Crop protection • Storage • Ramularia • Pear scab • 'Green' products • South Tyrol • Apple varieties • Tractors • Spraying technology • Double table top

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In this edition:



Reduction of crop protection products

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Double table top in cherry



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Special edition EFM

At the moment, the European fruit growing sector is more than ever on the move. The challenge for practically every grower is, in a situation with strongly rising production costs, to find the right route to the future.

As the European fruit growing sector, we are at a tipping point at this moment. Firstly, the assortment of apple varieties. Among the dozens of new apple varieties that in certain respects are just a bit better than the varieties we already had, there are also some pearls that really distinguish themselves from the existing varieties. Think of varieties with a special flavour experience or varieties that combine low susceptibility to fungal diseases with a very good flavour.

Also in the field of automation, robotics and artificial intelligence (AI), there are developments that can support the fruit grower in his work. Think of robot-like machines for activities in the orchard or packing fruit. Other developments are to be found in cultivation technology, with the aim of saving on labour and raising production and quality. Techniques for thinning or controlling growth for every single tree, and the development into the direction of a 2-dimensional training system, are examples of this. The EFM editorial board is closely tracking these developments and with great regularity reporting on them in this fruit growers' magazine.

This special EFM edition offers everybody who has not yet taken out a subscription to EFM an impression of what sort of thing we report on in EFM. This special edition is a compilation of articles and reports that appeared in EFM in 2023.

This edition can be digitally downloaded free by everyone from the EFM website; www.fruitmagazine.eu

EFM differs from other growers' magazines. It is a crossborder European fruit growing magazine with information and articles from all over Europe. Correspondents from various countries contribute to the contents. Another unique point is that EFM is issued in various languages. At the moment, the magazine is published in Dutch, German and English language editions.

EFM is a valuable and almost indispensable source of information for the professional and future-oriented fruit grower.

Have we succeeded in convincing you? You can directly subscribe to EFM via our website www. fruitmagazine.eu.

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Gerard Poldervaart Editor in chief EFM

Target group

The European Fruit Magazine (EFM) is the fruit growers' magazine for the professional and future-oriented fruit grower and started publication in January 2009. EFM is targeted at growers of apples, pears, plums and cherries and suppliers, consultants, researchers and all other persons and businesses active in the fruit sector. EFM is available in both printed and digital formats and appears 11x per year in three languages: German, Dutch and English.

EFM today

HYPERPARASITOIDS THREATEN ORGANIC CONTROL

Hyperparasitoids or the enemies of beneficials, play a great and still underestimated role in the organic control of pests. For instance, hyperparasitoids can be the cause that parasitic wasps can no longer do their work. In fruit growing, parasitic wasps are beneficials controlling aphids. Parasitic wasps parasitise aphids, but in their turn can be parasitised by hyperparasitoids. According to researchers Ammar Alhmedi and Tim Beliën of Belgian research institute pcfruit, there are even examples that 90% of primary parasites were parasitised by hyperparasitoids. In this way it is even possible for the complete population of beneficial parasitic wasps in an orchard or greenhouse to die. Hyperparasitism has hardly been researched, but this phenomenon is supposed to have a great impact on organic control (*Source: Fruit magazine*)

PLEA FOR LOWER PRICES ORGANIC PRODUCTS IN SUPERMARKET

Organic products are on the shelves of the supermarkets at too high prices compared with regular products. This is the opinion of the Dutch association of organic farmers and growers Biohuis. According to Boihuis, supermarkets would be able to sell more organic products at a lower price, if shops were to calculate their margins on these products in eurocents instead of percentages, Biohuis states. Retail chains determine the margin on products by calculating a certain percentage on the price at which they buy articles. As a result of the higher purchasing price of organic products, the difference in price is then further enlarged.

