AdvisoryNetPEST

DSS tools for effective treatment of BYDV (Barley Yellow Dwarf Virus)

The practices identified in this project are called 'Novel Approaches' and abbreviated as 'NA'

Farmer's name
David Jones

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Name of the farm
The Morley Agriculture Foundation

Country
United Kingdom

Description of the farm context

The 750hs farm in situated in the east of England. The East of England generally experiences a mild and dry climate, characterized by higher average temperatures and less rainfall compared to other parts of the UK. It's known for being drier than the west, with some areas receiving less than 600mm of rain annually. The soil at the farm is made up of clay which may result in issues with waterlogging and compaction. The crops grown on the farm include winter wheat, barley, oilseed rape, sugar beet, maize, rye and oats.

Partner Organization

ADAS www.adas.co.uk

AdvisoryNetPEST

The **AdvisoryNetPEST** project aims to create a **network** and **upgrade advisory services** across the EU to increase the sharing of knowledge and the **adoption of innovative solutions to reduce the use and risks of pesticides** (RURP) in all **EU Member States**, enabling the agricultural sector to achieve the targets proposed by the Farm to Fork Strategy.

AdvisoryNetPEST www.advisorynetpest.eu

THE TECHNIQUE

Short Description:

There are many Decision Support Systems (DSS) freely accessible. These can be used to help farmers and adviors in adapting plant protection use.

Crop Sector:

Arable crops, others, Wheat

Targeted pest and diseases:

BYDV (Barley yellow dwarf virus)

Objective of the NA:

A number of DSS have been collected and gathered on the IPM Decisions platform. These tools, using disease and pest forecast, help manage plant protection measures to be done at the right moment.

In this example we avoid unnecessary applications to treat BYDY within Winter Wheat crops, thanks to a DSS system.

Level of practice adoption across the country:

1 2 3 4

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UK Research and Innovation

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Expectations regarding RURP

*RURP : Reduction of Use and Risks of Pesticides

Be able to predic the presence of BYDV within Winter Wheat crops and know when to spray to effectively treat BYDV whilst also avoiding unnecessary applications.

Key success factors

- Enourage farmers involvement by training them to use and understand the DSS tool with hands on training workshops as well as access to advisors.
- Integration with existing practices with DSS working along side – not in place of – farmer experience and physical monitoring.

Methods/strategy of application in the farm

- Farmers or advisors input field and crop details into the system.
- The tool integrates weather and monitoring data.
- Risk scores, alerts, or threshold warnings are generated.
- Recommendations are reviewed alongside field observations.
- Decisions are made using both DSS outputs and on-farm inspection.

Improvements of the NA

DSS tools should be simplified to encourage their use. Better clarity between the differences of tolerance, resistant and susceptible is needed for farmers for this approach. There is a current lack of information on interoperating suction trap data and DNA analysis.

Resources and skills needed to adopt the NA

There shouldn't be any direct resource limitations for farmers in the UK that would prevent them from implementing the novel approach. However, the decision support tools are not available in all European countries. this would need to change in order for it to be accessible for all.

Figure 1: BYDV symptoms - AHDB

Figure 2: Drone crop monitoring tool – Farmers Weekly

Figure 3: BYDV symptoms - AHDB

Advice from the Advisor

The advisor expressed support for the novel approach, noting that most advisors and agronomists strive to act in the best interests of both farmers and the environment,. However, their primary responsibility remains ensuring farmers' success and maintaining crop quality

Farmers Testimony

Farmers are sometimes reluctant to adopt new approaches due to the risk of them not working resulting in a BYDV infection and therefore, reduced yield.

Policies and Regulatory Support

Policy changes and government assistance would help to encourage farmers to implement the novel approach, such as; SFI payments from the UK government and IPM4, payment of £40/ha for farmers not to spray insecticides. Co-ops in Hungary could help farmers with dealing with BYDV regionally. In Hungary and the Netherlands, only a few farmers would be interested. they would pay directly rather than going through advisors. They would need training, weather forecasts and decision support tools.

