

It is felt that the character spinule diameter will prove to be useful, if an improved measuring technique can be found. Preliminary investigations of ultrathin sections of pollen viewed through a transmission electron microscope suggest that this may represent an improved technique.

Early investigations of pollen size and tendency towards intine rupture lead us to believe that these characters will also contribute to intervarietal discrimination.

References:

- Banerjee, U. C. and E. S. Barghoorn. "Electron microscopy of the pollen grains of maize, teosinte, and Tripsacum." Maize Genetics Cooperation News Letter 44: 43 (1970).
- Rumbaugh, M. D. and R. H. Whalen. "Variations in pollen grain size of inbred maize lines." Maize Genetics Cooperation News Letter 46: 171 (1972).
- Tsukada, M. and J. R. Rowley. "Identification of modern and fossil maize pollen" Grana Palynologica 5: 3 (1964).

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1. The taxonomy of Zea mays (Gramineae).

The origin of maize has long been disputed. Of the various theories, the oldest postulates its direct origin by ancient human selection from a wild grass of the genus Euchlaena, the "Teosinte" of Mexico and Guatemala; i.e., maize is simply regarded as a highly domesticated and variable cultivar of Euchlaena. The morphological steps, first clearly outlined by G. N. Collins (J. Agr. Res. 17: 127-135, 1919), were discussed but not accepted by P. C. Mangelsdorf (Bot. Mus. Leafl. Harvard Univ. 12: 33-75, 1945) and amplified by W. C. Galinat (An. Rev. Gen. 5: 447-478, 1971) and myself (H. H. Iltis, The Maize Mystique, 5 pp. mimeo. MS. 1970; cf.

Galinat, loc. cit., pp. 450, 462). The genetic reasons were first outlined by G. Beadle (J. Hered. 30: 245-247, 1939).

The close relationship of Euchlaena to Zea was taxonomically formalized by Reeves and Mangelsdorf (Am. J. Bot. 29: 815-817, 1942), who transferred its two accepted species to Zea. Of these, the perennial tetraploid, Z. perennis, is the most primitive and distinctive in the genus. The diploid annual Z. mexicana sensu lato, however, contains two major elements: the Tripsacum-like, more primitive "Florida" Teosinte (E. luxurians) from Guatemala, which does not cross as readily with maize and other Teosinte forms, and which deserves separate subspecific status (see below); and the remaining races (cf. H. G. Wilkes, Teosinte: the closest relative of Maize, Bussey Inst. Harvard, 158 pp., 1967) which cross with close to 100% fertility with maize, and are best considered, for the time being, under but one subspecies, conspecific with maize as suggested by C. D. Darlington (Chromosome Botany, Allen and Unwin, London, pp. 130-131, 1956):

"The breeding and chromosome evidence ... agree in requiring that Euchlaena mexicana and Zea mays should be described as one species, the wild grass being today an authentic and scarcely changed representative of what the ancestor of Zea mays must have been."

The new combination, made informally by Iltis (loc. cit.), was validly published in Galinat (loc. cit., p. 450), who, however, neglected to cite the basonym date and place of publication, an oversight rectified below. Further study may in addition demand separate subspecific recognition of other Zea mays races, especially the "Rio Balsas" and "Chalco" populations (cf. Wilkes, loc. cit.).

Synopsis of Zea

1. Zea mays L. ssp. mays
2. Zea mays L. ssp. mexicana (Schrad.) Iltis, in Galinat, An. Rev. Gen. 5: 450, 1971
(based on Euchlaena mexicana Schrader, Index Sem. Hort. Goett., 1832; Linnaea 8: 25, 1833).
3. Zea mays L. ssp. luxurians (Durieu) Iltis, stat. et comb. nov.
(based on Euchlaena luxurians Durieu, Bull. Soc. d'Acclimat. 19: 581, 1872).

4. Zea perennis (Hitchcock) Reeves et Mangelsdorf.
(based on Euchlaena perennis Hitchcock).

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1. Androgenesis and the indeterminate gametophyte (ig) mutation:
Influence of pollen parent on androgenesis frequency.

Embryo sacs which carry ig promote androgenesis whether or not the nucleus of the male gametophyte involved carries the mutation. Evidence in support of this inference derives from matings between strains of inbred W23 where the total androgenesis frequency in crosses utilizing ig ig ear parents was 2.3% (Science 166: 1422-1424, 1969). A smaller population employing a second inbred as male yielded only one-fourth as many cases, raising thereby the possibility of a major influence of pollen parent on androgenesis frequency.

Further evidence bearing to this point derives from experiments whose principal aim was to identify the source of the cytoplasm in the event of ig related androgenesis (cf. following item). The pollen parents were inbreds WA374, W23R and A632; the female parent was W23 ig ig $R^{nj} R^{nj}$. Standard as well as Texas-sterile cytoplasmic counterparts of both parents were employed. The results are summarized according to male parentage, with the 1971 and 1972 data combined so as to provide large enough numbers for a test of heterogeneity.

The incidence of androgenesis, monoploids and diploids combined, differs significantly among the three male parents ($X^2 = 6.6$, $P = 0.03$).

Of 151 cases of androgenesis in all, 15 were diploid. The data indicated unequal proportions of monoploid and diploid derivatives over the three inbreds (X^2 , uncorrected for continuity, = 6.1; $P = 0.05$). WA374, it will be noted, had both the highest total androgenesis frequency and the largest proportion of diploids. A broader survey of pollen parents and