

FURTHER STUDIES ON THE EFFECT OF CHEMICALS, INTERFERING WITH PROTEIN AND NUCLEIC ACID SYNTHESIS, ON THE PROCESS OF VERNALIZATION

CHAKRAVARTI AND DEVI¹ suggested a positive correlation between protein and nucleic acid synthesis on the one hand and acquirement of vernalization status on the other. In the present investigation, effects of 8-azaguanine, ethionine, 5-fluorouracil and 2-thiouracil, extensively used in photoperiodic studies², have been determined on the vernalization of *Eruca sativa* L. culture 6518 and *Linum usitatissimum* L.R. 17.

Technique followed has been the same as in the previous study¹. Seeds of *Eruca* and *Linum*, vernalized for 2 and 3 weeks respectively, were sown on 20-10-1975. In the present investigation, a record of both the age of the plants at anthesis and also of the number of leaves on the main axis, below the first flower, has been indicated.

the criterion of leaf number is taken into consideration. This has remained completely unaffected in azaguanine treated plants. In ethionine treatment, only *Linum* at 500 ppm has shown significant increase in the number of leaves over water vernalized. In fluorouracil and thiouracil treatments, however, this has happened in both the plants. As it is necessary that both the criteria of anthesis and node (leaf) number should be altered in the same direction for the process of vernalization to be specifically involved³, out of the 4 chemicals, fluorouracil and thiouracil fully satisfy the requirements. They are known to inhibit photoperiodic floral induction in a large number of plants through inhibition of RNA synthesis². As they also nullify low temperature effect in *Eruca* and *Linum*, there is a possibility of nucleic acid synthesis for their acquirement of vernalization status. These observations are in conformity with those of Chakravarti and Devi¹.

TABLE I

Effect of certain chemicals on the vernalization of Eruca sativa L. and Linum usitatissimum L.

Chemical	Conc. ppm.	<i>Eruca</i>				<i>Linum</i>			
		Anthesis (days)	Increase over water V	Leaf No.	Increase over water V	Anthesis (days)	Increase over water V	Leaf No.	Increase over water V
Azaguanine	100	47.7	14.7*	8.5	1.1	54.1	23.3*	31.6	- 0.8
	10	39.2	6.2**	7.8	0.4	44.2	13.4*	34.0	1.6
Ethionine	500	47.8	14.8*	10.1	2.7	55.7	24.9*	48.2	15.8*
	100	45.7	12.7*	8.4	1.0	44.2	13.4*	37.2	4.8
	10	44.5	11.5*	8.8	1.4	40.0	9.2**	29.5	- 2.9
Fluorouracil	500	56.3	25.5*	45.6	13.2*
	100	47.4	14.4*	13.7	6.3*	46.0	15.2*	38.6	6.2**
	10	38.4	5.4**	12.8	5.4*	40.1	9.3**	38.5	6.1**
Thiouracil	100	49.2	16.2*	13.6	6.2*	55.4	24.6*	50.6	18.2*
	10	42.3	9.3**	11.8	4.4**	48.7	17.9*	48.6	16.2*
Water vernalized (V)		33.0	..	7.4	..	30.8	..	32.4	..
Unvernalized		50.2	17.2*	14.8	7.4*	58.7	27.9*	62.5	30.1*

* Significant at 1% level. ** Significant at 5% level.

Data presented in Table I reveal that both in *Eruca* and *Linum*, all the 4 chemicals have diminished the effect of chilling as determined by the time taken for anthesis but that is not so when

As regards disagreement in the results obtained through anthesis and node number in azaguanine and ethionine treatments, it is not possible to offer an explanation at this stage. However,

there are other similar instances on record⁴. Before coming to a final conclusion, it would be necessary to study the effect of these chemicals on a number of other vernalizable plants.

