

Ausoni Mountains and Fondi Lake Natural Park activities on Life FAGESOS Project on 2022-2024

STUDY TOUR TO ITALY FOR PORTUGUESE LIFE PROGRAMME OFFICIALS WITHIN THE PROJECT "PORTUGAL CAPACITY BUILDING FOR BETTER USE OF LIFE II"

Monte San Biagio - 02 july 2024

Dr. Simone Cali'
- Natural Park
Ausoni Mountains
and Fondi Lake



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‘Oak decline’ in Monte San Biagio (LT)

Since 2009 affects the largest cork oak forest in peninsular Italy (219,70 Hectars).

Two types of symptoms:

- foliage drying in sectors;
- stroke (fast death of the plant).

Course of disease: from some weeks to some months.

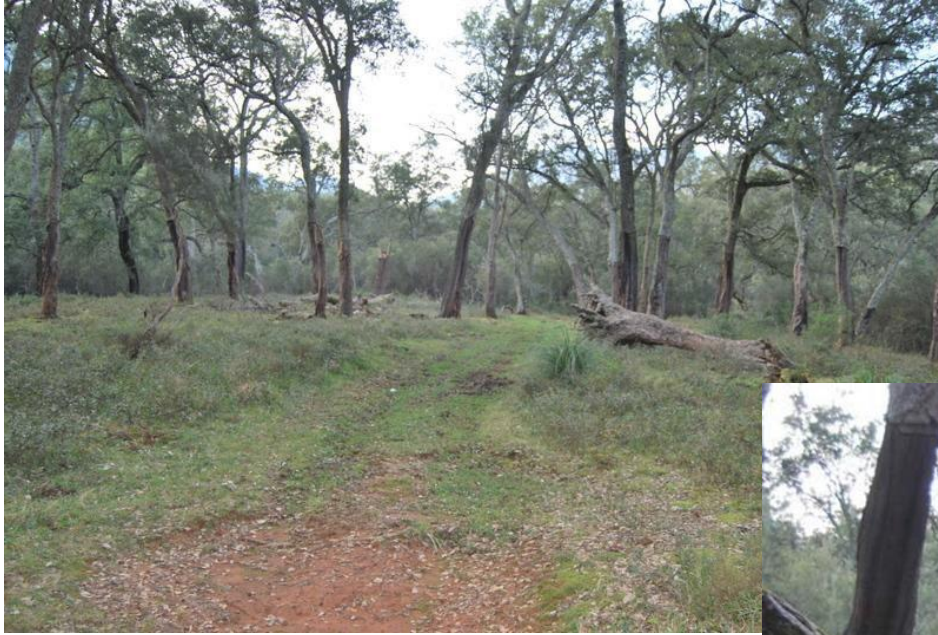


‘Oak decline’ in Monte San Biagio (LT)

Large forest areas have been destroyed.

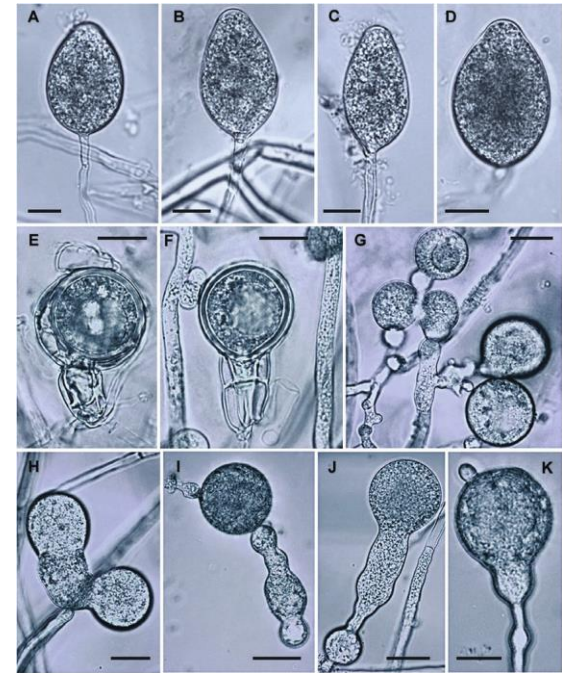


‘Oak decline’ in Monte San Biagio (LT)



The pathogen: *Phytophthora cinnamomi*

Regnum Chromista – Div. *Oomycota* causes necrosis of the roots with loss of functionality and subsequent death of the plant. Prevalent symptom: a gradual deterioration and drying of the foliage. Affected plants species about 5000 among crops, forestry and ornamentals: it's a worldwide pathogen.



Zoospores with 2 flagella



direzione di movimento →

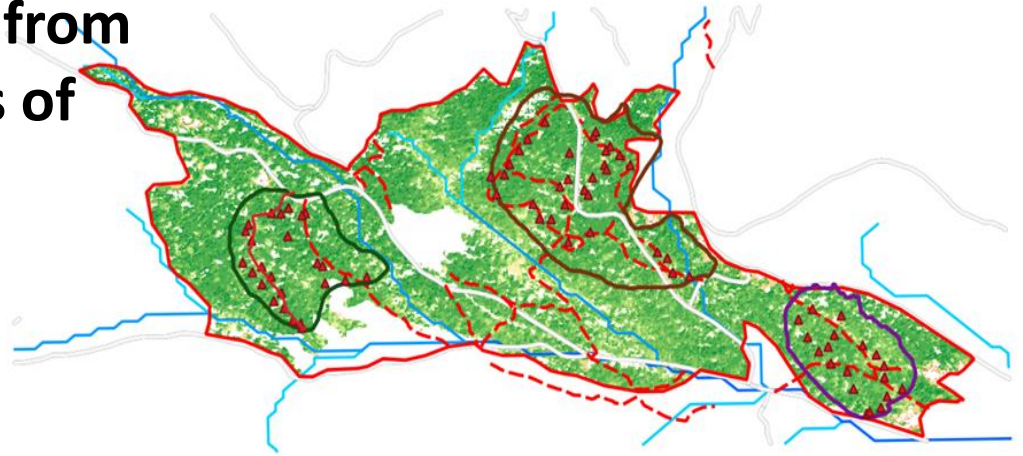
Typical symptoms on the collar and trunk

