duces H_2S, NH_3, catalase positive, hydrolyses starch and liquefies gelatin. Out of 34 host plants, belonging to 13 families, the bacterium infected and produced symptoms on the principal host *Bael* and on sour lime (*Citrus aurantifolia* Swingle) spots were produced but there was no canker formation.

The bacterium is identified as *Xanthomonas campestris* (Pammel) Dowson but pathovar is yet unnamed. The bacterium resembles *X. bilvae* Patel *et al*[1], a name which is no longer accepted under the provisions of the International Code of Nomenclature as most of the species of *Xanthomonas* were reduced to pathovars of *X. campestris* by Dye *et al*[2], and due to lack of a type culture, *X. campestris* pv. *bilvae* was not accepted in to ISPP, list. The present isolate (IMIB 8600) resembles the organism of Patel *et al*[1] and a revived name *X. campestris* pathover *bilvae* (*nom rev*) is proposed as per Rule 28A of the International Code of Nomenclature of Bacteria 1976[3].

Thanks are due to Dr J. F. Bradbury, CMI, UK for his help in identifying the bacterium and valuable suggestions and for depositing this culture (IMI B8600) at the National Collection of Plant Pathogenic Bacteria, Harpenden, UK[3]. Thanks are due to Dr R. M. Singh, Dean for his encouragement.

29 November 1983.

1. Patel, M. K., Allayyanavaramath, S. N. and Kulkarni, Y. S., *Curr. Sci.*, 1953, **22**, 216.
2. Dye, D. W., Bradbury, J. F., Goto, M., Hayward, A. C., Lelliott, R. A. and Schroth, M. N., *Rev. Plant Pathol.*, 1980, **54**, 153.
3. Bradbury, J. F. (Personal communication).

IN VITRO HYBRIDIZATION IN AN INCOMPATIBLE CROSS—*BRASSICA JUNCEA* × *BRASSICA HIRTA*

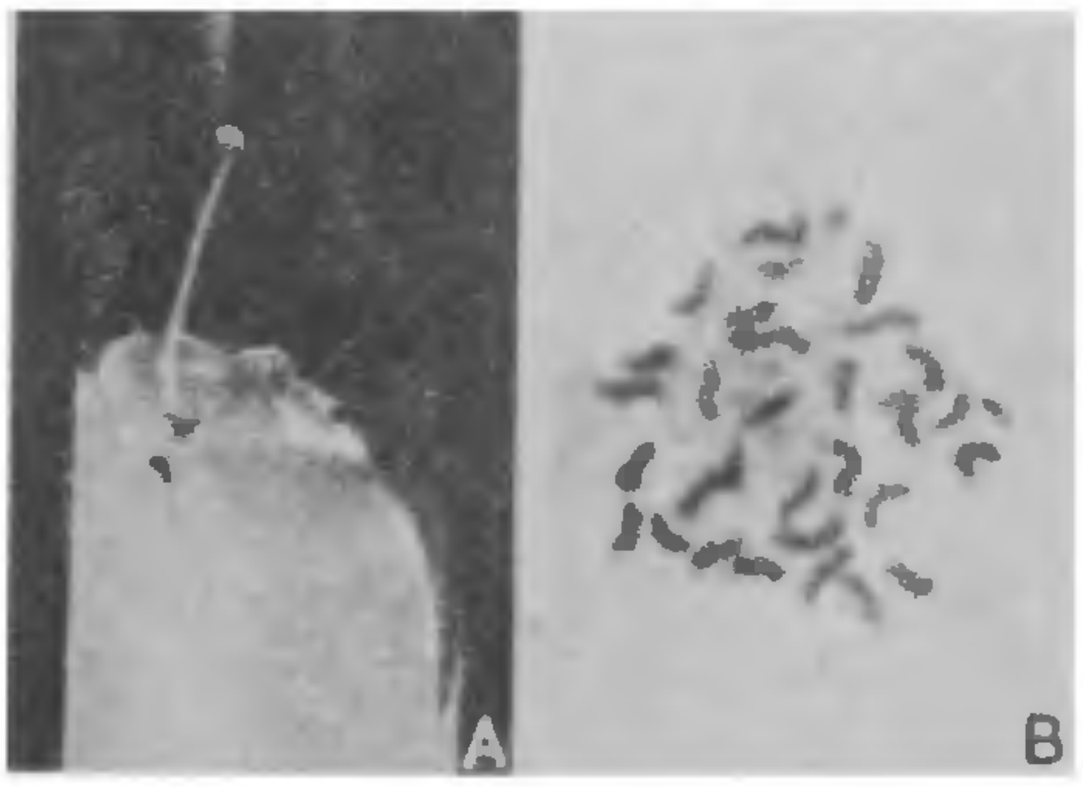
D. MAHAPATRA and Y. P. S. BAJAJ
Tissue Culture Laboratory, Punjab Agricultural University, Ludhiana 141 004, India.