By adding a certain amount on top of the purchasing price instead calculating a percentage margin, organic products can become cheaper and supermarkets will sell more of them, according to a Biohuis spokesperson. (Source: Nieuwe Oogst)

FIRE BLIGHT ALSO THREATENS WILD APPLES IN THE REGION OF ORIGIN OF THE APPLE

Fire blight (*Erwinia amylovora*) is spreading world-wide. Especially in Central and Southeast Asia, the disease has spread over a large area during the past few years. The regions of origin of the primal

DANONE DUE TO APPEAR IN COURT CHARGED WITH PLASTIC POLLUTION

Various NGOs have taken French dairy producer Danone to a French court because of the great amounts of plastic that are used when packing products that subsequently end up in nature. ClientEarth, Surfrider Foundation Europe and Zero Waste France demand that Danone set out a 'deplastification path'. "We realise quite well, that this cannot be done from one day to the next, but it has to start today", Antidia Citores said, spokesperson for the NGO coalition. The organisations start the procedure in France on the basis of a 2017 law on the vigilance obligation that compels big French companies to see to it that their suppliers all over the world respect fundamental human rights and the environment.

In late September, Danone was for the first time declared in default by the coalition of NGOs, together with some food and distribution giants, including Auchan and Carrefour. The coalition has only summoned Danone. "The dialogue with the other companies is still going on. It is not impossible that they will also be called to account in front of a French court", Sébastien Mabile said, one of the NGO lawyers.

Danone (100,000 employees and more than 24 billion euros annual turnover), in 2021, according to its own annual report, used about 751,000 tonnes of plastics. The concern has set itself the target, by 2025, to design packaging that is '100% recyclable, reusable and biodegradable'. NGOs criticize the company because it concentrates on recycling its packaging, instead of tackling the problem at the source by reducing the use of plastic. (*Source: Vilt.be*)



Danone has to stand trial in France because of the large amounts of plastic packaging. Shutterstock



EFM today

apple are also to be found here, such as Kazakhstan, Kyrgyztan and Tadjikistan. It is feared that the bacterium will also strike in the primal forests with apple trees, with the result that valuable genetic material is lost. The prevent this, universities in Switzerland, the United Kingdom and Kyrgyztan have developed an app to keep track of the situation and be able to quickly signal cases of infestation. It is hoped that with the help of the app the local population will be able to better recognise fire blight and report infestation to the local authorities that can then take action in turn.

60 MILLION EUROS FOR FRENCH ORGANIC GROWERS

In early August, the European Commission has approved the French plan to support the organic agricultural and horticultural sectors to the amount of 60 million euros. This is an emergency relief plan, for organic farms that have seen their turnovers plummet during the past few years. Therefore, various conditions apply that must be met to receive emergency relief. For instance, the operating result for depreciations must have fallen by at least 20% in the period between June 2022 through May 2023 compared with the same period in 2018/2019 and the cashflow in the period 2022/2023 must have fallen by 20% compared with 2018/2019. The emergency relief only goes for farms that are already organically certified or have applied for this and are in conversion. (Source: Fruitnet)

MOST CO, EMISSIONS IN THE PEAR CHAIN CAUSED BY CONSUMER

The French environmental organisation CITEPA calculated that in the pear chain, from the orchard to the consumer, 527 gram equivalents of CO₂ are emitted.

With 211 g eq CO₂ per kilo of pears, consumers are responsible for the major part of the CO₂ emissions. This is caused by the CO₂ emission of cars from and to the shop where the pears are bought. The production of pears itself requires 120 g eq CO₂. During grading, packing and refrigerating, another 94 g eq is emitted. Transport from the orchard via cold store and packing station to the shop costs 70 g eq CO₂.

NEW FOOD INGREDIENTS FROM FRUIT AND VEGETABLE WASTE

Extracting valuable nutrients from surplus apples. This is exactly what the South Tyrol Laimburg research station (Italy) aims to do with the new project 'puRipiaNtA'. Together with the Mirnagreen company from Italian Bolzano, the Laimburg research station wants "to develop valuable and innovative food ingredients from food waste". With the help of a new process, so-called small RNAs are extracted from fruits and vegetables to make use of their antioxidant and anti-inflammatory characteristics. The project, which was set up in close cooperation between science and industry, helps to reduce food waste, to promote the circular economy and to create healthy food options.

What are small RNAs?

