

Takasi YAMAZAKI* & Yuichi KADOTA** : **A new species of
Astragalus from Hokkaido, Japan**

山崎 敬*・門田裕一** : 北海道産ゲンゲ属の一新種

Genus *Astragalus* is composed of about 2,000 species, and occurs predominantly in the temperate and the subfrigid zones of the northern hemisphere. According to the current floristic manuals of Japan, six species are recognized in Hokkaido (Ohwi 1975, Kitamura & Murata 1980, Ohashi 1981). In the course of our studies of the alpine flora of Hokkaido, we made field explorations in the Central Uplands of Hokkaido and obtained plants of *Astragalus*, which do not belong to any taxa hitherto known from Japan. As the result of taxonomic examination, it was clarified that the plants should be ascribed to a new species.

Astragalus tokachiensis Yamazaki et Kadota, sp. nov. Fig. 1, 2.

Astragalus membranaceus Bunge var. *obtusus* auct. non Makino: Ko. Ito, Alp. Pl. Hokkaido, 84, f. 326. 1981.

Herba perennis, diffusa. Rhizoma crassa, circ. 2 cm diam. Caules facciculati, ascendentes, 10-30 cm longi, teretes, in sicco tenuiter striati, pilis adpressis puberulis albidis vestiti. Folia alterna, imparipinnata, cum petiolis 3-6 cm longa, 1.5-2 cm lata; petioli 5-10 mm longi, rachesque adpresse puberuli; stipulae membranaceae liberae, divaricatae, inferiores ovatae obtusae vel subacutae, sursum superiores minora lanceolatae acutae, 3-6 mm longae, 0.5-3 mm latae, superne glabrae, subtus sparse albo-puberulae; foliolae oppositae, 8-10-jugae, brevissime petiolulatae, ellipticae vel elliptico-oblanceolatae, 5-11 mm longae, 3-6 mm latae, utrinque rotundatae, apice brevissime mucronatae, supra glabrae subtus sparse albo-puberulae. Inflorescentiae axillares, foliis subaequilongae, capitato-racemosae, 3-8-floriferae; pedunculae 3-5 cm longae, sparse albo-puberulae; pedicelae 1.5-2 mm longae, subdense breviter nigro-hirsutae; bractee lineares, 2-4 mm longae, apice obtusae, subtus margineque sparse albo-puberulae. Flores 16-17 mm longi. Calyx membranaceus, albo-fuscatus, tubuloso-campanulatus, 6-7 mm longus, 4-5 mm

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latus, apice oblique 5-dentatus, externe glabrous vel adpressissime albo-puberulus, margine pilis lanatis albidis caducis obtectus, dentibus brevissimis late deltoideis, apice subacutis, interne margineque dense nigro-pubescentibus. Corolla flavo-albida, calyce circ. 3-plo longiora, glabra; vexillum circ. 17 mm longum 6 mm latum apice emarginatum; alae vexillo subaequilongae, partibus dilatatis oblongis circ. 6 mm longis 2 mm latis, apice rotundatis, basi auriculatis, inferne unguiculatis, unguibus circ. 10 mm longis; carinae circ. 16 mm longae 2 mm latae. Stamina carina exserta, circ. 17 mm longa, filamentis glabris. Ovaria linear-oblongata circ. 5 mm longa 0.8 mm lata glabra basi longe stipitata, stipitibus filiformibus circ. 10 mm longis glabris. Stylus curvatus circ. 3 mm longus, glabrus. Legumina pendula, membranacea, semi-obovata, turgida, 22-25 mm longa, circ. 10 mm lata, glabra, longe stipitata; stipites circ. 10 mm longi.

TYPE: Hokkaido, Tokachi-shicho, Kato-gun, Kamishihoro-cho, Mt. Nishi-Kumaneshiridake alt. 1600 m, July 27, 1985, fl, *T. Yamazaki 4998* (holotype in TI; isotype in TNS). Paratypes: Hokkaido, Tokachi-shicho, Kamishihoro-cho, Mt. Nishi-Kumaneshiridake alt. 1600 m, July 27, 1985, fl & y. fr., *Y. Kadota 12304* (ALA, BM, CAN, KYO, LE, TNS, TU, VLA); Mt. Nipesotsuyama, at



Fig. 1. Habit of *Astragalus tokachiensis*. Courtesy of Dr. Mitsuko Sugiyama.

the summit area alt. 2010 m, Aug. 4, 1985, fl. & y. fr., *Y. Kadota & K. Midorikawa 12731* (TNS); Mt. Nipesotsuyama, Aug. 4, 1985, fr. *S. Umezawa s.n.* (TNS).

Jap. Name: Tokachiôgi (nov.)

