Supplementary Table 1. List of germplasms used in the study, along with population of origin, pedigree, known combining ability and model-based predicted background.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Inbred line code | Inbred register name | Genetic background as determined by pedigree information | Origin | Known combined ability | Predicted background at k=3 (1) |  |  | Predicted background at k=4 (2) |  |  |  |
| 1 | P465 |  | Argentine landrace |  | P465 |  |  | P465 |  |  |  |
| 2 | LP611 | Fam. P465 | Recurrent selection in (P465 x D)F2 | dent | P465 |  |  | P465 |  |  |  |
| 3 | LP662 | Fam. P465 | (P465 x D)F2 | dent | P465 |  |  | P465 |  |  |  |
| 4 | LP613 | Fam. P465 | Rec. Sel. in (P465 x D)F2 | dent | P465 |  |  | P465 |  |  |  |
| 5 | LP168 | Fam. P465 | Rec. Sel. in (P465 x D)F2 | dent | P465 |  |  | P465 |  |  |  |
| 6 | LP125-R | Fam. LP125r | Sint. Colorada Dura | flint/dent | ACDS |  |  | ACDS |  |  |  |
| 7 | LP317 | Fam.LP311 | Synt. Hybrid L100 | flint/dent | Mixed |  |  | LP299-2 |  |  |  |
| 8 | LP311 | Fam.LP311 | Synt. Hybrid L100 | flint/dent | Mixed- ACDS |  |  | Mixed |  |  |  |
| 9 | LP116 | Fam.CACaribe | Comp. Argentino Caribe | dent | ACDS |  |  | ACDS |  |  |  |
| 10 | LP122 | Fam. LP122 | Comp. Argentino-Caribe | dent | ACDS |  |  | ACDS |  |  |  |
| 11 | LP1032 | Fam. Comp.I | Compuesto I | dent | ACDS |  |  | ACDS |  |  |  |
| 12 | LP199 | Fam. Comp II | Compuesto II | dent | Mixed- ACDS |  |  | ACDS |  |  |  |
| 13 | LP1044 | Fam. Comp.I | Compuesto I | dent | ACDS |  |  | ACDS |  |  |  |
| 14 | LP299-2 | Fam. LP299-2 | Synt. Hybrid P | flint | Mixed |  |  | LP299-2 |  |  |  |
| 15 | LP197 | Fam. LP299-2 | Synt. Hybrid P | flint | Mixed |  |  | LP299-2 |  |  |  |
| 16 | LP223 | Fam. LP299-2 | Synt. Hybrid P | flint | Mixed |  |  | LP299-2 |  |  |  |
| 17 | LP304 | Fam. LP299-2 | Synt. Hybrid P | flint | Mixed |  |  | LP299-2 |  |  |  |
| 18 | LP2541 | Fam.BS13 | Population BS13 | flint | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 19 | LP214 | Fam. CanArg | Cross Local Flint x Canadian Dent F2 | flint/dent | Mixed |  |  | Mixed |  |  |  |
| 20 | LP4703 | Fam.Prolif | Prolific Composite | dent | ACDS |  |  | Mixed |  |  |  |
| 21 | LP212 | Fam. CanArg | Cross Local Flint x Canadian Dent F2 | flint | Mixed-P465 |  |  | Mixed |  |  |  |
| 22 | LP236 | Fam. CanArg | Cross Local Flint x Canadian Dent F2 | flint | Mixed |  |  | LP299-2 |  |  |  |
| 23 | LP122-2 | Fam. LP122 | (L3178xL196)F2 | flint/dent | ACDS |  |  | ACDS |  |  |  |
| 24 | LP2542 | Fam.BS13 | Population BS13 | flint | BS13-BSSS |  |  | Mixed |  |  |  |
| 25 | LP561 | Fam.CACaribe | Synt. R4PC | dent | Mixed- ACDS |  |  | Mixed |  |  |  |