BRASSICA as an oilseed crop occupies second position in India, and is only next to groundnut. The commercially grown species (*B. juncea, B. napus, B. campestris*) are mostly susceptible to leaf blight (*Alternaria brassicae*). White mustard (*Brassica hirta* or *Sinapis alba*) though resistant to blight, is incompatible and so far attempts to cross *B. juncea* ($2n = 36$) × *B. hirta* ($2n = 24$) using conventional breeding methods have not been successful[1]. However in the present study, by resorting to the culture of young ovules, hybrid plantlets ($2n = 30$) have been obtained *in vitro* and the technique described.

The flower buds of *B. juncea* and *B. hirta* were emasculated two days before anthesis, and were cross pollinated two days after emasculation. Immature ovules [10–15 days after pollination (DAP)] were aseptically excised and cultured on Murashige and Skoog's medium (MS)[2] supplemented with indole acetic acid (IAA 2 mg/l) + kinetin (kin 0·5 mg/l) + casein hydrolysate (CH 500 mg/l). All the manipulations were conducted under sterile conditions in a laminar flow chamber (Klenzaids, Bombay), and the

Table 1 *In vitro growth response of parental as well as hybrid ovules (15 DAP) of Brassica cultured on MS + IAA (2 mg/l) + kin (0.5 mg/l) + CH (500 mg/l)*

Ovules (Parentage)	No. of ovules cultured	No. of ovules forming plants	Percentage of plantlet formation
Brassica juncea	60	36	60.00
Brassica hirta	45	20	44.44
B. juncea × *B. hirta*	260	6	2.31
B. hirta × *B. juncea*	210	4	1.90



Figures A and B. *In vitro* cultures of the hybrid ovules (15 DAP) of a cross *Brassica juncea* × *B. hirta*. **A.** Plantlet from a hybrid ovule 25 days after culture on MS + IAA (2 mg/l) + kin (0.5 mg/l) + CH (500 mg/l). **B.** Root tip squash of a hybrid showing an intermediate chromosome number ($2n = 30$).

cultures were maintained at 25 ± 2°C. For chromosome studies the root tips of the parents and those of the hybrid plants were fixed in acetic alcohol (1:3) and stained with acetocarmine.

There was a considerable difference in the growth response and germination of the parents and the hybrid ovules (table 1). The younger ovules had a tendency to proliferate to form callus, the older ovules germinated. The parental ovules started to grow within 2 days of culture, and produced plants in 10 days. The hybrid ovules on the contrary took considerable time (25–30 days) to germinate (figure A). Whereas the germination of parental ovules, *B. juncea* and *B. hirta* was 60% and 44% respectively, the hybrid ovules showed a poor germination of only 2%. The root tip squashes from the hybrid plantlets, showed $2n = 30$ (figure B), an intermediate chromosome number between their parents.

Appreciation is expressed to Dr K. S. Labana for his kind help, and to the ICAR for financial support.

31 January 1984

1. Dowary, R. K., Klassen, A. J. and Stringam, G. R., In: *Hybridization of crop plants* (eds) W. R. Fehr and H. H. Hadley, Am. Soc. Agron., Madison, Wisconsin 1980, p. 495.
2. Murashige, T. and Skoog, F., *Physiol. Plantarum*, 1962, **15**, 473.

