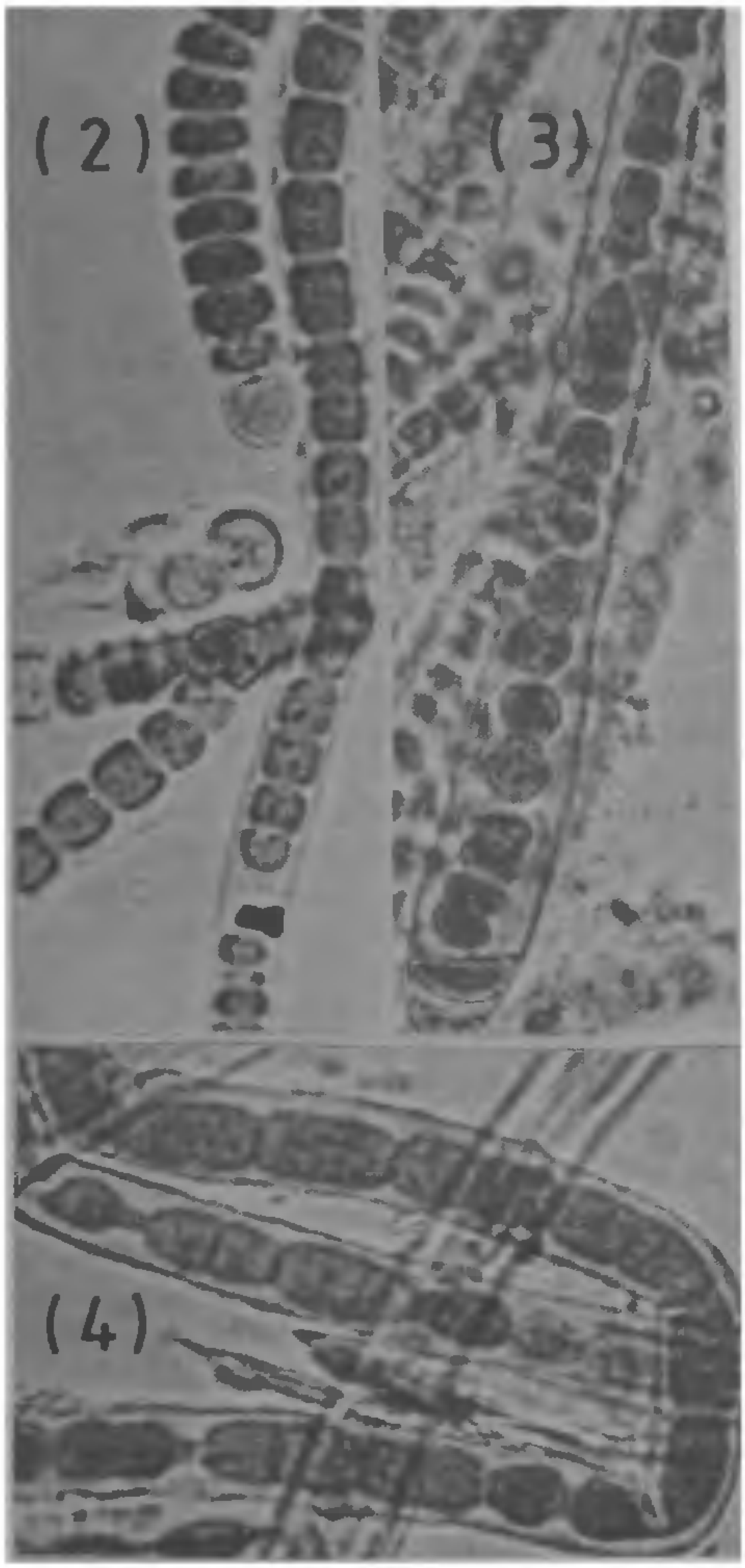

Figures 2–4. *C. marchicā.* **2.** From basal inorganic medium in light (× 445); **3.** From fructose-supplemented medium in light showing thick sheath layer around the trichome (× 385); **4.** From fructose-supplemented medium in dark showing elongated trichome surrounded by thick sheath layer (× 360).

synthesis of sheath layer around the trichome.

