



PINEA SPOT CONGRESS

LISBON 2023

21 TO 23 NOVEMBER



CONGRESSO PINEA SPOT
LISBOA 2023
21 A 23 DE NOVEMBRO

THE AGE OF STONE PINE MOTHER TREES INFLUENCES REPRODUCTIVE CAPACITY AND OFFSPRINGS SEEDLING PERFORMANCE

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INTRODUCTION

BACKGROUND

Role of old-growth forests

Reproductive capacity and
seed viability

OBJECTIVE

Assess the influence of *Pinus pinea* age
class in:

- Cone and seed size and weight
- Seed germination
- Seedling survival
- Seedling performance

MATERIAL AND METHODS



22 years old



47 years old



140 years old

Pure even-aged stands, Northern Plateau
3 age classes
32 trees

- 5-10 cones per tree: size and weight
- 100 seeds per tree: size and weight



MATERIAL AND METHODS



22 years old



47 years old



140 years old

Progressive water drought

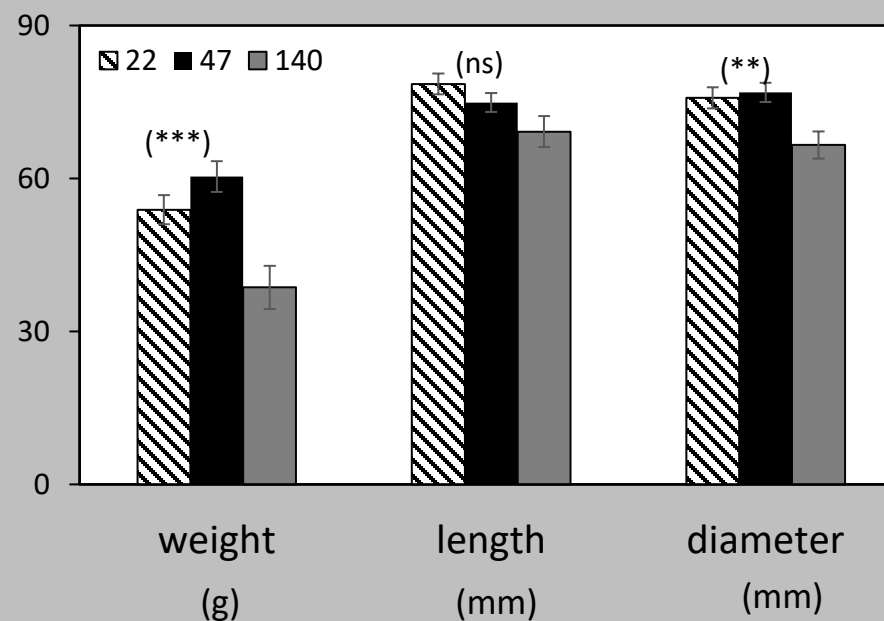
- seedling survival
- soil moisture
- Fv/Fm
- biomass partitioning
- height
- diameter



- Mixed model
- Tree and age effects
- Repeated measures analysis: soil moisture, survival and Fv/Fm

RESULTS

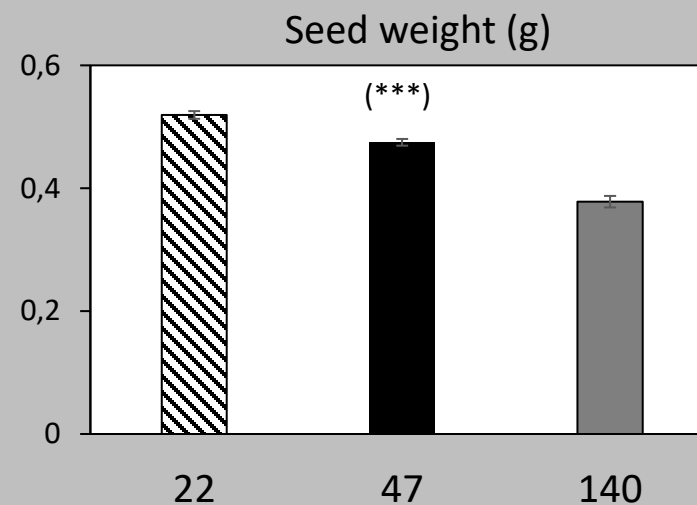
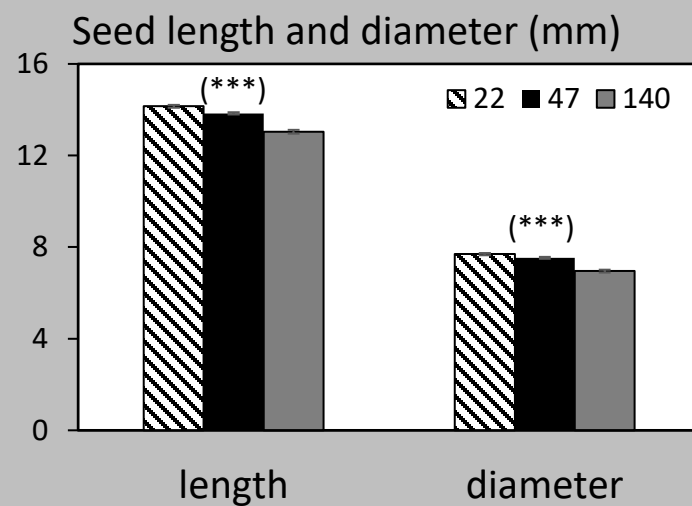
A. CONE TRAITS



