

Chromosome numbers of *Erigeron miyabeanus* Tatew. & Kitam. (Asteraceae) and the allied taxa from Hokkaido, northern Japan

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Abstract Chromosome numbers for four taxa of the genus *Erigeron* (Asteraceae) of Hokkaido, northern Japan, are reported. A count of $2n=18$ for *E. thunbergii* A. Gray subsp. *glabratus* (A. Gray) H. Hara f. *kirigishiensis* Inagaki & Toyokuni is reported here for the first time. For *E. thunbergii* subsp. *glabratus* var. *heterotrichus* H. Hara, a new chromosome number of $2n=27$ is reported.

Key words: Chromosome numbers, *Erigeron miyabeanus*, *Erigeron thunbergii* subsp. *glabratus* f. *kirigishiensis*, Hokkaido.

Erigeron miyabeanus (Tatew. & Kitam.) Tatew. & Kitam. ex H. Hara (Asteraceae) is rarely found in Hokkaido, Japan. While an allied taxa, *E. thunbergii* A. Gray subsp. *glabratus* (A. Gray) H. Hara, is distributed mainly from central to northern parts of Japan. In Hokkaido six taxa of *Erigeron* are found in limestone and serpentine areas: *E. miyabeanus* (Tatew. & Kitam.) Tatew. & Kitam. ex H. Hara, *E. thunbergii* A. Gray subsp. *glabratus* (A. Gray) H. Hara var. *glabratus*, *E. thunbergii* A. Gray subsp. *glabratus* var. *glabratus* H. Hara f. *kirigishiensis* Inagaki & Toyokuni, *E. thunbergii* A. Gray subsp. *glabratus* var. *glabratus* H. Hara f. *haruoi* Toyokuni, *E. thunbergii* A. Gray subsp. *glabratus* (A. Gray) H. Hara var. *angustifolius* H. Hara and *E. thunbergii* A. Gray subsp. *glabratus* (A. Gray) H. Hara var. *heterotrichus* H. Hara. In this paper we will provide basic cytological data for plants found in serpentine and limestone areas in Hokkaido.

Materials and Methods

Living plants were collected from five localities in Hokkaido as listed in Table 1. They were

transplanted in Asahikawa. For the counts of somatic chromosome numbers, root tips were used. They were treated with 0.002 M 8-hydroxyquinoline for 3–4 hours, fixed in a 3:1 mixture of alcohol and acetic acid for several seconds, and transferred to 1 M-HCl at 60°C for about 10 seconds thereafter. They were squashed in 1% aceto-orsein.

Voucher specimens except for *Erigeron thunbergii* subsp. *glabratus* var. *heterotrichus* are deposited in TNS.

Observations

1. ***Erigeron miyabeanus*** (Tatew. & Kitam.) Tatew. & Kitam. ex H. Hara: $2n=18$ (Fig. 1).

This alpine species is restricted to the Mt. Poronupuri area, Kitami Province, northern Hokkaido and resembles *E. thunbergii* subsp. *glabratus* in general appearance. The chromosome number of $2n=18$ has been reported by Ito *et al.* (1995) for the cultivated plants. The material used in this study was collected in Mt. Pisshiri which is a new locality of this species (Sato, 1994). Our count of $2n=18$ is agreeable with the

Table 1. Chromosome number and locality of *Erigeron* taxa studied.

Taxa and Localities	No. of plants examined	2n=	Previous reports
<i>E. miyabeanus</i> Tatew. & Kitam. Mt. Pisshiri, Teshio Province	1	18	2n=18 (Ito <i>et al.</i> , 1995)
<i>E. thunbergii</i> A. Gray sp. <i>glabratus</i> H. Hara	1		n=18 (Matsuura & Suto, 1935)
Shoya, Erimo-cho	1	18	2n=18 (Sakai, 1934; Shimotomai & Huziwara, 1940; Huziwara, 1954; Arano, 1963; Nishikawa, 1988)
f. <i>kirigishiensis</i> Inagaki & Toyokuni Mt. Kirigishi, Sorachi Province	2	18	
var. <i>heterotrichus</i> H. Hara Akaiwa-Seigankyo, Shimukappu-cho	1	18	2n=18 (Huziwara, 1965)
Nakanokawa, Taiki-cho	1	27	

previous report.

