Costs and effectiveness of on-farm measures to reduce aquatic risks from pesticides

Martha van Eerdt (PBL)
Aaldrik Tiktak (PBL)
Joanneke Spruijt (PPO)
Erna van der Wal (CLM)
Henk van Zeijts (PBL)
Introduction

  - 2014: Integrated Pest Management (IPM)

- Aims of directive:
  - reduction of risks
  - reduction of dependence

- Legal and voluntary IPM-measures available for target achievement

- We present
  - The risk reducing potential of IPM-measures
  - The costs of IPM-measures
EU and national policies

- 2014: Integrated Pest Management

- Targets for surface water, drinking water, food residues, farm profits and worker safety
  - 2010: no exceedances of water quality standards and risk reduction of 95% in surface waters compared to 1998
- IPM stimulation: Knowledge development, awareness raising and dissemination
Evaluation of IPM-measures: methods

Selection of 105 IPM measures
- 15 field crops
- Tested by 400 growers
- Economically viable
- 2010: 60% voluntarily adopted

Evaluation of the measures with a farm economic/environmental model (MEBOT)
- Risk reducing potential
- Dependence (treatments)
- Costs

Reference: GAP 2008-2010
Water quality standards exceeded at 50% of the monitoring sites

Evaluation of the Dutch policy plan on sustainable crop protection: Poster Tuesday-48 by Aaldrik Tiktak, Ton van der Linden, Martha van Eerdt & Roel Kruijne

www.pesticidesatlas.nl
Spray drift dominant pathway for aquatic risk
Reference: aquatic risk is crop dependent

Explaining factors:
- Toxicity of pesticides used
- Emission percentage
- Number of applications
Aquatic risk

Number of treatments
Three types of on-farm measures evaluated for further risk reducing potential

1. Pest prevention
   - Cultivation techniques
   - Monitoring of pests
   - Non-chemical methods
   - Chemical methods

   measures aimed at lowering pesticide use (n=72)

2. Substitution of high risk pesticides by lower risk pesticides (n=10)

3. Best Available Techniques for spray drift reduction
   - Extra wide crop-free buffer strips

   emission reduction (n=23)
Results: risk reducing potential of IPM measures

Arable crops

- Pest prevention (8)
- Cultivation techniques (8)
- Monitoring (18)
- Non-chemical methods (24)
- Chemical methods (14)
- Substitution (10)
- Spray drift reduction (11)
- Buffer strips (12)

Horticultural crops

Trees

Median
Range
Not available

Risk reduction potential relative to reference (%)
Top 10 measures for treatment reduction

Avoided treatments

- Cultivation on racks - Strawberries
- Straw mulching - Narcissus
- Apply limewater - Apples
- Straw mulching - Tulips
- Pheromone confusion - Pears
- Reduce number of Botrytis treatments - Narcissus
- Mechanical weed control - Asparagus
- Straw mulching - Hyacinth
- Stimulate degradation of leaves - Apples
- Apply limewater - Pears

Source: PBL, 2013
40% of measures had negative costs

Costs and effectiveness of IPM measures
Conclusions

- IPM-measures can reduce aquatic risk by an additional
  - 60-80% when using measures for emission reduction
  - Up to 80% when substituting high risk pesticides
  - Up to 40% when using low-input IPM-measures

- 40% of IPM-measures had negative costs

- IPM-measures were not effective for reduction of dependence

- To reduce dependence redesign of farming system is needed
Thank you for your attention

Acknowledgement

• Experts from ‘Farming with Future’
• Joanneke Spruijt, Applied Plant Research
• Erna van der Wal, CLM Research Advice
• Aaldrik Tiktak, Henk van Zeijts PBL Netherlands Environmental Assessment Agency

Martha.vaneerdt@pbl.nl
http://www.pbl.nl/en/
Legal obligations in Dutch Water Pollution Act

Width of buffer strip is 0.25 m (winter wheat) up to 1.50 m in potatoes

Legal obligations
- Nozzles minimally 50% drift reducing
- Crop-free buffer strip

PBL Netherlands Environmental Assessment Agency
What are the most important emission pathways?

1000 kg active substance
- 2007 – 2009
- 1997 – 1999
Many (but not all) growers apply voluntary IPM-measures