Effectiveness of Dispersants on Oil Spills for Coastal Habitat Protection as a Function of Types of Oil and Dispersant

Qianxin Lin and Irving A. Mendelssohn

Wetland Biogeochemistry Institute
School of the Coast and Environment
Louisiana State University
Baton Rouge, LA 70803, USA

Objectives

Compare and evaluate the effectiveness of “recently marketed” dispersants applied to different oils for coastal marsh habitat protection

1. Effect and efficacy of simulated nearshore application of different dispersants to fuel oil for coastal habitat protection

2. Effectiveness of simulated nearshore application of different dispersants to crude oil for coastal habitat protection

NCP Product Schedule-Listed Dispersants:

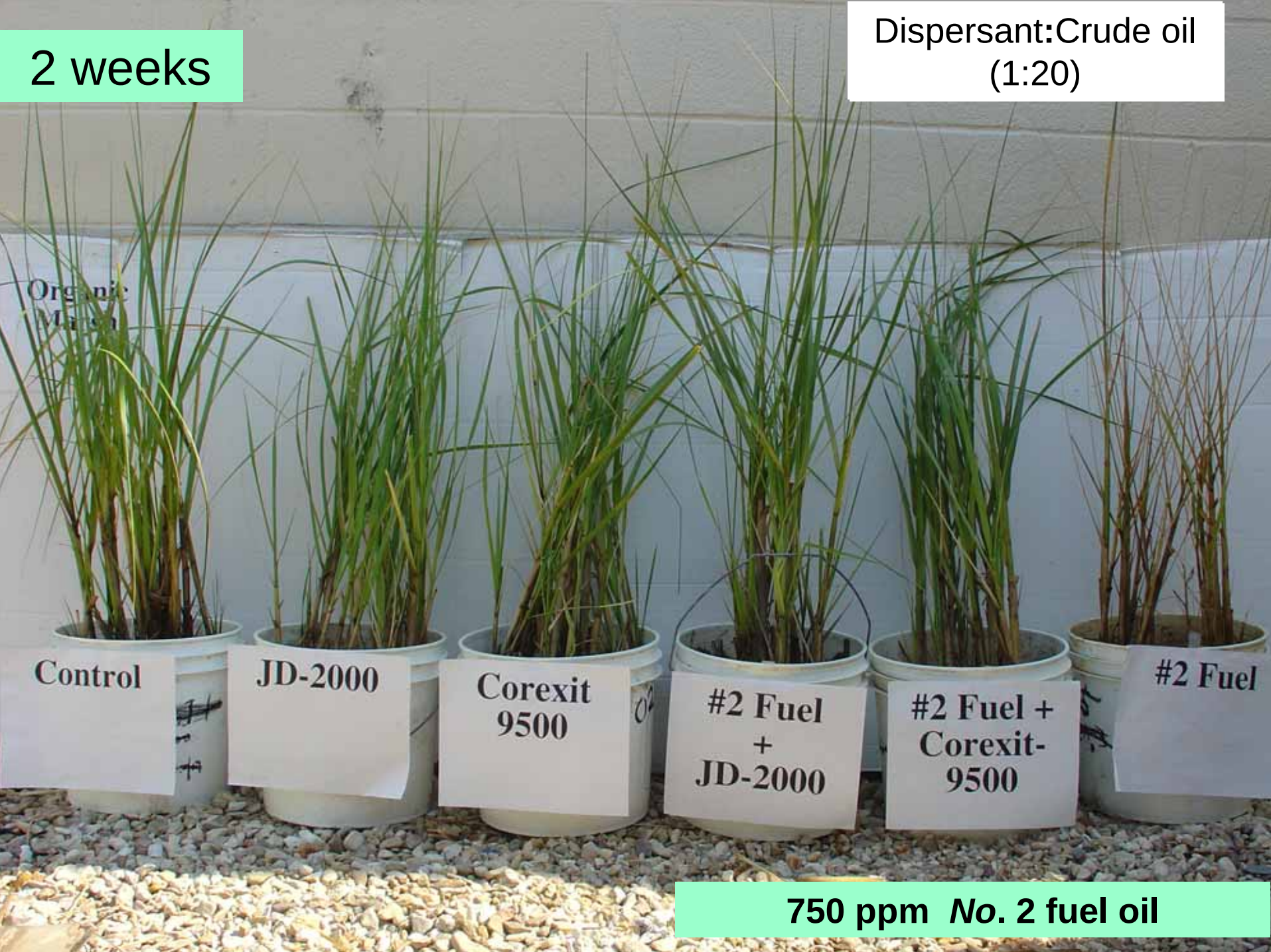
- **Corexit 9500 (Exxon):**
  Effectiveness: 45.5% for SLC (swirling flask)
  $LC_{50\text{-}48hr}$: 32.2 ppm for *Mysidopsis bahia*

- **JD-2000 (Vopak):**
  Effectiveness: 84.1% for SLC (swirling flask)
  $LC_{50\text{-}48hr}$: 90.5 ppm for *Mysidopsis bahia*

1. Effect and efficacy of simulated nearshore application of dispersants to 750 ppm of *No. 2 fuel oil* for coastal habitat protection


750 ppm No.2 fuel oil
750 ppm No. 2 fuel oil + JD 2000
750 ppm No. 2 fuel oil + Corexit 9500

