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1. Lea, D. E., *Actions of Radiations on Living Cells*, Cambridge University Press, U.S.A., 1962.
2. Majumdar, S. K. and Riley, H. P., "Chromosomal alteration in relation to speciation in *Haworthia*," *Adv. Front. Pl. Sci.*, 1967, 18, 63.
3. Narain, P., "Cytogenetical and hybridization studies on some species and cultivars of *Gloriosa* and *Amaryllis*," *Ph.D. Dissertation*, University of Agra., 1972.
4. Riley, H. P., "Chromosomal interchanges and evolution in the Aloinae. Chromosome, its structure and function," *The Nucleus*, Suppl., Vol., University of Calcutta, Calcutta, 1968, p. 115.

EFFECT OF IONIZING RADIATION ON EPIDERMAL TISSUES AND SECONDARY XYLEM IN *SOLANUM MELONGENA* L. CV. PUSA PURPLE LONG

RAISUDDIN AHMAD AND SAEED A. SIDDIQUI
Department of Botany,
Aligarh Muslim University, Aligarh 202 001, India

CONSIDERABLE amount of work has been done on the effect of ionizing radiation on epidermal tissue[1,2,4]. Our knowledge regarding the effect of radiation on secondary xylem is rather meagre. Therefore, the present investigation was undertaken to find out the effect of ionizing radiation on epidermal tissues and secondary xylem in *Solanum melongena* L. cv. Pusa purple long.

The dry seeds of *Solanum melongena* L. cv. Pusa purple long were subjected to gamma irradiation at dosage levels of 5, 10, 20, 30, 40 and 45 krad. The irradiated seeds were sown in pots filled with 1:1 mixture of soil and farm yard manure. The peelings from leaves from 60 day old seedlings were obtained following the technique of Leelavathi and Ramayya[3]. The small pieces of stem were boiled in 40-50 % HNO_3 for maceration. The individual elements of vessel and fibres were measured. The average length of vessel and fibres and width of the vessel were calculated from the readings obtained on 500 randomly selected elements of each category from each sample.

The number of stomata per unit area was 52 (maximum) in control and it decreased with the increase in the intensity of gamma irradiation and reached only 38 (maximum) in 45 krad (Fig. 1). The stellate type of trichomes borne on the epidermis of leaves show a reverse trend. The number of trichomes per unit area was 18 (maximum) in control and showed an increasing trend from lower to higher doses and was 32 (maximum) in 45 krad (Fig. 1).

The length and width of the vessel measure 370 μ and 15 μ respectively in control, while in the irradiated plants, they show a decreasing trend from lower to higher doses. In 45 krad, the length and width of vessel measure 273 μ and 8 μ respectively (Fig. 1). The fibre length measures 467 μ (maximum) long in control, while it decreases with the increase in the irradiation and measures 350 μ (maximum) in 45 krad (Fig. 1).

From our results it may be concluded that the irradiated plants exhibit reduction in size of vessel elements and fibre length in secondary xylem. This reduction in length and width of vessel elements affects water conduction adversely. Consequently to check the transpiration rate, the number of stomata per

