AgroSCOPE

Annual Report 2018

Agroscope good food, healthy environment

Schweizerische Eidgenossenschaft
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Education and Research EAER
Agroscope

For more information on the articles in the online report, visit
www.annual-report.agroscope.admin.ch

Research work at Agroscope led by Marcel van der Heijden deals with the identification of useful bacteria and fungi in the soil.

Mission Statement

Swiss Research for Agriculture, Nutrition and the Environment

Agroscope, the Swiss Federal Centre of Excellence for Research in the Agriculture and Food Sector, is affiliated with the Federal Office for Agriculture (FOAG). Agroscope is strategically managed by the Agroscope Council, whilst the Agroscope Executive Board is responsible for its operative management.

Vision

Agroscope makes an important contribution to a sustainable agriculture and food sector as well as to an intact environment, thereby contributing to an improved quality of life.

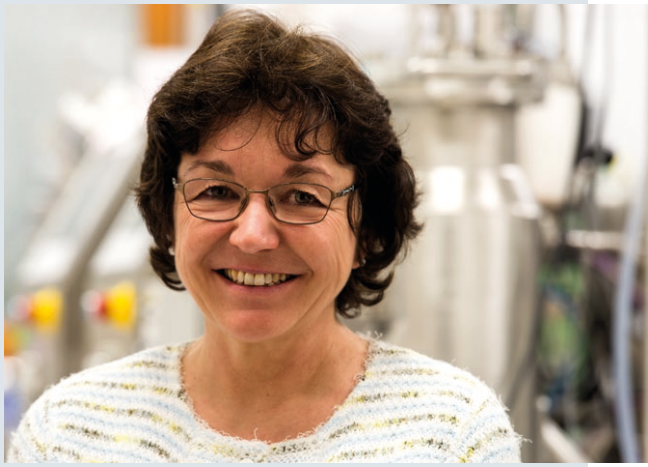
Aim and Purpose

Agroscope researches along the entire value chain of the agriculture and food sector for a competitive and multifunctional agricultural sector, for high-quality food for a healthy diet, and for an intact environment. Our focus is on research and development for the benefit of the agriculture and food sector; the provision of decision-making bases for federal-authority legislation; enforcement tasks within the framework of the legal provisions in the service of agriculture and the general public; and knowledge exchange and technology transfer with practitioners, agricultural extension, industry, science, the teaching sector and the public.

Soil – the Foundation of the Agriculture and Food Sector

"Everything that works against nature, will not endure the times." This quote from Charles Darwin holds true for the soil in particular. Erosion, nutrient loss, over-fertilisation, contamination, compaction and construction projects all take their toll on the soil. But only healthy soil can maintain its varied functions and services.