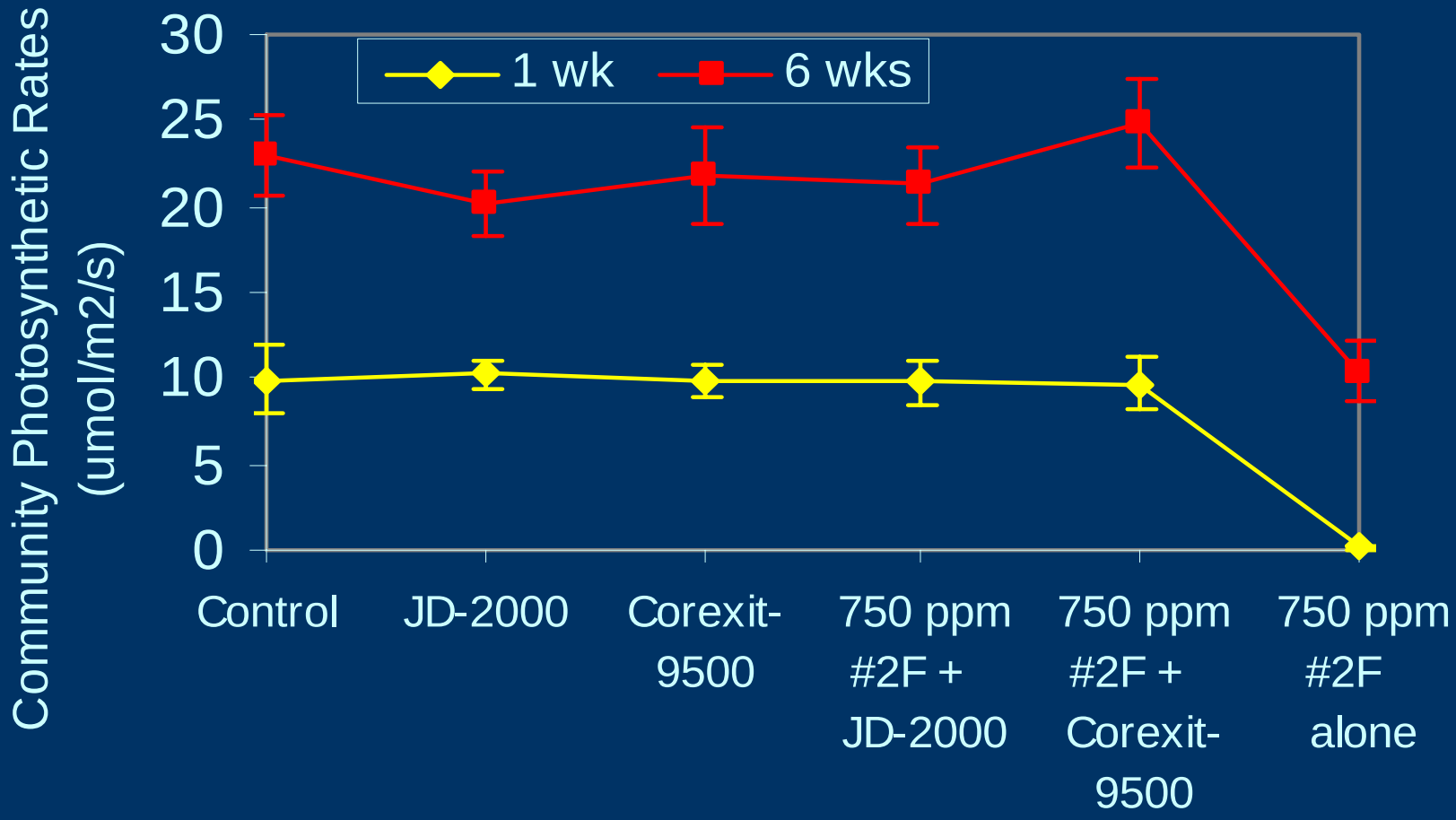

3
M2
FkM1
M1


2 weeks
Dispersant:Crude oil
(1:20)
Control
JD-2000
Corexit
9500
#2 Fuel
+
JD-2000
#2 Fuel +
Corexit-
9500
#2 Fuel
750 ppm *No*. 2 fuel oil