Small RNAs are small molecules with great potential, namely, a new food ingredient. They are produced in all organisms to regulate important physiological functions, such as controlling pathogens in plants. "These molecules have a unique chemical structure, as a result of which they have antioxidant and anti-inflammatory characteristics. That is why, they represent innovative ingredients that are very interesting for the food sector", Roberto Viola, CEO and co-founder of Mirnagreen, explains. The idea behind the puRipiaNtA-project is, the development of new technologies to produce plant extracts that are rich in 'small RNAs'. "This means that they can be used in the form of new ingredients and can add value to other foodstuffs", according to researcher Daniela Hey of the Laimburg research station.



Fruit and vegetable waste can be used to make valuable food ingredients.

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KOMPETENZZENTRUM OBSTBAU - BODENSEE

Reduction crop protection products possible, but at what price?

Info

Lifespan

In the trial orchard in Bavendorf the rain protection cover weathered some substantial hail showers. "The rain protection cover is hail resistant", researcher Christian Scheer concluded. The lifespan of the rain protection cover is a point for attention, though. After 5 to 7 years, the rain protection cover is often worn to such an extent, that replacement has to be considered. In various places in Europe, protecting apple trees with rain protection cover has been and is being researched. An important aim is the reduction of fungal infestation and the connected curbing of the number of sprayings with chemical crop protection products. The impact on scab is evident, but what is the effect on other pests and diseases? And what about the impact on the environment and the CO₂ balance of rain protection covers and perhaps the most important point, is it economically feasible?

During the online pip fruit seminar, organised by DLR Rheinpfalz on 10, 11 and 12 January this year, researcher Christian Scheer discussed the results of trials with rain protection covers over apple trees at the *Kompetenzzentrum Obstbau Bodensee* (KOB) in South German Bavendorf and answered the questions mentioned above.

KOB research

In March 2018, the KOB, the trial station on the German side of Lake Constance, started research into the effects of rain protection covers over apple trees. In a 1.6 ha orchard with the varieties Gala, Braeburn and Wellant, four cultivation systems are compared:

1) Hail net + IP crop protection schedule. This object represents the 'standard situation' at Lake Constance, namely, hail nets over the trees and an integrated crop protection schedule.

2) Hail net + reduced crop protection schedule. In this object the crop protection schedule has been adapted in such a way, that the demand of certain supermarkets that a maximum of the residues of four products can be found on the fruits is met.



Rain protection cover over the trees is effective against scab and storage rot infestation.

FFM

In both hail net orchards, the hail net is closed after flowering and opened again after the harvest. 3) Cover + crop protection schedule without fungicides. The aim is to see whether fungicide sprayings can be dispensed with by protecting the trees with rain protection covers. The rain protection cover is closed before flowering and opened again after harvesting.

4) Cover + side-netting + reduction insecticides. By fitting nets around the orchard, insects are prevented from flying in, so that sprayings against, for instance, codling moth (*Cydia pomonella*) can be dispensed with.

EM



Nets around on orchard are just as effective against codling moth as the combination of virus, mating disruption and Coragen.

No scab under rain protection cover

In spite of dispensing with the fungicide sprayings, the trees in the orchards with covers remained free of scab (*Venturia inaequalis*). On the other hand, the trees under hail cover were infested by scab in spite of an intensive fungicide schedule. Infestation by fruit tree canker (*Neonectria ditissima*) also occurred less under covers than hail nets.

Practically the same conclusions hold good for fruit rot as for scab. Under the rain protection covers, in spite of dispensing with fungicide sprayings, less *Neofabraea*-fruit rot (formerly known as *Gloeosporium*) occurred than in the case of trees intensively treated with fungicides under a hail net. In the case of mildew, the situation was the other way around, however. On trees under the covers, considerably more mildew occurred than on trees under hail nets.

Insects

In three of the four orchards, codling moth was controlled with mating disruption, granulose virus and Coragen (chlorantraniliprole). In the fourth orchard, these products were dispensed with and around the orchard a net had been fitted to keep out insects such as the codling moth. There was no difference in the damage caused by



Under rain protection cover, the woolly apple aphid population can quickly become problematic.

codling moth between the orchards. So, the nets have been able to sufficiently keep out codling moth. This does not hold good for the summer fruit tortrix (*Adoxophyes orana*).

