## Supplemental Table 1

Table H.1 Hybrid year of commercialization (YOC) effect on ear (cobs and kernels) dry matter, N content, and N concentration at each sampling date. Sampling was initiated at V13 (T1) and conducted at weekly intervals for four weeks (T2, T3, T4, T5). Means represent the average of two years and five N treatments.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **-----Dry Weight (g ear-1)-----** | | | | | |
| **Hybrid YOC** | **T1** | **T2** | **T3** | **T4** | **T5** |
| 1946 | 0.01 | 0.15 | 1.08 | 9.35 | 20.93 |
| 1958 | 0.01 | 0.20 | 1.89 | 11.26 | 24.09 |
| 1967 | 0.00 | 0.05 | 1.37 | 5.86 | 17.42 |
| 1976 | 0.00 | 0.07 | 1.31 | 5.91 | 19.05 |
| 1995 | 0.01 | 0.19 | 1.60 | 12.88 | 34.37 |
| 2003 | 0.02 | 0.30 | 2.33 | 12.86 | 32.71 |
| 2015 | 0.01 | 0.12 | 2.09 | 10.24 | 29.06 |
| **-----N Content (mg ear-1)-----** | | | | | |
| 1946 | 0.38 | 7.41 | 35.08 | 215.60 | 365.63 |
| 1958 | 0.64 | 9.82 | 56.89 | 238.77 | 414.85 |
| 1967 | 0.09 | 3.51 | 41.78 | 138.97 | 333.32 |
| 1976 | 0.18 | 4.49 | 39.53 | 130.77 | 331.11 |
| 1995 | 0.57 | 9.73 | 53.66 | 291.71 | 562.75 |
| 2003 | 1.39 | 13.94 | 69.14 | 260.47 | 480.21 |
| 2015 | 0.37 | 7.02 | 67.64 | 225.89 | 451.48 |
| **-----N Concentration (%)-----** | | | | | |
| 1946 | 7.18 | 5.76 | 3.25 | 2.29 | 1.75 |
| 1958 | 6.96 | 5.32 | 3.09 | 2.12 | 1.72 |
| 1967 | 6.87 | 6.90 | 3.23 | 2.38 | 1.91 |
| 1976 | 6.95 | 6.93 | 3.28 | 2.25 | 1.76 |
| 1995 | 7.22 | 5.77 | 3.40 | 2.29 | 1.64 |
| 2003 | 6.89 | 4.88 | 3.03 | 2.05 | 1.49 |
| 2015 | 7.02 | 6.21 | 3.33 | 2.23 | 1.55 |

## Supplemental Table 2

Nitrogen treatment (N Treat) effect on ear (cobs and kernels) dry weight, N content, and N concentration at each sampling date. Sampling was initiated at V13 (T1) and conducted at weekly intervals for four weeks (T2, T3, T4, T5). Nitrogen treatment labels reflect the kg N ha-1 applied at V4 (number before the underscore) and at R1 (number after the underscore). Means represent the average of two years and seven hybrids.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **-----Dry Weight (g ear-1)-----** | | | | |
| **N Treatment** | **T1** | **T2** | **T3** | **T4** | **T5** |
| 0\_0 | 0.01 | 0.12 | 1.25 | 7.23 | 16.18 |
| 0\_220 | 0.00 | 0.10 | 1.28 | 7.76 | 23.69 |
| 55\_165 | 0.01 | 0.15 | 1.83 | 9.97 | 26.92 |
| 165\_55 | 0.01 | 0.22 | 2.11 | 12.16 | 29.58 |
| 220\_0 | 0.01 | 0.19 | 1.86 | 11.71 | 30.43 |
|  | **-----N Content (mg ear-1)-----** | | | | |
| 0\_0 | 0.38 | 6.23 | 36.97 | 148.85 | 240.40 |
| 0\_220 | 0.30 | 5.30 | 40.64 | 177.05 | 411.10 |
| 55\_165 | 0.46 | 7.32 | 57.45 | 219.84 | 451.93 |
| 165\_55 | 0.78 | 11.14 | 65.47 | 266.52 | 486.50 |
| 220\_0 | 0.66 | 9.99 | 59.28 | 261.83 | 509.30 |
|  | **-----N Concentration (%)-----** | | | | |
| 0\_0 | 6.75 | 5.61 | 3.06 | 2.09 | 1.54 |
| 0\_220 | 6.44 | 6.04 | 3.35 | 2.33 | 1.76 |
| 55\_165 | 6.80 | 5.88 | 3.26 | 2.25 | 1.72 |
| 165\_55 | 7.52 | 5.97 | 3.20 | 2.24 | 1.70 |
| 220\_0 | 7.47 | 6.27 | 3.28 | 2.25 | 1.72 |

