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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameters** | | **Unit** | **Limit** | **F1** | **F2** | **F3** | **Validation Fields** |
| Base temperature for emergence (TBASEM) | | °C | [-10 à 8] | 5 | 5 | 5 | 5 |
| Maximum temperature for emergence (TEFFMX) | | [18-32] | 32 | 32 | 32 | 32 |
| Temperature sum | at emergence (TSUMEM) | °C-d | [0-170] | 63 | 82 | 82 | 75,7 |
| from emergence to anthesis (TSUM1) | [150-1050] | 711 | 680 | 750 | 713,7 |
| from anthesis to maturity (TSUM2) | [600-1550] | 704 | 710 | 670 | 694,7 |
| Daily increase in temperature sum  (DTSMTB) | b at 0 °C | °C-d | [0-38] | 0 | 0 | 0 | 0 |
| at 05°C | 0 | 0 | 0 | 0 |
| at 30°C | 25 | 25 | 25 | 25 |
| at 45°C | 27 | 27 | 27 | 27 |
| PhotoInhibition (DLC) | | hour | [6-18] | - | - | - | - |
| PhotoInsensitivity (DLO) | | - | - | - | - |
| Leaf area index at emergence (LAIEM) | | m2 m-2 | [0,0007-0,3] | 0,1342 | 0,1342 | 0,1342 | 0,1342 |
| Relative leaf area growth rate (RGRLAI) | | °C d-1 | [0,007-0,5] | 0,0087 | 0,0087 | 0,0087 | 0,0087 |
| Specific leaf area  (SLATB) | at DVS a =0 | ha kg-1 | [0,0007-0,0042] | 0,00297 | 0,00202 | 0,00185 | 0,00228 |
| at DVS=50 | 0,00263 | 0,00223 | 0,00185 | 0,00224 |
| at DVS=100 | 0,00232 | 0,00192 | 0,0015 | 0,00191 |
| at DVS=200 | 0,00228 | 0,00198 | 0,00142 | 0,00189 |
| Life span of leaves growing at 35°C (SPAN) | | d | [17-50] | 24 | 19 | 17 | 20 |
| Base temperature for leaves aging (TBASE) | | °C | [-10 à 10] | 5 | 5 | 5 | 5 |
| Extinction coefficient for diffuse visible light  (KDIF) | at DVS = 0 | unitless | [0,44-1] | 0,5 | 0,5 | 0,5 | 0,5 |
| at DVS = 200 | 0,5 | 0,5 | 0,5 | 0,5 |
| Light use efficiency  (EFFTB) | at 5°C | kg ha-1 h-1 J-1 | [0,4-0,5] | 0,45 | 0,45 | 0,45 | 0,45 |
| at 32°C | 0,45 | 0,45 | 0,45 | 0,45 |
| Maximum CO2 assimilation rate (AMAXTB) | at DVS = 00 | kg ha-1 h-1 | [1-70] | 19 | 30 | 25 | 24,7 |
| at DVS = 100 | 19 | 30 | 25 | 24,7 |
| at DVS = 101 | 5 | 10 | 3 | 6,0 |
| at DVS = 130 | 4 | 8 | 2 | 4,7 |
| at DVS = 200 | 2 | 5 | 1 | 2,7 |
| AMAX reduction factor (TMPFTB) | at 5°C | unitless | [0-1] | 0,01 | 0,01 | 0,01 | 0,0 |
| at 10°C | 0,6 | 0,6 | 0,6 | 0,6 |
| at 15°C | 1 | 1 | 1 | 1 |
| at 25°C | 1 | 1 | 1 | 1 |
| at 35°C | 0 | 0 | 0 | 0 |
| Gross Assimilation reduction factor (TMNFTB) | at Tminc = 0°C | unitless | [0-1] | 0 | 0 | 0 | 0 |