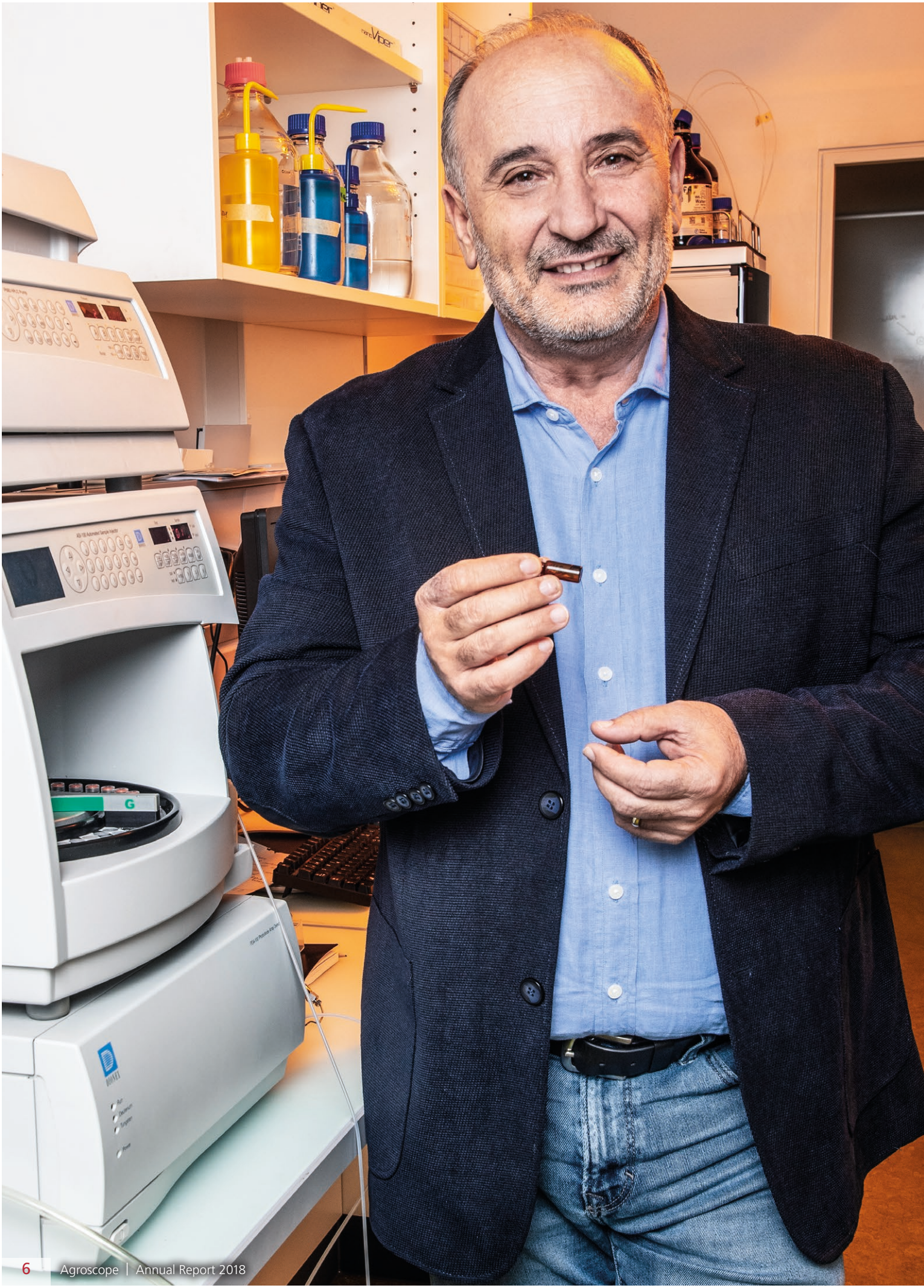
Healthy soil means good harvests, healthy food, and an economically successful agriculture and food sector. But the soil has a number of further functions: it purifies the water that we drink, and can sequester carbon. The latter function counters climate change. A healthy soil provides a habitat for flora and fauna, as well as for microorganisms. Among these are many beneficial organisms – some, such as mycorrhizal fungi, with which we are already familiar, and others whose functions have yet to be discovered.



The cover story of this annual report introduces three projects on the topic of soil. Learn how Agroscope researchers are maintaining soil functions, and even attempting to improve them. Soil offers a potential for plant production that has not been fully exploited to date: optimised soil management and targeted control of natural soil processes should result in even better yields.

Research that helps practitioners must be interdisciplinary and geared to the agro-ecosystem as a whole. This requires multi-year trials and a variety of professional skills, but also a feel for the most pressing problems and the aspiration to develop practice-oriented, implementable solutions. It is precisely these that are the strength of Agroscope research. Agroscope is thus ideally positioned to help bridge existing knowledge gaps and to offer action-oriented solutions, as well as decision-making bases for legal measures. This commitment to the soil – the foundation of the agriculture and food sector – serves both the present and future generations.

Eva Reinhard
Head of Agroscope



Soil Fertility: Vital for Agriculture and Society

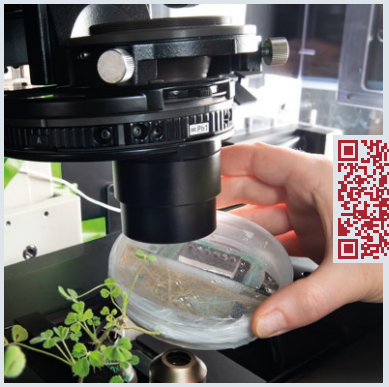
What are the distinguishing features of a fertile soil? How can fertility be maintained and increased? Three Agroscope research groups are taking a close look at soils and developing productive farming methods that encourage soil fertility.

Vegetables, fruits, cereals, meat, potable water – 95 % of our foods come from the soil. Soil is a vital resource not just for agriculture, however, but for our whole planet: it supplies plants with a reservoir of nutrients, provides a habitat for one-quarter of all living species (biodiversity), contributes to the functioning of ecosystems *inter alia* with the carbon, nitrogen and water cycle, acts as a water filter and reservoir, and sequesters large amounts of carbon from the atmosphere (greenhouse gas).