However, not everything is positive. The rain protection cover provides a fantastic living environment for the red spider mite (*Panonychus ulmi*). Therefore, this insect much more frequently occurs under rain protection covers than under hail nets (see table 1). Also the aphid population, and then especially the woolly apple aphid *Eriosoma lanigerum*), much more quickly develops to a dangerous level under rain protection cover than under a hail net. This is especially a problem in organic growing, because here no or hardy any correction products are available to fight an infestation that has got out of hand. Mostly, these can still be used in integrated production.

Fruit quality

Does rain protection cover affect fruit quality? In the trial – on still young trees – this is hardly the case, as appears from the research. In 2019, the second year of the trial, there was hardly any difference in production between the cultivation systems. Apples under the rain protection cover, were slightly bigger than those under a hail net, though. In 2022, the situation was different. Converted to a hectare, the Gala trees produced

Sulphur

EFM

The susceptibility of the rain protection cover to sulphur, makes application in organic growing very difficult. In the trial in Bavendorf, sulphur was dispensed with for the sake of the lifespan of the rain protection cover.

Irrigation

Growing fruit under rain protection cover is inextricably linked with irrigation by means of drip irrigation. In principle, this is an extra cost item for a cultivation system under rain protection cover, although climate change really also makes irrigation necessary in other cultivation systems, with or without hail net.

Temperature

Temperature measurements by the KOB show that the temperature under the rain protection cover, on sunny days, is 3 to 5 °C higher than under a hail net.

Pest	Date observation	Hail net + IP	Hail net/ maximum 4 residues	Cover	Cover + side- netting
Red spider mite (eggs)	26-11-2019	0	1	355	262
Green apple aphid	24-06-2020	42%	45%	41%	7%
Woolly apple aphid (root collar)	07-04-2020	0%	0%	13%	39 %
Caterpillars/butterflies	18-08/21-09-2020	1.5%	2.1%	1.3%	1.9%
Predatory mite (leaf)	10-08-2020	0.8	1.1	1.0	1.0
# insecticides 2020		16 x	15 x	17 x	4 x
Mating disruption		yes	yes	yes	no
# acaricidos 2020		٥v	Ωv	1 v	0 v

Table 1. Influence of the cultivation system on infestation by some insects and mite species in 2020

Source: KOB/Christian Scheer



Beneficials

Possibly, a rain protection cover offers opportunities for beneficials that cannot develop well enough 'outside'. During the next couple of years, research institutes in Germany, Austria and Switzerland will do research into the deployment of beneficials against woolly apple aphid, spider mite and rust mite, pear sucker and black cherry aphid on trees under rain protection cover.

about 15 tonnes more (75 ton/ha) than the trees under a hail net (60 ton/ha).

Ripening of the apples under rain protection cover is comparable with ripening under a hail net. If there are any differences, apples under rain protection cover ripen a bit more slowly than under a hail net.

Financial

The investment costs of a rain protection cover are considerably higher than those of a hail net. Scheer calculated the investment costs of a hail net, including labour costs for installation, at slightly more than \in 31,000 per hectare. A rain protection cover including side-netting all around the orchard, worked out at \in 59,000 per hectare. "So, a rain protection cover is twice as expensive as a hail net", according to Scheer.

Research in Switzerland

The trial station in Swiss Wädenswil has also done research into the cultivation of apples under rain protection cover. In 2018, an orchard with the varieties Gala and Bonita was planted. Over one part of the orchard a hail net was fitted and over another rain protection cover. All trees were sprayed in the same way according to a strategy of the reduced deployment of fungicides (low residue strategy). Between early June and the beginning of September, no fungicides were sprayed. In both objects – hail net and rain protection cover – as a control, a part of the orchard was not sprayed with fungicides at all. Through the choice of varieties, a variety susceptible to scab (Gala) could be compared with a scab resistant variety (Bonita).

