The stem and peduncle, though they have relatively more anomocytic forms unlike in the foliar appendages, in ontogeny, they too are dolabrate mesogenous like the diacytic forms.

The hypocotyl and floral disc, however, stand out from the other plant parts in regard to their stomatal structure and ontogeny. On the hypocotyl some of the anomocytic stomata are uni- or dolabrate mesoperigenous. On the floral disc, the stomata are further deviated, for all of them are anomocytic in structure and perigenous in origin.

From the above generalisations it is clear that stomata, despite differences in their structure, are stable regarding the origin of their subsidiaries on the different foliar appendages as well as the stem and peduncle. Thus the mode of origin of the subsidiaries of the stomata of the above parts suggests to be of taxonomic value in the three species studied. Further work would be of importance in showing upto what taxonomic level does this character remain constant in the family.

From the phylogenetic and morphogenetic viewpoint too, the occurrence of highly contrasting stomata confined to specific parts in the same plant is of significance. If perigenous stomata are regarded phyletically to have originated from the mesogenous ones through suppression of the meristematic capacity of their meristemoids as previously hypothesized by Pant,[5] the stomata of the floral disc represent derived forms. The immediate cause which may have brought about this modification is considered to be the localisation of hormones at a higher gradient in the floral disc which would inhibit meristematic activity; or it could be that the nectar in the disc acts as an inhibiting influence on the stomatal meristemoids.

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OPEN SPIKELET—A RADIATION INDUCED MUTANT CHARACTER IN RICE

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THE note records the isolation of a new mutant character, open spikelet, in R_2 generation of a cross, *viz.* Jhona 349 × T(N)1 following irradiation of its seeds. The mutant is characterised by open spikelets in which the lemma and palea are unable to close after they have opened for blooming (Fig. 1); 80 to 85% of the spikelets remain sterile; and the remaining spikelets contain only partially developed kernels.

Five hundred dormant F_2 seeds of the cross were treated with 30 KR of gamma-rays from the Co^{60} source and were grown in R_1 generation during *kharif* 1966. Out of 500 seeds, 467 seeds germinated and seedlings grew to maturity. The main panicle in each plant was bagged just after heading to avoid natural crossing. On ripening the panicles were harvested and threshed individually. The seed from these panicles was grown in single separate rows in R_2 generation during *kharif* 1967. In progeny No. 10, two out of 8 plants had panicles in which spikelets remained open upto ripening. In one of these two plants some of the panicles were bagged immediately after heading. It was observed that all the spikelets in the selfed panicles remained open; majority of them were sterile; in few the kernels were partially developed. Similar condition was also observed in the remaining panicles of this plant, and those of the other plant.

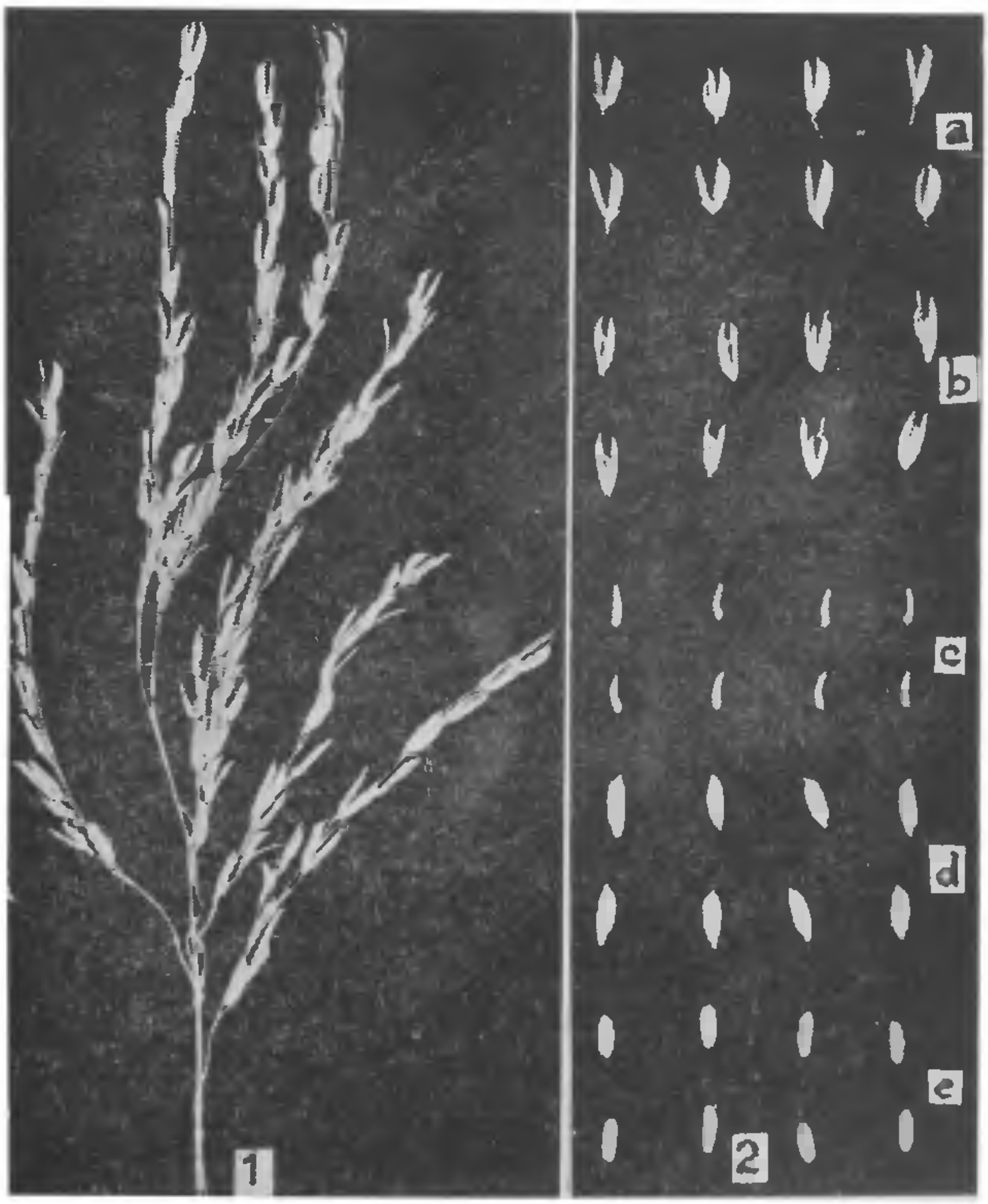
The partially developed kernels collected from the selfed panicles were grown in R_3 generation during *kharif* 1968. This progeny, designated as Mutant No. 1002, bred true showing complete penetrance and expressivity of the mutant character. The main panicle of each plant was selfed, while others were left as such to mature. After harvest the spikelets