In a country like Switzerland, soils suitable for agricultural use are a very scarce resource. It is therefore important that the agricultural sector and society alike know how soils function and what promotes their fertility. This is precisely the aim that Agroscope has in mind, particularly with its research in the form of long-term trials on arable-crop plots on its Changins and Reckenholz sites, as well as with innovative approaches focusing primarily on the soil microbiome.

Organic carbon – the key to fertility

A 2018 general survey of the trials carried out by Agroscope over a 50-year period showed that substantial amounts of organic carbon can be added to the soil over the long term through farmyard manures and residues of cultivated crops. This parameter plays a key role in soil fertility and in the sequestering of carbon dioxide. However, only a consistent supply of manure can maintain the soil's organic carbon content, and thus increase crop yields. The impact of the different kinds of tillage – plough, reduced tillage, no-till – on soil fertility shows that all methods result in a decrease in organic-carbon content. Reduced tillage can slow down this effect, however. All three sorts of tillage lead to similar yields over the long term. Crop rotation brings no advantages in terms of the soil's organic carbon content, but it enables higher yields to be achieved both over the short and long term. To summarise, a combination of regular inputs of organic manures, reduced tillage and a varied crop rotation can maintain soil fertility and field-crop yields over the long term.



Sokrat Sinaj leads research in agricultural crop nutrition.

How can compacted soils regenerate?

Around one-third of all Swiss soils are affected by compaction. Increasingly heavy machinery on waterlogged soils causes compression of the soil and damage to soil structure. This negatively affects air and water permeability, and hence the development of roots and soil organisms. By assessing the risk before driving heavy agricultural machinery over soils, compaction can be avoided. But what can be

done if a soil is already compacted? Research work on this subject is testing which farming methods have a potential for improvement. Tillage alone will not succeed in restoring soil structure. A sensible approach consists of a crop rotation with deep-rooted plants and application of an organic manure that nourishes the soil organisms and promotes the natural soil processes. These measures are also important for an optimal humus content, which is in turn essential for soil fertility. To this end, Agroscope has developed a software program (Humus Balance Calculator) for farms for testing the organic-matter content of the soil and adjusting it through practices such as appropriate crop rotation, the application of organic manure, and intercropping.

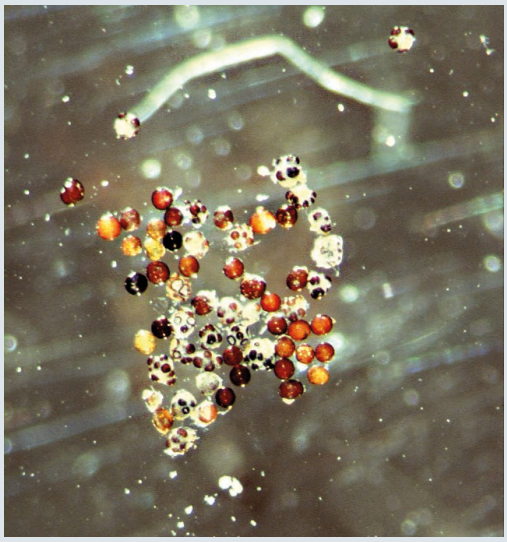
Fertility and cultivation systems

A research project conducted at an international level over a 10-year period compared various field cropping systems – conventional farming with and without ploughing, organic farming with ploughing, or no-till – in terms of yields and environmental impacts. Numerous parameters such as productivity, nutrient balance, microbial diversity, susceptibility to erosion and carbon sequestration have already been investigated. Initial results after four years show that the no-plough methods and organic farming have a positive impact on soil functions and energy balance. Despite these significant environmental benefits, however, yields are decreasing from one year to the next. Agroscope researchers are therefore currently examining which agricultural practices combine high yields with environmental benefits. They are also testing the potential of soil microorganisms to reduce fertiliser applications.

The potential of the soil microbiome

Microorganisms in the soil play a key role in soil fertility and plant growth. To give just two examples, bacteria living in symbiosis with clover absorb significant amounts of nitrogen, and mycorrhizal fungi (which form symbiotic associations with plant roots) make considerable amounts of phosphorus and trace elements available to plants.

The aim of Agroscope's research is to better understand these biological soil processes, and to identify useful bacteria and fungi in the rhizosphere microbiome. Laboratory ex-



periments with model systems show that an increase in microbial diversity and in the number of soil-dwelling organisms promotes the absorption of nutrients by plants and reduces leaching losses. Trials with mycorrhizal fungi are currently being conducted on several maize plots with the aim of increasing soil fertility. On some fields, 30 % higher yields were observed after inoculation with the fungus; on others, no impact was noted. In another project, commercially available products containing microorganisms beneficial for the soil were tested. It emerged that the quality of these commercial products varied greatly, and that up to 50 % of the microorganisms contained in these products were incapable of survival. These results lead us to the conclusion that the products are of unsatisfactory quality, and that a quality assurance system should be introduced.