| 26 | LP29 | Fam. CCP | Comp. Colorado Precoz | flint/dent | Mixed |  |  | LP299-2 |  |  |  |
| 27 | LP179 | Fam. Suwan | Suwan | flint/dent | Mixed |  |  | Mixed |  |  |  |
| 28 | LP612 | Fam. P465 | Rec. Sel. in (P465 x D)F2 | dent | P465 |  |  | P465 |  |  |  |
| 29 | LP220 | Fam. CanArg | Cross Local Flint x Canadian Dent F2 | flint/dent | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 30 | LP221 | Fam. CanArg | Cross Local Flint x Canadian Dent F2 | flint/dent | Mixed |  |  | Mixed |  |  |  |
| 31 | LP605 | Fam. P465 | [(P465 x D)Fn\*x ZN6]F2 | dent | Mixed-P465 |  |  | Mixed |  |  |  |
| 32 | LP916 | Fam. DK | DK752xB73 | flint/dent | Mixed |  |  | Mixed |  |  |  |
| 33 | LP917 | Fam. DK | DK752xB73 | flint/dent | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 34 | LP818 | Fam. LP299-2 | Synt. Hybrid P | flint | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 35 | LP59 |  | (L10612xB14)F2 | flint | Mixed |  |  | Mixed |  |  |  |
| 36 | LP124 | Fam. CCP | Comp.Colorado Precoz | flint/dent | Mixed-P465 |  |  | Mixed |  |  |  |
| 37 | LP438 |  | Comp. Semidentado Precoz | flint | Mixed- ACDS |  |  | Mixed |  |  |  |
| 38 | LP1996 | Fam. Comp II | Comp II/I | flint | ACDS |  |  | ACDS |  |  |  |
| 39 | LP1513 | Fam. Comp II | Comp II | flint | ACDS |  |  | ACDS |  |  |  |
| 40 | LP1512 | Fam. Comp II | Comp GSSS | flint | ACDS |  |  | ACDS |  |  |  |
| 41 | LP521 | Fam. LP125r | Synt. Colorada Dura | flint/dent | ACDS |  |  | ACDS |  |  |  |
| 42 | LP126 | Fam. LP125r | (LP125r x L196)F2 | flint/dent | ACDS |  |  | ACDS |  |  |  |
| 43 | LP453 | Fam.CACaribe | Comp. Argentino Caribe | flint | ACDS |  |  | ACDS |  |  |  |
| 44 | LP5708 | Fam.CACaribe | Comp. Argentino Caribe | dent | Mixed |  |  |  |  |  |  |
| 45 | LP1411 | Fam. LP122 | (LP199x L3178)F2 | flint/dent | ACDS |  |  | ACDS |  |  |  |
| 46 | LP153 |  | (A1 x L1571)F2 | dent | ACDS |  |  | ACDS |  |  |  |
| 47 | LP13 |  | Synt. Colorada Dura | flint | ACDS |  |  | ACDS |  |  |  |
| 48 | LP256 r |  | Rec. sel. in (L256 x D)F2 | dent | ACDS |  |  |  |  |  |  |
| 49 | LP509 |  | Comp. BSSS x Cuarentín | flint | Mixed |  |  | LP299-2 |  |  |  |
| 50 | LP562 |  | R49022 x Hybrid M370 | dent | Mixed- ACDS |  |  | ACDS |  |  |  |
| 51 | LP563 | Fam. DK | DK7312 x Landrace Calchaquí | flint/dent | Mixed- ACDS |  |  | Mixed |  |  |  |
| 52 | LP579 |  | [(5842xLP125)x(28xP1338)]F2 | dent | ACDS |  |  | ACDS |  |  |  |
| 53 | LPB1 |  | L327 (CAC)x Local White | LPB2 | ACDS |  |  | ACDS |  |  |  |
| 54 | LP2 | Caribbean lines 3 Argentine flint synthetic | Compuesto 3:3:B | flint | Mixed |  |  | Mixed |  |  |  |
| 55 | LP869 |  | Synt. Hybrids | flint | Mixed |  |  | Mixed |  |  |  |
| 56 | LPB2 |  | Broad base white endosperm population derived from US germplasm | LPB1 | Mixed |  |  | Mixed |  |  |  |
