How I implement IPM

Details of a holistic IPM strategy with low pesticide input on a Dutch farm

Gilbert van Campen
Kraggenburg
The Netherlands

My farm

PEDO-CLIMATIC CONTEXT

The Netherlands is part of the Atlantic North – and Central environmental zone. Situated in the north of the country, reclaimed clay soils are predominant on our farm.

Weather conditions during the growing season are highly variable. Hot and dry spells as well as prolonged periods of precipitation can occur. Annual precipitation ± 850 mm. Annual average temperature ± 10.5 °C. Annually ± 1700 hrs of sunshine.

MAIN PESTS

- Potato: foliar fungal pathogens, aphids, viruses, nematodes, weeds.

AGRONOMICAL CONTEXT

- Crops are grown in rotation to avoid as many soil borne problems as possible:
- 1:3 potato, 1:6 sugarbeet, 1:12 onion, 1:6 wheat 1:6 tulips and 1:12 carrots.
- 135 ha arable farm on clay (reclaimed land) slightly north of the centre of the Netherlands

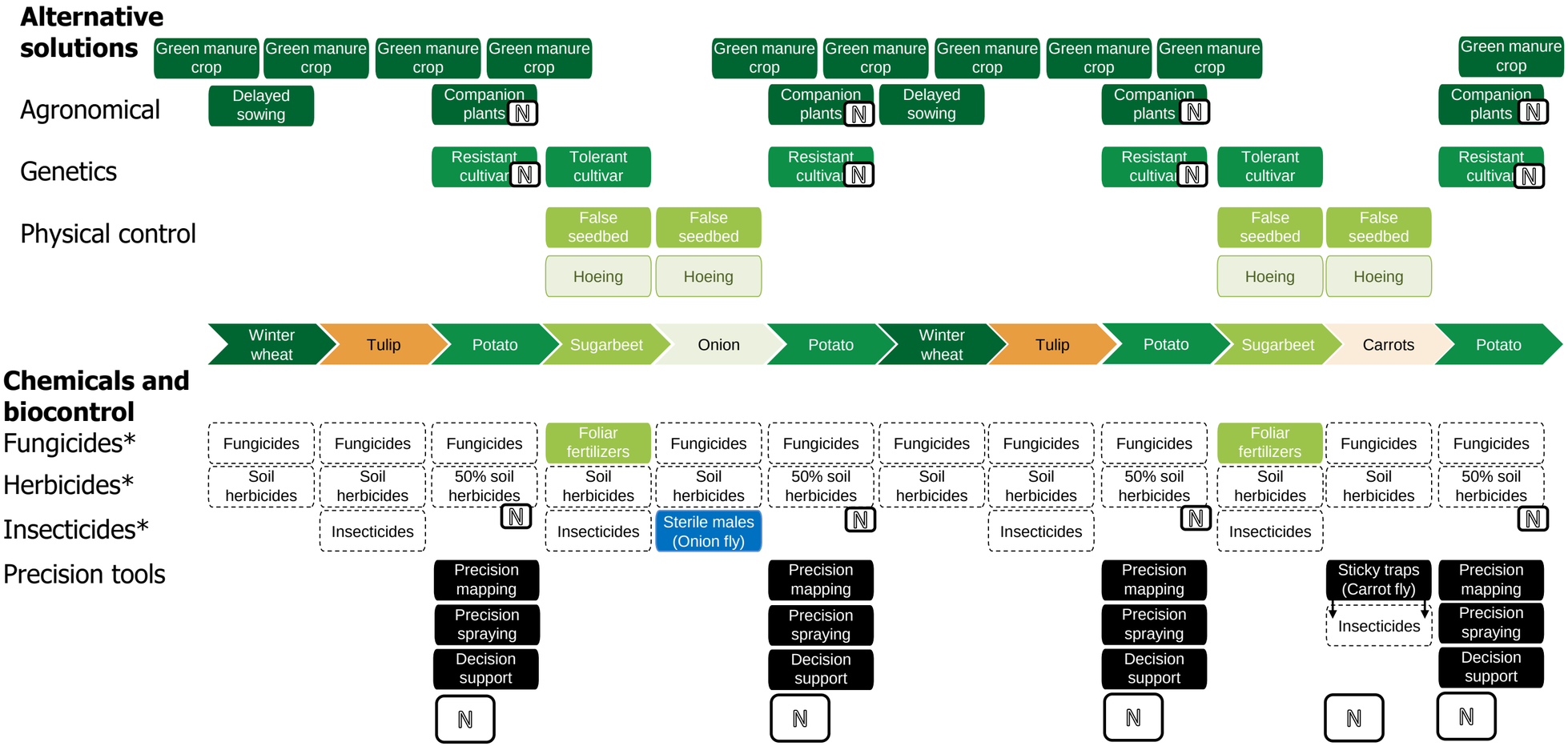
SOCIO-ENVIRONMENTAL CONTEXT

- Workforce: 2 – 5 workers

OBJECTIVES AND MOTIVATIONS OF THE FARMER

Produce high quality arable products and limit the use of pesticides as much as possible.

My strategy



*In green = low risk PPPs
* In blue = biocontrol agents

Legend N **New solution** ~~**Solution**~~ **Abandoned solution** **Non systematic solution**

Key IPM measures

Prevention:
Prevention is key. Our 12-year rotation includes: Potatoes 1:3, carrots & onions 1:12, other crops 1:6.

Clean seed potatoes:
The humigator reduces storage losses, silver scurf & black dot. Pesticides mostly avoided.

Weed control in potato:
Low input system allows a 50% reduction of soil herbicides.

Biodiversity:
Experimental: companion plants in potato confuse aphids and harbor natural enemies. Insecticides are mostly avoided.

Green manure crops: used whenever possible to retain nutrients and to manage nematodes.

Precision tools:
Automated precision mapping of potato cultivars at planting. Task maps allow to only spray susceptible cultivars.
Reductions in spraying of up to 75%.

Decision support potato late blight: Only spray potato crops when necessary. Average of 2 – 3 sprays less per year.

Foliar diseases in sugarbeet under low disease pressure: Specific foliar fertilizers used. Fungicides mostly not needed.

Onion fly: controlled through the application of sterile males. Insecticides not necessary.
Carrot fly: sticky traps allow to spray only when necessary. Insecticides mostly not needed.

Weed control: False seedbeds and hoeing allow for a reduction of the herbicide input.

My results

Comparison with standards

Pests control

Very good

Potato late blight control on resistant cultivars