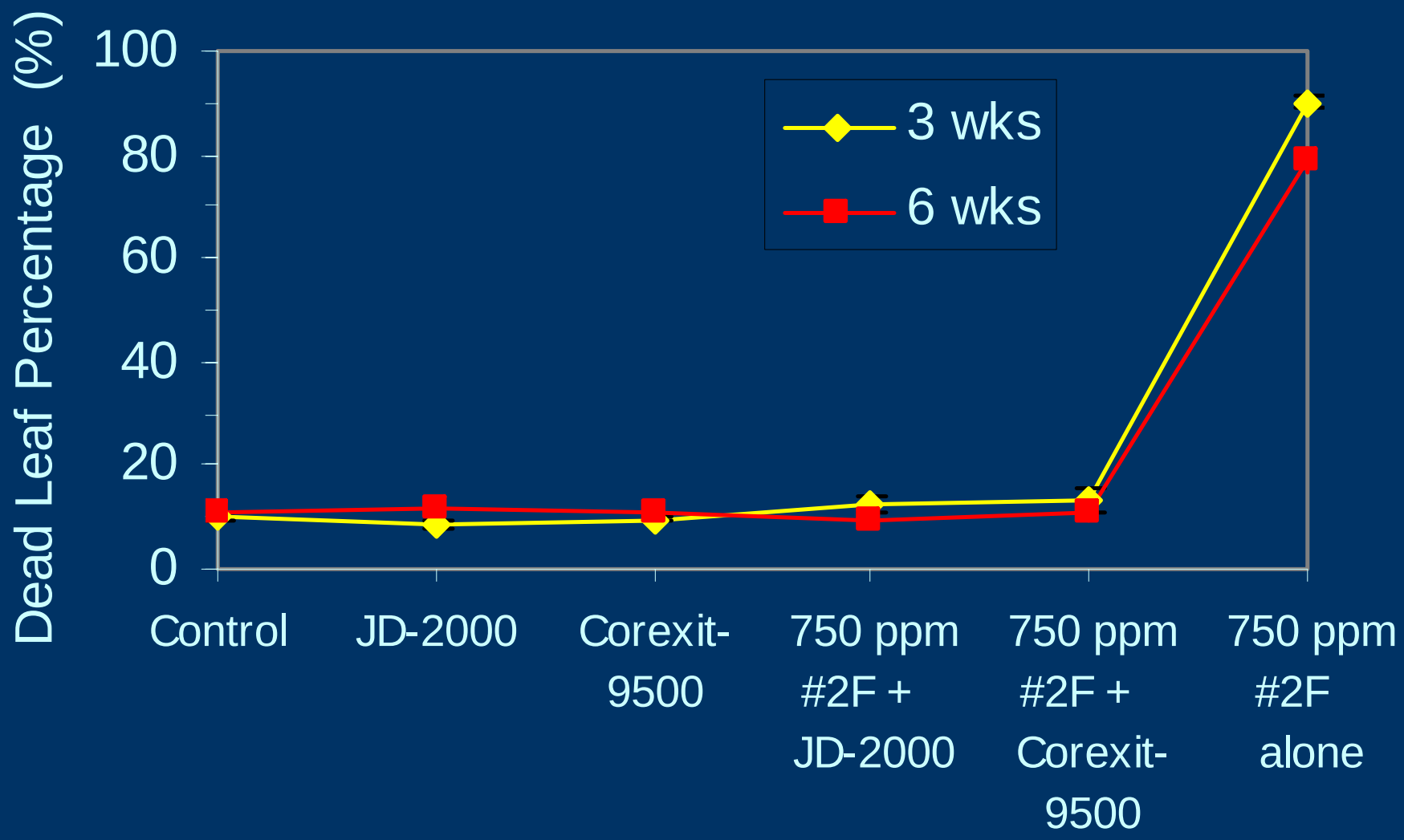

Control
JD-2000
Corexit 9500
JD-2000 + 750 ppm fuel
Corexit 9500 + 750 ppm fuel oil
750 ppm No. 2 fuel

