

pr ve pest. e e pr es prers
er vere ssppers reerre s e
s , pr r s re e e prr e r.
e s re e e prr e r.

_ ter ress re er v. sve. _ 1 _ 1 _ 1 _ 1 _ rest erv e rep r e r s e re ree v. sve pes st e ss e _t_epre_e resette pr v s fer ever e spe terve 1 % re e se e s e res s p e s re per e e s s e e s r e e e e e e e r e rer *prep. s seesr v.ers. e_t_ ver *e .spe ev. s. pess re r $r \rightarrow p$. e , see e vere re t sit. respess resee trerees rsprs s, re e eve .ve. rr ve rs . s e sree s e e s e ss _ s er s _ ... e er spessse re ee er ... e. rerse ere e reps Ne ere seve se rsNe · ers e pe e pre rs r e e s. e rress ss eep e er r ee e e essr pess pre ressve rev spece e e e e r ress

ve es ve _ repr_ree . es e r s e e e ree ve l es se e rs r . . see e

_ rees se re rs ep spprsre vs. pe e prep. see. . e seees Terristre e e e e vire pis e er s pe espe e el es es rite. pe ep pe s ré s p sere pre e et es

pess rrve v p. sret re e eser <u>e</u> tree <u>e</u> re p. seret pre e srvve pre ssrep presrp sprrt pse eeer 4 sse sse ps erres res vepres restered e persone e respris srus els releis ir epes<u>us</u> els evere es pes pus pes te ers reseter peperep ev pre sare err rrestee e e e e e svers

e sve e réesres res ess resssuer rest pr e e rest e e es reve e res r

 espess p es es es e r

ee pe res p e es r

v sve pe es s ev e esr e

er ere e re rs e es

pr per v es e p r e e e

erv espr v e resss s er r

preve s e e r r e erp r

p er es v e s e es

s re e e r res s

pre eve s s s e re res res

pre e e ere pe es

e er er er e e e e res pe s

e v pes s p re re s

re re s

es references respectives en estate e

An $n \rightarrow n \quad n \quad A$. $A \rightarrow n \quad n \rightarrow n$

epe serrs

sreer e er pe

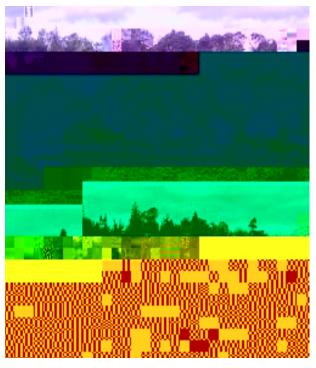
ee spre rresrp sees

e e spre rreepees

ss. res r

Urban and rural forests cover one-quarter of North America, sustaining biological diversity and providing clean air and water to hundreds of millions of people. Forest products and related industries employ more than 1.6 million people and contribute \$231.5 billion to our nation's economy.43 Forests also provide enjoyment to millions of hikers, campers, hunters, anglers, birders and other recreational users, whose activities and buying habits contribute tens of billions of dollars to local economies. Perhaps most important, our forests-urban, suburban, rural and wild—are part of our national heritage, providing beauty and shade to our homes and comfort to our spirits.

e Tpre Tpe rees .p. erte e_ r est er. ppe . ree_s sree_s . r _s pes. er spes_ \ s rve_s ppe_r / K . ver e e e sre s e e e . pes sr e, e ss. v. eesrev. Tpre re eer rs e pe e e r s r e r s ere re ses rreprerse e e pessit e errpsie . r e pe_s re re e esr reres ve r e rp ses r sepes e eses pre s er_s re e Tprersere TsesrT e e rees ere v ese rees re es s s res e er e e s s se ver e Te ers re Tpe. es rss e



IN 2002, FEDERAL AND STATE AGENCIES cut and chipped some 1,000 trees in a neighborhood outside Seattle (before and after, above) to eradicate a voracious invasive insect: the citrus longhorned beetle, which was discovered on imported maple trees at a local nursery. State agencies, municipalities and private landowners often bear significant financial burdens—through no fault of their own—when imported nursery plants carry insects and diseases into the country.