2. ***Erigeron thunbergii*** A. Gray subsp. ***glabratus*** (A. Gray) H. Hara: 2n=18 (Fig. 2).

This variety is distributed in Japan from central Honshu to Hokkaido and is found in subalpine and alpine stony grassy habitats. The chromosome number of 2n=18 for this subspecies was first reported by Sakai (1934) with the cultivated plants. The same chromosome number has been reported by Shimotomai and Huziwara (1940), Huziwara (1954) and Arano (1963) for Honshu materials, and Nishikawa (1988) for Hokkaido material. Our count of 2n=18 was made with the material from Shoya, Erimo, southern Hokkaido. Matsuura and Suto (1935), however, have reported the chromosome number of n=18 for the material from the Daisetsu Mountains, central Hokkaido. Thus for this plant two kinds of chromosome numbers have been known.

3. ***Erigeron thunbergii*** A. Gray subsp. ***glabratus*** (A. Gray) H. Hara f. ***kirigishiensis*** Inagaki & Toyokuni: 2n=18 (Figs. 3, 4).

The occurrence of this form is restricted to higher mountain parts of Mt. Kirigishi of Yubari Mountain Range where it grows chiefly on limestone rocks. According to Inagaki and Toyokuni (1971) this form well resembles f. *haruoi* Toyokuni endemic to Mt. Yubari in general ap-

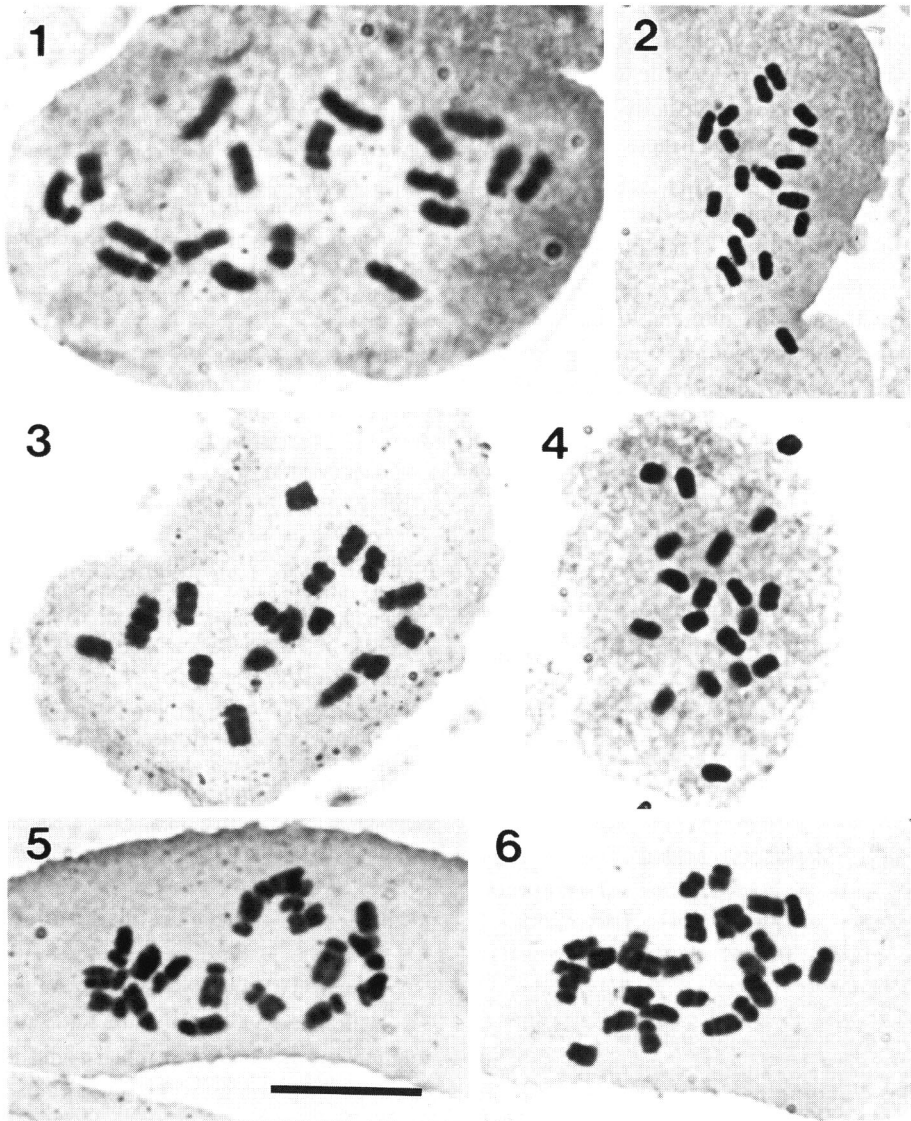
pearance, but is distinguished from the latter by having longer, narrower leaves with somewhat acutiuscule apex. By the degree of hairiness on stem the plants used here were separated: one with long hair and the other with short and long hairs.

