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Physiological Plant Ecology I

Responses to the Physical Environment

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Symbols, Abbreviations and Units

Some specialized symbols are defined and used only in particular Chapters. If no definition is given, then the symbols or abbreviations have the meanings indicated below. The International System of Units (SI) has been generally adapted throughout. However, concentrations are expressed in mM as well as the SI unit, mol m^{-3} (1 mM = 1 mol m^{-3}); water potentials are expressed in bars as well as the SI unit, pascals (1 bar = 0.1 MPa).

For convenience and to provide uniformity, superscripts are used to indicate locations and subscripts designate species, quantities, or conditions. For example, $r^{a}_{CO_2}$ is the resistance of the air boundary layer to CO_2 diffusion, T^{leaf}_{min} is the minimum leaf temperature, and Ψ^{xylem}_{P} is the pressure potential component of the total water potential ($\Psi = \Psi_P + \Psi_\pi + \Psi_m$) in the xylem.

Symbol or Abbreviation	Description	Unit
A	area	m^2
a	absorptance	
a	activity	mM or mol m^{-3}
a	superscript for air boundary layer	
ADP	adenosine diphosphate	
AMP	adenosine monophosphate	
ATP	adenosine triphosphate	
C_3	photosynthetic carbon reduction cycle (Calvin cycle)	
C_4	dicarboxylic acid pathway of photosynthesis	
CAM	crassulacean acid metabolism	
chl	chlorophyll	
c	concentration	mM or mol m^{-3}
D	diffusion coefficient	$m^2\ s^{-1}$
DCMU	3-(3′,4′-dichlorophenyl)-1,1-dimethylurea	
DNA	deoxyribonucleic acid	
d	diameter	m
d	day	
E	Einstein	
EDTA	ethylenediaminetetraacetic acid	
e	emittance	
F	Faraday	96,487 A s mol^{-1}
Fd	ferredoxin	
g	conductance	m s^{-1} or mol $m^{-2}\ s^{-1}$ [a]

Symbol or Abbreviation	Description	Unit
h	hour	
ha	hectare	
i	superscript for inside (generally intracellular)	
IR	infrared	
J_j	net flux of species j	mol m^{-2} s^{-1}
J_v	volume flow	m s^{-1}
K	thermal conductivity coefficient	W m^{-1} k^{-1}
K	degrees on Kelvin scale	
K_i	inhibitor constant	mM or mol m^{-3}
K_m	Michaelis-Menten constant	mM or mol m^{-3}
k	first order rate constant	s^{-1}
L_P	hydraulic conductivity coefficient	m s^{-1} bar^{-1} or m s^{-1} Pa^{-1}
l	length	m
ln	logarithm to base e	
log	logarithm to base 10	
M	molecular weight	g mol^{-1}
m	subscript for matric potential	
max	subscript for maximum value	
mes	superscript for mesophyll	
min	subscript for minimum value	
N	Avogadro's number	6.023×10^{23} molecules mol^{-1}
N_j	mole fraction of species j	
NAD^+	nicotinamide-adenine dinucleotide, oxidized	
NADH	nicotinamide-adenine dinucleotide, reduced	
$NADP^+$	nicotinamide-adenine dinucleotide phosphate, oxidized	
NADPH	nicotinamide-adenine dinucleotide phosphate, reduced	
n	number of moles	
o	superscript for outside (generally ambient)	
P	subscript for hydrostatic pressure potential	
p	partial pressure in gas phase	bar or Pa
PAR	photosynthetically active radiation (generally 400 to 700 nm)	E m^{-2} s^{-1}
PEP	phosphoenolpyruvate	
Pi	inorganic phosphate	
PS I, PS II	Photosystem I, Photosystem II	
Q_{10}	temperature coefficient	
R	gas constant	8.314 J mol^{-1} K^{-1}
RNA	ribonucleic acid	
RuBP	ribulose-1,5-bisphosphate	

Symbol or Abbreviation	Description	Unit
r	resistance	$s\ m^{-1}$ or $m^2\ s\ mol^{-1}$ [a]
r	radius	m
r	reflectance	
SD	standard deviation	
SEM	standard error of the mean	
T	temperature	°C (or K, especially indicating differences in temperature)
t	time	s
UV	ultraviolet	
V	volume	m^3
V_{max}	maximum reaction velocity	$mol\ s^{-1}$ or $mM\ s^{-1}$
v	velocity	$m\ s^{-1}$
v	reaction velocity	$mol\ s^{-1}$ or $mM\ s^{-1}$
wt	weight (e.g. dry wt)	
wv	subscript for water vapor	
γ	activity coefficient	
λ	wavelength	nm
μ	chemical potential	$J\ mol^{-1}$
π	subscript for osmotic potential	
ρ	density	$kg\ m^{-3}$
σ	reflection coefficient	
σ	Stefan-Boltzmann constant	$5.67 \times 10^{-8}\ W\ m^{-2}\ K^{-4}$
ψ	water potential	bar or Pa

[a] Diffusional gas fluxes are most commonly represented by $J_j = g_j\, \Delta c_j = \Delta c_j / r_j$, where g_j can be in $m\ s^{-1}$. Alternatively, $J_j = g_j\, \Delta N_j = \Delta N_j / r_j$, where g_j can be in $mol\ m^{-2}\ s^{-1}$