Sigeru DAIGOBO*: **Chromosome numbers of the fern genus *Polystichum* (1)**

大悟法 滋*: イノデ属の染色体数 (1)

The present study was designed to obtain additional informations concerning the chromosome numbers of the genus *Polystichum*. The first cytological study of the genus *Polystichum* was made by Manton (1950) on five European (including two hybrids) and one African species. In her work the basic chromosome number of the genus was considered to be 41. A number of subsequent works (Manton and Sledge 1954, Mehra 1961, Taylor and Lang 1963, Kurita 1966, Mitui 1968 and others), although somewhat fragmentary, have reported the chromosome numbers of about fourty taxa of *Polystichum*.

In the present study, the chromosome numbers of 10 species are re-examined, and those of eight species and one varieties are reported for the first time. The determination of the chromosome numbers was by the aceto-carmin squash method using spore mother cells fixed with Carnoy's fluids or Newcomer's solution.

P. biaristatum (Bl.) Moore: Manton and Sledge (1954) reported n=82 for this species from Ceylon, while Mehra (1961) reported n='123' for the same species from India. The 82 bivalents in meiosis were observed in the material from Taiwan, agreeing with the report of Manton and Sledge (1954).

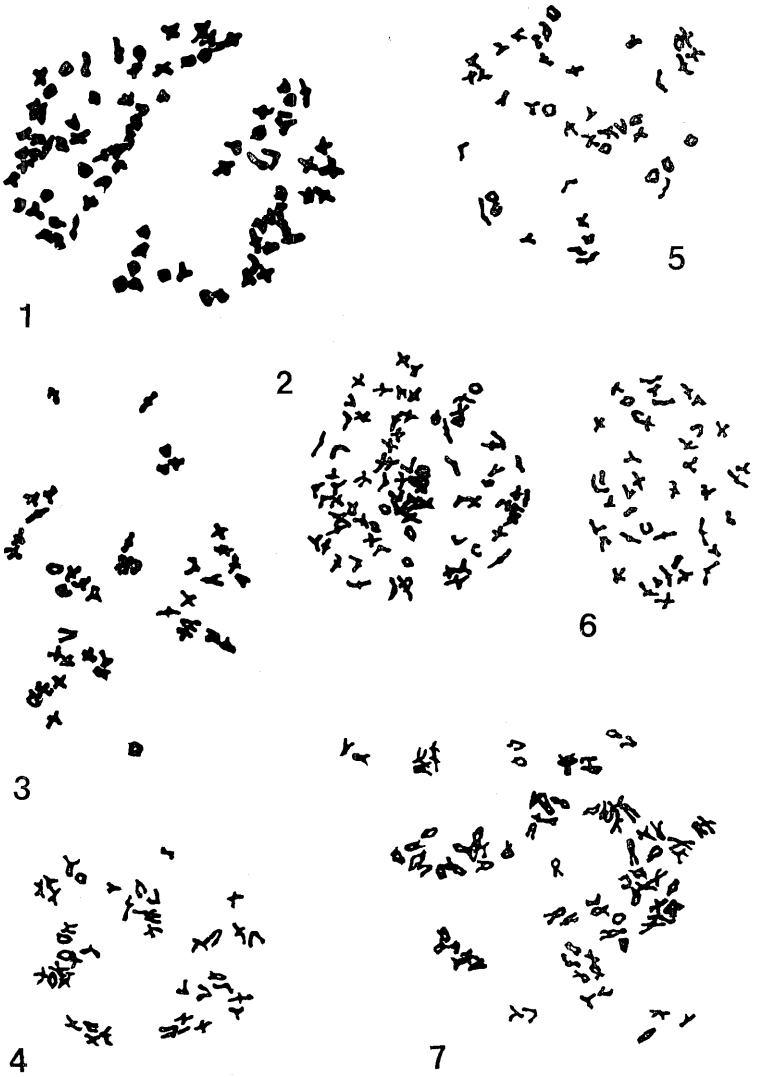
P. braunii (Spenn.) Fée: Manton and Reichstein (1961), Vida (1963), and others reported n=82 and 2n=164 for this species from Europe, but Taylor and Lang (1963) reported n=82-84 from British Columbia, Canada. In Japan, Mitui (1970) reported n=82 for this species from Yamanasi Prefecture. I have observed 82 bivalents in meiosis in the materials collected in Totigi Prefecture.

