



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

Tveganja pri vnosu GRM v slovenske gozdove

*dr. Barbara Piškur, dr. Ana Brglez, dr. Tine Hauptman, dr. Maarten de
Groot in dr. Nikica Ogris*

*Delavnica za dobavitelje gozdnega reprodukcijskega materiala
GIS, 30.5.2023*

Vnos GRM v gozd = tveganje

... nepovratno poškodovan gozd...

Plant parasitic nematodes from a forest tree nursery in southern Spain with some notes about the influence of soil storage on the quantitative recovery of *Meloidogyne arenaria*

In: *Nematology*

Authors: Miguel Talavera, Juan Carlos Magunacelaya, and Antonio Tobar

Online Publication Date: 01 Jan 1999



Fitoplazma (brest)

Xylella fastidiosa



Bakterije

Glive

Virusi

Žuželke

Fitoplazme

Nematode

Oomicete

Pršice

Phytophthora spp.

Biol Invasions (2021) 23:2173–2190
<https://doi.org/10.1007/s10530-021-02496-6>

ORIGINAL PAPER

***Phytophthora* species repeatedly introduced in Northern California through restoration projects can spread into adjacent sites**

Laura Lee Sims  · Matteo Garbelotto



Plant Pathology (2019) 68, 196–204

Doi: 10.1111/ppa.12933

Control of *Phytophthora* species in plant stock for habitat restoration through best management practices

L. Sims^{a*†} , S. Tjosvold^b, D. Chambers^b and M. Garbelotto^a

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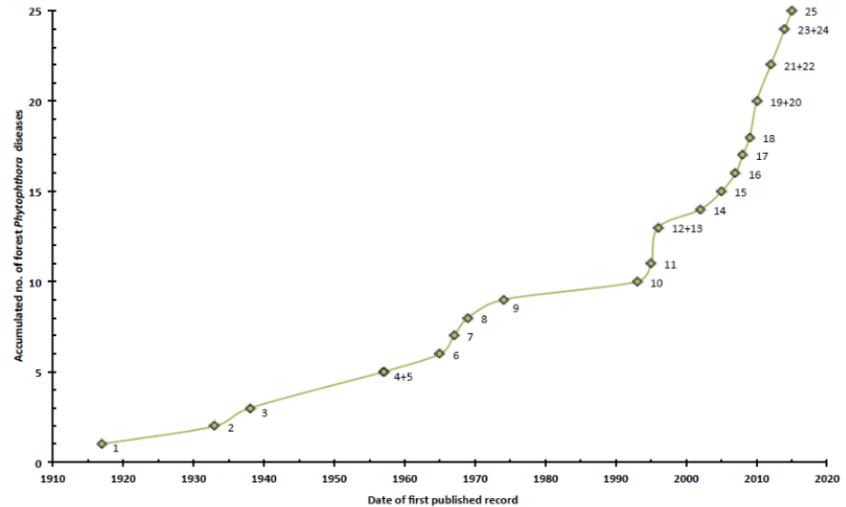


Dead and dying coffeeberry (*Frangula californica*) shrubs are clearly visible in a falling restoration in a coastal scrub site in San Mateo County, dominated by shrubs with occasional small groups of trees. *Phytophthora crassamura* and *P. megasperma* were both isolated directly from symptomatic tissue and from the rhizosphere (i.e. soil and fine roots) of diseased plants. Photo by Laura Sims.

Phytophthora spp.

- 50 vrst (1996) → 150 vrst (2018)
- pan-EU študija (Jung et al., 2016):
 - 90 % drevesnic (730)
 - 67 % nasadov (2500)
 - 68 različnih vrst fitoftor → večina **INVAZIVNIH**

~ EU: 1990-2010: 680.000 novih
pogozditev (5 mil. ha) s sadikami,
okuženih s fitoftorami



Vir: Jung et al., 2018: Canker and decline diseases caused by soil- and airborne *Phytophthora* species in forests and woodlands

Forest Pathology



For. Path. 46 (2016) 134–163
© 2015 Blackwell Verlag GmbH

doi: 10.1111/efp.12239

Widespread *Phytophthora* infestations in European nurseries put forest, semi-natural and horticultural ecosystems at high risk of *Phytophthora* diseases

Phytophthora spp.

