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BEYOND XYLELLA

Effective and sustainable IPM schemes to mitigate *Xylella fastidiosa* impacts

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Table of contents

Summary 4

1 INTRODUCTION 5

2 MATERIAL AND METHODS 6

2.1 Definition of IPM schemes 6

2.1.1 General characteristics representing the implementation context of IPM schemes 7

2.1.2 Context-dependent elements 7

2.2 Evaluation of IPM schemes 8

2.2.1 First round of evaluation of IPM schemes 10

2.2.2 Second round of evaluation of IPM schemes 12

2.3 Statistical analysis 12

3 RESULTS 15

3.1 First round evaluation of IPM schemes 15

3.2 Second round evaluation of IPM schemes 20

4 SUMMARY OF RESULTS AND CONCLUSIONS 27

5 References 30

ANNEX A – Description of IPM options 31

ANNEX B – List of candidate IPM schemes 39

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SUMMARY

One of the main objectives of the BeXyl project is to support the implementation of effective, sustainable, and context-specific management strategies for *Xylella fastidiosa* across European production systems affected by the pathogen. Achieving this objective requires translating the scientific knowledge generated within the project into practical tools supporting decisions by growers, nursery operators, advisors, and plant health authorities.

This deliverable presents the development, evaluation, and implementation of the BeXyl Decision Support System (DSS) for selecting Integrated Pest Management (IPM) schemes for almond, grapevine, and olive. Rather than recommending individual measures, the DSS combines compatible management options into coherent schemes adapted to different epidemiological, agronomic, and operational contexts. The schemes are organised according to crop, user type, management objective, and management intensity.

The development of the DSS required the integration of scientific evidence, experimental results, modelling outputs, management recommendations, and technical expertise generated across the BeXyl work packages. This process relied on continuous interaction among project partners, whose complementary expertise covered plant pathology, entomology, epidemiology, agronomy, risk assessment, modelling, and plant health management. The Plant Health Institute (PI) also played a fundamental role by facilitating knowledge integration, coordinating discussions, and ensuring the scientific consistency of the framework.

A structured two-stage procedure was used to evaluate the candidate IPM schemes. In the first round, 130 schemes were assessed using the Overall Assessment Score of IPM Schemes (OASIS), supporting their initial screening and prioritisation. Based on these results, 54 schemes were retained for a second-round multicriteria evaluation addressing Level of scientific and technical knowledge, Effectiveness, Environmental impact, Safety, and Adoption readiness. Integrated performance was then calculated as a composite indicator.

The evaluation showed that no single strategy performs optimally under all conditions. Different schemes provide different balances among expected effectiveness, environmental sustainability, implementation requirements, and adoption readiness. The results therefore support a context-specific approach, allowing users to identify strategies suited to their objectives, available resources, and local epidemiological conditions.

The main output of this work is the BeXyl DSS, which integrates the evaluated IPM schemes into an operational platform. To the best of our knowledge, it represents the first European decision-support system specifically designed to support the selection of complete IPM schemes for managing *X. fastidiosa* across multiple host crops. The DSS is one of the main exploitable outcomes of BeXyl, translating knowledge generated across the consortium into a practical tool for evidence-based and transparent decision making. Developed through continuous interaction with experts and stakeholders, it provides a solid basis for future implementation, validation, and further development beyond the project lifetime.

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1 INTRODUCTION

Xylella fastidiosa (*Xf*) is one of the most important plant pathogenic bacteria threatening European agriculture, affecting multiple host crops and requiring long-term management strategies adapted to diverse epidemiological, agronomic, and regulatory contexts. In areas where the pathogen is established, disease management relies on Integrated Pest Management (IPM), combining preventive, monitoring, and intervention measures targeting the pathogen, its vectors, host plants, and the agroecosystem. Because the relative effectiveness, feasibility, and sustainability of available management options vary according to local conditions, supporting evidence-based selection of appropriate management strategies represents one of the major challenges for sustainable *Xf* management.

One of the main objectives of the BeXyl project is to translate the scientific knowledge generated across the consortium into practical tools that support decision-making by farmers, nursery operators, advisors, and plant health authorities. Within this framework, WP7 developed the BeXyl Decision Support System (DSS), an operational platform designed to support the selection and implementation of IPM strategies for almond, grapevine, and olive production systems under endemic conditions. The DSS is intended for use in areas where long-term IPM management is compatible with phytosanitary regulations, particularly within containment areas, and is not designed for pest-free areas, eradication areas, or buffer zones subject to mandatory eradication measures.

The main innovation of the BeXyl DSS is that it supports the selection of complete IPM schemes rather than individual management measures. Instead of recommending isolated interventions, the system organises compatible management options into coherent IPM schemes tailored to different crops, users, management objectives, and implementation contexts. This approach acknowledges that no single management strategy is universally optimal and that effective disease management depends on balancing expected effectiveness, scientific evidence, environmental sustainability, safety, operational feasibility, and adoption readiness according to the specific characteristics of each production system.

The development of the DSS required the integration of scientific evidence, experimental results, modelling outputs, and technical knowledge generated throughout the BeXyl project. Results from multiple work packages were progressively harmonised and translated into operational management options through continuous interaction among project partners, bringing together complementary expertise in plant pathology, entomology, epidemiology, agronomy, modelling, risk assessment, and plant health management. The active coordination of the Project Integration team ensured the consistency of this process and facilitated the transformation of multidisciplinary scientific knowledge into a common operational framework.

This deliverable presents the methodological framework adopted for the development, evaluation, and implementation of the BeXyl IPM schemes and describes the two-stage expert evaluation process used to identify the most suitable strategies for different production contexts. It also presents the implementation of the resulting schemes within the BeXyl DSS, which constitutes one of the principal exploitable outcomes and long-term legacies of the project.

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2 MATERIAL AND METHODS

2.1 Definition of IPM schemes

The IPM schemes were developed using a structured framework that integrates scientific evidence, expert knowledge, and available management options. The framework provides a consistent basis for organizing management strategies into coherent schemes that can be adapted to different epidemiological, agronomic, and operational contexts. The following sections describe the key concepts and terminology underlying the development, organization, and selection of the proposed IPM schemes.

IPM refers to the careful consideration of all available plant protection methods and the subsequent integration of appropriate measures that discourage the development of populations of harmful organisms and keep the use of plant protection products and other forms of intervention at levels that are economically and ecologically justified, while reducing or minimizing risks to human health and the environment (EU Framework Directive on the Sustainable Use of Pesticides, Directive 2009/128/EC).

IPM options are management interventions that may operate at the strategic, tactical or operational level and aim to reduce the abundance and impacts of pathogen and vector populations. An IPM option can target one or more of the following IPM principles:

- **Prevention**: Prevention options act by:
  - Reducing the presence or intensity of risk factors, thereby decreasing the likelihood of plant infections;
  - Reducing plant susceptibility through improved plant health or increased tolerance.
- **Monitoring**: Monitoring consists of the systematic and regular observation, sampling, or recording of pest populations and disease incidence or severity according to standardized protocols. It is conducted to assess pest pressure, detect early infestations or infections, evaluate temporal trends, and support timely and informed decisions regarding the selection, implementation, and evaluation of appropriate management options.
- **Intervention**: Intervention options aim to reduce pathogen spread or disease development by acting on the pathogen, its vector, or the host plant. These options may directly target the bacterium or the vector, or modify plant physiological responses in ways that reduce pathogen multiplication, transmission, or disease progression.

IPM schemes are structured combinations of complementary IPM options organized into coherent management strategies tailored to specific implementation contexts. Each scheme integrates prevention, monitoring, and intervention options according to the crop, user profile, management objective, and management intensity. The schemes are intended to provide practical and scientifically based guidance for the long-term management of *Xf* in established areas.

The IPM schemes were developed through a structured process integrating scientific evidence, expert knowledge, management options currently available in Europe, and knowledge generated within the BeXyl project. Candidate schemes were constructed by combining IPM options according to their intended function, compatibility, feasibility, and suitability for different *Xf* management contexts. The complete list of IPM options considered

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in the development of the schemes is provided in **Annex A**, together with a description of each option and relevant notes derived from expert comments and the scientific literature.

The DSS is being developed around a decision-tree framework designed to guide users towards the most appropriate IPM schemes. Scheme selection is based on two complementary categories of information: (i) general characteristics describing the implementation context, and (ii) context-dependent elements that determine the applicability of individual IPM options. General characteristics are used to identify the subset of IPM schemes potentially suitable for a given situation, whereas context-dependent elements further refine the selected schemes by identifying which management options can be implemented under the prevailing agronomic, epidemiological, and regulatory conditions (**Figure 1**).

2.1.1 General characteristics representing the implementation context of IPM schemes

General characteristics define the implementation context in which users seek recommendations on IPM schemes. They are used to identify the subset of IPM schemes that are potentially applicable before their refinement through context-dependent elements (**Figure 1**). The general characteristics considered in the DSS are:

- Actor (end user): farmer, nursery, risk manager (phytosanitary authority). Farmers and nurseries have access only to the IPM schemes specifically developed for their respective user profiles, whereas risk managers have access to the complete set of IPM schemes available for both farmers and nurseries;
- Crop species: almond, grapevine, olive;
- Objective of the actor (end user): replacement or establishment of a new plantation of the same crop species, management of existing crops;
- Level of management intensity: the level of effort and resources that the user is willing or able to invest in implementing IPM measures (low, medium, or high).

2.1.2 Context-dependent elements

Context-dependent elements describe the local agronomic, epidemiological, technical, and regulatory conditions that influence the applicability, feasibility, and expected effectiveness of individual IPM options within an IPM scheme. They are used to tailor the scheme by identifying which management options can be effectively implemented under the prevailing local conditions. Relevant context-dependent elements include cultivar susceptibility or resistance, crop age, infection level, vector pressure, water availability, soil and landscape characteristics, production standards, organic or quality-certification requirements, local regulations, and the technical capacity available for implementation. For example, the removal of infected plants may be recommended primarily in young plantations of susceptible cultivars, whereas resistant or tolerant cultivars may remain productive despite infection. Similarly, soil tillage is recommended only where it is agronomically appropriate and compatible with local regulations, production standards, and management practices.

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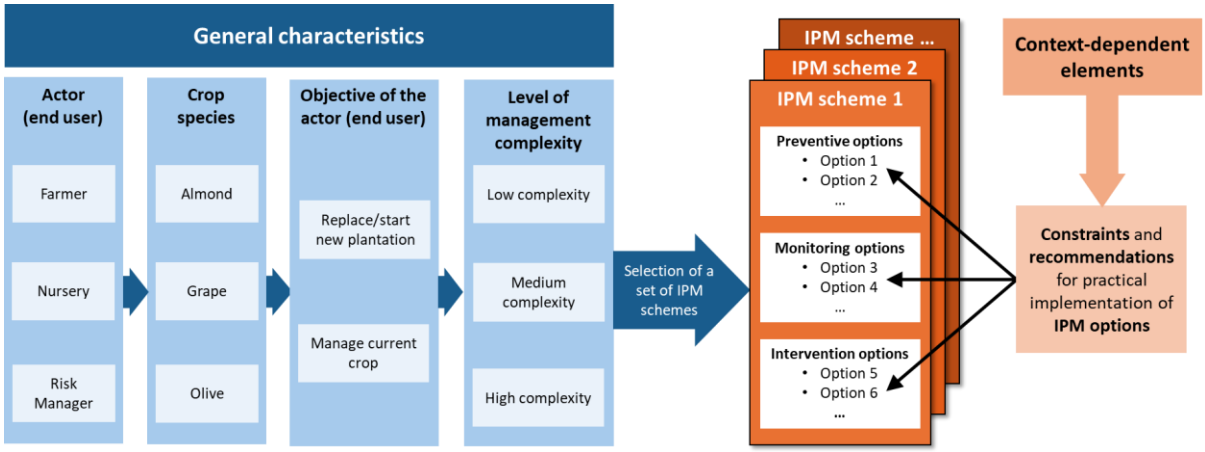


Figure 1. General characteristics defining the implementation context for the selection of most appropriate IPM schemes.

2.2 Evaluation of IPM schemes

The evaluation of IPM schemes is a key component of their development and refinement within the BeXyl project. It aims to assess the feasibility, applicability, and adoption potential of candidate schemes across different implementation contexts by integrating scientific evidence, expert judgement, and stakeholder perspectives.

An initial set of candidate IPM schemes was developed for almond, grapevine, and olive production systems and evaluated through a structured two-stage process. The first stage consisted of an overall expert assessment of all candidate schemes. Based on these results, the most promising schemes were selected for a second stage involving a more detailed evaluation that combined expert judgement with stakeholder consultation. The evaluation involved researchers, plant health authorities, extension specialists, consultants, and representatives of the agricultural sector from different European countries (**Table 1**).

Table 1. List of risk managers, professors, researchers, extensionists and consultants involved in the evaluation of the IPM schemes.

Country	Institution or company	Role	Type	1st round	2nd round
Egypt	FAO	Regional Plant Protection Officer	Risk manager	x	x
France	Direction générale de l'alimentation	National expert in viticulture	Risk manager		x
France	France Olive Production	Consultant	Extensionist/ Consultant		x
France	French National Research Institute for Agriculture, Food and Environment (INRAE)	Researcher	Researcher	x	x
France	Institut français de la vigne et du vin (IFV)	Research scientist	Researcher	x	x
Greece	Agricultural University of Athens	Associate professor	Professor/ Researcher		x
Greece	Benaki Phytopathological Institute	Research scientist	Researcher		x

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Greece	Dep. of Agriculture Crop Production and Rural Environment, University of Thessaly	Full Professor	Professor/ Researcher		x
Israel	Dep. of Plant Pathology and Weed Research, Agricultural Research Organization	Research scientist	Researcher	x	x
Italy	Agrimeca	Extensionist	Extensionist/ Consultant	x	
Italy	Center for Research, Experimentation and Formation in Agriculture “Basile Caramia”	Research scientist	Researcher	x	x
Italy	CIHEAM Bari	Scientific Administrator	Risk manager		x
Italy	National Research Concil of Italy, Turin	Research scientist	Risk manager		x
Italy	National Research Concil of Italy, Bari	Research Director	Researcher		x
Italy	National Research Concil of Italy, Bari	Senior research scientist	Researcher		x
Italy	National Research Concil of Italy, Bari	Research scientist	Researcher		x
Italy	Regional phytosanitary service of Apulia (Osservatorio Fitosanitario)	EQ Manager for "Phytosanitary Planning and Management"	Risk manager	x	
Italy	Regional phytosanitary service of Apulia (Osservatorio Fitosanitario)	Risk manager	Risk manager		x
Italy	Regional phytosanitary service of Apulia (Osservatorio Fitosanitario)	Risk manager	Risk manager		x
Italy	University of Milan	Associate Professor	Professor/ Researcher		x
Italy	University of Padova	Research scientist	Researcher		x
Italy	University of Bari	Research scientist	Researcher	x	x
Italy	University of Torino	Full Professor	Professor/ Researcher	x	x
Italy	University of Torino	Research scientist	Researcher	x	x
Italy	University of Torino	Full Professor	Professor/ Researcher		x
Portugal	Direção-Geral de Alimentação e Veterinária, Superior Institute of Agronomy, Lisbon	Superior technitian	Researcher	x	
Portugal	School of Agriculture of the Polytechnic Institute of Bragança	Full Professor	Professor/ Researcher		x
Portugal	University of Trás-os-Montes and Alto Douro, Vila Real (utad)	Assistant professor	Researcher		x
Spain	Andalusian Institute of Agricultural and Fisheries Research and Training (IFAPA)	Tenured Scientist at IFAPA	Researcher		x
Spain	Institute for Sustainable Agriculture, Spanish National Research Council	Researcher	Researcher	x	x

