

Input data of crop parameters used in AquaCrop-OS model

Parameters	Value
Growing degree/Calendar days from sowing to emergence/transplant recovery	5
Growing degree/Calendar days from sowing to maximum rooting	49
Growing degree/Calendar days from sowing to senescence	90
Growing degree/Calendar days from sowing to maturity	100
Growing degree/Calendar days from sowing to start of yield formation	51
Duration of flowering in growing degree/calendar days (-999 for non-fruit/grain crops)	10
Duration of yield formation in growing degree/calendar days	51
Growing degree day calculation method	2
Base temperature (degC) below which growth does not progress	8
Upper temperature (degC) above which crop development no longer increases	30
Pollination affected by heat stress (0: No; 1: Yes)	1
Maximum air temperature (degC) above which pollination begins to fail	40
Maximum air temperature (degC) at which pollination completely fails	45
Pollination affected by cold stress (0: No; 1: Yes)	1
Minimum air temperature (degC) below which pollination begins to fail	10
Minimum air temperature (degC) at which pollination completely fails	5
Biomass production affected by temperature stress (0: No; 1: Yes)	1
Minimum growing degree days (degC/day) required for full biomass production	12
Growing degree days (degC/day) at which no biomass production occurs	0
Shape factor describing the reduction in biomass production for insufficient growing degree days	138.135
Initial percentage of minimum effective rooting depth	70
Minimum effective rooting depth (m)	0.3
Maximum rooting depth (m)	2.3
Shape factor describing root expansion	1.3
Shape factor describing the effects of water stress on root expansion	-6
Maximum root water extraction at top of the root zone (m3/m3/day)	0.0104
Maximum root water extraction at the bottom of the root zone (m3/m3/day)	0.0026
Exponent parameter for adjustment of Kcx once senescence is triggered	1
Soil surface area (cm2) covered by an individual seedling at 90% emergence	6.5
Number of plants per hectare	75000
Minimum canopy size below which yield formation cannot occur	0.049
Maximum canopy cover (fraction of soil cover)	0.90
Canopy decline coefficient (fraction per day/GDD)	0.0124
Canopy growth coefficient (fraction per day/GDD)	0.0181
Crop coefficient when canopy growth is complete but prior to senescence	1.05
Decline of crop coefficient due to ageing (%/day)	0.3
Water productivity normalized for ET0 and C02 (g/m2)	33.7
Adjustment of water productivity in yield formation stage (% of WP)	100
Crop co2 sink strength coefficient	0.5
WP co2 adjustment parameter given by Steduto et al. 2007	0.000138
WP co2 adjustment parameter given by FACE experiments	0.001165
Reference harvest index	0.40
Initial harvest index	0.01
Possible increase of harvest index due to water stress before flowering (%)	0
Coefficient describing positive impact on harvest index of restricted vegetative growth during yield	7
Coefficient describing negative impact on harvest index of stomatal closure during yield formation	3

Maximum allowable increase of harvest index above reference	15
Crop Determinancy ('0': Indeterminant, '1': Determinant)	1
Excess of potential fruits	50
Percentage of total flowering at which peak flowering occurs	33.33
Upper soil water depletion threshold for water stress effects on affect canopy expansion	0.14
Upper soil water depletion threshold for water stress effects on canopy stomatal control	0.69
Upper soil water depletion threshold for water stress effects on canopy senescence	0.69
Upper soil water depletion threshold for water stress effects on canopy pollination	0.8
Lower soil water depletion threshold for water stress effects on canopy expansion	0.72
Lower soil water depletion threshold for water stress effects on canopy stomatal control	1
Lower soil water depletion threshold for water stress effects on canopy senescence	1
Lower soil water depletion threshold for water stress effects on canopy pollination	1
Shape factor describing water stress effects on canopy expansion	2.9
Shape factor describing water stress effects on stomatal control	6
Shape factor describing water stress effects on canopy senescence	2.7
Shape factor describing water stress effects on pollination	1
Adjustment to water stress thresholds depending on daily ET0 (0: 'No', 1: 'Yes')	1
Vol (%) below saturation at which stress begins to occur due to deficient aeration	5
Number of days lag before aeration stress affects crop growth	3
Reduction (%) to p_lo3 when early canopy senescence is triggered	12
Proportion of total water storage needed for crop to germinate	0.2