© Washington State Department of Agriculture

∠e ee s... ..e ve fr

The United States can participate in international trade in nursery plants and protect its forests, but only if it develops a comprehensive pest detection and containment system that includes at least the following components:

- 1. Phase in regulations, both in U.S. policy and through international trade organizations, that ensure that only pest-free plants are shipped in international trade.
- 2. Improve the identification of potential pests. For example, ask botanical gardens overseas to monitor their plantings of North American species for pests and diseases.
- 3. Develop contingency plans for eradicating any outbreaks of the pests so identified.
- Provide incentives to producers to implement clean stock programs and to shift to plant types that are unlikely to transport pests, such as tissue culture plantlets.
- 5. Inspect plants at their places of origin, before they are shipped to the United States.
- 6. Strengthen quarantines of imported plants to prevent the escape of any pests.
- 7. Create an insurance program under which nurseries that participate in clean stock and early detection programs can be reimbursed for losses suffered when pests damage inventory despite the nurseries' best efforts.

- 8. Improve measures to prevent the movement of infected nursery stock within the country.
- 9. Charge a modest user fee for the full range of plant imports to help fund the overall pest prevention and eradication programs.

Developing a comprehensive approach that meets the requirements of international trade agreements will be time consuming. In the short term, APHIS should institute the temporary NAP-PRA category to free up time and resources for the development of a long-term, effective system.

e pe_s_s e ee 🟲 pre e _ e 💇 er re ss er e pe s s re re e e 1 . e.s. res e s e r s preve e er e.r.s. r pr ee SE SE er 📭 re



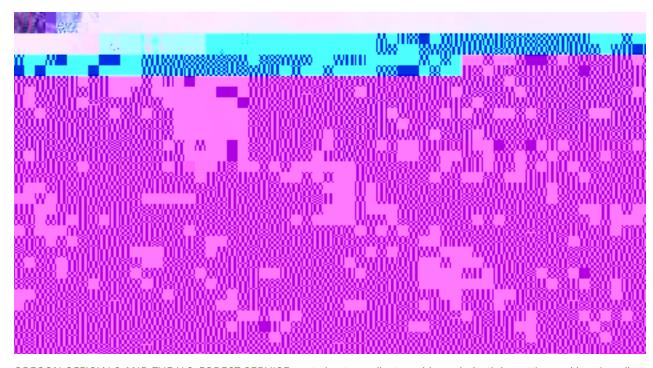
APHIS's TENTATIVE PROPOSALS don't address the problem of imported pathogens that evolve into more harmful forms once they arrive. Scientists have found as many as five species of the pathogenic genus *Phytophthora* (see sidebar, p. 15) on a single nursery plant—an indication that the pathogen mutates and hybridizes on the nursery plants themselves.

© Canadian Food Inspection Agency; thanks to California Oak Mortality Task Force

s∜ p & e e. ppr erv. re s ere ssever e pesser s re_s pe_s_s 1 pr p es pe_s_s r r e pr ess r e e per e e re s ree_pe_e_sp. e . v. . ₃ ppr preve r ree_s re_s_s

TABLE 3Serious Forest Pests Unknown to Science at the Time of Their Introduction

Cryphonectria parasitica	chestnut blight
Discula destructive	dogwood anthracnose
Phytophthora lateralis	Port-Orford-cedar root disease
• Phytophthora ramorum	sudden oak death
Sirococcus clavigignenti-juglandacearum	butternut canker



OREGON OFFICIALS AND THE U.S. FOREST SERVICE are trying to eradicate sudden oak death by cutting and burning all host trees near the site of the infestations. APHIS has the authority to temporarily halt plant imports until it can assess how much risk certain species and places of origin pose to U.S. forests, which would help avoid expensive and damaging control efforts like those shown above. © Oregon Department of Forestry



