Agroscope

Schweizerische Eidgenossenschaft
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Confederazione Svizzera
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Federal Department of Economic Affairs, Education and Research EAER
Agroscope

Alternative plant protection for the Swiss Fruit production

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28.5.2017, Sint Truiden

Tasks

- Reorganisation of Agroscope
- Low residue trial
- Exclosure netting on apples
- Spotted wing drosophila on stone fruits

Agroscope

Agroscope: fusion of all Swiss agricultural research stations

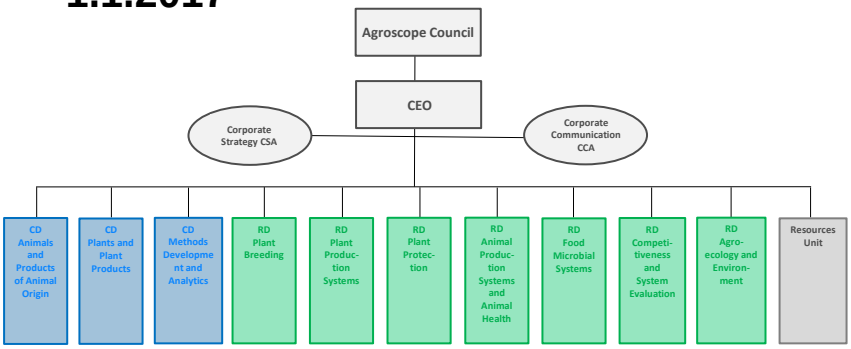
Agroscope
Head: Gysi Michael

- **Institute for Plant Production Sciences**
  Head: Mayor Jean-Philippe
- **Institute for Livestock Sciences**
  Head: Guidon Daniel
- **Institute for Food Sciences**
  Head: Bachmann Hans-Peter
- **Institute for Sustainability Sciences**
  Head: Steffen Paul

Old structure ended 2016

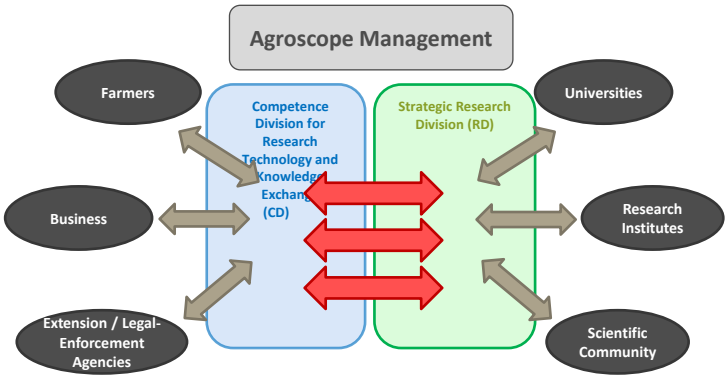
Agroscope

Agroscope Organisational Chart as of 1.1.2017



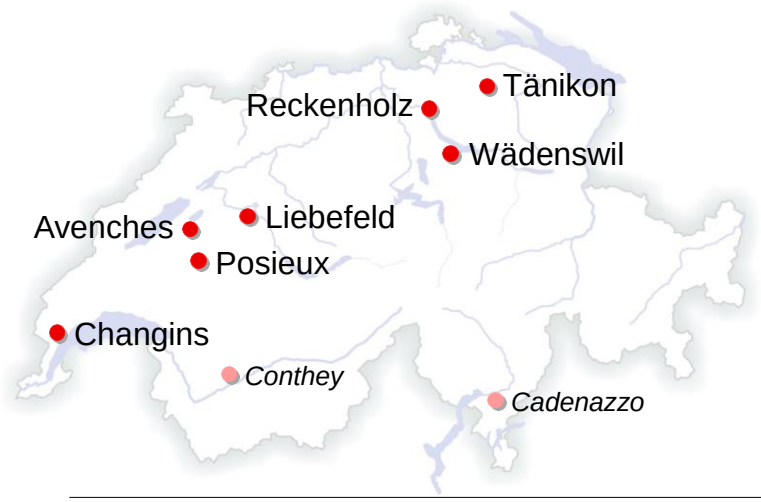
CD: Competence Division for Research Technology and Knowledge Exchange **RD:** Strategic Research Division