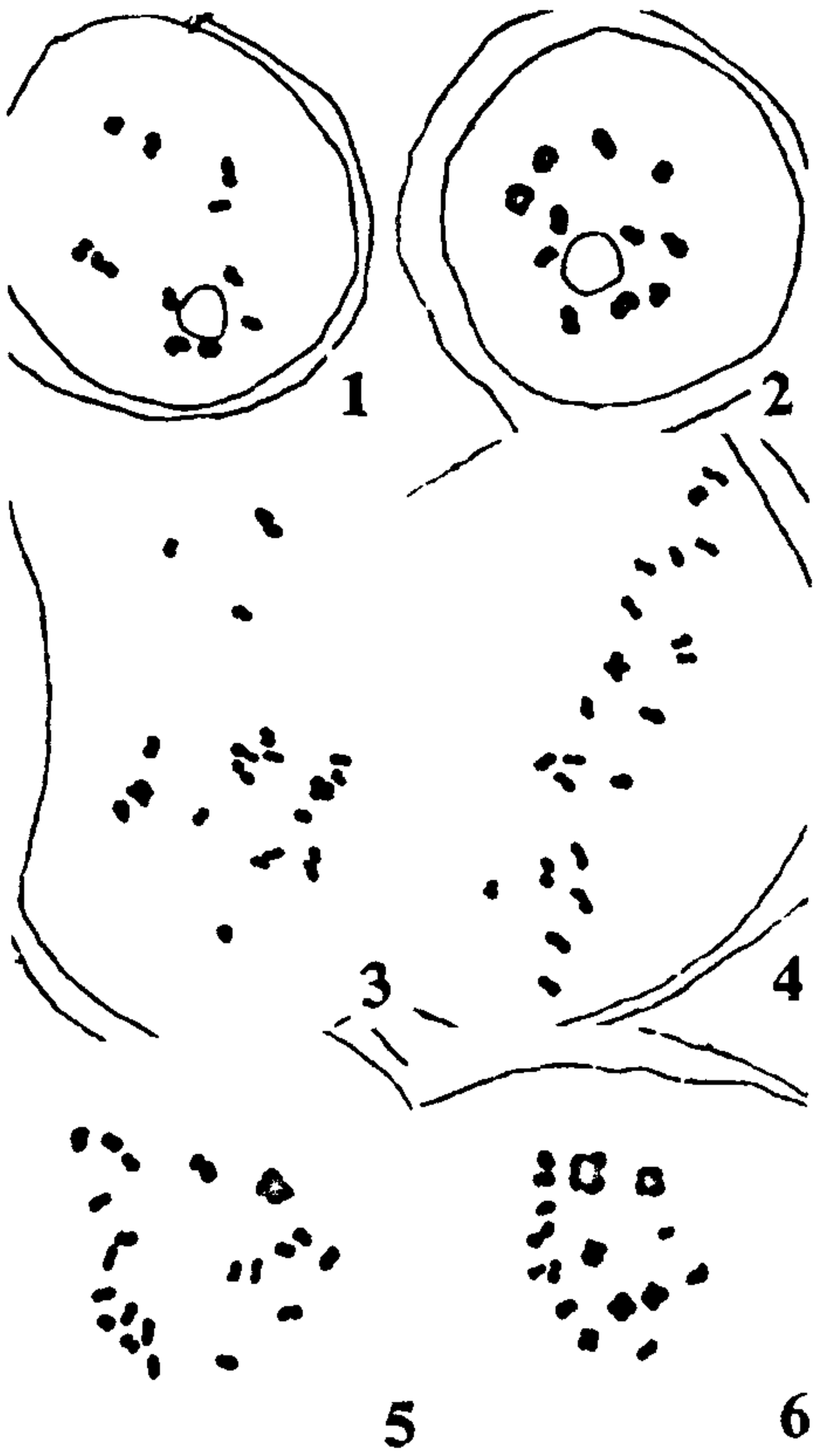
BEHAVIOUR OF MEIOTIC CHROMOSOMES IN INDUCED AUTOTETRAPLOIDS OF *SALVIA COCCINEA* JUSS.

M. S. HAQUE

Department of Genetics and Plant Breeding, Bidhan Chandra Krishi Viswa Vidyalaya, Mohanpur, India.
Present address: Forest Genetics, Forest Research Institute, Dehara Dun 248 006, India.

SALVIA COCCINEA is an ornamental herb. Several varieties of this species are cultivated for their beautiful red, pink and white flowers. All these varieties contain $2n = 22$ very small chromosomes[1]. Meiotic studies showed normal chromosome behaviour with regular formation of 11 bivalents as well as equal anaphase separation[2]. It is the ornamentals among which induced autopolyploids have been produced commercially in many species[3]. As the flower size of *S. coccinea* was too small, attempts were made to induce colchiploidy with a view to increase the flower size. Seedlings of two varieties of *S. coccinea i.e.* Red Indian (red flower) and Pink Pearl (pink flower) were treated with 0.25% colchicine solution which produced a few tetraploids in both the varieties. The present communication reports the behaviour of their meiotic chromosomes.

Flower buds were directly smeared in 2% aceto-carmine solution and chromosomes were observed under a Carl—Zeiss microscope. It was noticed that



Figures 1–6. 1, 2 Diploid chromosomes of vars. Red Indian and Pink Pearl ($n = 11$), **3, 4** of induced autotetraploid var. Red Indian (2 IV + 18 II, 1 IV + 20 II), **5, 6** of induced autotetraploid var. Pink Pearl (1 IV + 20 II, 6 IV + 10 II).