. Oct. 1897, ? s.n. (CU) ; Youngmongshan Makiapou 29. July. 1914 E.Licent.BM. 47107. ; **Shangtung** : ? , 14. Aug. 1930, C.Y.Chiao 2946 (NYBG) ; Lao shan, 14. Aug. 1930, C.Y.chiao 2946 (CU) ; Laoshan, 14. Aug. 1930, C.Y. Chiao 2946 (CU) ; Lao Shan, 14. Aug. 1930, C.Y. Chiao 2946 (NYBG) ; **Shennongjia** : Forest District, 17.Sep. 1980, B.Barthobruew et al, 1441 (GH) ; **Szechwan** : ? , 21. July. 1987, Wang Zhing-tao etc 870026 (GH) ; Guan Xian, 1. Aug. 1987, Wang Zhong-tao 870025 (NY) ; Guan Xian, 1. Aug. 1987, Wang Zhong-tao etc. 870302 (NY) ; Guan Xian, 21. July. 1987, Wang Zhong-tao etc. 870025 (NY) ; Guan Xian, 21. July. 1987, Wang Zhong-tao etc. 870026 (GH) ; Guan Xian, 21. July. 1987, Wang Zhong-tao 870302 (NY) ; **Tibet** : Lhasa, 22. July. 1942, Ludolw & Sherriff 8816 (BM) ; Lhasa, 22. July. 1942, Ludlow&Sherriff 8816 (GH) ; Lhasa, 22. July. 1942, Ludlow & Sherriff 8816 (GH) ; Himalaya, Ranavont. Swg 1967. T.E.Lancker & T.A.S. ; **Hungari** : ? July. 1900 Holulvg. BM 47083 ; **India** ; **Kashmir** : ? , 14. Aug. 1992, J.F. Duthie 12465 (BM) ; ? , 20. Aug. 1940, R.R. Stewart 20904 (NY) ; ? , 20. Aug. 1940, R.R. Stewart 20904 (NY) ; ? , 21. Aug. 1940, R.R. Stewart 20947 (NY) ; ? , 25. Aug. 1939, R.R. Stewart 18958 (NY) ; ? , 26. Aug. 1931, W. Koelz 2701 (NY) ; ? , 3. Aug. 1940, R.R. Stewart 20360 (NY) ; ? , 5. Aug. 1940, R.R.Stewart 20415 (NY) ; ? , 5. Aug. 1940, R.R. Stewart 20415 (NY) ; **Baltistan**, 21. Aug. 1940, R.R. Stewart 20947 (NY) ; **Baltistan**, 3. Aug. 1940, R.R. Stewart 20360 (NY) ; godai to Chillam, 25. Aug. 1939, R.R. Stewart 18958 ; **Ladak**, 26. August 1931, Walter Koelz 2701 (NY) ; Astor. Dayen in Astar Valley, 14-8-92 J.F.Duthie. BM 47042 ; **Punjab** : ? , 18. Aug. 1949, R.R.Stewart 23555 (NY) ; ? , 18. Aug. 1949, R.R. Stewart 23555 (NY) ; **Japan** ; **Kushiro** : ? , 18. July. 1981, H.takahashi 1188 (NY) ; **Nemuro** : ? , 9. Sept. 1965, N.Naruhashi 1148 (CU) ; ? , 4. Sept. 1965, N.Naruhashi 1148 (NY) ; ? , 9. Sept. 1965, N Naruhashi 1148 (NY) ; **Kushiro** : ? , 18. July. 1981, H. Takahashi 1188 (NY) ; **Sagalein** : ulique Secus rias kochallap aug. 1908. Faurie 47048 (BH) ; ? , Aug. 1908, U. Faurie 766 (BM) ; **Sapporo** : ? , July. 1887, ? s.n. (CU) ; ? , July. 1887, ? s.n. (CU) ; **Sohya** : ? , 19. Aug. 1978, H.koyama. BM. 47107 ; Rishiri, 19. Aug. 1978, H. Koyama 5579 (BM) ; **Hokkaido** : Hidaka, 27. July. 1955, Miyoshi Furuse s.n. (CU) ; Nishiwada, 11. Oct. 1931, J. Ohwi s.n. (BH) ; Nishiwada 11. Oct. 1931, J. Ohwi s.n. (BH) ; Hidaka, Fuyushma, 27. July. 1955, Miyoshi Furige s.n. (CU) ; ? , Sept. 1904, D.Faurice 6153 (CU) ; ? , Sept. 1904, U. Faurze 6153 (CU) ; **Mongolia** : ? , Altai Mt. 22. June. 1925, R.W.Chaney 220 (CU) ; Champei to kalgan, 25. Aug. 1938, J. ohui 10667 (BM) ; Champei to Kalgan, 25. Aug. 1938, J. Ohwi 10667 (BH) ; Tula river, 30. July. 1970, C.Jebbrey 1429 (GH) ; Tula R., 30. July. 1970, C. Jeffrey 1429 (GH) ; Mt. Altai, 22. June. 1925, R.W. Chaney 220 (CU) ; **Pakistan** ; W-Himalaya, 35 °20'N 75 °50'E, 8. Aug. 1967, T.E. Larkutu TEL 1458 (BM) ; West Parkistan, Pearson, BM 47103; **Russia** ; Khabarovsk ; ? , 20.