P. eximium (Mett. ex Kuhn) C. Chr.: Manton and Sledge (1954) reported n=c. 120 for this species from Ceylon. However, the materials from Yakusima, Kagosima Pref. showed the haploid chromosome number of 41. Kurita

* Bot. Inst., Fac. Sci., Tokyo Kyoiku Univ., Otsuka, Tokyo. 東京教育大学理学部植物学教室.

(1965) also reported n=41 for this species (as *P. gemmiferum* Tagawa) from the same locality.

P. fibrillosopaleaceum (Kodama) Tagawa and var. *marginale* Serizawa:



Figs. 1-7. Numbers correspond to those in tab. 1. (×630)

Kurita (1966) and Mitui (1966) reported n=41 for this species. In the present study, the same haploid chromosome number is observed in both the mother species and the variety.

P. hancockii (Hance) Diels: Mitui (1968) reported n=41 for this species from Japan. I have observed 41 bivalents in the meiosis of this species from Taiwan.

P. microchlamys (Christ) Matsum.: The haploid chromosome numbers are counted to be 82 for the first time for this species. The specimens used for this study was a form so-called "var. *azumiense*". I considered this variety was only a habitat modification of *P. microchlamys* (Daigobo, 1972).

P. neolobatum Nakai and *P. rigens* Tagawa: Evidently 123 bivalent chromosomes were counted at the first meiotic division in both species. These species are probably apogamous as other triploid species of this genus, as 32 spores are produced in each sporangium.

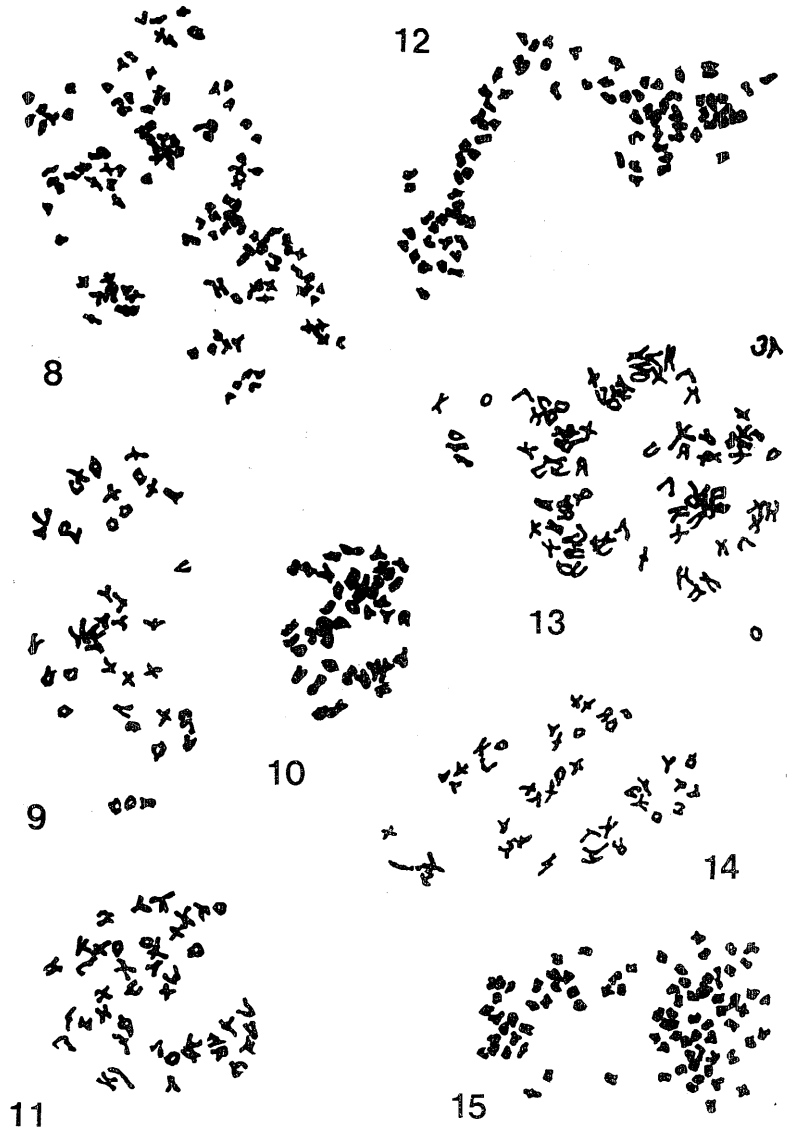
P. obai Tagawa: This species is endemic in Amamiosima, Kagosima Prefecture. The chromosome numbers at the meiosis are counted to be n=41. Kurita (1967) also reported the same number for this species from the same locality.