These examples of current soil research illustrate how Agroscope is working to find answers to concrete problems on fertility, efficient use of resources, compaction, and the improvement of the soil in its function as a sustainable basis of life. Long-term trials are a particularly valuable tool for better understanding, modelling and testing the impacts of different agricultural practices. In future, research projects will continue to aim to provide practical solutions that will safeguard the sustainable fertility of agricultural soils ■

Microorganisms in the soil play a key role in soil fertility and plant growth

Increasing knowledge about Grass Growth and Quality

Managing grasslands means managing species communities. To make the best use of these communities, we must also know about grass growth and quality, and master grassland conservation. The 'Into-Grass' project aims to develop tools to facilitate grassland management, grass utilisation and grass quality assessment. Launched in 2018, this transdisciplinary project involves four Agroscope teams, and is based *inter alia* on a network of 32 grasslands distributed across Switzerland, which will help us better understand the impact of climatic conditions on grass growth and quality.
www.agroscope.ch/srf01

Allelopathy for Weed Control

Some plants produce allelochemical compounds which have growth-suppressing effects on other plants. This phenomenon is of interest to weed scientists, who aim to develop herbicide-free methods for controlling weeds in field crops. Agroscope is evaluating the potential of certain cover crops (e.g. buckwheat, oats, radish) for combatting weeds. The experiments clearly demonstrate that allelopathy plays a role in suppressing the growth of amaranth. Work will continue to extend this control method to other weeds.
www.agroscope.ch/srf02

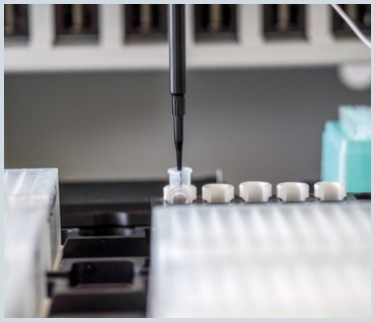
Divona, a New Disease-Resistant White Grape Variety

Christened in 2018, Divona is the result of a cross between the 'Bronner' and 'Gamaret' varieties. The best candidates were selected throughout an innovative process including, in particular, early disease-resistance tests and winemaking trials. Boasting good resistance to botrytis blight and high resistance to powdery mildew, Divona allows growers to reduce the use of plant-protection products. As for the wines produced from the Divona grape, they are very well noted during tastings: structured, with a fine, aromatic bouquet evoking notes of exotic fruits and citrus.
www.agroscope.ch/srf03

Fattening Pigs Without Soya

Soya imports are controversial owing to the long transport routes from South America and the clearing of old-growth forest for farmland which they entail. If we could exploit the known potential of Swiss pig breeds to cope with a reduced-protein diet, Switzerland could make crude-protein savings equivalent to the quantity of soy currently imported for pig production. What's more, these animals excrete less nitrogen, thereby reducing environmental pollution. To achieve these benefits, we need to determine how we can breed healthy, productive pigs with this trait.
www.agroscope.ch/srf04

Role of Viral Communities in Cultivated Plants



Deep-sequencing techniques have revealed the existence of numerous microorganisms in all of the planet's ecosystems. In Switzerland, Agroscope's Virology Research Group is utilising these techniques to check the state of health of crops. Our research has led to the detection of complex viral communities which sometimes contain unknown viruses. Whilst the majority of these viruses do not cause disease, our work shows that they interact with the agricultural ecosystem, and can influence the dynamics of disease transmission.
www.agroscope.ch/srf05

Heat Stress in Grazing Dairy Cows

In Switzerland as elsewhere, global climate change is leading to more frequent heat waves. Dairy cattle are very susceptible to heat stress, which leads to reduced performance as well as negatively affecting animal health and well-being. Measures commonly used to deal with heat stress in housed cows are not practicable in the case of cows on pasture. A research project launched in 2018 therefore has two aims: to recognise incipient heat stress via behavioural traits, and to develop practical measures for reducing heat stress in grazing dairy cows.
www.agroscope.ch/srf06

