3rd Mediterranean Seagrass Workshop Morocco 2012

ASSESSMENT OF THE ECOLOGICAL STATUS OF *P OCEANICA* MEADOW WITH A "NO DESTRUCTIVE SHOOT METHOD": NDSM.

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Context of the study

Posidonia oceanica

- Is a bioindicator
- Is a key species for the Mediterranean Sea
- Is a protected species

Objective

MSW Malta 2006 … « the use of non-destructive methods for the general conservation of the meadow »

- For research works and for monitoring programs
- For scientists and managers

- A No Destructive Shoot Method (NDSM)

Tested and validated

Some protocols of *in situ* measurements are available

Shoot density
Maximum leaf lenght
% dead matte…

Cartography

Some protocols of *in situ* measurements are available

For tissue contents,

Some adapted methods

i.e. Third leaf

Some protocols of *in situ* measurements are available

For tissue contents,

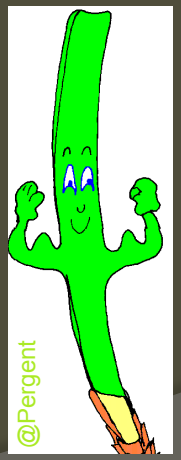
Some adapted methods

i.e. Third leaf

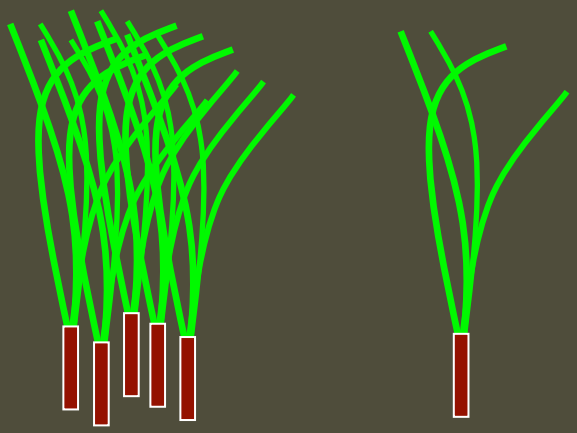
BUT this approach

Not efficient for Sn, Mo
Not efficient for epiphyte, for PREI

Focus on the foliar parts of the shoot



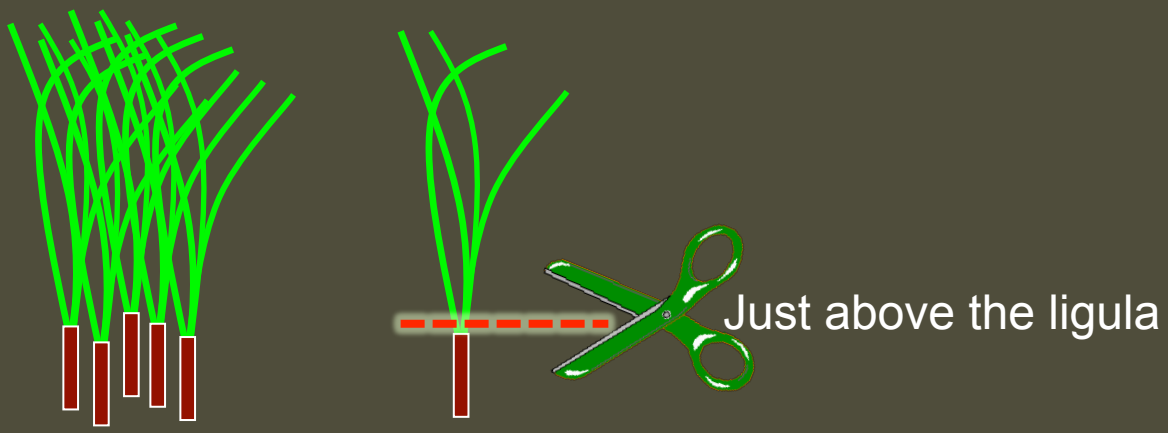
Methods *In situ*



Meadow

Selected site

Methods *In situ*

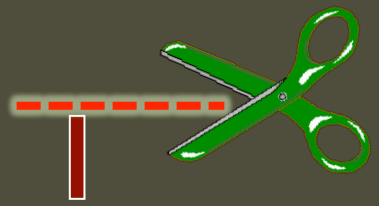


Meadow

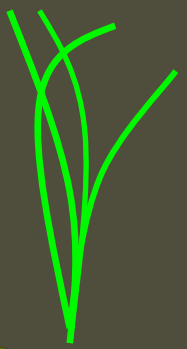
20 shoots

Methods *In situ*

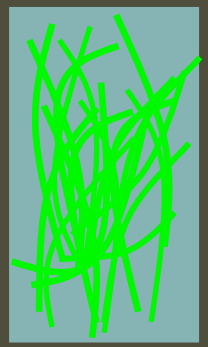
Meadow



Leaves

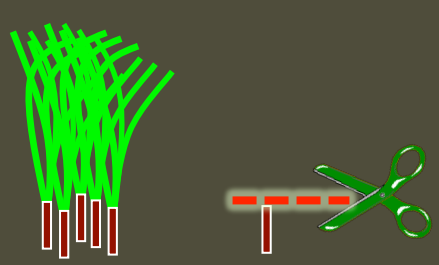


Plastic bag



In a freezer for later measurements

?! Too easy to be true ? !

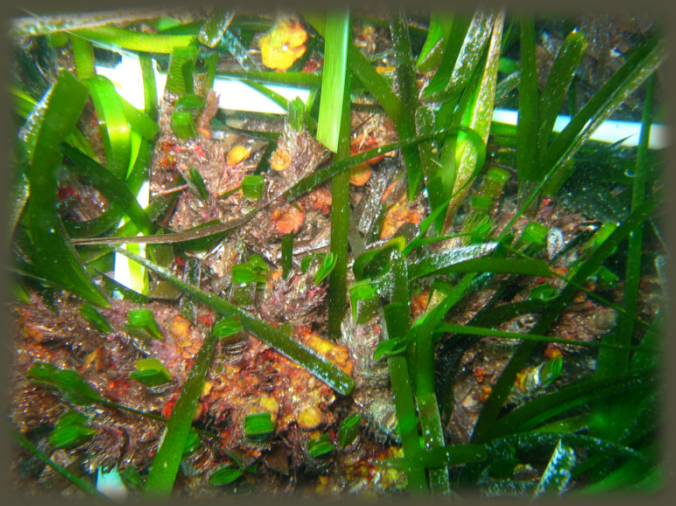


Meadow

tissue contents

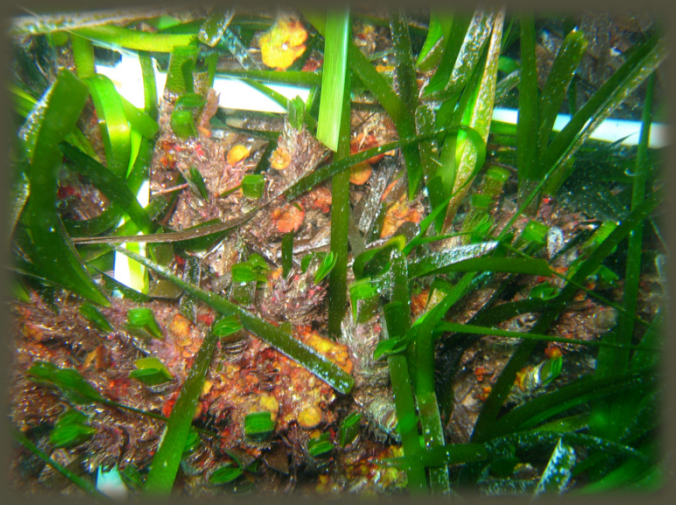
biometry

Tests, comparisons and validation



T0

They survive, they grow…



T0

T0+2 monthes

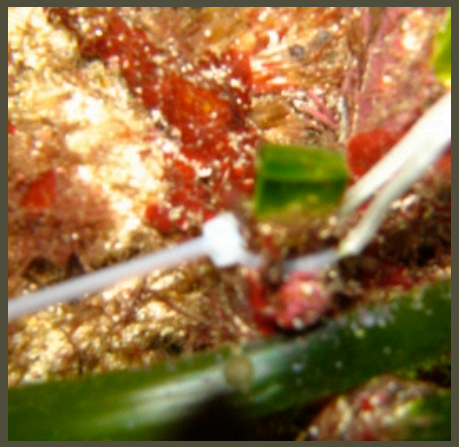
They survive, they grow… and they flower