Jelševa sušica (*P. xalni*, *P. xmultiformis*, *P. uniformis*)

- jelše relativno „neproblematična“ drevesna vrsta do 1993 (UK, *A. glutinosa*)
- Manjši listi, rumenjenje, redkeje olistana krošnja, povečan obrod, propad (mlajša drevesa do 1 leta; starejša več let; 100 % mortaliteta v poplavljenih območjih)
- Razširjanje z vodotoki
- 3 vrste: *P. xmultiformis* & *P. uniformis*: tujerodni vrsti (S. Amerika); hibridizacija teh dveh vrst v *P. xalni* (EU)
- Bavarska: okuženi obrečni gozdovi (20.000 km)
- Avstrija: okuženi obrečni gozdovi (26 rečnih sistemov)
- VZROK: sadnja okuženih sadik
- *P. siskiyuensis* (S. Amerika, Avstralija - 2013, UK)



Vir: Jung et al., 2018: Canker and decline diseases caused by soil- and airborne *Phytophthora* species in forests and woodlands

Phytophthora spp.

Fitoftorna sušica vejic (sudden oak death & sudden larch death)

- 1995, USA (Kalifornija)
- Gozdovi, urbana okolja
- *P. ramorum*
- > 150 gostiteljev
- EU:
 - 1990; *Rhododendron* spp., *Viburnum* spp.
 - 2009; UK; *Larix kaempferi* (2013: 3 milijone dreves, 10.000 ha)
 - maj 2017: *L. kaempferi*, gozd, Francija
- različne linije *P. ramorum*



Vir: Jung et al., 2018: Canker and decline diseases caused by soil- and airborne *Phytophthora* species in forests and woodlands

Phytophthora spp.

Mediterranska makija

P. cinnamomi ,...

+

Klimatske spremembe

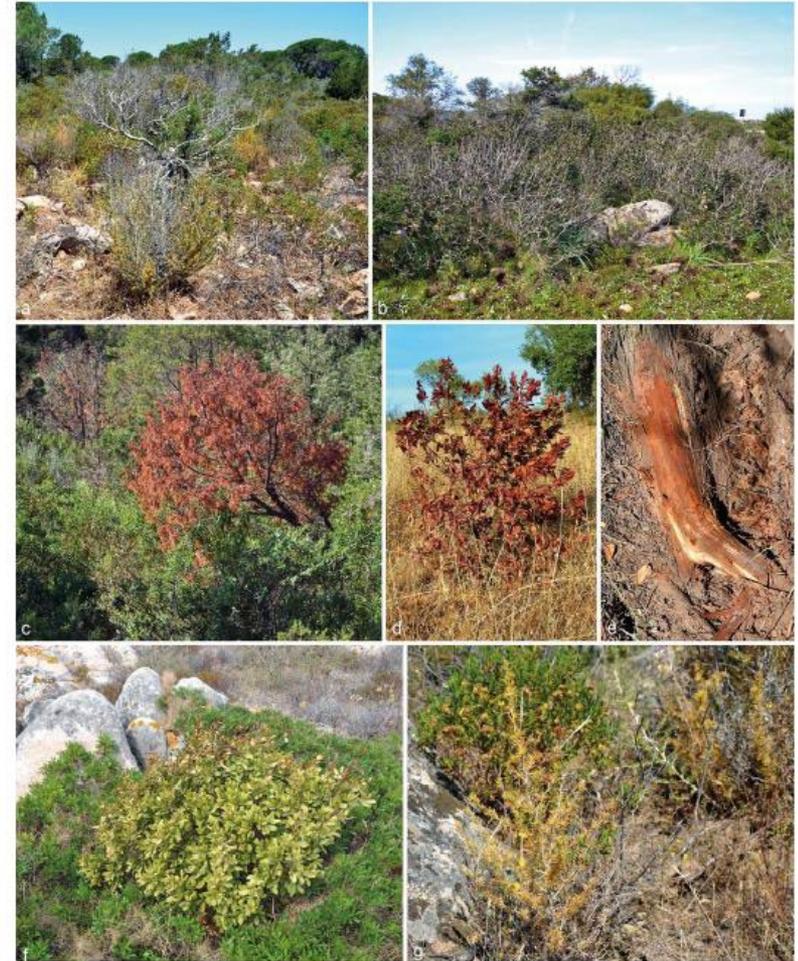
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Article
***Phytophthora mediterranea* sp. nov., a New Species Closely Related to *Phytophthora cinnamomi* from Nursery Plants of *Myrtus communis* in Italy**

