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POSITION PAPER OF THE GERMAN WINEGROWERS' ASSOCIATION E.V.

On "Plant Protection in Viticulture - Potential for Reduction, Limits and Outlook"

The sustainable use of plant protection products to safeguard yields and ensure biodiversity forms the basis of economically and ecologically sustainable vineyard management, thereby protecting the livelihoods of winegrowers. Without plant protection products, it is impossible for the vine to protect itself from pathogens and remain healthy. High-quality wine can only ever be created from healthy grapes. This makes it essential for winegrowers to apply plant protection products. At the same time, winegrowers want to protect the environment and reduce use to an absolute minimum. What approaches are available to achieve this?

According to the JKI Pesticide-Trends Database Explorer, pesticide expenditure in Germany has fallen by around 35% compared to the period 2011-2013¹. In its March 2017 report *assessing the implementation of measures with regard to the sustainable use of pesticides*, DG SANTE notes that Germany has been implementing measures to promote the sustainable use of plant protection products for more than 35 years now. These measures have led to considerable, quantifiable progress, including the reduction of environmental risks associated with plant protection products use by more than 50% in the period 1987-2007.

What have we managed so far?

These reductions were enabled by the commitment and willingness of the winegrowers to change, as well as by successful cooperation between various actors. Weather forecasts have become more accurate, while at the same time, cooperation with the official advisory service intensified. A drastic reduction in insecticide use in viticulture was achieved through so-called mating disruption (pheromones). More and more farms are abandoning the use of herbicides in exchange for higher labour input. These increased costs cannot be reclaimed on the market under the current conditions.

Several biodiversity projects in vineyards² have shown that viticulture, regardless of the deployed cultivation method, creates a particularly biodiverse ecosystem.

¹ Turnover divided by volume used, HRI group (all), All pesticide products, Total; <https://sf.julius-kuehn.de/pesticide-dbx/hri>; Reference period following the EU Farm-2-Fork strategy.

² <https://www.julius-kuehn.de/pressemitteilungen/pressemeldung/news/pi2022-18-weinbau-steil-lagen-der-mosel-sind-ein-hotspot-der-artenvielfalt/> and Kaczmarek, Marvin & Entling, Martin &

Vines are both a permanent crop and a mixed crop as well as a formative element of our cultural landscape.

Greatest potential savings today with recycling sprayers

The different features of the equipment result in very high accretion qualities (e.g. applications over several rows, easily adjustable blower power, or even tunnel sprayers). An effective pesticide saving with this technique is achieved primarily through excellent application (reduction of application rates) and through collecting and reapplying non-accumulated spray liquid. This means that an up to 50% larger area can be treated (or 30% of pesticides can be saved) with one tank filling, depending on the foliage condition. Software-based spray computers are used to monitor and precisely adapt the application rate.

The use of recycled equipment is currently difficult on steep slopes; nevertheless, suitable equipment of a lightweight construction does exist. However, this has not yet found its way into the practice of steep slope viticulture. As a result, DWV believes the further development of recycling sprayers for steep slopes to be essential in order to reduce the use of pesticides on steep slopes. Currently, recycling equipment can only be used in locations that can be accessed directly.

Optimally adjusted application equipment

One prerequisite for precise pesticide application and the associated savings is the rigorous adjustment of the equipment and the use of drift-reducing nozzles (standard: 75%), as outlined in the advanced training courses for the certificate of competence. This ensures better product accretion depending on the height of the foliage and thus a reduction in quantity. The same is true of choosing the appropriate driving speed. To achieve this, the equipment manufacturers must provide clear information that additionally informs the user about the optimal settings of the appliance during use.

Hoffmann, Christoph. (2023). Differentiating the effects of organic management, pesticide reduction, and landscape diversification for arthropod conservation in viticulture. *Biodiversity and Conservation*. 10.1007/s10531-023-02621-y. available at https://www.researchgate.net/publication/370691420_Differentiating_the_effects_of_organic_management_pesticide_reduction_and_landscape_diversification_for_arthropod_conservation_in_viticulture or Leyer, I., and K. Mody. (2022) Förderung der Biodiversität im Weinbau. [Promoting biodiversity in viticulture.] pp. 196-210 in K. Ulrich, Editor. *Ganzheitliche Nachhaltigkeit in der Weinwirtschaft - Zukunftsfähige Lösungen für die gesamte Wertschöpfungskette*. [Holistic sustainability in the wine industry - Sustainable solutions for the entire value chain.] Ulmer, Stuttgart