(blazes on xylem apparatus)



2020 – start of a three-year Regional project with Viterbo University UniTUS

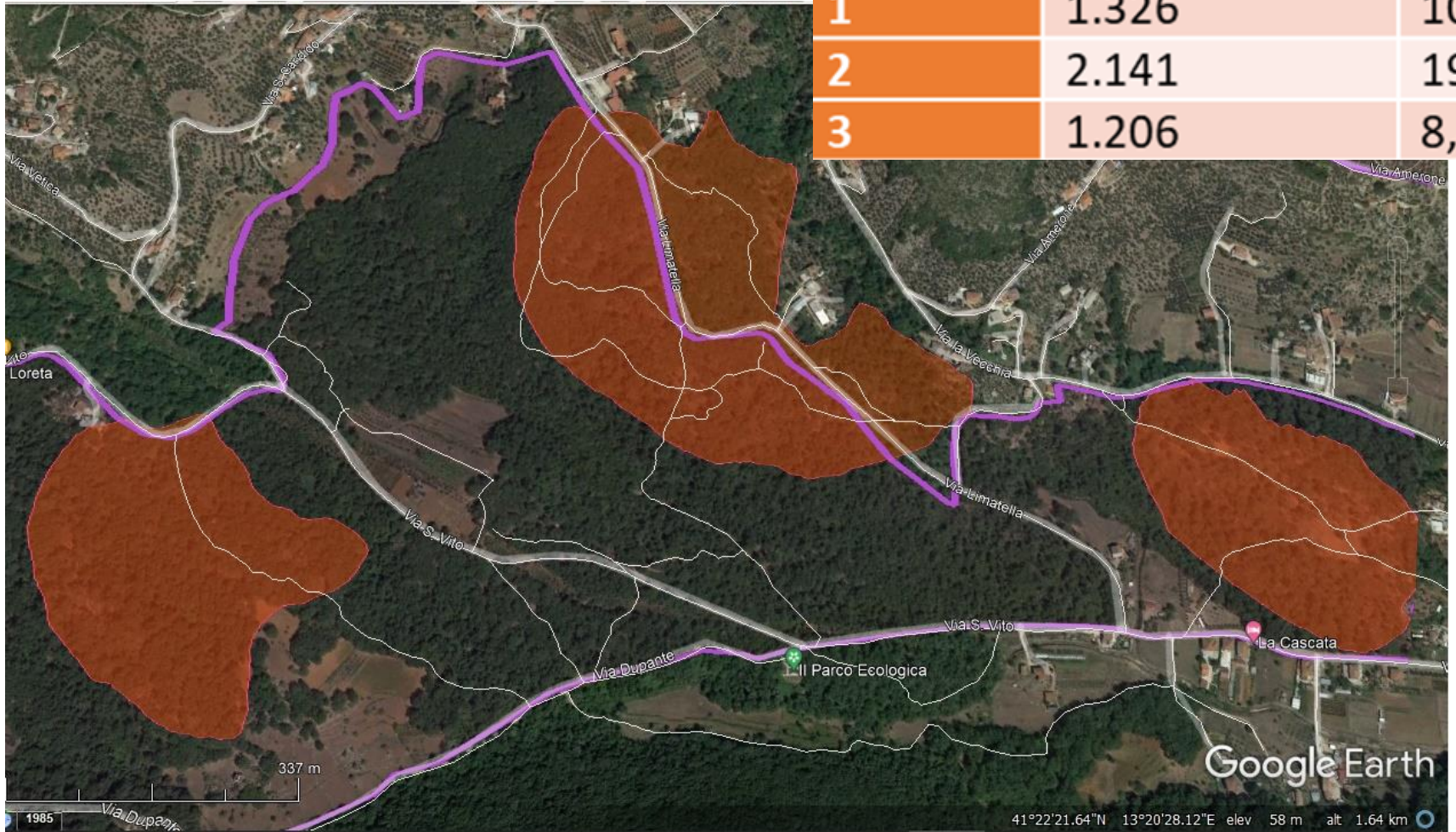
3 big outbreaks were delimited, by collecting 76 soil root samples from sick plants rated on 5 classes of disease intensity.



Foci	Perimeter (mt)	Area (Hectares)
1	1.326	10
2	2.141	19,5
3	1.206	8,4

2020 – delimited outbreaks on G.map

Foci	Perimeter (mt)	Area
1	1.326	10
2	2.141	19,5
3	1.206	8,4



2020 Regional Project – samples on the rhyzospheres shown in map.



95 fungi colonies obtained:

