1. Table comparing major photosynthetic pathways

CHARACTERISTIC	C_3	C_4	CAM	LPP
Morphology of leaf or photosynthetic axis	Palisade + spongy mesophyll	Krantz anatomy	Succulent; large vacuoles	Parichnos (connected aerenchyma system)
Stomata	Medium to many	Medium	Few, sunken, or occluded	Few, sunken, or occluded
Chloroplasts	Concentrated in palisade cells	Concentrated in bundle sheath cells	Concentrated in palisade cells	Concentrated around aerenchyma
Chlorophyll a:b	∼3:1	∼4:1	≤3:1	?
CO_2-compensation concentration at optimal temperature	30–70μl/l	<10μl/l	Day: 0–200μl/l; Night: <5 μl/l	Low?
Theoretical energy requirement[a] (CO_2:ATP:NADPH)	1:3:2	1:5:2	1:6.5:2	1:3:2
Primary CO_2 acceptor	RuBP	PEP	Day: RuBP; Night: PEP	RuBP or submerged as in CAM
First product of photosynthesis	3-carbon acids (PGA)	4-carbon acids (malate, aspartate)	Day: PGA; Night: malate	PGA or submerged as in CAM
Carbon Source	Atmosphere	Atmosphere	Atmosphere	Sediment/Respiration
δ^{13}**C**	-20 – -40‰	-10 – -20‰	-10 – -35‰	reflecting sediments; approx. -25‰
Habitat	Non-specific	High insolation	Water stress	Aquatic/Anoxic soils
Photosynthesis depressed by O_2	Yes	No	Yes	No
Photorespiration	Yes	No	No	No
Net photosynthetic capacity	Low to high	High	Day: low; Night: medium	?
Light saturation	Medium	No saturation	Medium to high	?
Redistribution of photosynthate	Slow	Fast	Variable	?
Productivity (tons/hectare/year)	Medium, 22±0.3	High, 39±17	Low	?
Earliest evidence	Proterozoic	Miocene	Devonian	Carboniferous

Adapted from Larcher (1980, Table 3.1) and Salisbury and Ross (1978, Table 11.3).

[a] Assuming CO_2 saturation; C_3 plants incur additional cost due to photorespiration in an O_2-rich atmosphere.

References

Larcher, W. (1980) *Physiological Plant Ecology, 2nd Edition.* Berlin: Springer-Verlag.

Salisbury, F. B. and C. W. Ross (1978) *Plant Physiology, 2nd Edition.* Belmont, California: Wadsworth.