

Takuji HOSHINO*: **A cytotaxonomical study of *Carex paxii*
and two allied species**

星野卓二*: キビノミノボロスゲと近縁2種の細胞分類学的研究

Six species of *Carex* have been described from Section Multiflorae Kükenth. in Japan (Akiyama 1955). Three of these species, *C. paxii*, *C. albata* and *C. nubigena* var. *franchetiana*, were studied cytotaxonomically. They are closely related and each of these species is found in restricted areas of Japan (Akiyama 1955, Yoshikawa 1957, 1958, 1960).

Carex paxii commonly occurs in the southern district of Korea and China. In Japan it is thought to be present only in a restricted area of Okayama Prefecture. *Carex albata* is found from the Hokkaido to Kinki Region, and *C. nubigena* var. *franchetiana* is found from the Chugoku to Kyushu Region in Japan. These latter two taxa occupy distinct ecological niches (Akiyama 1955, Yoshikawa 1957, 1958, 1960).

Materials and methods The plants for this study consisted of six clones of *Carex paxii* collected from Kibitsu-hiko-Jinja, Okayama Pref., three clones of *C. albata* collected from Shigakogen, Niigata Pref., and four clones of *C. nubigena* var. *franchetiana* collected from Mt. Yataka, Okayama Pref.

Meiotic metaphase I chromosomes were observed in the pollen mother cells (PMCs). Young staminate spikelets were fixed in a 3:1 mixture of absolute ethanol and glacial acetic acid at 5°C for over two hours. PMCs were squeezed from the anthers into 45% acetic acid solution, and the anther walls were removed with a dissecting needle. After they were stained in 1% aceto-orcein for 5 or 10 minutes, cover slips were added and PMCs were gently squeezed.

Mature utricles were mounted on JEOL SEM stubs and coated with gold-palladium. The surface pattern of utricles was observed by the JEOL JMS-35 scanning electron microscope.

Results and discussion In the six clones of *Carex paxii*, 38 bivalent chromosomes were observed at meiotic metaphase I (Fig. 1-A). This number, $2n=76$,

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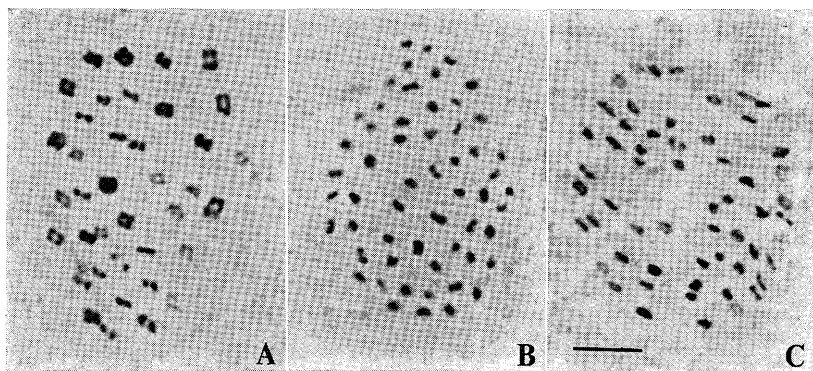


Fig. 1. Light micrographs of meiotic metaphase I chromosomes of PMC's in the three taxa. A. *C. paxii* ($2n=38II$). B. *C. albata* ($2n=56II$). C. *C. nubigena* var. *franchetiana* ($2n=56II$). Scale = $5\ \mu\text{m}$.

is the same as that reported by Hoshino (1981). At meiotic metaphase I, the 38 bivalents varied in size from about $1.6\ \mu\text{m}$ to $0.3\ \mu\text{m}$ in length. These chromosomes are among the smallest in the genus. The chromosome number of *Carex albata* was $n=56$ in the three clones (Fig. 1-B) and is the same as that reported by Hoshino (1981). In the four clones of *C. nubigena* var. *franchetiana*, 56 bivalents were observed at meiotic metaphase I (Fig. 1-C). This count is the first record for this species. In both species the 56 bivalents varied in size from about $0.8\ \mu\text{m}$ to $0.3\ \mu\text{m}$ in length.

Carex paxii had about eight large chromosomes which were not found in *C. albata* and *C. nubigena* var. *franchetiana*. Thus the chromosome number and karyotype of *C. paxii* is different from that of the other two species. *Carex paxii* is thought to be a chromosomally stable species since no irregularities were observed in the course of meiotic divisions.

In *Carex* it is well known that the size of the chromosomes decreases with an increase in chromosomes number. There is a general speciation pattern in this genus that the species with few, large chromosomes give rise to species with many, small chromosomes (Hoshino 1981). From this general pattern, it is concluded that *C. albata* and *C. nubigena* var. *franchetiana* arose later than *C. paxii*.