- 70 *P. cinnamomi*
- 4 *P. cryptogea*
- 8 *P. plurivora*



2020-22: K-phosphonate by endotherapy

**3000 oaks
treated inside
and around the
3 outbreaks**



Treated oaks with K-phosphonate on O.B. 1 and 2 in 2020-22

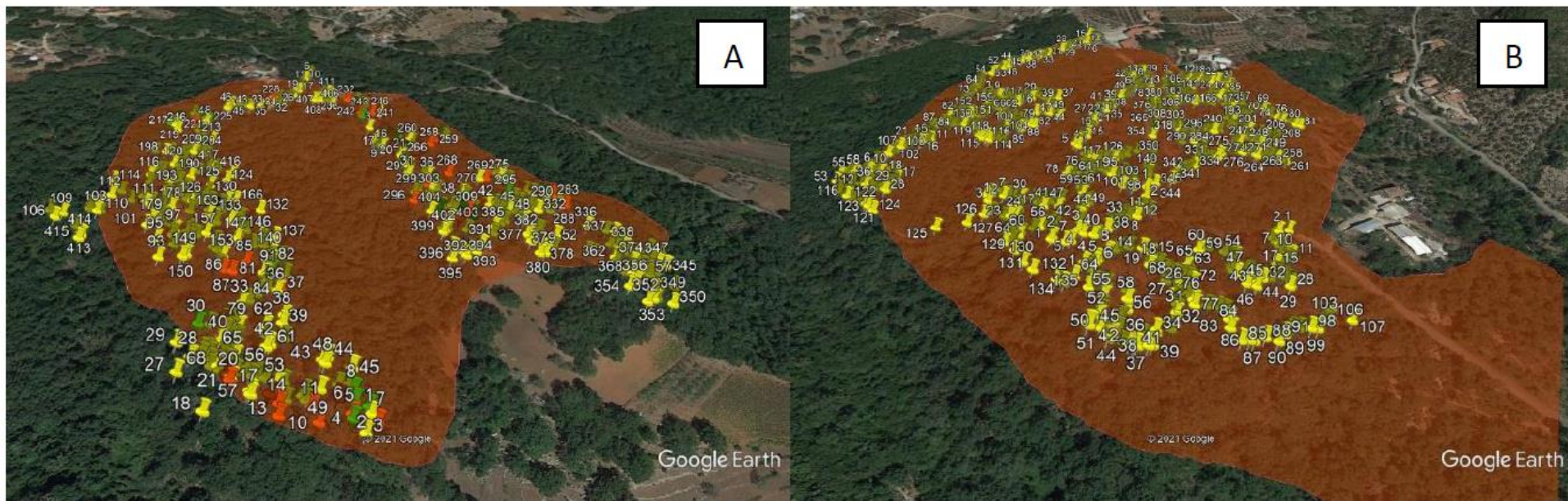


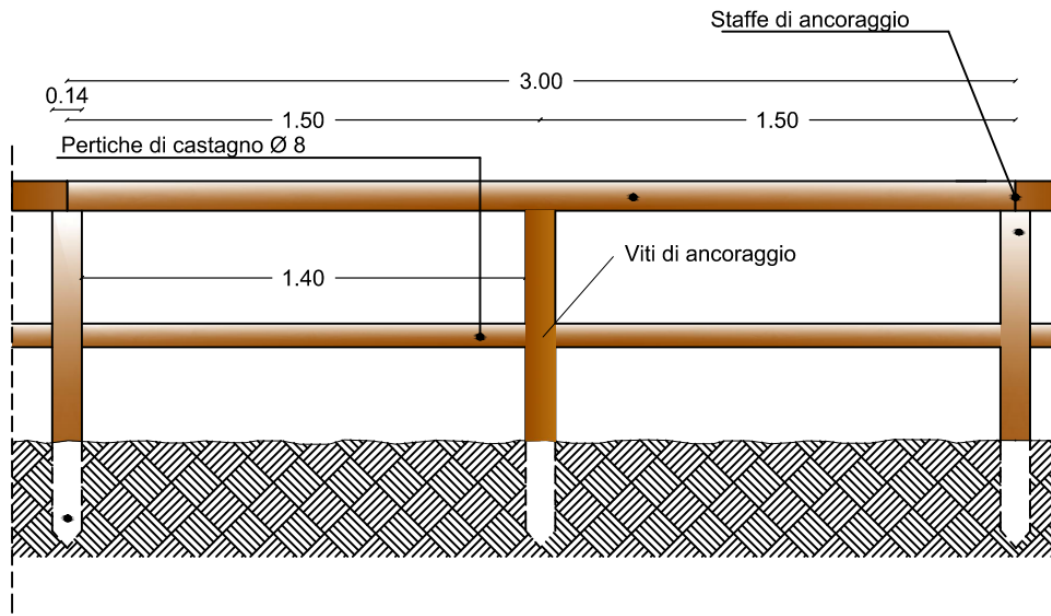
Figura 5 Mappa delle piante trattate nei Focolai 1 (A) e 2 (B)

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A detail of the future

Particolare Staccionata in pali di castagno
Prospetto frontale

Scala 1:20



Life-FAGESOS Project main goals

- 1) Reduction of the incidence of the disease: Integrated pest management protocols for each tree species (cork oak, evergreen oak, chestnut);**
- 2) Risk maps, predictive models of disease development caused by *Phytophthora* species (*P. cinnamomi*, *P. cambiavora*, *P. multivora*);**
- 3) Improving the resistance of ecosystems to disease;**
- 4) Reduction of human and natural pressures on ecosystems;**



1° Life-FAGESOS main goal

- **1 Reduction of incidence: 3 integrated control protocols, one for each tree species (cork oak, evergreen oak, chestnut) by:**
 - **resistance inducers (potassium phosphite Kalex EVO),**
 - **bacteria promoting plant growth and antagonistic microorganisms (Atens Tricoten® Trichoderma atroviride AT10 + Bactrium® Bacillus megaterium BM77-BM06) -**
 - **bio-fumigant molecules (Biofence® FL)**
 - **where still permitted: new methods of distribution of products based on potassium phosphite (treatment in fruit chestnut orchards with drones).**



