

COASTAL PRAIRIE RESTORATION

Choosing Plants for Success

STUDY
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STUDENT RESEARCH

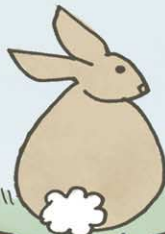
CNGA Grassland Research Awards for Student Scholarship Winner, 2019 & 2020

JUSTIN LUONG

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THE RESEARCHERS
WANTED to know IF
SPECIFIC Functional Traits
AND Phylogenetic Distance
COULD IMPROVE RESTORATION
Success



FUNCTIONAL TRAITS
ARE CHARACTERISTICS
THAT HELP PLANTS SURVIVE
BECAUSE THEY ARE RELATED
TO SURVIVAL AND
REPRODUCTION

TRAITS
Studied:

NOT
LOBED



HIGHLY
LOBED

LOBEDNESS



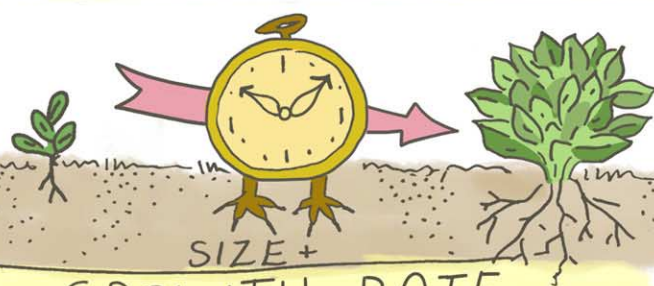
CARBON
TO
NITROGEN
RATIO

C:N

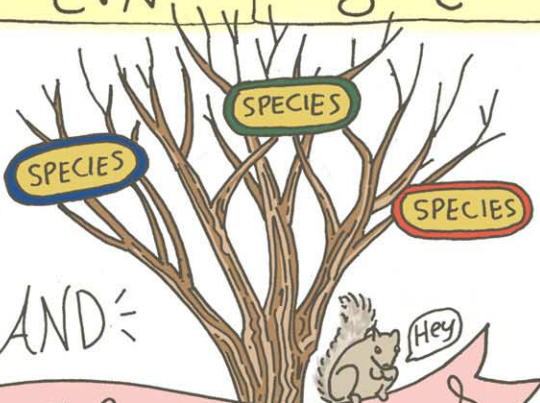


PROXY FOR
WATER USE
EFFICIENCY

$\delta^{13}C$



GROWTH RATE



AND:

evolutionary relationships

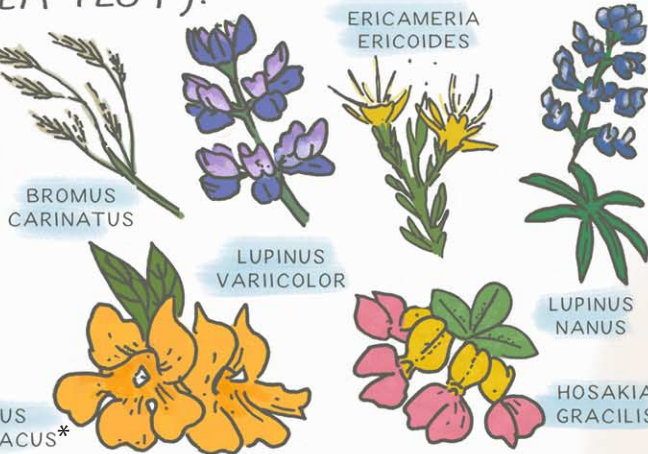
PHYLOGENETIC DISTANCE

SANTA CRUZ

THIS AREA IS PRETTY DEGRADED. IT HAD BEEN USED FOR GRAZING THEN AGRICULTURE



RESEARCHERS CREATED A FIELD DROUGHT EXPERIMENT AT THE *Younger Lagoon Reserve*. THEY CONSTRUCTED RAIN OUT SHELTERS WHICH KEPT OUT 60% OF RAINFALL. THERE WERE 5 SHELTERS + 5 AMBIENT WATER PLOTS.



ALL PLOTS (DROUGHT + AMBIENT) WERE MOWED and PLANTED with 12 NATIVE SPECIES. PLOTS were WEEDED in Year 1 and ASSESSED in Years 3+4.



EXPERIMENTAL DESIGN



*Mimulus is now *Diplacus aurantiacus*

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2665-
Leaf
Samples
Collected

DROUGHT RELATED TRAITS WERE
measured FROM EACH LEAF
SAMPLE. PLOTS were ASSESSED
for PLANT COVER.

THE STUDY
RESULTS SUGGEST
THAT THE SELECTED
NATIVE SPECIES ARE
BETTER Adapted TO
DROUGHT THAN THE
Invasives IN THE
PLOTS.

Ambient Rainfall

GREATER ABUNDANCE
OF INVASIVE
NONNATIVE GRASSES

Drought Treatment

GREATER ABUNDANCE
OF NATIVE GRASSES
AND FORBS

PLANTS WITH THESE TRAITS
WERE MORE SUCCESSFUL:

MORE LOBED
OVERALL

SLOWER
GROWTH RATE
OVERALL

HIGHER CARBON
TO NITROGEN
RATIO
IN AMBIENT
WATER PLOTS

C:N

$\delta^{13}\text{C}$

HIGHER DELTA
CARBON-13
IN
DROUGHT PLOTS

SPECIES
more
CLOSELY
RELATED
to
NEIGHBORS

were
LESS
LIKELY
to
DIE

AS the CLIMATE CHANGES PERIODS OF
DROUGHT MAY INCREASE. UNDERSTANDING
Functional Traits + Phylogenetic
Distance CAN HELP INCREASE Native
COVER in FUTURE Restoration PROJECTS.