Figure 1. Sand dyke cutting across the sandstone and shale beds of basal Talchir Group, Gungatta River, Sarguja district, M.P.

decreases to few millimeters. The associated sedimentary beds are devoid of any zeolite veins.

The study leads to the conclusion that the fissures for the formation of dykes might have developed by earthquake shocks during deposition. The occurrence of earthquake during the rock deposition is also indicated by the presence of pseudomud cracks on the downstream side of Gungatta river[7] and penecontemporaneous folding in Talchir shales which are exposed in adjacently lying Lotma and Barnai rivers[8]. The occurrence of earthquakes during the Talchir sedimentation indicates that the processes responsible for the faulting in the Gondwana basins of Peninsular India had been initiated during the Talchir period.

The clastic dykes are generally formed in two ways. Firstly, by the intrusion of clastic material from some underlying source layer under abnormal pressure and secondly, by filling of material from above. In the present case, the overlying beds have already been eroded, and the distinguishing features related to the latter process are not found. Therefore, it is difficult to conclude whether the material was forced from some underlying source or simply filled from above.

The unusual occurrence of zeolite veins in the clastic dyke needs special attention. Zeolites generally occur as filling of amygdales, fissures and openings in basic igneous rocks, alteration of aluminium silicates[9].

The downward thinning of zeolite veins, in the clastic dykes indicates that the solutions for zeolite crystallization might have come from an overlying source. The possible source of the solutions may be Deccan Traps which are found at the top of Bunderkot hill (760 m) in the vicinity (about 10 km). Further, towards the south, laterized Deccan Traps occur extensively as cap rock, on the top of the Mainpat ridge (1127 m), almost throughout its length. Therefore, the possible source of zeolite veins may be traced to these flows which in the past, might have extended upto Gungatta river. However, detailed work is needed to get a meaningful conclusion about the mechanism and physico-chemical conditions of their formation.

The authors thank Professor S. H. Rasul and Professor N. Ahmad for their help and encouragement.

27 July 1984; Revised 28 January 1985

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ISOPEROXIDASE IN RELATION TO MICROSPORE DIFFERENTIATION IN *DIOSCOREA COMPOSITA*

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THE shift from vegetative to reproductive phase of life involves a series of changes in the meristem of flowering plants. During recent years, the change over has been found to involve sex specific macromolecules

whose activity leads to the differentiation and development of male and female reproductive organs. Isoperoxidases represent a group of compounds which have been proved to be definitely involved in sex expression by various workers[1-5]. The role of isoperoxidases has been demonstrated in the microsporogenesis of an andromonoecious Umbellifer[6] in this laboratory. To test the validity of the earlier observations, the work was extended to *Dioscorea composita*, a dioecious species, practising a different breeding system. The results of the experiment constitute the text of present communication.

The isoperoxidases were studied from buds of different ages. For isoperoxidase analysis the technique followed was that of Koul and Bhargava[6]. For extraction of the isozymes the buds were crushed in phosphate buffer maintained at pH 7.3 (30 mg per 0.15 ml). Extraction was carried out overnight in cold. The separations were achieved on 7.5% polyacrylamide gels using tris-glycine (pH 8.3) as the electrode buffer. Finally, the isoperoxidases were detected by benzidine-H_2O_2 reaction.

Perusal of figure 1 reveals that in anthers isoperoxidases increase both in number as well as quantity up to the time pmc enter into meiosis. Thereafter, there is an allround decline. This is illustrated by the fact that at premeiotic stage, the anthers contain four isoperoxidases. During pmc meiosis the number increases to seven but post-meiotic anthers have only three isoperoxidases (figure 1). The quantity of individual peroxidases (revealed by the intensity of staining of individual bands) increases during the course of meiosis and declines thereafter. On the female side, the pattern remains uniform at different developmental stages. Only two isoperoxidases bearing nos. 2 & 4 were detected in female flowers of all ages. They show moderate intensity.

A comparison between the isoperoxidase pattern of male and female tissues reveals that both the bands of female tissue are common with male tissue at one or the other developmental stage. This rules out involvement of any specific isoperoxidase in megasporogenesis and embryo sac development. On the contrary, three peroxidases represented by band nos. 5, 6 and 7 are exclusively encountered in dividing pmcs. These results lend support to the results obtained in *Scandix pecten-veneris* in which specific isoperoxidases were found involved in pmc meiosis[6]. The present experiment shows that dioecious angiosperms follow the same pattern with respect to isoperoxidases as do the andromonoecious species. It still remains to be explored whether isoperoxidases are also involved in the development of male and female gametes even in cryptogams.

