1. Gustafsson, A., *Apomixis in higher plants*, Lunds Univ., Arsskr. N. F. Avd., I-III, 1946-1947, 42:3: 1-371.
2. Nielson, E. L., *Bot. Gaz.*, 1941, **103**, 177.
3. Wilton, A. C., *Can. J. Bot.*, 1963, **41**, 1645.
4. Wycherley, P. R., *Mededel. Landbouwhogesch, Opzoekingssta*, Staat. Gent., 1952, **52**, 75.
5. Latting, J., *The biology and utilization of grasses*, London, Academy Press, 365, 1972.
6. Younger, V. B., *Am. J. Bot.*, 1960, **47**, 753.
7. Nygren, A. and Almgard, G., *Kungl. Lauthbrukshogsk* Ann., 1962, **28**, 27.

AFLATOXIN PRODUCTION ON SOME FRUITS BY *ASPERGILLUS FLAVUS* LINK EX FRIES AND *ASPERGILLUS PARASITICUS* SPEARE

ANJANA SINGH AND K. K. SINHA
Department of Botany, Bhagalpur University, Bhagalpur 812007, India

AFLATOXIN elaboration on fruits and vegetables has not received much attention[1,2]. This communication deals with aflatoxin production by *Aspergillus flavus* Link ex Fries and *A. parasiticus* Speare on five fruits.

Equal weights (100 g) of five common fruits *viz.*, orange (*Citrus reticulata* Blanco), mosambi (*Citrus sinensis L. Osbeck), apple (Pyrus malus* L.), guava (*Psidium guajava* L.) and banana (*Musa paradisiaca* L.) were suface sterilized and inoculated separately with *A. flavus* BG-19 and *A. parasiticus* NRRL-3240 (two well-known aflatoxin producing fungi). These were subsequently incubated for 7 days at fixed R. H. of 96%. Aflatoxins were extracted from the infested tissues with aqueous methanol and chloroform respectively according to the method of Jones[3]. Choloroform extract was evaporated to dryness and the residue was dissolved in 1 ml chloroform, 100 μl of this aliquot was spotted on TLC plate which was developed in toluene: iso-amyl alcohol:methanol (90:32:2, v/v) solvent system[4]. Qualitative analysis of aflatoxins was done under long wave UV-light and the quantity of aflatoxin B_1 was estimated by dilution to extinction technique[2].

It is evident from table 1 that aflatoxin production by *A. flavus and A. parasiticus* varied with the nature of substrates (fruit). Mosambi was a good base for elaboration of this mycotoxin by both the species (0.686 and 0.879 ppm respectively) whereas banana and apple fruits were poor substrates for elaboration of this toxin by *A. flavus* (0.047, 0.066 ppm) and *A. parasiticus* (0.087, 0.042 ppm) respectively whereas orange was a favourable fruit (0.601, 0.515 ppm respectively).

TABLE 1
Aflatoxin production by A. flavus and A. parasiticus on some fruits

Fruits	Amount of aflatoxin B_1 produced (ppm) by	
	A. flavus	*A. parasiticus*
Mosambi	0·686	0·879
Orange	0·601	0·515
Apple	0·066	0·042
Guava	0·563	0·257
Banana	0·047	0·087

Higher production of aflatoxins in mosabi and orange fruits may be attributed to rich vitamin C, malic acid, citric acid, sucrose contents in these fruits which are known to be good sources for aflatoxin production.[5]

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1. Moreau, C., *Moulds, toxins* and *food* (Translated and edited by M. O. Moss), John Wiley, New York p. 477, 1979.
2. Bilgrami, K. S., Prasad, T., Misra, R. S. and Sinha, K. K., Technical report of I.C.A.R. Research project, 1980.
3. Jones, B. D., *Methods of aflatoxin analysis*. G-70, Tropical Products Insititute, London, p. 58, 1972.
4. Reddy, T. V., Vishwanathan, L. and Venkitasubramanium, T. A., *Anal. Biochem.*, 1970, **38**, 568.
5. Detroy, R. W., Lillehoj, E. B. and Ciegler, A., *Microbial Toxins* (eds. Ciegler, A., Kadis, S. and Ajl, S. J.). Academic Press, New York, p. 3, 1971.