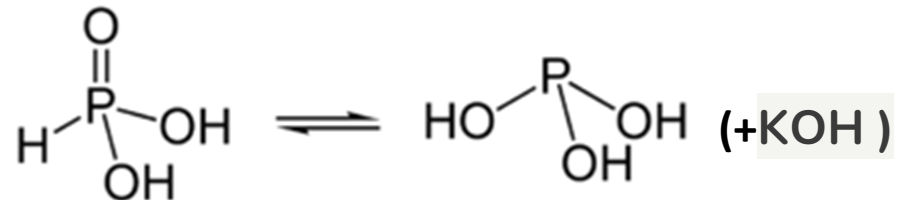
K-phosphonate no more admitted as fertilizer

- seeking for Protocols for treatments with alternative products to k-phosphonate by drones (Kalex EVO: fertilizer that can also strengthen the crops).

It compensates and prevents micro-nutrients deficiencies and is able to maintain healthy and resistant plants.



PK fertilizer

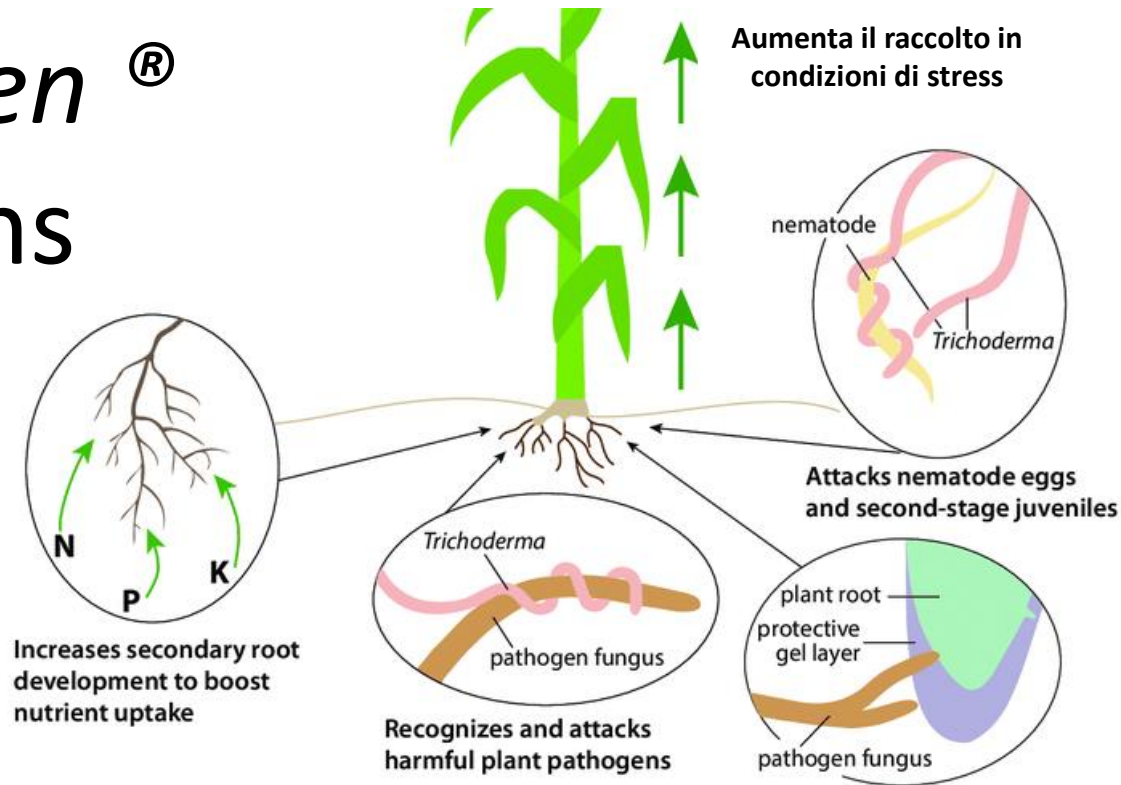


Tautomeria della molecola di H_3PO_3 : **acido fosfonico** $\text{HP}(\text{O})(\text{OH})_2$ (a sinistra)
e **acido fosforoso** $\text{P}(\text{OH})_3$ (a destra)



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Tricoten[®] Atens



TRICOTEN[®] for disease biocontrol - based on the new strain of *Trichoderma atroviride* AT10 - the first strain to obtain the low risk classification from the EFSA (European Food Safety Authority)

St. Vito Forest foreseen cleaning Stations overview



Implementation of hygienic measures



Mats used against bird flu in England



Fig. 6: Tappeti igienizzanti collocati presso uno stabilimento produttivo inglese.



A solution to be
adopted in
Monte san
Biagio:

concrete base
with
prefabricated
modules



Positions of wheels cleaning stations

Positions of wheels stations will be slightly shifted, related to previous considered positions;

- placed alongside public streets, in Parking areas in strategic positions, to avoid troubles for viability and possible accidents;
- Sanitization of wheels will be made in “self-service” mode by drivers going out from outbreaks Areas;
- All the Stop Areas will need a layer of reinforced concrete under the mats, to stick and make them effective and long-lasting.
- Popularization will be necessary to explain to citizens the purposes of the stations.



