

Amino Acid Content of GEM Germplasm

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Method:

Hand pollinated ears of GEM germplasm were produced in the field in 2007 and analyzed using a microbial amino acid analysis method (Scott et al., 2004). Total protein content is not considered in this analysis. Methionine, Tryptophan and Lysine were measured and used to calculate an Index value in which these three amino acids were weighted equally. Data from the 2007 field season was combined with data from 2006 to produce a two-year data summary or with data from 2006 and 2005 to produce a three-year data summary. These data summaries are included at the end of this report. We have included results from several hybrids in this study and the pedigrees of these are in parentheses.

Checks:

B73 and Mo17 were included as normal check samples. B101 was included as a high check sample for methionine content, and several opaque2 varieties were included as high check samples for Lysine and Tryptophan. All checks are bolded in the data tables, high checks appear in red text and normal checks appear in blue text. The high and normal checks ranked as expected with two exceptions: Mo17 had unexpectedly high tryptophan content and A619o2 had an unexpectedly low lysine value.

Summary:

This year's data is similar to what we have observed in previous years. A number of GEM accessions are not significantly different from the high methionine check and some score high for lysine as well. The XL lines from North Carolina tend to be strong in these amino acids. The variation in tryptophan content is less significant. This is probably due to a combination of error in our measurement and a low level of genetic variability for tryptophan. A couple of new lines from Cuba did well in overall in the two year test and it will be interesting to see how these results hold up next year.

Scott, M.P., S. Bhatnager, and J. Betran. 2004. Tryptophan and methionine levels in quality protein maize breeding germplasm. *Maydica* 49:303-311.

3 year data – Methionine, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

2258-03_XL380_S11_F2S4_71/97_Bulk/98	A
1881-002/98_DKXL370AN11F2S3_7521-05	A
B101	A
1886-003/98_DKXL370AN11F2S3_7521-05	A B
UR11003:S0302-1011-001	A B
1883-001/98_DKXL370AN11F2S3_7521-05	A B
1895-001/98_DKXL370AN11F2S3_7521-29	A B
1883-002/98_DKXL370AN11F2S3_7521-05	A B
CHIS740:S1411a-783-2	B C
CH05015:N1204-057-001	B C
B73	B C
AR16035:S02-450-1	B C
FS8B(S):S0316-814-1	C D
DKXL212:N11a-139-1-1	C D
MDI022:N2120-253-001	C D E
CUBA117:S15-372-1	C D E
B45 o2	D E
AR17056:N2035-421-001	E
Mo17	F

3 year data - Lysine, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

Mo17	A
B45 o2	A B
MDI022:N2120-253-001	A B
1883-002/98_DKXL370AN11F2S3_7521-05	A B
DKXL212:N11a-139-1-1	A B C
1886-003/98_DKXL370AN11F2S3_7521-05	B C D
1895-001/98_DKXL370AN11F2S3_7521-29	C D E
1883-001/98_DKXL370AN11F2S3_7521-05	C D E
2258-03_XL380_S11_F2S4_71/97_Bulk/98	C D E
CUBA117:S15-372-1	C D E
UR11003:S0302-1011-001	D E
CHIS740:S1411a-783-2	D E
1881-002/98_DKXL370AN11F2S3_7521-05	D E
AR17056:N2035-421-001	D E
CH05015:N1204-057-001	D E
B101	D E
FS8B(S):S0316-814-1	E
AR16035:S02-450-1	E
B73	E

3 year data – Tryptophan, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

B45 o2	A
FS8B(S):S0316-814-1	B
1883-001/98_DKXL370AN11F2S3_7521-05	B C
1883-002/98_DKXL370AN11F2S3_7521-05	B C D
UR11003:S0302-1011-001	B C D E
1895-001/98_DKXL370AN11F2S3_7521-29	B C D E
2258-03_XL380_S11_F2S4_71/97_Bulk/98	B C D E
AR17056:N2035-421-001	B C D E
B101	B C D E
1886-003/98_DKXL370AN11F2S3_7521-05	C D E
1881-002/98_DKXL370AN11F2S3_7521-05	C D E
DKXL212:N11a-139-1-1	C D E
CHIS740:S1411a-783-2	C D E
B73	C D E
CUBA117:S15-372-1	C D E
MDI022:N2120-253-001	C D E
AR16035:S02-450-1	C D E
CH05015:N1204-057-001	D E
Mo17	E