Carlo Bregant ¹, Antonio A. Mulas ¹, Giovanni Rossetto ¹ , Antonio Deidda ², Lucia Maddau ², Giovanni Piras ³ and Benedetto T. Linaldeddu ^{1,*} 



Vir: Jung et al., 2018: Canker and decline diseases caused by soil- and airborne *Phytophthora* species in forests and woodlands



- Zaznane vrste *Phytophthora* spp. v vzorcih iz drevesnic v 2022:
 - *Phytophthora lacustris*
 - *Phytophthora ganapodyides*
 - *Phytophthora cryptogea*
 - *Phytophthora (pseudo)cryptogea*
- Pa tudi:
 - *Phytopythium litorale*
 - *Phytopythium vexans*
 - *Pythium litorale*
 - *Phytopythium chamaehyphon*
- **Znani patogeni rastlin, izolati *Phytopythium* so bili v laboratorijskih pogojih izredno agresivni**
- Podana priporočila (higienski in biovarnostni ukrepi): dezinfekcija zalivalnih sistemov, odstranjevanje ne-vitalnih rastlin, dezinfekcijski predpražniki...



2022 – *Macrophomina phaseolina*



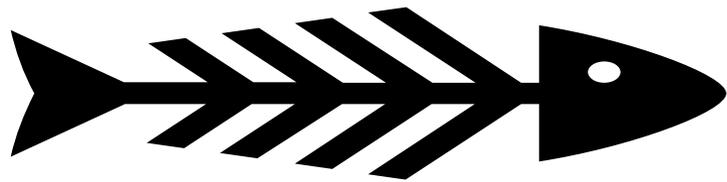
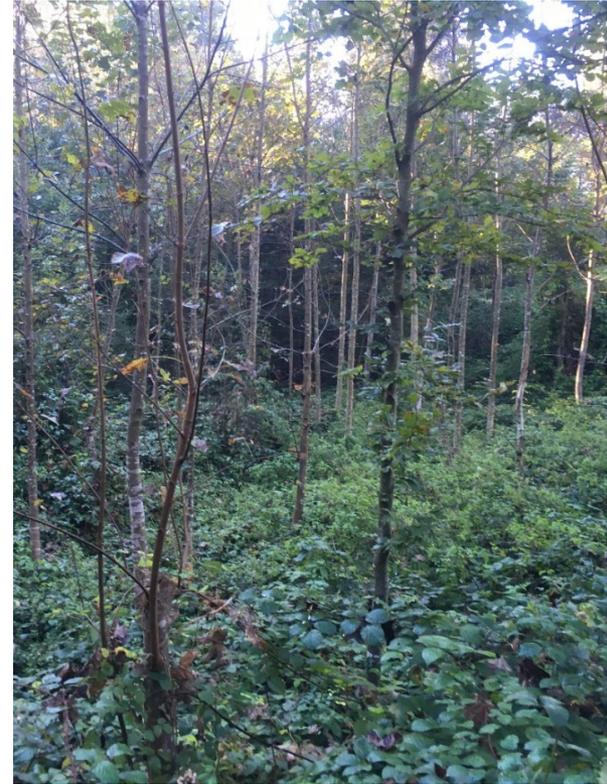
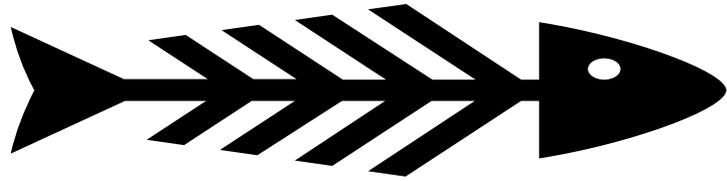
- 20% sadik *P. abies*: klorotične, nekroze, koreninski sistem
- Nekroze tudi na 10% vizualno zdravih sadikah
- *Phytophthora* sp., *Heterobasidion* sp., ???
- Izolacije & barkoding: iz vseh vzorcev smo pridobili glivo ***Macrophomina phaseolina***
- Botryosphaeriaceae, generalist, tla, nekroze in gniloba, odmiranje sadik, visoke T & suša → izgube; dolgotrajna obstojnost v tleh (>15let); vstop skozi korenine v vaskularni sistem (prevajanje vode, hranil)

