



BIO KILLER Pneumatic pest removal machinery



Farmer's name

Witold Popek



Contact

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Name of the farm

Agricultural farm Witold Popek



Country

Poland- Podkarpacie region (southeastern part)



Description of the farm context

The farm covers 9.82 hectares. Strawberries, cucumbers, raspberries, currants, and pumpkins are grown there.

Partner Organization



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

THE TECHNIQUE

Short Description:

BIO KILLER is a mobile pneumatic device (attached to a tractor) used to remove pests of agricultural and horticultural crops

Crop Sector:

Outdoor vegetables

Targeted pest and diseases:

Insects

Objective of the NA:

This BIO KILLER device is a machinery that, attached to the tractors, enables to remove pest such as vegetable whitefly, cruciferous beetle, Colorado potato beetle, Western corn rootworm. By removing the pest and destroying the collected insects, this NA enables to avoid pesticide use.

Level of practice adoption across the country:

1 2 3 4



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Expectations regarding RURP

By removing and destroying mechanically the pest present on the crop, BIO KILLER avoids the spraying of pesticides. This also enables to reduce pesticides residues on vegetable production



Key success factors

Due to increasing restrictions on the use of pesticides, the only solution will be to use this type of equipment. However, to do this, farmers need to have an adequate amount of money to purchase or rent Biokiller. Therefore, another key to success would be funding for the purchase of this equipment.



Methods/strategy of application in the farm

The farmer must plan the appropriate distance of the rows of cultivated plants and also devote more time to precise monitoring.

Farmers need to pay attention to the right moment to use this machine-Biokiller primarily captures adult insects, so treatments should be performed in advance to prevent them from laying eggs. For this reason, it is very important to precisely monitor crops.



Improvements of the NA

One company invented a new version of Bio Killer. It has high performance fan which allows operation at higher working speeds. Moreover it has smooth, independent adjustment of row spacing enables quick work setup or using the machine on different props.

The new biokiller gives possibility to operate the machine on the three-point hitch without a front PTO (Power-Take-Off) compatible with standard tractors.



Resources and skills needed to adopt the NA

Required training in machine operation should not be a problem. Furthermore, the machine is easy to operate; basic agricultural experience is sufficient. It is important to pay attention to the quality of training in pest monitoring, determining harmfulness thresholds, and optimizing treatment timing.



Figure 1-4 Bio Killer



Advice from the Advisor

Farmers should be aware that pneumatic insect removal is not a selective procedure, meaning it can also destroy beneficial insects. This can be partially mitigated by performing the procedure at specific times of day, for example, after pollinators (bees) have flown by.



Farmers Testimony

First experience and user suggestions led to the development of this design. Currently, the machine can be mounted on the front of a tractor. It can also be used in conjunction with a row cultivator, the frame of which can be used to mount a hydraulic pump driving the suction fan if the tractor does not have a front power take-off shaft.



Policies and Regulatory Support

This equipment is very friendly for the environment. All such solutions should be promoted and financed by the government. If there is any chance to reduce the amount of used pesticides, we should spread this solution to other countries. To make this happen, we need to make politicians aware of that. Unfortunately, there is currently no funding available for the purchase of Biokiller.



Social and Cultural Acceptance

The greatest need is to promote and support organic farmers. Farmer organizations, producer groups, and agricultural product contracting companies can be interested in implementing the machine into practice or perhaps organizing service-based use of the machine.



BENEFITS

There are many benefits of using bio killer, for example: reduction of costs associated with the application of pesticides. Moreover we enhance food safety, through minimised use of plant protection agents.

In addition, crops quality is improved because of the absence of pest residues and sooty mold fungi. Using biokillers increase farm profitability- the production is more efficient and sustainable.



BOUNDARIES

One negative effect is impact on working time. The main challenge is to multiple treatments compared to insecticide treatments, as the chemicals may last a bit longer. The total number of working hours for the Biokiller machine will be higher due to the longer working time compared to the classic sprayer - lower efficiency associated with the smaller working width.

To go further on NA replication:

Generally, there is a lot of interest among fruit and vegetable producers, mainly due to the increasingly narrow range of registered plant protection products that can be used.

Advisors believe that a properly functioning machine, with a few modifications, can ensure 100% effectiveness.

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 bees	-- / - / 0 / + / ++	
	Impact on arthropods other than bees	-- / - / 0 / + / ++	
	Impact on earthworms	-- / - / 0 / + / ++	
	Impact on non-target soil micro-organisms	-- / - / 0 / + / ++	
Air quality	Impact on pesticide emissions	-- / - / 0 / + / ++	
Working conditions	Knowledge requirements	high training level moderate training level low training level no training	
	Impact on working-time	+ 75%	
	Impact on human health	high risk moderate risk low risk no risk	
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 systemic feasibility analysis highlights the BIO KILLER as a sustainable and health-conscious alternative to conventional pesticide use in outdoor vegetables. By pneumatically removing and destroying target insects, it effectively reduces pesticide levels and emissions while maintaining pest control, crop quality, and even potentially increasing yield.

This non-chemical approach enhances food safety, supports environmental sustainability, and benefits biodiversity, positively affecting bees, earthworms, other arthropods, and soil microorganisms.

However, adoption comes with notable challenges. Operating the device is more labour-intensive, up to 75% more, and time-consuming on large fields due to its limited working width. Additionally, the investment is substantial (€10,000–€25,000), and repeated use may contribute to soil compaction.

Evaluation:



Not Satisfying



Not Satisfying



Moderately Satisfying



Satisfying



Very Satisfying

Further information:

- <https://www.warzywa.pl/technika/bio-killer-pionierskie-urzadzenie-na-skale-swiatowa/>
- <https://www.farmer.pl/technika-rolnicza/maszyny-rolnicze/odkurzacz-bio-killer,83543.html>
- <https://www.akpil.pl/bio-killer-2/>