P. ohmurae Kurata and *P. otomasui* Kurata: These two species are sexual diploids, having 41 pairs of chromosomes at the meiosis. These are the first cytological data for the two species.

P. ovatopaleacum (Kodama) Kurata: Kurita (1966) and Mitui (1968) reported n=82 for this species. I have observed the same haploid chromosome number. One of the specimens used for this study was a form so-called "var. *coraiense*". This variety was reduced to the synonym of the mother species by the author (1972). There seems to be no cytological difference between the mother species and the variety form.

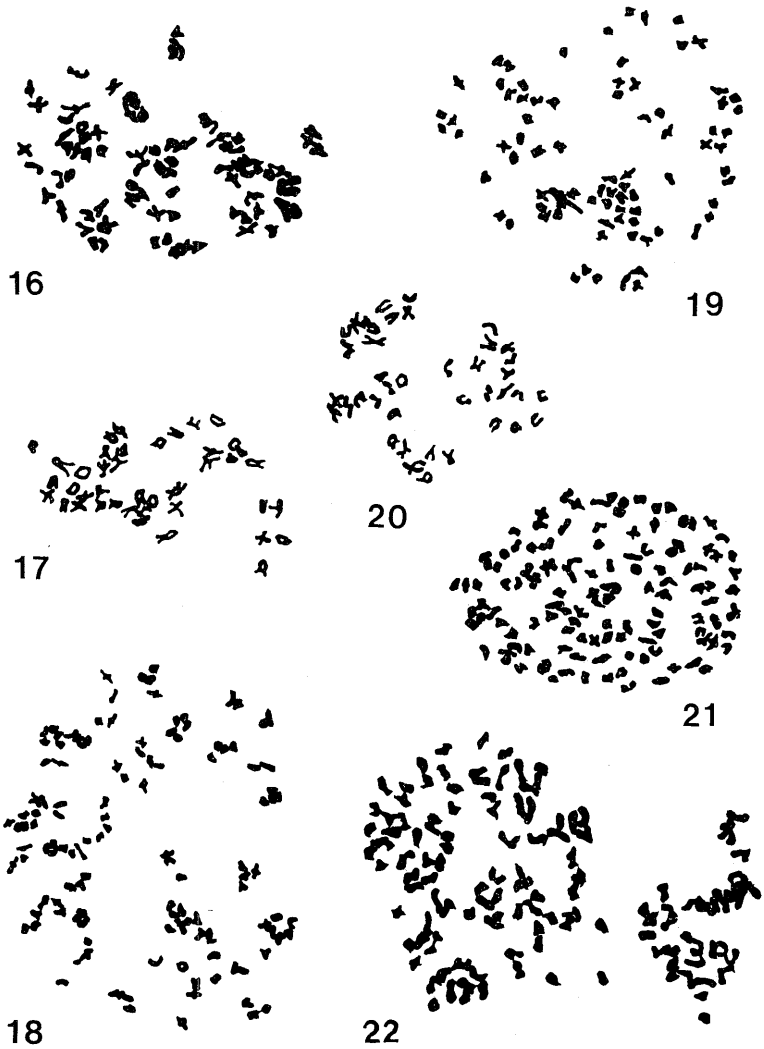
P. parvipinnulum Tagawa and *P. stenophyllum* Christ: Both species collected from Taiwan showed 41 pairs of chromosomes at the meiosis. These are the first cytological data for both species.

