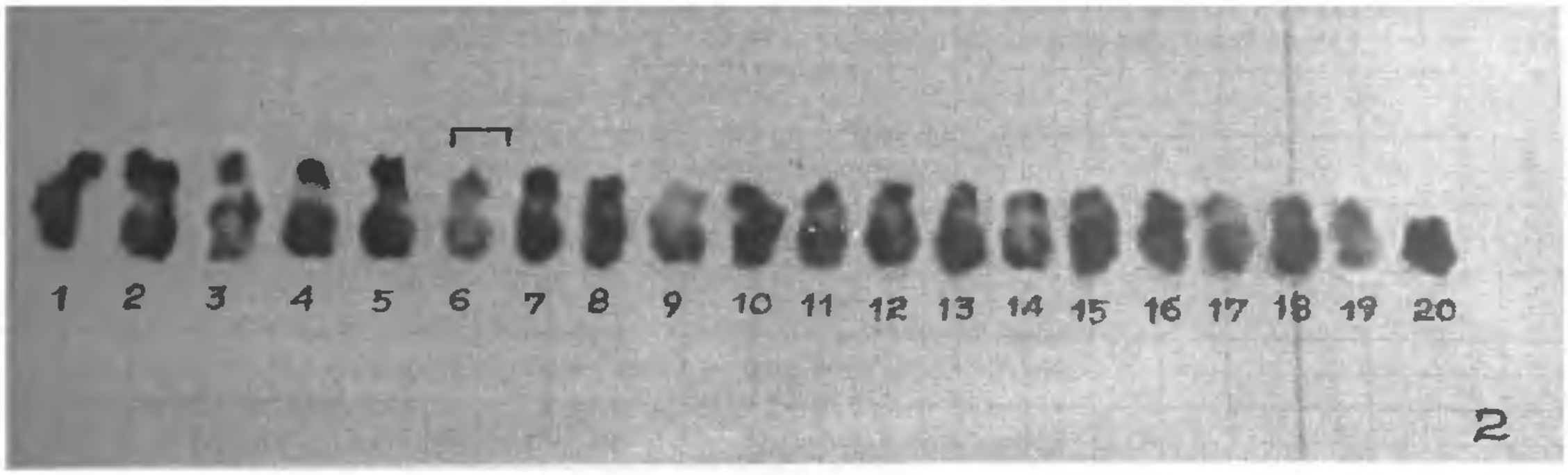

Figure 2. Karyotype drawn from figure 1. Chromosome No. 6 is *SAT* chromosome.

certain chemical and physical mutagen agents can be detected even at very low doses through pollen mitosis studies[8].

In conclusion, it may be mentioned that pollen mitosis studies along with meiotic analysis and breeding behaviour form an excellent adjunct for understanding the mechanism underlying the cytogenetic evolution of different orchid species.

The author is grateful to Dr K. L. Chadha, Director, Indian Institute of Horticultural Research, Bangalore for facilities and encouragement.

22 March 1984; Revised 21 June 1984

1. Shindo, K. and Kamemoto, H., *Cytologia*, 1963, **28**, 68.
2. Sharma, A. K. and Chatterjee, A. K., *Nucleus*, 1966, **9**, 177.
3. Withner, C. L., *Orchid-Scientific studies*, John Wiley Sons, New York, 1974, 411.
4. Levan, A., Fredga, K. and Sandberg, A. A., *Hereditas*, 1964, **52**, 210.
5. Sampathkumaran, M. and Sheshagiriah, K. N., *Proc. Indian Sci. Congr.*, 1931, **18**, 277.
6. Pancho, J. B., *Taxon*, 1965, **14**, 50.
7. Mehra, P. N. and Vij, S. P., *Taxon*, 1970, **19**, 106.
8. Brewbaker, J. L., *J. Hered.*, 1957, **48**, 217.

THE EFFECTS OF ZINC SULPHATE ON THE ULTRAVIOLET LIGHT SENSITIVITY OF *CHLORELLA VULGARIS* BEIJERNICK.

S. C. AGRAWAL
Department of Botany, Banaras Hindu Univers.., Varanasi 221005, India.

It has been known that zinc chloride enhances the toxic effect of gamma irradiation in the bacterium *Bacillus megaterium*[1]. The present investigation was undertaken to study the effects of pretreatment by $ZnSO_4$, on the ultraviolet light sensitivity of *Chlorella vulgaris*.