Uncovering Genetic Diversity

A novel three-step method provides important information for the conservation of endangered livestock breeds, enabling the genetic origins, kinship relations and degree of inbreeding of an individual in a population to be determined. Based on this, a breeding programme will allow rapid implementation of diversity measures for preserving the original genetics, e.g through the exclusion of animals with a high admixture level. An initial study of 531 horses examined the population structure of eight horse breeds.
www.agroscope.ch/srf07

Using Microbiomes for Agriculture

By developing core competencies for the analysis of microbiomes, Agroscope researchers were able to generate numerous important findings in joint internal and external research projects. Highlights were the observation of a correlation between microbial communities and type of land use, the discovery of new active substances, and initial results with the application of isolated strains. In future, this could help to combat soil-borne pests and reduce the use of plant-protection products.
www.agroscope.ch/srf08

New Fruit Varieties are Market-Ready

Breeding new varieties of apples, pears and apricots is part of the remit of Agroscope's breeding programmes. The new varieties must meet market and consumer requirements and be a step forward towards economically and environmentally sustainable production. The latest new varieties are called 'Ladina', 'FRED'®, 'Lisa' and 'Mia'.

At Agroscope, hand pollination still forms the basis of breeding. Researchers cross parent varieties with desirable traits. This procedure is supported by molecular selection methods. In this way, they detect specific genes that are responsible e.g. for resistance to diseases, or for particular quality traits. As soon as the breeders have selected the numerous offspring plants for the desired traits, they carry out in-depth testing of the outstanding ones in terms of production, storage and fruit-quality characteristics.

Once an innovation is market-ready, the organisation responsible for the market launch of Agroscope fruit varieties comes into play: VariCom GmbH. This is also the case for Ladina, FRED®, Lisa and Mia.

Ladina, the fireblight-tolerant variety

For the new apple variety Ladina, Agroscope breeders combined the qualities of the subacid and aromatic variety Topaz, which is also resistant to scab, with the sweet and crunchy Japanese variety Fuji. Unlike its parent varieties, Ladina is tolerant to the bacterial disease fire blight. After the successful testing in Switzerland, this variety is also being tested in France, Germany, Italy, the USA, Chile, South Africa, Australia and New Zealand.

Agroscope apple breeder Markus Kellerhals tastes 'his' latest apple variety, the fireblight-tolerant Ladina.

Pear FRED® with the skin of an apple

The fruit of Agroscope's newly-bred pear variety is marketed under the brand name FRED®. The new pear boasts an early harvest-time, high productivity, and tolerance to fire blight. Juicy, flavourful, slightly subacid, and firm and crunchy, it stores well and can be handled similarly to an apple thanks to its firm skin.

A big step towards economically and environmentally sustainable fruit production

Lisa and Mia: The offspring of the Valais apricot 'Luizet'

The new apricot varieties 'Lisa' and 'Mia' have inherited their mother variety's good taste. Luizet's daughters also wow consumers with their high-quality flavour, tolerance to disease (Monilia in the case of Lisa, bacterial disease in the case of Mia), their attractive orange-red colour, and ripeness in the first half of July, as well as their good transportability and shelf-life.

The next aim is to develop offspring from Lisa and Mia which are tolerant to both monilia and bacterial disease ■


2212
2212

Cutting Back on Concentrates to Increase Earnings

Swiss dairy farmers use differing percentages of roughage and concentrates in their feed. Agroscope showed that relying for the most part on fresh grass and keeping costs under control helps farmers achieve good cost-efficiency, enabling them to produce milk a quarter to a third more economically.

Which fresh-grass systems are economically successful? This was the question examined by researchers working on the project 'Optimisation of Grassland-Based Milk-Production Systems Based on Indoor Feeding of Fresh Herbage'. The School of Agricultural, Forestry and Food Sciences (HAFL) and the Vocational Education and Training Centre for Nature and Nutrition (BBZN) were Agroscope's project partners in this research.

To answer the question, 36 commercial farms were divided into three pilot groups: two combined systems with indoor feeding of fresh herbage and an average of 430 kg and 1160 kg concentrate, respectively, plus a 'full grazing' system with 90kg concentrate per cow and year. Serving as the reference group was the 'standard Swiss farm', which spends more money on average for concentrates than the pilot groups.

Conclusions: When fresh grass is used, milk can be produced up to a third more cheaply in the three pilot groups than in the reference group. The biggest savings are to be found with concentrates, which are more expensive in Switzerland than in other countries. In addition to lower labour costs, we can also observe lower building costs in the pilot groups.

A 'full grazing' system gets by on just 90 kg concentrate per cow and year and helps to save costs, and hence to produce milk more economically.