Verticillium dahliae



Brglez in sod., v tisku

Verticillium dahliae



Pepelovke (*Erysiphe* spp.)



- V EU 4 kriptične vrste (*E. alphitoides*, *E. quercicola*, *E. hypophylla*, *Phyllactinia roboris*): tujerodne vrste, distribucija v SLO? **tveganje za nove vnose, raznos, večanje raznolikosti → nastanek novih, agresivnejših različkov**
- Okužba – vitalnost in fitnes sadike
- Okužena sadika = inokulum
- Ekonomski vidik

Dobri nameni – tvegane rešitve



www.zazdravje.net

POSADI DREVO

Iniciativa za sajenje dreves



DAN DREVES

Po zgledu drugih držav, bi radi vpeljali vseslovenski dan sajenja dreves – dan v letu, ko prebivalci Slovenije skupaj sadimo drevesa.



DREVESNICE

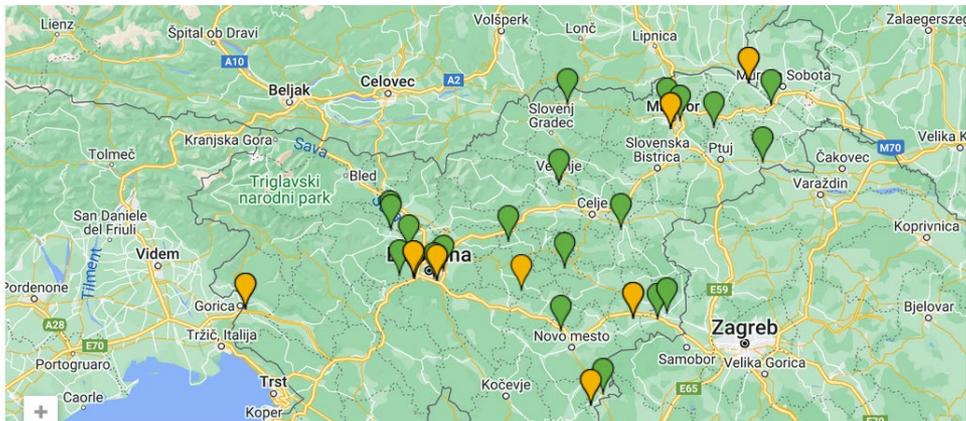
Seznam drevesnic po Sloveniji



AKTIVNOSTI

Aktivnosti v Sloveniji povezane s sajenjem in skrbjo za drevesa.

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TVEGANJA / VPLIVI

- **Drevesničar**
- **Končni uporabnik**
- **Kupec**
- **Okolje**
- **Družba**

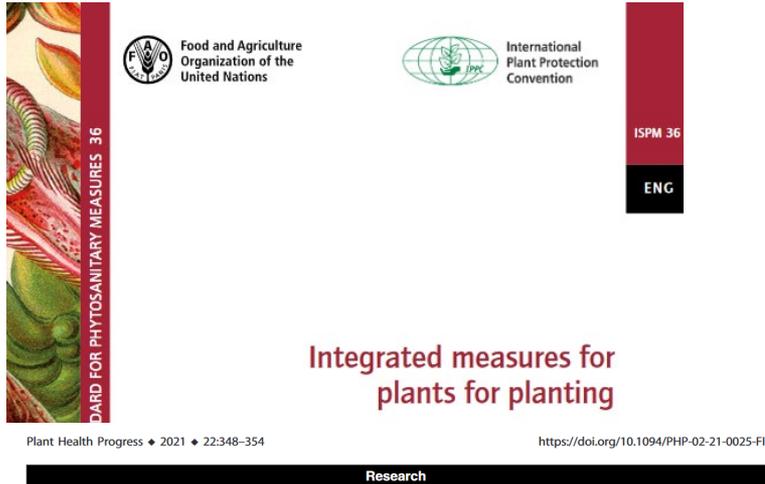




Pogozdovanje Krasa s črnim borom, Bazovica, 1906-1910 (v knjigi Človek, zemlja, kamen in burja: zgodovina kulturne krajine Krasa / Aleksander Panjek).

