Table 2 *Range and mean number of chromosome associations per cell in heptaploid G. rothschildiana.*

Associations	Range	Average
VII	0–1	0.04 ± 0.002
IV	0–1	0.4 ± 0.01
II	30–38	36.0 ± 0.24
I	1–10	3.12 ± 0.34

aneuploids in the Gloriosas obtained from M/s Chandra Nursery, Sikkim. This indicated that hexaploid and octoploid *Gloriosa* existed at Sikkim. Since *G. rothschildiana* is an out-crossed species[4,5] occurrence of such plants is expected.

Meiotic analysis at metaphase I, had also indicated cytological behaviour of heptaploid taxon. The mean chromosome associations per cell were: I = 3.12 $\pm$0.34, II = 36.0$\pm$0.24, V = 04$\pm$0.01 multivalents = 0.04$\pm$0.002.

It is suggested that the heptaploid taxon discovered among the *G. rothschildiana* plants has originated from an interploidal hybridization (8*x* × 6*x* or vice versa) and has an allo-amphiploid constitution.

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CYTOLOGICAL ASSAY OF C-MITOTIC POTENCY OF TUBER EXTRACT FROM DIPLOID AND POLYPLOID SPECIES OF *GLORIOSA* L

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ASSAYING C-mitotic potency developed by Greenberg *et al*[1] has been a most viable method for screening colchicine in plants. C-mitotic potency of colchicine extracted from tubers of *Gloriosa superba* L[2] and somatic anomalies induced by aqueous extract of *G. superba*[3] have been studied. Both tubers and seeds of this plant are tapped for colchicine. It is, therefore, essential to know whether other species of *Gloriosa*, both diploids and polyploids, have this potency for their commercial exploitation. In the present investigation, C-mitosis has been assayed in six species of *Gloriosa viz G. lutea* Hort, *G. plantii* Loud, *G. Masterpiece*, *G. carsonii* Baker, *G. Shrimati-Bhima* and *G. rothschildiana* O'Brien.

Dry tuber (25g) was finely powdered and extracted with distilled water. Two mm portions of the well-grown fresh onion root tips were pretreated with 0.5, 1, 1.5 and 2% tuber extract for 5 hr at 25°C. They were then washed thoroughly with distilled water and fixed in modified Farmer's fluid where acetic acid is replaced by lactic acid[4]. After fixation for 24 hr, the root-tips were hydrolyzed in 1 N HCl at 60°C for 4 to 5 min, cooled and washed with distilled water twice for 15 min. The meristematic portion was dissected and squashed in 2% propiono-orcein. The C-mitotic potency of the crude colchicine from different *Gloriosa* species has been scored according to the method of Greenberg *et al*[1] as follows.

$$\text{Index} = \frac{2C + 1S + ON}{n}$$

where C = number of clumps (full effect), S = number of scatters (partial effect) N = number of normal post prophases, n = total number of post prophases.

C-mitotic potency of colchicine in the tuber extract with varying concentration was scored following Greenberg *et al*[1] and presented in table 1. Normally, according to the method, greater the proportion of clumps, greater the effect. Among the diploids *G. lutea* Hort exhibited reduction in C-mitotic potency with

