

Hiroshi Yabu: Occurrence of associated four minute chromosomes at meiotic metaphase I in the tetrasporangia of *Laurencia intricata* Lamouroux (Rhodophyta)

Key Index Words: chromosome—cytology—*Laurencia intricata*—meiosis—*Rhodophyta*.
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During the study of cytology on the materials of *Laurencia intricata* Lamouroux (Ceramiales, Rhodophyta) which is commonly grown in summer season on the flat shore of Moheji (near Hakodate, Hokkaido) and its vicinity, I recently noticed the presence of associated 4 minute chromosomes in the chromosome complements at meiotic metaphase I in the tetrasporangia. Therefore, the tetrasporic plants collected from Moheji in September 1989 were examined again to obtain the data for the chromosome complements, after fixed in aceto alcohol (1 : 3) and stained with aceto-iron-haematoxylin-chloral hydrate solution (Wittman 1965).

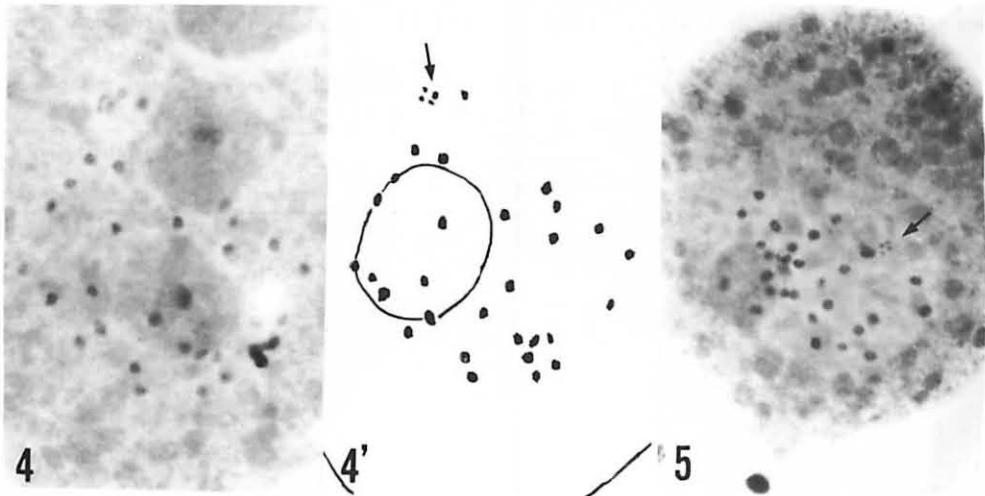
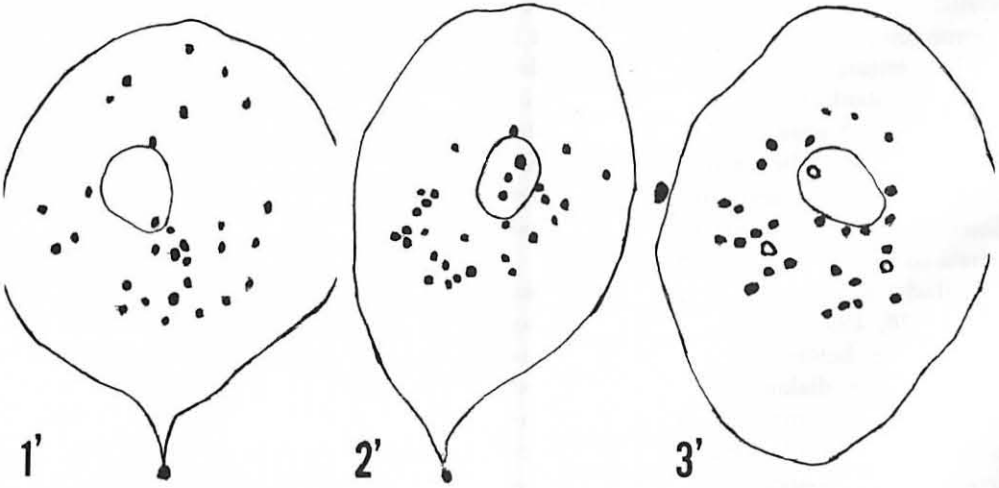
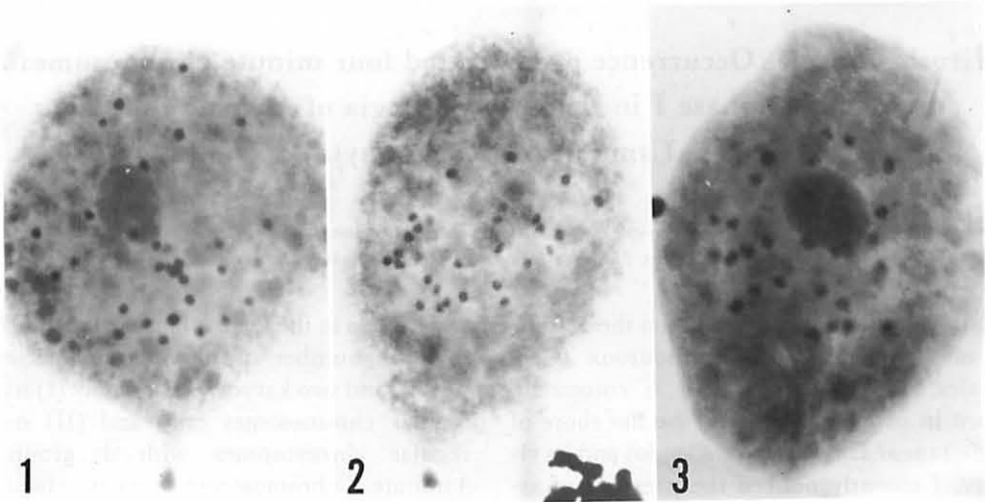
Similarly to the other *Laurencia* species (Yabu 1978, 1985), the present species has diffuse stage before diakinesis at meiosis I. Until late diakinesis, such associated 4 minute chromosomes could not be discernible. The count of chromosomes and occurrence of such associated 4 minute chromosomes are shown in Table 1 and Figs. 1-8.

