The fact that not a single cleistogamous plant appeared even among 2283 F_2 segregates derived from 3 different crosses cannot be explained even by assuming as many as 5 pairs of duplicate recessive genes. Therefore, the only plausible inference about the genetic nature of cleistogamy in Dhundhuni rice rice variety is that it may be being governed by one or more cytoplasmic factors.

January 20, 1981.

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EFFECT OF LOW LIGHT AT ANTHESIS ON SPIKELET STERILITY IN RICE

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Spikelet sterility is one of the major factors for low grain yield in rice during the monsoon season. Low light normally prevalent during the flowering period is considered to be responsible for high sterility in early to medium duration rice varieties[1]. As the critical period for pollination and fertilization is the day of anthesis, trials were carried out at Central Rice Research Institute, Cuttack, during *kharif* 1978 to see the effect of low light exposure of the plants during the period of anthesis on spikelet sterility.

Two early high yielding cultures, *Rama* and *JS* 52–102 (*Pallavi*) were grown in pots. The spikelets from the main shoot were tagged at the time of anthesis and were exposed to varying low light intensities (10, 25 and 50% normal light) for specific periods near the anthesis period, *i.e.*, 1 hr before anthesis (T_1) during anthesis (T_2), 1 hr after anthesis (T_3), and combination of treatments $T_1 + T_2$ (T_4), $T_2 + T_3$ (T_5) and $T_1 + T_2 + T_3$ (T_6). Control series were maintained under normal light (80 klux). The reduced light was manipulated by wooden screens and the light intensities determined by lux meter were obtained at the top of the plant by altering the distance between two wooden strips (2 cm wide and 1 cm thick).

Table I

Effect of varying light intensities during anthesis on spikelet sterility % in rice (kharif 1978)

Treatment	Sterility % under varying light intensities					
	10% NL		25% NL		50% NL	
	Ratna	*JS*	*Ratna*	*JS*	*Ratna*	*JS*
T_1	61·4	37·1	47·7	35·3	40·9	32·4
T_2	73·6	49·6	60·3	40·2	52·9	40·4
T_3	43·1	37·9	49·0	41·4	46·7	34·1
T_4	68·1	45·0	56·2	43·8	50·4	44·1
T_5	69·4	48·1	58·6	44·8	52·7	41·6
T_6	69·7	54·6	62·1	45·9	53·9	44·0
Control (NL)	40·6	27·5				

CD 5%: V (variety) = 1·30, L (light) = 1·12, T (treatments) = 0·98, $V \times L = 1·82$, $V \times T = 1·06$, $L \times T = 0·98$, $V \times L \times T = 2·38$. NL = Normal light (80 klux), *JS* = *JS* 52–102.

Treatments T_1 to T_6 as indicated in text.

The sterility, in general, increased with reduction in light intensity, *i.e.*, 34, 45, 49 and 55% sterility at 100, 50, 25 and 10% of normal light. Cv *Ratna* consistently showed higher sterility (43–74%) than *JS* 52–102 (32–54%) at all the light regimes. Reduced light for 1 hr prior or 1 hr after anthesis showed lower sterility (42%) than that at anthesis (53%). The combination of shade treatment along with that at anthesis (T_4, T_5 and T_6) consistently recorded high sterility (53–55%) indicating the crucial role of light during the short period of anthesis on spikelet sterility (Table I).

The adverse influence of low light at the critical stage of anthesis has not been reported earlier. However, reports on heat induced sterility have shown that high temperatures (above 35°C) at anthesis even for less than 1 hr are detrimental for fertilization of rice spikelets[2].

The present results suggest that though low solar radiation during *kharif*, in general, is responsible for high sterility, the prevalence of such radiation during the critical period of anthesis assumes para-

mount importance in determining spikelet sterility in rice.

August 16, 1980.