- ✓ Lowest cone weight and diameter in oldest trees (age 140)
- ✓ High variability between trees ($P < 0.0001$)

RESULTS

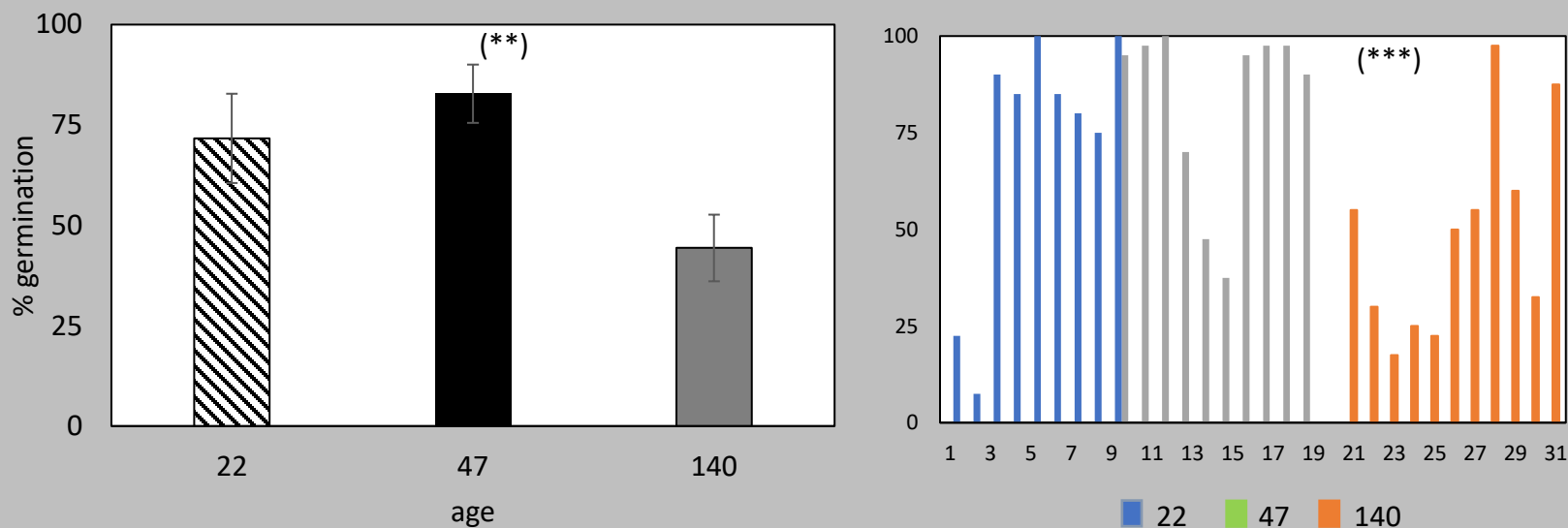
B. SEED TRAITS



- ✓ Seed length, diameter and weight decreases with age
- ✓ High variability between trees ($P < 0.0001$)