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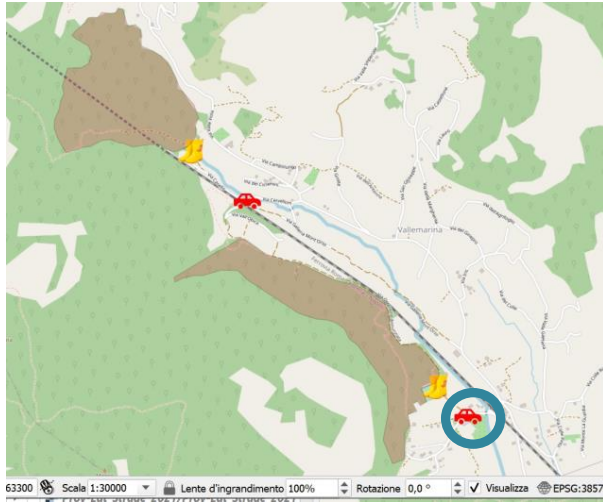
Candidate wheels cleaning station F.1

«Vetica Str.»



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Cleaning Station for wheels «Padre Biagio Square»



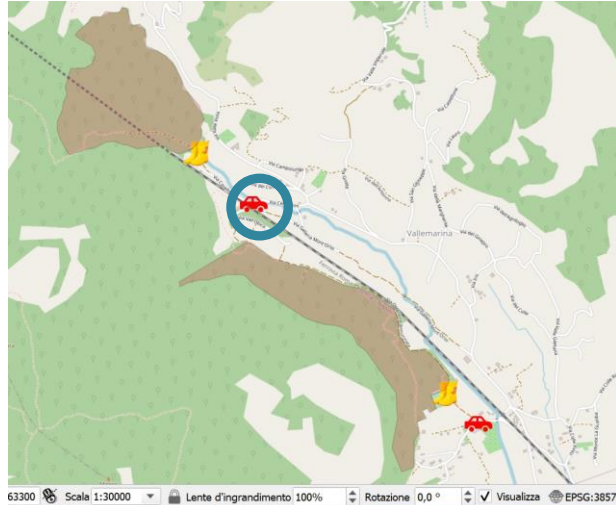
«Valle Marina»
Area



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Wheels Cleaning Station «Cervelloni Fountain»

«Valle Marina» Area



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Foreseen Boots stations in Valle Marina fraction

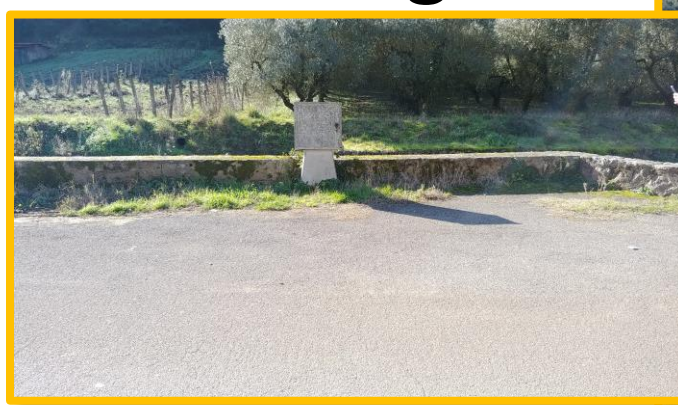


Candidate wheels station F.2 «Limatella Str.»



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Candidate wheels cleaning station «St. Vito Str.»



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Signposts for tire cleaning stations



Aiutaci a fermare il deperimento della
Sughereta di San Vito

Questa malattia sta uccidendo le nostre sughere

**A 100 metri da qui:
Stazione di pulizia pneumatici
disinfezione gratuita delle ruote**

Grazie del tuo contributo!

Per segnalazioni e informazioni contattare: Ente Parco Naturale Regionale Monti Ausoni e Lago di Fondi



0771513644



parcoausoni@regione.lazio.it

<https://www.parchilazio.it/montiausoni>

Signposts for tire cleaning stations



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Comune di Monte
San Biagio

Aiutaci a fermare il deperimento
della Sughereta di San Vito

Questa malattia sta uccidendo le nostre sughere

Stazione di pulizia pneumatici



**Transita con il tuo veicolo sul tappeto
disinfettante prima di proseguire**



Grazie del tuo contributo!!

Per segnalazioni o informazioni contattare: Ente Parco Naturale Regionale Monti Ausoni e Lago di Fondi



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Signpost to be put on the outbreaks entrance



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Area sottoposta ad interventi per la lotta al deperimento della sughera

Non entrare! Lasciala guarire!

Per segnalazioni o informazioni contattare: Ente Parco Naturale Regionale Monti Ausoni e Lago di Fondi



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Signpost to be put beside the boots cleaning stations



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**Aiutaci a fermare il deperimento della
Sughereta di San Vito**

Questa malattia sta uccidendo le nostre sughere

Stazione di pulizia delle calzature



Le suole delle tue
scarpe possono
trasportare
Phytophthora
cinnamomi in luoghi
ancora non infettati.

1. Appoggiati alla barra superiore della stazione.
2. Rimuovi il fango in eccesso dalle scarpe con le alette laterali vicino al suolo.
3. Applica il disinfettante sulle suole e sulle spazzole in abbondanza.
4. Pulisci suola e tomaia passando ripetutamente una scarpa alla volta sulle spazzole orizzontali e laterali.

Grazie del tuo contributo!

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General information signpost to raise citizens' awareness



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Aiutaci a fermare il deperimento della Sughereta di San Vito

Questa malattia sta uccidendo le nostre sughere



Non entrare nella sughereta durante e immediatamente dopo piogge persistenti, sia a piedi che con mezzi meccanici. In caso di transito, non trasportare suolo o materiali imbrattati di fango, mantieniti sui sentieri o le strade carrozzabili e al momento di uscire dalla sughereta pulisci accuratamente le calzature e gli pneumatici dai residui di suolo. È inoltre buona norma disinfettare le suole delle scarpe e gli pneumatici con varechina diluita (2-3%) usando un semplice spruzzatore manuale o utilizzando le stazioni di pulizia e disinfezione dislocate sul territorio dal progetto FAGESOS e segnalate da apposita cartellonistica.

