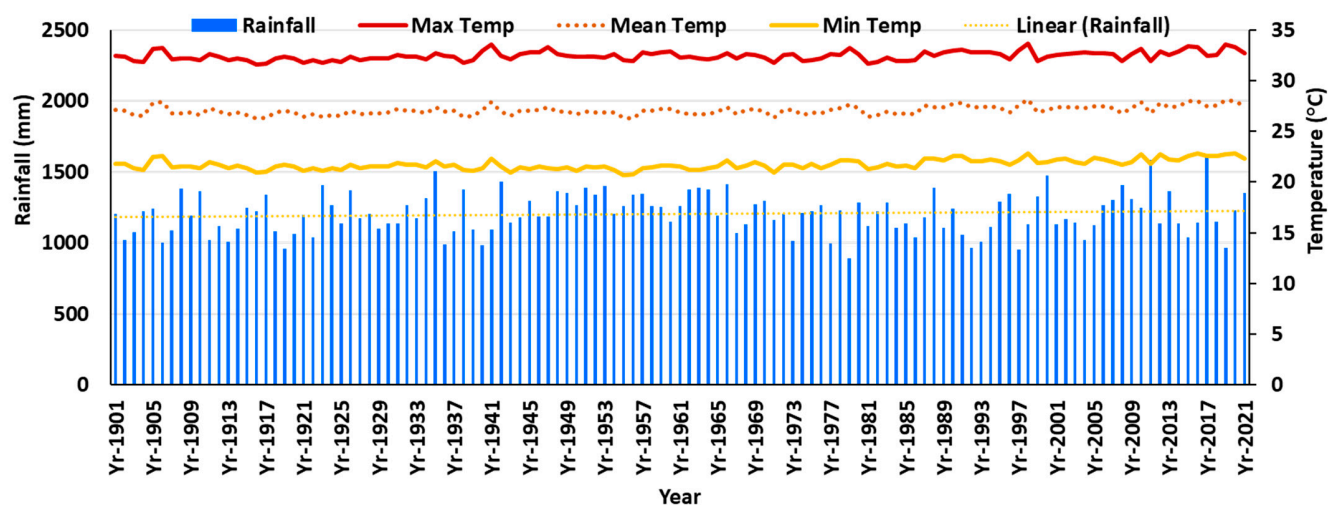# Supplementary Materials



**Figure S1.** Yearly long-term climate during 1901-2021 at experimental location, Pakchong, Nakhon Ratchasima, Thailand. Yearly rainfall (total) in mm, and temperature (maximum, mean & minimum) in °C.

**Table S1.** Analysis of variance for the effect of water levels, genotypes, and their interaction on different agro-physio-biochemical traits of maize in the greenhouse.

| Source of variance | df | RL3 (cm) | SBD3 (cm) | PH3 (cm) | LA1 (cm² plant⁻¹) | LA2 (cm² plant⁻¹) | LA3 (cm² plant⁻¹) | APB3 (g plant⁻¹) | RW3 (g plant⁻¹) | TPB1 (g plant⁻¹) | TPB2 (g plant⁻¹) | TPB3 (g plant⁻¹) | RGR-T1 (mg plant⁻¹ d⁻¹) | RGR-T2 (mg plant⁻¹ d⁻¹) | RGR-T3 (mg plant⁻¹ d⁻¹) | NAR-T1 (mg cm⁻² d⁻¹) | NAR-T2 (mg cm⁻² d⁻¹) | NAR-T3 (mg cm⁻² d⁻¹) | SPAD3 | RWC3 (%) | Pr3 (µmol g⁻¹ FW) | TSS3 (mg g⁻¹ FW) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replication | 3 | 11.31 | 3.41 | 17.00 | 25.99 | 49.57 | 216.3 | 1.65 | 0.23 | 0.52 | 1.67 | 3.13 | 47.84 | 13.43 | 28.42 | 1.28 | 0.28 | 0.47 | 19.05 | 86.97 | 0.01 | 0.02 |
| Water level (W) | 2 | 18.63** | 29.54** | 446.44** | 2019.27** | 1650.45** | 10687.4** | 152.04** | 9.18** | 24.78** | 105.21** | 235.20** | 255.69** | 198.54** | 311.11** | 10.54** | 8.85** | 3.58** | 106.50** | 827.58** | 0.51** | 0.54** |
| Genotype (G) | 2 | 51.84** | 26.52** | 70.64** | 317.17** | 950.41** | 1622.6** | 16.96** | 5.62** | 1.30** | 10.77** | 39.26** | 492.13** | 279.91** | 577.77** | 1.92** | 3.92** | 4.13** | 12.32* | 511.23** | 0.06** | 0.17** |
| W×G | 4 | 1.72ns | 6.01** | 13.79** | 67.37** | 73.91** | 217.2** | 1.94** | 0.09* | 0.73** | 0.61ns | 1.96* | 33.59** | 120.69** | 111.11** | 3.34** | 5.40** | 2.19** | 3.37ns | 95.10** | 0.07** | 0.06** |