- **Preventivni biovarnostni ukrepi**
- **Certifikacijske sheme?**
- **Dodatne zahteve projektov, nacionalno-financiranih shem za uporabo sadik?**
- **Nacionalne zahteve?**
- **Ozaveščanje**
- **Sadike lokalnega izvora**
- **Omejitve pri vnosu iz tujine, tudi vnosi za namene poskusov**

Vnos zdravega sadilnega materiala, pridelanega ob upoštevanju preventivnih biovarnostnih ukrepov, v naravna okolja je „cost-effective“ in etično sprejemljiv pristop.



Food and Agriculture Organization of the United Nations

International Plant Protection Convention

ISPM 36

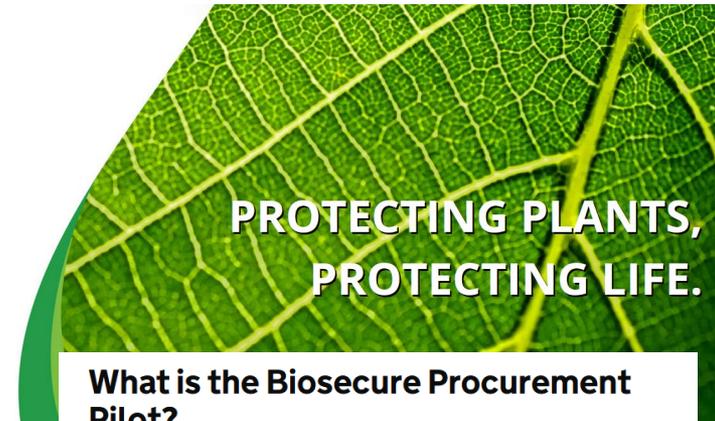
ENG

STANDARD FOR PHYTOSANITARY MEASURES 36

Integrated measures for plants for planting

Plant Health Progress ♦ 2021 ♦ 22:348–354 <https://doi.org/10.1094/PHP-02-21-0025-FI>

Research



PROTECTING PLANTS, PROTECTING LIFE.

What is the Biosecure Procurement Pilot?

Also included in the England Trees Action Plan is our commitment to introduce a new biosecure procurement criterion for suppliers of plants and trees to government contracts. As we talked about above, this is because we know strong biosecurity relies on everyone playing their part and being committed to ensuring that plants and trees are always sourced from reputable suppliers with high biosecurity standards.

From June 2022, Defra and the Forestry Commission will introduce a 12-month pilot to test a new biosecure procurement requirement as part of the England Woodland Creation Offer and the Tree Health Pilot grant schemes. This means suppliers will need to demonstrate that they can meet the biosecurity requirements set out within [Plant Health Management Standard](#).



An Accreditation Program to Produce Native Plant Nursery Stock Free of *Phytophthora* for Use in Habitat Restoration

Tedmund J. Swiecki,^{1,*} Elizabeth A. Bernhardt,¹ Susan J. Frankel,² Diana Benner,³ and Janell Hillman⁴

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⁴ Santa Clara Valley Water District, San Jose, CA 95118

Accepted for publication 8 April 2021.

Help safeguard your business and our countryside.

Just one disease like ash dieback can cause billions of pounds worth of economic and environmental damage. That's why we need to work together to grow, buy and sell healthy plants.

What can you do?

By adopting the Plant Health Management Standard and becoming Plant Healthy certified, you'll be helping to protect our plants, landscape and wildlife.



... nurseries will play a crucial role. By enforcing appropriate biosecurity practices and early detection, they can reduce their economic losses and limit pest spread into forests and urban areas...

(Antonelli et al., 2022)

IN DUBIO PRO NATURA



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