Organisational Logic



- Strengthening of cooperation through interconnections between entities with different focuses
- Better orientation towards the different stakeholder groups

Agroscope's Sites



Our experimental farms

Breitenhof (9 ha)
Stone fruit centre
Partnership with Cantons, SOV and FiBL

Güttingen (8.4 ha)
Pome and stone fruits
Partnership with LBBZ Arenenberg

Wädenswil (22.5 ha)
Pome and stone fruits
Apple breeding
Nuclear stock

Pesticides in public focus, more than ever!

Consumer magazine on Swiss Television

Publication 2017 in Aqua & Gas

The Swiss agreement

SwissGAP defined requirements on multiple pesticide residues (since 2007 a consensus between producers, traders and retailers)

Product	Number of Residues, active substances ≥ 0.01 mg/kg		
	up to here ok	alert level	product no more ok
Pome fruits	4	5	≥ 6
Stone fruits	4	5	≥ 6
Cherries	5	6	≥ 7
Strawberries, raspberries, black berries	5	6 -7	≥ 8
Grapes	5	6	≥ 7
Other berries	4	5	≥ 6

Residue monitoring in the past years has shown:

- No major problems with stone and pome fruits
- Critical for soft berries, table grapes and some vegetables

In 2011, retailers asked SwissGAP for further reduction.
For 2016 Lidl demands fruits without neonicotinoids.

Swiss national action plan for risk reduction and sustainable use of pesticides

- Risk to human and the environment has to be reduced by 50% with a reduction and a limitation of pesticide use and a reduction of emissions.
- Delayed because of political process. In action by end of 2017?

Low-residue apple trial 2009 - 2013

Goals
- Reduction of chemical-synthetic pesticides
- No detectable residues
- Production of 1st class fruits (recommondations for farmers)

4 varieties

Golden Delicious 0.32 ha

3 scab resistant varieties: Ariane, Otava, Topaz 0.25 ha each

3 plant protection strategies

- integrated production (IP)
- organic production (BIO)
- Low-residue (LR) combination of IP und BIO

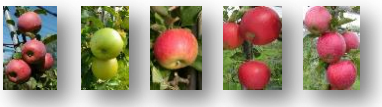
Summary

- No pesticide residues were detected with the Low-Residue (LR) strategy (adapted fungicide strategy, mating disruption, nets)
- Powdery mildew, scab and important pests were under control with LR strategy
- For scab resistant varieties (Vf), chemical scab control is needed to prevent resistance loss
- A switch to an organic fungicide strategy after bloom results in problems known for organic production: increased incidence of strorage rots and minor diseases (e.g. *Marssonina coronaria*)
- Hot water treatment could reduce storage rots
- Economic production with LR-strategy is difficult with prices paid for integrated produced apples

LR trial to be continued…

- New scab resistant varieties
- Focus on long time effects and comparison between integrated and LR strategy
- Improved weed control

5 varieties



Scab resistant varieties:
Ariane Otava Topaz Ladina Natyra®
je 0.25 ha

2 crop protection strategies
With 3 repetitions

- Integrierte Produktion (IP)
- Verbesserte Low-Input / Residue (LR) Strategie
  Kombination aus IP und BIO

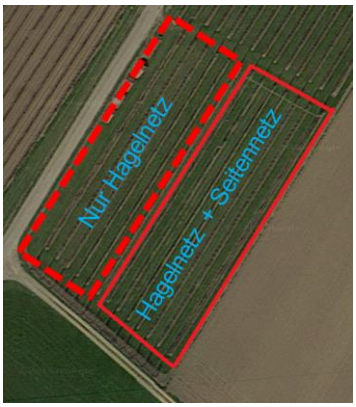
New focus: microbiom on apples

- Impact of spray program an variety on microbiom and incidence of storage rots
- Possibilities to influence the beneficial part of the microbiom