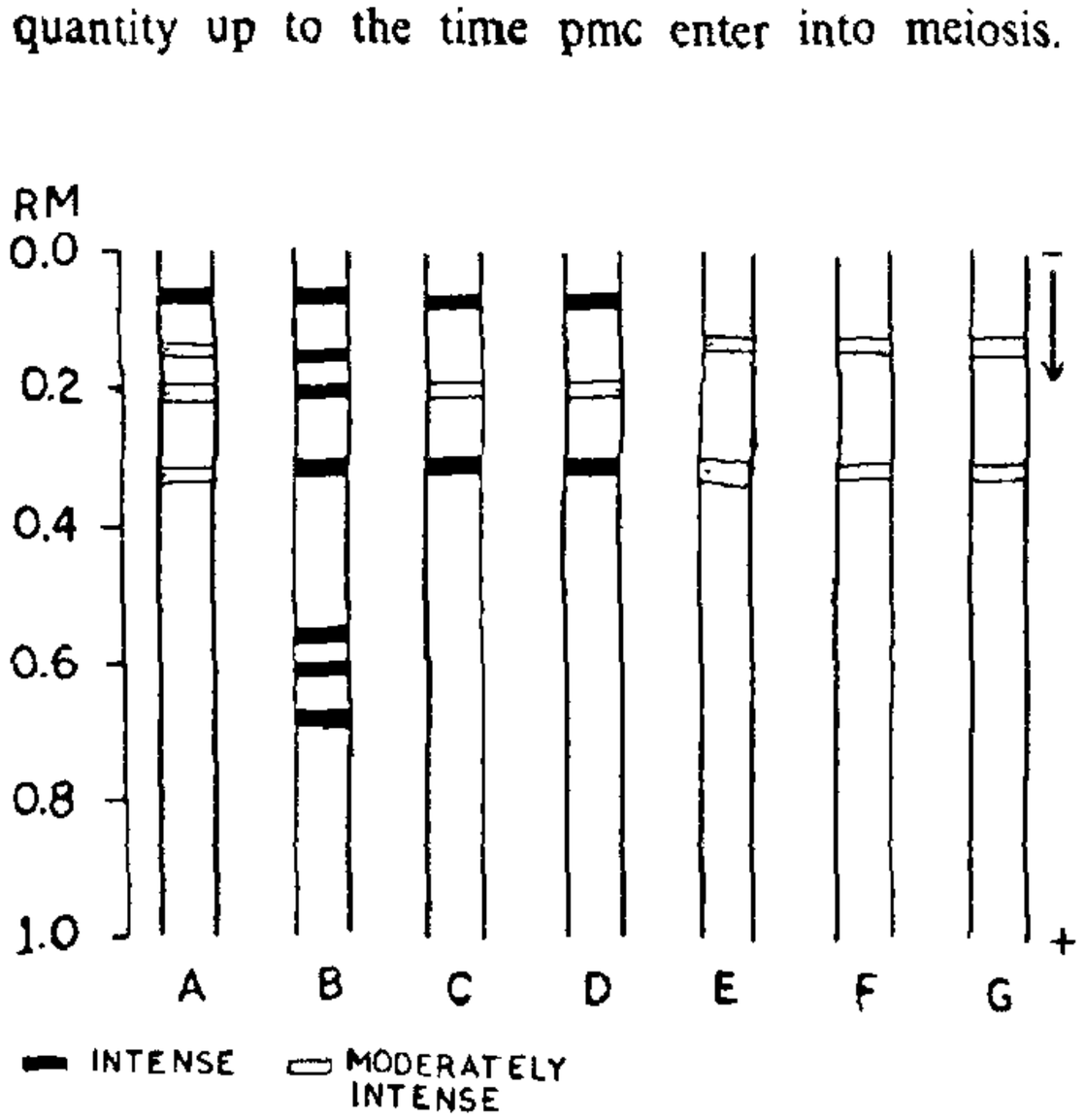

Figure 1. Peroxidase zymograms at different stages of microsporogenesis and male gametogenesis. (A-D) and pistil development (E-G); A—premeiotic sporogenous cell stage; B—pmcs undergoing meiosis; C—at pollen stage; D—at dehiscence stage; E—pistil at prereceptive stage; F—pistil at receptive stage; G—pistil at post receptive stage.

The authors are grateful to Prof. A. K. Koul for guidance and critical evaluation of the work and to Prof. Y. R. Malhotra, for facilities. The financial assistance received from CSIR, New Delhi, is gratefully acknowledged.

23 May 1984, Revised 3 December 1984

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