POLLEN DIMORPHISM IN *ALTHEA ROSEA* L.

DARSHAN SHARMA
Palynology Laboratory, National Botanical Research Institute, Lucknow 226001, India

THE phenomenon of pollen dimorphism, mostly pertaining to size, shape, aperture type, and exine ornamentation within the pollen mass of a species has

been reported in several taxa associated with heterostyly[1,2]. In the family Malvaceae, Nair[3] has reported spine dimorphism in the pollen mass of *Malva parviflora* but the study was not supported with scanning electron microscope. The present report aims at bringing to the focus the importance of studies with SEM in gaining deeper understanding of the finer details regarding the spine dimorphism and exine ornamentation in the pollen grains of *Althea rosea* L.

Both acetolysed[4] and unacetolysed[5] pollen grains were studied by light microscope. For SEM studies acetolysed grains were used and electron micrographs were taken on JOEL, JSM-35C microscope. The pollen grains are described below.

The pollen grains are pantoporate and spheroidal. According to the size, the grains are grouped as small grains, size: 115 μm (108-132 μm: unacetolysed), 143 μm (122-154 μm; accetolysed), and large grains, size: 146 μm (135-157 μm; unacetolysed), 170 μm (162-178 μm; acetolysed). Exine is spinate. Spines are long, pointed (10-12 μm), and interdispersed with verrucae (1-3 μm). There are two types of grains in the same pollen mass. In one type bases of spines and verrucae are surrounded by a rim like, granular (1·5–2 μm) structures (figures 1, 3), which occasionally fuse to form continuous ring. In the second type of grains, the basal rims are absent (figures. 2, 4). Exine is thick 5-8 μm (excluding spines), ectexine is thin (1·5–2 μm) composed of very thin tectum and columella layer. Endexine is thick (5-6 μm), consists of two layers namely, thick and homogeneous endexine I, and very thin, hyaline endexine II. Excrescences are compactly arranged in small grains and distantly arranged in larger grains. Similarly, the pore diameter is 1-2 μm in small grains and 2-4 μm in larger grains. Interexcresences area is granular in both types of grains.

It is evident from the above data that the two pollen types differ with regard to the presence or absence of an annuloid, granular, dissected or continuous ring at the bases of spines and verrucae. Further, the two types of excrescences namely, spines and verrucae are present on the surface of same pollen. The presence of two types of pollen in the same pollen mass coming from the anthers of same flower, may be considered to reflect some cytological changes in cultivated plants. Such morphological variations have also been often found in other cultivated plants[6-7]. The present study indicates that the minute but important structural features are always lost in the light microscopic investigations, suggesting thereby the imperative need of SEM studies.

