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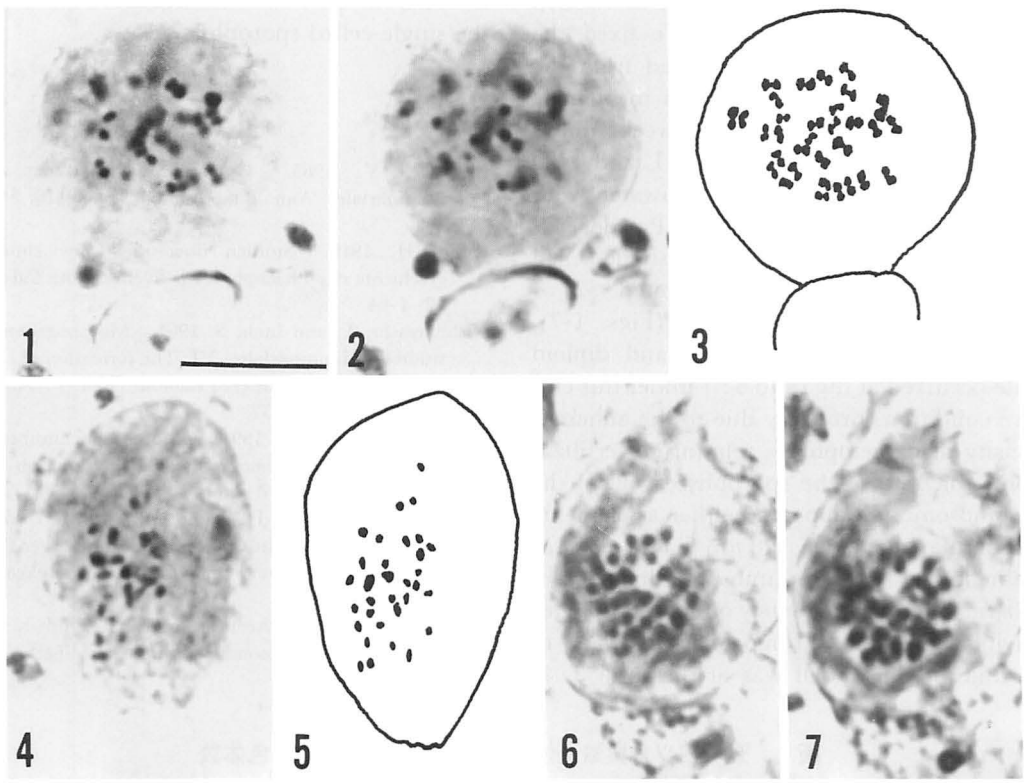
Hiroshi Yabu, Norishige Yotsukura and Tsuyoshi Sasaki: Chromosome number in *Chorda filum* (L.) Lamour. (Laminariales, Phaeophyta)

Key Index Words: chromosome number—Chorda filum—*Laminariales.*
Hiroshi Yabu, Norishige Yotsukura and Tsuyoshi Sasaki, Laboratory of Marine Botany, Faculty of Fisheries, Hokkaido University, Hakodate, Hokkaido 041 Japan

For *Chorda filum* (L.) Lamour., a common species of Laminariales in the summer season on the shores in the northern hemisphere, the chromosome numbers have hitherto been reported by three investigators, viz., Kylin (1918), Nishibayashi and Inoh (1961) and Evans (1965), as shown in Table 1. The senior author of the present study has preliminarily attempted for years to examine the chromosome number of this species, using the cytological methods employed by those investigators. Those methods, however, did not offer satisfactory dividing nuclei to be able to decide its exact chromosome number. In the recent cytological study on the species of *Laminaria*, Yabu and Yasui (1991) easily obtained sufficient metaphase nuclei for chromosome counts in one- or two-celled sporophytes, using aceto-alcohol (1 : 3) for fixing and aceto-iron-haematoxylin-chloral hydrate



Figs. 1–7. Metaphase chromosomes in the one-celled sporophytes of *Chorda filum* (L.) Lamour. Bar: 10 μm. All figures are in the same scale.
1. A sporophyte cell with 32 chromosomes in dumb-bell shape. 2. The same sporophyte as shown in Fig. 1, at different focus level. 3. Camera-lucida drawing of the same sporophyte as shown in Fig. 1. 4. A sporophyte with 32 chromosomes in granular shape. 5. Camera-lucida drawing of the same sporophyte as shown in Fig. 4. 6. A sporophyte with c. 60 chromosomes. 7. The same sporophyte as shown in Fig. 6, at different focus level.

Table 1. Data of previous and present cytological investigations for Chromosome number of *Chorda filum*.

Investigator and locality of material	Chromosome number	Method
Kylin (1918) Sweden	n=c. 20 in sporogenesis 2n=40 in meristematic portion	classical sectioned method, using strong Flemming's solution for fixing and iron-haematoxylin for staining
Nishibayashi and Inoh (1961) Seto Inland Sea, Japan	n=c. 30 in sporogenesis	classical sectioned method, using Abe's solution for fixing and iron-haematoxylin for staining
Evans (1965) Anglesey, England	n=c. 28 in sporogenesis and female gametophytes 2n=c. 56 in young sporophytes	sguash method, using mainly, aceto-alcohol for fixing and acetocarmine for staining
Present stndy Moheji, Hokkaido, Japan	n=32 in single-celled sporophytes	aceto-alcohol for fixing and aceto-iron-haematoxylin-chloral bydrate for staining

(Wittmann 1965) for staining. This study was undertaken to observe the clear features of chromosomes in the cells of such juvenile sporophytes with this procedure.

The material dealt with in this description was obtained on June 25, 1991, at Moheji near Hakodate, Hokkaido. We fixed the sporophytes which were produced from the liberated zoospores derived from the female gametophytes cultured for two weeks under conditions, 10°C, 2,500 Lux, 12 L and 12 D photoperiod in the filtered seawater with 0.01% SLP (Squid Liver Protein Powder) extract (Yabu et al. 1984). Eighty single-celled sporophytes we observed exhibited 32 or c. 30, and c. 60 chromosomes (Figs. 1-7). These sporophytes in haploid and diploid state occurred at the ratio 5 : 1 under this culture condition, probably due to the adherent density of gametophytes relating to fertilization. In both of the sporophytes, all of the chromosomes all appeared either as elements in granular shape of c. 0.8 μm diameter, or as elements in slender dumb-bell shape of c. 1.0 μm length. Frequency of the sporophytes having either the chromosomes in shape of granule or dumb-bell was at the ratio 2 : 1. The reason for the occurrence of the chromosomes as those two types of elements at such ratio is left to elucidate in our future studies. In a temporal conclusion, the chromosome number of *Ch. filum* was determined to be n=32 from the aboue chromosome counts in the single-celled sporophytes.

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籔　凞・四ツ倉典滋・佐々木剛：褐藻ツルモの染色体数

褐藻ツルモの染色体数は現在迄に Kylin (1918) が n=約20，2n=40，西林と猪野 (1961) が n=約30，Evans (1965) が n=約28，2n=56 と報告している。本種の染色体数を確かめるため函館市外茂辺地で採集した材料を用いて培養し，そこに生じた1細胞期の幼芽胞子体を酢酸・アルコール (1：3) で固定し，酢酸・鉄・ヘマトキシリンで染色を行った。その結果，幼芽胞子体内で観察した中期核分裂像から，染色体数は n=32 と結論された。
(041 函館市港町3丁目1-1　北海道大学水産学部水産植物講座)