

Tetsuo KOYAMA*: **Taxonomic study of *Carex*
in Eastern Asia (2)****

小山 鐵 夫*: 東亞産スゲ属の分類学的研究 (2)**

5. Variation and geography of *Carex atrata* in broad meaning, and what is *C. atrata* in Japanese authors' sense?

A reasonable view on Japanese sedges described by Steudel, Miquel, Franchet, C. B. Clarke and Kükenthal was given by Dr. Ohwi in his great monograph of *Carex*, but still, owing to the lack of specimens for comparison, the species of which the type is European, Chinese or American plant contain many unsolved problems. The question to which I refer in the present article, in fact, falls under the category of the above question.

It has come under my notice that *Carex atrata* in Japanese authors' sense or 'Kurobo-suge' does not very well agree with the descriptions of this species based upon European or American ones. Recently, however, several European and American materials I obtained have certified my above forecast correct. Here I hope to take up three allied species of *Carex atrata* group at least. They are *C. atrata*, *C. aterrima* and *C. atratiformis*, and the former two are strikingly resembling to each other and also more closely related to our sedge in question than any other allied taxon of *Atratae* in a narrow sense. Although this group of sedge has hitherto been known as one of the most variable species, I was able to distinguish these three species from Japanese 'Kurobo-suge'—the distinguishing characters are of course, in itself, suitable to those between European and Asiatic members—as expressed in the Table 1.

It will be said that Table 1 proves *C. atrata* in Japanese authors' sense to be better regarded as an different taxon from *C. atrata* in original meaning by the scale and perigynium characters printed in italics in the table. In selecting suitable epithet for East-Asiatic *C. atrata*, it is a matter of course that the critical study of Kreczetowicz's species described from Eastern Siberia and from Central Asia is next necessary. But before comparing Japanese 'Kurobo-suge' with his species, I hope to observe its variations briefly. Culms and inflorescences vary most markedly. The robust scabrous upright culms up to 6 dm tall are distinct from gracile ones which are nodding above and smooth except only below the

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** Continued from Journ. Jap. Bot. 29: 48 (1954).

Table 1. Variations in *Carex atrata* sensu lato.

	pistillate scale	perigynium	lowest bract	culm
<i>atrata</i>	narrow-ovate to elliptical-lanceolate, gradually tapering to acutish to acute tip nearly from the base, black to dark black-brown with lighter margin, apex & midrib, longer than the perigynium.	obovate to elliptical, 3-3.5 mm lg., densely punctulate, below abruptly attenuate to short stipe-like nerveless base.	setaceous scarcely exceeding the inflorescence.	slender, smooth.
<i>aterrima</i>	almost as in <i>atrata</i> , but generally slightly larger and real black exc. margin & midrib.	obovate to oval, 4 mm lg., abruptly attenuate to short stipelike nerveless base.		robust, scabrous.
<i>perfusca</i>	ovate, subabruptly tapering to acutish apex from above the middle, ferruginous-brown or dark purple-brown but not black, with lighter narrow hyaline margin & midrib, as long as or shorter than the perigynium.	elliptical 4-4.5 mm lg., purplish ferruginous, base abruptly contracted not stipelike, obsolete few-nerved.	exceeding the inflorescence, leaf-like.	robust, scabrous.
<i>Japonalpina</i> (michi) = <i>atrata</i> sensu auct. japon.	almost as in <i>perfusca</i> but slightly smaller and brown or purple-brown, not ferruginous.	elliptical oval, ovate-oval to elliptical, 3-3.5 mm lg., abruptly contracted to nerveless not stipitate base.	leafy and exceeding the infl., or setaceous and shorter than it.	slender smooth, robust scabrous.
<i>atratiformis</i>	narrowly ovate to oblong-elliptical, gradually tapering to acute to subacuminate tip from above the middle, shorter to longer than the perigynium, dark purplish red, not or very narrow-margined, no lighter midrib.	obovate or elliptical occasionally narrow ovate, 2.5-3.5 mm lg., reddish purplish, nerveless, with short stipelike base.	setaceous to leafletlike, usually shorter than the inflorescence.	slender to robust, scabrous.

