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EFFECT OF GAMMA RADIATIONS AND GIBBERELLIC ACID ON GROWTH AND SHOOT REGENERATION IN CALLUS CULTURES OF *DATURA INNOXIA*

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STIMULATORY effects of low doses of ionizing radiations on growth and differentiation in cultured plant cells have been reported[1-6]. Some workers have demonstrated a variety of responses of GA_3 on organogenesis. There are evidences of repression of organogenesis by GA_3 in both meristem cultures and callus[7,8] as well as synergistic effect of GA_3 on organogenesis in combination with other plant growth regulators[9-11]. This communication describes the results of investigations carried out on growth and differentiation in the anther derived cultures of *Datura innoxia* that had been subjected to varying doses of gamma-irradiation and transferred to media with and without GA_3.

Explants of anther-derived haploid plantlets, raised according to the method of Sharma and Chowdhury[12] were used for initiating calli on Murashige and Skoog's[13] medium supplemented with 2 mg/l of 2,4-D (MS_2). These cultures were irradiated with different doses of gamma rays (source ^{60}Co; intensity 800 r/min) and transferred to fresh MS_2 and B_3[14] media for callus growth and shoot regeneration respectively. Four cultures were employed for each treatment. All the cultures were kept in the dark at $27 \pm 1°C$ except for shoot differentiation where they were incubated under constant illumination of 4000 lux. Growth rate was measured by recording an increase in the fresh as well as the dry weights after 20 days of incubation.

Growth of callus cultures was stimulated at 0.2 kR dose of gamma-radiation (table 1) but it decreased as radiation dose increased. Cultures exposed to 5 kR dose turned brown, indicating a general inhibition of callus growth. Shoot regeneration, however, was

Table 1 *Growth of callus cultures of Datura innoxia after 20 days of incubation.*

Rad. Dose (kR) Treatment	% increase in fresh weight		% increase in dry weight	
	MS_2	$MS_2 + GA_3$ (2 mg/l)	MS_2	$MS_2 + GA_3$ (2 mg/l)
0	301.64	262.24	301.00	228.28
0.2	404.93	360.12	377.00	258.00
1.0	289.34	250.13	220.10	155.95
5.0	112.00	137.04	150.10	139.80

Table 2 *Effect of gamma-irradiation and GA_3 on shoot regeneration (number of shoots regenerated/4 cultures) in callus cultures of Datura innoxia after 60 days of incubation.*

Rad. Dose (kR) Treatment	Medium	
	B_3	$B_3 + GA_3$ (2 mg/l)
0	6	0
0.2	11	0
1.0	19	0
5.0	0	0

stimulated both at 0.2 as well as 1 kR radiation doses (table 2). The frequency of shoot buds formed in cultures irradiated with 0.2 and 1 kR was 2 and 3 times respectively as compared to that in unirradiated cultures. Differentiation in these irradiated cultures occurred 10–12 days earlier than in unirradiated ones. No shoot regeneration was observed in 5 kR irradiated cultures. Low dose (0.2 kR) of irradiation was conducive to active cell proliferation, resulting in exuberant growth of the callus. Also the morphogenetic capacity for regeneration of shoot buds and plantlets in cultures exposed to low doses (0.2 and 1 kR) was augmented over unirradiated control. Higher dose (5 kR) was detrimental to both growth as well as differentiation. The inherent ability for growth and differentiation of the isolated plant cells culminating in plantlet formation, can thus be enhanced by the use of a stimulatory dose of radiation. Addition of GA_3 to the media resulted in the lower growth and it prevented organogenesis completely, both in unirradiated as well as irradiated calli. Thus the stimulatory effects of gamma radiations were not seen in the presence of GA_3.

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PATHOLOGIC DINOSAURIAN EGG SHELLS FROM KHEDA DISTRICT, GUJARAT

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WELL preserved dinosaurian egg nests have recently been discovered in infratrappean limestone of Kheda district, Gujarat[1]. In the area under review, the total thickness of the infratrappean sequence is about 6 m. The sequence starts with about 1 m thick conglomerate at the base, overlying granitoids and pegmatoids. This conglomerate which is very rich in dinosaurian bones, grades upward into calcareous pebbly sandstone which grades upward into siliceous limestone and further into pure limestone. The thickness of the limestone is about 3 m and the egg clutches are confined to the upper part of this limestone (figure 1).