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Spain	Istituto Valenciano de Investigaciones Agrarias	Researcher	Researcher	x	x
Spain	MAPA	Risk manager	Risk manager		x
Spain	Institut de Recerca i Formació Agroalimentària i Pesquera de les Illes Balears	Research Scientist	Researcher	x	x
Spain	Institut de Recerca i Formació Agroalimentària i Pesquera de les Illes Balears	Research scientist	Researcher	x	x
Spain	Oficial Laboratory of Plant Health Service Extremadura Region, Merida	Risk manager	Risk manager	x	x
Spain	Plant Health Service Generalitat Valenciana (GVA), Valencia	Responsible of plant reproductive material controls in Valencia region	Risk manager		x
Spain	Plant Health Service Generalitat Valenciana (GVA), Valencia	Risk manager	Risk manager	x	x
Spain	Plant Health Service Generalitat Valenciana (GVA), Valencia	Risk manager at Plant Health and Plant Protection Service	Risk manager	x	x
Spain	Regional phytosanitary service of Balearic Islands	Risk manager at Plant Health Section	Risk manager	x	
Spain	Seguridad Alimentaria y Salud Publica (TRAGSATEC), Madrid	Risk manager at Plant Health Department	Risk manager	x	
Spain	Spanish Research Council	Full Professor	Professor/ Researcher	x	x
Spain	Tragsa group - SEPI	Group leader	Risk manager		x
Spain	University of Córdoba	Assistant professor	Professor/ Researcher	x	
Spain	Viveros Villanueva	Nurserymen and Plant Producers	Nurserymen and Plant Producers	x	
Tunisia	NEPPO	Risk manager	Risk manager	x	

2.2.1 First round of evaluation of IPM schemes

The first evaluation round involved the assessment of 130 candidate IPM schemes, the composition of which is provided in **Annex B**. The number of candidate schemes developed for each combination of actor, crop, management objective, and management intensity is reported in **Table 2**.

The evaluation was based on the Overall Assessment Score of IPM Schemes (OASIS), a composite index designed to express the expert's overall judgement on the suitability of an IPM scheme for practical implementation under a specified management context. Scores range from 1 (very low suitability) to 10 (very high suitability) and require experts to consider the following evaluation criteria:

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- **Costs**: Economic resources required for implementing the IPM scheme in European *Xf* pathosystems;
- **Effectiveness**: Expected ability of the IPM scheme to reduce vector populations, disease incidence, or crop damage under European *Xf* conditions;
- **Ease of use**: Ease of implementation of the IPM scheme under practical field conditions;
- **Level of scientific knowledge**: Strength of the scientific evidence supporting the implementation of the options included in the IPM scheme;
- **Environmental impact**: Potential short- and long-term effects on non-target organisms, beneficial species, biodiversity, and ecosystem services;
- **Human health safety**: Level of risk for the health and safety of operators, local communities, and consumers;
- **Readiness**: Degree of technological maturity and availability of the options considered in the IPM scheme for practical use, considering its development status, validation, and market accessibility (focusing only on *Xf* pathosystems in Europe).

Experts were asked to consider all seven evaluation criteria when assessing each candidate scheme across the main European production contexts in which the target crops are grown. Rather than assigning separate scores to each criterion, they expressed a single OASIS score reflecting the integrated performance of the scheme and its overall suitability for practical implementation.

Table 2. Number of candidate IPM schemes evaluated by experts during the 1st and 2nd rounds, arranged as function of actor, crop, objective and management intensity level.

ACTOR	Crop	Objective	1st Round Evaluation			2nd Round Evaluation		
			Low Intensity	Medium Intensity	High Intensity	Low Intensity	Medium Intensity	High Intensity
FARMER	Almond	Replace	3	6	6	2	2	2
FARMER	Almond	Manage	3	6	6	2	2	2
FARMER	Grapevine	Replace	3	6	8	2	2	2
FARMER	Grapevine	Manage	3	6	8	2	2	2
FARMER	Olive	Replace	3	6	6	2	2	2
FARMER	Olive	Manage	3	6	6	2	2	2
NURSERY	Almond	Replace			6			3
NURSERY	Almond	Manage			6			3
NURSERY	Grapevine	Replace			6			3
NURSERY	Grapevine	Manage			6			3
NURSERY	Olive	Replace			6			3
NURSERY	Olive	Manage			6			3

OASIS scores were subsequently classified into four performance categories (poor, moderate, good, and excellent; **Figure 2**) to facilitate comparison among candidate schemes and support the selection of those to be included in the second evaluation round. Experts were also invited to provide qualitative comments on each scheme, highlighting implementation constraints, operational considerations, recommendations for improvement, and other factors relevant to their practical implementation and adoption by end users.

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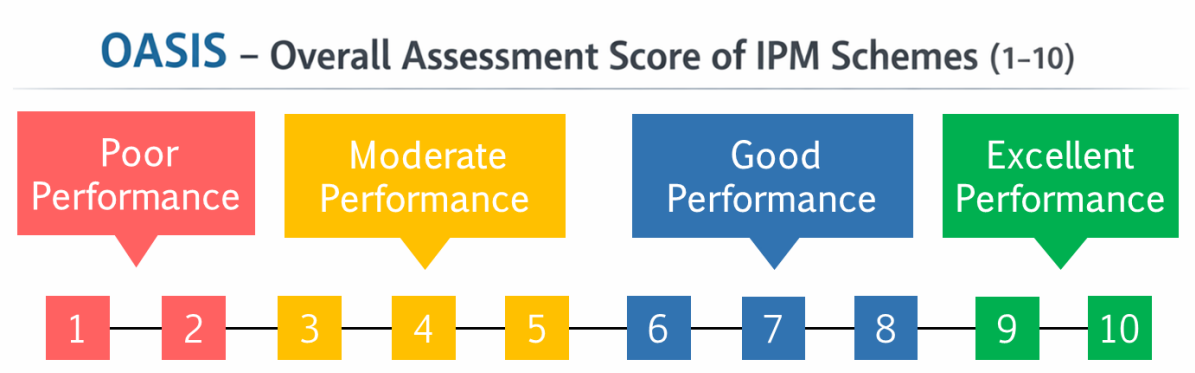


Figure 2. Overall Assessment Score of IPM Schemes (OASIS) classes.

2.2.2 Second round of evaluation of IPM schemes

The results of the first evaluation round were used to identify the most promising IPM schemes for each combination of actor, crop species, management objective, and management intensity. A total of 54 candidate schemes (18 for each crop species) were selected for the second evaluation round. Unlike the first evaluation round, which relied on a single overall assessment (OASIS), the second round adopted a multicriteria approach in which experts scored each selected IPM scheme separately for five evaluation criteria.

During the second evaluation round, experts assessed each scheme against five criteria, each scored on a scale from 1 to 10 (**Figure 3**):

- Effectiveness
- Level of scientific and technical knowledge
- Environmental impact
- Safety
- Adoption readiness, a composite criterion integrating practical feasibility, implementation costs, technological readiness and stakeholder acceptability.

The second-round evaluation provided a more detailed assessment of the strengths and limitations of the selected IPM schemes and supported the identification of those considered most suitable for inclusion in the BeXyl DSS.

2.3 Statistical analysis

Expert evaluations from the first and second evaluation rounds were analysed separately for almond, grapevine, and olive. For each crop, IPM scheme, and evaluation variable, descriptive statistics were calculated, including the number of valid evaluations, mean, median, standard deviation (SD), and interquartile range (IQR). For the first evaluation round, these statistics were calculated for the OASIS criterion, whereas for the second round they were calculated separately for the five evaluation criteria (Effectiveness, Level of scientific and technical knowledge, Environmental impact, Safety, and Adoption readiness).

To provide an overall measure of the technical performance of each IPM scheme, a composite indicator termed Integrated performance was calculated for each expert–scheme

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combination in the second evaluation round as the arithmetic mean of the scores assigned to Effectiveness, Level of scientific and technical knowledge, Environmental impact, and Safety. Adoption readiness was analysed separately because it represents a distinct dimension related to the practical implementation of an IPM scheme, integrating feasibility, implementation costs, technological maturity, and stakeholder acceptability.

To identify systematically discordant scoring patterns, the consistency of each expert relative to the overall expert group was evaluated separately for each criterion by calculating the mean absolute deviation of the expert's scores from the corresponding scheme-specific median:

$$Deviation_{ik} = \frac{\sum|Score_{ijk} - Median_{jk}|}{N_{ik}}$$

where $Score_{ijk}$is the score assigned by expert *i* to scheme *j* for criterion *k*, $Median_{jk}$is the median score assigned by all experts to scheme *j* for criterion *k*, and $N_{ik}$is the number of schemes evaluated by expert *i* for that criterion. Experts showing a mean absolute deviation greater than two score points for a given criterion were considered to present a systematically discordant scoring pattern. The threshold of two score points was defined *a priori* as an operational criterion to identify consistently divergent scoring behaviour while preserving the natural variability expected among expert judgements. Their evaluations were excluded only from the analyses involving that specific criterion, whereas their evaluations for the remaining criteria were retained. This predefined criterion-specific filtering procedure was adopted to reduce the influence of consistently divergent scoring behaviour while preserving legitimate differences of opinion among experts.

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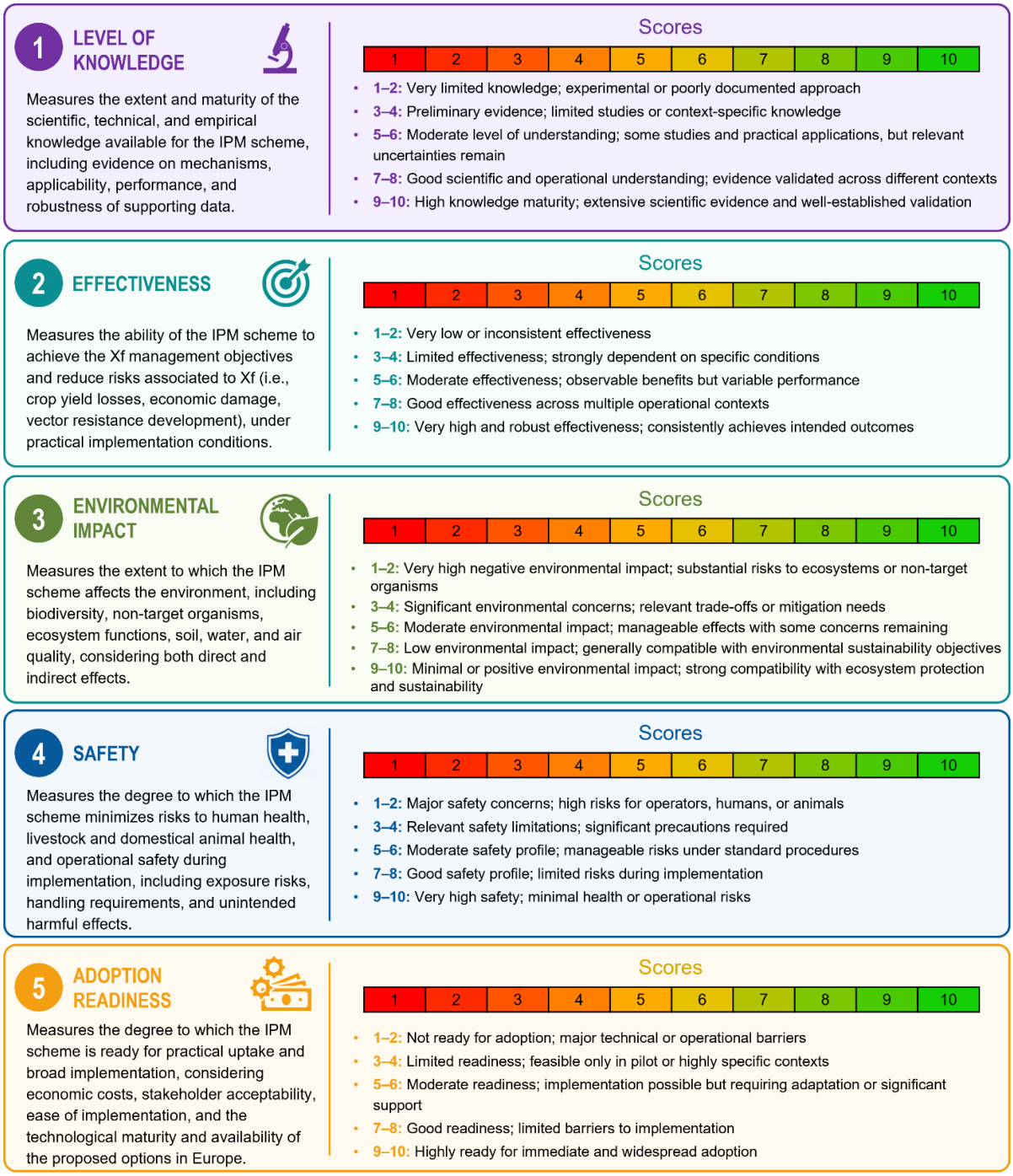


Figure 3. Description of the five evaluation criteria for the 2nd round of evaluation of IPM schemes.

Inter-expert reliability was evaluated separately for each crop and evaluation criterion using intraclass correlation coefficients (ICC). Rating matrices were constructed with IPM schemes as rows and experts as columns. Because the classical two-way ICC model requires a complete rating matrix, only experts providing complete evaluations for all schemes within each crop–criterion combination were included in the corresponding analysis. Reliability was estimated using a two-way random-effects model based on absolute agreement. ICC(2,1) was used to estimate the reliability of the evaluation provided by a single expert, whereas ICC(2,k) estimated the reliability of the mean score across all retained experts. For each estimate, the 95% confidence interval, F statistic, numerator and denominator degrees of freedom, and

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associated *p*-value were reported. ICC values below 0.40 were interpreted as indicating low reliability, values between 0.40 and 0.75 as moderate reliability, and values above 0.75 as high reliability.

Agreement among experts was evaluated for each IPM scheme and evaluation criterion by comparing each individual score with the corresponding scheme-specific median. An expert evaluation was considered to agree with the group assessment when the absolute difference between the individual score and the median did not exceed one score point:

$$Agreement_{ijk} = \begin{cases} 1 & \left|Score_{ijk} - Median_{jk}\right| \leq 1 \\ 0 & otherwise \end{cases}$$

This tolerance was established *a priori* as an operational definition of practical agreement within the 10-point evaluation scale. Agreement was expressed as the percentage of valid evaluations satisfying this condition. Standard deviation and interquartile range were used as complementary measures of score dispersion to describe the variability of expert opinions.

The overall performance of each IPM scheme was interpreted by jointly considering its mean evaluation score and the corresponding percentage of expert agreement. Results were analysed separately according to crop species, actor, management objective, and management intensity. Reference values of 7 for the mean score and 75% for expert agreement were defined *a priori* as descriptive decision-support thresholds to identify schemes combining favourable evaluations with high expert consensus. These thresholds were intended solely to facilitate the interpretation and prioritisation of the evaluated IPM schemes and should not be interpreted as statistical significance criteria.