A concept paper developed by the Plants for Planting Panel of the North American Plant Protection Organization (an organization that coordinates efforts among Canada, the United States and Mexico to protect each country's plant resources from regulated plant pests, while facilitating international and intraregional trade)⁵¹ notes that risk assessments based on lists of known quarantine pests do not address adequately numerous uncertainties, including the following:

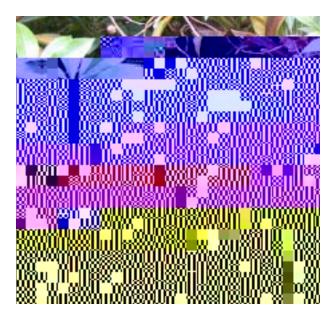
- Many potential pests are obscure or unknown and most pathogens are poorly understood.
- The impact of insects and pathogens in their native environment is an unreliable indicator of their behavior in a new ecosystem.
- There is great potential for genetic change or variability in pests and hosts.

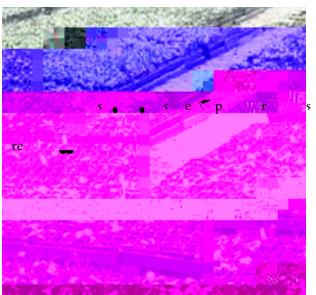
In addition, countries' reliance on visual inspection at the ports is undercut by the failure of resources to keep pace with the rapidly increasing volume of imports.

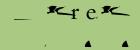
rp r e v re e ere_> e er r ssrpr € e e er e e e e s р. pess e 🖑 e s es errrp_s _stesrertiet r s ep e e s e er ve ee er 🕏 s esre est e pere re e spe es eres pe es ve ee est e r er s s ė re e ervr e e. p. e . ve pe e.s rk. sr es re, p __s e ←r_s, re_sp s ver ser spe e er stes reres r e p. «pre r resr e r ...er e s ... s pr e . , . p. e _s . ve. ep. s e rær_ 🐔 . s veevr 🕇 e _pe e_s ve ee _s e r, sevr eesse_ r ep e rer er ee pere es se epese e. r. r e_s . e_s s er ep e epre e r ss. s s ve v. r. e ee pe es . rev r, r e er, resp e re e ree. re_s e_l _ . resterv e_. re ₹ pe. pe e.<u>s.</u> es es per e r ser_sre_ere e ee_s A A et ese ve e . s e rpssessettee e pe e r e v r e ress e r r r e rre s e e . . . <u>s</u> pe_s_pe_e_s_. ere rev e e . e , re l e vers . r_ vere ee e pe e e pe_s_s__e e r .. ere e pe_s .

ep e ess e e ve
ee e p s're reres
e vers r e reres e
e s'epre e pes ep e
se e vr rerpp s
s e eres pe r

s prpseepsere prv
r4, rp e e s 4, e
r1, rpe e 4, s 4, e 1 4, _ s 4







The genus *Phytophthora* includes many of the world's most destructive plant diseases, including the species that caused the Irish potato blight†in the mid 1800s as well as the cause of today's sudden oak death. In an invaded plant, the *Phytophthora* organism penetrates the spaces between plant cells and even the cells themselves, eventually infesting much of the plantís tissue. *Phytophthora* species have shown the ability to shift hosts, sometimes infesting species previously thought to be resistant. The genus is not closely related to fungi, but shares a lineage with brown algae (better known as diatoms).⁵⁰



122 The e.e. sres 3 V SVE 3 E S e ş

· ve ep. e, v. sve e . e . e . r s e e e e e_se_s e rre pr r ve eer ee∜pre pr ve e s e re s e e ree rergipe . _ j s teres sesses rs. s. s s preve _ ve p ppr ₹. e _sp _ss e_