3 year data – Index, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

B45 o2	A
1883-002/98_DKXL370AN11F2S3_7521-05	A B
1886-003/98_DKXL370AN11F2S3_7521-05	B C
2258-03_XL380_S11_F2S4_71/97_Bulk/98	B C
1883-001/98_DKXL370AN11F2S3_7521-05	B C
1895-001/98_DKXL370AN11F2S3_7521-29	B C D
MDI022:N2120-253-001	B C D E
1881-002/98_DKXL370AN11F2S3_7521-05	C D E F
UR11003:S0302-1011-001	C D E F G
B101	C D E F G H
DKXL212:N11a-139-1-1	C D E F G H I
CHIS740:S1411a-783-2	D E F G H I J
FS8B(S):S0316-814-1	D E F G H I J
Mo17	E F G H I J
CH05015:N1204-057-001	F G H I J
CUBA117:S15-372-1	G H I J
B73	H I J
AR16035:S02-450-1	I J
AR17056:N2035-421-001	J

2 year data – Methionine, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

CUBA164:S2012-602-001	A
CUBA117:S1542-057-001	A B
2258-03_XL380_S11_F2S4_71/97_Bulk/98	A B C
B101	A B C D
UR11003:S0302-1011-001	A B C D E
1881-002/98_DKXL370AN11F2S3_7521-05	B C D E F
1886-003/98_DKXL370AN11F2S3_7521-05	B C D E F
AR03056:N09-250-1	B C D E F G
1895-001/98_DKXL370AN11F2S3_7521-29	C D E F G H
AR17056:N2025-574-1	C D E F G H I
B14 A opaque 2	C D E F G H I J
CUBA117:S1542-037-002	C D E F G H I J
(B101/LH123)	C D E F G H I J
1883-001/98_DKXL370AN11F2S3_7521-05	C D E F G H I J K
1883-002/98_DKXL370AN11F2S3_7521-05	C D E F G H I J K
CH05015:N1204-057-001	C D E F G H I J K L
AR16035:S02-450-1	C D E F G H I J K L
(LH119/LH123)	D E F G H I J K L
B73	D E F G H I J K L
UR11003:S0302-937-1	C D E F G H I J K L
XL370A:S11 F2S4 2228-03)-Sib	C D E F G H I J K L M
CHIS740:S1411a-783-2	E F G H I J K L
DKXL212:N11a-139-1-1	E F G H I J K L
(B101/DKXL212:N11a-139-001-001)	E F G H I J K L
A619 opaque 2	E F G H I J K L
FS8B(S):S0316-814-1	E F G H I J K L
MDI022:N2120-253-001	E F G H I J K L
BR52060:S0210-147-001	F G H I J K L M
CUBA117:S15-372-1	F G H I J K L M
(LH119/DKXL212:N11a-139-001-001)	G H I J K L M
MDI022:N2120-333-001	H I J K L M
SCR01:N1310-358-1	F G H I J K L M N
B14A o2/o2 x A619 o2/o2	I J K L M
B45 o2	J K L M
BR51721:N2012-098-002	J K L M
AR17056:N2035-473-001	J K L M N
BR51721:N2012-164-002	K L M N
CUBA164:S2012-456-001	L M N
AR17056:N2035-421-001	M N
Mo17	N

2 year data – Lysine, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

B14 A opaque 2	A
B45 o2	A B
(B101/DKXL212:N11a-139-001-001)	B C
1883-002/98_DKXL370AN11F2S3_7521-05	B C D
Mo17	B C D
MDI022:N2120-333-001	C D E
CUBA164:S2012-456-001	C D E F
1886-003/98_DKXL370AN11F2S3_7521-05	C D E F
MDI022:N2120-253-001	C D E F G
1883-001/98_DKXL370AN11F2S3_7521-05	C D E F G H
BR51721:N2012-164-002	C D E F G H
B14A o2/o2 x A619 o2/o2	C D E F G H
AR03056:N09-250-1	C D E F G H
2258-03_XL380_S11_F2S4_71/97_Bulk/98	D E F G H I
DKXL212:N11a-139-1-1	D E F G H I
BR51721:N2012-098-002	E F G H I J
SCR01:N1310-358-1	E F G H I J K L M
(B101/LH123)	E F G H I J K
1881-002/98_DKXL370AN11F2S3_7521-05	E F G H I J K L
(LH119/DKXL212:N11a-139-001-001)	F G H I J K L M
1895-001/98_DKXL370AN11F2S3_7521-29	G H I J K L M
CUBA164:S2012-602-001	G H I J K L M
BR52060:S0210-147-001	G H I J K L M
B101	G H I J K L M
CUBA117:S1542-057-001	H I J K L M
CUBA117:S15-372-1	H I J K L M
XL370A:S11 F2S4 2228-03)-Sib	F G H I J K L M
FS8B(S):S0316-814-1	I J K L M
AR17056:N2035-421-001	J K L M
UR11003:S0302-1011-001	J K L M N
CH05015:N1204-057-001	K L M N
CHIS740:S1411a-783-2	K L M N
AR17056:N2025-574-1	K L M N
UR11003:S0302-937-1	J K L M N
A619 opaque 2	K L M N
B73	K L M N
(LH119/LH123)	L M N
AR16035:S02-450-1	L M N
CUBA117:S1542-037-002	M N
AR17056:N2035-473-001	N

