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norman.daurelle@inrae.fr

Efficiency of anti-sharka control strategies

Norman Daurelle^{1,2}, Anne Quillévéré-Hamard², Olivier Cotto¹ and Gaël Thébaud¹

¹UMR PHIM Plant Health Institute, INRAE, Univ Montpellier, CIRAD, Institut Agro, IRD, Campus international de Baillarguet, 34398 Montpellier, France.
²ANSES, Unité EAS (Epidémiologie et Appui à la Surveillance), 31 av. Tony Garnier, 69007 Lyon, France

What is sharka?

Sharka, caused by the plum pox virus (PPV), is a disease affecting *Prunus* trees. It is transmitted in a non-persistent manner by aphids, and long-distance dispersal is mainly due to human transport of infected plant material. The symptoms include distorted leaves, yellow rings on fruit stones, alteration of fruit shape and chemical content, as well as premature fruit drop in some cases. The costs associated with sharka management have been estimated at 10 billion euros between 1975 and 2005.¹

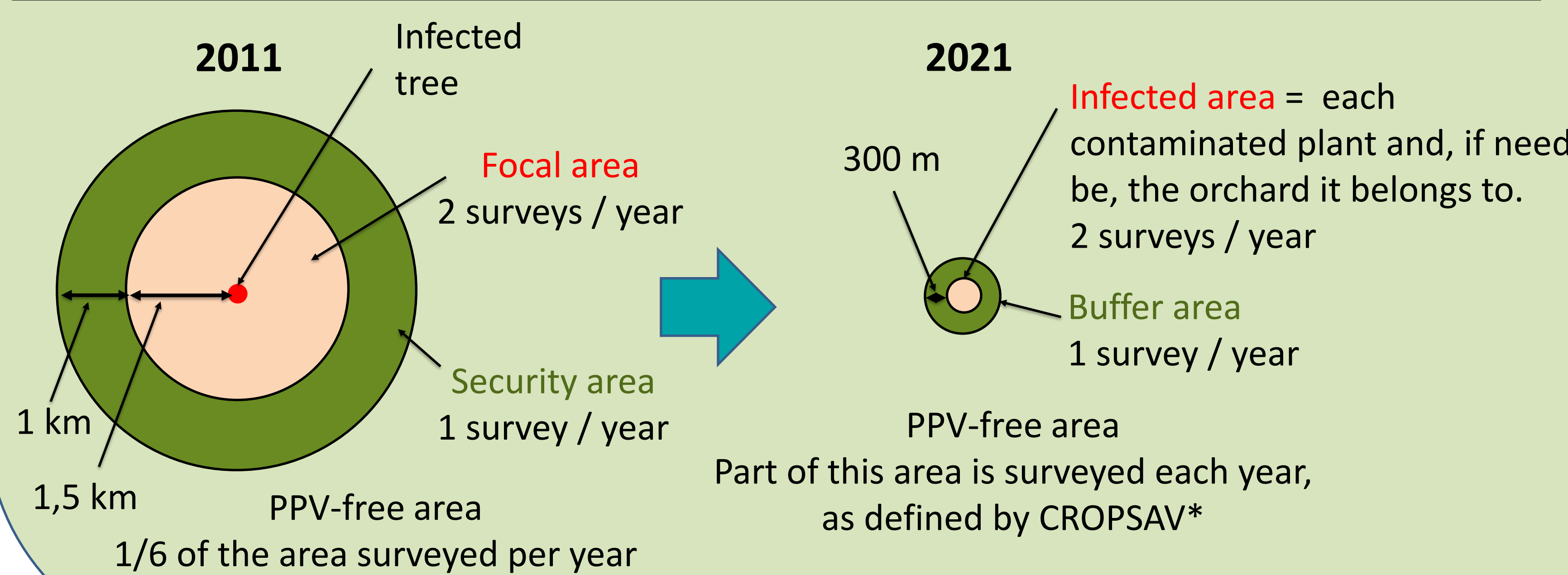


Symptoms of sharka on apricot (top) and plum tree leaf (bottom)