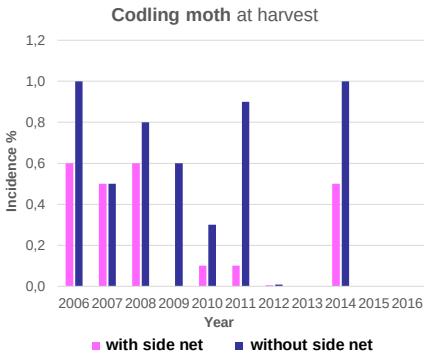
Longterm apple trial in Güttingen: nets and mating disruption

- Hail net on whole plot
- One part with Insect net (~3.5x4.0mm)
- Mating disruption with Isomate-CLR/OFM
- No insecticides against moths

- Varieties: Boskoop (B), Redlove (R), Jonagold (J), Modi® (M)
- Root stocks: M9 vt (B), M9 T337 (R), M9 Fl56 (J), M9 T337 (M)
- Planting: 2005 (B), 2011 (R), 2012 (J), 2008 (M)
- Area: 0.4 ha



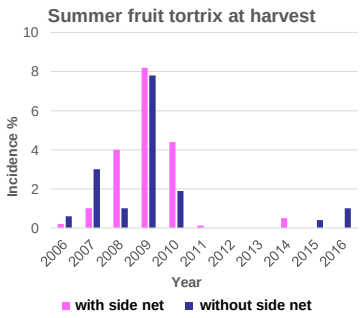
Exclosure netting 2006-2016:

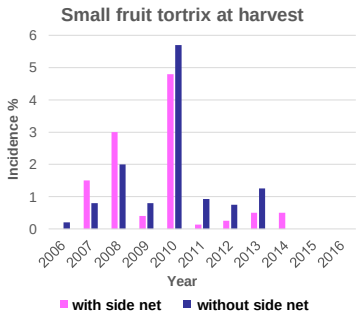


Long time observations

- 50% reduction of damage from codling moth compared to part with hail net only
- Population remains low without specific insecticides

Exclosure netting 2006-2016:





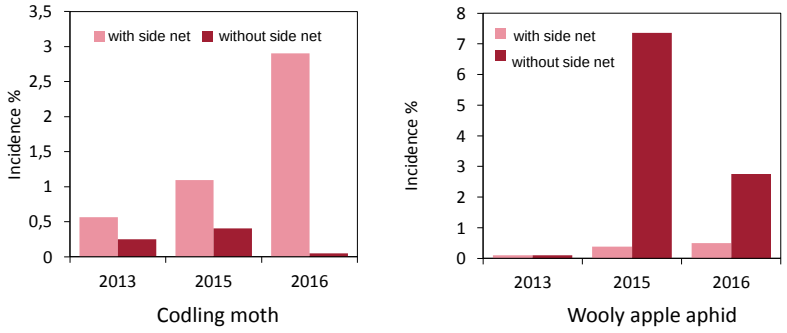
Observation

- No significant effect on summer fruit tortrix and smaller fruit tortrix
- Smaller mesh width is necessary