All statistical analyses were performed using R version 4.5.2 (R Core Team, 2026).

3 RESULTS

3.1 First round evaluation of IPM schemes

A total of 24 experts from seven Mediterranean countries participated in the first-round evaluation of the candidate IPM schemes, assessing at least one of the three target crops (**Table 1**). Experts were based in Spain (52%), Italy (22%), Portugal, France, Israel, Egypt, and Tunisia (26%). Most participants were researchers or university professors (61%), followed by representatives of plant health authorities (35%), while one participant represented the nursery sector (4%).

The consistency of individual scoring patterns was assessed using the criterion-specific mean absolute deviation from the scheme-specific median. Most experts showed a mean deviation below the predefined threshold of two score points for all evaluated criteria. Four experts exceeded this threshold and were therefore excluded from the first-round analyses according to the predefined filtering procedure described in the Methods.

The reliability of the expert evaluations was assessed using intraclass correlation coefficients (ICC). The reliability of a single expert evaluation was low (ICC(2,1) = 0.12; F = 5.9; df = 129; p < 0.0001), indicating substantial variability among individual expert judgements. In contrast, the reliability of the aggregated evaluations was high (ICC(2,k) = 0.76), demonstrating that the mean scores calculated across the retained experts provided a consistent assessment of the candidate IPM schemes.

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Candidate schemes were subsequently ranked according to their mean OASIS score and the corresponding percentage of expert agreement with the scheme-specific median. For farmer-oriented schemes, mean OASIS scores ranged from 4.14 to 6.95 for almond (**Figure 4**), from 3.97 to 7.68 for grapevine (**Figure 5**), and from 3.93 to 7.20 for olive (**Figure 6**). Expert agreement was generally limited, with fewer than 50% of the evaluations falling within one score point of the median for most schemes. Only one almond scheme achieved an agreement greater than 75%.

Across the three crops, schemes designed for cultivar replacement or the establishment of new plantations generally received higher evaluations than those intended for the management of existing plantations. Likewise, schemes requiring higher management intensity tended to receive higher OASIS scores than low- and medium-intensity alternatives.

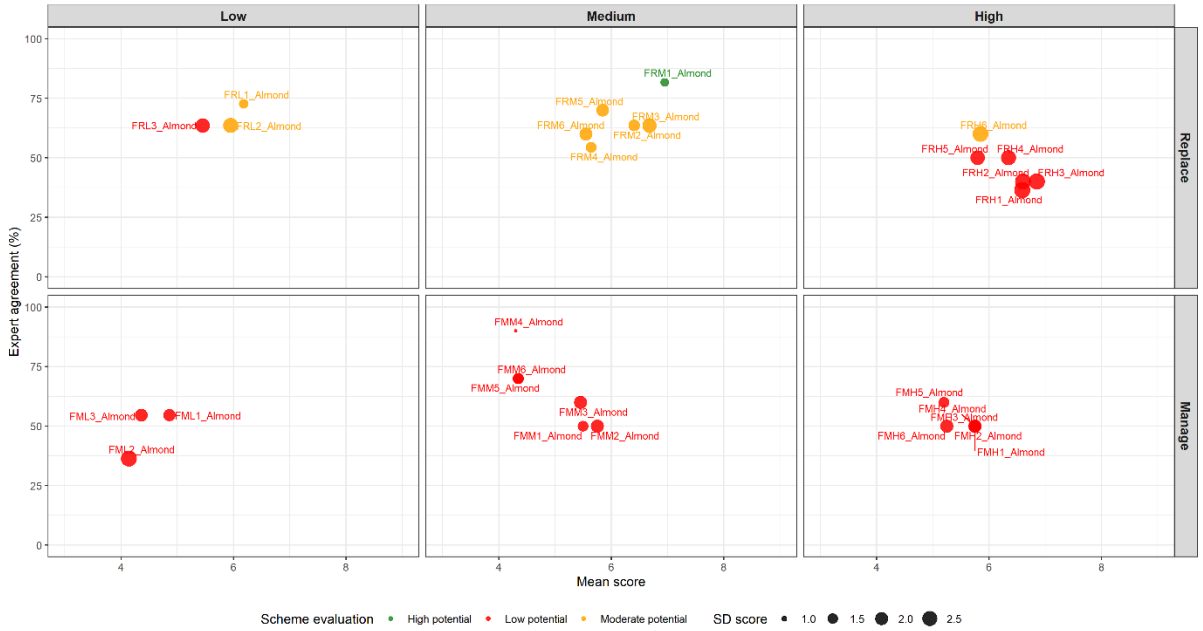


Figure 4. Mean score and expert agreement (%) with the median evaluation score of the IPM schemes during the first-round evaluation for the management of almond orchards by farmers. Schemes are arranged according to the intensity level (low, medium and high), and management objective (replace cultivar/start new plantation, or manage current crop). High potential: mean score > 5.5 and agreement > 75%; moderate potential: mean score > 5.5 and agreement > 50% and ≤ 75%; low potential: mean score ≤ 5.5 or agreement ≤ 50%.

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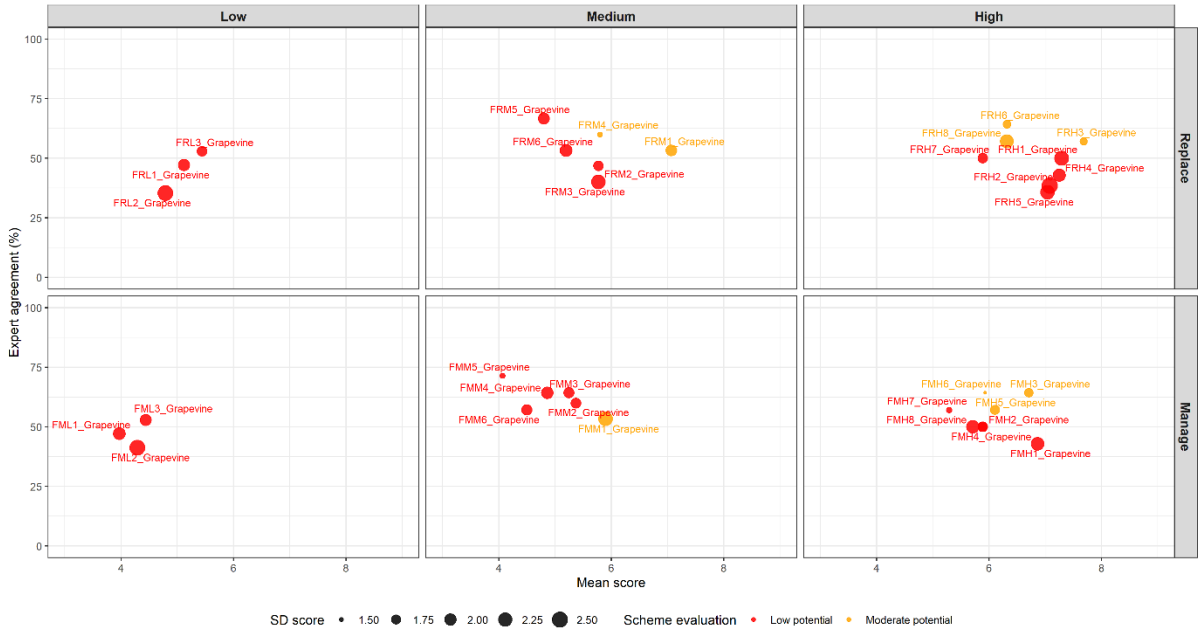


Figure 5. Mean score and expert agreement (%) with the median evaluation score of the IPM schemes during the first-round evaluation for the management of grapevine by farmers. Schemes are arranged according to the intensity level (low, medium and high), and management objective (replace cultivar/start new plantation, or manage current crop). High potential: mean score > 5.5 and agreement > 75%; moderate potential: mean score > 5.5 and agreement > 50% and ≤ 75%; low potential: mean score ≤ 5.5 or agreement ≤ 50%.

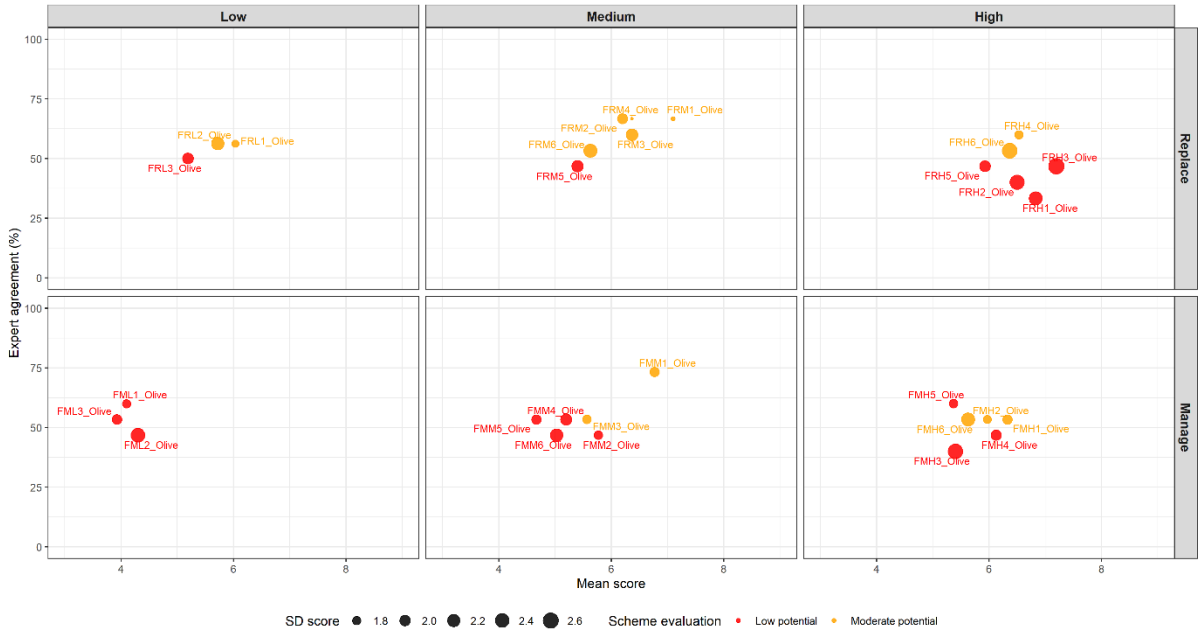


Figure 6. Mean score and expert agreement (%) with the median evaluation score of the IPM schemes during the first-round evaluation for the management of olive groves by farmers. Schemes are arranged according to the intensity level (low, medium and high), and management objective (replace cultivar/start new plantation, or manage current crop). High potential: mean score > 5.5 and agreement > 75%; moderate potential: mean score > 5.5 and agreement > 50% and ≤ 75%; low potential: mean score ≤ 5.5 or agreement ≤ 50%.

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For nursery production, only high-intensity IPM schemes were developed, reflecting the higher level of management typically adopted in nurseries and the zero-tolerance requirement for *Xf* infection. Mean OASIS scores were generally higher than those obtained for farmer-oriented schemes, ranging from 6.60 to 7.95 for almond (**Figure 7**), from 6.68 to 8.96 for grapevine (**Figure 8**), and from 5.97 to 8.03 for olive (**Figure 9**). However, expert agreement remained generally low, with fewer than 50% agreement for most schemes. Only one grapevine nursery scheme exceeded the 75% agreement threshold and also ranked among the highest-scoring schemes. As observed for farmer-oriented schemes, nursery schemes aimed at the establishment of new plantations generally received slightly higher scores than those focused on the management of existing crops.

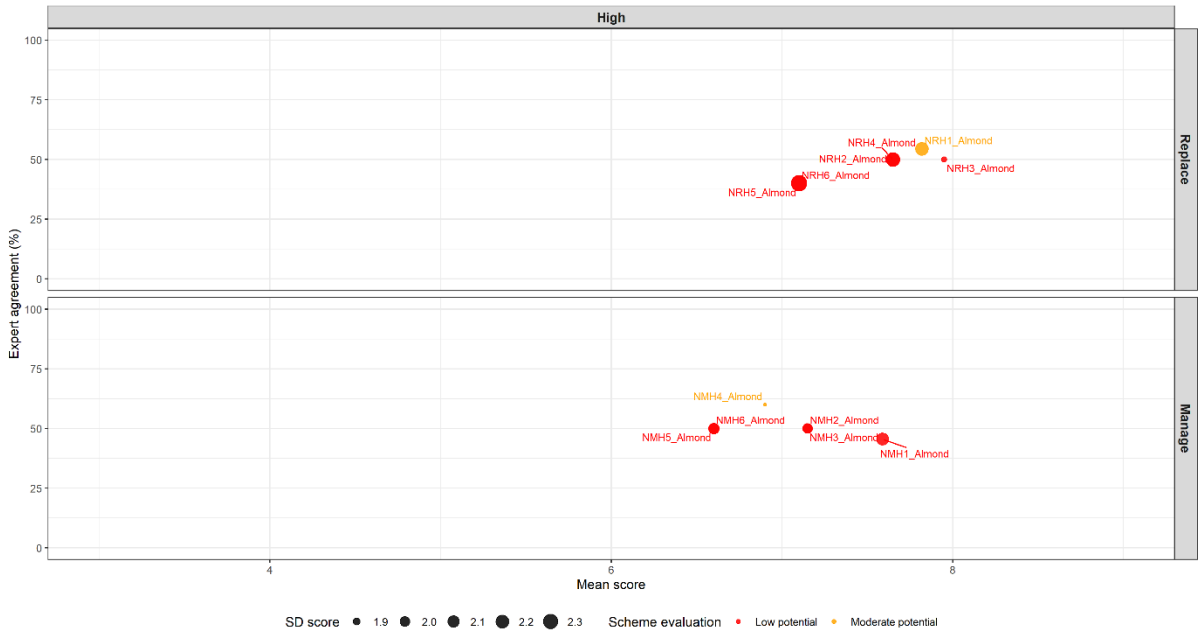


Figure 7. Mean OASIS score and expert agreement (%) for the candidate IPM schemes evaluated during the first round for farmer-oriented almond production. Schemes are grouped according to management objective (establishment of a new plantation or management of an existing plantation) and management intensity (low, medium, and high). Dashed lines indicate the reference thresholds used to identify high-potential schemes (mean score = 5.5; agreement = 75%).