The chromosome number of this form has not been reported hitherto, and was proved here to be 2n=18 for the first time. This chromosome number is the same as that of *E. thunbergii* subsp. *glabratus* in present study.

4. ***Erigeron thunbergii*** A. Gray subsp. ***glabratus*** (A. Gray) H. Hara var. ***heterotrichus*** (H. Hara) H. Hara: 2n=18 (Fig. 5); 2n=27 (Fig. 6).

The occurrence of this variety is limited to serpentine area of Mt. Shibutsu and Mts. Tanigawa, central Honshu those are well-known for their rich flora including many paleo-endemic species. The chromosome number of 2n=18 (Huziwara, 1965) for this variety has been reported on plants from Mt. Shibutsu, Gunma Prefecture, central Honshu.

Two plants were collected in Akaiwa-Seigankyo, Shimukappu, central Hokkaido and Nakanokawa, Taiki, southern Hokkaido. They are newly found localities in Hokkaido. Those localities are belonging to the serpentine area of Mts. Yubari and Hidaka Mountain Range, respectively. The count of 2n=18 for the plant from Akaiwa-Seigankyo was the same as the pre-



Figs. 1–6. Somatic chromosomes of *Erigeron* species. 1: *E. miyabeanus*, $2n=18$ (Mt. Pisshiri). 2: *E. thunbergii* subsp. *glabratus*, $2n=18$ (Shoya, Erimo). 3: *E. thunbergii* f. *kirigishiensis*, $2n=18$ (Mt. Kirigishi). 4: *E. thunbergii* f. *kirigishiensis* with both short and long hairs, $2n=18$ (Mt. Kirigishi). 5: *E. thunbergii* ssp. *glabratus* var. *heterotrichus*, $2n=18$ (Akaiwa-seigankyo, Shimukappu). 6: *E. thunbergii* ssp. *glabratus* var. *heterotrichus*, $2n=27$ (Nakanokawa, Taiki). Scale bar: $10\ \mu\text{m}$.

vious report. The plant from Nakanokawa, however, had the chromosome number of $2n=27$. This count is the first report for this variety.

Discussion

The ultrabasic rock area extending from

Toikanbetsu southwards to Mt. Apoi via Kamukotan serves the backbone of Hokkaido Island, northern Japan. In this area there grow a considerable number of unique plants characterized by the following morphological attributes: leaves are dwarf, glabrous, lustrous, thickened and narrower in contrast with those of non-ultra-

basic rock areas. Good examples of such habit are found in the *Erigeron* plants; observation on the four taxa used here shows a wide range of variation in the color of plant body, the shape of leaves and the degree of hairiness on stem and leaves.

Differences in chromosome numbers are generally useful to clarify intra- and inter-specific relationships among related taxa. As mentioned above, the chromosome number of $2n=18$ was observed for four taxa of the genus *Erigeron*. Furthermore the new chromosome number of $2n=27$ was observed for *E. thunbergii* subsp. *glabratus* var. *heterotrichus*. Polyploidy may be involved in the variation of the morphological characters in the genus *Erigeron*.

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