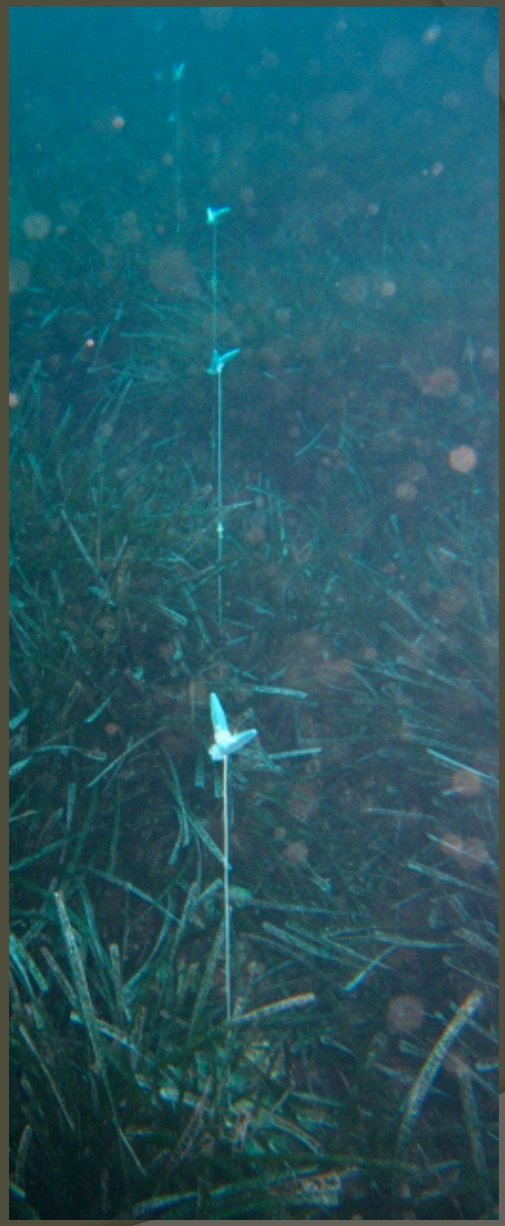
T0

T0+2 monthes

1. Surviving test

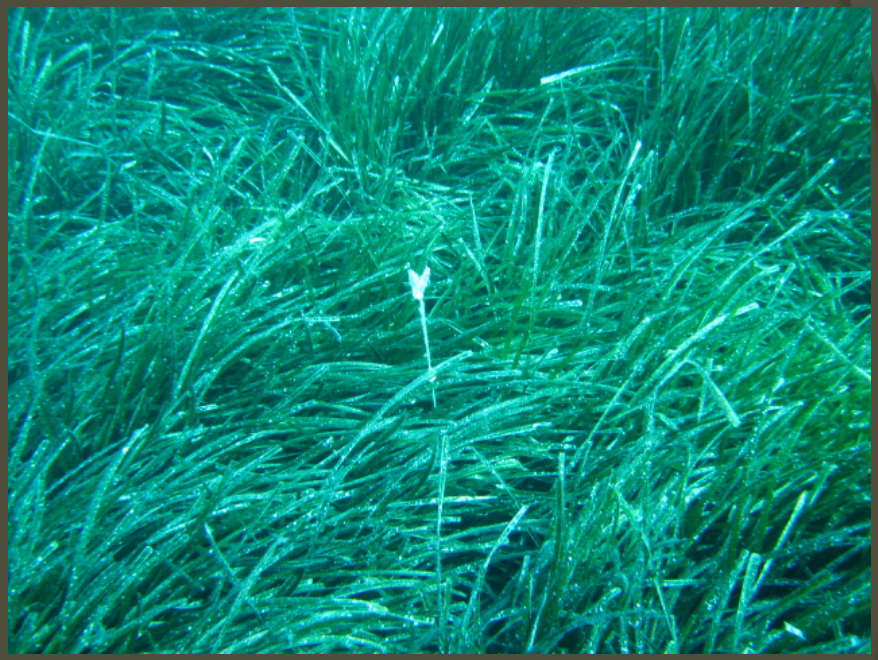
February 2011



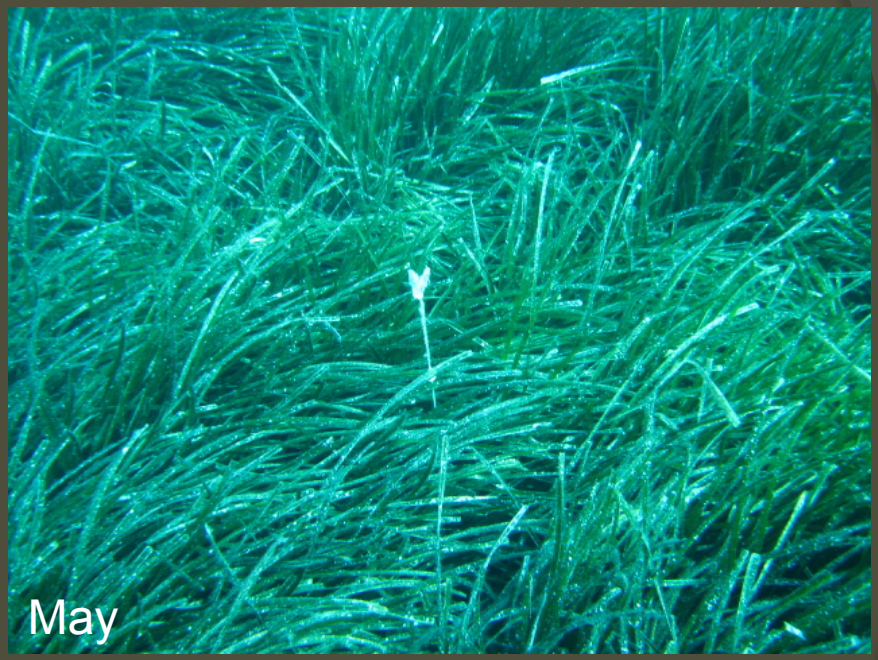


2m

Transect 200m, 15m



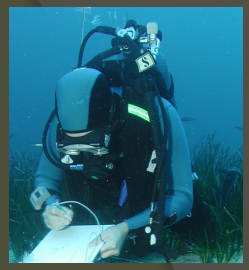
May 2011



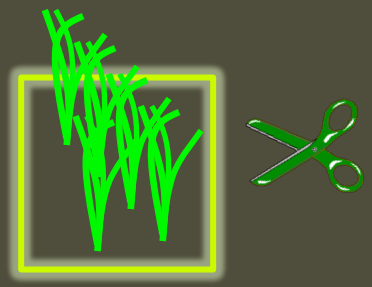
98%

2. Test on Growth

During one year, …



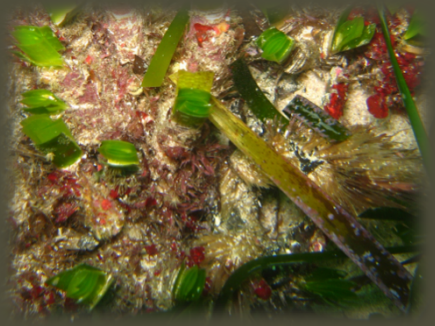
In situ

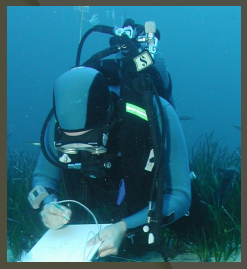


C1

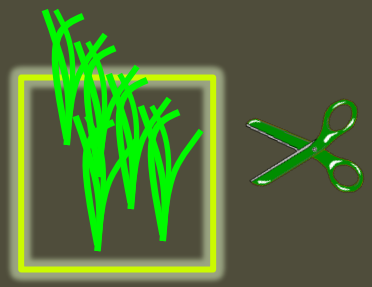
- September 2010

  I cut 20 shoots in quadrate



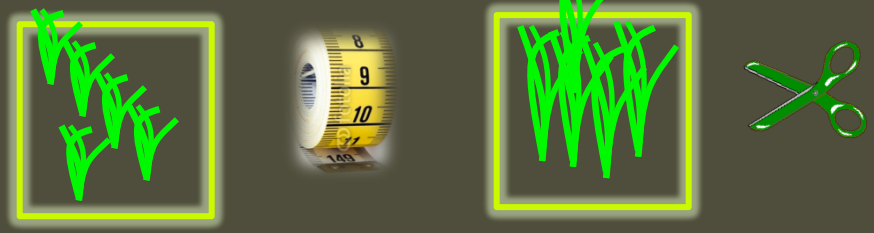


In situ



C1

