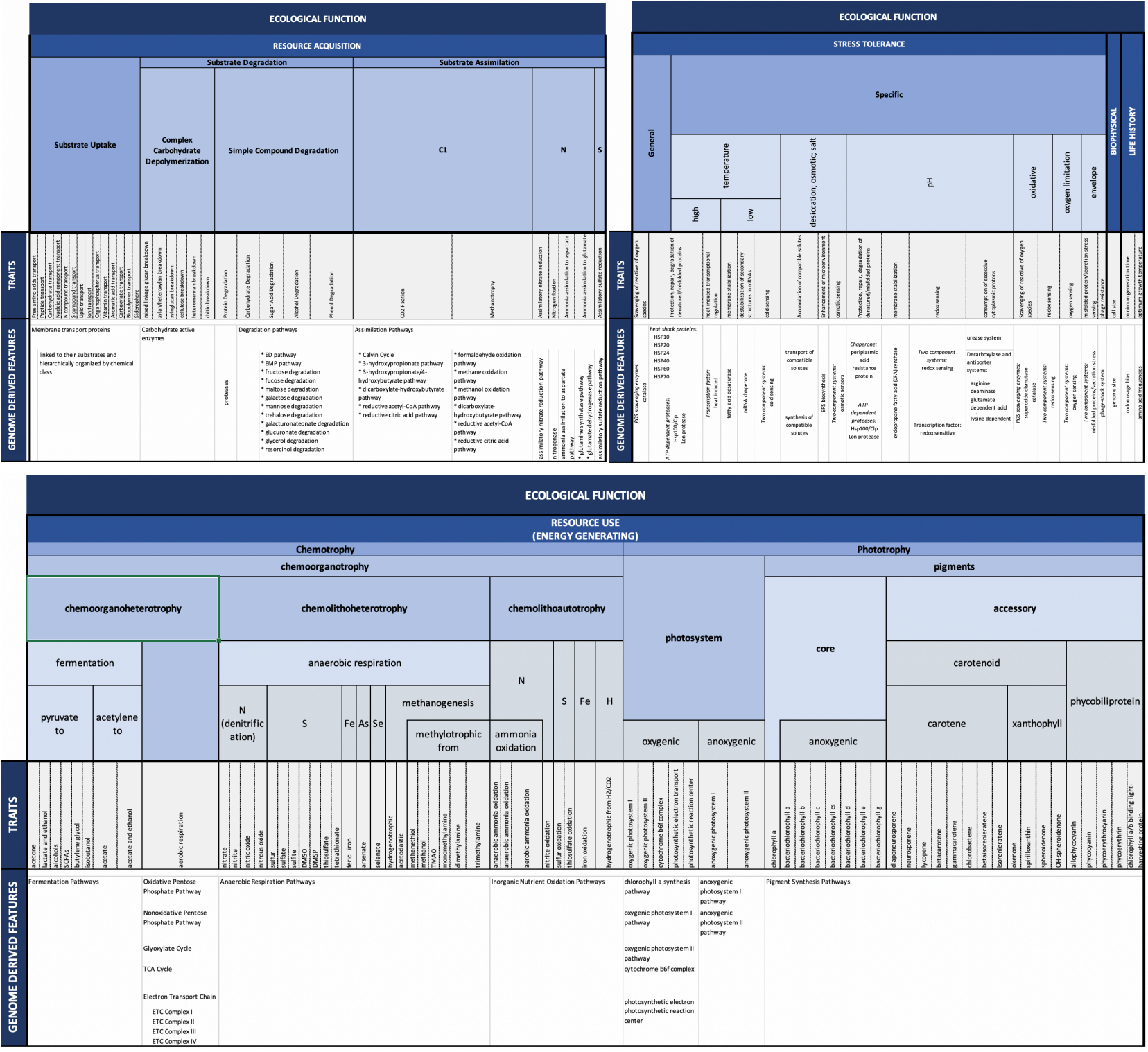
ECOLOGICAL FUNCTION
RESOURCE ACQUISITION
Substrate Degradation
Substrate Assimilation
Substrate Uptake
Complex Carbohydrate Depolymerization
Simple Compound Degradation
C1
N
S
TRAITS
Free amino acids transport
Peptide transport
Carbohydrate transport
Nucleic acid transport
N compound transport
S compound transport
Lipid transport
Ion transport
Organic phosphorus transport
Vitamin transport
Aromatic acid transport
Carboxylate transport
Biopolymer transport
Siderophore
mixed linkage glucan breakdown
xylan/heteroxylan breakdown
xyloglucan breakdown
cellulose breakdown
heteromannan breakdown
chitin breakdown
Protein Degradation
Carbohydrate Degradation
Sugar Acid Degradation
Alcohol Degradation
Phenol Degradation
CO2 Fixation
Methanotrophy
Assimilatory nitrate reduction
Nitrogen fixation
Ammonia assimilation to aspartate
Ammonia assimilation to glutamate
Assimilatory sulfate reduction
GENOME DERIVED FEATURES
Membrane transport proteins
linked to their substrates and hierarchically organized by chemical class
Carbohydrate active enzymes
proteases
Degradation pathways
* ED pathway
* EMP pathway
* fructose degradation
* fucose degradation
* maltose degradation
* galactose degradation
* mannose degradation
* trehalose degradation
* galacturonateonate degradation
* glucuronate degradation
* glycerol degradation
* resorcinol degradation
Assimilation Pathways
* Calvin Cycle
* 3-hydroxypropionate pathway
* 3-hydroxypropionate/4-hydroxybutyrate pathway
* dicarboxylate-hydroxybutyrate pathway
* reductive acetyl-CoA pathway
* reductive citric acid pathway
* formaldehyde oxidation pathway
* methane oxidation pathway
* methanol oxidation pathway
* dicarboxylate-hydroxybutyrate pathway
* reductive acetyl-CoA pathway
* reductive citric acid pathway
assimilatory nitrate reduction pathway
nitrogenase
ammonia assimilation to aspartate pathway
* glutamine synthetase pathway
* glutamate dehydrogenase pathway
assimilatory sulfate reduction pathway
ECOLOGICAL FUNCTION
STRESS TOLERANCE
General
Specific
temperature
high
low
desiccation; osmotic; salt
pH
oxidative
oxygen limitation
envelope
BIOPHYSICAL
LIFE HISTORY
TRAITS
Scavenging of reactive of oxygen species
Protection, repair, degradation of denatured/misfolded proteins
heat-induced transcriptional regulation
membrane stabilization
destabilization of secondary structures in mRNAs
cold-sensing
Accumulation of compatible solutes
Enhancement of microenvironment
osmotic sensing
Protection, repair, degradation of denatured/misfolded proteins
membrane stabilization
redox sensing
consumption of excessive cytoplasmic protons
Scavenging of reactive of oxygen species
redox sensing
oxygen sensing
misfolded proteins/secretion stress sensing
phage resistance
cell size
genome size
codon usage bias
amino acid frequencies
minimum generation time
optimum growth temperature
GENOME DERIVED FEATURES
ROS scavenging enzymes:
catalase
ATP-dependent proteases:
Hsp100/Clp
Lon protease