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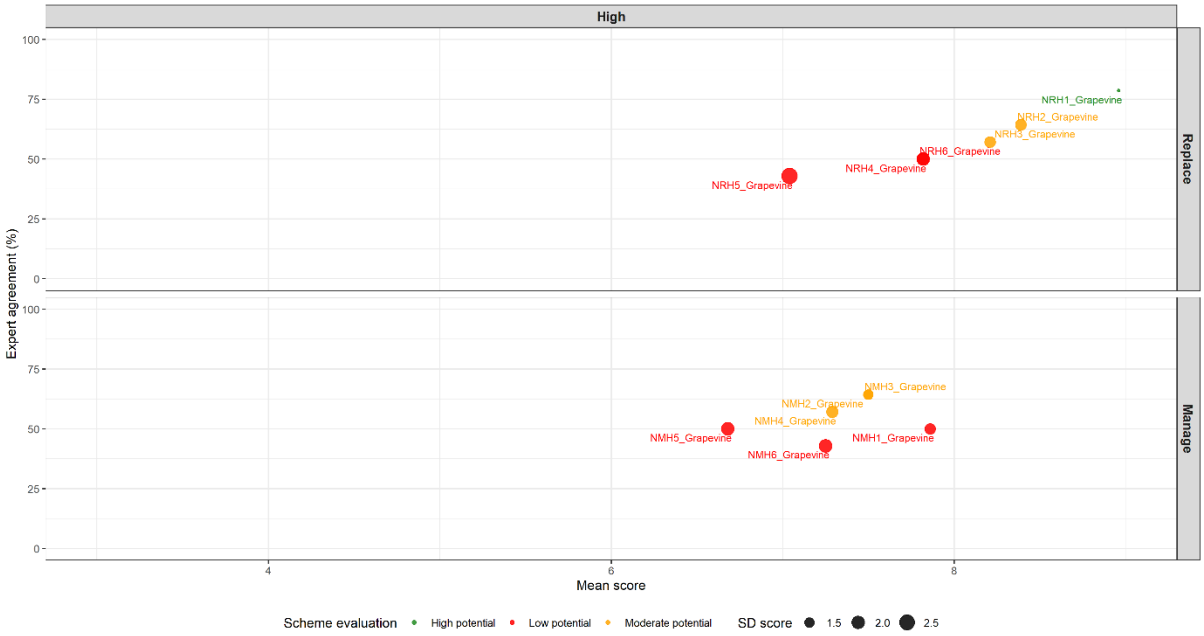


Figure 8. Mean OASIS score and expert agreement (%) for the candidate IPM schemes evaluated during the first round for farmer-oriented grapevine production. Schemes are grouped according to management objective (establishment of a new plantation or management of an existing plantation) and management intensity (low, medium, and high). Dashed lines indicate the reference thresholds used to identify high-potential schemes (mean score = 5.5; agreement = 75%).

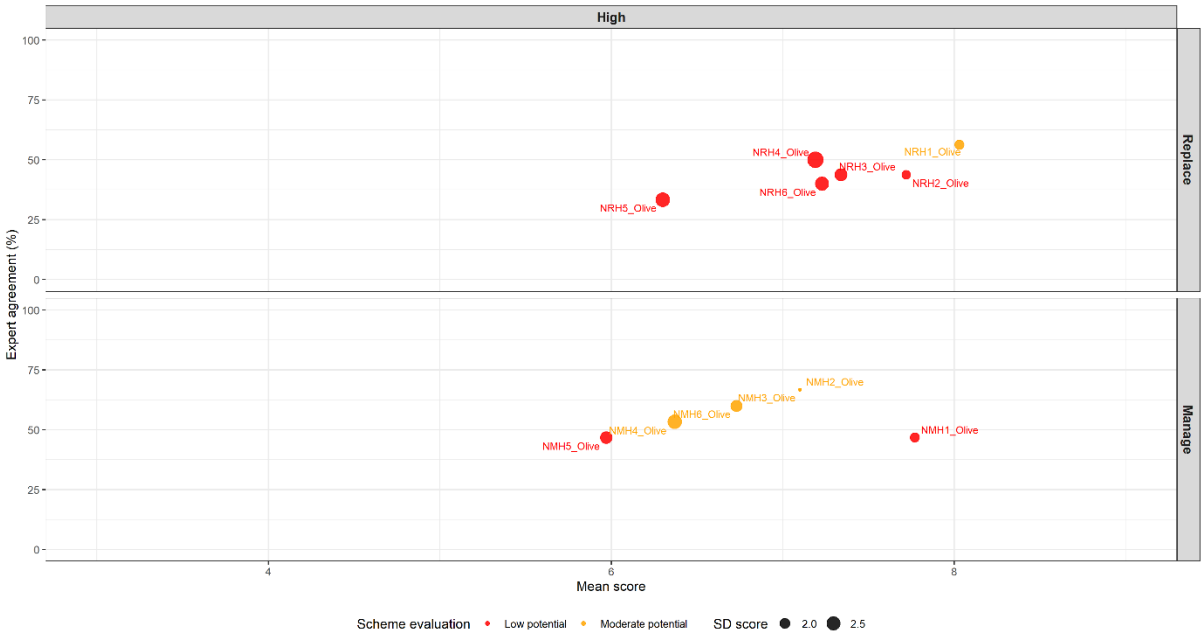


Figure 9. Mean OASIS score and expert agreement (%) for the candidate IPM schemes evaluated during the first round for farmer-oriented olive production. Schemes are grouped according to management objective (establishment of a new plantation or management of an existing plantation) and management intensity (low, medium, and high). Dashed lines indicate the reference thresholds used to identify high-potential schemes (mean score = 5.5; agreement = 75%).

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Based on the results of the first evaluation round, the highest-ranked IPM schemes were selected for further assessment. For farmer-oriented schemes, the two highest-ranked schemes within each combination of management objective and management intensity were retained, using the mean OASIS score as the primary ranking criterion and expert agreement as the secondary criterion. For nursery production, the three highest-ranked schemes were selected for each management objective. This selection resulted in 18 candidate IPM schemes per crop (12 for farmers and 6 for nurseries), which were subsequently evaluated during the second-round assessment (**Table 3**).

Table 3. List of selected IPM schemes for each Actor, management intensity level, management objective, and crop based on the 1st round evaluation by experts.

Actor	Intensity level	Objective	Almond	Grapevine	Olive
Farmer	Low	Replace/start new plantation	FRL1_almond, FRL2_almond	FRL1_grapevine, FRL3_grapevine	FRL1_olive, FRL2_olive
Farmer	Low	Manage current crop	FML1_almond, FML3_almond	FML2_grapevine, FML3_grapevine	FML1_olive, FML2_olive
Farmer	Medium	Replace/start new plantation	FRM1_almond, FRM3_almond	FRM1_grapevine, FMR3_grapevine	FRM1_olive, FRM3_olive
Farmer	Medium	Manage current crop	FMM1_almond, FMM3_almond	FMM1_grapevine, FMM3_grapevine	FMM1_olive, FMM3_olive
Farmer	High	Replace/start new plantation	FRH3_almond, FRH4_almond	FRH3_grapevine, FRH5_grapevine	FRH1_olive, FRH3_olive
Farmer	High	Manage current crop	FMH3_almond, FMH4_almond	FMH3_grapevine, FMH4_grapevine	FMH1_olive, FMH4_olive
Nursery	High	Replace/start new plantation	NRH1_almond, NRH3_almond, NRH4_almond	NRH1_grapevine, NRH2_grapevine, NRH3_grapevine	NRH1_olive, NRH2_olive, NRH3_olive
Nursery	High	Manage current crop	NMH1_almond, NMH3_almond, NMH4_almond	NMH1_grapevine, NMH3_grapevine, NMH4_grapevine	NMH1_olive, NMH2_olive, NMH3_olive

3.2 Second round evaluation of IPM schemes

A total of 37 experts from seven Mediterranean countries participated in the second-round evaluation and assessed the IPM schemes developed for at least one of the three target crops (**Table 1**). Most participants were based in Italy (38%) and Spain (32%), followed by France (11%), Greece (8%), Portugal (5%), Egypt (3%), and Israel (3%). As in the first evaluation round, the panel consisted predominantly of researchers and university professors (65%). Representatives of plant health authorities accounted for 32% of the participants, while one expert was an extension specialist (3%).

The consistency of individual scoring patterns was assessed separately for each crop and evaluation criterion using the mean absolute deviation from the scheme-specific median. Mean deviations remained below the predefined threshold of two score points for 93.5%,

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92.0%, and 94.4% of the expert–criterion combinations for almond, grapevine, and olive, respectively. Depending on the crop and criterion, up to four experts exceeded this threshold. In accordance with the predefined criterion-specific filtering procedure, their scores were excluded only from the analyses of the criterion for which a systematically discordant scoring pattern was identified, while their evaluations of the remaining criteria were retained.

Inter-expert reliability was assessed separately for each crop and evaluation variable using intraclass correlation coefficients (**Figure 10**). Single-measure estimates, ICC(2,1), representing the reliability of a score provided by an individual expert, ranged from 0.03 to 0.36 across crops and evaluation variables. Although the associated tests were statistically significant ($P < 0.01$), the low magnitude of these estimates indicated substantial variability among individual expert judgements, consistent with the results of the first evaluation round. The lowest single-measure reliability estimates were observed for Level of scientific and technical knowledge in almond and grapevine and for Integrated performance in olive.

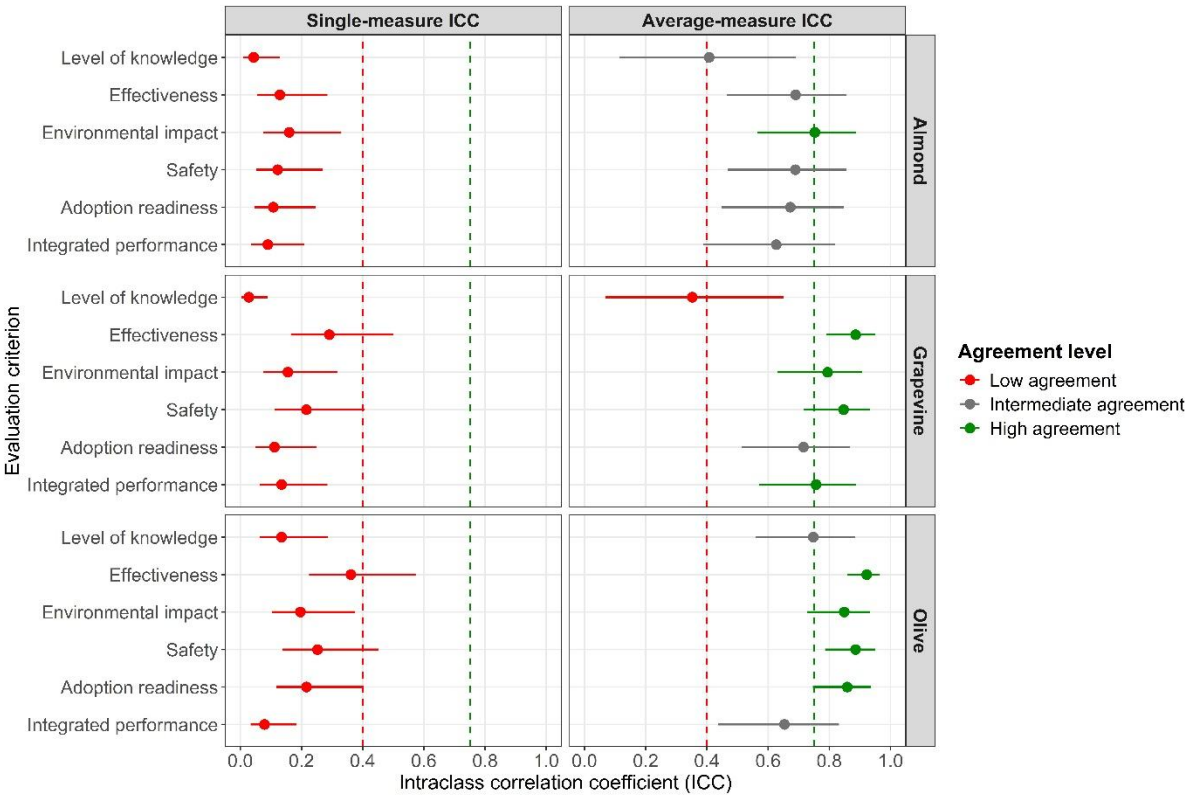


Figure 10. Intraclass correlation coefficients (ICC) assessing inter-expert reliability in the evaluation of IPM schemes for almond, grapevine, and olive. Single-measure ICCs represent the reliability of an evaluation provided by one expert, whereas average-measure ICCs represent the reliability of the mean score across the experts retained for each crop–criterion combination. Points indicate ICC estimates and horizontal lines indicate 95% confidence intervals. Estimates were classified as low (<0.40; red), intermediate (0.40–0.75; grey), or high (>0.75; green) agreement. The vertical dashed lines indicate the reference thresholds of 0.40 and 0.75.

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In contrast, average-measure estimates, ICC(2,k), representing the reliability of the mean score calculated across the retained experts, were intermediate to high for most crop–variable combinations. Almond generally showed the lowest reliability of aggregated scores, whereas olive showed the highest. These results indicate that, despite the limited reliability of individual evaluations, averaging scores across experts generally provided moderately to highly reliable scheme-level estimates. The main exception was Level of scientific and technical knowledge for grapevine, for which the average-measure ICC remained below 0.40, indicating low reliability of the aggregated score.

The detailed evaluation highlighted systematic differences among schemes according to actor, management objective, and management intensity (**Figures 11–13**). Low-intensity schemes generally received higher scores for Level of scientific and technical knowledge than medium- and high-intensity schemes for almond, grapevine, and olive. This pattern suggests that low-intensity schemes were more frequently based on management options supported by consolidated scientific and technical evidence.

Conversely, Effectiveness scores generally increased with management intensity. Nursery schemes were rated as more effective than farmer-oriented schemes, reflecting the more stringent management requirements and the zero-tolerance objective applied to nursery production. Within the same management-intensity category, schemes aimed at cultivar replacement or the establishment of a new plantation generally received higher Effectiveness scores than schemes intended for the management of existing crops.

The inclusion of chemical management options affected evaluations of Environmental impact and Safety. Schemes recommending one or more applications of chemical insecticides, as occurred in many medium- and high-intensity schemes, generally received lower scores for these criteria than schemes without chemical interventions. Lower Environmental impact and Safety scores were also observed for some low-intensity schemes that included herbicide use for vector management.

Integrated performance, calculated as the arithmetic mean of Effectiveness, Level of scientific and technical knowledge, Environmental impact, and Safety, provided an overall measure of the technical, scientific, environmental, and safety-related performance of each scheme. Among farmer-oriented schemes, low-intensity alternatives generally achieved the highest Integrated performance scores, while medium- and high-intensity schemes showed broadly similar and lower values. Nursery schemes also achieved relatively high Integrated performance scores.

These findings indicate that, although medium- and high-intensity schemes were generally considered more effective for the management of Xf, they often included options supported by less consolidated evidence or associated with greater potential risks to the environment and human health. These factors reduced their overall Integrated performance scores.