inflorescence. Concerning the lowest bract, I could discriminate two forms: one has a leafy long bract usually exceeding the inflorescence and this corresponds to a form with the robust culm and purple brown spikelets, and another has a setaceous one not exceeding the inflorescence and corresponding to a form with the weak culm and brownish small spikelets. A plant represented by the above mentioned robust culm with leaflike bract and large purple-brown inflorescence is the Korean type. And, one represented by the slender culm and small inflorescence subtended by a setaceous bract is the Japanese type. Namely, all Korean specimens fall under the former category, whereas we can hardly find the Korean type on the Akaishi Mountain Range of Japan. The specimens from Mt. Shiroumadake of the Tateyama Mountain Range contain a few specimens of the Korean type.

Now, of three species of *Atratae* described from Siberia by Kreczetowicz, which fall within the category of *C. atrata*, *Carex perfusca* seemed to be most closely allied to our 'Kurobo-suge'. He described *C. perfusca* in his original description as follows:

".....culmis validis superne scabris 50-80 cm altis, foliis 4-7 mm latis breviter acutatis Spiculae 4-7, fasciculatim congestae, bractea ima inflorescentiam superante, squamis ferrugineo-fuscis utriculis brevioribus. Utriculi elliptici 4-4.5 mm lg. violascenti-ferruginei basi obsolete nervulosi subsessiles,"

Except the perigynium this description well agrees with our Korean type of 'Kurobo-suge'. So, our sedge undoubtedly belongs to *C. perfusca*, although it is not quite identical with Siberian plant. The area of *C. perfusca* lies between Mongolia and Central Asia, thus the area of our 'Kurobo-suge' lies close by but is discontinuous to that of *C. perfusca*. It will be thought that our 'Kurobo-suge' would have possibly been differentiated from *C. perfusca* by the isolation of area.

Carex atrata and its allies are widely distributed in the alpine and arctic regions of the Northern Hemisphere, and since each area is respectively isolated, each taxon is also fairly well differentiated. The pistillate scales and the perigynia, however, do not vary independently, but there we can see a co-ordination to some extent as expressed in Figure 3. Further, of all examined taxa of *C. atrata* group, I hope to recognize four well differentiated taxa which are considered to be treated as subspecific status as I describe in the next paragraph. But then, when we have other larger and more precise data, they may prove *C. atrata* and its allied taxa to be recognized as relic alpine species well differentiated each

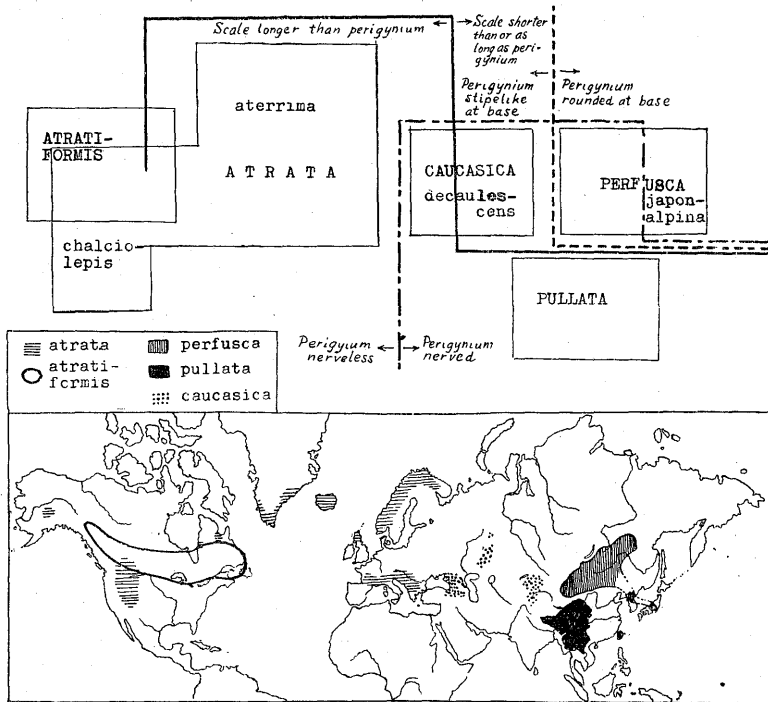


Fig. 3. Distribution of *Carex atrata* & its allies.
(North American data on Dr. M. Raymond, 1951)

other by isolation.

