IPM adoption in my hub

Facilitation approach and progress made in IPM adoption

The Dutch arable hub

Geert Kessel
Wageningen Research
Lelystad, the Netherlands

THE HUB COACH ORGANISATION

Two IPMWorks hubs are active in the Netherlands, they focus on arable and vegetable (in an arable context) cultivation respectively. The arable hub is led by Wageningen Research (WR), part of Wageningen University and Research (WUR). WR is a pioneer in IPM research and implementation.

For IPMWORKS, WR is responsible for the organization of the hub, providing members with IPM inspiration, support of IPM try-outs and the organization of demonstration events.

THE HUB

Approximately 20 farms participate in the hubs. Five from the central province of Flevoland (clay) and 15 from the southern province of Noord Brabant (sand). One of the participating farms combines organic and conventional cultivation. All other participating farms are conventional.

In the Netherlands, IPMWorks cooperates with NPPL, a national project on precision agriculture to the benefit both projects.

OBJECTIVES AND MOTIVATIONS OF THE FARMERS

The participating farmers are forerunners. They are intrinsically motivated to help develop more durable forms of arable production, economically, environmentally and socially. Introduction of IPM in arable production was started already many years ago. Both arable production and IPM are however complex. Stable introduction of IPM at farm level therefore is a slow, stepwise and complex process. The participating farmers are happy to demonstrate their successes and discuss the problems encountered for the benefit of the sector.

DRIVERS

Farmers understand that their future perspective depends on innovation towards durability. Within the Dutch framework of high tech farming they naturally search for technical solutions such as robot weeding and precision spraying. Agroecological solutions to pest, disease and weed problems, such as wider rotations, banker plants and biological control are becoming increasingly integrated to come to true, integrated, IPM solutions.
Yield and economic return remain as important drivers but environmental impact and biodiversity now also create added value for the farmer, the environment and the local community.

BARRIERS

Farmers operate within the constraints of economic viability. As a result, they are critical towards new, often riskier, more data and knowledge intensive methods. IPM solutions thus also have to be reliable and robust in an environment of continuously changing weather conditions and climate change.

In addition, the ever-changing rules and regulations hamper investment in future proof methods and technology.

IPM challenges and results

IPM Challenges

An enquiry early in the IPMWorks project resulted in two main challenges:

- **Weed control in onion, carrots and other fine-seeded crops:**
  Weed control in these crops is heavily dependent on soil herbicides. Most of the active ingredients herein are on the EU list of Candidates for Substitution (CfS) making it likely that availability will be discontinued in the near future. Alternative control methods are urgently needed.

- **Control of aggressive foliar diseases:**
  Disease control of *Cercospora* spp. in sugar beet and *Phytophthora infestans* in potato depends on CfS fungicides (Cercospora) or highly frequent applications (Phytophthora). Solutions include cultivation of more resistant cultivars but the risk of pathogen populations breaking host resistances must be carefully managed to ensure future durability of this IPM solution.

The hub's results

What progress has been made?

A mechanical weed control workshop was held in February 2022. In addition, the farmers were introduced to more integrated forms of weed control in fine-seeded crops including physical (burning of weeds prior to emergence of the crop), mechanical (weeding robots) and agroecological (using transplants instead of seed) methods.
With respect to Cercospora and Phytophthora control, genetic control tools were introduced and demonstrated including sustainability of host resistance.

What issues still need to be addressed?

Full mechanical weed control in fine-seeded crops remains challenging. Often a point is reached where manual weeding becomes necessary. The cost of manual weeding however exceed the net return of the crop resulting in a financial loss.

Pathogens adapt! Host resistance is easily "broken" when deployed without a resistance management strategy. Pathogen adaptation is a serious threat to the durability of IPM control strategies and must be considered.

How are the hub farmers going to proceed?

The Dutch arable IPMWorks hub was built on the preceding veldleeuwerik (skylark) network. Through long years of experience, hub members know and trust each other. In addition, follow up IPM projects are initiated. The Dutch ICM framework (= holistic IPM) has now been universally adopted as the unifying principle by the Dutch arable sector.

ICM has been introduced to advisors and input providers. ICM will be included in presentations to farmers by advisors and input providers over the winter.

Key conclusions

The introduction of IPM in arable production systems is complex. In addition, economic constraints cause farmers to be risk averse.

Forerunner farmers are intrinsically motivated to help develop more sustainable production methods. They also have the skills, tools and knowledge to serve as examples for their colleagues.

As a result, introduction of reliable and robust IPM methods for weed, disease and pest control is a slow and lengthy process that started many years ago and will continue far into the future.

Farmer collaboration, facilitated and supported by experts, in hubs, sharing knowledge, ideas and experience is of critical importance to the successful implementation of IPM.

Facilitation approaches

How do we sustainably manage late blight in potatoes?

What is the precise issue?

