

Distribution of Diploid AA ($2n = 16$) of *Scilla scilloides* Found in Taiwan

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台湾で発見された二倍体ツルボ AA ($2n = 16$) の分布

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In nine plants of *Scilla scilloides* collected from the suburbs of Taoyuen city in Taiwan (Formosa), karyotypes and chromosome configurations in meiosis were studied. Those plants were diploid $2n = 16$ with AA genome constitution and exhibited regular chromosome pairing with 8_{II} in metaphase I in pollen mother cells. The plant with AA genome constitution was reported first in Taiwan. The morphology and flowering time of the plants much resembled those of AA from Korea.

Scilla scilloides (Lindley) Druce, *Liliaceae*, is a long-lived perennial herb distributed from Ussuri southwards and northern China to Korea, Japan, Ryukyus, Taiwan, and Hong Kong (cf., e.g., Ohwi 1965, Noda 1967, 1976, Ihara 1977, Yü and Araki 1991).

Cytologically, the species is a complex consisting of two diploids and six polyploids with two basic genomes A ($x = 8$) and B ($x = 9$) (cf., e.g., Haga and Noda 1976, Sato 1942, 1953). The allopolyploids such as AABB ($2n = 34$), ABBB ($2n = 35$), and AABBB ($2n = 43$) are distributed in China to Japan through Korea. Two diploids, AA

($2n = 16$) and BB ($2n = 18$), tend to be distributed allopatrically. AA is found in northeastern China, Korea and Hong Kong but not in Japan and Taiwan. BB is found in Japan and Lushan in Jiangxi Province, southeastern China (Araki 1972, 1985, Araki et al., 1979, Haga and Noda 1976, Ihara 1977, Yang and Zhu 1987, Yü and Araki 1991). The range of the diploids is important to discuss the origin of the allopolyploids. The present paper reports AA newly found in Taiwan.

Materials and Methods

Nine plants were collected from a suburb of

Taouyen city, Taouyen County in Taiwan (Formosa) by the second and third authors on 28 February, 1989 and were cultivated in the experimental garden of Kumamoto University, Kumamoto, Japan.

For karyotypic analyses, the root-tips were pretreated with a 0.002 M 8-hydroxyquinoline solution for 2 hours before fixation with La Cour 2BE, and then squashed in 45% acetic acid following Feulgen-staining. Pollen mother cells (PMCs) were fixed in Newcomer's solution and squashed in 1% iron-acetocarmine for meiotic study.

Results and Discussion

The gross morphology of the materials is identical with that of Korean AA except for the curled leaves. Their height of flower stalk, up to 60 cm tall, is prominently taller than the other cytotypes. Eight of nine Taiwanese plants flowered in late July as well as the case of Korean AA at the experimental garden. Remaining one plant flowered in late May. The flowering time is also a characteristic of AA. The other cytotypes, generally, blossom in September to October.

All nine plants were a diploid, having $2n=16$. The morphology of chromosomes corresponded with those (denoted the genome A_5) of Korean and Chinese AA (Fig. 1, cf. Araki 1972, 1985, Yü

and Araki 1991). The constituent eight chromosomes of the set were of a large metacentric a_1 as marker chromosomes, five subtelocentric a_2 to a_6 , and two small-sized metacentric a_7 and a_8 . The chromosome a_2 carried a large satellite. This was common in AA but not in the allopolyploids such as AABB. Pairing of metaphase I chromosomes in PMCs was regular, 8_{II} (100% in 50 cells). This meiotic configuration was the same as that observed in Korean and Chinese AA (Fig. 2, cf. Araki 1972, Yü and Araki 1991).

The materials were different in the height of flower stalks and flowering time from the plants (the specimens in TH and KYO) collected from Suao city of Ilan County and those (the specimens in KYO) collected by Faurie in October in 1914. Those plants had the short flower stalks and flowered in late October. Those, thus, might not represent AA. Okabe (1938) reported the plants with $2n=34$, probably AABB, and Chang and Hsu (1974) reported the plants with $2n=34$, AABB, from Taiwan. The AA is the first record from Taiwan.

AA was not only found in northeastern China and Korea but in Hong Kong (Ihara 1977). The finding of AA in Taiwan, thus, might be suggested that this cytotype is widely distributed in southeastern China.

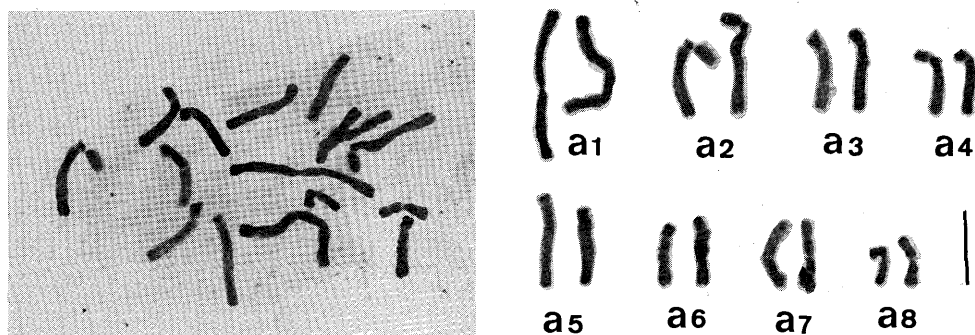


Fig. 1. Somatic metaphase (left) and chromosome complement (right) of *S. scilloides* ($2n=16$, AA) from Taiwan. Bar indicates 10 μ m.

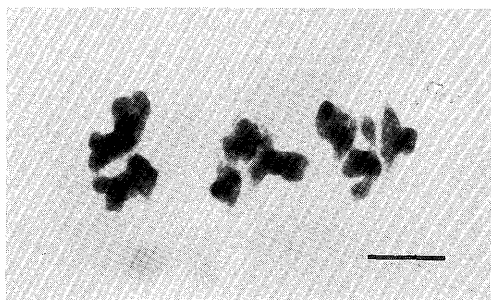


Fig. 2. Metaphase I configuration ($2n = 16 = 8_{II}$) in PMC of *S. scilloides* from Taiwan. Bar indicates $10 \mu\text{m}$.

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要 旨

ユリ科の多年草ツルボ (*Scilla scilloides* (Lindley) Druce) には、ゲノム A ($\chi = 8$) からなる二倍体 AA とゲノム B ($\chi = 9$) からなる二倍体 BB、および 6 種類の倍数体が知られている。しかし、2つの二倍体は隔離分布をしている。したがって、二倍体の分布の調査は、異質倍数体の起源を考える上で重要な問題である。台湾の桃園県桃園市の郊外から採集した 9 個体のツルボは、他の倍数体には見られない AA の特質を持っていた。すなわち、約 60 cm の長い花茎をつけ、7 月下旬に開花した。核型分析の結果、これら 9 個体はすべて二倍体 AA ($2n = 16$) であることが確定した。すなわち、ゲノム A のマーカーである大型の中部動原体型 (a_1)、5 本の次端部動原体型 ($a_2 \sim a_6$)、2 本の小型の中部動原体型 ($a_7 \sim a_8$) の 8 本から成る染色体組を 2 つ含んでいた。また、減数分裂第一中期においては、正常な 8_{II} が形成されていた。台湾における AA の分布が確認されたのは初めての事である。