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Article:
Quain, MD, Makgopa, ME, Márquez-García, B et al. (2014) Ectopic phytocystatin expression leads to enhanced drought stress tolerance in soybean (Glycine max) and Arabidopsis thaliana through effects on strigolactone pathways and can also result in improved seed traits. Plant Biotechnology Journal, 12 (7). 903 - 913. ISSN: 1467-7644

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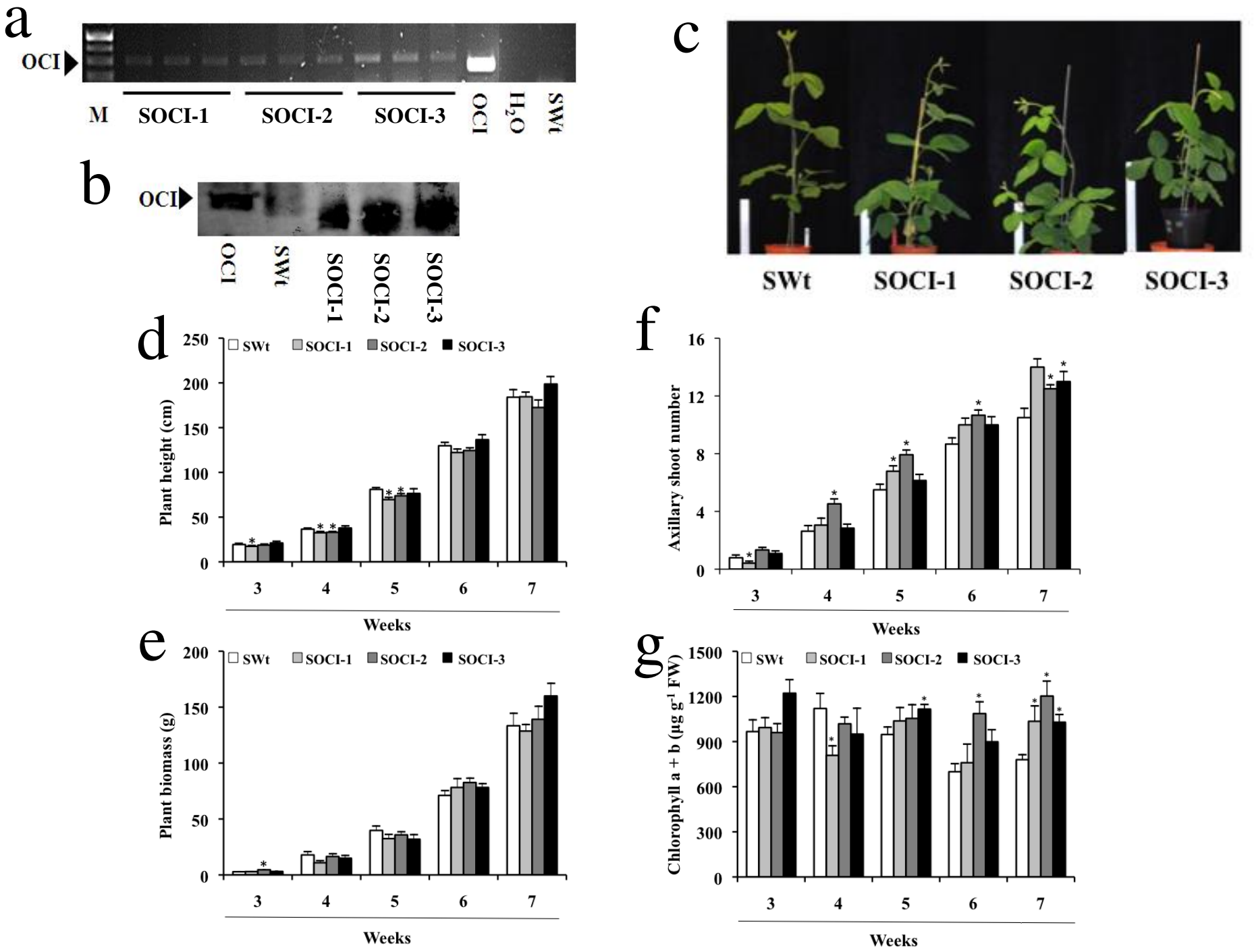
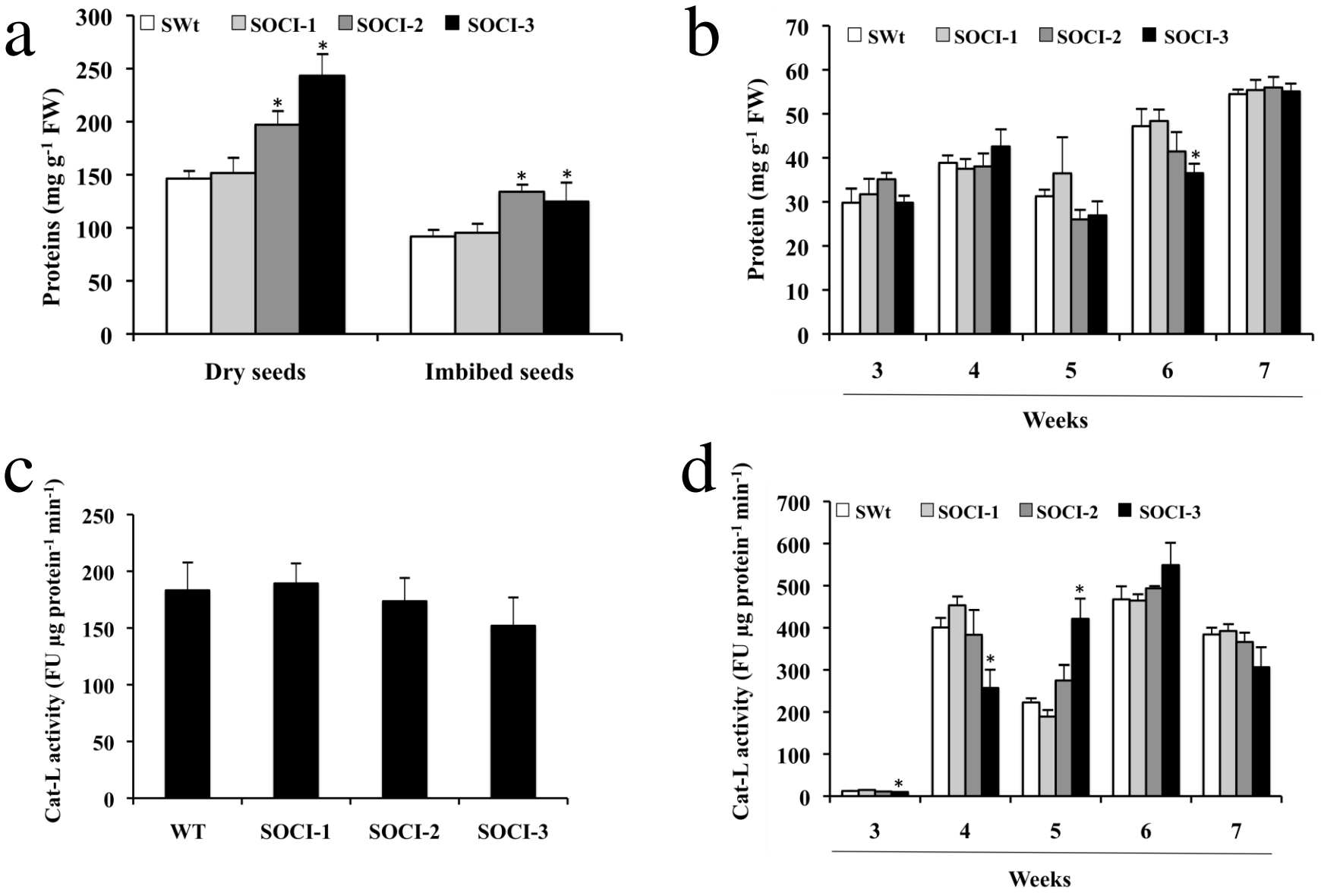
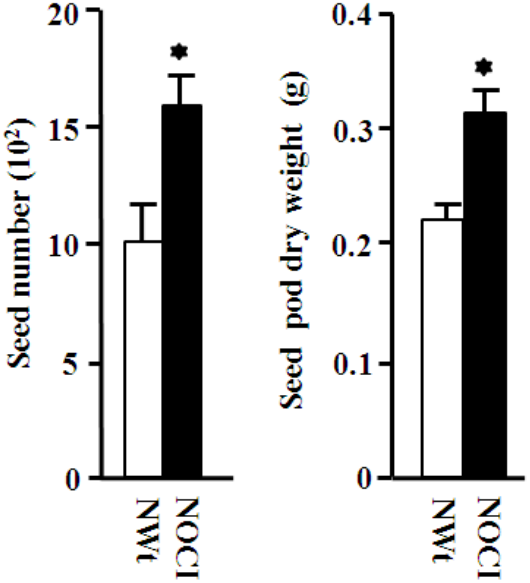