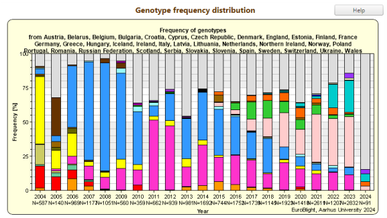
Potato late blight (Phytophthora) control in potatoes requires, on average, 12-15 fungicide applications per growing season, around 50% of the pesticides used in arable cultivation in the Netherlands. Significant reductions are necessary to realize the F2F target reduction of 50%.

An IPM solution including components from all 5 pillars: 1) sufficiently long rotation, 2) soil management, 3) more resistant cultivars and 4) decision support to guide the timing of 5) direct control measures (fungicide applications) reaches the F2F goals but is not yet used in practice.

What did we do?

Phytophthora control was a main topic from the start of the IPMWorks project.

- WR provided in depth knowledge on epidemiology and adaptability of the pathogen population.
- Hub members were shown live IPM demonstration trials + previous results on late blight control in more resistant cultivars.
- Hub members were given the opportunity to experiment with late blight resistant cultivars under guidance of experts.
- The resulting experimental fields were used for IPMWorks demonstrations to other hub members.



What conclusions were drawn?

- Host resistance is a very effective and valuable tool to control pests and diseases.
- Availability of genetic resources conferring host resistance may be limited.
- Additional knowledge and tools are necessary to allow for sustainable deployment of host resistance.
- Preventing pathogen adaptation must be taken into account as part of any durable IPM solution for pest, disease and weed control.
- Durability of control is found in the integration of control tools from all five pillars of IPM.

My tips for making it work:

- Seeing is believing, real life demonstrations are the most effective tools to share knowledge and experience.
- Add a social event to any technical demonstration or workshop. A shared lunch or a drink stimulates discussion and knowledge sharing.
- Farmers live and plan by the day. Take this into account when planning meetings/demo's but don't be disappointed when only a few show up, e.g. during harvest time.
- Combine technical and ecological demos. Big machines more easily draw a crowd.

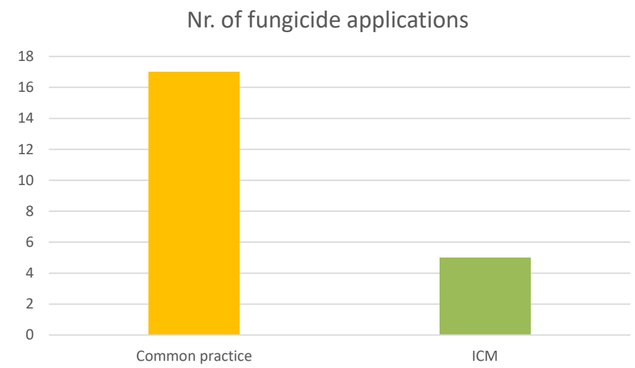
Individual facilitation

- Conduct personalized farm visits to establish trust and a friendly relationship. New (software) tools often need a personal introduction to set them up and for first use.
- Whatsapp works better and faster for communicating with individual members and with the whole hub.
- Executing on-farm trials to evaluate beneficial system changes.

Collective facilitation

- Trust is key. Without trust knowledge, experience and ideas are not shared.
- Let the hub members talk! The collective knowledge is huge.
- National and international on farm demos are very effective for sharing out of the box knowledge and experience.
- Social events following pr preceding a demonstration or workshop is very effective in creating "team IPMWorks".

IPM adoption & pesticide use



Comparison of conventional potato late blight control to a IPM control:

- Conventional control strategy: a susceptible potato cultivar was grown and preventively sprayed with fungicides using a decision supprt system for timing of the applications.
- IPM control strategy, a late blight resistant cultivar was grown which was preventively sprayed with fungicides under high disease pressure only.
- Disease pressure was extremely high during the 1st half of the growing season and normal in the 2nd half.

Results:

- Both crops (conventional and IPM) were healthy until harvest.
- The conventional control strategy needed **17** fungicide applications
- The IPM control strategy needed **5** fungicide applications.
- Since epidemic development was not allowed, pathogen adaptation did not occur in this trial.

Gilbert van Campen

My main objective is to produce high quality arable products in a healthy environment using as little pesticides as possible.

Step by step I am gaining experience and adopting more and more functional IPM measures in my control strategies for pests, diseases and weeds.

Sufficient pesticides should remain available for emergencies.

I estimate IPM currently results in average reductions of 25% (fungicides & herbicides) and 30% (insecticides) as compared to current common local practice.

Geert Kessel

IPM is a knowledge and data intensive, farm level, approach to pest, disease and weed control.

A systematic, step by step approach is key to successful introduction of IPM.

Introduction of IPM requires the support of the entire production chain.

The complexity of IPM is a hurdle for introduction. Support from colleagues (hubs) and experts can help to overcome this hurdle.

A European network of demonstration farms promoting low pesticide use and economically efficient management strategies

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