Measurement for Community Photosynthetic Rates

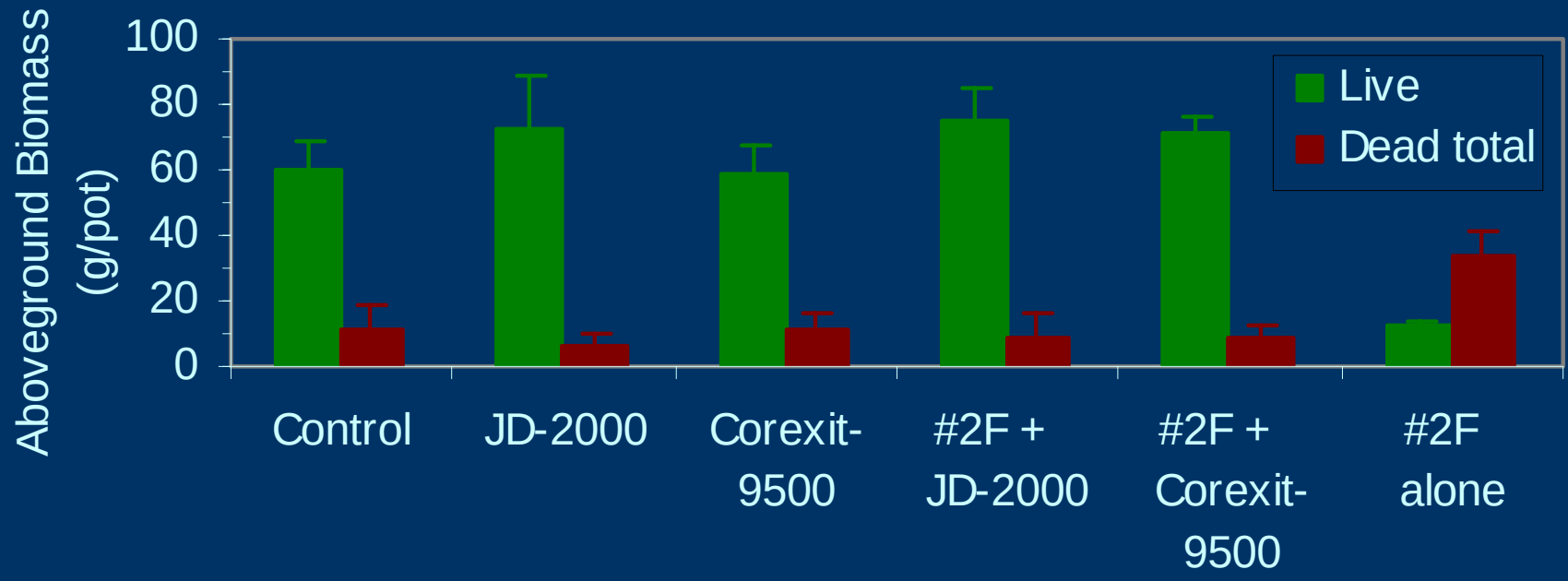
Community Photosynthetic Rates



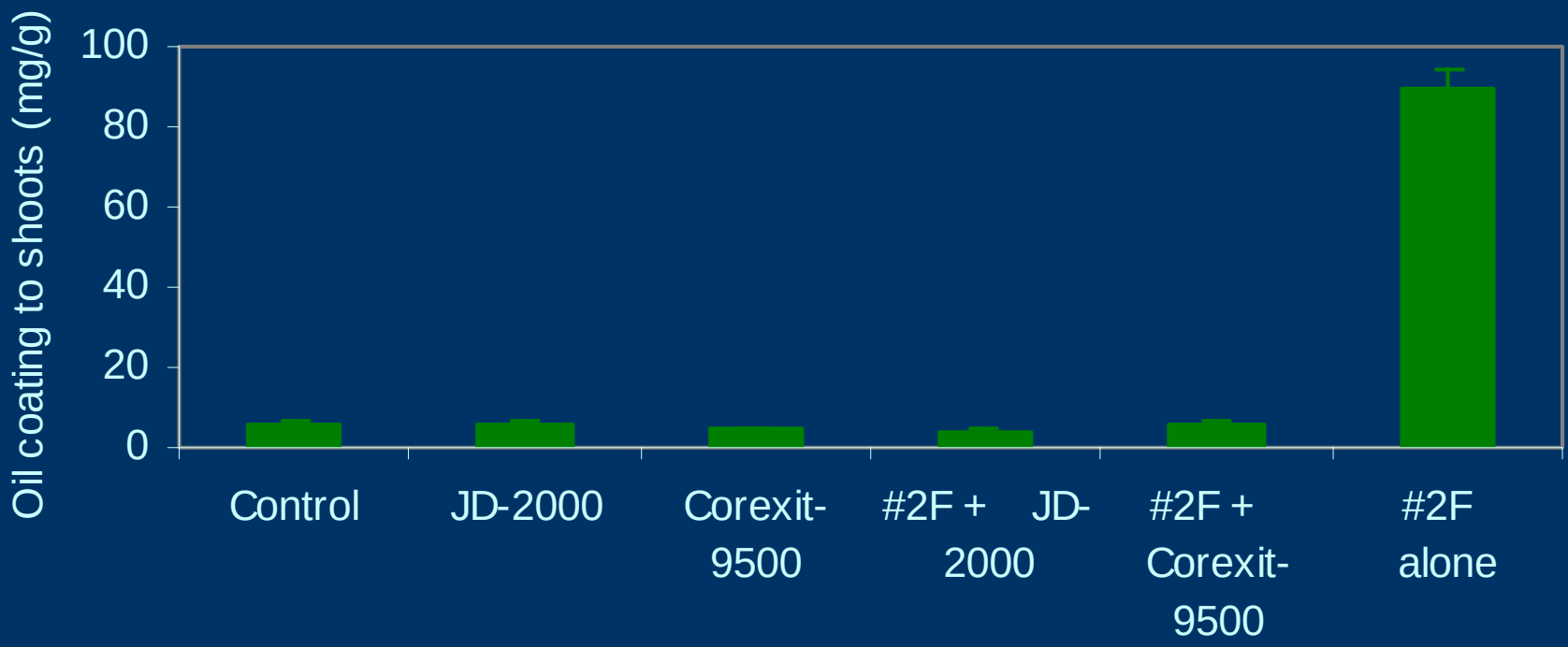
Mortality Rates



Aboveground Biomass (2 months)