of both the selfed and unselfed panicles from each plant were examined in the laboratory. It was observed that in the selfed panicles, two types of spikelets developed as on the mother plant in R_2 generation, *viz.*, open and sterile spikelets (Fig. 2 *a*), and open spikelets with partially developed kernels (Figs. 2 b and *c*). In unselfed panicles in addition to these two types of spikelets as observed in selfed ones there were a few spikelets which had fully developed kernels and looked like normal paddy grains (Figs. 2 d and *e*). The proportion of different types of spikelets in selfed and unselfed panicles is given in Table I.

TABLE I

Percentage of different types of spikelets in panicles of Mutant No. 1002 in R_3 generation during kharif *1968*

Type of spikelets	Proportion of spikelets in percentage in	
	Selfed panicles	Unselfed panicles
1. Open and sterile spikelets ..	85·14	80·33
2. Open and with partially developed kernel	14·86	18·72
3. Closed spikelets with fully developed kernel (Normal paddy grains)	..	0·95



FIGS 1–2. Fig. 1. Mature Panicle of Mutant No. 1002 with open spikelets. Fig. 2. Different types of spikelets of Mutant No. 1002. (*a*) open spikelets with no kernels; (*b*) open spikelets with partially developed kernels; (*c*) Partially developed kernels. (*d*) Normal spikelets; (*e*) normal kernels.

The data given in Table I show that:

1. Grain setting was more in the unselfed panicles than in the selfed ones;
2. Self-fertilization resulted in partial development of some of the kernels; and
3. Foreign pollen may cause development of the kernel into full grain and the spikelet to attain the size of normal paddy grain with closed lemma and pales,