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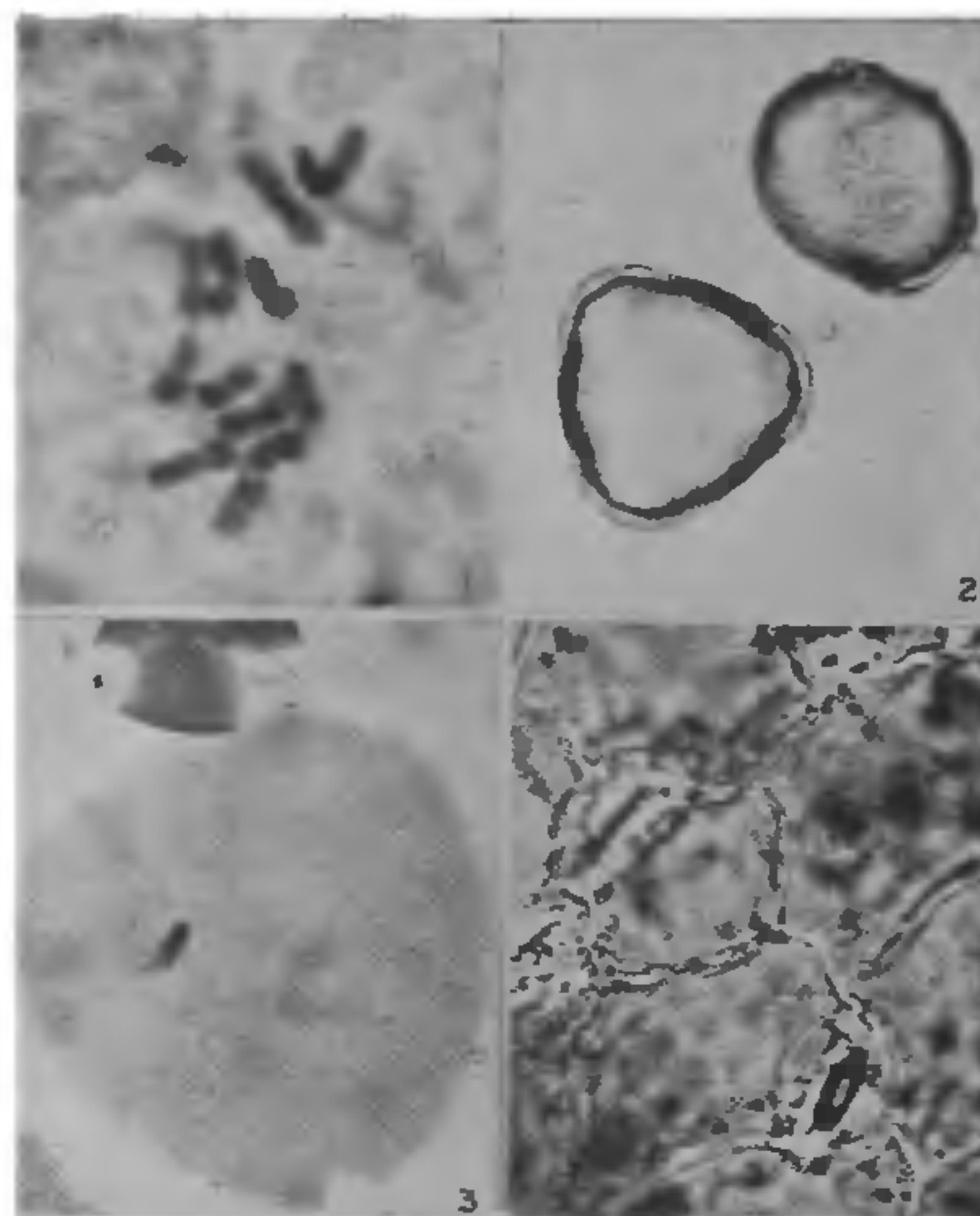
CHROMOSOME NUMBER AND MORPHOLOGY OF *SESBANIA PROCUMBENS* (ROXB.) W. AND A.

Sesbania Scop. (FABACEAE) is represented by four species in India¹, namely, *S. aegyptica* Pers., *S. aculeata* Pers., *S. procumbens* (Roxb.) W. and A., and *S. grandiflora* Pers. Gamble⁵ has erected *S. aculeata* var. *paludosa* of Baker as a distinct species, viz., *S. paludosa*. The chromosome numbers $2n = 12$ in *S. aegyptica*^{6,8}, *S. aculeata*⁸ and $2n = 24$ in *S. aculeata*⁶ and *S. grandiflora*^{7,10} have been reported earlier. The chromosome number in the only herbaceous species, *S. procumbens*, has not been reported and the same is reported here as $2n = 12$ (Fig. 1). There is no work on this rare sesban which has been recorded for the first time from a non-coastal region. Morphological, cytological, palynological and anatomical characters are also presented to supplement the distinctive features of this taxon. Baker¹ and Gamble⁵ have given a detailed morphological description of the species.

This species is confined to coromandel regions of peninsular India occurring chiefly in rice fields^{1,3,5,9}. The material investigated by the present authors was discovered for the first time in Karnataka State, near Kukkanahalli Tank (Mysore), on 20-9-1975 (Bhaskar and Lakshmi Devi, 574 MGM) on the marshy tank bund. This also forms an addition to the 'Hydrophytes and marsh plants of Mysore' reported earlier².

Sesbania procumbens (basonym = *Aeschynomene procumbens* Roxb.) and *Aeschynomene indica* are usually confused since they are similar in habit and bear small sensitive leaflets and more or less yellow flowers. However, the present study has revealed

many differences. *Sesbania* has a long septate fruit and diadelphous androecium (9 + 1) instead of a lomentum and diadelphous stamens in bundles of 5 each characteristic of *Aeschynomene* and a few other related genera. *S. procumbens* can be easily distinguished in the field by its bright yellow flowers while they are pale yellow or cream-coloured with red streaks in *Aeschynomene*. The stipules are absent in the latter and are small triangular and caducous in *S. procumbens*.



FIGS. 1-4.

Plants in *Sesbania procumbens* flowered from August to October and fruits persist till November. The flowers were found to open in the afternoon, between 1.30 to 2.00 p.m. Pollen grains are 3-colpate (rarely 4), triangular in polar view (Fig. 2) and exine is finely reticulate. LO pattern reverse or OL (pitted?). As in *S. aculeata* the vegetative nucleus was completely obscure at the shedding stage of pollen (Fig. 3). They were found to be mononucleate throughout the process of maturation of pollen from the smallest flower bud. However, at only one stage of the bud, i.e. 3 days before opening, a minute dot-like faintly stained body was observed in the pollen which is believed to be the vegetative nucleus. This becomes completely obscure very soon. A similar condition was also seen in *S. aculeata*. Pollen germinated on the stigma of the same flower, and it is monosiphonous.

The seeds which are smooth and shining germinated within five days after implanting. Stem