Il deperimento delle querce è una sindrome letale per la sughera. Si trasmette con grande facilità attraverso il trasporto passivo di particelle di suolo, fango e acqua.



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Boots cleaning stations: Project developement

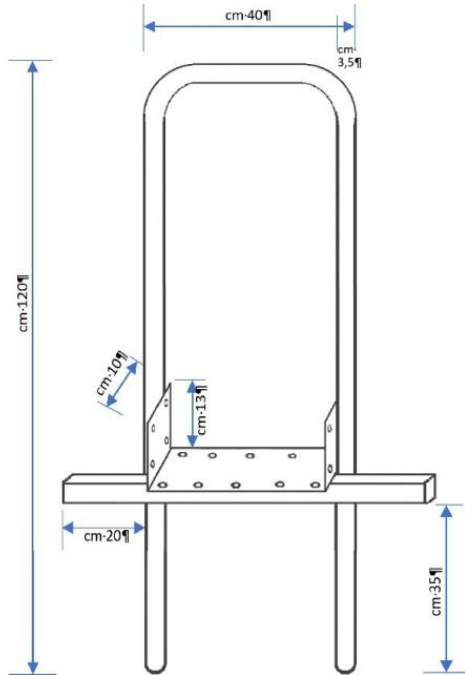


Figura 1: Schema e misure della stazione per scarpe.



Figura 2: prototipo della stazione di pulizia scarpe.



Boots cleaning stations placement – Outbreak 2



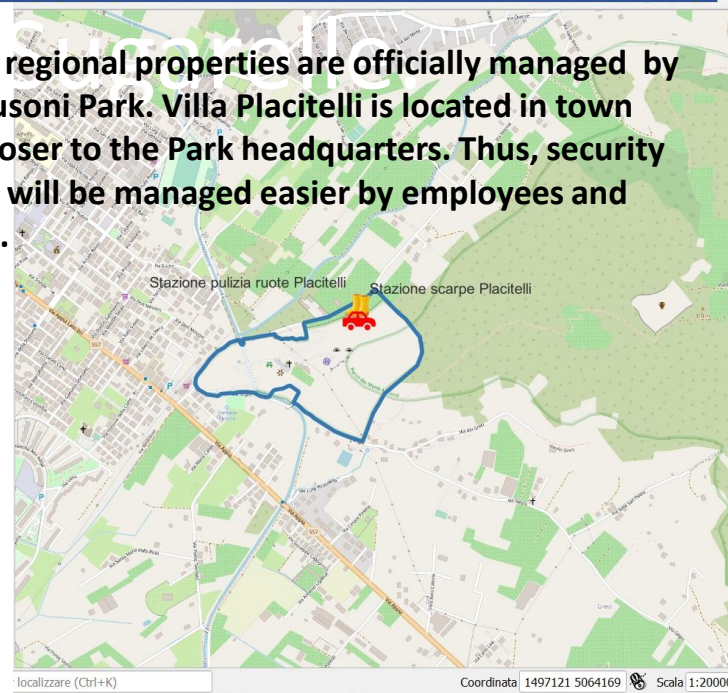
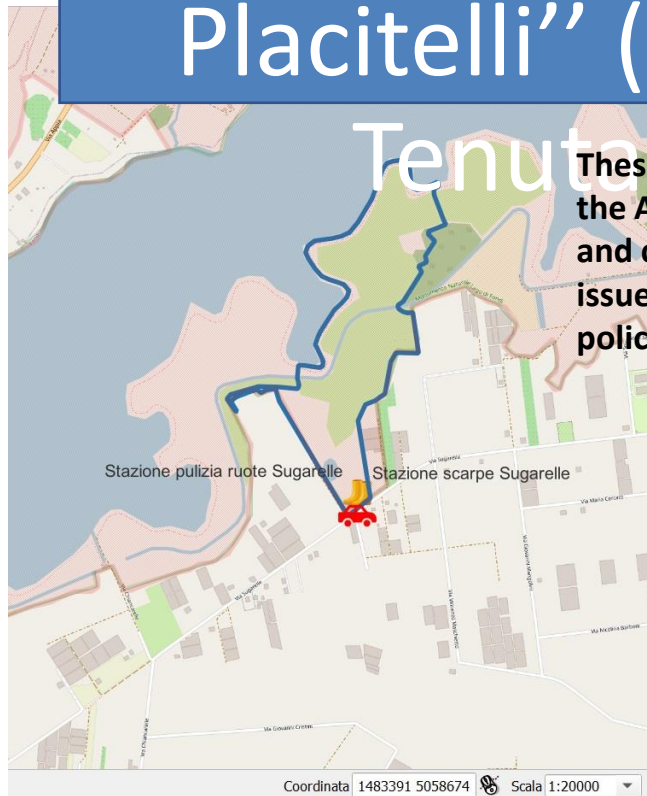
Boots cleaning stations placement – Outbreak 3



nursery area of “Villa Placitelli” (right side) and

Tenute Sugarelle

These regional properties are officially managed by the Ausoni Park. Villa Placitelli is located in town and closer to the Park headquarters. Thus, security issues will be managed easier by employees and police.



2024 – our preferred “Stress tests” ... Passed!