Scab

Even in the extremely wet year of 2021, with high scab pressure, the trees under the rain protection cover remained totally free of scab. This held good for both the trees treated with a low residue strategy and the trees that were not sprayed with fungicides at all. On the Gala trees under the hail net, scab infestation just before picking rose to 43% of fruits infested in the case of the untreated trees and 30% on the trees treated according to the low residue strategy. The scab resistant variety Bonita, remained free of scab in all objects.

Marssonina

In Switzerland, among other places, the fungus *Diplocarpon mali* causes the Marssonina leafdrop disease. The disease brings about premature leafdrop. In the trial, for both Gala and Bonita in the object under rain protection cover and without fungicides, before the harvest, half of the leaves had fallen off. In the object with reduced deployment of fungicides (without rain protection cover), leafdrop could be limited to 24% (Bonita) and 13% (Gala). However, the rain protection cover had the most effect against Marssonina. Trees practically remained free of the disease here.



By growing apples under rain protection cover, the use of crop protection products can be considerably reduced. However, the energy input and CO₂ footprint of a rain protection cover are less favourable, researcher Christian Scheer of the KOB told.

According to Scheer's calculations, it is possible to save \in 400 to \in 500 per hectare per year with a rain protection cover on the costs of fungicide sprayings against scab and fruit rot. On the other hand, there are extra costs for the control of mildew (such as manually removing mildew infestation in spring).

Side-netting around the orchard can save \in 200 tot \in 300 per hectare per year on the control of codling moth. Control of woolly apple aphid and fruit tree red spider mite requires extra measures (sprayings), however.

A rain protection cover cannot be made profitable by savings on crop protection products. When asked the question, in what way rain protection cover over apple trees could be made profitable, Scheer answered: "By higher prices for the apples."

Environment, energy and CO₂

So for the time being, it seems that especially the environment profits by growing apples under rain protection cover, but is that really so? By growing under rain protection cover, it is possible to save on the number of crop protection products. That is 'profit' for the environment. Rain protection cover is not exactly environmentally friendly for several reasons and can therefore not be called sustainable. Calculations of the carbon footprint or CO, footprint of a cultivation system under rain protection cover compared with traditional cultivations under hail nets showed a doubling per kilo of apples of the carbon footprint, Scheer showed. Moreover, the production of plastic reguires a lot of energy. If this is taken into account in the calculation of the energy requirement for the production of a kilo of apples, it appears to be three times higher than for growing under a hail net. "So, it is a matter of choice: fewer crop protection products or less CO, emission and energy", Scheer concluded.





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"Stop producing cherries in Germany and come to Greece"

During the past few years, cherry growers in Northwest Europe have come up against ever rising costs and increasing competition from the import of cheap cherries from the South of Europe. The situation is quite different in Greece. The cost price of cherries there is between € 1.50 and € 2.- per kilo. For supermarkets in, for instance, Germany or the Netherlands, the temptation is strong to buy cheap Greek cherries instead of the more expensive regionally produced cherries.

"It is impossible for German growers, to compete with Greek cherries", Johannes Rodivitis of Greek fruit tree nursery GRINN concluded. The company raises and sells a wide assortment of kinds of fruits and varieties and among other things represents ARTEVOS in Greece. Within GRINN, Rodivitis is responsible for the sale of trees and acts as a technical adviser for Greek fruit growers. During the annually organised stone fruit seminar in German Ahrweiler, Rodivitis talked about cherry growing in Greece. For many German cherry growers, what he said was confrontational and sobering. How are we supposed to react to developments in Greece and the import of cheaply produced Greek cherries? Rodivitis had only one single answer: "Move to Greece and grow cherries there".

Best growing region for cherries

Rodivitis showed that during the past 20 years, global cherry production has doubled. According to him, in Europe, Turkey and Greece are the two best growing areas for sweet cherry. In Greece, the surface area of sweet cherries has grown from 5,000 ha in 2009 to 20,000 ha in 2022 and in 10 years' time production has doubled. In the years to come, production will grow further. "We do not know if there is really scope for more cherries. The question is, whether in countries where no cherries are eaten now, consumers will also start eating cherries", according to Rodivitis.

