

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

Hugh H. Iltis

UNIVERSITY OF WISCONSIN
Madison, Wisconsin
Laboratory of Genetics

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

Frequencies of androgenetic monoploids and diploids obtained
in matings of three inbreds as male to W23 ig ig females

Pollen parent	Population	Androgenetic derivatives		
		Monoploid	Diploid	Frequency (x 10 ⁻³)
WA374	3369	59	11	20.8
W23R	2304	28	3	13.5
A632	3583	49	1	14.0
	9256	136	15	16.3

insight into the mechanisms of androgenesis and chromosome doubling is needed in order to discover whether this relationship is other than fortuitous.

Jerry Kermicle

2. Androgenesis and the indeterminate gametophyte mutation: Source of the cytoplasm.

Texas cytosterility is being used as a marker to identify maternal or paternal origin of the cytoplasm in the event of ig associated androgenesis. From T x N crosses, androgenetic plants were established from inbreds WA374, W23R, and A632 and then backcrossed to pollen parents of the respective inbred. Offspring from the backcrosses, consisting of 202 individuals descended from 44 monoploids and 73 descended from 3 diploids, were observed for pollen fertility in 1972.

All 202 were male sterile.

If sterility results from derivation of cytoplasm from the maternal parent, then descendants of andronotes obtained through N x N matings should be fertile. Such cases also serve as a control over the possibility that the observed sterility resulted not from inheritance of T-cytoplasm but as some consequence of the androgenetic event itself.

Observations on 71 first-generation descendants of 7 andronotes of N x N ancestry argue against a trivial basis for the male sterility which