a
OCI
M
SOCI-1
SOCI-2
SOCI-3
OCI
H2O
SWt
b
OCI
OCI
SWt
SOCI-1
SOCI-2
SOCI-3
c
SWt
SOCI-1
SOCI-2
SOCI-3
d
Plant height (cm)
SWt
SOCI-1
SOCI-2
SOCI-3
Weeks
e
Plant biomass (g)
SWt
SOCI-1
SOCI-2
SOCI-3
Weeks
f
Axillary shoot number
Weeks
g
Chlorophyll a + b (µg g-1 FW)
SWt
SOCI-1
SOCI-2
SOCI-3
Weeks


a
SWt
SOCI-1
SOCI-2
SOCI-3
Proteins (mg g-1 FW)
300
250
200
150
100
50
0
Dry seeds
Imbibed seeds
b
Protein (mg g-1 FW)
70
60
50
40
30
20
10
0
3
4
5
6
7
Weeks
c
Cat-L activity (FU µg protein-1 min-1)
250
200
150
100
50
0
WT
SOCI-1
SOCI-2
SOCI-3
d
Cat-L activity (FU µg protein-1 min-1)
700
600
500
400
300
200
100
0
3
4
5
6
7
Weeks

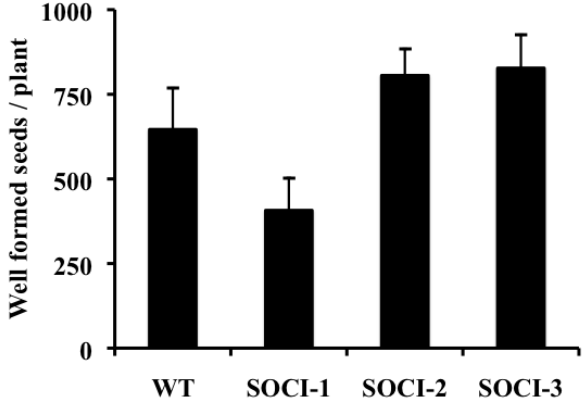
a

NWt
NOCI
2 cm

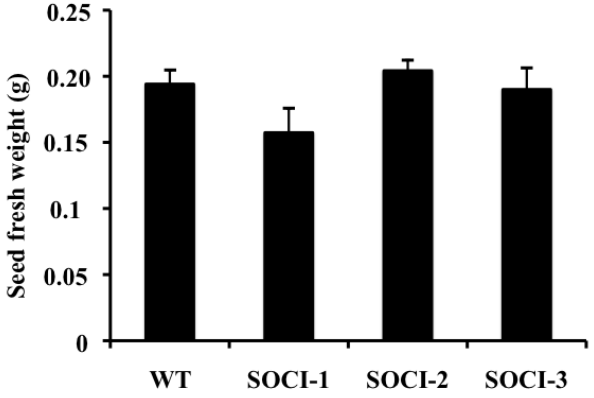
b


Seed number (10²)
20
15
10
5
0
*
NWt
NOCI
Seed pod dry weight (g)
0.4
0.3
0.2
0.1
0
*
NWt
NOCI