Full grazing pays off

In the 'full grazing' system, labour can be remunerated at a higher rate. What's more, farmers are also able to produce at lower milk prices than with the two combined systems, thanks not only to lower costs, but also to higher incidental revenues (livestock sales) and direct payments per kg of milk sold.

Farms producing small volumes of milk can achieve good economic results if they are able to keep costs low

True, farms using high amounts of concentrate produce more milk, but have no economic advantage over those using low amounts of concentrate. The reason for this is that although farms with higher production volumes have lower labour and building costs, these cannot offset the higher costs of concentrates or the lower incidental revenues per kg of milk.

Farms producing smaller volumes of milk can thus achieve very good economic results, provided that they deliberately keep the controllable costs low.

Producing more economically

All of the pilot groups produced milk 24 % to 32 % more economically than the reference group, and showed CHF 8 to CHF 13 more revenue per working hour. The better results are largely attributable to good management and pronounced cost-awareness ■

Defeating a Problem Pathogen in the Dairy Sector

A dreaded pathogen in the dairy industry, *Staphylococcus aureus* is linked to lower income owing to poor milk quality and high follow-up costs. Infected raw-milk cheese can also cause food poisoning in humans. A new genetic test reliably identifies this pathogen, and represents an innovation for the sector.

The pathogen *Staphylococcus aureus* genotype B (*Staph. aureus* GTB) can be found – with regional differences – throughout the whole of Switzerland. Highly contagious, it spreads via contaminated milking equipment, causes inflammation of the cow's udder, and has to date proven very difficult to control. Alpine farms are the most commonly affected, since herds from different farms are milked together on them.

The bacterium can enter the milk via the udder. Under certain conditions, it forms heat-resistant toxins in cheese, which can lead to stomach ache, dizziness and vomiting in humans. Milk that is free from this pathogen is especially important for Switzerland, since raw-milk cheese production is both traditional and widespread in this country.

A simple routine test

The genetic test is as easy and convenient to use as it was difficult to develop. Milkers can collect the milk samples themselves, and the laboratory results are available after just one day. In addition to identifying individual GTB-positive cows, the test can also be used to detect *Staph. aureus* GTB in bulk tank milk and to monitor whole herds, as it can detect one GTB-positive cow in the milk of 138 cows. If the bulk tank milk turns out to be GTB-positive, all cows must be tested individually in order to determine which cow is infected.

Benefits: lower use of antibiotics in dairy farming, lower farm costs, and an increase in milk and cheese quality – all of which contribute to the economic support of dairy farms.

The genetic test is as easy and convenient to use as it was difficult to develop

All herds infection-free

As demonstrated by Agroscope researchers in a field study, the best way to eradicate the pathogen is to sanitise the infected herds. To do so, the cows were tested individually with the new gene test, divided into groups, and milked accordingly. Infected cows were also treated with antibiotics. In just nine months all of the farms were free from infection, regardless of herd size, dairy-cow breed or milking system. Because of these results, a sanitation project for the particularly hard-hit canton of Ticino, supported by the Swiss federal government, has been very successfully underway for around 18 months now ■

Hans Graber investigates a standard bacterial culture. 'His' gene test represents a milestone in dairy farming.

New Meat Guidelines Online

Food packaging and labels impart a wealth of information to customers. Agroscope's new guidelines are intended as a resource for the food industry for the proper labelling of pre-packaged meat, meat preparations and meat products. They also contain references to the appropriate legal bases.
www.agroscope.ch/srf09

Protective Bacteria Underestimated

Lactic-acid bacteria have been used for millennia for the biopreservation of fermented foods. Their protective effect is conferred by the production of a wide range of antimicrobial metabolites. Protective cultures such as lactic-acid bacteria or other bacteria constitute a still-underestimated means of positively influencing the microbiome of foods. Agroscope seeks to discover the mechanisms in order to identify possible applications.
www.agroscope.ch/srf10

Sensors for Nitrogen Management

Agroscope aims to improve the nitrogen efficiency of crops and to reduce the leaching and conversion of nitrate to gaseous nitrogen oxides (denitrification). To this end, experts are using sensors to collect data on the spatial distribution of nitrogen within a field by means of multispectral drone and satellite images. Soil and groundwater samples from reference areas were used to calibrate the aerial images. The combination of these data should enable the development of practical, site-specific fertilisation methods for farmers.
www.agroscope.ch/srf11