Reduction of storage losses (humigator)

Medium

Companion plants to confuse aphids and prevent virus transfer

To improve

Weed control using soil herbicides

Evolution of use of pesticides

Very good

Fungicides

Medium

Herbicides

Insecticides

Increasingly biocontrol is applied as seed treatment

To improve

Additional Biocontrol options are needed

Sustainability indicators

Very good

- ↘ Use of products that are dangerous or toxic to the environment and/or user
- ↗ Use of agro-ecology
- ↗ Satisfaction of the farmer and his/her workers
- ↘ Pesticides costs

Medium

- = Use of fossil fuel energy
- = Use of sustainable energy
- = Workload
- = Equipment usage time
- ↗ Complexity of the cropping system
- = Labour employment
- = Distribution of work over the year

To improve

- = Use of biological control
- ↗ Costs of biological control, elicitors etc.
- ↗ Costs of agro-ecological measures

Key conclusions

- **The IPM approach allows me to experiment with additional preventive control measures.**
- **Successful new measures are included in the IPM control strategy for specific pests, diseases and weeds.**
- **As a result, we are gradually reducing the input of pesticides through applied agro-ecology and precision technology.**
- **Economically we continue to produce high quality arable products and seed.**
- **Chemical solutions should remain available as a last resort in emergencies.**
- **The substitution of chemical control by biocontrol products has to be studied in economic terms for potato crops. Solutions do exist, such as *potassium phosphonate* or *Bacillus amylolequifaciens* against mildew, and *rapeseed oil* against aphids. They require precise application and must be accompanied by favourable genetics.**

Legend

In green = positive trend
In red = negative trend
In black = comparable

= Comparable

↗ Increase

↘ Decrease

↗↗ Significant increase

↘↘ Significant decrease

Environmental indicators
Social indicators
Economical indicators

Our feedback

"The interaction between farming practice and IPM research is inspiring and key to success.

Gilbert van Campen (the Netherlands)

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.

"IPMWorks provides farmers with the opportunity to experiment with IPM. Specialist support and quantification of the results are key to successful adoption of IPM.

Geert Kessel (the Netherlands)

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

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

Automated monitoring and evaluation techniques are urgently needed to facilitate accurate decision making and evaluation of the results.

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