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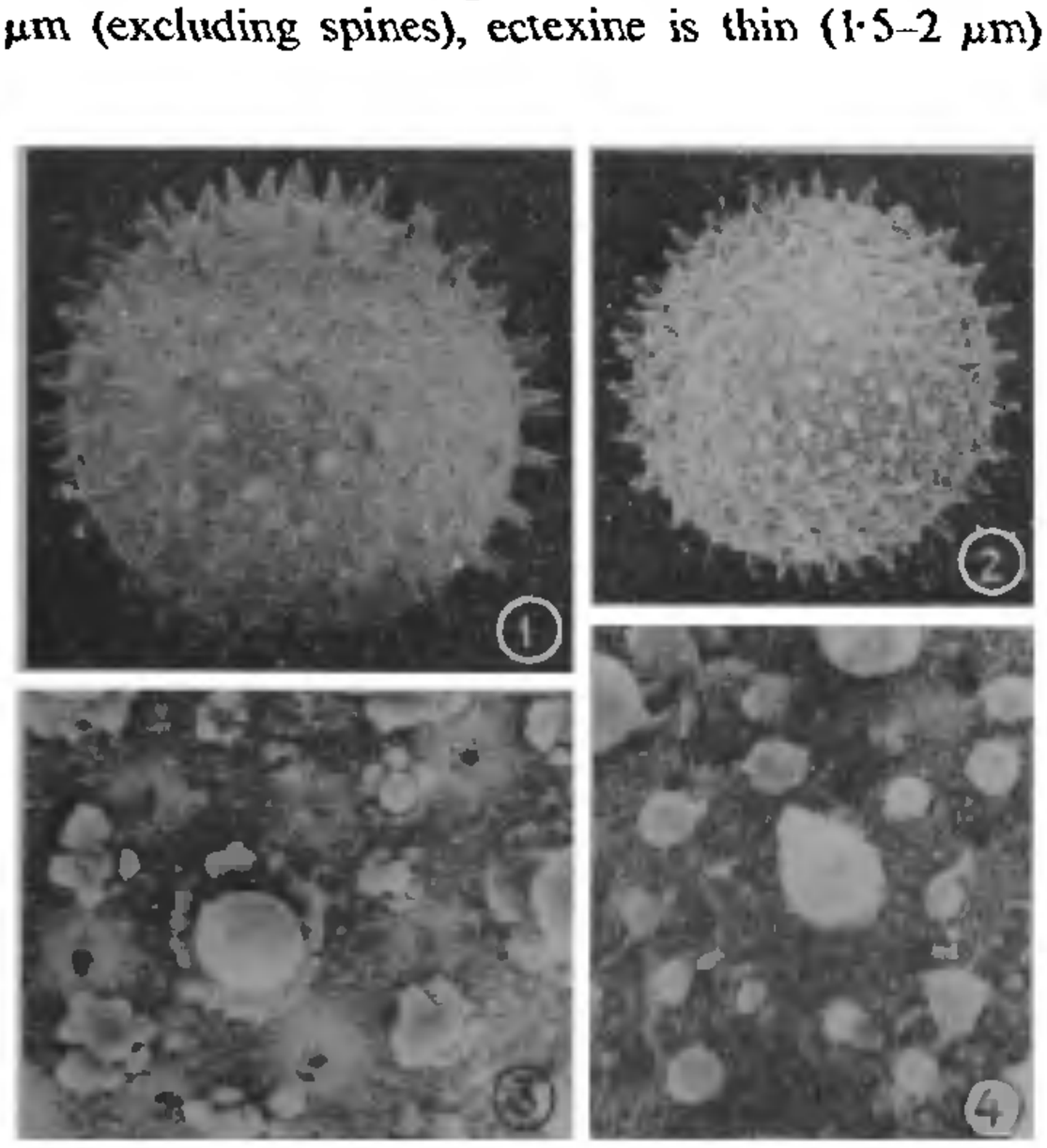

Figures 1-4. Pollen morphology of *Althea rosea L.* **1.** Pollen grain showing spines and verrucae with basal rims, X600. **2.** Pollen grain showing excrescences without basal rims, X600. **3** and **4.** Portions of both types of grains magnified to show finer details of exine ornamentation: Note the granular inter-excrescences area, X4100.

1. Kohler, E., in *The evolutionary significance of exine,* I.K. Ferguson and J. Muller (eds.), Academic Press, London, 1976, p. 147.
2. Rogers, C. M., *Grana*, 1980, **19**, 19.
3. Nair, P. K. K., *J. Sci. Ind. Res.*, 1958, **C17**, 35.
4. Erdtman, G., *Pollen morphology and plant taxonomy/ angiosperms,* Almqvist and Wiksell, Stockholm, 1952.
5. Nair, P. K. K., *Pollen morphology of angiosperms—A historical and phylogenetic study*, Vikas Publishing House, Delhi, 1970.
6. Chaturvedi, M., *Curr. Sci.*, 1978, **47**, 471.
7. Nair, P. K. K. and Kapoor, S. K., in *Glimpses in plant research,* P. K. K. Nair (ed.), Vikas Publishing House, Delhi, 1974, Vol. 2, p. 106.

STRUCTURE OF PERICARP AND DEHISCENCE MECHANISM IN *ANETHUM GRAVEOLENS* L.

INDU SHARMA AND L. C. LAMBA
Department of Botany, Kurukshetra University, Kurukshetra, India

Whilst plenty of information is available regarding the floral biology and gross morpholoy of fruits of