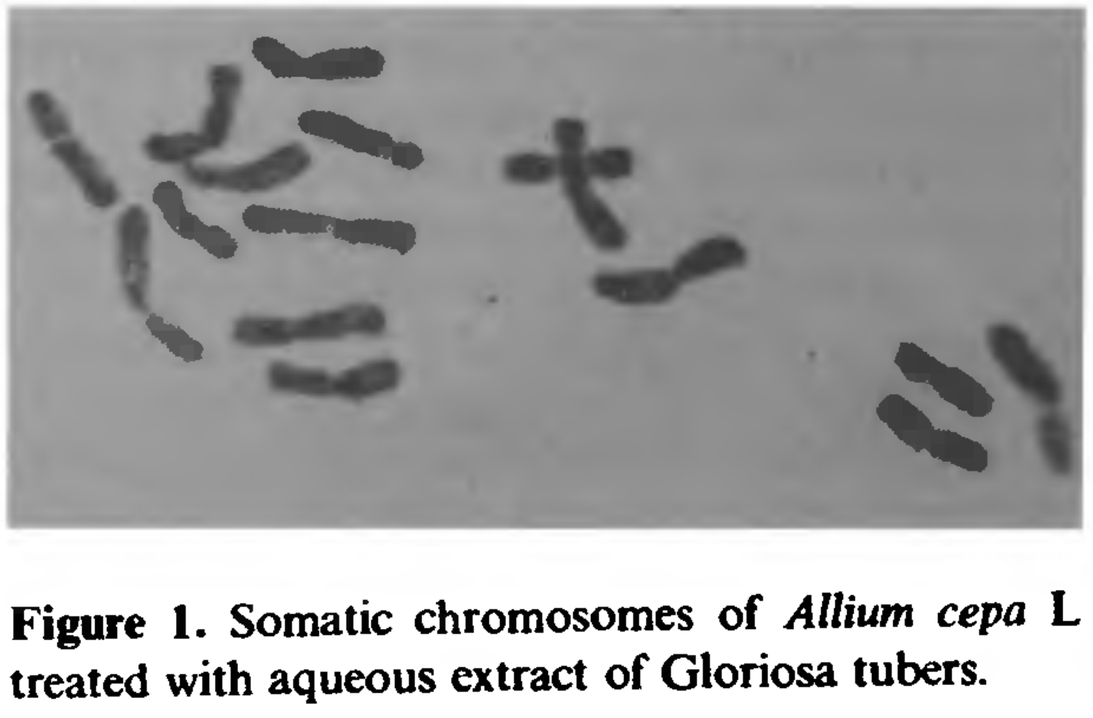

Figure 1. Somatic chromosomes of *Allium cepa* L treated with aqueous extract of Gloriosa tubers.

Table 1 *Comparative C-mitotic activities of aqueous tuber extracts of different Gloriosa* Spp.

Species	Concentration (%)			
	0.5	1	1.5	2
G. lutea	1.41 (276)	1.23 (266)	1.11 (344)	1.07 (336)
G. plantii	0.49 (410)	0.65 (202)	0.56 (236)	0.57 (168)
G. Masterpiece	— (339)	— (283)	— (420)	— (305)
G. carsonii	1.2 (450)	1.33 (610)	1.57 (420)	1.38 (360)
G. Shrimati-Bhima	0.68 (248)	0.59 (368)	0.51 (208)	0.57 (172)
G. rothschildiana	1.04 (464)	1.14 (492)	1.16 (450)	1.21 (304)

Figures in parenthesis indicate total number of somatic cells analysed.

increasing concentration. Nevertheless, the value obtained at lowest concentration *i.e.* at 0.5 % was highest of all. Except *G. Masterpiece* all others, irrespective of their ploidy, exhibit C-mitotic effect; and it increases with increasing concentration. Among the polyploids highest effect could be seen in *G. rothschildiana*.

The cytological assay carried out in *G. superba* L[2] and a similar study in *Iphigenia* Kunth[5] confirmed that both these plants contain colchicine which disrupts metaphase spindle. Similar work reported earlier had shown that water extract of tuber of *Gloriosa superba* L is able to induce a number of chromosomal anomalies[3]. But the present study reveals that most other species of *Gloriosa* L are able to induce only endomitosis and chromosomal disjunction similar to that caused by isolated colchicine and no other anomalies such as chromosomal breakage, bridge formation etc. The degree of C-mitotic effect that could be seen appears to be positively correlated with the colchicine content.

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BIOLOGICAL CONTROL OF CHICKPEA WILT

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THE use of mixed stands or multilines, and the use of a trap or inhibitory plants for host resistance are forms of biological control[1]. Using this technique, plant pathologists control many soil-borne pathogens. Biological control of wilt of pigeonpea is a long established practice in some parts of India[2,3]. However, wilt of chickpea is a problem in West Bengal. The disease is caused by *Fusarium oxysporum* f sp *ciceri*, a soil-borne pathogen. The infection occurs through fine rootlets or any wound. From rootlets the fungus passes on to the larger roots. The fungus confines itself to the vascular tissue. The wilting is characterized by gradual or sudden drying of leaves, followed by drying of entire plants or some of its branches.

Mixed cropping of chickpea with other crops is popular with the farmers in some areas of West Bengal. It was noticed that the incidence of chickpea wilt was lower whenever chickpea was grown admixed with linseed. The present investigation was undertaken to find out whether there is any role of linseed as a mixed crop with chickpea in the control of chickpea wilt.

With the above object a trial was conducted at the Pulses and Oilseeds Research Station, Berhampore (W.B.) during 1981–82, 1982–83 and 1983–84 in randomized block design with three replications. The plot size was 5 m × 3 m. The variety included in the study was B-67 for linseed and B-108 (susc) for chickpea. There were eight treatments *viz* (1) chickpea (pure) line sowing, (2) chickpea (pure) broadcasting, (3) chickpea + linseed (50:50) mixture broadcasting, (4) chickpea + linseed (66:33) mixture broadcasting, (5) chickpea + linseed (75:25) mixture broadcasting, (6) chickpea + linseed (1:1) alternate row, (7) chickpea + linseed (2:1) two rows of chickpea followed by one row of linseed, and (8) chickpea + linseed (50:50) intra row mixture. The ratio was calculated according to seed rate of both the crops. The seed rates of chickpea and