July. 1988, Thomas S.Elias 11123 (NY) ; ? 20. July. 1988, Thomas S. Elias 11123 (NY) ; **Siberia** : ? 5. Sept. 1890, P. krylr (NY) ; Irkutsk, 26. July. 1908, ? s.n. (CU) ; Irkutsk Prov. 26. July. 1908, ? s.n. (CU) ; usnersk, 5. Aug. 1890, P. Krylu s.n. (NY): U.S.A. ; California ; ? 20. June. ?, McKaskill&Roman Gankin Uni California ; Cultivated at California Univ., 20. June. 1961, June. McCaskill 629 (CU) ; **Connecticut** : Litchfield co, 3. Aug. 1980, Rosa Porges s.n. (BH) ; Litchfield Co., 3. Aug. 1980, Rosa Porges s.n. (BH) ; Massachusetts ; Hampshire country, 12. Oct. 1972, H.E.Ahles. BM. 41994 ; **New York** : Cultivated at N.Y. from Portugal, 15. Aug. 1970, W.J. Dress 11219 (BH) ; Greene Co., 25. Aug. 1986, Karl L. Brooks & Phil Caswell 6939 (BH) ; Greene Co., 24. Aug. 1986, Karl L. Brooks & Phil Caswell 6939 (BH) ; ulster Co., 28. Aug. 1985, Karl L. Brook & Phil Caswell 6794 (BH) ; Ulster Co., Denning, 28. Aug. 1985, Karl L. Brooks & Phil Caswell 6794 (BH) ; Pennsylvania ; Centre Co., 11. Sept. 1942, H.A. Wahl 1333 (BH) ; Ceulre Co, II Sept. 1942, H.A.Wahl 1333: **Russia** ; **Amur**: ? , ? 1906, F. Karo s.n. (CU) ; ? , ? 1906 , F.Karo s.n. (CU) ; **Kuriles** : Shikotan, 3. Sept. 1931, J. Ohwi 1195 (BH) ; Shikotan, Shakotanzaki, 3. Sept. 1931, J. Ohwi s.n. (BH) ; ? , ? 24. Aug. 1911, John W. Eckfelar s.n. (GH) ; ? , <Photo>?, 18X 1950, Bailey Hortorium 858.87 (BH) ; ? , ? 1865 . J.W.williamns BM. 47079 ; ? , ? ? ? (NY) ? , Brno (Bohemoslovacia, Moravia), 15. Aug. 1986, F. Černoch. Reading. uni. s.n. ; ? , Graecenses 17. Aug. 1974, H.Pittoni et Jipoelt. 47150. (BM) ; ? , HNZ Basil. Aug. 1838. ? (NY) ; ? , Mt. Altai, 4. Sept. 1931, B. Sehischkin et al s.n. (NY) ; ? , Nertschinsk, ? , 1889, J. Fregn 211 (BM) ; ? , Oahuria 1890. F.Karo Uni. California. s.n. ; ? , Osttirol 24. Aug. 1973, A. Polatscheck. 7151 (BM) ; ? , Polonica, exsiccata. Lithuania. Vilnae Zebr, 26. sierp. 1893, T.Synonowiczóna. 47184 (BM) ; ? , Shennongjia Forest District s.n. (31 ° 30'N 110 ° 30'E), 17. Sept. 1980, B. Bartholomuw et al 1441 (GH) ; ? , Stavropol, Kislovodsk, 12. July. 1906, L. Akinfiev 3437 (NYBG) ; ? , Zejskja Pristan, July. 1899, ? 415 (BM)