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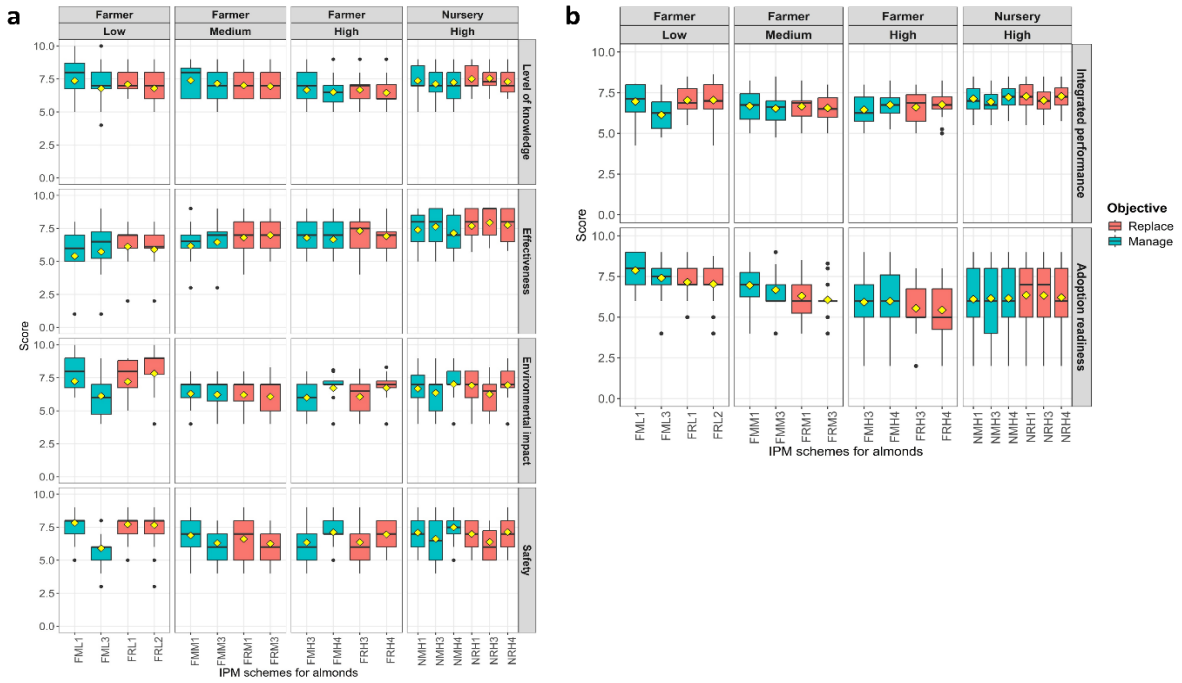


Figure 11. Distribution of expert scores assigned to almond IPM schemes during the second evaluation round. Panel (a) shows the scores for level of scientific and technical knowledge, effectiveness, environmental impact, and safety, while panel (b) shows integrated performance (calculated as the arithmetic mean of the four criteria presented in panel (a)) and adoption readiness. Yellow dots indicate mean scores.

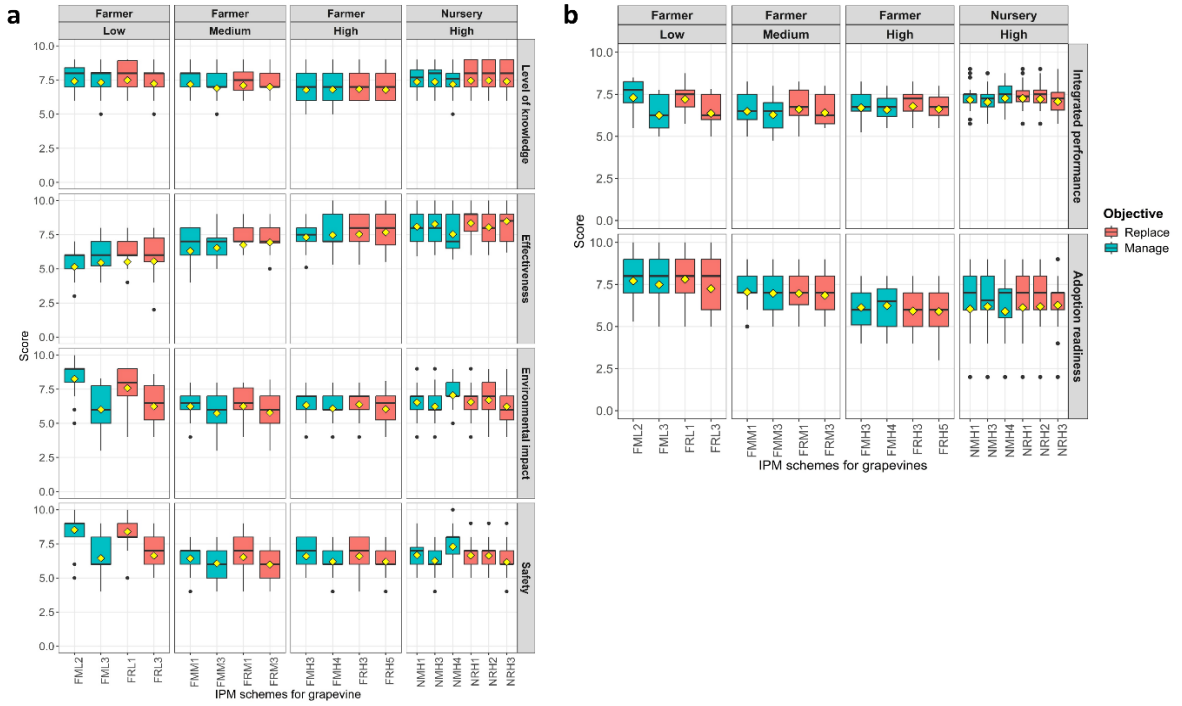


Figure 12. Distribution of expert scores assigned to grapevine IPM schemes during the second evaluation round. Panel (a) shows the scores for level of scientific and technical knowledge, effectiveness, environmental impact, and safety, while panel (b) shows integrated performance (calculated as the arithmetic mean of the four criteria presented in panel (a)) and adoption readiness. Yellow dots indicate mean scores.

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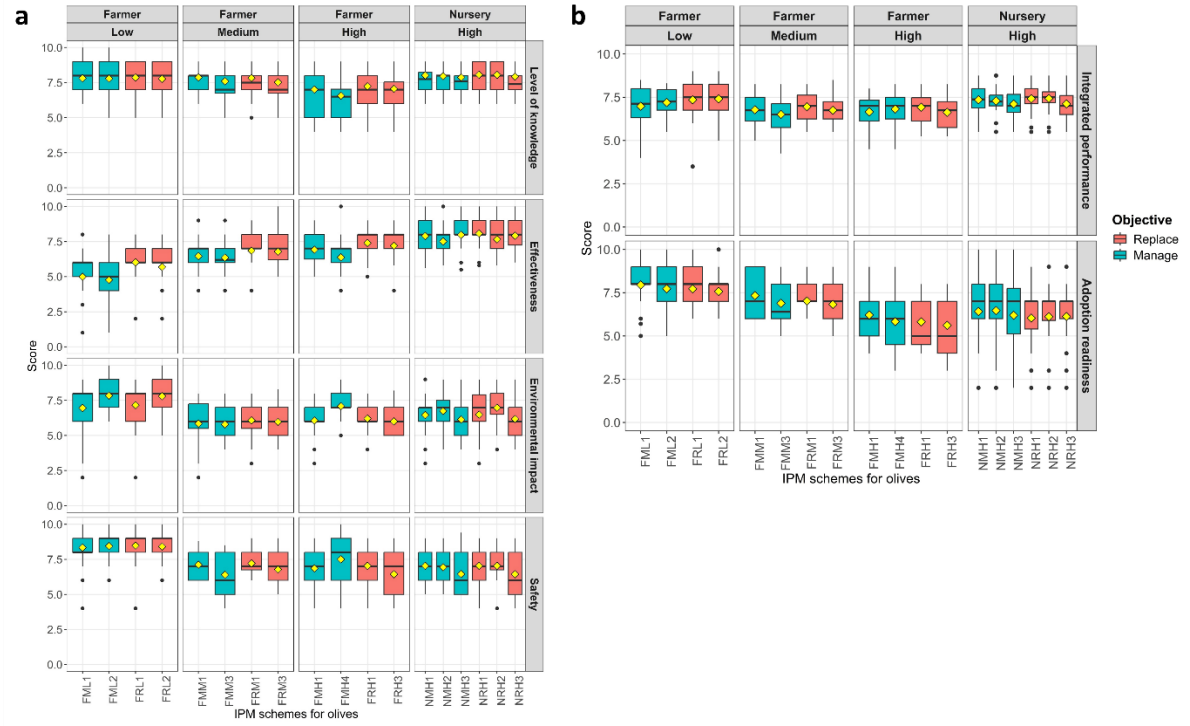


Figure 13. Distribution of expert scores assigned to olive IPM schemes during the second evaluation round. Panel (a) shows the scores for level of scientific and technical knowledge, effectiveness, environmental impact, and safety, while panel (b) shows integrated performance (calculated as the arithmetic mean of the four criteria presented in panel (a)) and adoption readiness. Yellow dots indicate mean scores.

Adoption readiness showed a different pattern. Among farmer-oriented schemes, low-intensity schemes obtained the highest mean scores and were generally classified as having good adoption readiness. They were followed by medium-intensity schemes, nursery schemes, and high-intensity schemes, which generally showed moderate adoption readiness. Within the same management-intensity category, schemes aimed at cultivar replacement or the establishment of a new plantation tended to receive lower Adoption readiness scores than schemes intended for the management of existing crops. This result reflects the greater resources, structural changes, and implementation commitments generally required for plantation replacement or establishment.

The relationship between scheme performance and expert consensus was examined by jointly considering the mean score and the percentage of expert agreement for Integrated performance and Adoption readiness (**Figures 14–16**). Schemes positioned to the right of the vertical reference line had mean scores of at least 7 and were therefore considered to show favourable performance. Schemes positioned above the horizontal reference line reached at least 75% expert agreement. Consequently, schemes located in the upper-right quadrant combined favourable mean evaluations with high expert consensus.

Medium-intensity schemes generally showed similar mean scores and agreement levels across crops and management objectives for both Integrated performance and Adoption readiness. For Adoption readiness, expert agreement was generally lower for high-intensity

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schemes than for low- and medium-intensity schemes. By contrast, Integrated performance showed agreement levels above 75% for most nursery schemes.

Among farmer-oriented schemes, approximately 11% were located in the upper-right quadrant for Integrated performance. All of these were low-intensity schemes. Approximately 28% of farmer-oriented schemes reached both reference thresholds for Adoption readiness and belonged to the low- or medium-intensity categories. Among nursery schemes, 83% were located in the upper-right quadrant for Integrated performance, whereas none reached both the mean-score and agreement thresholds for Adoption readiness. These results suggest that nursery schemes were generally considered technically robust but more challenging to implement in practice.

Overall, the second-round evaluation provided a detailed characterization of the strengths and limitations of the selected IPM schemes. The results confirmed that no single scheme performed optimally across all evaluation dimensions. Higher-intensity schemes generally offered greater expected effectiveness but were frequently associated with lower environmental and safety scores and more limited adoption readiness. Conversely, low-intensity schemes were generally supported by more consolidated knowledge and were considered easier to adopt, although their expected effectiveness was sometimes lower. The evaluation therefore supports the presentation of alternative schemes in the BeXyl DSS, allowing users to select management strategies according to their objectives, available resources, and local implementation conditions.

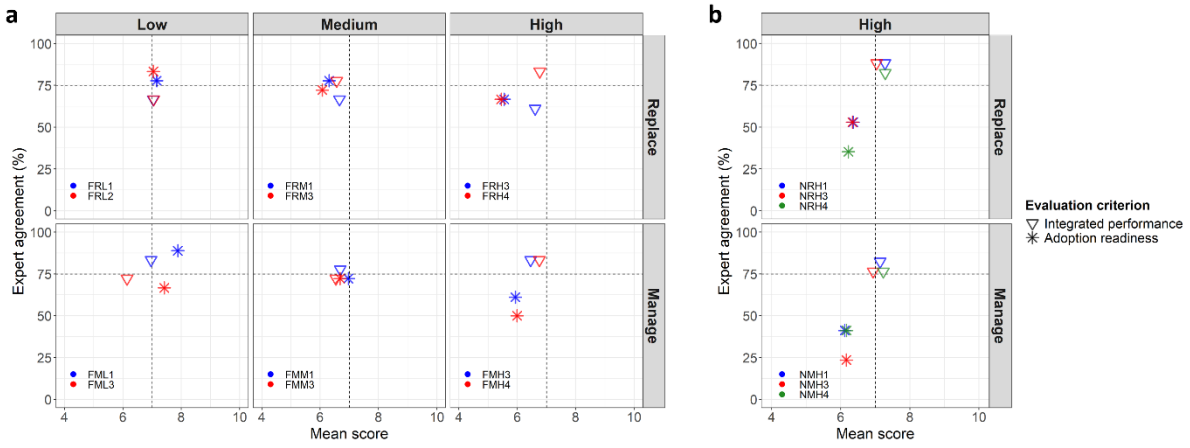


Figure 14. Mean scores and expert agreement for integrated performance and adoption readiness of almond IPM schemes evaluated in the second round for farmers (a) and nurseries (b). Colours distinguish schemes within each management objective (replace/start new plantation, or manage current crop) and intensity level (low, medium, and high). Dashed lines indicate the reference thresholds of 7 for mean score and 75% for agreement.

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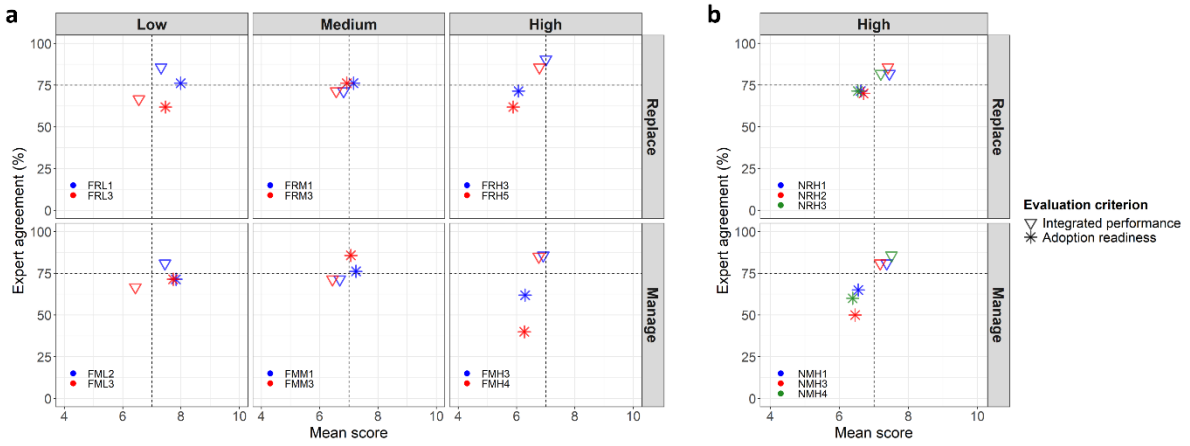


Figure 15. Mean scores and expert agreement for integrated performance and adoption readiness of grapevine IPM schemes evaluated in the second round for farmers (a) and nurseries (b). Colours distinguish schemes within each management objective (replace/start new plantation, or manage current crop) and intensity level (low, medium, and high). Dashed lines indicate the reference thresholds of 7 for mean score and 75% for agreement.