Social and Cultural Acceptance

Tradition vs innovation culture – in regions with strong traditional practices, new digital tools may be viewed with caution
Perceived complexity – farmers value tools that simplify – not complicate decisions
Digital confidence and skills gaps should be considered and education available to reduce fear of "getting it wrong"

To go further on NA replication:

To further advance the adoption of the NA in farming in both the UK and internationally, coordinated action is needed across research, advisory services, policy, and practice. Tools must be farmer-centred - simple to use, locally relevant, and clearly linked to practical and economic benefits - and supported by robust field validation and transparent methodologies to build trust. Wider uptake will depend on sustained training, advisor engagement, and peer-to-peer demonstration through pilot farms and field visits. Improved data quality and local monitoring networks are also essential to strengthen prediction accuracy and confidence in recommendations. Policy frameworks and incentive schemes can accelerate progress by recognising and rewarding evidence-based, risk-reducing practices, while ensuring data governance is clear and fair. Crucially, decision support systems should be positioned as aids that complement farmer expertise and field observation, not replacements, helping to secure both social acceptance and long-term behavioural change across different farming contexts.

BENEFITS

Crop quality may be improved by crop walks initiated by the use of DSS tools by enabling the early detection and management of BYDV. Timely interventions allow for the optimization of growth and yield. Sustainability is impacted through correct application timings as pollution is reduced, beneficial insects are protected, water quality is maintained and overall input is reduced.

BARRIERS

From a farmers perspective, decision support tools are not always user friendly and there is a risk that if BYDV is detected via the use of DSS, the farmer might spray when its not necessarily needed. Unnecessary spray applications have negative environmental impacts may increase resistance and also increases costs.

Systemic Feasibility Analysis: Expert insights from Literature and Field Data

CRITERIUM	INDICATOR	INDICATOR SCORE	EVALUATION
Pesticide use reduction level	Reduction of the applied volume of pesticides	**high reduction (>25%)** moderate reduction (10-25%) low reduction (<10%) no reduction	
Effectiveness of controlling the target pest/diseases/weed	Percentage reduction of the target pest/weed infestation or of the damage caused by the target disease	high reduction (>60%) **moderate reduction (30-60%)** low reduction (<30%) no reduction	
Soil quality	Impact on soil compaction	-- / - / **0** / + / ++	
Biodiversity	Impact on aquatic organisms	-- / - / 0 / **+** / ++	
Water quality	Impact on pesticide losses to surface water (runoff)	-- / - / 0 / + / **++**	
Air quality	Impact on pesticide emissions	-- / - / 0 / + / **++**	
Energy use	Impact on total energy consumption	-- / - / **0** / + / ++	
Working conditions	Knowledge requirements	high training level **moderate training level** low training level no training	
	Impact on human health	high risk moderate risk **low risk** no risk	
	Risk mitigation on operator/employee exposure	high mitigation moderate mitigation **low mitigation** no mitigation	
Costs	Required level of investment	> EUR 100.000 EUR 50.000 - 100.000 **EUR 10.000 - 50.000** < EUR 10.000	
Outputs	Impact on yields (produced volumes)	**+ 20%**	
	Impact on crop quality	-- / - / 0 / **+** / ++	

Impact Highlights

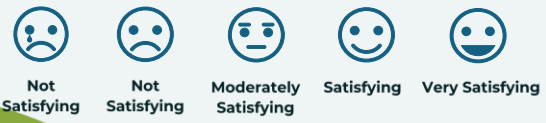
The common approach to managing barley yellow dwarf virus (BYDV) in cereals involves prophylactic applications of pyrethroid insecticides to control the aphid vectors (*Rhopalosiphum padi* and *Sitobion avenae*).

This method does not consider pest pressure or crop tolerance and is linked to negative effects on invertebrate biodiversity, including natural enemies and aquatic organisms.

Increased pesticide use also contributes to soil compaction and impacts earthworms due to greater farm traffic and higher use of fuel and water.

IPM Decision Support Systems offer a more rational, evidence-based alternative, balancing effective disease control with environmental stewardship, reduced input use, and long-term sustainability.

Evaluation:



Find out more details:

https://www.platform.ipmdecisions.net/