Carex atrata Linn. subsp. **atrata** (Linn.)—*C. atrata* Linn., Sp. Pl. ed. 1: 976 (1753); Schkuhr, Riedgr. **1**: 52, t. 10: f. 77 (1801) & **2**: 42 (1806); Kth., Enum. **2**: 433; Reichenb., Icon. **8**: t. 237, f. 592 (1846); Meish. in Act. Hort. Petrop. **13**: 347 (1901), p. p. !; Kükenth. in Engl. Pflanzenr. **4-20**: 396 (1909), p. p. incl. f. 62: D-G ! —Distrib. Scandinavia, Arctic Europ.-Russia, England, Southern Poland, Balkan, Alps, Auvergne Highland, Pyrénées, Iceland, Greenland, Labrador, Rocky Mts.

subsp. **perfusca** (V. Krecz.) T. Koyama, stat. nov. — *C. perfusca* V. Krecz. in Komarov, Fl. URSS **3**: 256 & 600 (1935)—*C. atrata* var. *aterrima* Kükenth. in Engl. l. c. 398, p. p., excl. basonym. — '*C. atrata* Linn.': Turcz., Fl. Baic.-Dahur. **2-2**: 271 (1856); Meish. l. c. 347, ex pte. —Distrib. Eastern Siberia, Mongolia, Central Asia.

var. **japonalpina** T. Koyama, var. nova — '*C. atrata* Linn.': Komar., Fl. Mansh. **1**: 372 (1901), saltem p. p. maj. !; Koidz. in Bot. Mag. Tokyo **33**: 211 (1919); Akiyama, Consp. Caric. Japon. 116 (1932), p. p.; Kitagawa in Bot. Mag. Tokyo **48**: 6 (1934); Ohwi, Cyper. Japon. **1**: 317 (1936).

A subsp. *perfusca* omnibus partibus minoribus, utriculis minoribus 3–3.5 mm longis basi enervis, squamis foemineis etiam brevioribus angustioribusque praecipue recedit.

Honshu: Mt. Shirouma (U. Faurie, s. n. !—KYO*; J. Ohwi, 7054 ! & 7782 !—KYO; S. Miki !—KYO; G. Koidzumi !—TI; J. Kikkawa !—TNS; H. Koidzumi !—TNS), Mt. Korenge (K. Hisauchi, 1906 !—TNS), Mt. Kitadake (H. Matsuda !—Holotypus in TI), Mt. Senjotake (K. Teramoto !—TI; J. Ohwi !—KYO), Mt. Arakawadake (G. Koidzumi !—TI), Mt. Mitsumine (J. Ohwi !—KYO)—Corea: Mt. Shajitsuho (G. Koidzumi !—KYO; S. Okuyama !—TNS), Mt. Mutoōho (M. Furumi, 337 !—TI), Hoōtaisan (M. Furumi, 263 !—TI), Jimmujo (R. Hirai, 50 !—TI), Moho (Y. Iguma !—TNS), Mt. Sorryon (J. Ohwi, 2021 !—KYO), Mt. Toryusan (J. Ohwi, 2728 !—KYO), Mt. Kamboōho (J. Ohwi !—KYO; Su & Sho !—KYO), Mt. Toseiho (H. Ito !—KYO; R. Saito !—KYO), Mt. Hakutoōsan (T. Ishidoya !—KYO, R. Saito !—KYO; R. Hirai, 102 !—KYO; T. Nakai !—TI), Mt. Chohakusan (T. Mori, 4 !—TI), Waigalbon (T. Nakai !—TI)—Manchuria (?!).