Astragalus tokachiensis is found at only two locations in Tokachi-shicho of Hokkaido, Mt. Nishi-Kumaneshiridake and Mt. Nipesotsuyama. In rocky places at the summit area of Mt. Nishi-Kumaneshiridake, this new fabaceous plant grows with *Pinus pumila*, *Rhodiola ishidae*, *Bupleurum ranunculoides* var. *alpinum*, *Penstemon frutescens*, *Artemisia arctica* subsp. *sachalinensis*, *Calamagrostis sachalinensis*, *Hierochloa alpina*, *Carex tenuiformis*, and so on. On the other hand, on the cliff facing the east at the summit area of Mt. Nipesotsuyama, *A. tokachiensis* is found growing with *Pinus pumila*, *Dianthus superbus* var. *speciosus*, *Hedysarum hedysaroides*, *Mertensia pterocarpa* var. *yezoensis*, *Leontopodium discolor*, *Erigeron thunbergii* subsp. *glabratus*, and so on. In the Central Uplands (the Taisetsu and the Ishikari Ranges) neighboring to Mt.

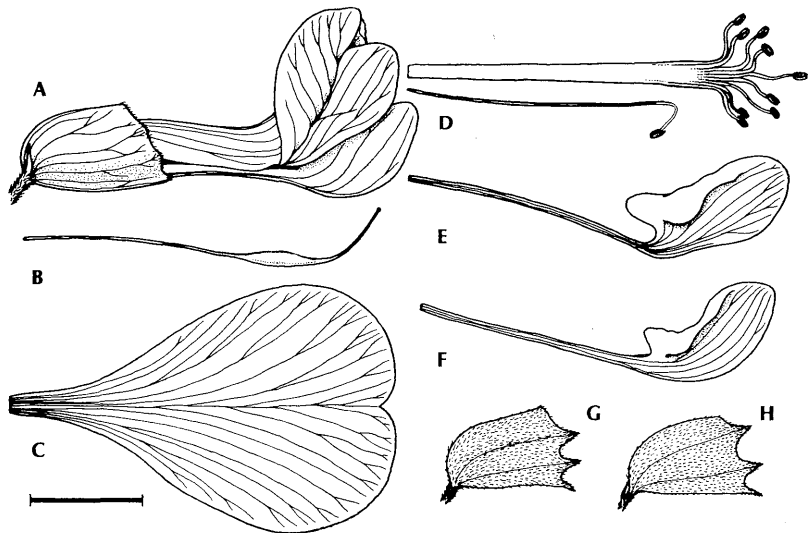


Fig. 2. Flower of *Astragalus tokachiensis* and calyces of *A. membranaceus*. A-F. *Astragalus tokachiensis*. Holotype (TD). A. Flower. B. Gynoecium. C. Standard. D. Androecium. E. Wing. F. Keel-petal. G-H. *Astragalus membranaceus*. G. Mt. Ôhirayama, Hokkaido (Sept. 3, 1977, *H. Hara s.n.*, TD). H. Konuma, Sakhalin (Aug. 8, 1937, *H. Sasa s.n.*, TNS). Scale indicates 5 mm.

Nishi-Kumaneshiridake and Mt. Nipesotsuyama, *A. tokachiensis* has not been located, and only *A. frigidus* subsp. *parviflorus* seems to occur there as an alpine species of the genus *Astragalus*.

Astragalus tokachiensis is delimited by having the following characters: leaflets oblong, 8-10-jugate, 5-11 mm long, 3-6 mm broad; calyx-lobes transversely narrow triangular, 0.5 mm long; calyces glabrous or almost glabrous; pods glabrous; stipules situated in the middle part linear-broadly lanceolate, 2-5 mm long, 0.5-2 mm broad. There is a difference in calyx-tube pubescence between plants of Mt. Nishi-Kumaneshiridake and those of Mt. Nipesotsuyama; plants from the former locality have glabrous calyx-tubes without exception, while those from the latter have calyx-tubes pubescent with whitish appressed hairs.

Astragalus frigidus subsp. *parviflorus* is discriminated from *A. tokachiensis* by acuminate and narrow triangular calyx-tubes, fewer leaflets (4-5-jugate), broadly ovate and larger stipules and pods pubescent with black appressed hairs and white hairs.

Astragalus membranaceus (including *A. shinanensis*, *A. membranaceus* var. *obtusus* and *A. yezoensis*) is closely related to the present new species. The range of *A. membranaceus* covers a wide region extending from Honshu (high mountains of the Chubu District and the calcareous area of Iwate Prefecture) to the Maritime Province of the USSR (Primorskij kraj) via Hokkaido (Mt. Ôhirayama [sometimes called as "Mt. Ôbirayama"] of Shiribeshi-shicho and the lowlands along River Ishikarigawa of Ishikari-shicho), Korea, Northeastern China and Sakhalin. As often observed in species with a wide range, *A. membranaceus* is variable morphologically. Its variability is prominent in stem height, leaflet size and trichome type. *Astragalus membranaceus*, however, is clearly distinguished from *A. tokachiensis* by constantly having acuminate and narrow triangular calyx-lobes and pubescent calyces and pods. Mention should be given to plants from Mt. Ohirayama which were recognized by Miyabe & Tatewaki (1938) as a distinct species, "*A. yezoensis*" [Trans. Sapporo Nat. Hist. Soc. 15: 205.—TYPE: Hokkaido, Shiribeshi-shicho, Shimamaki-gun, Shimamaki-mura, the Kariba Range, Mt. Ôhirayama, Aug. 10, 1938, *I. Yamamoto* 8775 (Holotype: SAPT; Isotype: TNS!)]. When compared with typical members of *A. membranaceus*, plants from Mt. Ôhirayama have smaller and narrower leaflets and fewer flowers per a raceme, and resemble *A. tokachiensis* in these features. The plants should be ascribed to *A. membranaceus*, however, since they have