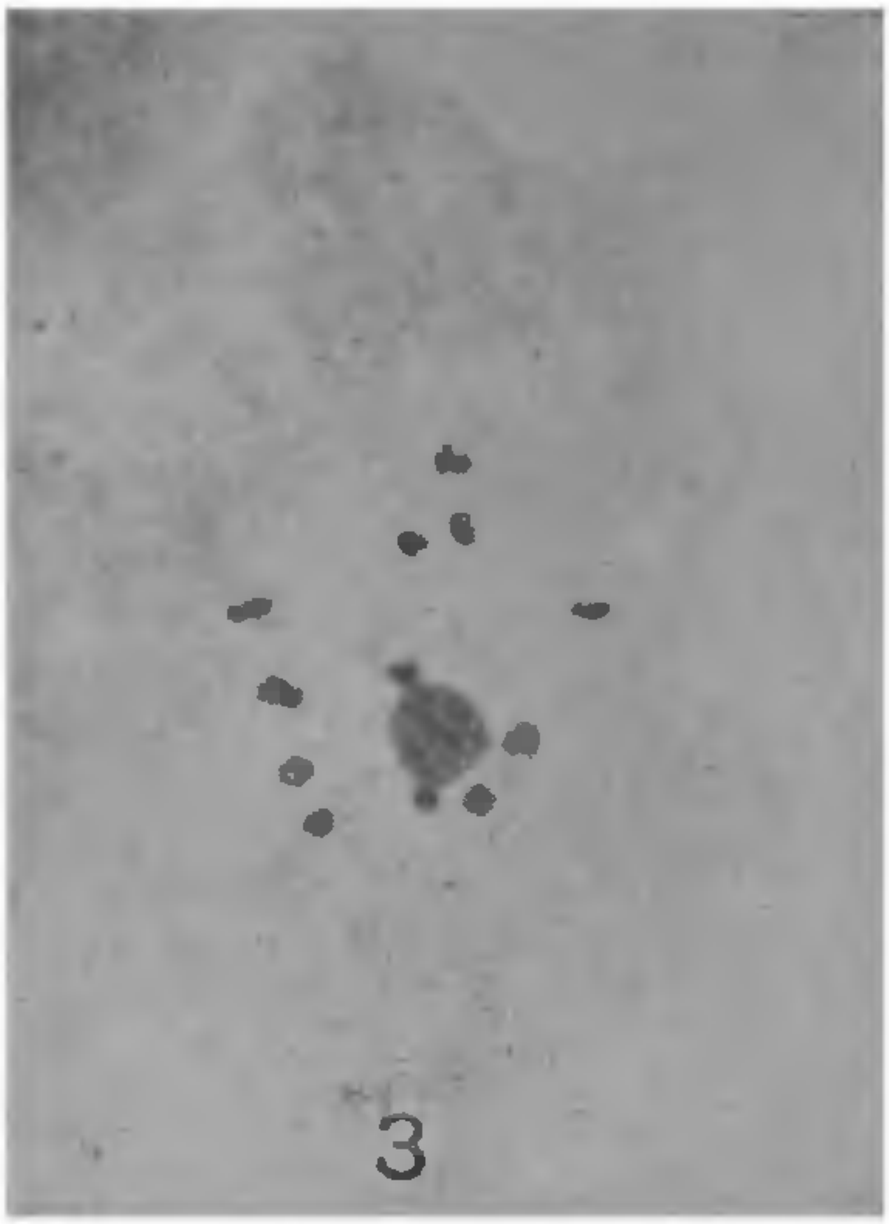


FIG. 3. Diakinesis exhibiting 12 bivalents in Mutant No. 1002.

These facts need further confirmation and progenies of partially and fully developed grains in the panicles of this mutant are being studied.

The open spikelet character in Mutant No. 1002, is assumed to be monogenic recessive because :

(1) It first appeared in F_2 generation ;

(2) There were two mutant plants in a progeny of 8 plants, which is a very close fit to 3 : 1 ratio ; and

(3) The panicle row bred true in R_3 generation.

Meiosis was normal with 12 bivalents at diakinesis (Fig. 3) followed by regular metaphase and anaphase stages.

This new mutant seems to be promising, because firstly its open spikelets may help to effect larger number of crosses efficiently and it may help to exploit hybrid vigour of suitable cross combinations with different varieties. Studies in this direction have already been initiated at the Punjab Agricultural University.

INTERNATIONAL CONFERENCE ON SPECTROSCOPY*

THE volume contains the invited lectures delivered at the International Conference on Spectroscopy held in Bombay during January 9–18, 1967. The subject-matter is dealt with in five groups, *viz.*, I. Spectra of Atoms and Diatomic Molecules ; II. Electronic Spectra of Polyatomic Molecules ; III. Infrared and Raman Vibration-Rotation Spectra ; IV. NMR and Microwave Spectra and V. Solid State Spectra and General Topics.

Special mention has to be made here of two papers appearing in the volume, *viz.*, a paper by O. Theimer on the Raman effect in a plasma and another by J. R. Singer on Lasers with frequency shifting systems. In the former paper, light scattering by a plasma is interpreted as a Raman effect with longitudinal plasma waves and is described in a manner which clearly exhibits the close analogy between the Raman effect in plasmas and in crystals. The experimental difficulties associated with the high temperature, low density and the collective behaviour of a plasma are discussed and it is shown how one can determine the electron density and velocity distribution, the ion temperature and the amplitude of unstable plasma waves by means of the light scattering method.

The book is well got up and excellently printed by the Tata Press, Bombay. It will be of great interest to research workers in the field of Spectroscopy.

**International Conference on Spectroscopy :* Invited Talks. Bombay (Published for the International Council of Scientific Unions with the financial assistance of UNESCO by the Department of Atomic Energy, Government of India), 1968. Pp. x + 288. Price $12.50/ Rs. 75·00.