Cherries starting from late April

The most important growing areas for sweet cherries are in the north of the country. Here 85% of the cherry surface area is to be found and round about 15 May, they start picking the Burlat variety. The most southerly growing area is at the same degree of latitude as Turkey. The first cherries can be picked here from late April. With varieties with a low chilling requirement (low-chill varieties) it would be possible to grow cherries even further south and pick cherries even 2 to 3 weeks earlier.

The first cherries are sold at high prices (about \in 8.- per kilo) and, as the season progresses, the price falls to \in 2.- per kilo in early June and \in 1.- to \in 1.50 in late June. At the end of the supply season, the price then slightly rises again. The major part of the cherries (71%) is exported. 93% goes to EU countries, with Germany the most important market and 7% goes to former EU member Great Britain.

Illegal propagation

According to Rodivitis, in Greece many illegally propagated trees are sold. "In many orchards there are different varieties from what growers think. This gives a bad name to certain varieties." Tree nurseries also cheat in the case of rootstocks. For instance, many tree nurseries buy mahaleb rootstocks and sell the trees maintaining that they are on MaxMa 14.

Info

Harvest workers Workers picking cherries in Greece, mainly come from India and Egypt. According to Rodivitis they are allowed to work in Greece for 5 years, but not in other countries.

Price of land

One hectare of land with irrigation, costs about € 20,000 per ha in Greece; without irrigation half.

Production costs

At the moment, production costs of sweet cherries in Greece are about € 12,000 per hectare. Production per hectare is an average 5-7 tonnes per ha and in modern orchards 10 tonnes per ha.



UFO

According to Rodivitis, cherry is the most difficult kind of fruit to raise as UFO. In Greece, various orchards that were raised in this way failed, on the one hand as a result of a lack of knowledge of the growers and on the other hand as a result of the use of too weak a rootstock (Gisela 6), which gives the trees too little vitality.



To a large extent, cherry growing in Greece is out-dated, but, compared with Northwest Europe, the cost price is low. Shutterstock

Low labour costs

According to Rodivitis, 10 years ago, a price of \in 1.50 was enough to earn some money, but now the cost price is at about \in 2.- per kilo. So, considerably lower than in Northwest Europe. It is especially the low labour costs that are the reason for the low cost price. The costs for harvest workers vary, in the case of an 8-hour working day, from \in 25.- to \in 30.- per day in the northern growing areas to \in 40.- to \in 50.- per day in the south. Labour costs are higher there, because

Doubling production through new growing techniques

Many cherry orchards in Greece are outdated. Due to the high trees, harvesting costs in many old orchards are too high. According to Rodivitis, only 15 to 20% of the cherry orchards is modern. In the case of newly to be planted orchards, Gisela 6 is the most commonly used rootstock with a share of 60%. In 20 to 30% of the cases, the choice is MaxMa 14 and sometimes more vigorous rootstocks, such as PiKu and CAB. Gisela 5 is not used.

The most frequently grown varieties are Burlat, Larian, Lapins, Ferrovia (Schneider's), Kordia, Regina, Samba, Black Star, Grace Star, Skeena, Sabrina, and Satin. The varieties from the Star series from Italy, turned out not to be a good option under Greek conditions. During the past 4 years, especially the Sweet varieties from Bologna, the Artevos varieties and the IPS varieties from California were the main points of interest. Although, a lot of experimentation takes place with other tree shapes and growing-on systems, the major part of the orchards is planted at 4 x 2 or 4 x 1.5 m and raised as spindles.

With the changing climate, irrigation is becoming more and more important. At the moment, drip irrigation is present at no more than 10% of the orchards. Giving too little water after harvesting results in problems with flower bud initiation and affects production in the year after. According to Rodivitis, it is possible to double the present production of an average 5 to 7 tonnes per ha with improved cultivation techniques.

EM

there is much demand for labour for harvesting oranges and from the tourist sector.