subsp. **caucasica** (Stev. in Mém. Soc. Nat. Moscou **4**: 68, 1913, pro sp.) Kükenth. in Engl. l. c. 400—Distrib. Caucasus, Ural, Pamirs.

subsp. **pullata** (Boott, Illustr. Carex **3**: 114, t. 364, 1862, pro var.) Kükenth. in Engl. l. c. 400—*C. Duthiei* C. B. Clarke in Hook. f., Fl. Brit. Ind. **6**: 731 (1894); Ohwi l. c. 316.—Himalaya, Burma, Siam, Tibet, North-western China, Formosa.

subsp. **atratiformis** (Britton in Bull. Torr. Bot. Club **22**: 222, 1895, pro sp.) Kükenth. in Engl. l. c. 399.—Distrib. North America.

6. Two new Japanese species of Carex.

Carex Omurae T. Koyama, spec. nova e Sect. *Mitratae* Kükenth.; *Carici conicae* Boott aliquantulum affinis est, sed ab illa spicula mascula lineari paucius florente, squamis masculis apice acutis non emarginatis nec truncatis, squamis foemineis lanceolatis, utriculis squamam subduplo superantibus apice in rostrum

* The following abbreviations are used for the herbaria in which I have seen materials:—TI=Herbarium of the University of Tokyo. KYO=Herbarium of the University of Kyoto. TNS=Herbarium of the National Science Museum, Tokyo.

longum subsensim attenuatis, foliis retrorsocaberrimis apice abrupte contractis valde recedit.

Herba perennis, rhizomate breviter decumbente vel ascendente plus minus caespitoso interdum tenuiter stolonifero, radicibus fibrosis validiusculis. Folia lineariformia patentia brevia usque ad 16 cm longa 2.5-4 mm lata rigida sordide viridia conduplicatoplana conspicue tricostata margine utrinque retrorsocaberrima apice abrupte contracta mucronata basi nonnihil attenuata in vaginam fuscopurpuream denum in fibras brunneas dissolutam persistentem et collum rhizomatis circumdantem. Culmi 1-3 erecti graciles 15-20 cm alti laeves basi paucivaginati, vaginis brachyphyllis fuscopurpureis rubescentibusve. Spiculae 3-4 superiores 2 saepe approximatae sexu distinctae; terminalis mascula linearis fusca rufofulvave 15-20 mm longa circiter 1.5 mm crassa sublaxiflora; reliquae foemineae cylindricae vel oblongocylindricae perlaxe florentes 15-20 mm longae circiter 3 mm in diametro exserte pedunculatae erectae. Bractee tubulosae 10-25 mm longae membranaceae fulvoviridulae apice oblique sectae vel brevilaminatae. Squamae masculae oblanceolatae hyalinae fuscae apice subsensim contractae acutae cuspidataeve. Squamae foemineae deltoideolanceolatae 2 mm longae pallidae interdum partim fulvae tenuimembranaceae a basi ad apicem usque gradatim angustatae apice acutae, costa angusta viridi uninervosa. Utriculi patentes quam squama sesqui longiores ellipsoidei 3-3.5 mm longi inconspicue trigoni plurinervi membranacei olivaceovirides plus minus nitiduli basi subito cuneatocontracti subestipitati apice subabrupte contracti in rostrum sublongum (ca. 1 mm longum) maturitate leviter recurvum, ore rigidulo bidentato, dentibus regulariter deltoideis. Nux arcte inclusa late elliptica vere trigona