**G. shikokianum** Matsumura: **Japan**; **Ehime** : Mt. Ishizuchi, ? 1931, K. Hiyama s.n. ; **Oita** : Mt. Oohunayama, Kuju, Kusu-Gun, 11. Aug. 1922, Z. Tashiro s.n. ; **Yamanashi** : Mitsutooge, 7. July. 1952, Shigetake Suzuki s.n. ; **Shikoku** : ? , 5. Aug. 1947, K Uno ; Mt. Tsurugi, in Awa, 13. Aug. 1905, Nakai s.n. ; Tokushima 14. Aug. 1959, s.n.

**G. shikokianum** var. *quelpartense* Nakai: **Korea**; **Jejudo** : Halasan, 24. July. 1986, Y.J.Chung s.n. (SKK) ; Hallasan, 20. July. 1994, S.J.Park s.n. (KUS)

**G. siennse** Knuth : **China**; **Shensi** : ? , 4. Aug. 1897, Rev. Jos. Giraldi s.n. (CU) ; **Szechwan** : Sungpan-hsien, 17. Aug. 1928, W. P. FAug. 4281 (GH) ; May-June. 1929, Herbert Stevens 333 (GH) ; **Tibet** : Eastern Tibet, Bavalley, July. 1926, J. F. Rock 14360 (NY) ; Eastern Tibet, Radja & Yellow River, June. 1926, J. F. Rock 14360 (NY) ; **Yunnan** : ? , ? , T. T. Yu 8983 (GH): **France** ; **Wintzenbach** : ? , 17. Aug. 1980, A. Schneider s.n. (RNG): **India** ; **Kashmir** : 15. Aug. 1954, R. R. Stewart 28304 (BM): **Japan** ; ? , 1879, C. Maries s.n. (BM) ; **Asamayama** : ? , July. 1984, V. Faurie 6150 (BM): **Kazachstan** ; **Kazakh** : ? , 14. July. 1985, Thomas S. Elias 9557(NY): **Mongolia** ; ? , 25. July. 1963, ? s.n. (PE): **Nepal** ; ? , 17. June. 1973, ? 686 (BM) ; Marghore, 18. July. 1968, S. B. Malla s.n. (BM) ; Mustang, ? , Aug. 1954, Stainton, Sykes IZ Williams 2180 (BM) ; W. Himalaya, Lahol, 11-12 June. 1856, ? s.n. (BM); **Newzealand** ; ? , 30. June. 1971, Niels Jacobsen s.n. (RNCT): **Russia** ; ? : Cultivated from Russia, 7. July. 1939, J. M. Gillett 10-116-2 (BM) ; **Moskva** : ? , 10. Aug. 1978, M. P. gritschuk s.n. (RNG) ; **Siberia** : ? , ? 1868, ? s.n. (BM) ; C. Siberia, Lake Naikal, 12. July. 1979, H.H. Iltis et al 637 (NY) ; Eastern Siberia, July. 1975, John Massey Stewart s.n. (BM) ; Novosibirsk, 22. July. 1979, H. H. Iltis et al 1087 (NY) ; S. Siberia, Altai Moutains, 18. Aug. 1978, T. S. Elias et al 4214 (NY) ; S. W. Siberia, Altai Moutains, 29. Aug. 1978, T. S. Elias, W. Weber, A, C, S, Tomb 4810 (NY) ; S. W. Siberia, Mt. Altai, 18. Aug. 1978, T. S. Elias et al 4186 (NY) ; S.W. Siberia, Novosibirsk, 15. Aug. 1978, T.S. Elias et al 4079 (NY) ; Irkutsk Prov. 15. July., 1908, A. Kryschtowitsch s.n. (CU) ; Yakutsk region, 15. Aug. 1984, Dale W. McNeal 684 (CU) ;