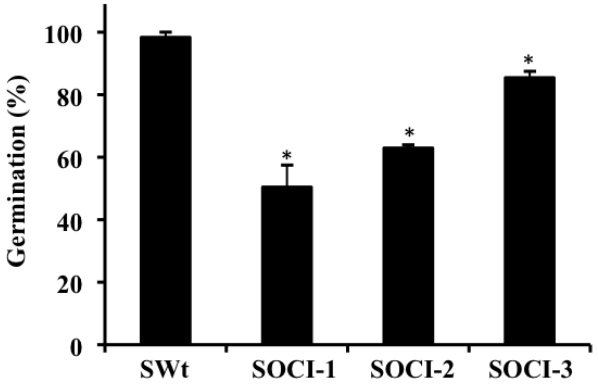
c


Well formed seeds / plant
1000
750
500
250
0
WT
SOCI-1
SOCI-2
SOCI-3

d


Seed fresh weight (g)
0.25
0.20
0.15
0.1
0.05
0
WT
SOCI-1
SOCI-2
SOCI-3

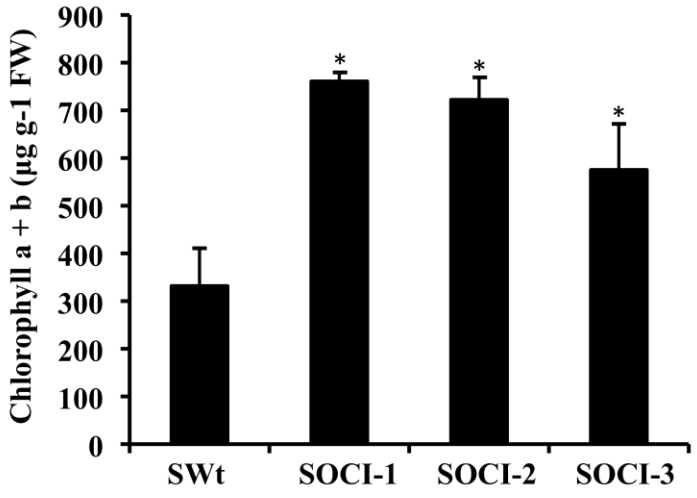
e