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RADIO PROTECTIVE EFFECT OF GIBBERELLIC ACID IN WHEAT VARIETY C 306

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CHROMOSOMAL damage produced by gamma radiations was reduced in the germinating barley[1,2], oats[3] and wheat[4] seeds with GA_3 post-treatment. Growth-promoting effect of GA_3 has been observed in many plant species including barley[2], rice[5], corn[6] and wheat[4,7,8]. The present study was planned to see the effect of GA_3 concentrations on the seedling height and chromosomal damage in a responsive wheat variety C 306.

Seeds of wheat variety C 306 were exposed to 20 kr of gamma irradiation at a dose rate of 370 R per min. The moisture content during irradiation was 11%. After irradiation the seeds were soaked, either in water or in GA_3 solution of different concentrations, for 16 h. The seeds were then removed from the solutions and germinated in 9 cm petri dishes on filter papers soaked with solutions of the same concentrations. Root tips were fixed for cytological studies after 36 h. After keeping in fixative for 24 h, the root tips were transferred to 70% ethanol and kept in refrigerator. Seedling height was recorded on 7-day-old seedlings.

GA_3 reduced the frequency of cytologically aberrant cells as seen at different mitotic stages (table 1). Also it may be seen that increasing GA_3 concentra-

Table 1 *Frequency of chromosome aberrations induced by gamma radiation with various concentrations of GA_3 in wheat variety C 306*

Concentration of GA_3 (ppm)	% cells with fragments at metaphase	% cells with bridges at anaphase and early telophase	% cells with micronuclei at interphase
0	28.73 (181)	28.95 (525)	7.93 (1298)
2	27.93 (111)	23.47 (455)	6.76 (917)
5	25.49 (111)	22.46 (325)	6.80 (882)
10	19.87 (151)	21.16 (567)	6.53 (1210)
30	20.15 (134)	19.42 (618)	5.72 (1347)
50	19.79 (139)	18.08 (730)	4.14 (1109)

Figures in parentheses refer to total number of cells studied.

tion resulted in a corresponding decrease of cytological abnormalities (table 1).

The chromosomal damage results from the absorption of energy and formation of free radicals after irradiation[9,10]. Removal of peroxy radicals should lead to the reduction in the extent of the damage produced. GA_3 results in enhanced activity of several enzymes and peroxidase[11,12] is one of them. This increased peroxidase activity probably eliminates the surviving peroxy radicals resulting in less cytological damage. Another reason for reduced cytological damage could be that GA_3 by its stimulatory action on metabolic processes[13] promotes repair of the radiation damages.

The seedling height also increased with GA_3 post-treatment (table 2). However, there was no effect of increasing concentrations of GA_3. The reason for absence of dose effect on seedling height is that 2 ppm concentration of GA_3 is sufficient for eliciting maximum growth response and an increase in concentration beyond 2 ppm has no further effect.

It may also be noted that cytological damage per unit concentration of GA_3 applied decreases as GA_3 concentration increases. It appears that further increase in GA_3 concentration beyond 50 ppm may have little effect.

The concentration required for eliciting maximum growth is much lower than that required for maximum effect on cytological damage suggesting that these two aspects of GA_3 effects may be independent. This differential effect of GA_3 is seen because the cellular mechanisms which affect repair of radiation damage are different from those which affect seedling growth. The first one is the nuclear phenomena modifying microenvironment in the chromosomal vicinity and the second is the cytoplasmic phenomenon resulting in cell enlargement.

Table 2 *Effect of various concentrations of GA_3 on gamma-irradiated seeds of wheat variety C 306*

Concentrations of GA_3 (ppm)	Seedling height (cm)
0	5.95 ± 0.44
2	8.63 ± 0.23
5	7.71 ± 0.21
10	7.87 ± 0.21
30	8.50 ± 0.15
50	8.74 ± 0.24

C. D. (5% level of significance) = 1.67 seedling height based on 4 replicates, each replicate having 25 seedlings.

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