Apply pesticides before you spot any symptoms – Preventing infections on a risk basis

Only a limited number of plant protection products (PPPs) can be used in viticulture. Currently, only preventive PPPs are available in viticulture. This presents us with great challenges every growing season, especially as concerns the main pests of powdery and downy mildew. At the same time, this means that in viticulture, pesticides must be applied preventively, based on forecast models, in order to safeguard the harvest and not expose the neighbouring parcel to any increased risk of transmission. This requires a high degree of flexibility and risk awareness for farms to predict the optimal time for maximum savings.

Better timing – More certainty through improved, small-scale forecasting models

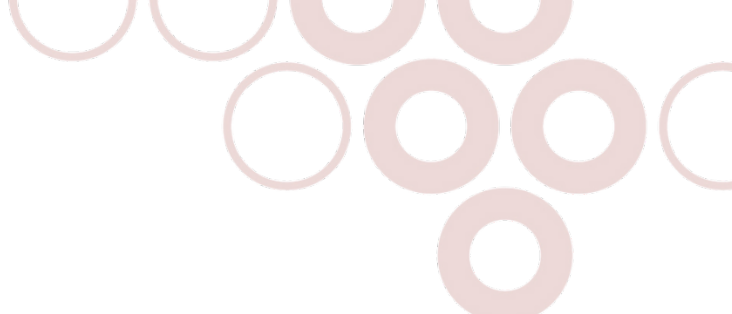
When using optimised plant protection technology, forecasting models that are as small-scale as possible provide more certainty. The forecasting quality must be improved to achieve greater PPP savings depending on the weather. Forecasting models offer a decision-making aid for farms. When choosing a forecasting system, care must be taken to ensure that it is validated continuously and over the long term.

More research for the long-term further development of integrated plant protection use: UVC technology, biologicals, other formulations, laser technology, drones, autonomy, AI, genetic engineering

UVC technology has good efficacy and great potential in plant protection, while taking a different approach to the usual liquid-based techniques. Unfortunately, it is not yet possible to carry out large-scale trials on UVC in plant protection in Germany. Promising approaches need to be tested in the field.

Aerial drones for plant protection have drift values of only 10% compared to large helicopters. Other drone applications are being developed and may bring additional benefits in the future. On the other hand, manufacturers are constantly developing the technology, and the national and EU regulatory systems can hardly keep up. It is important not to lose touch here. By improving crop-specific forecasts, autonomous drone systems offer the further advantage of being able to target and treat vineyards based on the forecast, without the need for a driver and regardless of the day of the week. However, before these can be used more extensively, the traffic laws must be amended accordingly, which means that currently, they have not yet found a place in the everyday life of winegrowers.

Research is currently being conducted into additional approaches with a future focus which are not yet ready to be applied (e.g. biologicals, other formulations, laser technology). These need to be followed up. Approval procedures, especially for biologicals, should be streamlined to bring them into use more quickly. The broad application of biologicals is crucially dependent on their efficacy in the field. Currently, there are no



biologicals on the market with sufficient efficacy. Discussions with scientists have revealed that no effective biological drug is likely to be ready for practical use by 2030. The advantages of new formulation techniques, such as microencapsulation, need to be exploited, and for this to happen, they need to be brought into widespread use sooner rather than later. Incentives are needed in this area for manufacturers to establish these new technologies more quickly.

The advisory service for PPP use should be complemented with AI. This could immediately link weather forecasts with spraying plans and address staff shortages, including in advisory services. It would be conceivable to link plant protection measures that have already been carried out with forecasting models that give winegrowers push messages with current and individualised plant protection recommendations.

In the future, mildew-resistant, established grape varieties would offer opportunities for further reduction in PPP use. This would require the genetic engineering law to be amended, as is currently being discussed at EU level, as well as more research into new genomic techniques (NGTs) in viticulture, and an amendment of the plant variety law.

While there are numerous approaches to further development, we must nevertheless be clear that there are limits to how far the application rate of active substances can be reduced to prevent resistance. More research on the limits of what is possible with active substances is needed to better assess them in practice.