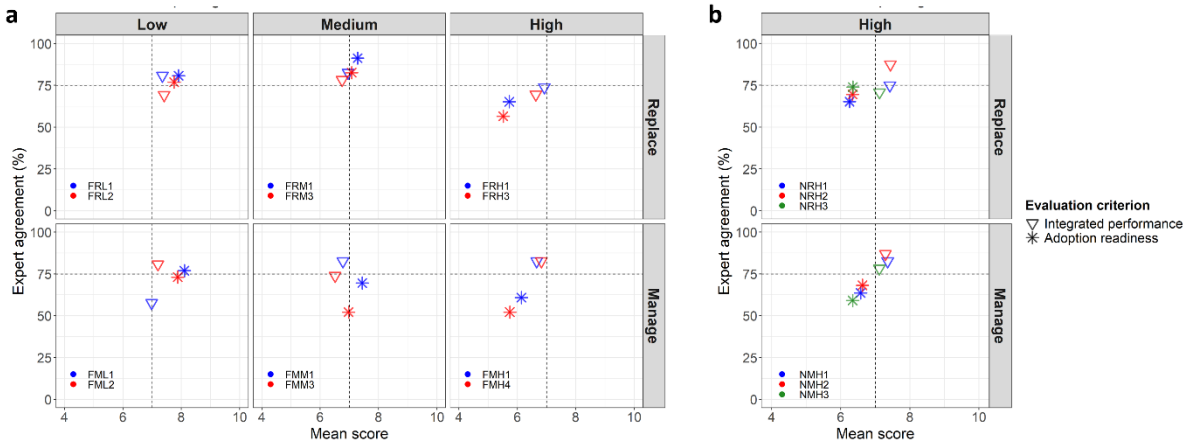


Figure 16. Mean scores and expert agreement for integrated performance and adoption readiness of olive IPM schemes evaluated in the second round for farmers (a) and nurseries (b). Colours distinguish schemes within each management objective (replace/start new plantation, or manage current crop) and intensity level (low, medium, and high). Dashed lines indicate the reference thresholds of 7 for mean score and 75% for agreement.

The final selection of IPM schemes and their composition is available through the **online BeXyl DSS**[1].

[1] Link to the DSS online platform: http://167.99.132.142/

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4 SUMMARY OF RESULTS AND CONCLUSIONS

This work developed a structured framework for the design, evaluation, and implementation of IPM schemes for *Xf* in almond, grapevine, and olive production systems. The framework was designed to accommodate the diversity of epidemiological, agronomic, and operational conditions under which the pathogen must be managed in Europe.

The IPM schemes were organised according to three main implementation dimensions: target user, management objective, and management intensity. Separate schemes were developed for farmers and nursery operators. For each user group, the schemes addressed either the management of an existing crop or cultivar replacement and the establishment of a new plantation. Farmer-oriented schemes were additionally differentiated into low-, medium-, and high-intensity alternatives, reflecting differences in the number and type of management options included, the resources required, and the expected level of intervention. Nursery schemes were developed only at high intensity, consistently with the stringent phytosanitary requirements associated with the production and movement of plants for planting.

The development process combined available scientific and technical evidence, expert knowledge, and management options applicable to the different crops and production contexts. Rather than seeking to define a single universally applicable strategy, the approach organised compatible measures into alternative schemes that could be selected according to the characteristics, needs, and constraints of individual users.

A two-round expert evaluation was conducted to assess, compare, and progressively refine the candidate schemes. During the first round, 130 IPM schemes were evaluated using the OASIS criterion. The OASIS evaluation provided a synthetic assessment of each scheme and supported their initial ranking according to mean score and expert agreement.

The reliability of evaluations provided by individual experts was low, indicating substantial variability in individual judgements. However, the reliability of the mean scores calculated across the retained experts was good. The aggregation of expert evaluations therefore provided a sufficiently robust basis for comparing the candidate schemes and selecting those to be examined in greater detail.

The first-round results showed systematic differences among management objectives, intensity levels, and user groups. Schemes aimed at cultivar replacement or the establishment of a new plantation generally received higher OASIS scores than schemes intended for the management of an existing crop. Higher-intensity schemes also tended to receive higher scores, reflecting the inclusion of a broader and more comprehensive set of management measures. Nursery schemes generally obtained higher scores than farmer-oriented schemes, consistently with the intensive preventive and control measures required to minimise the risk of infection in plants for planting.

Based on the first-round ranking, 54 IPM schemes were retained for the second-round evaluation, corresponding to 18 schemes for each target crop. For each crop, the selected set comprised 12 farmer-oriented schemes, representing the different combinations of management objective and intensity, and six nursery schemes.

The second-round evaluation provided a more detailed characterisation of the selected schemes according to five dimensions: Level of scientific and technical knowledge, Effectiveness, Environmental impact, Safety, and Adoption readiness. Integrated performance was subsequently calculated as the arithmetic mean of the first four criteria,

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providing an overall indicator of the balance among the scientific basis, expected effectiveness, environmental implications, and safety of each scheme.

As observed during the first round, the reliability of individual expert evaluations was generally low. By contrast, the reliability of the aggregated evaluations was intermediate to high for most crop–evaluation variable combinations. This indicates that, despite differences among individual judgements, averaging the evaluations generally produced reliable scheme-level estimates. The main exception concerned the Level of scientific and technical knowledge for grapevine, for which the reliability of the aggregated evaluation remained low. Results for this specific crop–criterion combination should therefore be interpreted with greater caution.

The second-round evaluation revealed clear trade-offs among expected effectiveness, strength of supporting knowledge, environmental and safety performance, and practical implementation. Low-intensity farmer-oriented schemes generally received the highest scores for the Level of scientific and technical knowledge. This indicates that the management options included in these schemes were more frequently supported by consolidated scientific evidence or established practical experience.

Effectiveness generally increased with management intensity. Medium- and high-intensity schemes included a larger number of complementary measures and were therefore considered more capable of reducing inoculum sources, vector populations, or transmission risk. Nursery schemes also obtained high Effectiveness scores, reflecting the intensive preventive and control measures required to meet their phytosanitary objectives.

However, greater expected effectiveness did not necessarily correspond to higher overall performance. Medium- and high-intensity schemes more frequently included measures supported by less consolidated evidence or associated with less favourable environmental and safety profiles. As a result, the advantages achieved in terms of Effectiveness were partly offset by lower scores for other evaluation criteria.

Chemical interventions were among the main factors affecting Environmental impact and Safety scores. Schemes recommending chemical insecticides and, in some cases, herbicides for vector management generally received lower scores for these criteria than schemes relying primarily on non-chemical measures. These results highlight the importance of evaluating IPM schemes not only according to their expected ability to manage Xf, but also according to their potential effects on the environment and human health.

Management objective also influenced the evaluation. Schemes aimed at cultivar replacement or the establishment of a new plantation were generally considered more effective than schemes intended for the management of an existing crop. However, within the same intensity category, they generally received lower Adoption readiness scores. Cultivar replacement and plantation establishment require substantial investment, structural changes, and long-term commitments, which may limit their immediate feasibility even when they offer important phytosanitary advantages.

Among farmer-oriented alternatives, low-intensity schemes generally achieved the highest Integrated performance and Adoption readiness scores. These schemes were typically based on well-established measures, presented comparatively favourable environmental and safety profiles, and required fewer resources or operational changes. Medium-intensity schemes showed intermediate Adoption readiness, whereas high-intensity schemes were generally considered more difficult to implement.

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Nursery schemes showed a different evaluation profile. They generally achieved high Effectiveness and Integrated performance scores, and most met both the reference thresholds for favourable Integrated performance and high expert agreement. However, none simultaneously reached the corresponding thresholds for Adoption readiness. Nursery schemes were therefore considered technically sound but comparatively demanding in terms of resources, organisation, implementation capacity, or regulatory compliance.

Among farmer-oriented schemes, only a limited proportion simultaneously achieved favourable Integrated performance and high expert agreement, and all of these belonged to the low-intensity category. A larger proportion met both thresholds for Adoption readiness and belonged to the low- or medium-intensity categories. These results confirm that the schemes considered technically strongest are not necessarily those that can be most readily implemented by end users.

Overall, no single IPM scheme performed optimally across all evaluation dimensions, crops, users, and management contexts. The relative suitability of a scheme depends on the balance among expected effectiveness, available scientific and technical knowledge, environmental and safety implications, implementation requirements, adoption readiness, and the specific objectives and resources of the user. The results therefore support the provision of alternative context-specific schemes rather than the prescription of a single standard management strategy.

The two-stage evaluation procedure provided a transparent and reproducible framework for screening and comparing alternative IPM schemes. The first round supported the prioritisation of a large set of candidate schemes, while the second round enabled a more detailed examination of their strengths, limitations, and trade-offs. The assessment of inter-expert reliability and agreement also made the uncertainty associated with expert evaluation explicit and supported a more cautious interpretation of the results.

The resulting IPM schemes were incorporated into the BeXyl DSS. The DSS guides users in identifying schemes consistent with the target crop, type of user, management objective, desired management intensity, and relevant implementation conditions. It also provides access to the detailed composition of each scheme and to information on the individual management options included.

To the best of our knowledge, the BeXyl DSS represents the first decision-support tool available at the European level specifically designed to support the selection of complete IPM schemes for the management of Xf. Its distinctive contribution lies in moving beyond the provision of information on individual control measures by organising compatible measures into coherent management strategies tailored to different crops, objectives, users, and operational contexts.

The DSS constitutes a concrete and exploitable result of the BeXyl project. Beyond its scientific contribution, the DSS represents an important legacy of the project. It translates scientific evidence and expert knowledge into an operational resource that is made openly available to farmers, nursery operators, advisors, researchers, and plant health authorities. Its modular structure also allows the schemes and their component measures to be revised as new scientific evidence, management options, regulatory requirements, or epidemiological knowledge become available.

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Ultimately, the BeXyl DSS demonstrates how the multidisciplinary knowledge generated within the BeXyl project can be transformed into an operational decision-support tool supporting transparent, evidence-based, and adaptive management of *Xf* across Europe.

In conclusion, the work delivered both a methodological framework and a practical decision-support tool for the integrated management of Xf. By explicitly representing the benefits, limitations, and implementation requirements of alternative management strategies, the BeXyl DSS supports more transparent, evidence-based, and context-specific decision-making. It therefore provides a tangible project outcome that can continue to support plant-health management and knowledge transfer beyond the formal duration of BeXyl.

5 REFERENCES

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ANNEX A – DESCRIPTION OF IPM OPTIONS

The IPM options are organised into three tables corresponding to the main IPM principles: Prevention, Monitoring, and Intervention. For each IPM option, the following information is provided:

- Category of option;
- Description;
- Context-dependent elements affecting its applicability;
- Notes supporting the selection of the option within the candidate IPM schemes.

Some options are listed but were not included in the IPM schemes. These correspond to options for which no clear consensus in literature regarding their recommendation for farmers or nurseries in European conditions; and/or the option is not yet sufficiently mature or commercially available for practical implementation. Options not included in the IPM schemes are reported in **red**.

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Table A1. Description of IPM options for **IPM Prevention**.

Category of Option	Option	Description	Context-dependent elements	Notes
Physical barrier	Protection structure	Installation of multifunctional nets against vectors around to protect the crop from *Xf* infection (e.g., greenhouse, exclusion net).		This option is mostly recommended only for nurseries, and sometimes for table grape production.
Landscape management	Surrounding vegetation management	Removal of infected plants and abandoned susceptible crops around the production area (when feasible) to reduce sources of infection and limit vector transmission to the crop.	Particularly recommended for susceptible cultivars located in areas where reservoir plants and high vector densities increase the risk of infection.	It is mostly recommended by for grapevines surrounded by high occurrence of plants (non-cultivated plants, abandoned crops) serving as reservoir of *Xf* for vectors. Especially indicated for susceptible cultivars of almond, grapevines and olives.
Xylella fastidiosa free plant material	Thermal treatment	Treatment of grapevine plants in nurseries to eliminate potential *Xf* infections.		Treatments for almonds or olives are currently being studied but are not yet available.
	Certified plant material	Use of planting material produced and marketed under official certification schemes that guarantee freedom from regulated pests and pathogens, genetic identity, and traceability. This option is recommended when establishing new plantations or replacing plants, in order to prevent the introduction of *Xf* and other harmful organisms, and to ensure healthy and reliable crop establishment.	Verify whether phytosanitary regulations in the specific area (e.g., *Xf* demarcated zones) restrict or prohibit the planting of host plants.	Always recommended when starting new plantations.
Resistant/ tolerant cultivars	Resistant/ tolerant cultivars	Use of tolerant/resistant cultivars for planting new orchards, or for replacing susceptible cultivars in existing orchards. Also includes overgrafting of healthy susceptible trees with resistant/tolerant cultivars.	Verify whether phytosanitary regulations in the specific area (e.g., *Xf* demarcated zones) restrict or prohibit the planting of host plants, including resistant/tolerant cultivars.	**Almonds and olives:** Always recommended **for farmers** when starting new plantations, if adapted to the specific conditions of the farmer. **Grapevines:** there are still no resistant/tolerant grapevine cultivars available in Europe
Ground cover (habitat) management	Soil tillage	Mechanical control of ground cover within and around the orchard, carried out in winter and/or spring, to manage herbaceous vegetation hosting *Xf* vectors, reducing juvenile survival and adult population	Requires technical support for the timing of implementation. Verify whether the local management constrains (rules) impose limitations to the implementation to soil tillage practices.	
	Mowing/ mulching	Cutting ground cover vegetation within and around the orchard, carried out in winter and/or spring, to manage herbaceous vegetation hosting *Xf* vectors, reducing juvenile survival and adult population	Requires technical support for the timing of implementation. Verify whether the local management constrains (rules) impose limitations to the implementation to mowing/mulching practices.	

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Ground cover (habitat) management	Chemical herbicides	Spraying of ground cover vegetation within and around the orchard with chemical herbicides, in winter and/or spring, to manage herbaceous vegetation hosting *Xf* vectors, reducing juvenile survival and adult population	Requires technical support for the timing of implementation. Verify whether the local management constrains (rules) impose limitations to the implementation of chemical herbicides.	Indicated for the control of juvenile stages of vectors only when mechanical control practices are not feasible.
	Sowing ground cover plants	Establishment of selected non-preferred or antagonistic plant species in the inter-rows to reduce vector colonisation, survival, or fitness, thereby limiting *Xf* transmission within the crop.	Requires technical support for recommending the best plant species for sowing and implementation protocol	This option is not indicated for nurseries. The effective implementation of this option may be challenging under dry conditions, and there is still an uncertainty due to the limited level of consolidated knowledge on its effectiveness against *Xf* vectors. This option may often be recommended as a sustainable alternative to soil tillage or the use of chemical herbicides for ground vegetation management.
Juvenile direct control	Juvenile chemical control	Spraying of authorized insecticidal plant protection products targeting juvenile stages of *Xf* vectors on ground cover vegetation. These products may include active substances of synthetic, natural, or mineral origin (e.g., pyrethrins, sweet orange oil, acetamiprid).	Requires technical support for the timing of implementation. Verify whether the local management constrains (rules) impose a limitation for the implementation of specific chemical molecules.	
	Juvenile physical control (repellent)	Spraying natural or inert mineral products (e.g., kaolin, zeolite) on ground cover vegetation hosting juvenile stages of *Xf* vectors. These substances create a physical barrier and modify the plant surface characteristics (e.g., reflectance, texture), interfering with host plant recognition, settling behaviour, and feeding activity, potentially reducing nymph survival.	Requires technical support for the timing of implementation.	
	Juvenile biological control (not included in the schemes)	Consists of the application of approved biological control agents targeting juvenile stages of *Xf* vectors on ground cover vegetation. This may include the use of authorized microbial plant protection products (e.g., entomopathogenic fungi or bacteria) or the augmentative release of natural enemies such as parasitoids and predators.	Requires technical support for the timing of implementation.	To date, no biological plant protection products are specifically registered in the EU for the control of *Xf* vector juveniles under field conditions. However, there is a strong potential of biological control for managing vector populations, particularly through the use of entomopathogenic fungi targeting juvenile stages within ground cover vegetation and contributing to the disruption of insect activity. Ongoing studies are showing promising results; however, the approach is still under development. Products specifically registered for the control of *Xf*

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				vectors in EU may become available in the near future.
Vector control	Adult chemical control	Spraying of authorized insecticidal plant protection products targeting the adult stage of *Xf* vectors on the canopy of the crop species. These products may include active substances of synthetic, natural, or mineral origin (e.g., pyrethrins, sweet orange oil, acetamiprid).	Requires technical support for the timing of implementation. Verify whether the local management constrains (rules) impose a limitation for the implementation of specific chemical molecules.	
	Adult physical control (repellent)	Spraying natural or inert mineral products (e.g., kaolin, zeolite) targeting the adult stage of *Xf* vectors on the canopy of the crop species. These substances create a physical barrier and modify the plant surface characteristics (e.g., reflectance, texture), interfering with host plant recognition, settling behaviour, and feeding activity, potentially reducing bacterial transmission.	Requires technical support for the timing of implementation.	
	Adult biological control (not included in the schemes)	Consists of the application of approved biological control agents the adult stage of *Xf* vectors on the canopy of the crop species. This may include the use of authorized microbial plant protection products (e.g., entomopathogenic fungi or bacteria) or the augmentative release of natural enemies such as parasitoids and predators.	Requires technical support for the timing of implementation.	To date, no biological plant protection products are specifically registered in the EU for the control of *Xf* vector adults under field conditions. However, there is a strong potential of biological control for managing vector populations, particularly through the use of entomopathogenic fungi targeting adults and contributing to the disruption of insect activity. Ongoing studies are showing promising results; however, the approach is still under development. Products specifically registered for the control of *Xf* vectors in Europe may become available in the near future.