Further Optimisation of Supply Security

Agroscope carried out model calculations in order to help create suitable framework conditions for security of supply. From these calculations, we learned that the Swiss population could be supplied with 2300 kcal per person and day without imports. Environmental impacts were not taken into account. Supplementary surveys and calculations showed that Swiss households should optimise their emergency stocks, and that compulsory food stockpiles should be expanded. The results of the evaluation of the supply security contributions will be included in the further development of Agricultural Policy AP22+.
www.agroscope.ch/srf12 and
www.agroscope.ch/srf13

Soil Erosion Can Be Prevented

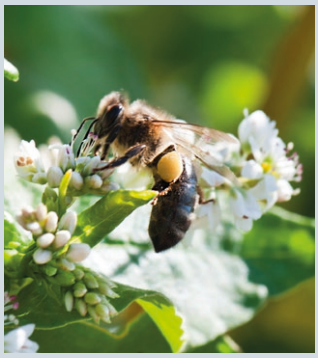
Both in Switzerland and worldwide, erosion ranks as one of the greatest threats to the resource soil. A unique dataset from twenty years of erosion-damage mapping in the region of Frienisberg (canton of Bern) shows the extent and trend of soil erosion. Although soil erosion varies from year to year, it has decreased markedly over the past twenty years; the promotion of practical soil-protection measures and the raising of awareness among producers are making an impact.
www.agroscope.ch/srf14

Soil Engineering with Beneficials

Soil plays a key role in food production. Soil quality can be improved by encouraging beneficial soil biota – either indirectly via cultivation methods that support beneficials, or directly by introducing the desired beneficials. Agroscope tested whether inoculation with mycorrhizal fungi increases yields. Conclusion: on some maize fields, yields increased by up to 30 %; on others, there was no effect. Agroscope is now working to determine the conditions under which such an inoculation is cost-effective.
www.agroscope.ch/srf15

Measuring Pollination Deficits in Five Crops

Researchers examined pollination deficits in apple, cherry, oilseed rape, broad bean and raspberry crops in over a hundred locations in the main growing regions of Switzerland. They also measured the impact of the pollinator community on yield quantity and quality. On average, pollination deficits were low but detectable. The data confirm the agronomic importance of crop pollination by insects. Depending on the crop, honeybees, wild bees or a balanced mixture of different pollinators are ideal.
www.agroscope.ch/srf16



Peaty Soils and Greenhouse Gases

Peaty soils used for agriculture are often backfilled with mineral soil material in order to offset their characteristically strong subsidence, so that the land can continue to be farmed. Whether or not this also helps lower the high greenhouse-gas emissions of peaty soils is not known. Since the beginning of 2018, and for the first time in Switzerland, researchers have therefore been using micrometeorological methods to measure the emissions on a backfilled site and on a reference site at a location in the Rhine valley.
www.agroscope.ch/srf17

State Accounts 2018

Statement of Financial Performance	Accounts 2017	Accounts 2018	Divergence 2018/2017	Divergence 2018/2017
	in CHF	in CHF	in CHF	in %
Functional earnings				
Financially impacting	22,277,485	22,742,226	464,741	2.1
Non-financially impacting	–268,136	299,367	567,503	211.7
Total revenues	***22,009,350***	***23,041,593***	***1,032,243***	***4.7***
Functional expenditure				
Financially impacting	132,176,576	131,251,182	–925,394	–0.7
Non-financially impacting	5,533,759	6,388,389	854,630	15.4
Service accounting between offices	49,102,979	46,788,938	–2,314,041	–4.7
Total functional expenditure	***186,813,315***	***184,428,509***	***–2,384,806***	***–1.3***
Statement of Investments				
Investment income	36,209	–	–36,209	–
Investment expenditure	3,642,764	5,821,310	2,178,546	59.8
Reserves				
Creation of earmarked reserves	1,883,340	2,710,142	826,802	43.9
Use of earmarked reserves	583,500	659,005	75,505	12.9
Third-Party Funds				
Acquisition of third-party research funding	15,351,358	14,329,086	–1,022,272	–6.7

Sites

Key Figures 2018

1012 people (=855 full-time positions) were employed by Agroscope as of 31 December 2018, based on financially impacting expenditure.

473 of these were women, corresponding to a 47 % share.

49 trainees were employed.

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1373 items were published.

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92 PhD thesis were supervised.

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2277 classes and lectures were given in total by Agroscope staff for practitioners, and at universities and universities of applied sciences in the year under review.