heat shock proteins:
HSP10
HSP20
HSP24
HSP40
HSP60
HSP70
Transcription factor:
heat induced
fatty acid desaturase
mRNA chaperone
Two component systems:
cold sensing
transport of compatible solutes
synthesis of compatible solutes
EPS biosynthesis
Two-component systems:
osmotic sensors
Chaperone:
periplasmic acid resistance protein
ATP-dependent proteases:
Hsp100/Clp
Lon protease
cyclopropane fatty acid (CFA) synthase
Two component systems:
redox sensing
Transcription factor:
redox sensitive
urease system
Decarboxylase and antiporter systems:
arginine deaminase
glutamate dependent acid
lysine dependent
ROS scavenging enzymes:
superoxide dismutase
catalase
Two component systems:
redox sensing
Two component systems:
oxygen sensing
Two component systems:
misfolded proteins/secretion stress sensing
phage-shock system
ECOLOGICAL FUNCTION
RESOURCE USE
(ENERGY GENERATING)
Chemotrophy
Phototrophy
chemoorganotrophy
chemoorganoheterotrophy
chemolithoheterotrophy
chemolithoautotrophy
photosystem
pigments
core
accessory
fermentation
anaerobic respiration
N
S
Fe
H
carotenoid
pyruvate to
acetylene to
N (denitrification)
S
Fe
As
Se
methanogenesis
methylotrophic from
ammonia oxidation
oxygenic
anoxygenic
carotene
xanthophyll
phycobiliprotein
TRAITS
acetone
lactate and ethanol
alcohols
SCFAs
butylene glycol
isobutanol
acetate
acetate and ethanol
aerobic respiration
nitrate
nitrite
nitric oxide
nitrous oxide
sulfur
sulfate
sulfite
DMSO
DMSP
thiosulfate
tetrathionate
feric iron
arsenate
selenate
hydrogenotrophic
acetoclastic
methanethiol
methanol
TMAO
monomethylamine
dimethylamine
trimethylamine
anaerobic ammonia oxidation
anaerobic ammonia oxidation
aerobic ammonia oxidation
nitrite oxidation
sulfur oxidation
thiosulfate oxidation
iron oxidation
hydrogenotrophic from H2/CO2
oxygenic photosystem I
oxygenic photosystem II
cytochrome b6f complex
photosynthetic electron transport
photosynthetic reaction center
anoxygenic photosystem I
anoxygenic photosystem II
chlorophyll a
bacteriochlorophyll a
bacteriochlorophyll b
bacteriochlorophyll c
bacteriochlorophyll cs
bacteriochlorophyll d
bacteriochlorophyll e
bacteriochlorophyll g
diaponeurosporene
neurosporene
lycopene
betacarotene
gammacarotene
chlorobactene
betaisorenieratene
isorenieratene
okenone
spirilloxanthin
spheroidenone
OH-spheroidenone
allophycocyanin
phycocyanin
phycoerythrocyanin
phycoerythrin
chlorophyll a/b binding light-harvesting protein
GENOME DERIVED FEATURES
Fermentation Pathways
Oxidative Pentose Phosphate Pathway
Nonoxidative Pentose Phosphate Pathway
Glyoxylate Cycle
TCA Cycle
Electron Transport Chain
ETC Complex I
ETC Complex II
ETC Complex III
ETC Complex IV
Anaerobic Respiration Pathways
Inorganic Nutrient Oxidation Pathways
chlorophyll a synthesis pathway
oxygenic photosystem I pathway
oxygenic photosystem II pathway
cytochrome b6f complex
photosynthetic electron photosynthetic reaction center
anoxygenic photosystem I pathway
anoxygenic photosystem II pathway
Pigment Synthesis Pathways