**Tomsk** : ? , 25. July. 1927, N. Schipczinsky 372 (CU) ; ? , 31. July. 1925, L. Sergievskaja s.n. (NY):

**G. soboliferum** Komarov: **Korea**; **Chonbuk** : Yiri, 30. May. 1960, J.O.Lim 15672 (SKK): **China** ; **Kirin** : ? , 12. Aug. 1963, ? .1086 (PE) ; ? , 7. Sept. 1950, ? .2378 (PE) ; **Kilin** : ? , 1898-99, 245 (NY) ; ? , 1898-99, ? s.n. (BM) ; ? , 23. Aug. 1934, ? s.n. (PE) ; ? , 81 VII 1897, V.komarov 997 (NY) ; N.Manchuria, 7. IV. 1923. A.D. voieykoff s.n. (CU) ; N-E, Manshuria, 30. VII 1902, D.LitviNov. s.n. (NY): **Japan** ; **Nagano** : ? , 29. Aug. 1960, Miyoshi Furuse s.n. (GH) ; ? , 15. Sept. 1968, M. shimizu 502 (BM) ; Shonano, 23. July. 1962, Miyoshi Furuse s.n. (GH) ; ? , 24. Sept. 1951. snigetaka Suzuki s.n. (CU) (N35° 56, E138° 26) ; ? , 15. Sept.1968. M.shimizu 502 (CU): **U.S.A.** ; **New York** : Cultivated of new york, 16. Aug. 1970, W.J.Dress 11394 (BH) ; Cultivated of new york, 21. Aug. 1971, W.J.Dress 10582 (BM) ; Cultivated of new york, 21. Aug. 1971, " 10582 (BH) ; Cultivated of New York, Sept. 1970. W.J.Press 11395 (BM)

**G. stapfianum** Handel-Mazzetii ; **China**; **Yunnan** : ? , 17. Aug. 1933, H.T. Tsai 53768 (GH) ; ? , ? , A. Henry 9270 (NY) ; ? , 19012. A.Henry s.n. (NY) ; ? , ? , ? , W.P. FAug. 3509 (NY): **Spain** ; **Cerdagne** : ? , 1928, F. Sennen 6547 (BM) ; ? , 23. June. 1928, F. Sennen 6547 (BM) ; **Leon** : ? , 22. July. 1983, M. F. & S. G. Gardner 2180 (RNG): **Sweden** ; Uppsala, 1957, Kertin Persson s.n. (BM): **Turkey** ; **Kars** : ? , 30. June. 1957, Davis & Hedge (D 30451) (BM) ; ? , 3. July. 1957, Davis & Hedge D30485 (BM): **U.S.A.** ; **New york** : Cultivated from N. Y., 14. July. 1968, W. J. Dress, 9697 (BH); **United Kingdom** : ? ; Cultiva, Barenhurst, kent, June. & Aug. 1979, R. M. Cracknell s.n. (BM)

**G. suzuki** Masamune: **Taiwan**; **Taipei** : Hualien Hsien, 28. June. 1977, D. E. Boufford, E. W. Wood and C. F. Hsieh ; Yinhai-Tentzu, Nantou co., 11. Aug. 1964, M. T. Kao s.n. (TAI) ; Hualien co., Hohuanshan, 15. Oct. 1992, T. H. Hsien s.n. (TAI) ; Mushe, Nantou co., 20. Aug. 1984, S. F. Huang