New trial in Wädenswil

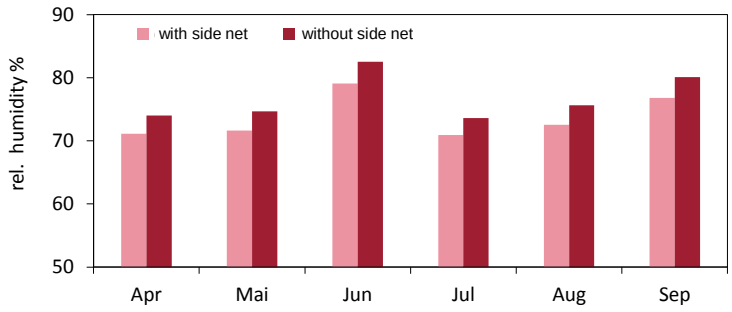
- 0.7 ha, varieties Opal and Diwa planted in 2012
- Whole plot with hail net, half plot with insect net (1.35 x 1.35 mm)

Effect on pests



Insect exclosure successfull for larger pest but small pests like aphids or mites can profit due to the exclosure of beneficials..

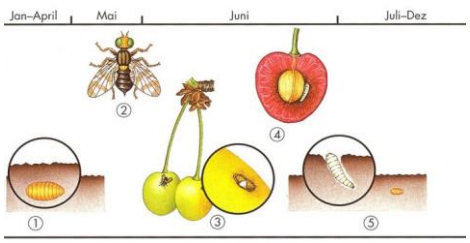
Effect on humidity



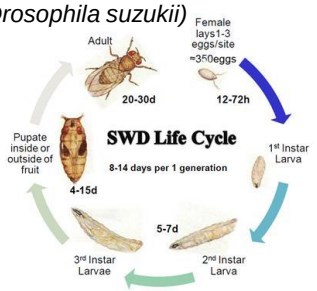
The potential effect of this increased humidiy on fungal diseases will be evaluated this year.

Cherry fruit fly and Spotted Wing Drosophila
Combined control strategies?

Cherry fruit fly **CFF**
(Rhagoletis cerasi)

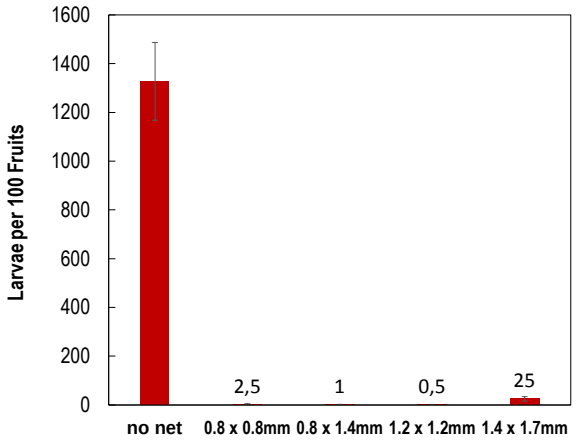


Spotted Wing Drosophila **SWD**
(Drosophila suzukii)