Organisational Chart

(State: April 1st 2019)

Agroscope Council

Agroscope
Eva Reinhard
Deputy CEO Romain Jeannotta

Corporate Communication CCA
Christine Caron-Wickli

Competence Divisions

Animals and Products of Animal Origin
Walter Stoll

- Feed Control
- Horse Breeding and Proper Housing
- Research Contracts Animals
- Posieux Experimental Farm
- Horses Avenches
- Processing Technology
- Biotechnology
- Production of Cultures

Plants and Plant Products
Willy Kessler

- Seed Quality
- Varieties and Production Techniques
- Plant-Protection Chemistry
- Ecotoxicology
- Phytosanitary Service
- Fruit-Production Extension
- Vegetable-Production Extension
- Viticulture Extension
- Product Quality and Innovation

Method Development and Analytics
Corinne Jud Khan

- Animal Biology
- Feed Biology
- Feed Chemistry
- Wine Quality
- Biochemistry of Milk and Micro-organisms
- Fermentation Organisms
- Ingredients
- Environmental Analytics
- Molecular Ecology
- Molecular Dia-gnostics, Genomics and Bioinformatics

Strategic Research Divisions

Plant Breeding
Roland Peter

- Field-Crop Breeding and Genetic Resources
- Fruit Breeding and Genetic Resources
- Fodder-Plant Breeding
- Breeding Research

Plant Production Systems
Christoph Carlen

- Field-Crop Systems and Plant Nutrition
- Greenhouse Crops
- Berries and Medicinal Plants
- Fruit Crops in the Alpine Region
- Herbology in Field Crops and Viticulture
- Viticulture
- Œnology

Plant Protection
Alain Gaume

- Phytopathology and Zoology in Fruit and Vegetable Production
- Plant Protection South of the Alps
- Mycology and Biotechnology
- Entomology in Field Crops and Viticulture
- Virology, Bacterio-logy and Phyto-plasmology
- Ecological Plant Protection in Field Crops

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Corporate Strategy CSA
a.i. Christian Flury

Animal Production Systems and Animal Health
Hans Dieter Hess

- Ruminants
- Pigs
- Grazing Systems
- Farm-Animal Welfare
- Bees
- Forage Production and Grassland Systems
- Swiss Institute of Equine Medicine (ISME)

Food Microbial Systems
Fabian Wahl

- Cheese Quality and Authenticity
- Cultures, Bio-diversity and Terroir
- Risk Evaluation and Risk Mitigation
- Functional Nutritional Biology
- Human Nutrition, Sensory Analysis and Flavour
- Microbiological Food Safety

Agroecology and Environment
Robert Baur

- Climate and Agriculture
- Water Protection and Substance Flows
- Soil Fertility and Soil Protection
- Swiss Soil Monitoring Network
- Plant-Soil Inter-actions
- Agricultural Landscape and Biodiversity
- Life-Cycle Assessments
- Biosafety

Competitive-ness and System Evaluation
Nadja El Benni

- Socioeconomics
- Farm Management
- Automation and Labour Organisation
- Digital Production

Resources Unit
Romain Jeannottat

- Human Resources
- Finances
- Information Technology
- Infrastructure and Safety
- Publishing
- Procurement Management
- Controlling
- Quality Management

← Organisational Chart

Masthead

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Strategic Research Fields (SRFs)

The 17 Strategic Research Fields (SRFs) focus on the most important challenges of the agriculture and food sector, and form the framework of our research and development activities.

SRF 1	Optimising and coordinating multifunctional grassland use and livestock husbandry
SRF 2	Developing resource-efficient cultivation methods and systems for field crops and special crops
SRF 3	Breeding and offering efficient and marketable plant varieties
SRF 4	Optimising protein supply for humans and animals
SRF 5	Developing sustainable, low-risk plant protection
SRF 6	Supporting and promoting animal-friendly husbandry and animal health
SRF 7	Using animal genetics and livestock breeding for site-adapted animal husbandry
SRF 8	Harnessing microbial biodiversity for the agriculture and food sector
SRF 9	Lowering microbial risks and antibiotic resistance for safe food
SRF 10	Promoting quality and product innovation in foods
SRF 11	Optimising production systems through Smart Farming
SRF 12	Highlighting the strategic success positions of the Swiss agriculture and food sector in open markets
SRF 13	Recognising potential for improving the competitiveness of farms
SRF 14	Assessing sustainability and eco-efficiency in agriculture and highlighting potential for improvement
SRF 15	Sustainable and locally adapted management of soil functions and services for tomorrow's agriculture
SRF 16	Preserving and harnessing the species and habitat diversity of the agricultural landscape
SRF 17	Making agriculture climate-change-proof and reducing its contribution to climate change

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