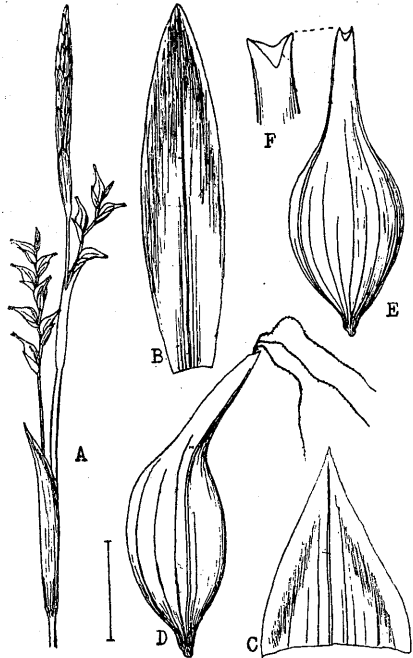


Fig. 4. *Carex Omurae* T. Koyama - A. A part of inflorescence; B. Staminate scale; C. Pistillate scale; D, E. Perigynia, lateral (D) & dorsal (E) views; F. Orifice. Scale for C, D, & E 1 mm. (Ic. orig.)

2-2.2 mm longa facie leviter convexa, disco minuto depresso indistincte annulato, stylo recto basi vix incrassato, stigmatibus 3 fere 2 mm longis. (Fig. 4)

Nom. japon. Suruga-suge (J. Sugimoto, nov.)

Hab. in sylv. Japonia: Abetoge in prov. Suruga, 1400 m alt. (T. Omura, 15762! —Holotypus in TNS); m. Dandoson in prov. Mikawa (K. Torii, sine num!).

Messrs. Sugimoto and Omura collected this interesting sedge on 5th of July in 1954 at Abetoge, the northeastern border of the Province of Suruga. Although this species seems to be an allied species of *C. pisiformis* Boott from its perigynium character, its vegetative parts suggest that this sedge is rather near to *C. conica*, one of the most common hillside species which flowers early in spring. Moreover retrorsely scabrous margins of the blades are unique, and the short blade abruptly contracted at its apex is uncommon in *Carex*. Within the Section *Mitratae*, in fact, the perigynium character is often of less value to distinguish allied species of the section.

Carex phaeodon T. Koyama, spec. nova e Sect. *Frigidae* Fries; haec species *Carici oshimensi* Nakai extrinsecus affinis tamen ab illa omnibus partibus flaccidis, utriculis oblanceolatis multo longioribus glaberrimis hyalinis longe rostratis adpresse trigonis, achenio apice non appendiculato, squamis masculis apice muticis valde recedit.

Herba perennis flaccida, rhizomate breviusculo plus minus caespitante longe stolonifero, innovationibus elongatis ascendentibus decumbentibusve, radicibus multis perdensis filiformibus lanuginosis. Folia plura late linearia laete viridia mollia flaccidave plana uni- vel tri-costata plana vel conduplicata 3-6 mm lata usque ad 25 cm longa supra parce aspera subtus pallidiora margine utrinque scabra apice in acumen longum acutissimum gradatim producta basi in vaginam longam antice hyalinam pallidam fusciorubentemve vix attenuata, ligulis hyalinis pallide rufofulvis truncatis breviter productis. Vaginae basilares superiores brachyphyllae inferiores aphyllas tenuiter membranaceae dilute fuscopurpureae vel fuscifulvae demum in fibras parallelas fulvas dissolutae et colum rhizomatis circumdantes. Culmi erecti 1-3 crassiusculi 2-3 dm alti circiter 1.5 mm crassi obsolete trigoni molliusculi grabriusculi basi paucivaginati et supra medium laxe spiculosi. Spiculae 3-6 erectae omnes distantes vel superiores 2-3 approximatae; terminalis mascula clavato-linearis brunnescens 2-3 cm longa medio 2-3.5 mm crassa; laterales foemineae vel androgynae oblongocylindricae 10-25 mm longae maturitate 7 mm crassae spisse pluriflorae incluse vel breviter exserte pedunculatae. Bracteae omnes tubulosovaginantes