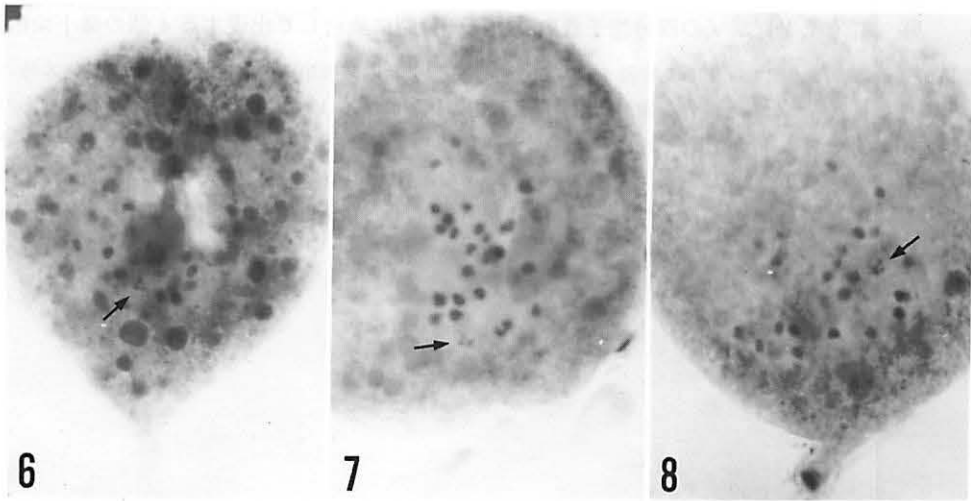
The data in the table indicates that the chromosome number of the present species is $n=30$, and two karyotypes, namely (I) $n=30$ regular chromosomes only and (II) $n=29$ regular chromosomes with 1 group of 4 minute chromosomes, exist in the tetrasporangia, and the tetrasporic plants comprise three varieties having tetrasporangia with karyotype (I) only, with karyotypes both (I) and (II), and with karyotype (II) only. From the above results, one of the regular chromosomes seems to have relation to the associated 4 minute chromosomes.

Up to the present time, the chromosome numbers in the genus *Laurencia* have been given for the following 10 species; *L. arbuscula* ($n=29$, Cordeiro-Marino *et al.* 1983), *L. catarinensis* ($n=28$, Cordeiro-Marino and Fujii 1985), *L. hybrida* ($n=ca. 20$ $2n=ca. 40$, Westbrook 1935), *L. nipponica* ($n=28$, Yabu 1978), *L. obtusa* var. *majuscula* ($n=20$ $2n=40$, Yabu and Kawamura 1959), *L. okamurai* ($n=32$, Yabu 1985), *L. papillosa* ($n=20$,

Table 1. Chromosome count and occurrence of associated 4 minute chromosomes at meiotic metaphase I in the tetrasporangia of *Laurencia intricata* collected at Moheji in September 1989.

Individual no.	Number of examined tetrasporangia	Number of tetrasporangia having 30 regular chromosomes	Number of tetrasporangia having 29 regular chromosomes together with associated 4 minute chromosomes
1	8	8	
2	9	9	
3	10	10	
4	8	8	
5	8	4	4
6	9	5	4
7	10		10
8	10		10
9	10		10
10	10		10





Figs. 1-8. Late diakinesis at meiosis I in the tetrasporangia of *Laurencia intricata* Lamouroux. $\times 1,280$. 1-3. Sporangia having 30 regular chromosomes. 4-8. Sporangia having 29 regular chromosomes together with associated 4 minute chromosomes (arrow). In Figs. 6-8, one of the 4 minute chromosomes is out of focus. In Fig. 4, cells of trichoblast are seen mixed in a part of the squashed sporangia. 1'-4'. Drawings of Figs. 1-4, respectively.

$2n=40$, Yabu and Kawamura 1959; $n=26$, Cordeiro-Marino *et al.* 1974), *L. pinnata* ($n=32$, Yabu 1985), *L. pinnatifida* ($n=ca. 20$, Kylin 1929; $n=15-16$, Grubb 1925; $n=ca. 20$ $2n=ca. 40$, Westbrook 1928, 1935; $n=29$ $2n=58$, Austin 1956; $n=29$, Magne 1964) and *L. undulata* ($n=30$, Yabu 1985).

The chromosome number of $n=30$ counted in the present species is so far the same with that in *Laurencia undulata* among the above species.

Such a group of the associated minute chromosomes observed in the present species has never been reported in any of the above species.

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藪 熙：紅藻モツレソゾの四分胞子嚢内減数第一分裂に集合して出現する4個の微小染色体

北海道函館近郊の茂辺地で採集した紅藻モツレソゾの四分胞子嚢内減数第一分裂を観察した結果、本種の染色体数は $n=30$ と見做された。その分裂像から四分胞子嚢内の核型には、(I) 30の正常な染色体を有するものと、(II) 29の正常な染色体と4個の微小染色体の一群を有するものとの2型があり、四分胞子体にはその四分胞子嚢に(I)型のみ有するもの、(I)と(II)の型を有するもの、(II)の型のみを有するもの、以上3種類が存在することを認めた。このことから4個の微小染色体の1群は30の正常な染色体のうちの1個と関係があるものと推察された。(041 函館市港町3-1-1 北海道大学水産学部)