RESULTS

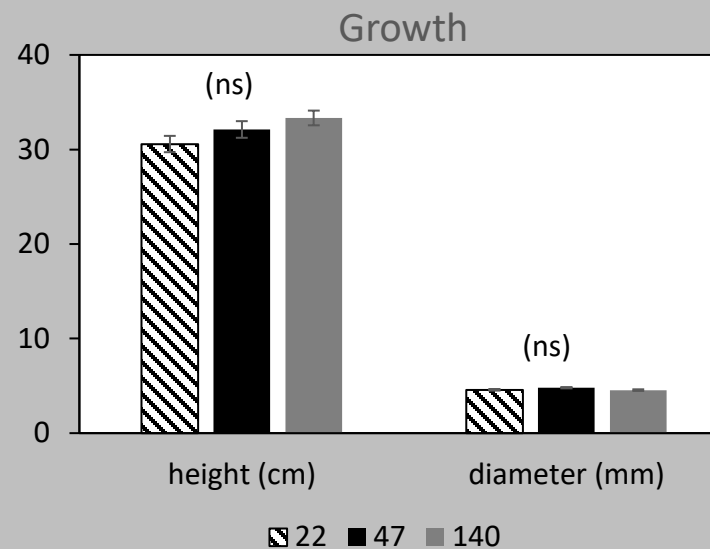
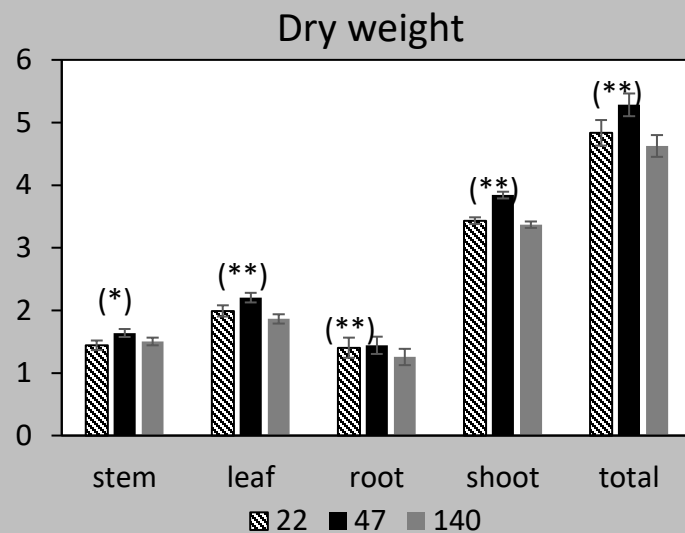
C. GERMINATION



- ✓ Lowest germination in oldest trees (age 140)
- ✓ High variability between trees