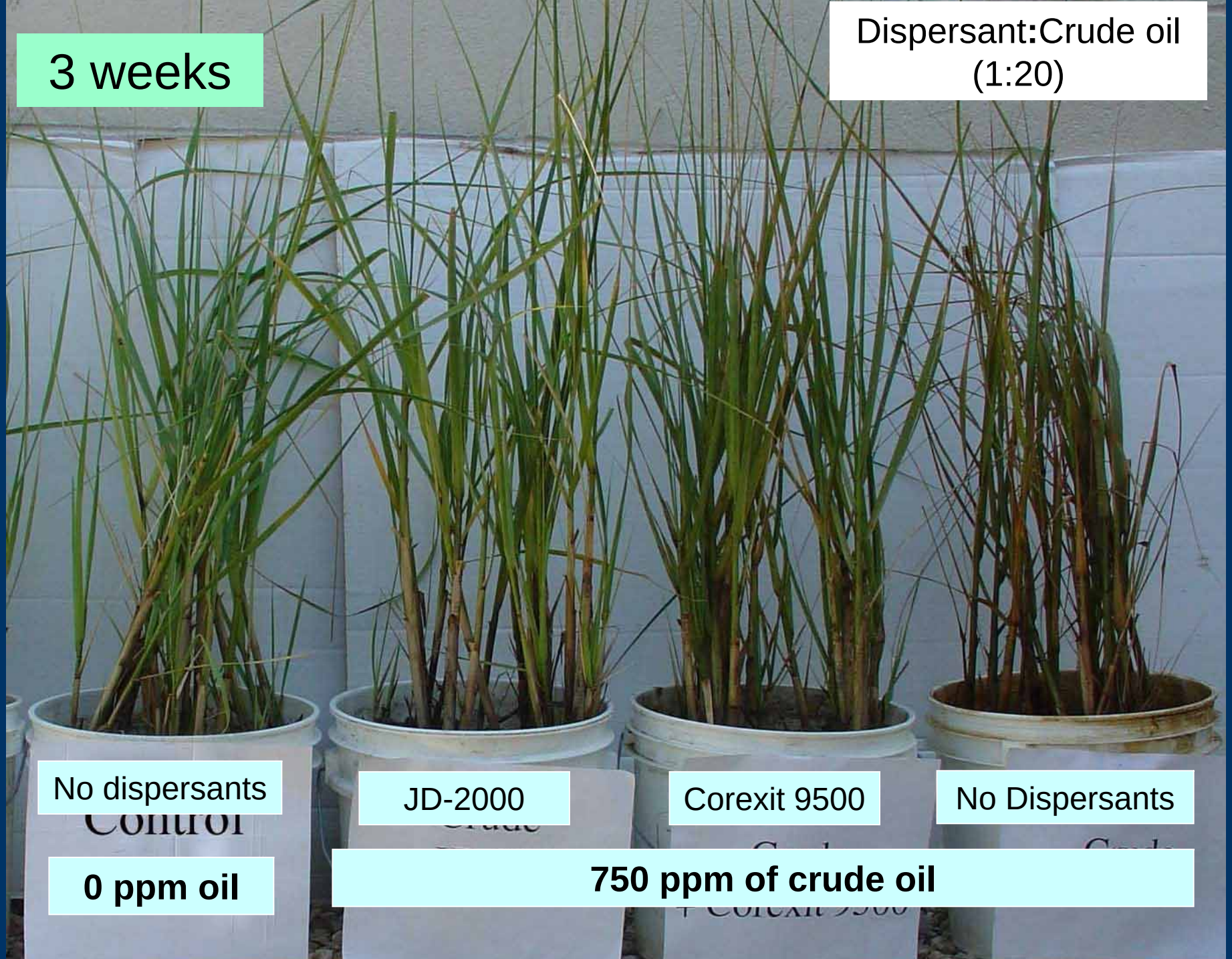


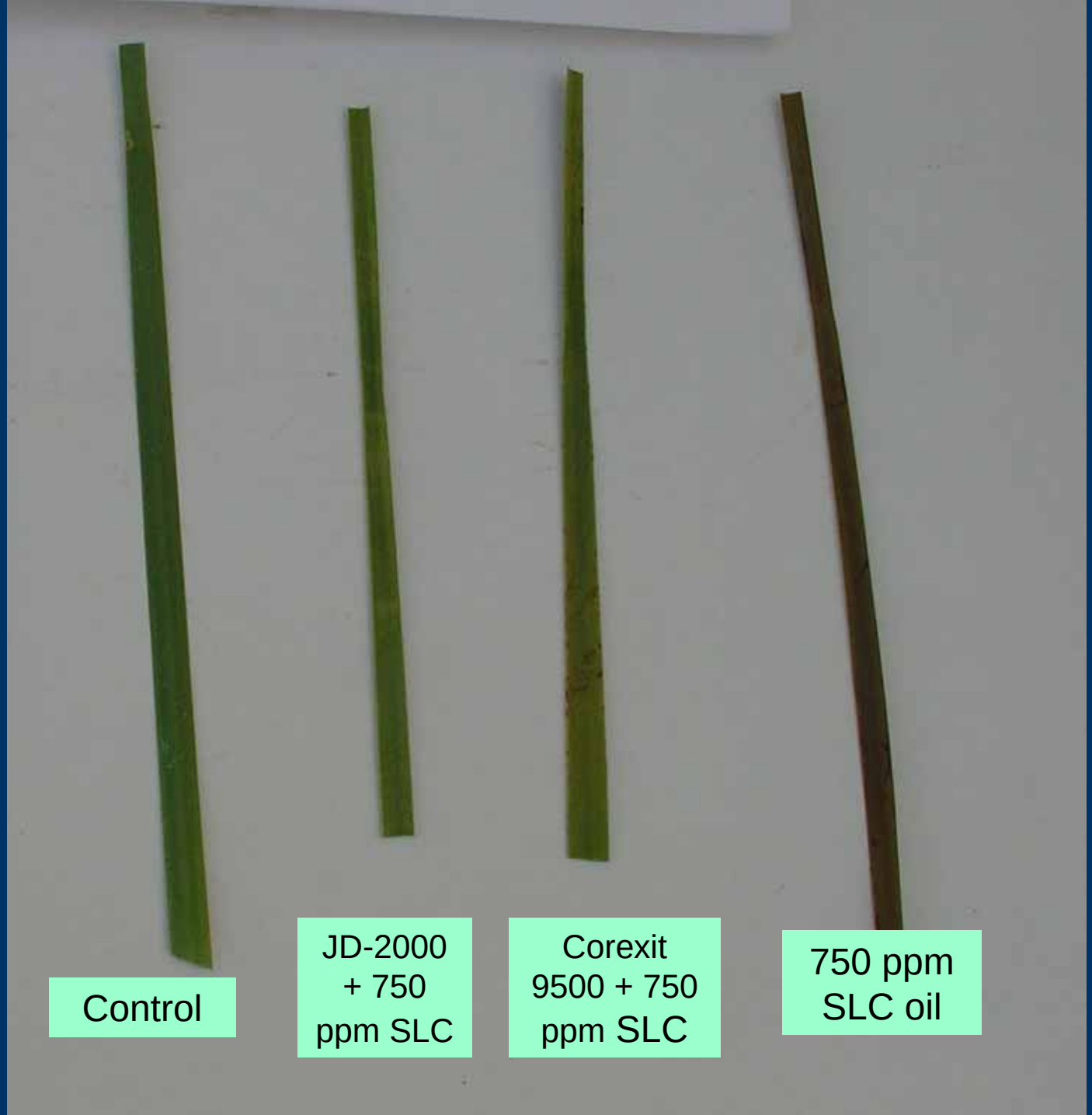
No. 2 fuel oil coating to shoots



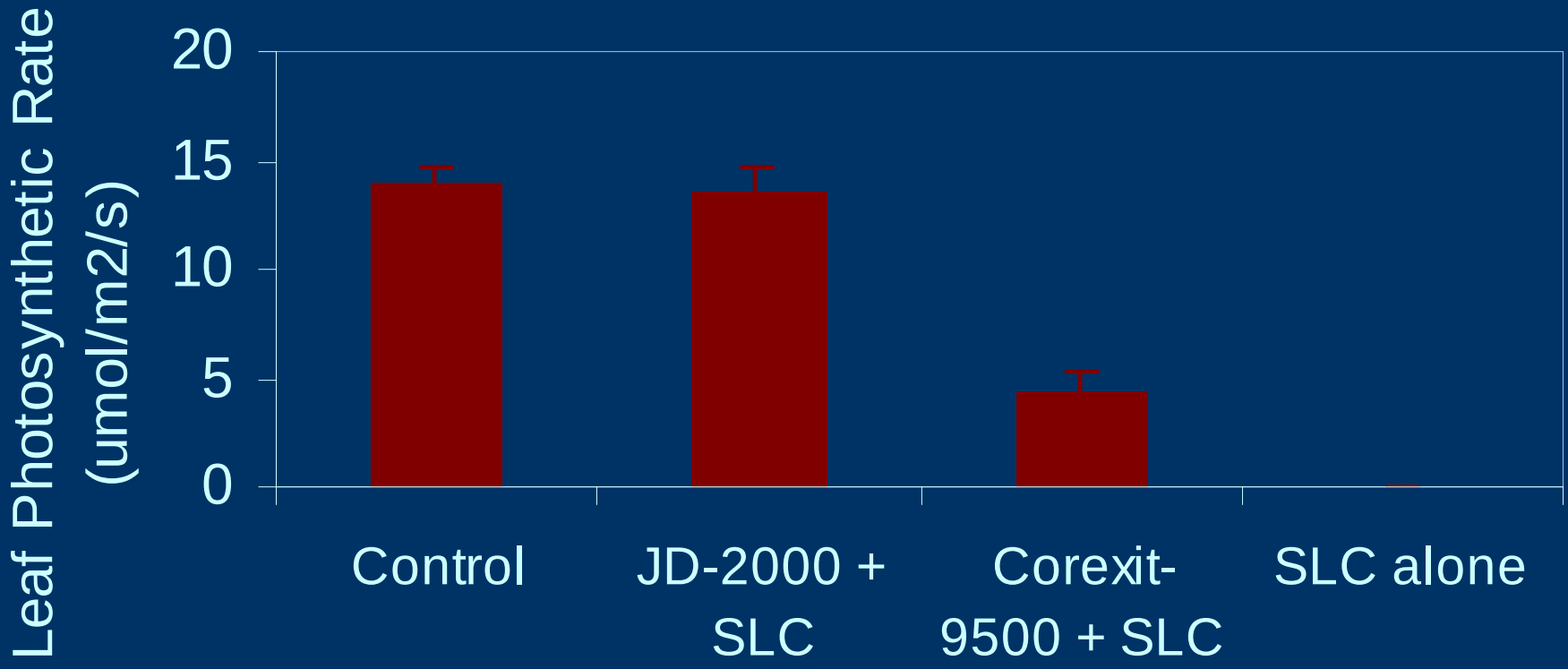
2. Effectiveness of simulated nearshore application of dispersants to 750 ppm of **SLC oil** for coastal habitat protection