The SEM study carried out by the author[2] has revealed the presence of two types of egg shells comparable to tubocanaliculate and angusticanaliculate types[3]. The normal egg shells show only one complete egg shell layer of tubercles (spheroliths).

Two types of pathologic tendencies are known so far in dinosaurian eggs. One is reduction in thickness

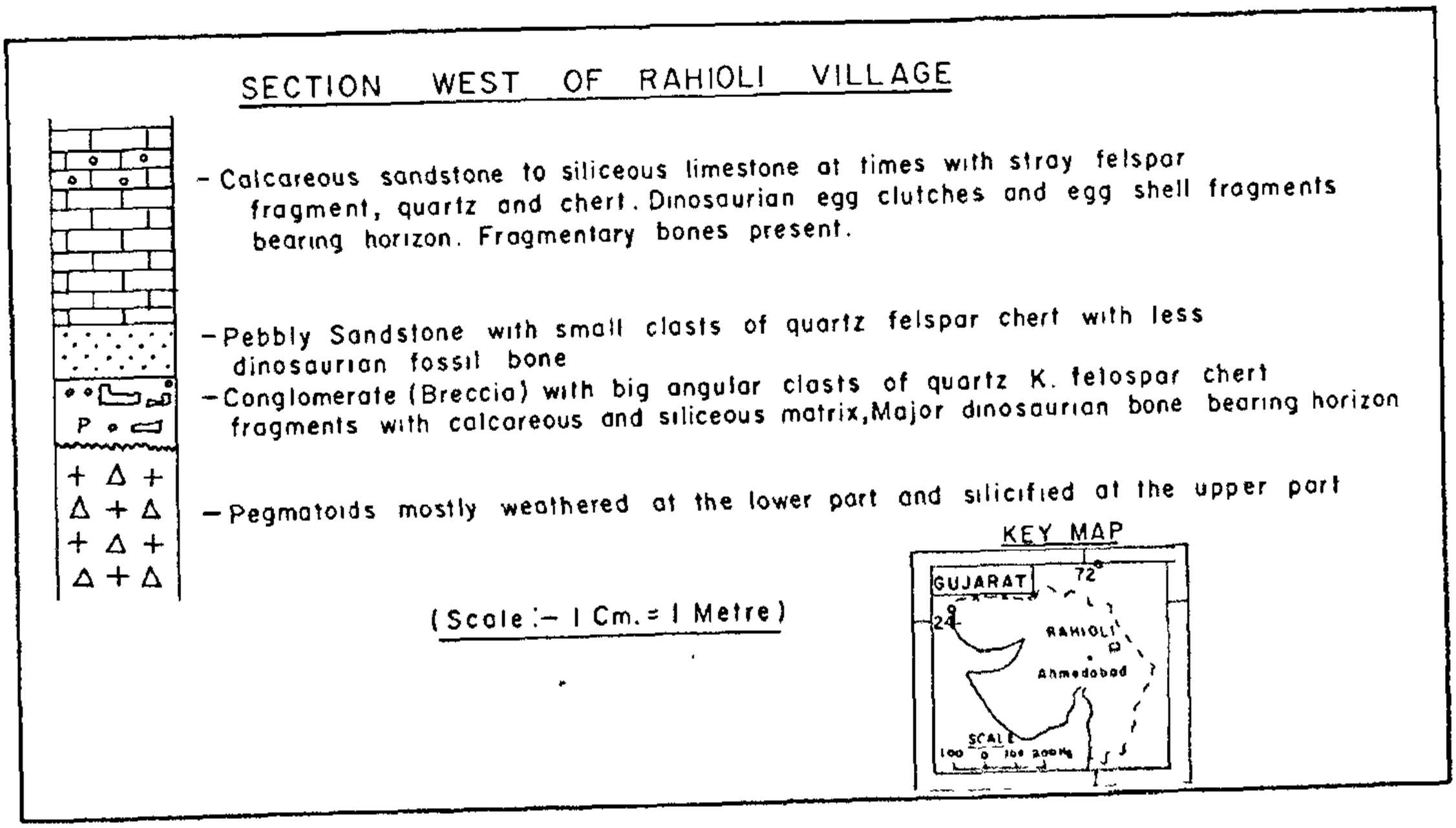

Figure 1. Section west of Rahioli village.