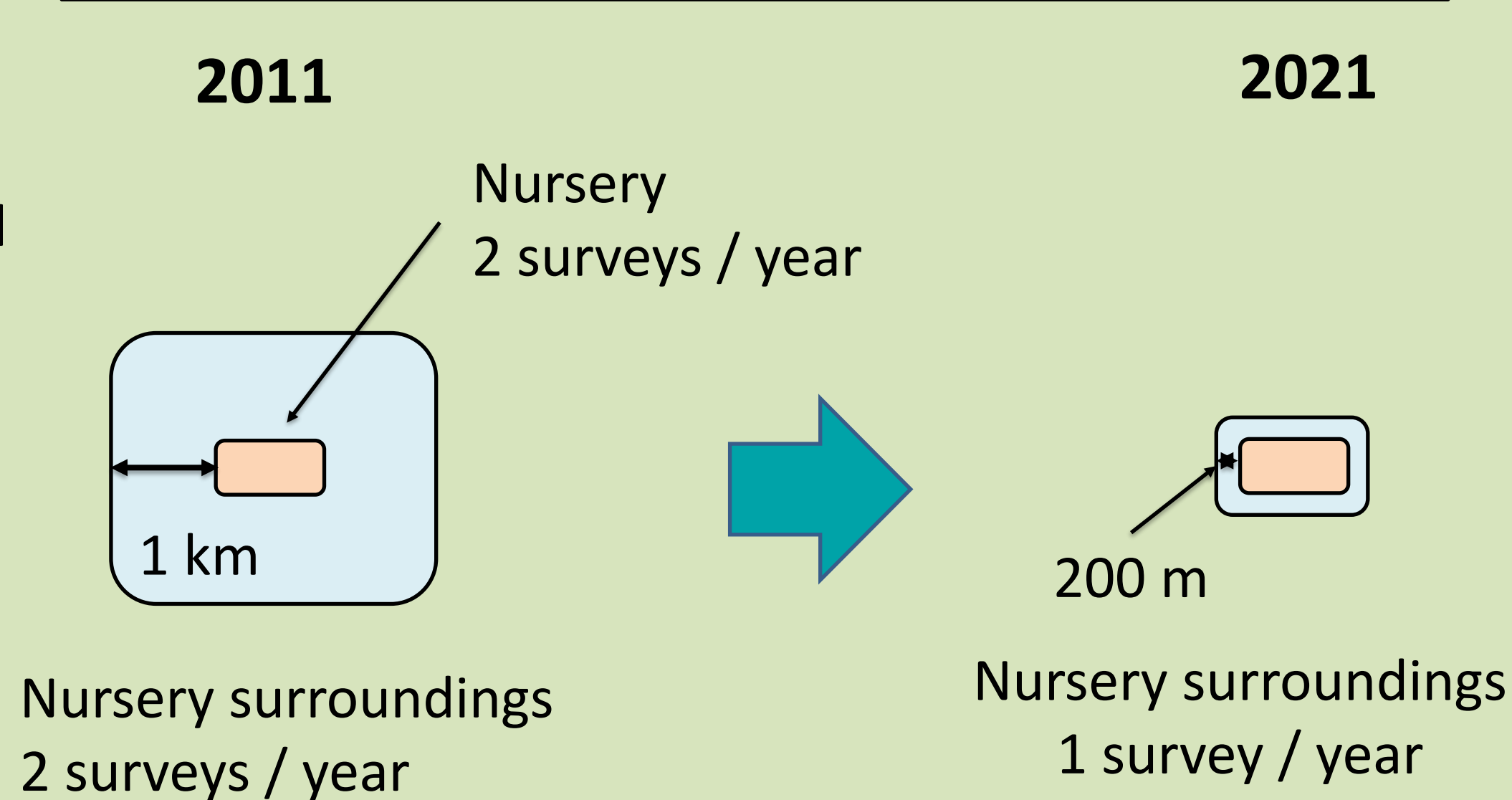
Recent changes in surveillance:

- In 2019 PPV has changed status from Quarantine Pest to Regulated Non-Quarantine Pest.²
- The state aims to transfer the responsibility and cost of surveillance to growers.

Orchards



Nurseries



Surveillance areas defined by ministerial decree^{3,4}

Transfer of surveillance responsibility + Changes in size of surveillance area and frequency

How are these changes going to impact the efficiency of disease management?

I/ How performant is the surveillance system? And in the future?