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Table A2. Description of IPM options for **IPM Monitoring**.

Category of Option	Option	Description	Context-dependent elements	Notes
Plant monitoring	Visual inspection of symptomatic trees	Monitoring of the orchard to identify potential infected plants. This requires that producers know how to identify symptoms related to *Xf* infection. It can be useful, for example, to identifying the plants to be removed, or to be sampled for molecular confirmation of infection, and to apply control options against *Xf* inside these plants (if available in the future).	Requires access by farmers and nurseries to technical support	It is often considered as not relevant for almonds, since infection in almonds is not showing evident/exclusive symptoms. This option may not be very effective for all crops if the incidence level of the disease is low.
	Molecular analysis of plant material (not included in the schemes)	Sampling of crop plants (asymptomatic and symptomatic plants) and collection of plant material for molecular analysis for monitoring the prevalence of *Xf* infection. Appropriate statistical designs may be indicated to determine the sampling plans	Requires technical support for implementation.	Mostly recommended for surveillance by phytosanitary services and research, although farmers could send samples to phytosanitary services to confirm infection. It is not clear whether this option should be included in the IPM schemes for nurseries or farmers in endemic scenarios.
	Molecular methods for in-field detection in plant	Methods to rapidly and accurately identify infected plants and characterize the subspecies and genetic profile of the bacteria (e.g., LAMP). Appropriate statistical designs may be indicated to determine the sampling plans.	Indicated as supplementary option to visual inspection in farms and nurseries. Requires technical support for implementation.	This option is more suitable for nurseries or phytosanitary services, although it could be used by specialized technicians and cooperatives to support farmers as complementary to visual inspection of symptomatic trees. However, it is not clear the necessity to recommending any of the molecular analysis of plants (in laboratory and in-field) in endemic conditions.
	Proximal sensing (not included in the schemes)	Monitoring and detection of infected host plants using proximal sensors. Appropriate statistical designs may be indicated to determine the sampling plans		Mostly recommended for phytosanitary services, research, and nurseries, with less application for farmers. However, it is not clear if this option should be included in the IPM schemes for nurseries or farmers.
	Remote sensing (not included in the schemes)	Monitoring and detection of infected host plants using satellite and airborne images at medium-large spatial scale		The technology is currently under development for almond, grapevine (low maturity level), and olive systems. This option is primarily recommended for use by phytosanitary services for surveillance and regulatory purposes, particularly within eradication and containment scenarios.
	Canine olfactory detection (not included in the schemes)	Inspection of plant material using trained detection dogs capable of identifying infected host plants through olfactory cues associated with *Xf* infection.		This option is currently under development for olives, and less advanced stage for almond and grapevine. This option is recommended only for use by phytosanitary services at nurseries and entrance points.
Vector monitoring	Historical data of vector population	Use of data and knowledge from previous years on the occurrence, abundance, and	Effective vector monitoring options (e.g., visual inspection and traps)	Effective vector monitoring options (e.g., visual inspection and traps) were not selected for low intensity level of IPM

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	seasonal dynamics of vector populations in a given area to support decisions on the timing and prioritisation of management practices. This information should be complemented by up-to-date bulletins or reports from local phytosanitary services or agricultural extension bodies to ensure alignment with current conditions.	were not selected for this level of intensity, since it requires technical support or some level of knowledge for implementation, more appropriated for medium/high intensity levels.	schemes, since it requires technical support or some level of knowledge for implementation, more appropriated for medium/high intensity levels.
Nymphal monitoring (visual inspection of vectors on the ground vegetation)	Monitoring of nymphal vector population on ground cover vegetation, usually using a 0.25 m2 quadrant as a sampling unit.	Requires technical support for the monitoring of vector populations and identification of insects, or can receive the report of vector population dynamics from phytosanitary services	The implementation of this option by farmers and nurseries requires the availability of technical support.
Chromotropic traps	Use of yellow sticky traps in the field for monitoring adult vector population.	Requires technical support for the monitoring of vector populations and identification of insects, or can receive the report of vector population dynamics from phytosanitary services	The effectiveness of this option is not clear, nor if it should be recommended for farmers (mostly recommended for phytosanitary services), or whether it should be considered at low or medium level of intensity. The implementation of this option by farmers and nurseries requires the availability of technical support.
Sweep nets	Monitoring of vector population on the ground vegetation and woody hosts.	Requires technical support for the monitoring of vector populations and identification of insects, or can receive the report of vector population dynamics from phytosanitary services	This option can be recommended for medium intensity level, as an alternative to chromotropic traps. However, it is not clear if this option should be recommended for farmers (mostly recommended for phytosanitary services). The implementation of this option by farmers and nurseries requires the availability of technical support.

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Table A3. Description of IPM options for **IPM Intervention**.

Category of Option	Option	Description	Context-dependent elements	Notes
Plant removal and replacement	Removal of infected plants (for farmers) Removal of infected lot (for nurseries)	Removal of infected crop and non-crop plants from the orchard, or removal of the infected lot of plants in nurseries. The infection can be confirmed by molecular methods, or visual detection of symptoms characteristic of *Xf* infection.	Requires technical support for decision-making and implementation protocol. For resistant/tolerant crops, the removal of infected plants is not recommended if outside eradication zones. In eradication zones, the removal of infected plants is mandatory.	**Almond and olive**: This option is mostly recommended for young plants of susceptible cultivars for almond and olives. In older trees, disease progression may be slower than the remaining productive lifespan, while tolerant or resistant cultivars may remain productive even when infected. However, there is no clear consensus about the recommendation of this option for IPM schemes in endemic scenarios. **Grapevines:** this option is mostly recommended for susceptible cultivars, although there is no clear consensus about the recommendation of this option for IPM schemes in endemic scenarios.
Good agronomic practices	Irrigation	Part of good agronomic practices. Adequate irrigation of the culture to avoid water stress. Can include emergency irrigation or regular irrigation.	Requires technical support for implementation protocol and availability of water/irrigation system	This option is recommended as a mean to reduce the severity of *Xf* infection, particularly in almond and olive crops. However, its application should be carefully balanced, as excessive use may increase plant attractiveness to vectors and potentially favour disease spread.
	Fertilization	Part of good agronomic practices. Adequate fertilization of the culture to strengthen plant resilience against abiotic and biotic stresses. Include the use of micronutrients such as copper, zinc and manganese.	This option does not act directly against *Xf*, but may contribute to mitigating, reducing, or masking symptom expression in infected plants.	This option is recommended as a mean to reduce the severity of *Xf* infection. However, there is no clear consensus in literature about the importance of fertilization for the management of *X. fastidiosa*, and whether it could be considered at low, medium, or high level of intensity. Studies also highlighted that its application should be carefully balanced, as excessive use may increase plant attractiveness to vectors and potentially favour disease spread.
	Pruning	Part of good agronomic practices, regular, non-severe pruning of plant canopy. Although it is not efficient in extinguishing the bacteria from the plant, it can reduce the velocity of disease progression.		This option is not recommended controlling *Xylella fastidisoa* in nurseries, as it does not represent a biosecurity measure such as physical protection structures. **Almond and grapevine**: considered a common agricultural practice. **Olive**: There is no consensus whether pruning should be placed at low or medium intensity levels.
	Good pests and diseases management	Part of good agronomic practices, important to reduce the plant stress and the severity of *Xf* infection.	This option does not act directly against *Xf*, but may contribute to mitigating, reducing, or masking symptom expression in infected plants.	Often indicated as important to reduce the plant stress and the severity of *Xf* infection.

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Good agronomic practices	Soil ammendants	Part of good agronomic practices. Agronomic measures involving the application of organic or mineral materials aimed at improving soil structure, fertility, and biological activity in order to promote plant health and vigour. By enhancing root development and overall crop resilience, soil amendments contribute to reducing plant susceptibility to stress factors and diseases.	This option does not act directly against *Xf*, but may contribute to mitigating, reducing, or masking symptom expression in infected plants.	
Resistance inducers	Resistance inducers (e.g., natural extracts, biostimulants and microbial inoculants)	Application of natural extracts (e.g., essential oils, botanic extracts), biostimulants, or microbial inoculants registered for the crop, that stimulate the plant's innate defence mechanisms, enhancing its capacity to resist or tolerate biotic and abiotic stresses.	This option does not act directly against *Xf*, but may contribute to mitigating, reducing, or masking symptom expression in infected plants.	This option may also be applied as a preventive measure, as it can stimulate plant defence responses and enhance plant tolerance, potentially reducing the susceptibility and impact of *Xf* infection.
Xylella fastidiosa control	*Xylella fastidiosa* chemical control (not included in the schemes)	Application of synthetic, mineral, microbial, or plant-derived compounds with reported antibacterial or antimicrobial activity against *Xf*, delivered through trunk injection (endotherapy) or foliar treatments. Examples include N-acetylcysteine, antimicrobial peptides, nanoparticles, plant extracts, and glass-ceramic materials.		This option is considered as experimental or under development, and therefore is not currently suitable for recommendation within IPM schemes. At present, no plant protection product is registered in Europe as an effective bactericide against *Xf.* Compounds remain at a low level of technological maturity for *X. fastidiosa* in the target crops, or lack sufficient field validation under European conditions. Nevertheless, this is regarded as a promising research area pending further validation and regulatory approval.
	Xylella fastidiosa biological control (not included in the schemes)	Application of antagonistic microorganisms or bacteriophages intended to act as biological control agents against *Xf*. These agents may inhibit bacterial growth, survival, or spread within the plant, or have been reported to stimulate plant defence responses against *X. fastidiosa*, thereby enhancing plant resilience.		This option is considered as experimental or under development, and therefore is not currently suitable for recommendation within IPM schemes. At present, no plant protection product is registered in Europe as an effective bactericide against *Xf.* Compounds remain at a low level of technological maturity for *X. fastidiosa* in the target crops, or lack sufficient field validation under European conditions. Nevertheless, this is regarded as a promising research area pending further validation and regulatory approval.

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ANNEX B – LIST OF CANDIDATE IPM SCHEMES

A total of 130 IPM schemes were defined based on preliminary expert consultation, literature information and current availability of management strategies against *Xf* outbreaks in European agroecosystems. All 130 schemes were evaluated by experts during a 1st round assessment, and a subset of 54 schemes were further evaluated during the 2nd round assessment.

Table B1. Candidate IPM schemes for managing *Xylella fastidiosa* infection in almond in established/endemic areas in Europe where IPM-based management is compatible with phytosanitary regulations.

Actor	Objective of the user	Complexity level	IPM ID	Preventive		Monitoring		Intervention	
				Option	Context-dependent constrains	Option	Context-dependent constrains	Option	Context-dependent constrains
Farmers	Replace cultivar/ start new plantation	Low	FRL1	**Certified plant material** **Resistant/tolerant cultivar** **Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops
Farmers	Replace cultivar/ start new plantation	Low	FRL2	**Certified plant material** **Resistant/tolerant cultivar**		**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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				Mowing/mulching	• Compatible with local management constrains (rules)			**Good pests and diseases management**	
Farmers	Replace cultivar/ start new plantation	Low	FRL3	**Certified plant material** **Resistant/tolerant cultivar** **Chemical herbicides**	 • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops
Farmers	Manage current crop	Low	FML1	**Soil tillage**	• Compatible with local management contrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops
Farmers	Manage current crop	Low	FML2	**Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops

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Farmers	Manage current crop	Low	FML3	**Chemical herbicides**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops
Farmers	Replace cultivar/ start new plantation	Medium	FRM1	**Certified plant material** **Resistant/tolerant cultivar** **Soil tillage** **Adult chemical control** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM2	**Certified plant material** **Resistant/tolerant cultivar**		**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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				Mowing/mulching	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)			**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
Farmers	Replace cultivar/ start new plantation	Medium	FRM3	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)			**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
Farmers	Replace cultivar/	Medium	FRM4	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops

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	start new plantation			**Resistant/tolerant cultivar** **Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support	**Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM5	**Certified plant material** **Resistant/tolerant cultivar** **Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability

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					occurrence and vector density)				
Farmers	Replace cultivar/ start new plantation	Medium	FRM6	**Certified plant material** **Resistant/tolerant cultivar** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM1	**Soil tillage** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops

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								Irrigation **Fertilization**	• Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM2	**Mowing/mulching** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM3	**Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops

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					affecting the risk (reservoir occurrence and vector density)			**Irrigation** **Fertilization**	• Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM4	**Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM5	**Mowing/mulching** **Adult repellent (physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM6	**Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Replace cultivar/	High	FRH1	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops

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	start new plantation			**Resistant/tolerant cultivar**		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Soil tillage	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments**	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH2	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Mowing/mulching	• Compatible with local	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	

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					management constrains (rules)				
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments**	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH3	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability

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						• For susceptible cultivars			
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments**	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH4	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Soil tillage	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk			**Fertilization**	

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					(reservoir occurrence and vector density)				
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments**	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH5	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
				Sowing ground cover plants	• Local management practices			**Soil amendments**	

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					(permanent cover, seasonal cover) • Requires easy access to technical support			**Resistance inducer**	
Farmers	Replace cultivar/ start new plantation	High	FRH6	**Certified plant material** **Resistant/tolerant cultivar** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability

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								Resistance inducer	
Farmers	Manage current crop	High	FMH1	**Soil tillage** **Adult chemical control** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH2	**Mowing/mulching** **Adult chemical control**	• Compatible with local management constrains (rules) • Compatible with local	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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					management constrains (rules)				
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
								Soil amendments	
								Resistance inducer	
Farmers	Manage current crop	High	FMH3	**Juvenile direct control (chemical or physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent

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					(permanent cover, seasonal cover) • Requires easy access to technical support		• For susceptible cultivars	**Fertilization** **Soil amendments** **Resistance inducer**	irrigation availability
Farmers	Manage current crop	High	FMH4	**Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability

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								Resistance inducer	
Farmers	Manage current crop	High	FMH5	**Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH6	**Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
								Soil amendments	
								Resistance inducer	
Nurseries	Replace cultivar/ start new plantation	High	NRH1	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Certified plant material		**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Soil tillage	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir			**Soil amendments**	

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					occurrence and vector density)			**Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH2	**Protection structure** **Certified plant material** **Mowing/mulching** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Replace cultivar/ start new plantation	High	NRH3	**Protection structure** **Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult chemical control**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization**	• Emergency or permanent irrigation availability

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				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments** **Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH4	**Protection structure** **Certified plant material** **Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	 • Emergency or permanent irrigation availability
Nurseries	Replace cultivar/ start new plantation	High	NRH5	**Protection structure** **Certified plant material** **Mowing/mulching** **Adult repellent (physical control)**	 • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability

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				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments** **Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH6	**Protection structure** **Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	 • Emergency or permanent irrigation availability
Nurseries	Manage current crop	High	NMH1	**Protection structure** **Soil tillage** **Adult chemical control** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability

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					occurrence and vector density)			**Soil amendments** **Resistance inducer**	
Nurseries	Manage current crop	High	NMH2	**Protection structure** **Mowing/mulching** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Manage current crop	High	NMH3	**Protection structure** **Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization**	• Emergency or permanent irrigation availability

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							Soil amendments **Resistance inducer**	
Nurseries	Manage current crop	High	NMH4	**Protection structure** **Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Manage current crop	High	NMH5	**Protection structure** **Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments**	• Emergency or permanent irrigation availability

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							Resistance inducer	
Nurseries	Manage current crop	High	NMH6	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Irrigation** • Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**
								Soil amendments
								Resistance inducer

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Table B2. Candidate IPM schemes for managing *Xylella fastidiosa* infection in grapevine in established/endemic areas in Europe where IPM-based management is compatible with phytosanitary regulations.