acuminate and narrow triangular calyx-lobes and pods pubescent with whitish appressed hairs (Fig. 2-G).

Sugawara (1940) published illustrations of *Astragalus membranaceus* from Sakhalin (Tab. 554), which comprise "a part of fruiting stem" and "calyces". The illustrations are somewhat puzzling, since the calyx-lobe appearing in "a part of fruiting stem" significantly differs in shape from that of "calyces". The lobe shape of "calyces" is quite similar to that of *A. tokachiensis*. We have observed that calyx-lobes in a specimen from Konuma (located in the vicinity of Yuzhno-Sakhalinsk) of Sakhalin [Aug. 8, 1937, *H. Sase s.n.*, TNS 94086] are constantly acute and narrow triangular (Fig. 2-H). Therefore, the following two possibilities can be postulated; 1) the illustrations of the "calyces" by Sugawara (1940) were drawn erroneously, and the plants with such calyces are absent in Sakhalin as appearing in the currently available floristic manuals (e.g., Miyabe & Miyake 1915, Kudo 1924, Vorobiev et al. 1974, Woroschilov 1982) or 2) the plants with such calyces really exist in Sakhalin. This problem remains to be studied hereafter.

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Soviet Far East]. 363-368. Nauka, Moscow. (in Russian).

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著者のうち門田は現在北海道の高山フロラについて分類学的研究を行っている。その一環として、1985年の夏、中央高地の山岳地域で調査を行い、ゲンゲ属植物を採集することができた。分類学的な検討の結果、このゲンゲ属植物はこれまでに知られていないものであることが明らかになったので、新種として記載した。このゲンゲ属植物は、現在までのところ、十勝支庁の北部山岳地域（西クマネシリ岳・ニベツツ山）でのみ得られているため、和名はトカチオウギ（十勝黄耆）とする。西クマネシリ岳においては、頂上付近の岩礫地に、ハイマツ、ホソバイワベンケイ、レブンサイコ、イワブクロ、サマニヨモギ、タカネノガリヤス、ミヤマコウボウ、レブンスゲなどともにはえる。一方ニベツツ山においては、頂上の東側の岩壁に、ハイマツ、エゾタカネナデシコ、チンマゲンゲ、エゾルリソウ、エゾウスユキソウ、ミヤマアズマギクなどともにはえる。この山域の北部には大雪山や石狩連峰など北海道中央高地の山岳があるが、高山性のゲンゲ属としてはリシリオウギのみでトカチオウギは発見されていない。トカチオウギは次のような形態的形質をもつことで特徴づけられる：①小葉は8-10対、長さ5-11 mm、幅3-6 mmで、小型で楕円形、数が多い。②萼歯は低平な広三角形、高さ約0.5 mm。③萼筒は無毛、またはほとんど無毛で白い伏毛がまばらにはえる。④子房および豆果は無毛。⑤中部の托葉は線形～広披針形、長さ2-5 mm、幅0.5-2 mm。リシリオウギは一見トカチオウギに似るが、萼歯が狭三角形となって尖り、小葉の数が3-5対と少なく、中部の托葉が広卵形で大きく、豆果が有毛で小さい点などで区別される。トカチオウギに最も近縁と考えられる種はタイツリオウギである。タイツリオウギは本州（中部地方の高山および岩手県の石灰岩地帯）・北海道（後志・大平山、石狩・石狩川沿いの低地）、朝鮮、中国東北部、サハリン、ソ連沿海地方に分布する。タイツリオウギは茎の高さ、小葉の大きさ各器官にはえる毛の種類や密度などの変異の幅は広いが、いずれも安定して狭三角形の萼歯と有毛の萼筒および豆果をもつ。とりわけかつて宮部金吾・館脇操両博士（1938）によって別種エゾノタイツリオウギ *Astragalus yezoensis* とされた後志大平山の個体は、小葉が小さく、1花序あたりの花が少ない点でトカチオウギに似ているが、萼歯が狭三角形で萼筒と豆果に白い伏毛がはえるので、上記のとおりタイツリオウギの1型と考えるのが妥当である。

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