2 year data – Tryptophan, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

B14 A opaque 2	A
CUBA164:S2012-456-001	B
B45 o2	B
B14A o2/o2 x A619 o2/o2	B
BR52060:S0210-147-001	C
FS8B(S):S0316-814-1	C D
1883-001/98_DKXL370AN11F2S3_7521-05	C D E
(B101/DKXL212:N11a-139-001-001)	C D E F
2258-03_XL380_S11_F2S4_71/97_Bulk/98	C D E F
BR51721:N2012-164-002	C D E F
1883-002/98_DKXL370AN11F2S3_7521-05	C D E F
BR51721:N2012-098-002	C D E F
1881-002/98_DKXL370AN11F2S3_7521-05	C D E F G
1895-001/98_DKXL370AN11F2S3_7521-29	C D E F G
A619 opaque 2	C D E F G H
UR11003:S0302-1011-001	C D E F G H
AR03056:N09-250-1	C D E F G H
UR11003:S0302-937-1	C D E F G H
B101	C D E F G H
AR17056:N2025-574-1	C D E F G H
CHIS740:S1411a-783-2	C D E F G H
1886-003/98_DKXL370AN11F2S3_7521-05	C D E F G H
(B101/LH123)	C D E F G H
XL370A:S11 F2S4 2228-03)-Sib	C D E F G H
DKXL212:N11a-139-1-1	C D E F G H
B73	C D E F G H
(LH119/DKXL212:N11a-139-001-001)	D E F G H
CUBA164:S2012-602-001	D E F G H
CUBA117:S15-372-1	D E F G H
CUBA117:S1542-057-001	D E F G H
MDI022:N2120-253-001	D E F G H
SCR01:N1310-358-1	C D E F G H
AR17056:N2035-421-001	E F G H
CUBA117:S1542-037-002	E F G H
Mo17	E F G H
MDI022:N2120-333-001	F G H
AR16035:S02-450-1	F G H
CH05015:N1204-057-001	F G H
(LH119/LH123)	G H
AR17056:N2035-473-001	H

2 year data – Index, letters indicate significance groupings, with entries connected by the same letter being not significantly different from one another. Entries are sorted in descending order by mean value.

B14 A opaque 2	A
B45 o2	B
CUBA164:S2012-456-001	B C
2258-03_XL380_S11_F2S4_71/97_Bulk/98	B C
1883-002/98_DKXL370AN11F2S3_7521-05	B C D
B14A o2/o2 x A619 o2/o2	C D E
(B101/DKXL212:N11a-139-001-001)	C D E F
CUBA164:S2012-602-001	C D E F
1886-003/98_DKXL370AN11F2S3_7521-05	C D E F G
1883-001/98_DKXL370AN11F2S3_7521-05	C D E F G
AR03056:N09-250-1	C D E F G H
CUBA117:S1542-057-001	C D E F G H
1881-002/98_DKXL370AN11F2S3_7521-05	C D E F G H
B101	C D E F G H I
1895-001/98_DKXL370AN11F2S3_7521-29	C D E F G H I J
UR11003:S0302-1011-001	D E F G H I J K
(B101/LH123)	D E F G H I J K
MDI022:N2120-253-001	D E F G H I J K L
DKXL212:N11a-139-1-1	E F G H I J K L
BR52060:S0210-147-001	E F G H I J K L
MDI022:N2120-333-001	E F G H I J K L
BR51721:N2012-164-002	F G H I J K L
BR51721:N2012-098-002	G H I J K L
FS8B(S):S0316-814-1	G H I J K L
AR17056:N2025-574-1	H I J K L
(LH119/DKXL212:N11a-139-001-001)	I J K L M
CUBA117:S15-372-1	I J K L M
Mo17	I J K L M
CHIS740:S1411a-783-2	I J K L M
CH05015:N1204-057-001	J K L M
CUBA117:S1542-037-002	J K L M
B73	J K L M
A619 opaque 2	J K L M
AR16035:S02-450-1	K L M
(LH119/LH123)	L M N
AR17056:N2035-421-001	M N
AR17056:N2035-473-001	N