Germination (%)
100
80
60
40
20
0
*
*
*
SWt
SOCI-1
SOCI-2
SOCI-3

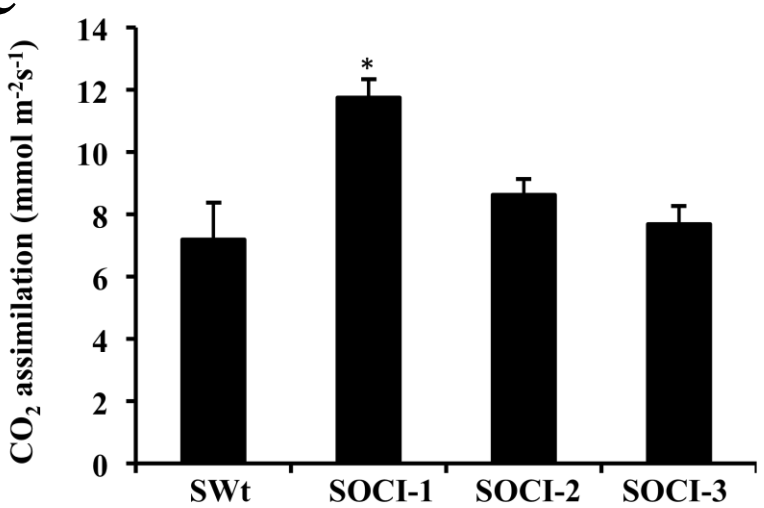
a

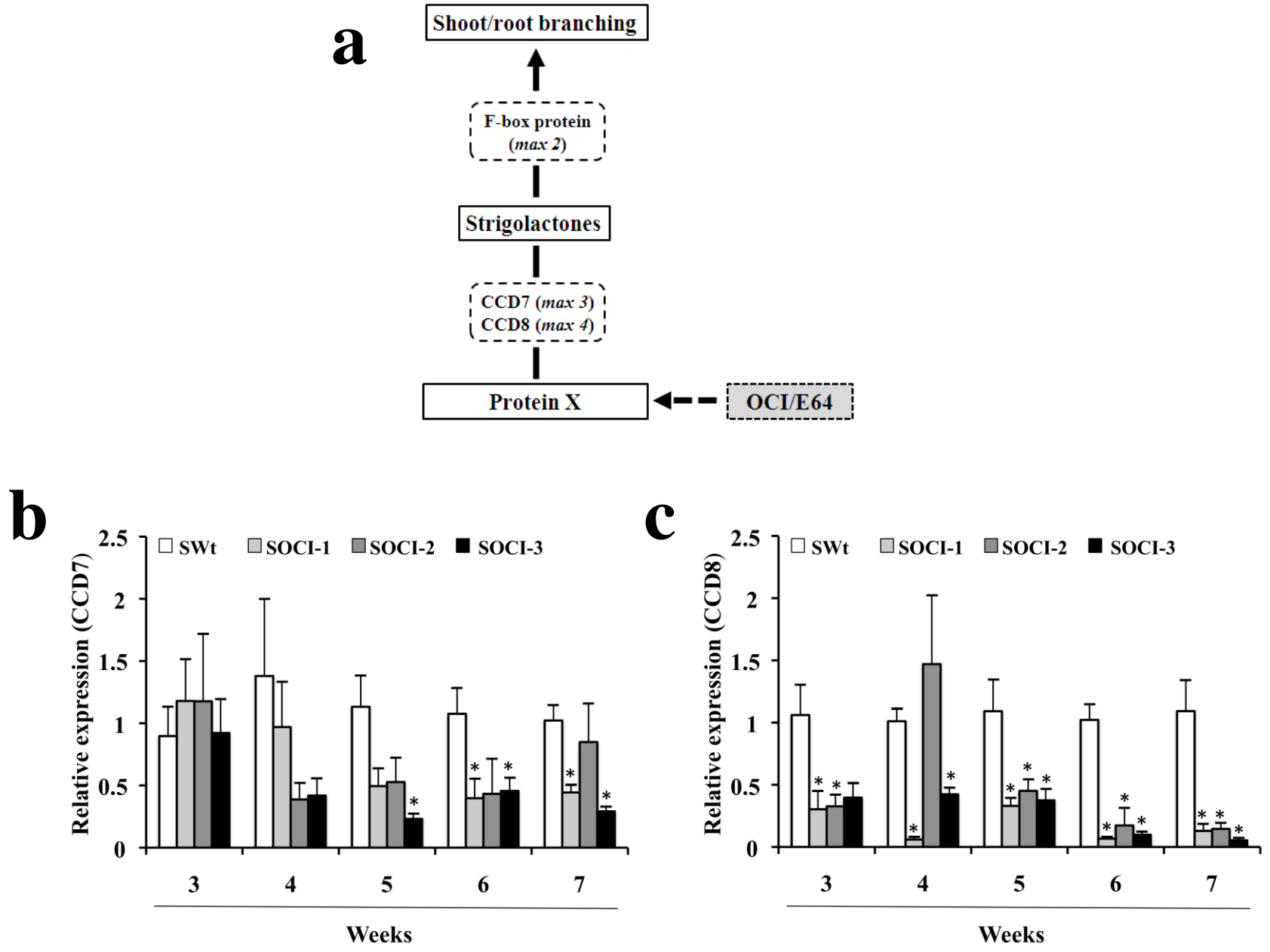
SWt
SOCI-1
SOCI-2
SOCI-3

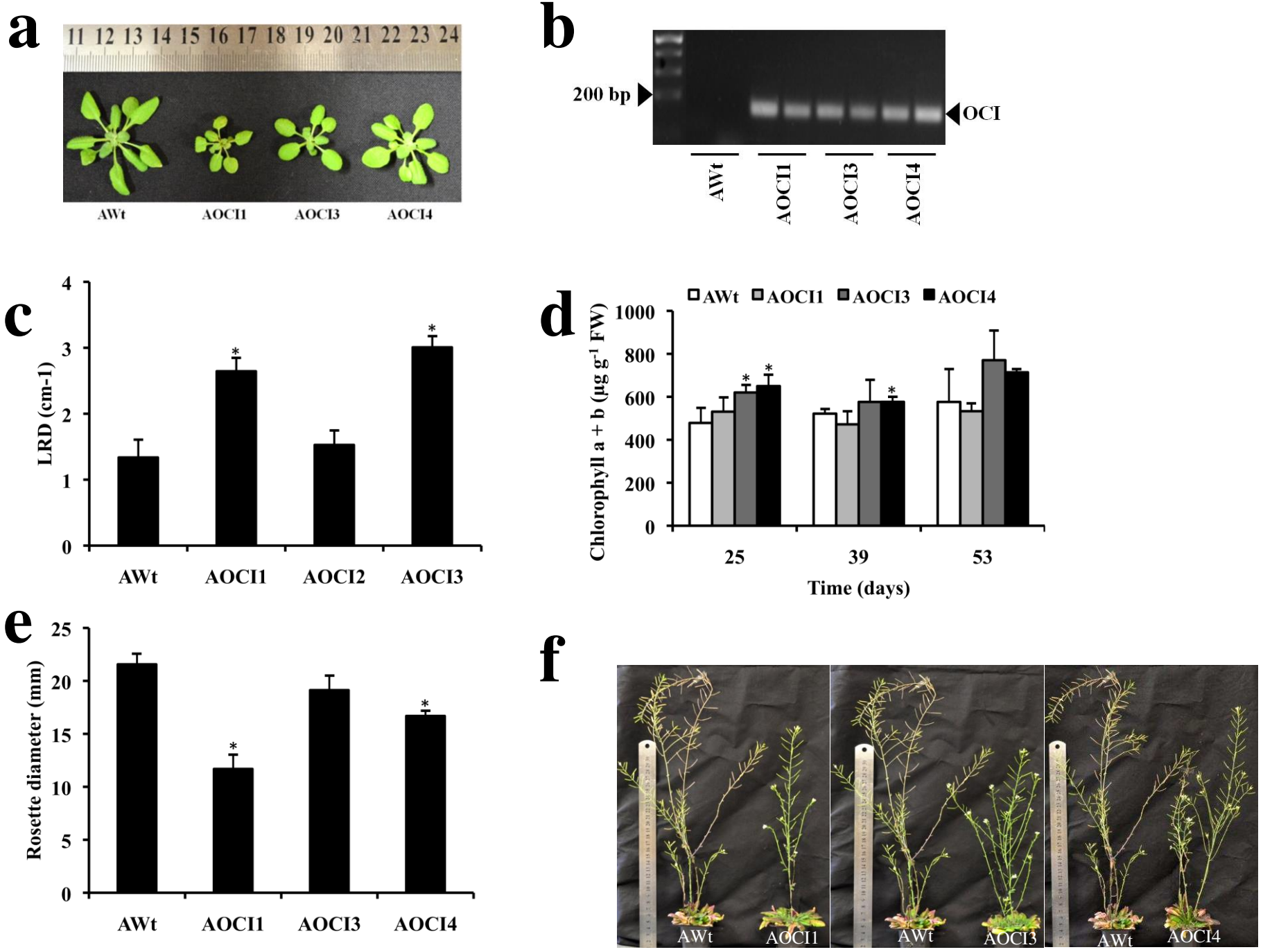
b

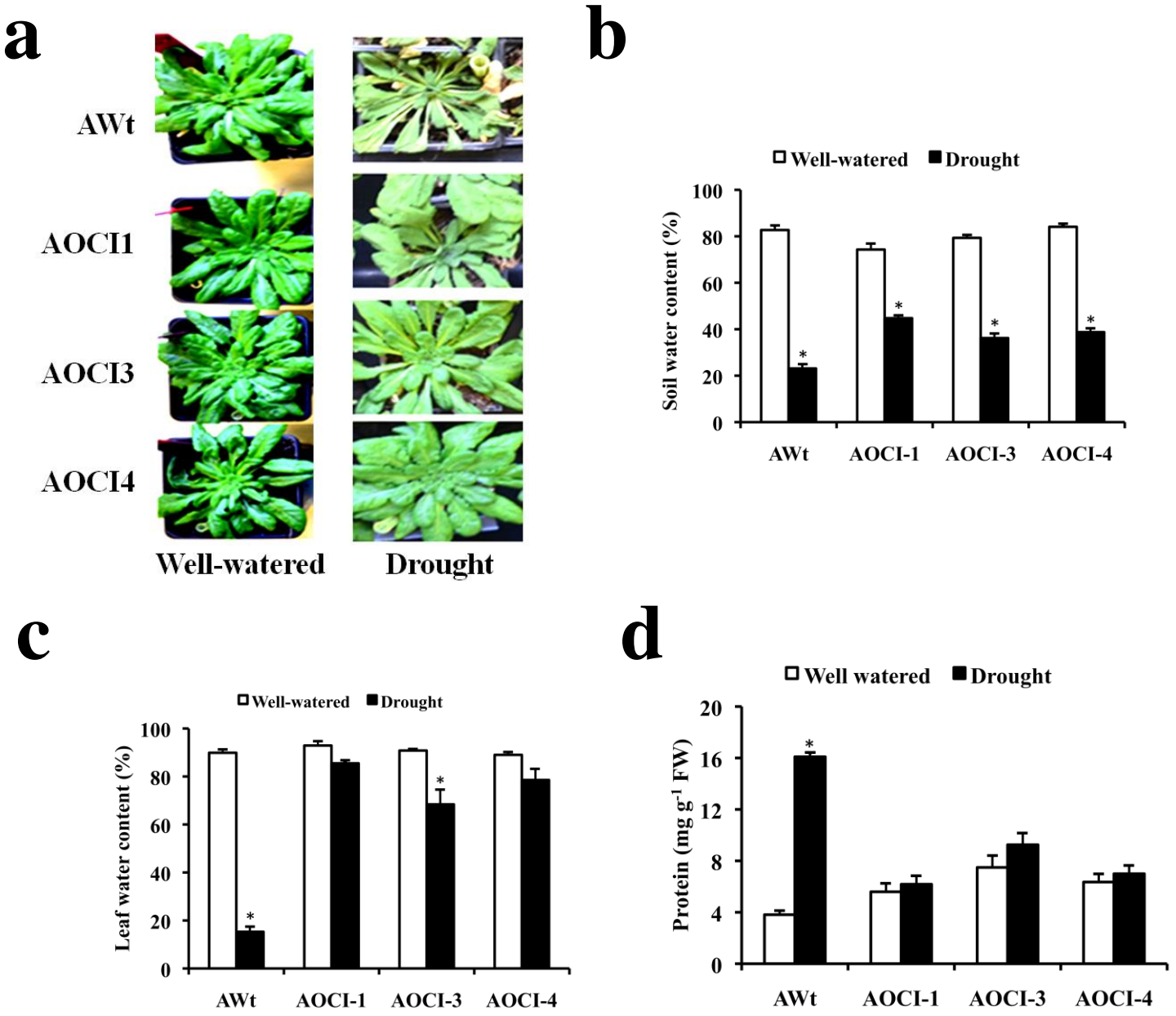

Chlorophyll a + b (µg g-1 FW)
900
800
700
600
500
400
300
200
100
0
*
*
*
SWt
SOCI-1
SOCI-2
SOCI-3

c


CO2 assimilation (mmol m-2s-1)
14
12
10
8
6
4
2
0
*
SWt
SOCI-1
SOCI-2
SOCI-3


a
Shoot/root branching
F-box protein
(max 2)
Strigolactones
CCD7 (max 3)
CCD8 (max 4)
Protein X
OCI/E64
b
SWt
SOCI-1
SOCI-2
SOCI-3
Relative expression (CCD7)
2.5
2
1.5
1
0.5
0
3
4
5
6
7
Weeks
c
SWt
SOCI-1
SOCI-2
SOCI-3
Relative expression (CCD8)
2.5
2
1.5
1
0.5
0
3
4
5
6
7
Weeks

