

Registration of 18 First-Cycle Tropical Midaltitude Maize Germplasm Lines

Eighteen tropical midaltitude maize (*Zea mays* L.) germplasm lines (Reg. no. GP-252 to GP-269; various PI numbers from 550899 to 550925; Table 1) were jointly developed by the International Institute of Tropical Agriculture (IITA) and the Cameroon Institute of Agronomic Research (IRA) as part of the USAID-financed National Cereals Research and Extension Project. They were released in 1991 for use as source germplasm or as parental lines in the high-rainfall tropical midaltitudes. Few internationally available inbred lines have been developed for this ecology.

The principal nursery and testing sites for development of these lines were in the Western and Adamawa Plateaus of Cameroon (5° to 8° N lat, 1000 to 1500 m altitude, 1500 to 2200 mm annual monomodal season precipitation). Data on days to silk, plant height, and resistance to *Exserohilum turcicum* (Pass.) K.J. Leonard & E.G. Suggs, *Cercospora zeae-maydis* Tehon & E.Y. Daniels, and *Physoderma maydis* (Miyabe) Miyabe were taken at two sites on the Jos Plateau of Nigeria (9° to 10° N lat, 1200 to 1400 m altitude, 1300 mm annual monomodal season precipitation). Maize streak virus (MSV) screening was performed at IITA, Ibadan, Nigeria (tropical lowland), using artificial field infestation with viruliferous leafhoppers (*Cicadulina* spp.).

These first-cycle lines were developed by selfing from the IITA Midaltitude Streak Resistant (TZMSR) and tropical lowland (TZSRW) populations (1,2), and from these populations or derivative lines crossed onto East African hybrids. The principal selection procedures included disease nursery and per se selection at S₁ to S₃ stages and testcross selection (with single-cross tester) at the S₃ stage. Testing as parents of single-cross hybrids was begun at the S₄ stage. Subline selection in disease nurseries was continued until at least the S₆ stage, and selected sublines (two to six) were bulked within the original S₃ line parent of the testcross selection to maintain vigor. By 1990, all lines listed had been selected in Cameroon as a parent of at least one single-cross hybrid acceptable for commercial production.

Predominant leaf pathogens in the Cameroon selection environments are *E. turcicum* and *Puccinia sorghi* Schwein., with occasional pressure from *Bipolaris maydis* (Nisikado & Miyake) Shoemaker, *Pucc. polysora* Underw., and *Phys. maydis*. A higher pressure (or different race) of *E. turcicum*, as well as a *Cercospora* sp., was observed and scored at Jos, Nigeria, in 1991.

The lines are primarily late maturing and short in stature (Table 1). As comparison, late-maturing TZMSR-derived open-pollinated cultivars and the Zimbabwe Seed Coop hybrid ZS206, grown in separate but adjacent experiments, silked in 77 and 76 d, and averaged 2.5 and 2.6 m plant height, respectively. All lines have white kernels except 88069, which is yellow. They are all resistant or moderately resistant to maize streak virus. It is expected that the primary utility of these lines will be as parents of varietal synthetics, and as parents of crosses and synthetics for inbred extraction for the high-rainfall midaltitudes. They exhibit sufficient diversity of plant heights, maturities, grain types, and disease resistance to contribute to a range of breeding requirements.

Small quantities (40 kernels) of seed will be provided to crop researchers upon written request. Seed requests should be sent to the Maize Program Leader, IITA, PMB 5320, Ibadan, Nigeria. We ask that appropriate recognition of source be given when this germplasm contributes to an improved cultivar or germplasm.

L. A. EVERETT,* J. T. ETA-NDU, M. NDIORO, I. TABI,
AND S. K. KIM (3)

References and Notes

1. IITA. 1983. Disease resistant maize varieties for mid-altitude ecology in Africa. p. 38-40. In IITA research highlights, 1983. IITA, Ibadan, Nigeria.
2. Kim, S.K., F. Khadr, J. Fajemisin, Y. Efron, and L. Everett. 1985. Disease resistance maize breeding for mid-altitude ecology in Africa. p. 75. In Agronomy abstracts. ASA, Madison, WI.
3. L.A. Everett, Dep. of Agronomy and Plant Genetics, Univ. of Minnesota, St. Paul, MN 55108; J.T. Eta-Ndu, M. Ndioro, and I. Tabi, IRA Bambui Stn., Box 80, Bamenda, Cameroon; and S.K. Kim, MIP, IITA, PMB 5320, Ibadan, Nigeria. Registration by CSSA. Accepted 28 Feb. 1994.

*Corresponding author.

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Table 1. Plant characteristics and disease reactions of tropical midaltitude maize inbred lines, averaged across two sites on the Jos Plateau, Nigeria.

Inbred	Reg. no.	PI no.	Parentage†	Grain texture‡	Days to silk	Plant height	Plant disease§		
							Et	Czm	Pm
					d	m	— score¶ —		
89223	GP-252	550899	TZMSR	D/F	80	1.6	1.9	2.5	4.8
89274	GP-253	550900	(KitII × TZMSR) × KitII	D/F	75	1.9	2.8	4.1	7.0
88091	GP-254	550901	TZMSR × East Africa Mix	F	80	1.8	2.5	5.1	2.8
89199	GP-255	550903	TZMSR	F	83	1.9	2.4	1.5	2.3
89207	GP-256	550904	TZMSR	F	83	1.7	4.6	5.1	3.9
89246	GP-257	550905	TZMSR	D/F	83	2.0	2.5	2.4	2.6
89248	GP-258	550906	TZMSR	F/D	82	2.0	2.8	2.3	3.0
89291	GP-259	550909	(ZS206 × TZMSR) × ZS206	D	77	1.9	2.5	1.9	2.4
89293	GP-260	550910	(ZS206 × TZMSR) × ZS206	F	83	1.8	3.1	1.8	2.5
89242	GP-261	550914	TZMSR	D	83	1.7	3.6	2.3	3.0
89311	GP-262	550916	M122 × N103	F	83	1.4	2.8	7.8	3.3
88069	GP-263	550918	ZS206 × TZMSR	F/D	83	1.6	1.9	1.5	2.4
88030	GP-264	550919	TZMSR	D/F	83	1.9	3.5	1.9	1.3
87014	GP-265	550920	TZMSR	F/D	79	1.6	3.0	4.5	2.9
87036	GP-266	550922	TZMSR	D	80	2.0	2.0	2.1	2.1
C70	GP-267	550923	R209 × TZSRW	D/F	83	1.7	4.8	1.4	2.6
Z28	GP-268	550924	TZSRW × Zambia Mat.	F	83	1.8	3.1	4.0	2.3
M131	GP-269	550925	TZMSR	F	82	1.8	5.3	2.6	2.3
LSD (0.05)					3	0.1	1.3	1.4	1.4

† Parentage: TZMSR and TZSRW, IITA mid- and low-altitude populations; KitII = Kitale II, Kenya highland population; East Africa mix = mixture of East Africa hybrids; ZS206, R209 = Zimbabwe Seed Coop hybrids; M122, N103 = Cameroon midaltitude inbred lines; Zambia mat. = unspecified Zambia germplasm.

‡ Grain texture: D = dent; F = flint; D/F = intermediate dent; F/D = intermediate flint.

§ Et = *Exserohilum turcicum*; Czm = *Cercospora zeae-maydis*; Pm = *Physoderma maydis*.

¶ Scored on a scale of 1 to 9, where 1 = no symptoms.