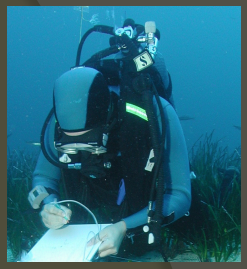
September



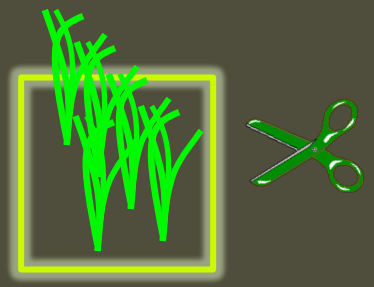
C1

C2

October



In situ

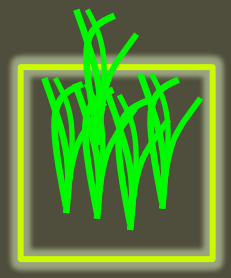


C1

September

C1

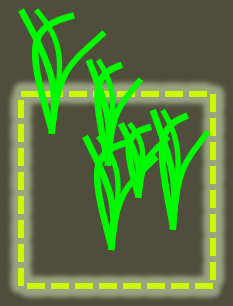
In situ



C2

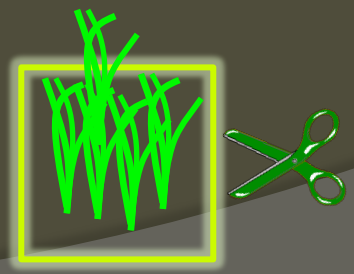
October

C1



C2

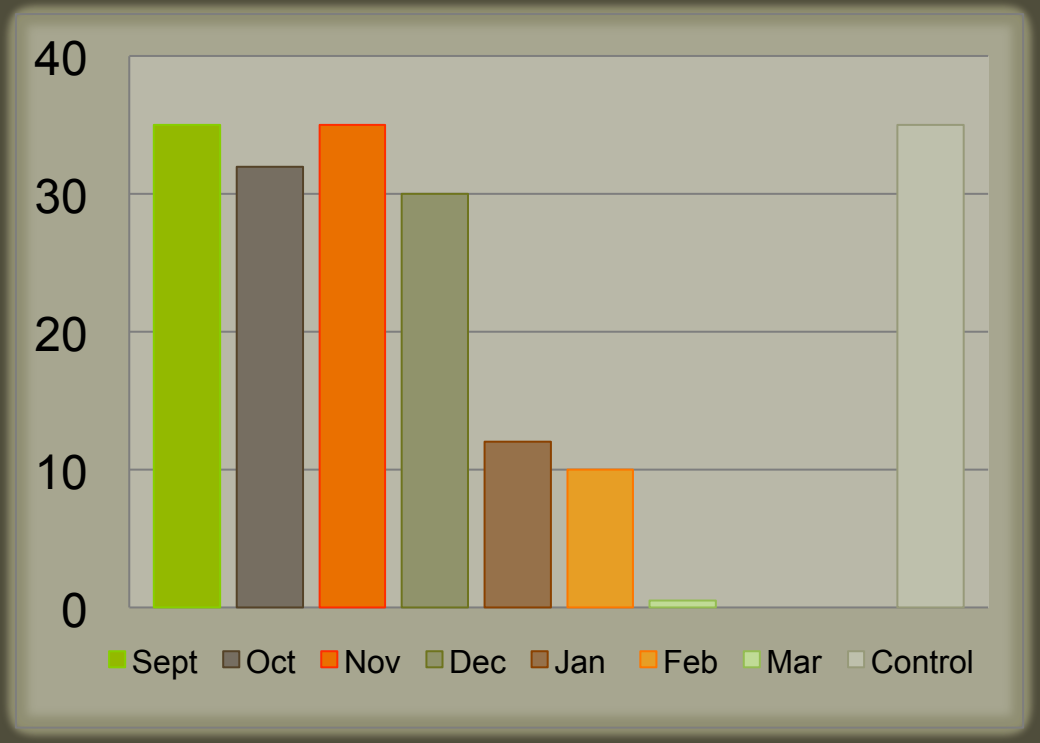
In situ



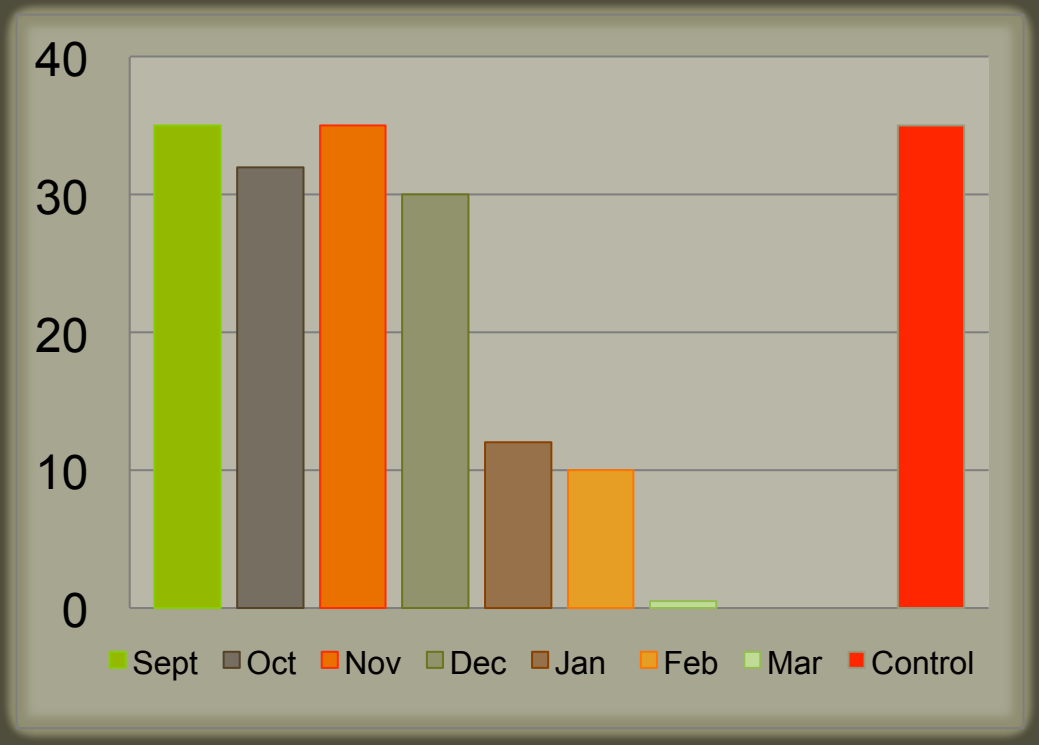
C3

November, December, . . .

Maximum Leaf lengths (cm) of shoot



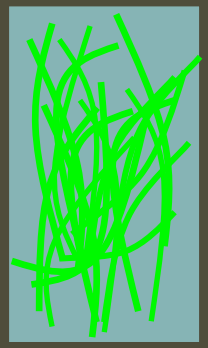
In march 2011


40
30
20
10
0
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Control