P. polyblepharum (Roem. ex Kunze) Pr.: Kurita (1966) and Mitui (1966) reported n=82 for this species. I have observed the same haploid chromosome number. One of the specimens used for this study was a form so-called "var. *scabiosum*". I considered this variety was only an abnormal form of *P. polyblepharum* (Daigobo, 1972).



Figs. 8-15. Numbers correspond to those in tab. 1. (×630)

P. retrosopaleaceum (Kodama) Tagawa: Kurita (1966) and Mitui (1968) reported n=41 for this species. I have observed the same haploid chromosome number.



Figs. 16-22. Numbers correspond to those in tab. 1. (×630)

Table 1. Chromosome numbers in 22 representatives of the genus *Polystichum* from Japan and Taiwan.

Species	Locality where the materials were collected	Haploid number	Fig.
P. biaristatum (Bl.) Moore	Terngjy, Kaohsiung Pref. (Taiwan)	82	1
P. braunii (Spenn.) Fée	Okukinu, Totigi Pref.	82	2
P. eximium (Mett. ex Kuhn) C. Chr.	Yakusima, Kagosima Pref.	41	3
P. fibrillosopaleaceum (Kodama) Tagawa	Taura, Kanagawa Pref.	41	4
var. *marginale* Serizawa	Suyama, Sizuoka Pref.	41	5
P. hancockii (Hance) Diels	Chitou, Nantou Pref. (Taiwan)	41	6
P. microchlamys (Christ) Matsum.			
"var. *azumiense* Serizawa"	Mt. Myoko, Niigata Pref.	82	7
P. neolobatum Nakai	Toyamagawa, Nagano Pref.	'123'	8
P. obai Tagawa	Amamiosima, Kagosima Pref.	41	9
P. ohmurae Kurata	Mt. Fuji, Yamanasi Pref.	41	10
P. otomasui Kurata	Tetuyama, Miyazaki Pref. & Danto, Kumamoto Pref.	41	11
P. ovatopaleaceum (Kodama) Kurata	Komakino, Tokyo Pref.	82	12
"var. *coraiense* (Christ) Kurata"	Okukinu, Totigi Pref. & Titibu, Saitama Pref.	82	13
P. parvipinnulum Tagawa	Chitou, Nantou Pref. (Taiwan)	41	14
P. polyblepharum (Roem. ex Kunze) Pr.	Taura, Kanagawa Pref.	82	15
"var. *scabiosum* Kurata"	Mituisi, Tiba Pref.	82	16
P. retrosopaleaceum (Kodama) Tagawa	Okukinu, Totigi Pref.	41	17
P. rigens Tagawa	Takao, Tokyo Pref.	'123'	18
P. shimurae Kurata in shed.	Gotenba, Sizuoka Pref. & Itukaiti, Tokyo Pref.	82	19
P. stenophyllum Christ	Nanhutashan, Ilan Pref. (Taiwan)	41	20
P. tsussimense (Hook.) J. Sm.	Mituisi, Tiba Pref.	'123'	21
"var. *mayebarae* (Tagawa) Kurata"	Yugawara, Kanagawa Pref.	'123'	22

P. shimurae Kurata in shed.: This undescribed species is a sexual tetraploid, having 82 bivalents at the meiosis. This species is known to occur at two localities, Gotenba and Itukaiti. In the present study, materials collected from these two localities were investigated. Since this species is nearly indistinguishable from *P. setiferum* var. *fargesii* (Christ) C. Chr. from China it will be necessary to make a further study of the morphology and the cytology of these two species.