Actor	Objective of the user	Complexity level	IPM ID	Preventive		Monitoring		Intervention	
				Option	Context-dependent constrains	Option	Context-dependent constrains	Option	Context-dependent constrains
Farmers	Replace cultivar/ start new plantation	Low	FRL1	**Certified plant material** **Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars
Farmers	Replace cultivar/ start new plantation	Low	FRL2	**Certified plant material** **Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars
Farmers	Replace cultivar/ start new plantation	Low	FRL3	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars

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				Chemical herbicides	• Compatible with local management constrains (rules)	**Historical data of vector population**		**Pruning** **Good pests and diseases management**	
Farmers	Manage current crop	Low	FML1	**Soil tillage**	• Compatible with local management contrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars
Farmers	Manage current crop	Low	FML2	**Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars
Farmers	Manage current crop	Low	FML3	**Chemical herbicides**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars

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Farmers	Replace cultivar/ start new plantation	Medium	FRM1	**Certified plant material** **Soil tillage** **Adult chemical control** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM2	**Certified plant material** **Mowing/mulching** **Adult chemical control** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • Emergency or permanent irrigation availability

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Farmers	Replace cultivar/ start new plantation	Medium	FRM3	**Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM4	**Certified plant material** **Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM5	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars

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				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
Farmers	Replace cultivar/ start new plantation	Medium	FRM6	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
Farmers	Manage current crop	Medium	FMM1	**Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars
				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM2	**Mowing/mulching** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM3	**Juvenile direct control (chemical or physical control)** **Adult chemical control**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM4	**Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM5	**Mowing/mulching** **Adult repellent (physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM6	**Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	High	FRH1	**Certified plant material** **Soil tillage**	 • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars

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				Adult chemical control	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Protection structure				**Fertilization**	
								Soil amendments	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH2	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars
				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Protection structure				**Fertilization**	
								Soil amendments	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH3	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars

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				Soil tillage	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Fertilization**	
								Soil amendments	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH4	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars
				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover)			**Fertilization**	

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					• Requires easy access to technical support			**Soil amendments** **Resistance inducer**	
Farmers	Replace cultivar/ start new plantation	High	FRH5	**Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	High	FRH6	**Certified plant material** **Soil tillage** **Adult repellent (physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars

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				Surrounding vegetation management **Sowing ground cover plants**	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	High	FRH7	**Certified plant material** **Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • Emergency or permanent irrigation availability

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Farmers	Replace cultivar/ start new plantation	High	FRH8	**Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH1	**Soil tillage** **Adult chemical control** **Surrounding vegetation management** **Protection structure**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation**	• For susceptible cultivars • Emergency or permanent

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								Fertilization **Soil amendments** **Resistance inducer**	irrigation availability
Farmers	Manage current crop	High	FMH2	**Mowing/mulching** **Adult chemical control** **Surrounding vegetation management** **Protection structure**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH3	**Soil tillage** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars

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					affecting the risk (reservoir occurrence and vector density)				
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH4	**Juvenile direct control (chemical or physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars
				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH5	**Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars

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				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
								Soil amendments	
								Resistance inducer	
Farmers	Manage current crop	High	FMH6	**Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars
				Adult repellent (physical control)		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
								Soil amendments	

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								Resistance inducer	
Farmers	Manage current crop	High	FMH7	**Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH8	**Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars

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				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Replace cultivar/ start new plantation	High	NRH1	**Protection structure** **Certified plant material** **Soil tillage** **Adult chemical control** **Surrounding vegetation management** **Thermal treatment**	• Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Replace cultivar/ start new plantation	High	NRH2	**Protection structure** **Certified plant material** **Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation**	• Emergency or permanent irrigation availability

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				Adult chemical control **Surrounding vegetation management** **Thermal treatment**	• Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization** **Soil amendments** **Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH3	**Protection structure** **Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management** **Thermal treatment**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	 • Emergency or permanent irrigation availability
Nurseries	Replace cultivar/ start new plantation	High	NRH4	**Protection structure** **Certified plant material** **Soil tillage**	 • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation**	 • Emergency or permanent irrigation availability

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				Adult repellent (physical control)		**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments**	
				Thermal treatment				**Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH5	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Certified plant material		**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Adult repellent (physical control)		**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments**	
				Thermal treatment				**Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH6	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Certified plant material		**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability

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				Adult repellent (physical control)		**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments**	
				Thermal treatment				**Resistance inducer**	
Nurseries	Manage current crop	High	NMH1	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Soil tillage	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Thermal treatment				**Soil amendments**	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH2	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	

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				Thermal treatment			**Soil amendments** **Resistance inducer**	
Nurseries	Manage current crop	High	NMH3	**Protection structure** **Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management** **Thermal treatment**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Manage current crop	High	NMH4	**Protection structure** **Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management** **Thermal treatment**	• Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Nurseries	Manage current crop	High	NMH5	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	

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				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Thermal treatment				**Soil amendments**	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH6	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Thermal treatment				**Soil amendments**	
								Resistance inducer	

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Table B3. Candidate IPM schemes for managing *Xylella fastidiosa* infection in olive in established/endemic areas in Europe where IPM-based management is compatible with phytosanitary regulations.

Actor	Objective of the user	Complexity level	IPM ID	Preventive		Monitoring		Intervention	
				Option	Context-dependent constrains	Option	Context-dependent constrains	Option	Context-dependent constrains
Farmers	Replace cultivar/ start new plantation	Low	FRL1	**Certified plant material** **Resistant/tolerant cultivar** **Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Emergency irrigation** **Good pests and diseases management**	• For susceptible cultivars • For young crops • Emergency irrigation availability
Farmers	Replace cultivar/ start new plantation	Low	FRL2	**Certified plant material** **Resistant/tolerant cultivar** **Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Emergency irrigation** **Good pests and diseases management**	• For susceptible cultivars • For young crops • Emergency irrigation availability
Farmers	Replace cultivar/ start new plantation	Low	FRL3	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops

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				Resistant/tolerant cultivar **Chemical herbicides**	• Compatible with local management constrains (rules)	**Historical data of vector population**		**Emergency irrigation** **Good pests and diseases management**	• Emergency irrigation availability
Farmers	Manage current crop	Low	FML1	**Soil tillage**	• Compatible with local management contrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Emergency irrigation** **Good pests and diseases management**	• For susceptible cultivars • For young crops • Emergency irrigation availability
Farmers	Manage current crop	Low	FML2	**Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Emergency irrigation** **Good pests and diseases management**	• For susceptible cultivars • For young crops • Emergency irrigation availability
Farmers	Manage current crop	Low	FML3	**Chemical herbicides**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Historical data of vector population**	• Requires easy access to technical support	**Removal of infected plants** **Emergency irrigation**	• For susceptible cultivars • For young crops • Emergency irrigation availability

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							Good pests and diseases management	
Farmers	Replace cultivar/ start new plantation	Medium	FRM1	**Certified plant material** **Resistant/tolerant cultivar** **Soil tillage** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM2	**Certified plant material** **Resistant/tolerant cultivar** **Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management**	• For susceptible cultivars • For young crops

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				Adult chemical control **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Irrigation** **Fertilization**	• Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM3	**Certified plant material** **Resistant/tolerant cultivar** **Juvenile direct control (chemical or physical control)** **Adult chemical control** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	Medium	FRM4	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops

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				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Soil tillage	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control) (physical control)				**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
Farmers	Replace cultivar/ start new plantation	Medium	FRM5	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)				**Irrigation**	• Emergency or permanent irrigation availability

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
Farmers	Replace cultivar/ start new plantation	Medium	FRM6	**Certified plant material** **Resistant/tolerant cultivar** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM1	**Soil tillage** **Adult chemical control**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management** **Irrigation** **Fertilization**	 • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM2	**Mowing/mulching** **Adult chemical control** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM3	**Juvenile direct control (chemical or physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops

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				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
								Irrigation	• Emergency or permanent irrigation availability
								Fertilization	
Farmers	Manage current crop	Medium	FMM4	**Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Adult repellent (physical control)		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Chromotropic traps**	• Requires easy access to technical support	**Good pests and diseases management**	
								Irrigation	• Emergency or permanent irrigation availability
								Fertilization	

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Farmers	Manage current crop	Medium	FMM5	**Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	Medium	FMM6	**Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability

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							Fertilization	
Farmers	Replace cultivar/ start new plantation	High	FRH1	**Certified plant material** **Resistant/tolerant cultivar** **Soil tillage** **Adult chemical control** **Surrounding vegetation management** **Sowing ground cover plants**	 • Compatible with local management constrains (rules) • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Replace cultivar/ start new plantation	High	FRH2	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops

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				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments**	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH3	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	

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				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments**	
								Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH4	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Soil tillage	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)		**Fertilization**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support		**Soil amendments**	
							Resistance inducer	
Farmers	Replace cultivar/ start new plantation	High	FRH5	**Certified plant material**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Resistant/tolerant cultivar		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Fertilization**	

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				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support			**Soil amendments** **Resistance inducer**	
Farmers	Replace cultivar/ start new plantation	High	FRH6	**Certified plant material** **Resistant/tolerant cultivar** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	 • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability

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Farmers	Manage current crop	High	FMH1	**Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
								Soil amendments	
								Resistance inducer	
Farmers	Manage current crop	High	FMH2	**Mowing/mulching**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH3	**Juvenile direct control (chemical or physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Adult chemical control	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	

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				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH4	**Soil tillage**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	• For susceptible cultivars • For young crops
				Adult repellent (physical control)		**Nymphal monitoring**	• Requires easy access to technical support	**Pruning**	
				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• Emergency or permanent irrigation availability

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Farmers	Manage current crop	High	FMH5	**Mowing/mulching** **Adult repellent (physical control)** **Surrounding vegetation management** **Sowing ground cover plants**	• Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density) • Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Sweep net** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • For susceptible cultivars	**Removal of infected plants** **Pruning** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	• For susceptible cultivars • For young crops • Emergency or permanent irrigation availability
Farmers	Manage current crop	High	FMH6	**Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)**	• Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Pruning**	• For susceptible cultivars • For young crops

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Sweep net**	• Requires easy access to technical support	**Good pests and diseases management**	
				Sowing ground cover plants	• Local management practices (permanent cover, seasonal cover) • Requires easy access to technical support	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support • For susceptible cultivars	**Irrigation**	• Emergency or permanent irrigation availability
								Fertilization	
								Soil amendments	
								Resistance inducer	
Nurseries	Replace cultivar/ start new plantation	High	NRH1	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Certified plant material		**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Soil tillage	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments**	

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							Resistance inducer	
Nurseries	Replace cultivar/ start new plantation	High	NRH2	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Certified plant material		**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments**	
								Resistance inducer	
Nurseries	Replace cultivar/ start new plantation	High	NRH3	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Certified plant material		**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Adult chemical control	• Compatible with local management constrains (rules)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	

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				Surrounding vegetation management	• For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)			**Soil amendments** **Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH4	**Protection structure** **Certified plant material** **Soil tillage** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • For susceptible cultivars • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	 • Emergency or permanent irrigation availability
Nurseries	Replace cultivar/ start new plantation	High	NRH5	**Protection structure** **Certified plant material** **Mowing/mulching**	 • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation**	 • Emergency or permanent irrigation availability

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				Adult repellent (physical control) **Surrounding vegetation management**	 • Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization** **Soil amendments** **Resistance inducer**	
Nurseries	Replace cultivar/ start new plantation	High	NRH6	**Protection structure** **Certified plant material** **Juvenile direct control (chemical or physical control)** **Adult repellent (physical control)** **Surrounding vegetation management**	 • Compatible with local management constrains (rules) • Local conditions affecting the risk (reservoir occurrence and vector density)	**Visual inspection of symptomatic trees** **Nymphal monitoring** **Chromotropic traps** **Molecular methods for in-field detection in plant**	• Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management** **Irrigation** **Fertilization** **Soil amendments** **Resistance inducer**	 • Emergency or permanent irrigation availability
Nurseries	Manage current crop	High	NMH1	**Protection structure** **Soil tillage**	 • Compatible with local management constrains (rules)	**Visual inspection of symptomatic trees** **Nymphal monitoring**	• Requires easy access to technical support • Requires easy access to technical support	**Removal of infected plants** **Good pests and diseases management**	

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				Adult chemical control	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
								Soil amendments	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH2	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult chemical control	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
								Soil amendments	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH3	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	

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				Adult chemical control	• Compatible with local management constrains (rules)	**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
								Soil amendments	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH4	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Soil tillage	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
								Soil amendments	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH5	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Mowing/mulching	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	

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				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
								Soil amendments	
								Resistance inducer	
Nurseries	Manage current crop	High	NMH6	**Protection structure**		**Visual inspection of symptomatic trees**	• Requires easy access to technical support	**Removal of infected plants**	
				Juvenile direct control (chemical or physical control)	• Compatible with local management constrains (rules)	**Nymphal monitoring**	• Requires easy access to technical support	**Good pests and diseases management**	
				Adult repellent (physical control)		**Chromotropic traps**	• Requires easy access to technical support	**Irrigation**	• Emergency or permanent irrigation availability
				Surrounding vegetation management	• Local conditions affecting the risk (reservoir occurrence and vector density)	**Molecular methods for in-field detection in plant**	• Requires easy access to technical support	**Fertilization**	
								Soil amendments	
								Resistance inducer	

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