| Source of variance | df | RL3 (cm) | SBD3 (cm) | PH3 (cm) | LA1 ($cm^2$ $plant^{-1}$) | LA2 ($cm^2$ $plant^{-1}$) | LA3 ($cm^2$ $plant^{-1}$) | APB3 (g $plant^{-1}$) | RW3 (g $plant^{-1}$) | TPB1 (g $plant^{-1}$) | TPB2 (g $plant^{-1}$) | TPB3 (g $plant^{-1}$) | RGR-T1 (mg $plant^{-1}$ $d^{-1}$) | RGR-T2 (mg $plant^{-1}$ $d^{-1}$) | RGR-T3 (mg $plant^{-1}$ $d^{-1}$) | NAR-T1 (mg $cm^{-2}$ $d^{-1}$) | NAR-T2 (mg $cm^{-2}$ $d^{-1}$) | NAR-T3 (mg $cm^{-2}$ $d^{-1}$) | SPAD3 | RWC3 (%) | Pr3 ($\mu mol$ $g^{-1}$ FW) | TSS3 (mg $g^{-1}$ FW) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Error | 24 | 1.73 | 0.50 | 2.47 | 4.09 | 7.54 | 32.8 | 0.25 | 0.03 | 0.08 | 0.26 | 0.48 | 7.23 | 1.92 | 4.05 | 0.19 | 0.04 | 0.06 | 2.75 | 12.46 | 0.002 | 0.03** |

RL3: root length from 3rd (final) sampling at 13 days after watering treatment started (DAWTS); SBD3: stem base diameter at 13 DAWTS; PH3: plant height at 13 DAWTS; LA1, LA2 & LA3: fully expanded green leaf area at 5, 9 & 13 DAWTS respectively; APB3: above ground plant dry biomass at 13 DAWTS; RW3: root weight at 13 DAWTS; TPB1, TPB2, TPB3: total plant dry biomass at 5, 9 & 13 DAWTS respectively; RGR-T1, RGR-T2, RGR-T3: relative growth rate based on total plant biomass at 5-9, 9-13 & 5-13 DAWTS, respectively; NAR-T1, NAR-T2, NAR-T3: net assimilation rate based on total plant biomass at 5-9, 9-13 & 5-13 DAWTS, respectively; SPAD: SPAD value for leaf greenness at 13 DAWTS; RWC3: relative water content at 13 DAWTS; Pr3: proline at 13 DAWTS; TSS3: total soluble sugar at 13 DAWTS; * and ** Significant at 0.05 and 0.01 levels respectively; ns: nonsignificant; df: degree of freedom.

**Table S2.** Analysis of variance for the effect of ethephon application tactics on different agronomic traits of maize under rainfed conditions at field level.

| Source of variance | df | PH-PM (cm) | EH-PM (cm) | EH:PH ratio (%) | SBD-VT (mm) | LA-V6 ($cm^2$ $plant^{-1}$) | LA-V10 ($cm^2$ $plant^{-1}$) | LA-VT ($cm^2$ $plant^{-1}$) | LA-R3 ($cm^2$ $plant^{-1}$) | APB-V6 (g $plant^{-1}$) | APB-V10 (g $plant^{-1}$) | APB-VT (g $plant^{-1}$) | APB-R3 (g $plant^{-1}$) | KNP (no. $plant^{-1}$) | 100-KW (g) | KY (t $ha^{-1}$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replication | 3 | 97.20 | 15.99 | 4.41 | 1.58 | 4411.41 | 31362 | 99474 | 50939 | 0.62 | 5.34 | 76.75 | 256.34 | 324.59 | 1.57 | 0.06 |
| Ethephon (E) | 6 | 791.88** | 787.86** | 93.67** | 0.52ns | 1346.36ns | 688925* | 1894430* | 1231297* | 0.21ns | 0.12ns | 244.12* | 745.34* | 190.09ns | 6.74* | 0.84* |
| Error | 18 | 96.22 | 14.39 | 4.01 | 1.59 | 4401.33 | 29462 | 91070 | 47677 | 0.62 | 5.39 | 79.64 | 253.70 | 333.44 | 1.66 | 0.06 |