**G. taebaek** S. P et Y. Kim: **Korea**; **Kangwon**: Taebaeksan, 12 Aug. 1995, S.J.Park s.n. (KUS); Taebaeksan, 10 Sept. 1995, S.J.Park s.n. (KUS)

**G. tripartitum** Knuth: **Korea**; **Jeju** : Hallasan, 11. Aug. 1994, S. J. Park s.n. (KUS): **Japan** ; **Kanagawa** : Mt Ohyama, 21. Sept. 1968, M. Shimizu s.n. (NY) ; Mt. Kami-Yama, Hakone, 17. Aug. 1950, S. Suzuk ; **Kotsuke** : Ikaho, 4. Sept. 1950, J. Ohwi s.n. (C) ; Ikaho in Kotsuke, 4. Sept. 1950, J. Ohwi s.n. (UC) ; **Tokyo** : Mt. Kawanor, 23. July. 1951, Shigetaka Suzuki

**G. uniflorum** Hayata: **Taiwan**; **Formosa** : ? , Aug. 7. 1919, E. Matita ; Mt. Kiraisyu-nampo, 14. Aug. 1929, Suzuki s.n. (BM) ; Mt. Kiraisyu-nampo, 14. Aug. 1929, Suzuki s.n. (BM) ; Noko, Central Range, 23. Aug. 1929, S. Suzuki s.n. (BM) ; **Taipei** : Hsintsu co. ; Ta-Pa-Chien-Shan, 11. Aug. 1972, c. T. Moo s.n. ; Hsintsu co. ; Ta-Pa-Chien-Shan, 2. Aug. 1972, H. J. Chang ; Mantow co. ; Chi-Ti, 8. Nov. 1968, Chien-Chang Hsu. s.n. ; Mt. Ho-Huan, Hua-Lien Hsien, 22. Aug. 1967, C. C. Kuo s.n. ; Nantou, Tayuling to Hohuanshan, 22. Aug. 1967, C. C. Hsu s.n. ; Nantou Hsien Kun-Yang, 27 June. 1991, Wei-Hsin Hu s.n. ; Taichung co. ; Shenshan, 1. Sept. 1973, C. M. Kuo s.n. ; Yunlingshanchung Nannupeishan Nanhucuanqu, Nanhutashan, Taichung, 5. July. 1986, J. C. Wang, S. F. Huang, W. S. Tang & K. C. Yang ; Ta-Yu-Ling to Ho-Huann-Shan, 22. Aug. 1967, Chien-Chang Hsu et R. Hsu s.n.

**G. wilfordii** Maxim.: **Korea**; **Kangwon** : Samchok, hwangi, 1. Aug. 1976, W.T.Lee s.n. (GW) ; Chunchun, Samaksan, 9. Sept. 1973, W.T.Lee s.n. (GW) ; Taebaeksan, 25. Aug. 1994, S.J.Park s.n. (KUS) ; Taebaeksan, 26, Aug. 1994, S.J.Park s.n. (KUS) ; Taebaeksan, 3. Aug. 1976, W.T.Lee s.n. (GW) ; Hongchon, Kongjaksan, 11. Aug. 1977, K.M.Yun s.n. (GW) ; Hongchon, Kongjaksan, 28. Aug. 1981, S.K.Lee s.n. (GW) ; **Kyungi** : Kapyung, 8. Aug. 1984, S.T.Lee 15765 (SKK) ; Guangreung, 14. Oct. 1954, T.H.Chung 15702 (SKK) ; Myungjisan, 23. Sept. 1993, S.J.Park s.n.

