The growth regulators, used for obtaining higher percentage of fruitset and yield, may also influence the photosynthetic activity of the leaves indirectly, by influencing the degree of development of leaf tissues.

Bidhan Chandra Krishi Viswa Vidyalaya, Kalyani, Nadia, West Bengal, *May* 19,1979.

P. K. CHATTOPADHYAY, S. P. GHOSH.*

* Present Address : N.E. Hill Complex (ICAR), Shillong.

1. Sylgin, E. A., *Morpho-physiological Potentiality of Leaves to Light*, Moscow (in Russian), 1963.
2. Brandt, A. B. and Tageeva, S. V., *Optical Paramaters of Plant Organisms*, Science Series, Moscow (in Russian), 1967.
3. Ghosh, S. P., *Morpho-physiological Peculiarities of Different Types of Fruiting Organs of Apple*, *Avtoreferat*, *TCXA*, Moscow (in Russian), 1970.

SEEDLING HANDEDNESS IN *PHASEOLUS VULGARIS* L.

ALL aspects of seedling characters in flowering plants were not explored, although some of them were used for taxonomic[1] and genetic studies[2]. However, Compton[3] studied seedling handedness in a number of cereals. Later this phenomenon was observed by Ono and Suemoto[4] in *Triticum*, Bahadur and Udayachandra[5] in *Sorghum* and Bahadur, Rao and Rao[6] in *Bambusa arundinacea*. Recently, Rao and Bahadur[7] reported seedling handedness in *Cajanus cajan*, a dicot for the first time. In this communication we report observations on the seedling handedness in *Phaseolus vulgaris* L. (Papilionaceae).

In Table I, cultivars of *P. vulgaris* studied are listed. Seeds were sown in small earthen flats and their germination characters were carefully observed as their first pair of leaves emerged and the seedlings have been classified as Left, Right and two types of Neutrals, according to the procedure followed by Rao and Bahadur[7]. The frequencies of four types of seedlings in each of the 7 cultivars have been worked out in the sample (Table I).

A total of 696 seedlings were examined out of which 339 (49·3%) were left-handed, 349 (50·7%) were right-handed and the rest neutrals (both types included). The data on neutral seedlings have not been given in Table I, since their number is negligible. The students *t* test was applied and the *t* value was found to be 0·51 and it is less than the tabulated value (2·18) at 5% level of significance and hence we conclude that there are no significant differences in the frequency of L and R forms of seedlings in *P. vulgaris* cvs. The L/R ratio was also found to be unity although a slight excess of R seedlings was observed. A similar excess of R seedlings was also observed in *Cajanus cajan*[7], *Bambusa arundinacea*[6] and in number of species of *Phaseolus* and *Vigna* (unpublished). However, Bahadur and Udayachandra observed a higher incidence of L seedlings in *Sorghum vulgare*[5].

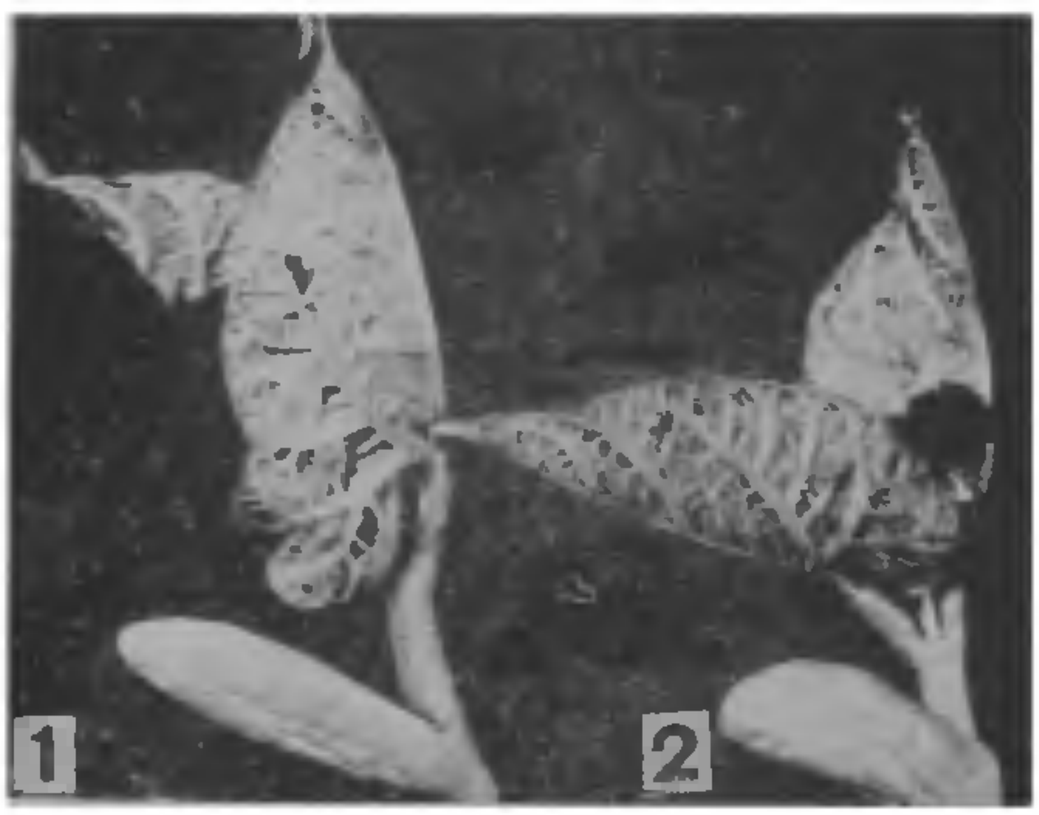
The seedling handedness observed in *P. vulgaris* is a clear case of bioisomerism and both L and R seedlings represent stereoisomeric forms and hence mirror images, like the one described in the cyathial bracts of *Euphorobia milli*[8]. The L and R biological objects have been variously designated in the literature as isomers or Bio-isomers[9], Enantiomorphs[10] and Bio-enantiomorphs[11]. But the causal factor for the existence