RESULTS

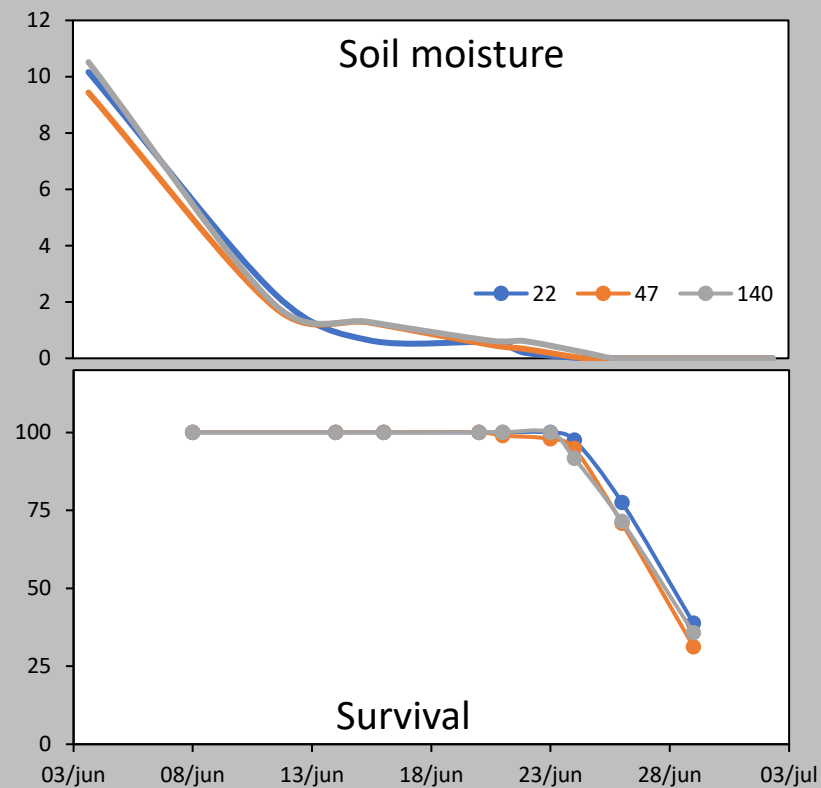
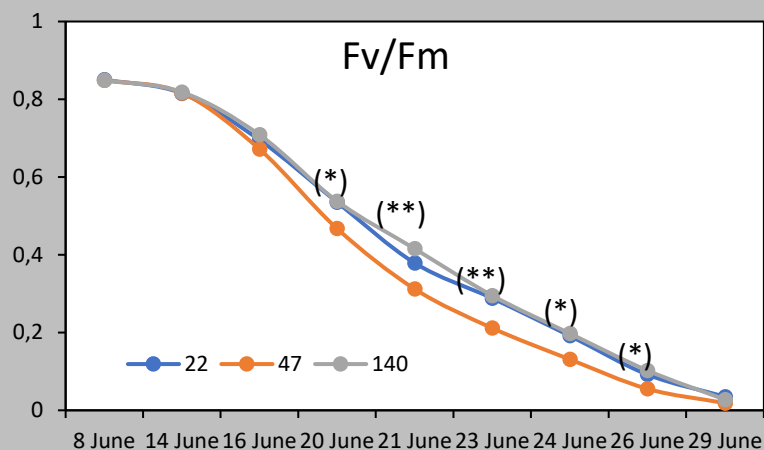
D. PROGRESSIVE WATER DROUGHT: morphology and growth



- ✓ Lowest dry weight in oldest trees (age 140)
- ✓ No effect of tree age on growth

RESULTS

D. PROGRESSIVE WATER DROUGHT: physiology



- ✓ Steep decrease in survival once SM=0%
- ✓ From SM~0.5% => Lowest Fv/Fm at age 47
- ✓ High variability between trees

CONCLUSIONS

- ❖ Highly significant between-tree variability
 - ❖ Significant effect of tree age:
 - Cone diameter and weight: < age140
 - Seed length, diameter and weight: age140<47<22
 - Germination: < age140
 - Dry weight: < age140
 - No effect on seedling growth
 - ❖ Steep decrease in seedling survival once SM=0%. No age effect
 - ❖ From SM~0.5 % => Lowest Fv/Fm at age 47
- LOWER
VALUES IN
OLDER TREES**

ABILITY OF OVERMATURE Pinus pinea TREES TO MAINTAIN A RELATIVELY HIGH REPRODUCTIVE CAPACITY AND SEEDLING PERFORMANCE THAT ASSURES ITS PERSISTENCE

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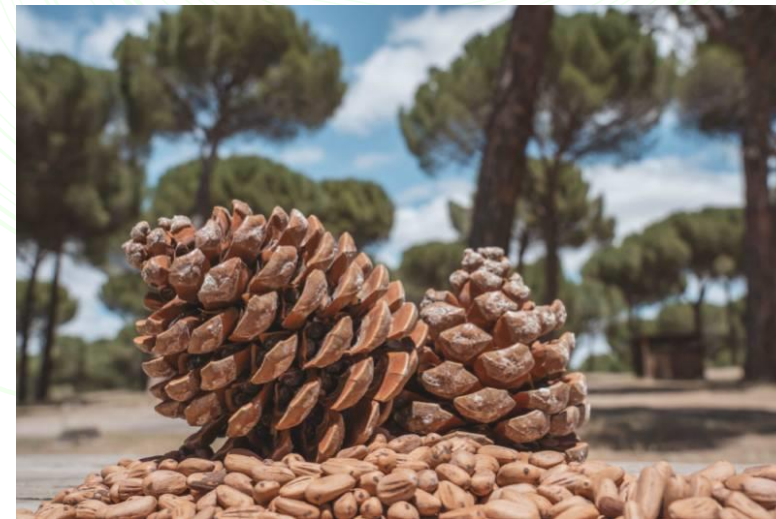
Responsible Entity:



Sponsor:



Organisation:



Acknowledgements

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