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某種の種の核分裂についての研究

YABU, Hiroshi

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Nuclear Division in *Bangia fuscopurpurea* (DILLWYN) LYNGBYE

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position of the longitudinal axis of the cell. In telophase, the chromosomes disappear, and the nuclear membrane and nucleolus make their appearance again. About this stage, a cleavage of the cytoplasm occurs from the periphery. The cleavage sometimes begins already in the metaphase stage. The process of the nuclear division described here is very similar to that observed in *Porphyra umbilicalis* (KRISHNAMURTHY, 1959) and in *Porphyra yezoensis* and *P. onoi* (YABU & TOKIDA, 1963). The existence of the prototrichogyne in the carpogonia is shown in PI. II, figs. 14–15 and PI. IV, fig. 38. The number of chromosomes counted in the metaphase of the fertilized nuclei were 6 in many of the thalli, but 8 in others.

Results obtained by the paraffin method

In the paraffin method, a number of thalli are imbeded together in a paraffin block, so their sections mounted on a slide glass are quite heterogeneous in nature making the identification of sex of fertile cells uncertain except when the cells are fully mature. In early prophase and late telophase, the nucleolus in a nucleus was often found to be two in number but rarely three or more. The nucleolus is sometimes still visible in late prophase (Pl. V, fig. 48). The chromosomes observed in metaphase are always somewhat smaller than those in a smeared preparation and usually granular in shape, never taking a V-shape. Similar to the results obtained by the smear method, the number of chromosomes observed in paraffin sections was 3 or 4 in a vegetative cell (Pl. V, figs. 48–51) and 6 or 8 in a fertilized one (Pl. V, figs. 64–67).

Summary

*Bangia fuscopurpurea* collected in Oshoro Bay, Hokkaido, was found to be a haploid alga. The haploid chromosome number was 3 in most of the thalli, but a few thalli in which the chromosome number was 4 were also found. The diploid chromosomes in the fertilized carpogonia and their derivatives were 6 or 8 in number.

Literature

Explanation of Plates
PLATE I

* Bangia fuscopurpurea* (DILLWYN) LYNGBYE

Photomicrographs of various parts of one and the same male thallus treated by the smear method, showing haploid chromosomes (n=3)

Fig. 1. Showing a nucleus in the early metaphase of vegetative division, with a V-shaped chromosome in the center

Fig. 2. The same nucleus as in Fig. 1, focused at a different level, showing two V-shaped chromosomes

Fig. 3. A side view of a nucleus in the metaphase of the first nuclear division in spermatium formation

Fig. 4. A nucleus in late prophase in spermatium formation

Figs. 5–6. A nucleus in metaphase in spermatium formation, showing three chromosomes

Fig. 7. A nucleus in anaphase

Figs. 8–9. Many nuclei stained dark in spermatium-forming cells; the arrow points to a side view of a nucleus in the metaphase with three chromosomes

(Figs. 1–5 & 9, ×800; Figs. 6–7, ×1000; Fig. 8, ×320)
Yabu: Nuclear Division in *Bangia fucopurpurea* (DILLWYN) LYNGBYE
PLATE II

Bangia fuscopurpurea (DILLWYN) LYNGBYE

Photomicrographs of various parts of one and the same female thallus (Figs. 10, 11, 12, 14, 16 and 17) and of their female thalli treated by the smear method

Fig. 10. A vegetative cell in the basal part of a thallus, showing a nucleus in early prophase

Fig. 11. A vegetative basal cell of a thallus, showing a nucleus in late prophase

Figs. 12-13. A nucleus in early metaphase in carpogonium formation

Figs. 14-15. A carpogonium with prototrichogyne on which is attached a spermatium

Fig. 16. A fertilized nucleus in metaphase, showing six chromosomes

Fig. 17. A fertilized nucleus in anaphase

(Figs. 10-13 & 16-17, x800; Figs. 14-15, x500)
Yabu: Nuclear Division in *Bangia fuscopurpurea* (Dillwyn) Lyngbye
PLATE III

Bangia fuscopurpurea (DILLWYN) LYNGBYE

Cells in various parts of male thalli treated by the smear method

Fig. 18. A vegetative cell in the basal part of a thallus, showing daughter nuclei at telophase

Fig. 19. A nucleus in early metaphase in a cell at the basal part of a thallus

Fig. 20. Two vegetative cells in the basal part of a thallus, showing nuclei in metaphase and late anaphase (n=4)

Fig. 21. Six vegetative cells, showing resting nuclei stained black and situated in each cell on the same side under the thallus surface

Fig. 22. Three vegetative cells, showing two nuclei in the resting stage and one nucleus in prophase

Fig. 23. A nucleus in prophase in the first division of spermatium formation

Fig. 24. A side view of the metaphase nucleus in the first division of spermatium formation

Figs. 25-27. Nuclei in the resting stage and in metaphase in the division of spermatium formation (n=3 and 4)

Fig. 28. A nucleus in anaphase in the division of spermatium formation

Fig. 29. Nuclei in prophase, metaphase and anaphase in the division of spermatium formation

Fig. 30. A spermatium

(Figs. 18-24 & 27-28, ×1480; Figs. 25-26 & 29-30, ×940)
Yabu: Nuclear Division in Bangia fuscorpurpurea (DILLWYN) LYNGBYE
PLATE IV

Bangia fuscopurpurea (DILLWYN) LYNGBYE

Cells in various parts of female thalli treated by the smear method

Fig. 31. A vegetative cell in the basal part of the thallus, showing nucleus in prophase
Fig. 32. A vegetative cell in the basal part of the thallus, showing a nucleus in metaphase
Fig. 33. A nucleus in metaphase
Fig. 34. A side view of a nucleus of metaphase
Figs. 35-37. A nucleus in metaphase \((n=4)\)
Fig. 38. Three carpogonia with prototrichogyne on which is attached a spermatium
Figs. 39-40. A fertilized nucleus in metaphase \((2n=6\ \text{and} \ 8)\)
Figs. 41-43. A fertilized nucleus in anahapce

(Figs. 31-32 & 34-37, \(\times 1480\); Figs. 33 & 39-43, \(\times 940\); Fig. 38, \(\times 580\))
Yabu: Nuclear Division in Bangia fuscopurpurea (DILLWYN) LYNGGE
PLATE V

_Bangia fuscopurpurea_ (DILLWYN) LYNGBYE

Cells in sections of various thalli treated by the paraffin method

Figs. 44-47. Part of young thallus, showing nuclei in the resting stages and in telophase

Figs. 48-49. Part of the young thallus, showing nuclei in the resting stage and in late prophase ($n=3$)

Figs. 50-52. Showing nuclei in the resting stage and in metaphase ($n=3$ and 4)

Figs. 53-63. Various stages of nuclear division in antheridium formation ($n=3$): 53, early prophase; 54-55, later prophase; 56, a polar view of metaphase; 57-59, a side view of metaphase; 60, anaphase; 61-62, two nuclei in telophase in the second division; cell is not divided yet.

Figs. 64-67. Fertilized nucleus in metaphase (64-65) and in late prophase (66-67) ($2n=6$ and 8)

(Figs. 44-67, ×1150)
Yabu: Nuclear Division in *Banajia fuscopurpurea* (DILLWYN) LYNGBYE