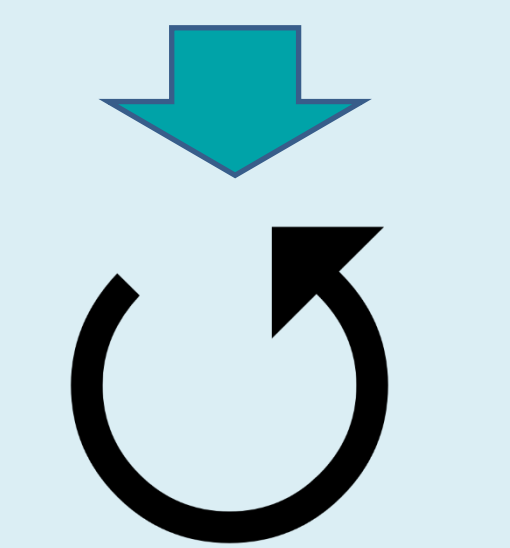
OASIS evaluation method⁵



Interview system members



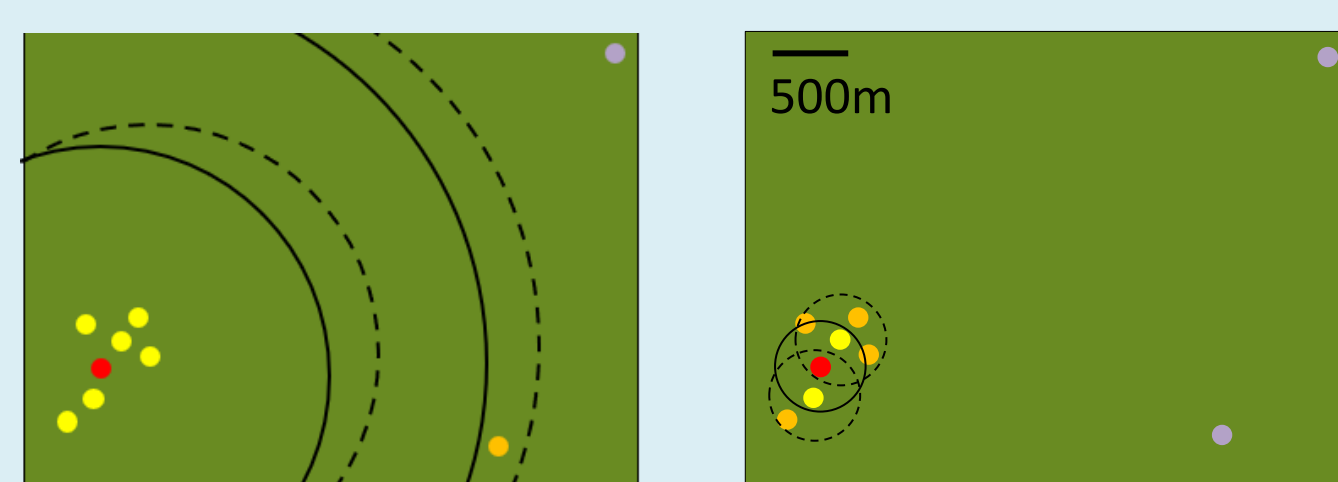
Grade system performance according to the OASIS scoring grid



Make recommendations to improve surveillance

II/ Metrics for measuring control success

Under previous surveillance Under target surveillance



- Initial infected tree
 - Secondary infected tree detected through survey on year n
 - Secondary infected tree detected through survey on year n+1
 - Secondary infected trees still undetected after 2 rounds of surveillance
- Boundaries of surveillance areas:
— around first case
... around secondary infections

We will define metrics that allow comparison of surveillance before and after changes.

III/ Epidemiological and economic efficiency of surveillance

Simulation of disease propagation

Cumulative proportion of infected trees within orchards



A realistic-landscape propagation model will be used to estimate epidemiological and economic efficiency of the transition system.

Different grower behaviours will be implemented into the model, and the efficiency of the target system will be estimated.

This work should provide i) insight into the efficiency of the different surveillance strategies, and ii) tools for detecting possible limits of the target strategy.

* CROPSAV = Conseils Régionaux d'Orientation de la Politique Sanitaire Animale et Végétale

Literature cited

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2 - « Règlement d'exécution (UE) 2019/2072 de la Commission du 28 novembre 2019 établissant des conditions uniformes pour la mise en œuvre du règlement (UE) 2016/2031 du Parlement européen et du Conseil, en ce qui concerne les mesures de protection contre les organismes nuisibles aux végétaux, abrogeant le règlement (CE) no 690/2008 de la Commission et modifiant le règlement d'exécution (UE) 2018/2019 de la Commission »

3 - Arrêté du 17 mars 2011 relatif à la lutte contre le Plum Pox Virus, agent causal de la maladie de la Sharka, sur les végétaux sensibles du genre Prunus, JORF n°0067 du 20 mars 2011
4 - Arrêté du 9 juillet 2021 relatif à la lutte contre le Plum pox virus, agent causal de la maladie de la sharka, JORF n°0163 du 16 juillet 2021
5 - P. Hendrikx et al., « OASIS: An Assessment Tool of Epidemiological Surveillance Systems in Animal Health and Food Safety », Epidemiology and Infection 139, no 10 (octobre 2011): 1486-96, <https://doi.org/10.1017/S0950268811000161>