superne leviter ampliatae hyalinomarginatae superiores aphyllae inferiores breviter laminatae. Squamae masculae oblanceolatae brunneae nitidulae apice contractae mucronatae vel acutae dorso valide tricarinatae. Squamae foeminae oblongo-ellipticae vel oblongo-ovatae 3-3.8mm longae herbaceae medio pallide virentes margine fuscobrunnescentes apice subabrupte acutae brevicuspidatae, costa trinervia. Utriculi erectopatentes oblanceolati vel linearioblongi squamis sesqui longiores 4.8-5.3 mm longi 0.9-1.2 mm lati vere triquetri glaberrimi tenuimembranacei laete vel subflavo-virentes praeter nervos 2 dorsales prominentes subnervi deorsum sensim angustati et basem obtusum breviter stipitatem formantes apice subabrupte contracti in rostrum longum (ad 1.5 mm longum) glabrum margine utroque sparse antrorsim spinulosum excurvum, ore leviter ampliato fuscato tenuiter bidentato, dentibus latis fuscis. Nux arcte inclusa oblanceolato-oblonga 2.5 mm longa 1 mm lata facie alboflavens leviter convexa adpresse trigona (ca. 0.8 mm) crasse stipitata, stylo erecto valde spongiosoincrassato linearifusiformi, stigmatibus 3 longis cum $2/3$ -utriculo aequantibus. (Tab. 1)

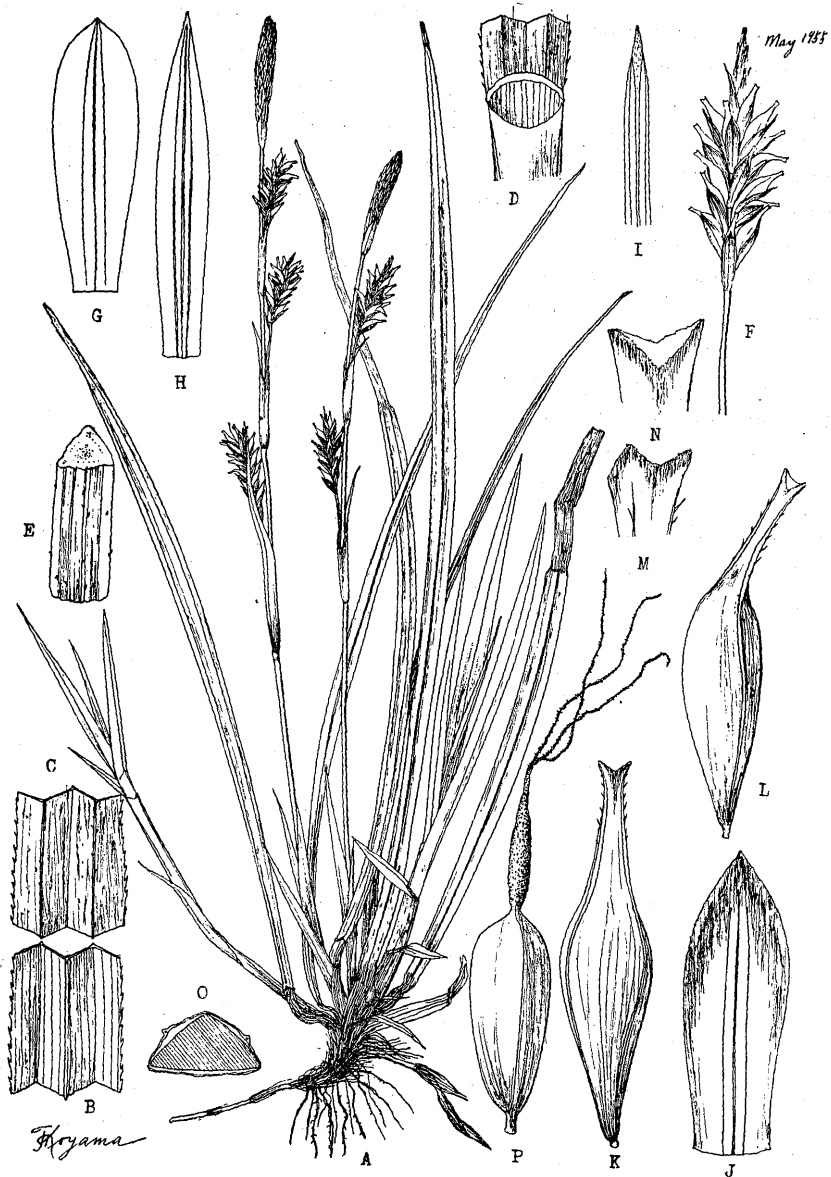
Nom. japon. Hashinaga-kansuge (Omura et Koyama, nov.)