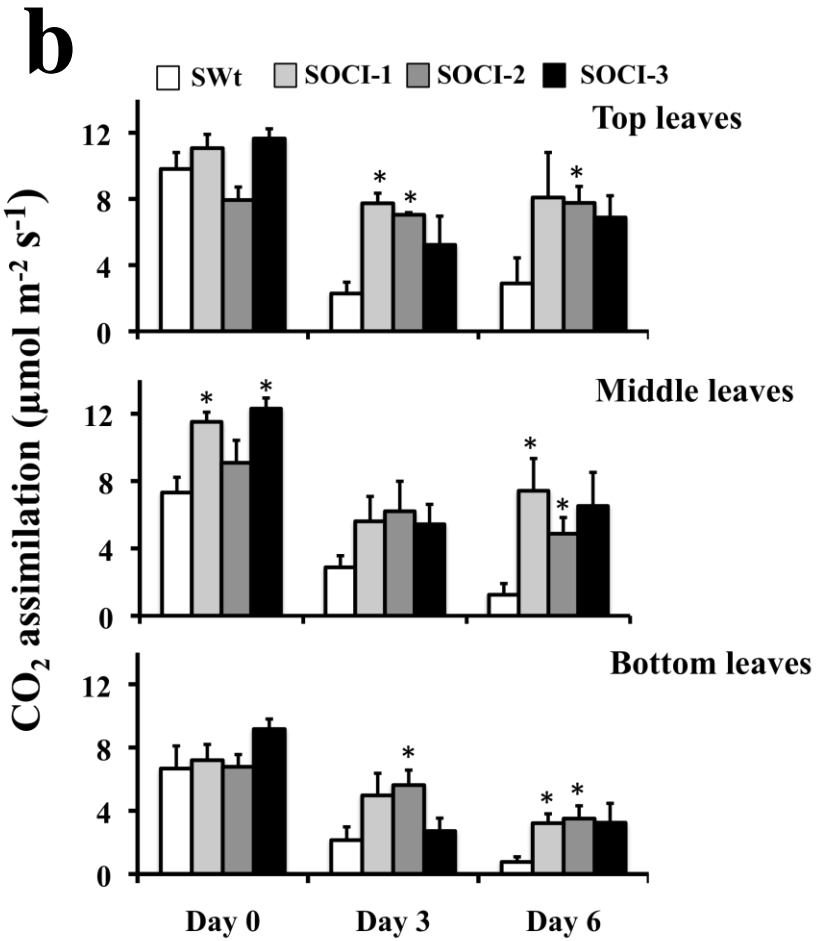

a
11 12 13 14 15 16 17 18 19 20 21 22 23 24
AWt
AOCI1
AOCI3
AOCI4
b
200 bp
OCI
AWt
AOCI1
AOCI3
AOCI4
c
LRD (cm-1)
0
1
2
3
4
AWt
AOCI1
AOCI2
AOCI3
d
AWt
AOCI1
AOCI3
AOCI4
Chlorophyll a + b (µg g-1 FW)
0
200
400
600
800
1000
25
39
53
Time (days)
e
Rosette diameter (mm)
0
5
10
15
20
25
AWt
AOCI1
AOCI3
AOCI4
f
AWt
AOCI1
AWt
AOCI3
AWt
AOCI4


a
AWt
AOCI1
AOCI3
AOCI4
Well-watered
Drought
b
Well-watered
Drought
Soil water content (%)
100
80
60
40
20
0
AWt
AOCI-1
AOCI-3
AOCI-4
c
Well-watered
Drought
Leaf water content (%)
100
80
60
40
20
0
AWt
AOCI-1
AOCI-3
AOCI-4
d
Well watered
Drought
Protein (mg g-1 FW)
20
16
12
8
4
0
AWt
AOCI-1
AOCI-3
AOCI-4

a

SWt SOCI-1

b


SWt
SOCI-1
SOCI-2
SOCI-3
Top leaves
Middle leaves
Bottom leaves
CO_2 assimilation (μmol m^{-2} s^{-1})
0
4
8
12
Day 0
Day 3
Day 6