| at Tmin = 03°C | 1 | 1 | 1 | 1 |
| Efficiency of conversion | into leaves (CVL) | kg kg-1 | [0,6-0,76] | 0,685 | 0,723 | 0,685 | 0,698 |
| into storage organs (CVO) | [0,45-0,85] | 0,85 | 0,7 | 0,45 | 0,667 |
| into roots (CVR) | [0,65-0,76] | 0,694 | 0,694 | 0,694 | 0,694 |
| into stems (CVS) | [0,63-0,76] | 0,662 | 0,63 | 0,662 | 0,651 |
| Relative increase in respiration rate for 10°C of temp increase (Q10) | | unitless | [1,5-2] | 2 | 2 | 2 | 2 |
| Relative maintenance respiration rate | for leaves (RML) | kg CH2O kg-1 d-1 | [0,002-0,03] | 0,03 | 0,03 | 0,03 | 0,03 |
| for storage organs (RMO) | 0,03 | 0,03 | 0,03 | 0,03 |
| for roots (RMR) | 0,03 | 0,025 | 0,015 | 0,023 |
| for stems (RMS) | 0,03 | 0,03 | 0,03 | 0,03 |
| Fraction of total biomass to roots (FRTB) | at DVS = 0 | kg kg-1 | [0-1] | 0,5 | 0,5 | 0,5 | 0,5 |
| at DVS = 10 | 0,5 | 0,5 | 0,5 | 0,5 |
| at DVS = 20 | 0,4 | 0,4 | 0,4 | 0,4 |
| at DVS = 35 | 0,22 | 0,22 | 0,22 | 0,22 |
| at DVS = 40 | 0,17 | 0,17 | 0,17 | 0,17 |
| at DVS = 50 | 0,13 | 0,13 | 0,13 | 0,13 |
| at DVS = 70 | 0,07 | 0,07 | 0,07 | 0,07 |
| at DVS = 90 | 0,03 | 0,03 | 0,03 | 0,03 |
| at DVS = 120 | 0 | 0 | 0 | 0 |
| at DVS = 200 | 0 | 0 | 0 | 0 |
| Fraction of aboveground dry matter to leaves (FLTB) | at DVS = 0 | kg kg-1 | [0-1] | 0,65 | 0,65 | 0,65 | 0,65 |
| at DVS = 10 | 0,7 | 0,65 | 0,65 | 0,67 |
| at DVS = 20 | 0,65 | 0,65 | 0,65 | 0,65 |
| at DVS = 30 | 0,65 | 0,7 | 0,7 | 0,68 |
| at DVS = 40 | 0,6 | 0,8 | 0,8 | 0,73 |
| at DVS = 50 | 0,55 | 0,6 | 0,6 | 0,58 |
| at DVS = 64.6 | 0,4 | 0,5 | 0,5 | 0,47 |
| at DVS = 75 | 0,2 | 0,5 | 0,5 | 0,40 |
| at DVS = 80 | 0,1 | 0,5 | 0,5 | 0,37 |
| at DVS = 85 | 0 | 0,5 | 0,5 | 0,33 |
| at DVS = 90 | 0 | 0 | 0 | 0 |
| at DVS = 95 | 0 | 0 | 0 | 0 |
| at DVS = 98,5 | 0 | 0 | 0 | 0 |
| at DVS = 100 | 0 | 0 | 0 | 0 |
| at DVS = 110 | 0 | 0 | 0 | 0 |
| at DVS = 115 | 0 | 0 | 0 | 0 |
| at DVS = 125 | 0 | 0 | 0 | 0 |
| at DVS = 200 | 0 | 0 | 0 | 0 |
| Fraction of aboveground dry matter to storage organs (FOTB) | at DVS = 0 | kg kg-1 | [0-1] | 0 | 0 | 0 | 0 |
| at DVS = 10 | 0 | 0 | 0 | 0 |
| at DVS = 20 | 0 | 0 | 0 | 0 |
| at DVS = 30 | 0 | 0 | 0 | 0 |
| at DVS = 40 | 0 | 0 | 0 | 0 |
| at DVS = 50 | 0 | 0 | 0,1 | 0,03 |
| at DVS = 64.6 | 0 | 0 | 0,2 | 0,07 |
| at DVS = 75 | 0 | 0 | 0,4 | 0,13 |
| at DVS = 80 | 0 | 0,4 | 0,4 | 0,27 |