The three species differ in the morphology of utricles. *Carex paxii* has several tubercles on the surface of the utricles (Fig. 2-A, B), but these are

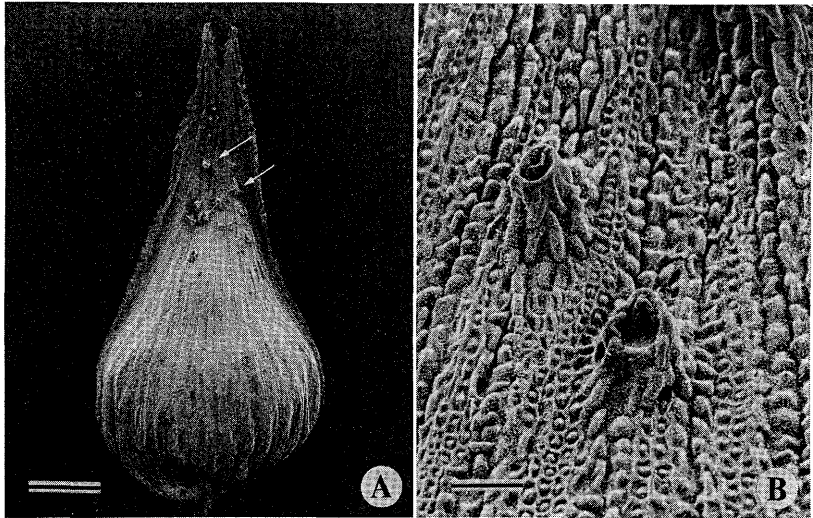


Fig. 2. Scanning electron micrographs of utricle of *C. paxii*. Arrows indicate large tubercles. A. scale=500 μ m. B. scale=50 μ m.

lacking in the other two species. *Carex albata* and *C. nubigena* var. *franchetiana* are very similar in morphology and karyotype but differ in the length of the beak of the utricles and in the surface of the culms.

There is proof that fruits of *Carex paxii* instead of rice were used for a purification ceremony at Kibitsu-hiko-Shrine (Okamoto 1978). The origin of the *Carex paxii* was, presumably, from Korea or China, and the establishment of this species in Japan probably dates from the days when fallen fruits were able to germinate on the precincts of the Shrine.

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References

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Okamoto, K. 1978. The *Carex* species of Okayama Prefecture in Japan (II). Bull. Okayama Univ. of Sci. 14: 119-129. Yoshikawa, J. 1957, 1958, 1960. Icones of Japanese *Carex*. 1: 1-141; 2: 142-281; 3: 282-421. Kanazawa.

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日本産のスゲ属ミコンガヤ節に属する特に近縁な3種について染色体の観察をし、その類縁関係について考察した。その結果、キビノミノボロスゲでは減数第一分裂中期において38個の2価染色体が観察され、対合異常は見られなかった。またミノボロスゲ、ツクシミノボロスゲでは、ともに56個の2価染色体が観察された。キビノミノボロスゲは他の2種に比べて大型の染色体を8個前後持っており、核形態学的に明瞭なちがいが見られた。キビノミノボロスゲは主に中国大陸や朝鮮に広く分布しており、日本では岡山県の神社の境内でのみ見られる。本種は神社の禊用に持ち込まれたものであることが推定された。

□「熊本の野草」編集委員会：熊本の野草〈上〉春～夏編 308pp. 1986. 熊本日日新聞社，熊本。¥2,800. 熊本県の高等学校の先生方の協力になるもので，熊本大学薬学部 浜田善利氏の監修である。平地，山地，海岸の植物に分けてカラー写真を各頁1-2枚ずつ配し，解説をつけてある。解説は漢字が多く使われていて，硬い感じがするが，これは他の図鑑の「やさしい」記述に追随せず，正確さを意図した結果である。そのほか植物名の由来や漢薬との関係，用途などに意が用いられている。（金井弘夫）

□浅野一男・伊知次国夫：伊那谷の植物 261pp. 1986. 信濃毎日新聞社，長野。¥2,200. カラー写真を主体に，暖帯，中間温帯，温帯の順に分け，各々の中では森林から草原へ生育地別に植物を配列してある。解説は植物名方言や用途に著者の永年の調査の結果が盛り込まれている。巻末の方言名索引は方言名と標準名とがセットになっていて，いちいちその頁をひかなくてもどの植物かわかるので，たいへん便利である。（金井弘夫）

□麓 次部：四季の花事典 542+11pp. 1985. 八坂書房，東京。¥5,800. 著者は1962-1978年京都府立植物園長。春夏秋冬の四季に分けて，その中をアイウエオ順に花木，花草の名をあげて解説したもの。写真や図を多く入れ，内容には和歌・俳句などもあげて，人生との関連や植物学上，園芸学上の解説をする。誰にも親しみやすい本である。

（木村陽二郎）