V6: vegetative 6 leaves stage; V10: vegetative 10 leaves stage; VT: vegetative tasseling stage; R3: reproductive phase-3 of maize plant; PM: physiological maturity stage; PH-PM: plant height at PM; EH-PM: ear height at PM; EH:PH: ear height and plant height ratio; SBD-VT: stem base diameter at VT; LA-V6, LA-V10, LA-VT, and LA-R3: leaf area at V6, V10, VT, and R3, respectively; APB-V6, APB-V10, APB-VT, and APB-R3: above ground plant biomass at V6, V10, VT, and R3, respectively; KNP: kernel number per plant; 100-KW: 100-kernel weight; KY: kernel yield.

**Table S3.** Analysis of variance for the effect of ethephon application tactics on different agro-physio-biochemical traits of maize under rainfed conditions at field level.

| Source of variance | df | Mean square | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SLW-VT ($g\ m^{-2}$) | LP-PM (%) | RGRA-V6V10 ($mg\ plant^{-1}\ day^{-1}$) | RGRA-V10VT ($mg\ plant^{-1}\ day^{-1}$) | RGRA-V6R3 ($mg\ plant^{-1}\ day^{-1}$) | NARA-V6V10 ($mg\ cm^{-2}\ day^{-1}$) | NARA-V10VT ($mg\ cm^{-2}\ day^{-1}$) | NARA-V6R3 ($mg\ cm^{-2}\ day^{-1}$) | Energy efficiency | AGDD (°C days) | HUE ($kg\ ha^{-1}\ °C\ days^{-1}$) | RWC-VT (%) | SPAD-VT | RSR-VTR3 (%) | EL-VT (%) | C absorption ($t\ C\ ha^{-1}$) | TSS-VT ($mg\ g^{-1}\ FW$) | Pr-VT ($\mu mol\ g^{-1}\ FW$) |
| Replication | 3 | 6.38 | 0.11 | 0.82 | 2.38 | 0.01 | 0.001 | 0.001 | 0.002 | 0.01 | 8140 | 0.02 | 21.52 | 4.67 | 0.01 | 0.07 | 0.08 | 6373 | 1.35 |
| Ethephon (E) | 6 | 69.51** | 83.32** | 1.94ns | 2.56ns | 1.21* | 0.001ns | 0.006* | 0.013* | 0.08* | 5837ns | 0.19* | 23.67ns | 5.16ns | 0.05* | 0.53* | 1.17* | 60365** | 38.92** |
| Error | 18 | 6.86 | 0.10 | 0.82 | 1.49 | 0.01 | 0.000 | 0.001 | 0.002 | 0.01 | 8056 | 0.02 | 22.27 | 4.75 | 0.01 | 0.07 | 0.08 | 6853 | 1.52 |

V6: vegetative 6 leaves stage; V10: vegetative 10 leaves stage; VT: vegetative tasseling stage; R3: reproductive phase-3 of maize plant; PM: physiological maturity stage; SLW-VT: specific leaf weight at VT; LP-PM: lodging percentage at PM; RGRA-V6V10, RGRA-V10VT, and RGRA-V6R3: relative growth rate based on above ground plant biomass during V6 to V10, V10 to VT, and V6 to R3, respectively; NARA-V6V10, NARA-V10VT, and NARA-V6R3: net assimilation rate based on above ground plant biomass during V6 to V10, V10 to VT, and V6 to R3, respectively; AGDD: accumulated growing degree days; HUE: heat use efficiency; RWC-VT: relative water content at VT; SPAD-VT: SPAD value of leaf greenness at VT; RSR-VTR3: relative senescence rate during VT to R3; EL-VT: electrolyte leakage at VT; C: carbon; TSS-VT: total soluble sugar at VT; Pr-VT: proline content at VT.