## Supplemental Table 3

Hybrid year of commercialization (YOC) effect on the parameters of the expolinear model fit to ear (cobs and kernels) dry matter and N content data and the sigmoid model fit to ear N concentration data. Parameters describe the linear phase (Cm, g ear-1 °Cd-1), the exponential phase (Rm, g g-1 °Cd -1), and length of exponential phase (tb, °Cd), upper asymptote (A), lower asymptote (B), inflection point (xm) and curve steepness (k). BL is the estimated beginning of linear growth for the fit expolinear models (°Cd). Parameter estimates assigned different letters are significantly different from each other at p<0.05. † indicates no statistical analysis was conducted.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **-----Dry Weight (g ear-1)-----** | | | |
| **Hybrid YOC** | **Cm** | **Rm** | **tb** | **BL**† |
| 1946 | 0.15 cd | 0.032 abc | 214 b | 349 |
| 1958 | 0.17 bc | 0.031 c | 217 b | 360 |
| 1967 | 0.12 e | 0.035 a | 202 b | 328 |
| 1976 | 0.13 de | 0.034 ab | 210 b | 338 |
| 1995 | 0.21 a | 0.035 a | 238 a | 364 |
| 2003 | 0.20 ab | 0.031 bc | 250 a | 392 |
| 2015 | 0.22 a | 0.034 abc | 236 a | 365 |
|  | **-----N Content (mg ear-1)-----** | | | |
|  | **Cm** | **Rm** | **tb** | **BL** |
| 1946 | 2.32 bc | 0.029 abc | 192 bcd | 341 |
| 1958 | 2.51 b | 0.028 bc | 189 cd | 347 |
| 1967 | 2.00 cd | 0.031 ab | 182 d | 326 |
| 1976 | 1.90 d | 0.030 abc | 187 cd | 332 |
| 1995 | 2.98 a | 0.033 a | 206 ab | 340 |
| 2003 | 2.45 b | 0.027 c | 214 a | 373 |
| 2015 | 2.72 ab | 0.031 ab | 201 abc | 344 |
|  | **-----N Concentration (%)-----** | | | |
|  | **A** | **B** | **xm** | **k** |
| 1946 | 7.87 | 1.69 b | 125 b | 59.0 bc |
| 1958 | 7.53 | 1.65 c | 126 ab | 55.4 c |
| 1967 | 7.92 | 1.80 a | 128 ab | 54.9 c |
| 1976 | 8.20 | 1.68 c | 125 b | 53.4 c |
| 1995 | 8.63 | 1.50 d | 143 a | 68.3 ab |
| 2003 | 8.26 | 1.29 e | 147 a | 76.4 a |
| 2015 | 8.26 | 1.34 e | 144 a | 66.1 ab |

## Supplemental Table 4

Nitrogen treatment (N Treat) effect on the parameters of the expolinear model fit to ear (cobs and kernels) dry matter and N content data and the sigmoid model fit to ear N concentration data. Nitrogen treatment labels reflect the kg N ha-1 applied at V4 (number before the underscore) and at R1 (number after the underscore). Parameters describe the linear phase (Cm, g ear-1 °Cd-1), the exponential phase (Rm, g g-1 °Cd -1), and length of exponential phase (tb, °Cd), upper asymptote (A), lower asymptote (B), inflection point (xm) and curve steepness (k). BL is the estimated beginning of linear growth for the fit expolinear models (°Cd). Parameter estimates assigned different letters are significantly different from each other at p<0.05. † indicates no statistical analysis was conducted.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **-----Dry Weight (g ear-1)-----** | | | |
| **N Treatment** | **Cm** | **Rm** | **tb** | **BL**† |
| 0\_0 | 0.12 b | 0.032 | 218 | 357 |
| 0\_220 | 0.17 a | 0.033 | 220 | 352 |
| 55\_165 | 0.18 a | 0.033 | 225 | 357 |
| 165\_55 | 0.19 a | 0.033 | 231 | 364 |
| 220\_0 | 0.19 a | 0.034 | 226 | 353 |
|  | **-----N Content (mg ear-1)-----** | | | |
|  | **Cm** | **Rm** | **tb** | **BL** |
| 0\_0 | 1.61 c | 0.028 b | 191 | 350 |
| 0\_220 | 2.27 b | 0.031 a | 186 | 330 |
| 55\_165 | 2.62 ab | 0.030 ab | 199 | 343 |
| 165\_55 | 2.72 a | 0.030 ab | 203 | 343 |
| 220\_0 | 2.85 a | 0.031 a | 200 | 340 |
|  | **-----N Concentration (%)-----** | | | |
|  | **A** | **B** | **xm** | **k** |
| 0\_0 | 8.18 ab | 1.39 b | 112 b | 68.3 a |
| 0\_220 | 7.29 c | 1.60 a | 140 a | 62.6 ab |
| 55\_165 | 7.80 bc | 1.62 a | 140 a | 59.6 b |
| 165\_55 | 8.51 a | 1.57 a | 141 a | 61.5 b |
| 220\_0 | 8.70 a | 1.64 a | 136 a | 57.6 b |