New grape varieties form a building block for the reduction of PPPs

The cultivation of fungus-tolerant grape varieties, so-called PiWis, forms a building block for the reduction of PPPs, making it possible to reduce the use of pesticide products by about 70%. The long conversion period (approx. 2.5% of the vineyard area per year) and the difficult sales opportunities for PiWi wines make this a problematic option. Other concerns are the duration and sustainability of resistance, as resistance can be overcome by appropriately mutated fungi.

It is not possible to abandon PPPs completely, even with PiWis. This would lead to a loss of resilience and would therefore not be a reasonable solution. The current research aim is to combine three resistance loci, including black rot.

The EU reduction target of 50% in the volume of pesticides by 2030 cannot be achieved with a switch to PiWis alone. PiWis can thus only be one part of the solution to the problem, albeit an important one in the long term with high reduction potential.

Labelling of risk classes in plan protection plans

A comprehensible package insert is the key to being able to better assess the (environmental) risk of the PPPs used when applying them in practice. We consider a grouping of PPPs according to risk classes, presented in a graphically appealing way, as a great help for the advisory service.

Advisory service

For the advisory service, the best possible measure should take precedence over the type of cultivation used. This means that we consider it reasonable to combine measures from organic and integrated cultivation.

There is great potential to upgrade and harmonise the official regional advisory services to ensure that all growing regions can rely on differentiated official advice. A well-staffed official advisory service is indispensable for this. This could also include the graphic classification of PPPs according to risk classes.

DWV position

In order to minimise the aforementioned measures for the reduction in the use of plant protection products, the DWV is calling for...

- ...an acknowledgement of the reductions already achieved and their inclusion in a knowledge-based discussion.
- ...equipment manufacturers to provide well-adjustable equipment, ideally factory-fitted with drift-reducing nozzles (standard: 75%). It would be desirable to further develop equipment in order to improve the application quality and reduce application rates in the long term.
- ...support programmes for, and further development of, recycling sprayers. Especially for the steep slope, lighter equipment with recycling technology needs to be released on the market and developed by more manufacturers.
- ...a strengthening of the pheromone user communities by reducing the bureaucratic tasks of the ombudspersons and making it easier to get in touch with property owners in order to further expand the reductions already achieved in the insecticide sector. In future, the application of pheromones should not be considered an insecticide treatment.
- ...in dry years, multiple herbicide applications are not necessary. Deviations in erosion-prone locations or on steep slopes would be permitted. This should be adapted in a revision of the guidelines on integrated pesticide use.
- ...an honest exchange with contractors who carry out plant protection measures. The client decides which measures are to be carried out and how. Reduction approaches require close cooperation between contractor and client.
- ...optimised forecast models with small-scale improved forecast quality to give more certainty for reduced PPP use.
- ...track of promising alternatives for PPPs, monetary support and lower barriers to research
- ...approval procedures for promising biologicals should be streamlined
- ...it must be possible to take up the opportunities of drone application in practice. Legal obstacles must be removed and more flexibility created for application.

- ...plant protection is the result of many parameters, the combination of which has a direct impact on the quantity and quality of yields. Flexibility is essential in PPP application.

A blanket reduction of PPPs is not possible, as it always depends on the weather conditions of the respective year as well as the location. In contrast to contact fungicides, if the active ingredient is not applied in sufficient volumes in purely systemic fungicides, this can lead to resistance. Safety buffers in the approval of PPPs must be taken into account. These must be available especially during challenging years.

Recycling technology cannot be applied everywhere, for topographical or economic reasons. Solutions must be further developed here.

The question of how to market new grape varieties, the risk of resistance loss in individual so-called PiWis as well as their partly reduced tolerance to grapevine lice are a cause of concern for winegrowers.

The consultancy service needs to apply a blanket approach for a whole region and therefore cannot reduce volumes to the same extent as winegrowers based on their individual situation. Many factors are relevant (including grape variety, location, level of care, previous year's infestation, device settings). As a result, every single winegrower must make individually appropriate decisions according to their risk profile.

The German Winegrowers' Association (Deutscher Weinbauverband e.V., abbreviated DWV), is the professional organisation of German winegrowers. It represents the general interests of its members in relation to international as well as national institutions and organisations and advocates protecting and promoting the professional interests of German winegrowers.