

Supplementary Table 1. Standard setting and calibrated parameters for AgroC used in simulation of maize growth at Akademija, Lithuania

Parameters	Value	Units or symbol meaning	Remarks
Base temperature	8	°C	Conservative
Start temperature for plant growth	45	Sum of GDD	Calibrated
Specific leaf area of new leaves	0.004	ha leaf kg ⁻¹ dry matter	Calibrated
Potential CO ₂ assimilation rate of a unit leaf area for light saturation	58	kg CO ₂ ha ⁻¹ leaf h ⁻¹	Calibrated
Initial light use efficiency	0.68	(kg CO ₂ ha ⁻¹ leaf h ⁻¹)(J m ⁻² s ⁻¹) ⁻¹	Calibrated
Maximal rooting depth	1.0	m	Calibrated
Number of seedlings per area	7	m ⁻²	Measured
Leaf area of one seedling	0.000669	m ⁻² per seedling	Calibrated
Critical LAI for leaf death due to self-shading	4	ha ha ⁻¹	Conservative
DVS against reduction factor of the maximal light assimilation rate	0	1.0	DVS = 1.0: Tasseling; DVS = 2.0: Physiological maturity
	1.3	1.0	
	1.6	0.8	
	2	0.3	
Daily average daytime temperature against reduction factor of the maximal light assimilation rate	-10	0.0	Temperature in °C
	9	0.1	
	16	0.8	
	18	0.9	
	20	1.0	
	30	0.8	
DVS against fraction of dry matter allocated to the shoot	0.0	0.2	Calibrated
	0.1	0.3	
	0.2	0.6	
	0.4	0.6	
	0.5	0.6	
	0.7	0.7	
	0.9	0.9	
	1.2	0.9	
DVS against fraction of dry matter of the above ground biomass allocated to the leaves	2.0	1.0	Calibrated
	0.0	0.6	
	0.3	0.9	
	0.8	0.2	
DVS against fraction of dry matter of the above ground biomass allocated to the stem	0.9	0.0	Calibrated
	0.0	0.0	
	0.3	0.0	
	0.8	0.7	
	0.9	0.5	
DVS against fraction of dry matter of the above ground biomass allocated to the cob	1.1	0.0	Calibrated
	0.0	0.0	
	0.8	0.0	
	0.9	0.8	
	1.1	0.9	
	1.4	0.8	
	2.0	1.0	

GDD = sum of growing degrees days, LAI = leaf area index, DVS = development stage

Supplementary Table 2. Standard setting and calibrated parameters for AquaCrop used in simulation of maize growth at Akademija, Lithuania

Parameters	Value	Units or symbol meaning	Remarks
Growth			
Crop water productivity	30.7	g m ⁻² , function of atmosphere CO ₂	Calibrated
Stomatal conductance threshold <i>p</i> -upper	0.69	Fraction of TAW at which stomata start to close	Conservative
Stomatal stress coefficient curve shape	6.0	Highly convex curve	Conservative
Morphology			
Maximum effective rooting depth, Z _x	1.0	m	Calibrated
Initial canopy cover	0.46	%	Calibrated
Maximum canopy cover	88	%	Calibrated
Canopy growth coefficient (CGC)	10.5	% day ⁻¹	Calibrated
Canopy decline coefficient (CDC)	0.79	% decline per day due to leaf aging	Calibrated
Leaf growth threshold <i>p</i> -upper	0.14	Fraction of TAW above which leaf growth is inhibited	Conservative
Leaf growth threshold <i>p</i> -lower	0.72	Leaf growth stops completely at <i>p</i> -lower value	Conservative
Leaf growth stress coefficient curve shape	2.9	Curve shape moderately	Conservative
Early senescence stress coefficient <i>p</i> -upper	0.69	Above this early canopy senescence begins	Conservative
Early senescence coefficient curve shape	2.7	Moderately convex curve	Conservative
Crop coefficient for transpiration, K _{c_{tr}}	1.02	Full canopy transpiration relative to ET ₀	Calibrated
Phenology			
Base temperature	8	°C	Conservative
Cut-off temperature	30	°C	Conservative
Time from sowing to emergence	45	Sum of GDD	Calibrated
Time from sowing to maximum CC	643	Sum of GDD	Calibrated
Time from sowing to start senescence	1110	Sum of GDD	Calibrated
Time from sowing to maturity	1200	Sum of GDD	Calibrated
Time from sowing to maximum rooting depth	582	Sum of GDD	Calibrated
Harvest			
Reference harvest index (HI ₀)	50	%	Calibrated

TAW = Total available water content, CC = canopy cover, GDD = sum of growing degrees days