TABLE I

The distribution of Left and Right-handed seedlings in Phaseolus vulgaris *cultivars*

Sl. No.	Cultivar	Twist of the first pair of leaves: Left	Right	L + R	LH/RH	LH%	Source of the seed material
1.	Bangalore Local	43	62	105	0·6935	41·00	Deccan Seed Stores, Hyderabad
2.	K-41	46	45	91	1·022	50·45	do.
3.	French Yellow	40	35	75	1·143	53·07	do.
4.	Premier	78	74	152	1·051	51·32	do.
5.	Hyderabad Local	43	48	91	0·897	47·25	do.
6.	PLB-14-1	36	38	74	0·92	48·64	NBPCR Regional Station, Simla.
7.	PLBK-1	53	47	100	1·128	53·00	do.
	TOTAL ..	339	349	688	0·986	49·27	

of isomeric forms of seedlings is so far unknown. Bahadur *et al.*[9] reviewed the possible reasons for the existence of handedness in plant parts and hypothesised that handedness possibly may be due to the presence of optically active substances, *i.e.*, Levo and Dextro compounds in plant metabolism. Onslow[12] (ex. Arber, 1961) suggested that the plant form is an expression of its chemical constitution. Dubrov[11] believes that the Geomagnetic force determines the bisymmetric status of living objects. It is possible that the left and right handed and neutral forms of seedlings in *P. vulgaris* are due to any of the causes but more experimental data are needed. According to Compton[3], the direction of the folding of the first leaf is not inherited in cereals. Studies on the inheritance of handedness during the course of the present work have shown that in *P. vulgaris*., the handedness is not inherited and does not follow the typical Mendelean ratio (unpublished).



FIGS. 1–2. Photograph of Left (Fig. 1) and Right-handed seedlings (Fig. 2) of *P. vulgaris*.

Note the contortion of the first pair of leaves as indicated by black strips.

We are grateful to the Directors, National Bureau of Plant Genetic Resources, Regional Research Station, Simla, for supplying the seed material and to Prof. U. B. S. Swami for facilities. The senior author is grateful to CSIR for the award of Senior Research Fellowship.

Department of Botany,
Kakatiya University,
Warangal 506 009, A.P.,
May 26, 1979.

M. MADHUSUDANA RAO.
N. PRATAP REDDY.
BIR BAHADUR.

1. Burger, H. D., *Seedlings of Some Tropical Trees and Shrubs Mainly of South East Asia*, Translated from Dutch by Burger, R. and Festing, B., Wagenigen, 1972.
2. Crowe, L. K., "Seedling characters in Teaching Genetics," In: *Teaching Genetics in Schools and Colleges*. Edits. Darlington C. D. and Bradshaw, A. D., Oliver and Boyd, London.
3. Compton, R. H., *J. Genet.*, 1912, **12**, 53.
4. Ono, H. and Suemoto, H., *Seiken Ziho*., 1967, **8**, 60.
5. Bahadur, B. and Udayachandra, U. S., *Indian J. Bot.*. 1979, **2**.
6. —, Rao, K. L. and Rao, M. M., *Curr. Sci.*, 1978, **47**, 584.
7. Rao, K. L. and Bahadur, B., *Ibid.* (In press).
8. Bahadur, B. and Reddy, N. P., *New Phytol.*. 1975, **75**, 131.
9. —, Rao, K. L., Kumar, P. V., Reddy, N. P. and Rao, M. M., In: *Vistas in Molecular, Solid State and Biophysics* (Prof. P. G. Puranik Commemorative Research Volume), 1977.
10. Davis, T. A., *Proc. Indian Natl. Sci. Acad.*, 1974, **4**, 424.
11. Dubrov, A. P., *The Geomagnetic Field and Life, Geomagnetic Biology*, Translated from Russian by Sinclair, F. L., Plenum Press, New York, 1978.
12. Arber, A., *Monocotyledons*, Hafner, N.Y., 1961 (Reprint).

STRUCTURE AND DEHISCENCE MECHANISM OF FRUIT WALL IN *ERUCA SATIVA* MILL—AN OLEIFEROUS CRUCIFER

CONSIDERABLE attention has been paid to this economically important group[1–4]. Floral morphology and seed structure of several members have been worked out[5–8]. Some work is available[9] on morphology and anatomy of seed of *Eruca sativa* but no published work is on record regarding dehiscence mechanism of the pericarp of this plant.

The siliquose fruit is the metamorphosed single bicarpellary and superior ovary. The ovary at archesporial initial stage of ovule shows almost roundish outline with uncutinized upper and inner epidermis. Its wall is 25 to 35 μm thick and is made up of parenchymatous cells. There are two procambial strands in dorsal plane and two in commissural plane. Two masses of parenchymatous cells one opposite each procambial strand meet, interlock and fuse to form false septum. Cells in the septum are with medium density cytoplasm and large vacuoles. In the beginning cells of upper epidermis as well as inner epidermis are longer than broad (Figs. 1, 2). However, at later stages the cells of upper epidermis divide anticlinally as a result the cells of this layer become broader than long (Figs. 3, 4). The cells comprising the inner epidermis are, however, throughout longer than broad.