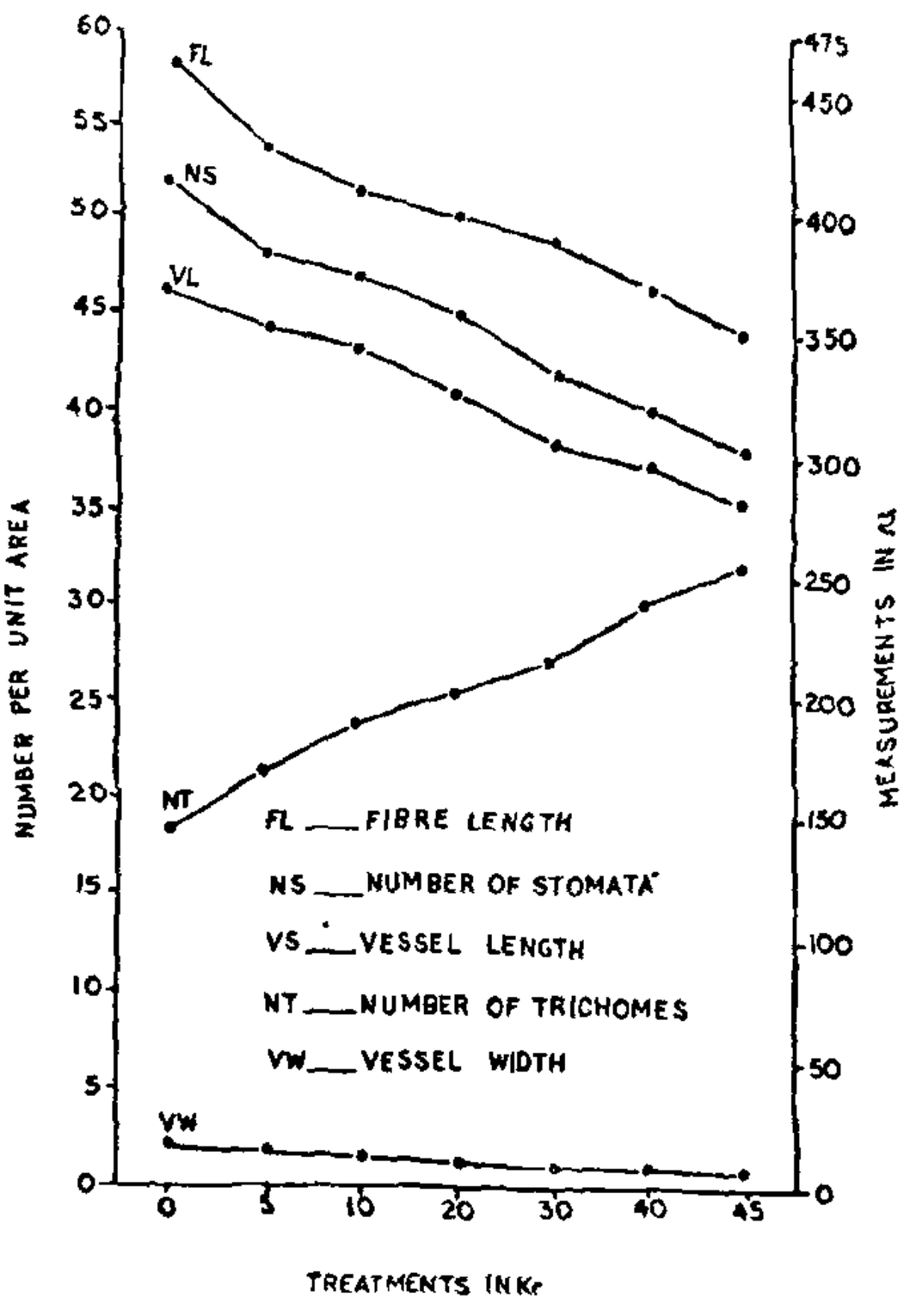

FIG. 1. Effect of gamma irradiation (5-45 krad) on number of stomata and trichomes, size of the vessel element and fibre length in *S. melongena* L. cv. Pusa purple long.

unit area decreases and the number of trichomes per unit area increases.

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1. Inamdar, J. A., Bhat, R. M., Gangadhara, M- and Pathan, M. A., *Geobios*, 1977, 4, 13.
2. Khan, F. A., Ahmad, R. and Siddiqui, S. A., *Symp. Natl. Acad. Sci.*, 1978, 41.
3. Leelavathi, A. and Ramayya, N., *Geobios*, 1975, 2, 117.
4. Siddiqui, S. A., Ahmad, R., Khan, F. A., Ahmad, S. and Siddiqui, S. P., *Proc. Symp. Environ. Biol.*, 1979, p. 249.

INDUCED FASCIATION IN *CELOSIA ARGENTEA* L.

N. C. Behera and S. N. Patnaik
Cytogenetics Laboratory
Department of Botany, Utkal University
Bhubaneswar 751 004, India

Fasciation is a morphological term applied most commonly to an abnormal stem condition in vascular plants in which the affected regions become flattened or ribbon-shaped[1]. All parts of a plant may be altered, many of them in combination with the changes in the stem structure. Fasciation has been reported as a relatively well-known plant monstrosity or teratological abnormality[2]. Many mutagens are found to cause fasciations in many plants[3–5] which give some ideas regarding the morphological adaptivity of the species. Although the common cocks comb *Celosia cristata* L.[6] and its plumose forms[2] are the glaring examples of such types of monstrosity, which have been considered to be evolved through mutations from *Celosia argentea* L., the latter has not been tried with chemical mutagens for the same.

Dry and dormant seeds of *Celosia argentea* L. forma. *spontanea* were presoaked in water for 24 hours and then treated with different concentrations of ethylmethane sulphonate (0·4%, 0·2% and 0·1%) for 6 hr. The seeds were washed with tap water and sown in the earthernware pots. The 15-day old seedlings were transplanted into the field. Different morphological characters were recorded at different stages of development—through M_1, M_2 and M_3 generations.

C. argentea is a wild annual plant with erect stem, strongly ribbed, often much branched with spike solitary, stalked, cylindrical with conical apex, very dense throughout their length with shining white flowers (Fig. 1). In the large treated population, only three plants showed some of its spikes and stems with fasciations characterized by the unregulated increase by weight and volume of the tissue, over that of the normal type. These relative loss of control over the growth area resulted in irregular and unpredictable types of forms. In one of the plants of M_2 generation of 0·2% EMS-treated population showed one of its spikes with a slight flattening of its floral axis in the early stages of development. Subsequent growth of the spike with a mid notch in the flattening region made the normal conical spike a forked one (Fig. 2). One of the plants of M_2 generations of 0·4% EMS treated population showed little more elaboration with much more flattening and looked like a cocks comb type of inflorescence with white flowerings. Numerous growing points develop at its tip (Fig. 3). Another plant of the same treatment was found to be with flattened main shoot with some normal branches from the very base of the plant. The normal branches showed normal cone-shaped inflorescence, whereas the fasciated branches showed forked type of inflorescence at different heights of the plant with much elaborate comb-like terminal inflorescence (Fig. 4). The leaves were arranged spirally in the flat ribbon-shaped stem instead of alternate arrangement.

Regarding the morphological nature of fasciations two views were proposed, one view[7] believed that fasciation results from an increase in number of growing points or buds which subsequently fuse, and the

Figs. 1–4. Inflorescences of *Celosia argentea*. 1. Normal. 2. Forked type. 3. Cocks comb type 4. Different levels of elaboration of inflorescences with fasciated stem.