After 3 monthes, the leaves reach the lenght of control leaves

3. Tissue contents

Plastic bag



biometry

tissue contents

Biometry (April 2011, n=20)

Stareso, 15m

	« Giraud »	MND
Leaf surface Area (cm^2/ shoot)	321	302
E/L	0,16	0,15

Biometry (April 2011, n=20)

Stareso, 15m

	« Giraud »	MND
Leaf Surface Area (cm^2/ shoot)	321	302
E/F	0,16	0,15
PREI	0,70	0,67

Good

2007

Calvi	0.724

Gobert et al., 2009

EQR	Ecological status	Color code
1-0.775	High	Blue
0.774-0.550	Good	Green
0.549-0.325	Moderate	Yellow
0.324-0.100	Poor	Orange
<0.100-0	Bad	Red

CN contents, trace elements

Leaf (n=20)	Giraud	MND
%C	41.3	41.4
%N	2.6	2.4
Cr	0.12	0.10
Zn	91	99
Cu	8.8	9.2
As	2.2	2.4
Pb	1.6	2.0

Conclusions

- No Destructive Method : NDM
- Use like the crossbows in whale research to take blubber biopsy without harming the whales

Without meadow alteration

Permits

Biometry

CNP, trace metals

- Thank you for your attention

Biometry (April 2011, n=20)

Stareso, 15m

	« Giraud »	MND
Leaf Area (cm^2/ shoot)	321	302
E/F	0,16	0,15
PREI	0,70	0,67

Along PACA coast, Other seasons

CN contents, trace elements

Leaf (n=20)	Giraud	MND
%C	41.3	41.4
%N	2.6	2.4
Cr	0.12	0.10
Zn	91	99
Cu	8.8	9.2
As	2.2	2.4
Pb	1.6	2.0

P, 19 trace elements