Exclosure netting against spotted wing Drosophila

Incidence on cherries with different net types

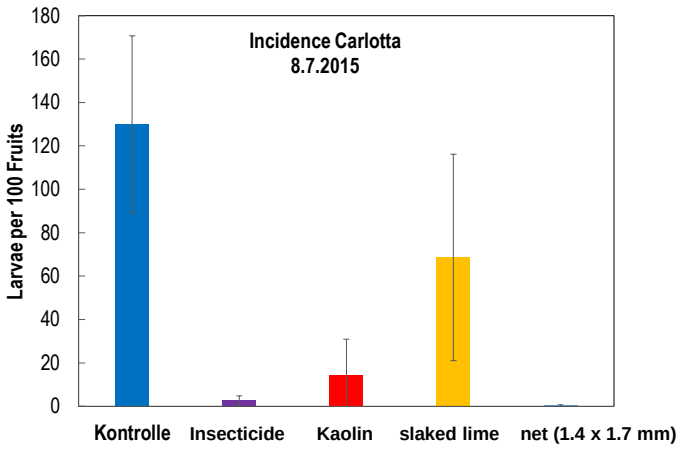


Physical barriers

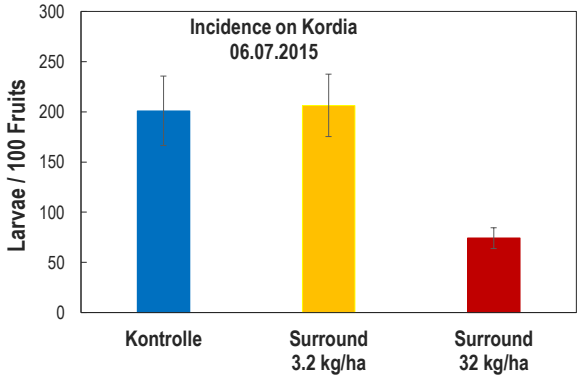
Kaolin

Slaked lime

Kaolin vs. Löschkalk



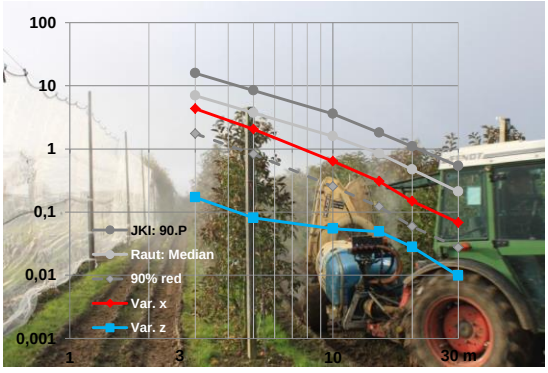
Kaolin: different concentrations



Deposition analysis with drift reducing measures

- Injector nozzles
- Hail net
- Side net
- Hedges
- Combinations

Drift reduction up to 95% is possible!



Trials on control of Drosophila suzukii on stone fruits

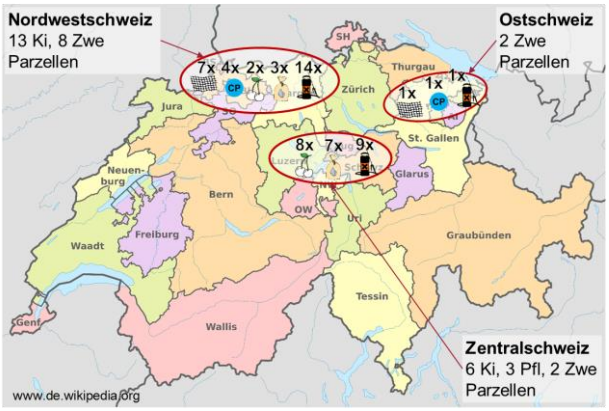
taskFORCE Drosophila suzukii

www.agroscope.ch I good food, healthy environment

Three approaches

taskFORCE Drosophila suzukii

On-farm trials 2016



Ki: cherries Zwe: plums Insecticides nets

slaked lime Surround CP Combi-Protec

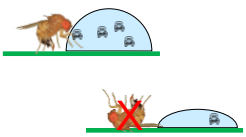
Exclude

- Nets provide a good protection against SWD
- Net allone does not guarantee absence of SWD in fruits
- Combination with insecticides 100% efficacy

Mask

- Efficacy of slaked lime and suround (kaoline) not always reliable
- Surround has no negative effect on destillery
- Poor rain persistence

Distract



- Efficacy of attractant Combi protect together with spinosad strongly depends on infection pressure
- High demands on application technology

New projects

- **Fenaco-Agroscope collaboration «Swiss apples – naturally»:** private-public partnership on minimizing residues on apples
- **Interreg project «*Model orchards for sustainable plant protection*»:** german, austrian and swiss collaboration on innovative production strategies (CH: Agroscope, Kt. SG, Kt. TG, D: KOB, HSWT, LTZ Augustenberg, Ö: LK Vorarlberg)
- **Interreg project «*Sustainable tree row management*»:** german, swiss collaboration on alternatives to herbicides (CH: Agroscope, D: KOB, HSWT, LTZ Augustenberg, Ö: LK Vorarlberg)