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HYPOSTASE IN CYPERACEAE

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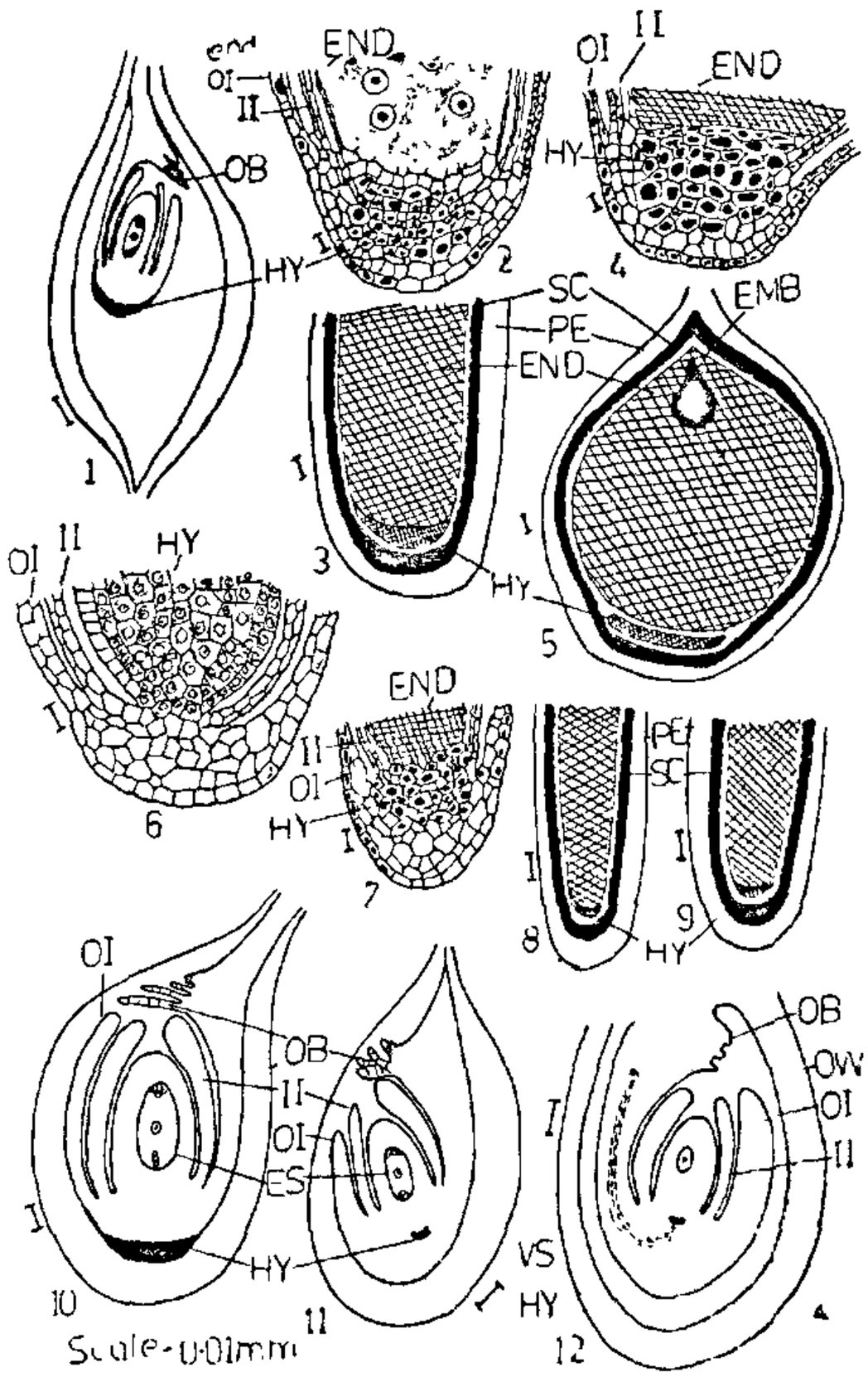
The family Cyperaceae has attracted the attention of botanists due to the unique mode of pollen development and also the embryogeny which conforms to Juncus variation of Onagrad type. While studying the embryological characters in the family, the presence of hypostase is noticed uniformly in the following taxa investigated by the author: *Pycreus pumilus* Nees., *Cyperus alternifolius* Willd., *Mariscus paniceus* Vahl., *Eleocharis atropurpurea* Kunth., *Fimbristylis cymosa* R. Br., *Scirpus supinus* Linn., *Eriophorum comosum* Wall., *Fuirena ciliaris* Linn, *Lipocarpha sphacelata* Kunth., *L. argentea* Br., *Remirea maritima* Abul. and *Scleria lithosperma* Roxb.

A group of nucellar cells at the chalazal end of the ovule became prominent and differed from the adjoining cells, having dense cytoplasm with distinct nucleus (Figs. 2, 4, 6, 7). This tissue was normally located at the chalazal end wherefrom the integuments originated. During seed development the cells in this region get enlarged and became somewhat thickened. After fertilization these cells get filled with tanniniferous granular deposits. Ultimately they were completely packed with tannin (Figs. 1–5, 7–12). In mature seeds, cells of this region were devoid of nucleus and cytoplasm.

The hypostase normally appeared bowl shaped, except in *Eleocharis atropurpurea* where it was saucer-shaped (Fig. 5). It persisted as such in mature seed. This was the only nucellar portion persisting in the mature seed (Figs. 1–12). The vascular supply of the ovule terminated at the base of hypostase (Fig. 12).

The presence of hypostase in the ovule of many angiosperms is well known. This structure has since been recorded in the family by different workers[3,6,7]. Various roles have been attributed to this structure. Van Tieghem[8] considered that these cells are resistant to digestion and possibly prevent the destruction of the nucellus in this area. Johansen[2] stated that the hypostase controls the entry of nutrients into the ovule. According to Goebel[1] it is concerned with water economy of the embryo sac. Netolitzky[5] designated it as 'chalazal corl. tissue' having mechanical function. Khanna[3] stated that it provides mechanical



Figs. 1–12. Hypostase in Cyperaceae. Fig. 1. *Pycreus pumilus* Nees. Fig. 2. *Cyperus alternifolius* Willd. Figs. 3, 4. *Mariscus paniceus* Vahl. Fig. 5. *Eleocharis atropurpurea* Kunth. Fig. 6. *Fimbristylis cymosa* R. Br. Fig. 7. *Scirpus supinus* Linn. Fig. 8. *Eriophorum comosum* Wall. Fig. 9. *Lipocarpha sphacelata* Kunth. Fig. 10. *Fuirena ciliaris* Linn. Fig. 11. *Remirea maritima* Abul. Fig. 12. *Scleria lithosperma* Roxb. Figs. 1, 10, 12. L.S. ovule. Figs. 2, 4, 7. L.S. mature fruit (lower part) showing tannin filled cells of hypostase. Figs. 3, 8, 9. L.S. of mature fruit (lower part) showing well-developed hypostase. Fig 5. L.S. of mature fruit showing saucer-shaped hypostase. Fig. 6. L.S. ovule (lower part) showing developing hypostase. (END = endosperm, ES = Embryo sac, HY = hypostase, II = inner integument, OB = obturator, OI = outer integument, OW = ovary wall, PE = pericarp SC = seed coat, VS = vascular supply).