750 ppm SLC oil
750 ppm SLC oil
+ JD 2000
750 ppm SLC oil
+ Corexit 9500

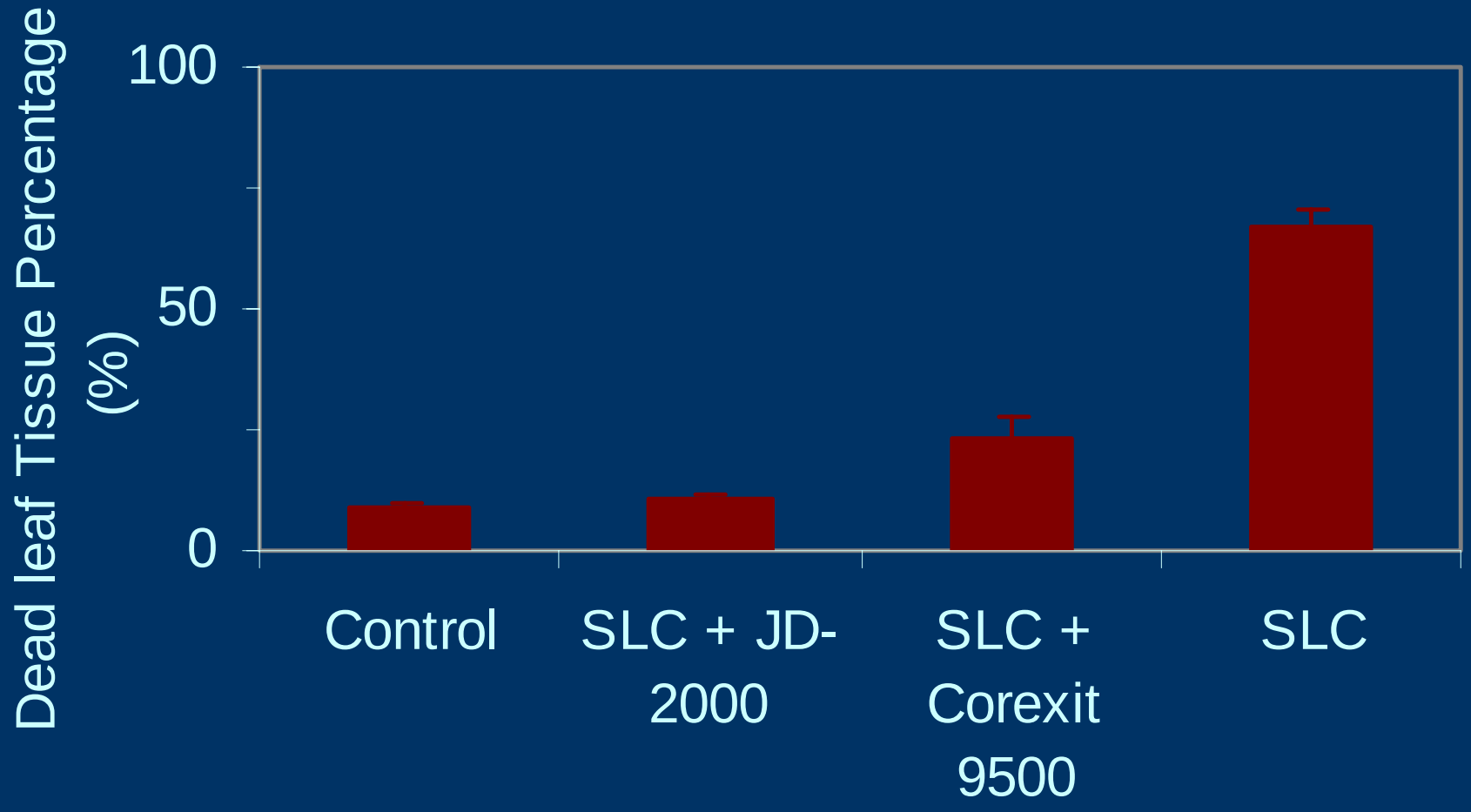

3 weeks
Dispersant:Crude oil (1:20)
No dispersants
JD-2000
Corexit 9500
No Dispersants
0 ppm oil
750 ppm of crude oil


Control
JD-2000 + 750 ppm SLC
Corexit 9500 + 750 ppm SLC
750 ppm SLC oil

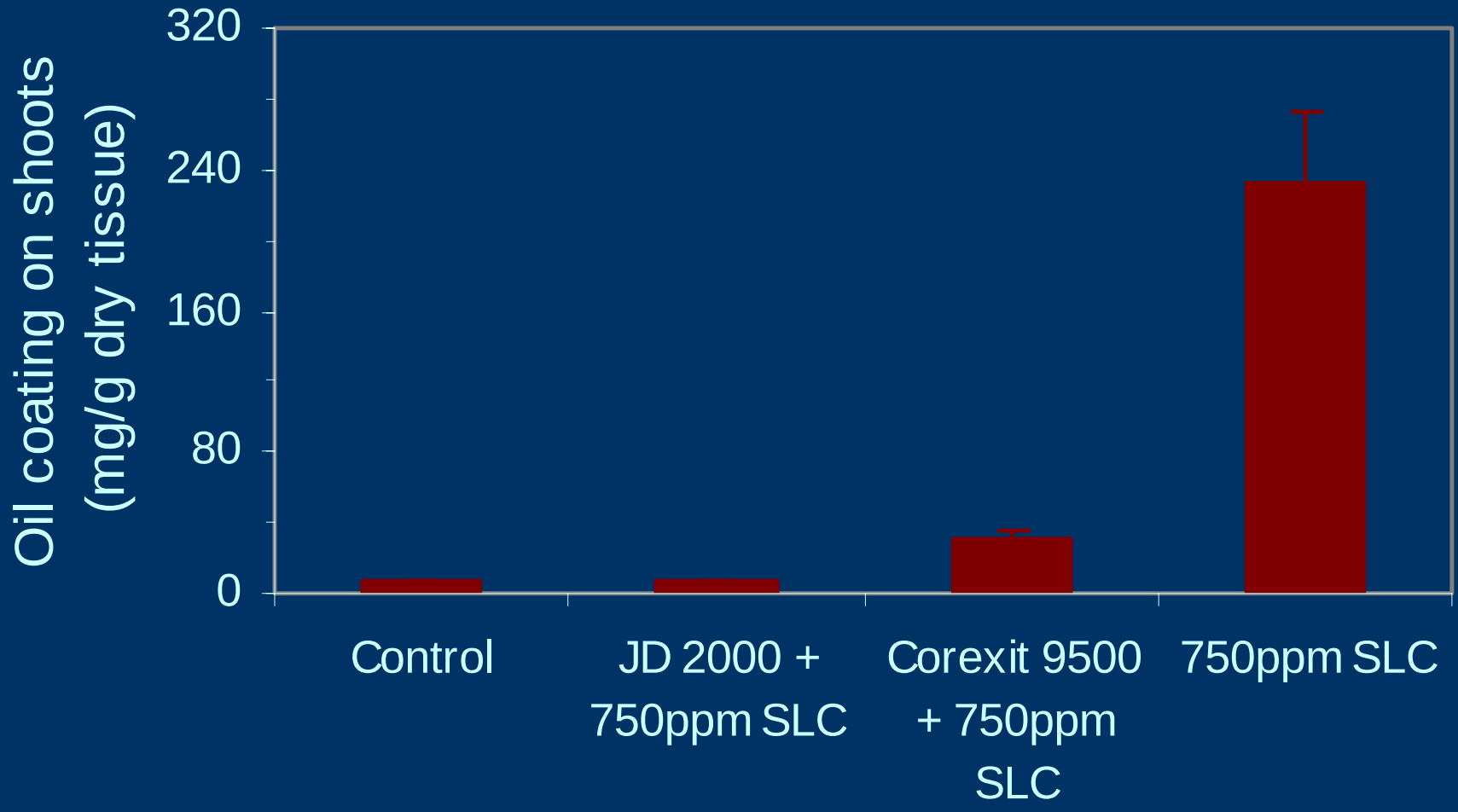
Effect of dispersants and 750 ppm of SLC on leaf photosynthetic rate (1 weeks)