P. tsussimense (Hook.) J. Sm.: This species is an apogamous triploid showing 123 bivalent chromosomes in meiosis as reported by Mitui (1965). One of the specimens used for this study was a form so-called "var. *mayebarae*". This variety was reduced to the synonym of the mother species by the author (1972). There seems to be no cytological difference between the mother species and "var. *mayebarae*".

The results obtained in the present study are summarized in the Table 1. There are three kinds of haploid chromosome numbers, n=41, 82 and 123, occurring in the representatives of the genus *Polystichum*. Therefore, the common basic number, 41, as proposed by Manton (1950), can also be applied to the present materials from Japan and Taiwan.

I would like to express my sincere thanks to Prof. Emer. Hirosi Ito for his valuable advice.

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イノデ属に属するシダ類 17 種 5 変種の染色体数を報告する。そのうち 10 種はすでに染色体数が報告されているものについての再検討であり，8 種 1 変種が今回あらたに観察された。結果は表 1 と図 1-22 に示されるように，いずれも 41 を基本数とする数が観察された。

○大深当帰の花芽抑制の一方法（岡田　稔）　Minoru OKADA: On the flower-bud control of medicinal angelica "Obuka-toki" (*Angelica acutiloba* Kit.)

芽択りとは大深当帰の苗を春（四月上～中旬）本畑に定植する際行なう方法である。大深当帰苗の成育の良いものは，その年中に抽苔して花が咲くとその年に枯れる（北海当帰は栽培中に抽苔しても殆んどが枯れないし，大深当帰ほど抽苔もしない）。そこで大深当帰の栽培には，頂芽の芯の部分を竹ベラで択り（即ち形成された花芽を取る），多数の輪生している側芽の生長を促す，所謂芽択りを実施するのである。この芽択り法は一般には竹ベラで択る方法が行なわれ，薬草栽培の図書にもこの方法が記載されている。しかしこの方法は労力がかかり，又定植した際その芽を択った所より腐る率が多い為，奈良県吉野郡下市地方では最近次の方法で行なっている所があったのでその大略を記する。

奈良県吉野郡下市町広橋辺では，四月三日頃から約 1 週間芽択り作業を実施している。四月二十日をすぎると成育が非常に悪くなるのでこの時期が良い。芽択りする前処理として，晩秋掘り出して春迄貯蔵の為仮植しておいた当帰苗を畑から掘り起し，再び苗を丸い輪の様に並べ替え，その上に 2～3 cm 位軽く土をかぶせ，段々に苗，土，の順に次々に約 30～40cm 位の高さに積み重ねて置き，芽択りをし易くする準備をする（土の中へ入れて土の水分，夜つゆ及び地熱とで，頂芽を柔かく徒長させる為であるし，又本畑に移植した時も成長が良い）。この様に輪状に仮植して約 1 週間放置後掘り起し，芽択りを実施する。この芽択り法は左手で根の部分を，右手で新芽の部分を持ち，軽く折り曲げ，引き抜く様にして頂芽の芯の部分を取るのである。この際なるべく苗を傷めず，苗の側芽の部分を特に傷つけない様にする事である。

尚奈良県吉野郡の大部分は従来通り頂芽を竹製の小刀（竹ベラ）で芯を択り取る方法を実施している。そして前述の頂芽を引き抜く方法は，最近の最も適切な方法であると思ったので記させて頂いた。

終りにこの方法につき御教示下さった奈良県下市町の南信市氏と御案内していただいた桜井市の福田真三氏に感謝致します。

（津村研究所）