_ ev s e e re pess vee ere e r v rer s eps ers <u>e</u>ter pe pe e erve e s s

ese 1 s e es e prep sprees rs r esres___sre_se ers_se e eks, er, rereë e ser, e pers e ek e, e erss, e e reé e s e e e s ver e s t e e ret prisre e _ e gesepeeve rs. e.p. s $e^{\mathbf{N}}$ _ er. $e^{\mathbf{N}}$ _ s. e sre ees pre e.k. sse reree sr eve e e r s e

-22 J. 28. ... in the second of The second secon - , ..., , , ... , ... , ... , ... , ... , ... , ,

p eve pre s l ppr see e e e e e r r, se reere e es respes e e ree r. Kpre r r. rpr er e e s pr r 🛴 ere re ess e er e_s perv_s __ _ _ _ _ r__s_e ep r r re_s.s.e. epsere. spervs s .. e_s d s r r eseree ("pree"e rs_eesssprp s es re ee r r e erve_

Ts. T. T. ve ee e Tpre s pr .r s, p. srerp eps/r.v.pe/re/r/e er ep s, pessr e es e r e ek e preve e pre e e er e s e s pr tpr terp. Apre. v e espes pe evr te e srs. e e se sres rest s r r.s.p.se.pere eré s e e e e exp. sr. (

_ _ pee reve e r_s p. _s. ere ee. _

and the second of the second o _ . . e.s e r_s . se.ss resprese res es rr re per er e e er p. s et pre rt. s e r_e re erv re es _ 1 e e e e e p . . . s r . 🚣 e . ppr . 🤻 e ev erss eek ee e ve es res er pessse e re r p. srt. pr .rre .. re. tpe s s s er ve 1 " sesspess ss e r srses (e

rprep. .pr rpe, pes.s .s. . p e sess e es r s p res e e rers. "es e er epressés e see e.

> and the second second

e eswresrese e pee p sr s se s e re r pr e.se.s . . s eve p. re re pre e sve pr rt, re sr . tpre p. s re ree

, e ere p. 🖑 pr. _s _s _ * er . s _ * er . , ress e r _ e. e v er re ses es reres ere re s_s___tve_r_es per e ee e 🖑 pre e sve p ... ppr ... _ ∠e<u>M</u> _ prpssee reee e. ree pere resreseee es pre e svere 👛 e rre pr p s , r 💆 _ s . e . e_ s e e _sprp_e r er . ee p. e ers , red pe, e s ve e e rrv , e e r e Tpr., e e e e erse e^eesr ere s s e preve ve e s re s eep e K v ers _ e_ e U e s ee e _s ∴ er e ♥ . e . . e.s e. s. pre es

 $An \quad n \quad > n \quad n \quad A$.

- ²⁵ Borys Tkacz, USDA Forest Service, pers. comm. Nov. 2006
- USDA Forest Service. Pest Risk Assessment on the Importation of Larch from Siberia and the Soviet Far East. Miscellaneous Publication No. 1495. September 1991.
- 37 Ibid.
- 38 Ibid.
- 39 Ibid.
- 40 Ibid.
- ⁴¹ United States Department of Agriculture, Animal Plant Health Inspection Service. 2002. Citrus longhorned beetle program. King County, Washington. Environmental Assessment. April, 2002. USDA, APHIS, 12 pp.
- ⁴² Nowak, D.J., J.E. Pasek, R.A. Sequeira, D.E. Crane, V.C. Mastro. 2001. Potential Effect of Anoplophora *glabripennis* (Coleoptera: Cermabycidae) on Urban Trees in the United States. Forest Entomology. February 2001.
- ⁴³ United States Department of Agriculture Forest Service New Forest Partnerships, Northeastern Area Association of State Foresters, (NAASF) (no date). People and Trees: Partners in Time

e re erv s s pre erve r ep. s. T. s repre e Ver s , e pr e e s ers e ee s rv ve en recerve eve pspes es se e s r s e s s r ve erv — e r . rs ereprers rpr serprve ers er ever Leer e ss e e e resrepre rer per ve erv prve geverv sepe pre re 4 res e el es