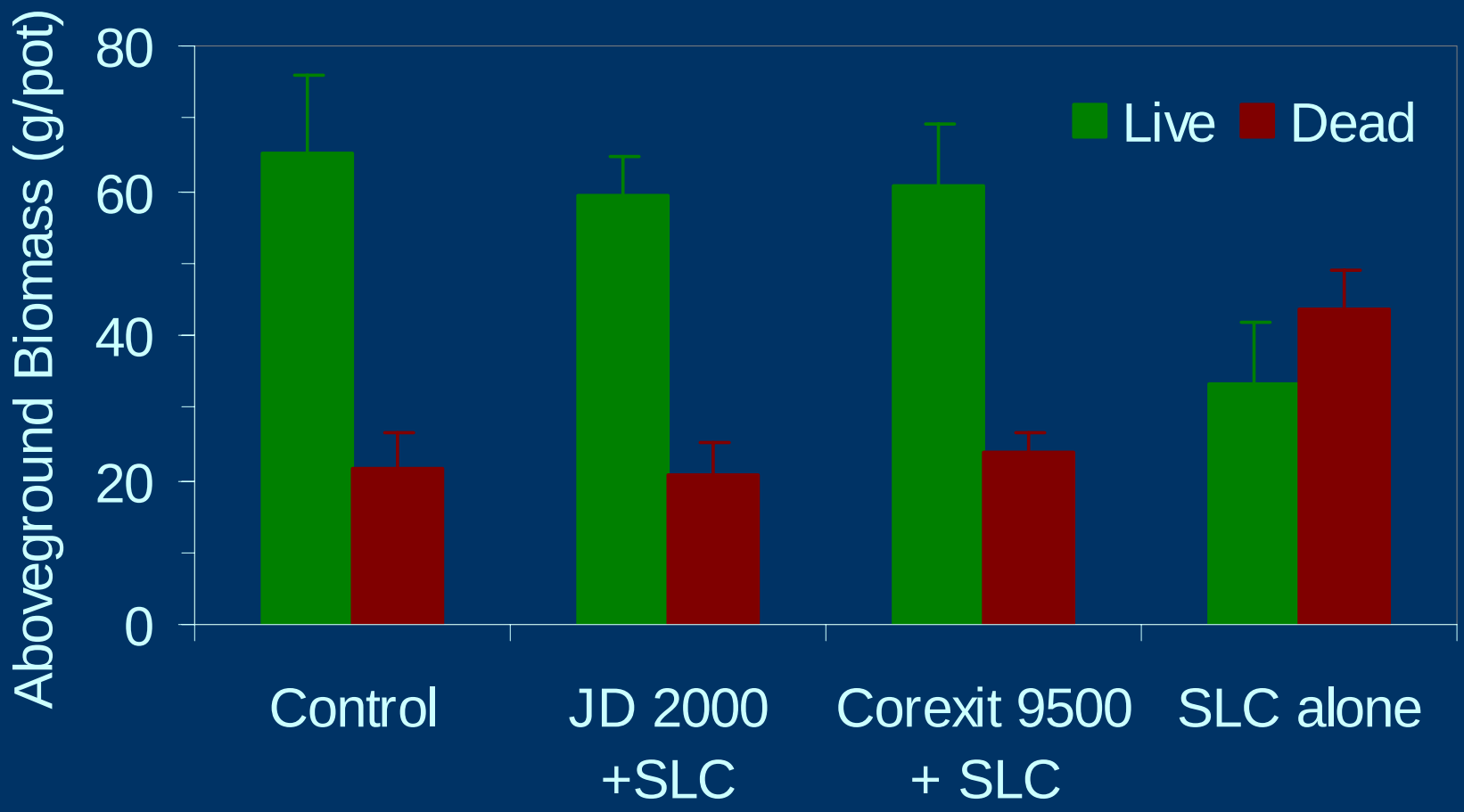
Effect of dispersants and 750 ppm of SLC on leaf mortality rates (3 weeks)



Effect of dispersants and 750 ppm of SLC oil coating to plant shoots



Effect of dispersants and 750 ppm of SLC on Aboveground Biomass (2 months)



Summary

- Simulated nearshore dispersant application to 750 ppm of *No.* 2 fuel oil indicated that both JD-2000 and Corexit 9500 greatly relieved the impacts of the oil to salt marsh plants. However, without dispersant application, impact of *No*. 2 fuel oil on *Spartina alterniflora* was significant.

Summary continued……

- Simulated nearshore dispersant application to 750 ppm of crude oil indicated that JD-2000 and Corexit-9500 also relieved impacts of the SLC oil to salt marsh plants. However, Corexit 9500 relieving the impacts of the SLC oil was not as effective as JD-2000. Without dispersant application, impacts of 750 ppm of SLC oil to plants were severe.

Summary continued……

- Dispersants relieving the impacts of oils to salt marsh plants appear to reduce the oil adhering to plant leaf surface. JD-2000 appears to be better than the Corexit-9500 in terms of relieving the impacts of SLC oil to plants. Dispersants are likely more effective to relieve the impacts of the relatively light fuel oil than that of the viscous crude oil on marsh plants.

Acknowledgement

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