Hab. in saxo muscoso humido secundum rivulos. Japonia: basi Tarutoge, Tomikawamura in prov. Kai, 150 m alt. (T. Omura, 15922!—Holotypus in TNS).

I found this fine distinct species also in Mr. Omura's gatherings sent from Tarutoge, the southern border of the Province of Kai. The type collection upon which Plate 1 depends, was gathered by himself on 13th April in 1955. According to him, the sedge flora of the locality was so poor that he had seen only three common sedges, *C. Morrowii*, *C. curvicollis* and *C. Thunbergii* at that time, and a considerable number of individuals of this new species was scattered on mossy rocky steep banks of the Fukushi River. This sedge belongs to Section *Frigidae* which is rather rarely occurring in Japan and all its members present external appearance quite unlike to the present one, but have nerveless thin adpressed lanceolate perigynium ending in a recurved spinulose-margined long beak. And *C. oshimensis*, to which this sedge is outwardly resembling is a member of *Mitratae*.

Explanation of Plate 1.

Carex phaeodon T. Koyama, n. sp.—A. Habit; B, C. Parts of blade, showing lower (B) & upper (C) surfaces; D. Ligule; E. A part of culm; F. Lateral spikelet; G, H. Staminate scales from lower (G) & upper (H) part of terminal spikelet; I. Apical part of anther; J. Pistillate scale; K, L. Dorsal (K) & lateral (L) views of perigynium; M, N. Dorsal (M) & ventral (N) views of orifice; O. Transverse section of ripe perigynium; P. Dorsal view of achene. (Icon. orig.)



5. 本州中央高地並びに北鮮の高山に知られるクロボスゲは今迄歐洲の *C. atrata* にあてられて居たが、実はそれとは大變相違したもので、むしろバイカルからモンゴル・中央アジアに知られる *C. perfusca* に似たものである事がわかつたので学名を *C. atrata* ssp. *perfusca* var. *japonalpina* と改める事にした。広義のクロボスゲは北半球の高山や極地に広く分布して居り、非常に多くの型に分化して居る。之等は、しかし、或程度地理的に統一がとれたもので、私は地理の上と形とから歐文中に示した5つの亜種を認めたいと思う。それ等を第3図の模式図中にフルタイプで記した。この5つの亜種それぞれの中に變種とすべきものが幾多記述されては居るが、それ等を全部整理するには尙現在資料不足である。兎も角クロボスゲは一時北半球を広く覆つた氷期の植物で現在高山に残つて、孤立の爲相當に分化したスゲの一つであると考えられる。

6. スルガスゲ (杉本順一氏命名)——ヒメカンスゲ系の一品で、駿河安倍峠で見出された。採集者の大村敏朗氏を煩わして現地を見たがナンブスゲ・カンスゲを産するのみで、勿論こんな高い所 (1400 m) にはヒメカンスゲはなかつた。鳥居喜一氏が本種を三河段戸山で採つて居られた事を最近知つた。

ハシナガカンスゲ (大村氏及筆者)——支那から中央亜細亜にかけて多い *Frigidae* の一品。邦産ではイハカンスゲ・シャウジャウスゲ等のグループであるが外形はオホシマカンスゲに稍近い特異な一品である。果胞から云うと支那産の *C. scabrirostris* に近い。甲斐樽崎で大村敏朗氏採集。(第一図版)

Errata 正 誤 (Vol. 30. no. 5)

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130	10	ad	ac
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131	15	foemineis distat.	foemineis longe pedunculatis pendulis praecipue distat.
	17	nudosos	nudos
132	8	noua	nova
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