*Geranium* (Geraniaceae)의 종자산포형태에 따른 형태학적 연구

(KUS) ; Myungjisan, 5. Aug. 1994, S.J.Park s.n. (KUS) ; Bukhansan, 1. Oct. 1961, W.T.Lee s.n. (SKK) ; Soyosan, 11. Sept. 1960, U.J.Oh s.n. (SKK) ; Soyosan, 11. Sept. 1960, H.O.Kim 15705 (SKK) ; Soyosan, 28. June. 1959, J.W.Cho 15704 (SKK) ; **Kyungbuk** : Ulungdo, 8. Aug. 1985, S.T.Lee 15743 (SKK) ; Palkongsan, 8. Oct. 1967, W.T.Lee s.n. (GW) ; **Chonbuk** : Dukyousan, 22. July. 1988, Y.J.Chung 15744 (SKK) ; **Chungnam** : Mangyang, Jaksansa, 31. Aug. 1972, W.T.Lee s.n. (GW) ; Kayasan, 24. Aug. 1956, T.H.Chung 15642 (SKK) ; **Chungbuk** : Kyesangun Songdukri, 13. Aug. 1959, W.T.Lee s.n. (SKK) ; ? : Kunjado, 18. Sept. 1982, M.S.Chung 15735 (SKK) ; Namchok, Taesungsan, 18. Sept. 1883, W.T.Lee s.n. (GW) ; Bonguisan, 28. Aug. 1979, W.T.Lee s.n. (GW) ; Taekisan, 27. July. 1976, W.T.Lee s.n. (GW) ; ? , Aug. 1906, V. Faurie 581 (BM); **China** ; **honan** : ? , 26. Aug. 1960, ? s.n. (PE) ; Cili, 5. Sept. 1984, k.S.Chow et al 919 (GH) ; Hupeh, 1885-88, Aug.henry 4197 (BM) ; ? , Aug. 1885-88, Henry 7343 (GH) ; ? , ? , A. Henry 4197 (NY) ; **kiangsu** : ? , Nanking, ? , 1980 K.S.Chow 80345 (NY) ; Nanking, 1980, K.S.Chow. 80345 (BM) ; Manshuria ; ? , 14. July. 1903, ①. LifviNov. 3263 (NY) ; ? , 9. Aug. 1896, V. komarov 991 (BM) ; ? , ? 1859, C.Wilford s.n. (GH) ; N.Mamshuria, Echo, 25. Aug. 1923 A.D.Voielydolcoff s.n. (CU) ; N-E manshuria, 6. Aug. 1902, ? s.n. (NY) ; **kirin** : ? , 17. Aug. 1896, V.komarov 991 (NY) ; **Shan-dong** : ? , ? ? s.n. (PE) ; **Shausi** : ? , 9. Oct. 1990, X.T.Liu s.n. (GH) ; ? , 13. Aug. 1916, E. Licent 2421 (BM) ; ? , 20. Oct. 1952, ? , s.n. (PE) ; **szechwan** : ? , 27. Sep. 1936, K.L.Chu 3959 (BM); **U.S.A** ; **New York** : ? , 25. Aug. 1973, W.J.Dress s.n. (BH); **Japan** ; **Hokkaido** : kushiro-shichou, 10-12 Aug. 1988, A. Takehara K. T. Nemoto 7378 (GH) ; **Nikko** : Akanuma 24. July. 1916, E. Lishiba s.n. (BH) ; **Kita-gun** : Mutsu 16. Sept. 1954, Miyoshi Furuse s.n. (CU) ; **Saitama** : Mt. Milsumine, 22. Aug. 1953, Shogetaka Suzuki s.n. (CU) ; **Shiga** : ? , 22. Oct. 1965, M. Togashi s.n. (CU) ; Mt.Ibuki, 20. Aug. 1922, G.koidzumi s.n. (CU) ; Mt. Ibuki-yama, 27. Sep 1963, Fukuoka 6318 (NY) ; Mt. Ibuki, 20. Aug. 1922, G.koidzumi s.n. (BM) ; Mt.Ibuki-yama, 27. Sep. 1963, N.Fukuoka, 6318 (CU) ; Wonshu, 22. Oct. 1965, M. Togashi s.n. (NY) ; **Awa** : Sikoku, 24. May. 1925, T. Murai 1972 (GH) ; **Taihoku** : ? , 22. July. 1933, Jisaburo Ohwi 4253 (BH) ; **Tokyo** : Mt.kariypse, 4. Oct. 1953, shigetaka Suzuki s.n. (CU) ; **Yamanashi** : kfu-shi, (138°33'E, 35°46'N), 5. Sept. 1987, Y.tateishi 11325 (GH)