The alga, collected from a fresh water pond situated at Sarnath, Varanasi, was maintained on agar plates containing Bold's Basal medium at $22° \pm 1°C$ and illuminated at 2 k lux light intensity from day light fluorescent tubes for 16 hr a day. Irradiation was done with UV light (Philips germicidal lamp) giving main output at 2537 A with a dose rate of 32 ergs/mm^2/sec at a distance of 30 cm for 10, 15 and 20 min. During irradiation the alga was constantly stirred on a magnetic stirrer. Equal amounts of irradiated material were pipetted out and plated on agar plates containing 20 ml of sterilized Bold's Basal medium solidified by 1 % agar. The plates containing the irradiated samples were kept in the dark for 24 hr to avoid photoreactivation. They were later exposed to light and transferred to culture chamber. In another series of experiments, the alga was pretreated with different concentrations of $ZnSO_4$ ranging between 2 to 100 ppm for 60 min and then irradiated as above.

Table 1 shows that $ZnSO_4$ alone at the concentration of 2 and 5 ppm has no effect on the percentage

Table 1 *Survival percentage of Chlorella vulgaris Beijernick after zinc sulphate treatment, UV irradiation and combination of exposures to zinc sulphate and UV light. Values are Mean ± SD*

Concentration of $ZnSO_4$ (ppm)	Percentage survival of the alga pretreated with $ZnSO_4$ for 60 min and thereafter exposed to UV light for			
	0 min	10 min	15 min	20 min
0	100.0	30.4 ± 1.7	16.3 ± 1.5	1.7 ± 0.3
2	100.0	81.3 ± 2.0	52.4 ± 2.9	26.2 ± 1.4
5	100.0	82.0 ± 0.8	48.2 ± 0 7	24.4 ± 1.6
50	91.0 ± 2.6	25.2 ± 0.9	7.3 ± 1.3	0.6 ± 0.1
100	67.0 ± 1.8	23.7 ± 2.1	1.6 ± 0.2	0.0

survival of *Chlorella*, however, 50 and 100 ppm of $ZnSO_4$ slightly decreases the percentage survival. The survival rate of the alga gradually declined, with increase in UV doses. It is evident from the present study that pretreatment of alga with $ZnSO_4$ at the concentrations of 2 and 5 ppm decreases the toxicity of UV light. However, 50 and 100 ppm of $ZnSO_4$ treatment increased the radiosensitivity of the alga.

Eichhorn[2] has observed that Zn^{2+} ions complexes with the genetic material, to stabilize the DNA structure toward radiation damage. It has been demonstrated that metal ions exert an effect on the cells redox potential, generally giving a protection against radiation[3]. It appears, therefore, that $ZnSO_4$ at lower concentrations of 2 and 5 ppm could result in a radioprotective action. However, 50 and 100 ppm of $ZnSO_4$ increases the radiosensitivity. This could be due to combination of toxic injuries induced by higher concentration of $ZnSO_4$ and by the radiation.

Thanks are due to The Head, Department of Botany, Banaras Hindu University for providing laboratory facilities and to UGC for financial assistance.

23 January 1984; Revised 13 June 1984

1. Kiortsis, M., *Nature (London)*, 1968, **217**, 746.
2. Eichhorn, G. L., *Inorganic Biochemistry*, Vol. II, Amsterdum, Elsevier.
3. Butler, J. A. V. and Robins, A. B., *Nature (London)*, 1962, **193**, 673.

INDUCED PARTHENOSPORES IN *COSMARIUM LAEVE* RABENH.

G. SATHAIAH, T. MOGILI and VIDYAVATI
Department of Botany, Kakatiya University, Warangal 506 009, India.

THE occurrence of haploid resting spores is a well-known phenomenon for the family Zygnemataceae. In the desmidiaceae it is a rare phenomenon, although there are a few reports with regard to the placoderm as well as saccoderm desmids[1-4]. Brandham[5] reported the occurrence of parthenospores in the desmids under three main types (emergent, non-emergent and semi-emergent). We now report the occurrence of the emergent type of parthenospore in a placoderm desmid, *Cosmarium laeve*, Rabenh under various culture conditions.

C. laeve was collected from a cistern, in the University Campus, Kakatiya University, Warangal and was maintained in unialgal culture in biphasic medium[6] at 18–22°C with an illumination of 16/8 hr L/D cycle. The following culture conditions were tried: (i) alternate light/dark receiving 16L/8D hr at 18–22°C, (ii) daylight at North window at 27–29°C (iii) constant light at 27–29°C and (iv) refrigerated cabinet with constant dark at 8–9°C.

Four sets of test-tubes were taken and autoclaved with 10 ml of varied inorganic media, Chu's 10[7], Godward[8], Waris[9], Reynold's[10] and Knop's[11] along with soil extract[6]. The cell suspension (10 ml) was centrifuged in sterile centrifuge tubes at 2000 rpm for 5 min. The supernatant was poured off and the sedimented cells were inoculated in test-tubes under aseptic conditions, and kept for observations.

The formation of parthenospores in the culture started from the 12th day onwards in all the four culture conditions employed during the present inves-