Cork oak germplasm collection on 2022



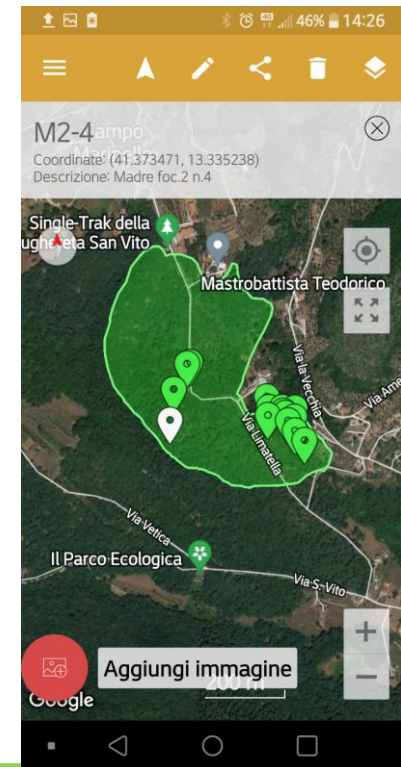
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Selecting -georeferencing of trees

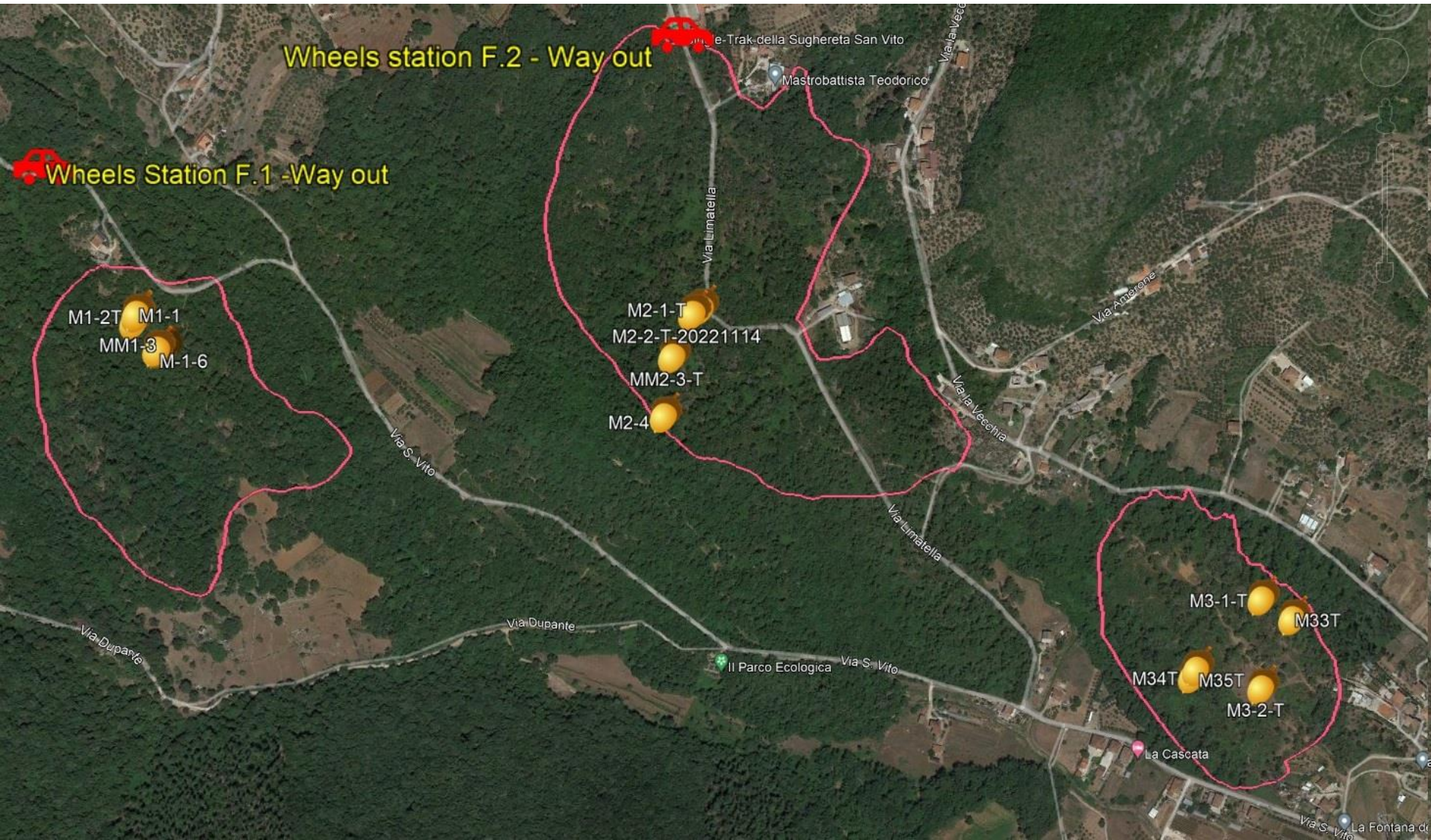


trees selected by phenotypic aspect marked with spray paint, photographed and geo-referenced on wgs84 coordinates

A free app for GIS measurements to geo-referencing the trees



Mother plants positions 2022-2023



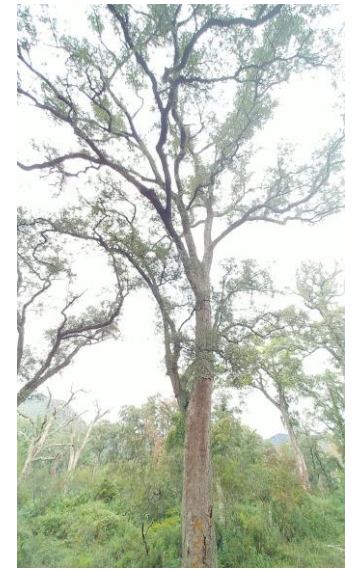
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Outbreak 1 mother plants