*G. wlassovianum* var. *wlassovianum* Fisher et Link: **Korea**; **Kangwon** : Samyungsan(Hyangrobong), 30. Aug. 1994, S.J.Park s.n. (KUS) ; Samyungsan(Hyangrobong), 30. Aug. 1994, S.J.Park s.n. (KUS); **China** ; **Kilin** : austro-orientalis, 1860, W.H. Mesuvi BM s.n. (47123) ; ? 1860, Maack s.n. (BM) ; ? , 16. July. 1897, K.V.Komarov 916 (BM) ; ? . 2. July. 1895, V.Komarov. ;

*G. wlassovianum* var. *maximowiczii* Park: **Korea**; **Kangwon** : Samyungsan(Hyangrobong), 30. Aug. 1994, S.J.Park s.n. (KUS) ; Samyungsan(Hyangrobong), 30. Aug. 1994, S.J.Park s.n. (KUS); **China** ; **Kilin** : austro-orientalis, 1860, W.H.Mesuvi 47123 (BM) ; ? 1860, Maack s.n. (BM) ; ? , 16. July. 1897, K.V.Komarov 916 (BM) ; ? . 2. July. 1895, V.Komarov. N.B.G. ; Rossica, 2. July. 1895, V.Komarov 996 (NY) ; ? . 16. July. 1897, V.Komarov. 47098 (BM) ; **Hopeh** : chinli, 30, Aug. 1927, J.C.Liu 1320 (CU) ? ; Jade Fountain 30. Aug. 1927, C.Liu uni California. s.n.

*G. yesoense* Franchet et Savatier: **Japan**; **Akita** : Oga-shi, Mt. Kanpu-zan, 25. July. 1981, Y. Endo 954 (GH) ; **Amori** : Pref. Shimokita Peninsula, 19. July. 1986, H. Sakai & J. Iketsu 628 (GH) ; **Gunma** : Mt. Jigoku-dake, 26. July. 1964, N. Pukuoka 6770 (CU) ; Iwate, 22. July. 1977, E. Miki and T. Yahara 23. (BM) ; Iwate, Prov. Rikachyuu, 24. July. 1958, Miyoshi Furuse s.n. (GH) ; **Kaga** : Mt. Hakusan, 12. July. 1929, J. Ohui s.n. (BH) ; **Kitami** : ? , 30. July. 1969, M. Shimizu s.n. (NY) ; **Kushiro** : ? , 16. July. 1981, T. Tsujii & H. Takahashi 1495 (NY) ; **Nagano** : ? 11. Aug. 1992, Reiko Nishimura 682 (GH) ; **Nemuro** : ? , 28. July. 1981, Tatsumi Kato 01002 (GH) ; ? , 9. Sept. 1965, N. Naruhashi 1148 (NY) ; **Oshima** : Hakodak, 10. July. 1890, R. Miyabe & M. Fokubuchi s.n. (CU) ; Hakodate, 10. July. 1890, R. Niyabe & M. Fokubuchi s.n. (CU) ; **Shinano** : Mt. Shirouma-shozu, 27. July. 1935, S. Okamoto s.n. (BM) ; Mt. Kirigawine, 1. Aug. 1938, J. Ohwi 8411 (BH) ; **Sohya** : ? , 18. Aug. 1978, H. Koyama 5569 (BM) ; **Nikko** : Tochigi, 23. July. 1939, Sigetaka Suzuki s.n. (CU) ; Senjogahara, 29. July. 1951, J. Ohwi 289 (GH) ; **Tokachi** : Nakagawa-gun, 27. July. 1986, Takayuki Kwahara 836 (NY)