| at DVS = 85 | 0 | 0,2 | 0,4 | 0,20 |
| at DVS = 90 | 1 | 0,9 | 1 | 0,97 |
| at DVS = 95 | 1 | 0,9 | 1 | 0,97 |
| at DVS = 98,5 | 1 | 1 | 1 | 1 |
| at DVS = 100 | 1 | 1 | 1 | 1 |
| at DVS = 110 | 1 | 1 | 1 | 1 |
| at DVS = 115 | 1 | 1 | 1 | 1 |
| at DVS = 125 | 1 | 1 | 1 | 1 |
| at DVS = 200 | 1 | 1 | 1 | 1 |
| Fraction of aboveground dry matter to stems (FSTB) | at DVS = 0 | kg kg-1 | [0-1] | 0,35 | 0,35 | 0,35 | 0,35 |
| at DVS = 10 | 0,3 | 0,35 | 0,35 | 0,33 |
| at DVS = 20 | 0,35 | 0,35 | 0,35 | 0,35 |
| at DVS = 30 | 0,35 | 0,3 | 0,3 | 0,32 |
| at DVS = 40 | 0,4 | 0,2 | 0,2 | 0,27 |
| at DVS = 50 | 0,45 | 0,4 | 0,3 | 0,38 |
| at DVS = 64.6 | 0,6 | 0,5 | 0,3 | 0,47 |
| at DVS = 75 | 0,8 | 0,5 | 0,1 | 0,47 |
| at DVS = 80 | 0,9 | 0,1 | 0,1 | 0,37 |
| at DVS = 85 | 1 | 0,3 | 0,1 | 0,47 |
| at DVS = 90 | 0 | 0,1 | 0 | 0,03 |
| at DVS = 95 | 0 | 0,1 | 0 | 0,03 |
| at DVS = 98,5 | 0 | 0 | 0 | 0 |
| at DVS = 100 | 0 | 0 | 0 | 0 |
| at DVS = 110 | 0 | 0 | 0 | 0 |
| at DVS = 115 | 0 | 0 | 0 | 0 |
| at DVS = 125 | 0 | 0 | 0 | 0 |
| at DVS = 200 | 0 | 0 | 0 | 0 |
| Relative death rate of roots  (RDRRTB) | at DVS = 0 | kg kg-1 day-1 | [0-0,02] | 0 | 0 | 0 | 0 |
| at DVS = 150 | 0 | 0 | 0 | 0 |
| at DVS = 150.01 | 0,02 | 0,02 | 0,02 | 0,02 |
| at DVS = 200 | 0,02 | 0,02 | 0,02 | 0,02 |
| Relative death rate of stems (RDRSTB) | at DVS = 0 | [0-0,04] | 0 | 0 | 0 | 0 |
| at DVS = 150 | 0 | 0 | 0 | 0 |
| at DVS = 150,1 | 0,02 | 0,02 | 0,02 | 0,02 |
| at DVS = 200 | 0,02 | 0,02 | 0,02 | 0,02 |
| Specific stem area  (SSATB) | at DVS = 0 | ha kg-1 | [0,0003-0,0003] | 0 | 0 | 0 | 0 |
| at DVS = 200 | 0 | 0 | 0 | 0 |
| Initial total crop dry weight (TDWI) | | kg ha -1 | [0,5-300] | 130 | 210 | 100 | 146,67 |
| Development Stage at harvest (DVSEND) | | unitless | [1-2,5] | 2 | 2 | 2 | 2 |
| Initial rooting depth (RDI) | | cm | [10-50] | 10 | 10 | 10 | 10 |
| Maximum rooting depth (RDM) | | cm | [10-150] | 55 | 55 | 55 | 55 |
| Maximum daily increase in rooting depth (RRI) | | cm d-1 | [0-3] | 1,2 | 1,2 | 1,2 | 1,2 |
| Maximum relative death rate leaves due to water stress (PERDL) | | kg kg-1 d-1 | [0-0,1] | 0,03 | 0,03 | 0,03 | 0,03 |
| Correction factor transpiration rate (CFET) | | unitless | [0,8-1,2] | 1,2 | 1,2 | 1 | 1,1 |
| crop group number for soil water depletion (DEPNR) | | unitless | [1-5] | 4 | 4,2 | 4,5 | 4,2 |