| 57 | LP3830 |  | (B23xB87)F2 | flint | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 58 | LP580 |  | (Hybrid Titanium F4)F2 | dent | P465 |  |  | BS13-BSSS |  |  |  |
| 59 | LP915 |  | [(N28xB73)x(N28x199)]F2 | flint | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 60 | CML370014 |  | CML327 (Cimmyt) x BS132 |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 61 | A485 |  | (Hybrid ACA 2000 )F2 |  | ACDS |  |  | ACDS |  |  |  |
| 62 | L4674 |  | (Hybrid AX924)F2 |  | Mixed |  |  |  |  |  |  |
| 63 | L4637 |  | (LP561 x LP611)F2 |  | ACDS |  |  | ACDS |  |  |  |
| 64 | B98 |  | Population BS11 |  | Mixed |  |  | Mixed |  |  |  |
| 65 | L1445 |  | Rec. Sel in [(LP1512xLP199)(LP453xLP58)]F2 |  | Mixed- ACDS |  |  | ACDS |  |  |  |
| 66 | B100 |  | Developed from B85xH99. The cross was backcrossed to H99, and pedigree selection within the backcross generation used to develop B100. |  | ACDS |  |  | Mixed |  |  |  |
| 67 | ZN6 |  | Developed from red flint populations |  | ACDS |  |  | ACDS |  |  |  |
| 68 | L5665 |  | (P578 x LP116) F2 |  | P465 |  |  |  |  |  |  |
| 69 | L5605 |  | (P578 x LP116) F2 |  | Mixed-BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 70 | L5632(04.5481) |  | (P578 x LP116) F2 |  | Mixed |  |  | Mixed |  |  |  |
| 71 | LP32 |  | Composite Colorado Precoz |  | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 72 | L58 |  | Composite Dentado Precoz |  | Mixed |  |  | Mixed |  |  |  |
| 73 | LP923 |  | Hybrid 2F10 F2 |  | Mixed |  |  | ACDS |  |  |  |
| 74 | LP178 |  | Suwan | flint/dent | ACDS |  |  |  |  |  |  |
| 75 | LP598=A485 |  | Hybrid ACA 2000 F2 | dent | ACDS |  |  | ACDS |  |  |  |
| 76 | LP661 |  | (LP662 x LP611)F2 | dent | P465 |  |  | P465 |  |  |  |
| 77 | LP918 |  | Hybrid AX888 F2 | dent | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 78 | 08.3326 | Fam. 2541 | Rec. selection in BS13 conducted in Argentina using LP612 as tester |  | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 79 | (7310x7266)-1-133 |  | Hybrid C280 F2 |  | P465 |  |  | BS13-BSSS |  |  |  |
| 80 | 2915xLP2541-A |  | (B73 x LP2541)F2 |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 81 | 2915xLP2541-B |  | (B73 x LP2541)F2 |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 82 | 2915xLP2541-C |  | (B73 x LP2541)F2 |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 83 | 2915xLP2541-D |  | (B73 x LP2541)F2 |  | BS13-BSSS |  |  | Mixed |  |  |  |
| 84 | AX888IT-A |  | Hybrid AX888IT F2 |  | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 85 | AX888IT-B |  | Hybrid AX888IT F2 |  | BS13-BSSS |  |  | Mixed |  |  |  |
| 86 | AX888IT-C |  | Hybrid AX888IT F2 |  | Mixed |  |  | Mixed |  |  |  |