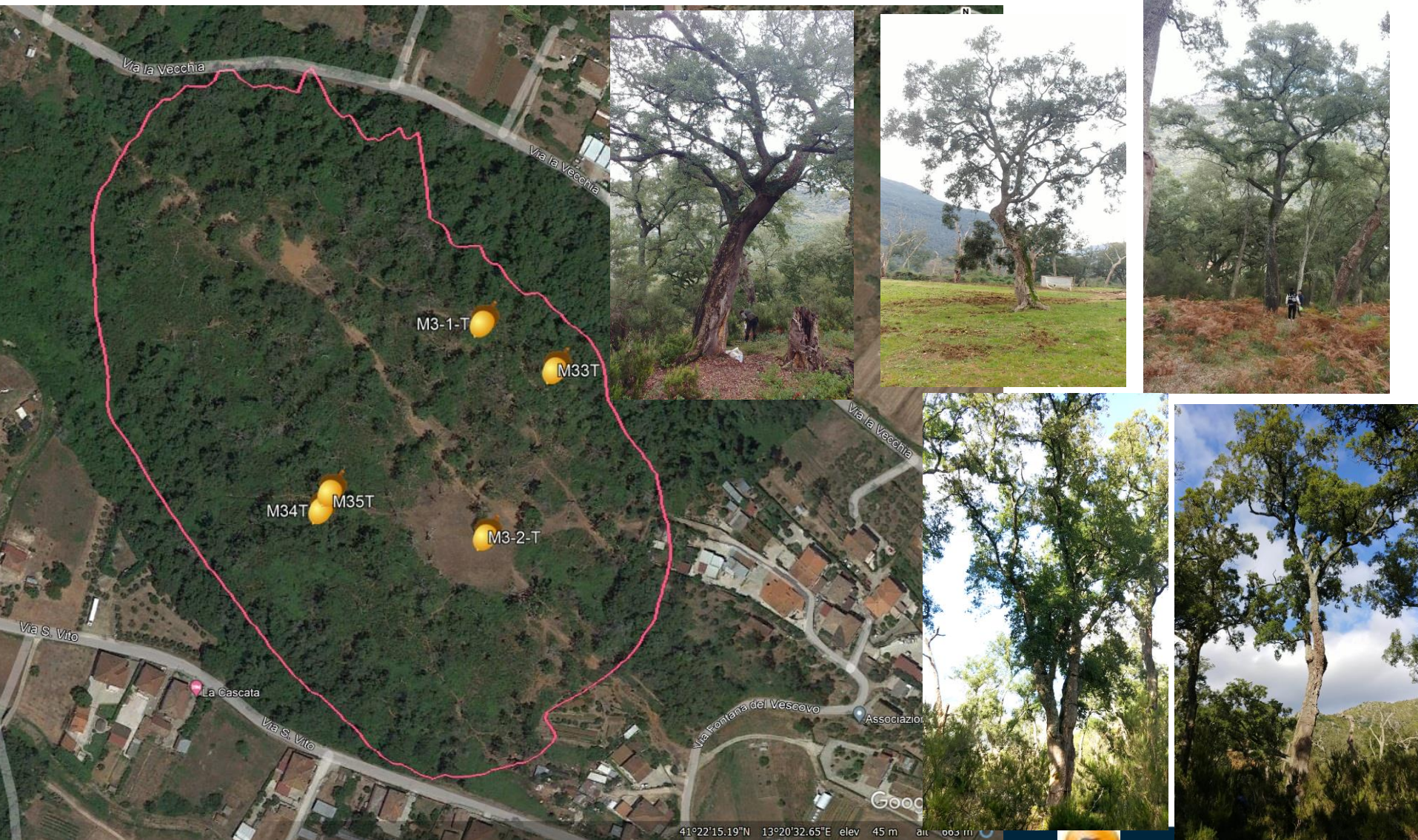
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Outbreak 2 mother plants



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Outbreak 3 - Mother Plants



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Germplasm collection on 2022-2023

Acorn selection and sanitization



Acorns seeding on 2023

**Using
professional
plant soil**

**in plastic pots,
with the help
of civil volunteers
of the Park**



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Nursery Area

Currently the oak plants are stored at the
Park headquarters



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Nurserv area at Park Headquarters



Germplasm collection 2022 - results

- 11 mother plants selected (around 700 acorns)
(M-1-2-T, M-1-3, M-1-4, M-2-1-T, M-2-4-T, M-3-1-T, M-3-2-T)

Mother plant; Outbreak n.; Plant n.; Treated or not with K-phosphonate)

- 4 half sib progeny had not enough progeny to submit them to laboratory trials
- Many losses likely caused by root diseases - mechanical damages - high summer heat



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Checking for resistant mother plants

7 half-sib progeny now being checked for resistance to *P. Cinnamomi* at UniTUS



Germplasm collection 2023 - numbers

- 4 new mother plants selected
(M-1-6; M-3-3; M-3-4; M-3-5)
- 3 old mother plants resampled
(M-1-3; M-1-4 M-1-5)
- approx. 560 plants seeded in plastic pots

The future nursery area will be more structured and professional. This probably will prevent most of the plants losses.



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2023 – civil service volunteers training – Park headquarter



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2023 – training for agriculture students of technical institute – Itri (LT)



Communication on events: artistic happening into the forest (outside outbreaks)– Nov. 2023



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Thanks for your attention



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