| 87 | AX888IT-D |  | Hybrid AX888IT F2 |  | Mixed |  |  | Mixed |  |  |  |
| 88 | Z9801-A |  | Hybrid Z9801 F2 |  | Mixed |  |  | Mixed |  |  |  |
| 89 | Z9801-B |  | Hybrid Z9801 F2 |  | Mixed |  |  | Mixed |  |  |  |
| 90 | (LP915x3125-2)-1-10 |  | (DK752xB73)F2 |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 91 | (LP915x3125-2)-1-67 |  | (DK752xB73)F2 |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 92 | (LP562x3584)-1-39 |  | (M370 x Flint.Arg.)x Flint Arg. |  | ACDS |  |  | ACDS |  |  |  |
| 93 | (LP562x3584)-1-53 |  | (M370 x Flint.Arg.)x Flint Arg. |  | ACDS |  |  | ACDS |  |  |  |
| 94 | (R4930x3125-2)-1-9 |  | (DK752xB73)F2 |  | Mixed |  |  | Mixed |  |  |  |
| 95 | (R4930x3125-2)-1-60 |  | (DK752xB73)F2 |  | Mixed-BS13-BSSS |  |  | Mixed |  |  |  |
| 96 | (7310x7266)-1-56 |  | Hybrid C280 F2 |  | P465 |  |  | BS13-BSSS |  |  |  |
| 97 | (7310x7266)-1-84 |  | Hybrid C280 F2 |  | P465 |  |  | BS13-BSSS |  |  |  |
| 98 | (7310x7266)-1-91 |  | Hybrid C280 F2 |  | P465 |  |  | BS13-BSSS |  |  |  |
| 99 | 08.3525 |  | High Oleic Acid Population, derived from [(LP1512xLP199)(LP453xLP58)]F2 |  | ACDS |  |  | ACDS |  |  |  |
| 100 | 08.3556 |  | Low Saturated Fatty Acid Population derived from [(LP1512xLP199)(LP453xLP58)]F2 |  | ACDS |  |  | ACDS |  |  |  |
| 101 | 08.3538 |  | High Oleic Acid Population derived from [(LP1512xLP199)(LP453xLP58)]F2 |  | ACDS |  |  | ACDS |  |  |  |
| 102 | 08.3590 |  | High Oleic Acid Population derived from [(LP1512xLP199)(LP453xLP58)]F2 |  | ACDS |  |  | ACDS |  |  |  |
| 103 | B73 |  | BSSS |  | BS13-BSSS |  |  | BS13-BSSS |  |  |  |
| 104 | P1338 | Argentine x exotic. Contemporary to P465 |  |  |  |  |  | ACDS |  |  |  |
| 105 | A1 | Contemporary to a P465 |  |  |  |  |  | ACDS |  |  |  |
| 106 | P21 | Contemporary to P465 |  |  |  |  |  | ACDS |  |  |  |
| 107 | 28 | Argentine Caribbean x Cuarentín Synt. |  |  |  |  |  | ACDS |  |  |  |
| 108 | 34 | Argentine Caribbean x Cuarentín Synt. |  |  |  |  |  | ACDS |  |  |  |
| 109 | 41 | Cuarentín Synt. |  |  |  |  |  | LP299-2 |  |  |  |
| 110 | 43 | Cuarentín Synt. |  |  |  |  |  | LP299-2 |  |  |  |
| 111 | 51 | Cuarentín Synt. |  |  |  |  |  | LP299-2 |  |  |  |

(1) Predicted genetic background of 103 inbreed lines based on 50 SSRs and STRUCTURE analysis at k=3. Defined subpopulations were as follow: P465, Argentine x Caribbean Derived Stocks (ACDS), BS13-BSSS, and mixed germplasms (Olmos et al, 2014a). Mixed inbreds with ≥ 60% membership from one subpopulation were called with the corresponding subpopulation. (2) Predicted genetic background of 111 inbred lines based on 74 SSRs and STRUCTURE analysis at k=4. Defined subpopulations were as follow: P465, ACDS, BS13-BSSS, LP299-2 related lines, and mixed germplasms.