Hydrocooling

Under the warm conditions in Greece, hydrocooling immediately after harvesting is a must. With hydrocooling in combination with MAP foil, the shelf-life of cherries can be extended from 1 to 3 weeks. However, not all varieties are suited to hydrocooling. Experience has shown that varieties that crack at the nose do not tolerate hydrocooling. According to Rodivitis, this characteristic (nose cracking) is probably genetically linked to self-fertility. Varieties originating from Germany and the Czech Republic ('German type' varieties) are suited to hydrocooling though.

Deep-frozen sweet cherries

According to Rodivitis, growing cherries for processing is also an interesting branch. There is much demand for deep-frozen cherries for use in bakeries and catering. The varieties Skeena and the old Greek variety Tragana Edessis are very suitable for this. These varieties have beautifully coloured flesh and a stone that separates easily. However, many class 2 cherries of other varieties are also sold for this purpose.



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Lagerungstagung Laimburg Ramularia new threat to apple growing

During the past few years, at the cooperatives in North Italian South Tyrol, at the moment the apples came out of the cold stores, an increasing number of apples was found with spots on the skin. In the laboratory of the Laimburg research station, *Ramularia spp*. could be shown to be the organism causing the damage. This fungus causes speckled lenticel spots in the skin.

At the moment no control strategy for this relatively unknown harmful organism is known as yet. This appeared from the presentation of researcher Sabine Öttl of the Laimburg research station during the storage seminar on 5 August 2022. She moreover indicated she expected this problem to increase considerably during the next few years.

Ramularia spp.

Ramularia is the asexual form of the Mycosphaerella fungus. Infestation only shows after stor-



Until recently, damage in the form of lenticel spots caused by the *Ramularia* fungus had remained fairly limited in South Tyrol. During the past few years, however, after storage, more and more often infested batches of apples have been found.

Versuchszentrum Laimburg

age as speckled lenticel spots. Symptoms are red-brown to black speckled, often serrated, irregularly shaped 1 to 8 mm sized spots around the lenticels. The infestation is mainly found on Golden Delicious, but also on Gala and Braeburn. The genus *Ramularia* includes various species that are responsible for the development of leaf spots, necrosis or chlorosis on various kinds of plants. Laimburg research station isolated the fungus from spots present on the fruits. On the petri dishes in the laboratory a diversity of forms and colours was to be seen, varying from grey to pink and black. "This is an indication, that several species are involved", according to Öttl.

Control

From laboratory trials that were carried out in 2013 in Piemonte (Italy) appears that the active ingredients tetraconazole, pyrimethanil and dodine are effective against the *Ramularia* fungus. The problem is, however, that it is not sufficiently known when and how fruits are infected. The symptoms are only visible when the apples leave

Info

Storage day 2022

The storage day organised by Laimburg research station in South Tyrol (North Italy), took place on 5 August 2022. About 100 interested persons took part in this day in the NOI Techpark in Bolzano, or attended the presentations online, to be informed about the latest developments in the field of fruit storage.

Damage symptoms

Round the lenticels speckled, reddish-brown to black spots develop. Very typical is the irregularly shaped, serrated edges of the spots. Often also brown to black, round and dry, rotting spots occur. The diameter of the spots is about 1 to 8 mm. The infested spots are slightly sunk and under them, a greenish-brown discolouration of the flesh is often visible. What is typical is that some apples from a batch after storage can often be much more strongly affected than others. This raises the suggestion, that in addition to the fungus, other factors, connected with the senescence of the fruit may be involved. *Source: Obstbau/Weinbau magazine 2/2022*





Although *Ramularia* has been known about for almost 10 years, it is not yet clear when the fungus infects the fruits, researcher Sabine Öttl told during the storage day organised by the Laimburg research station on 5 August. *Screenshot Lagerungstagung*

Annual storage day

country.

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Every year the Laimburg research station in North Italian South Tyrol organises a storage seminar. Laimburg researchers but also from other institutes in Italy, here share their knowledge and insights and the latest research results with the people responsible for storage of the cooperatives and other interested persons. This year, scald, storage problems of Scilate/Envy[®], the influence of weather conditions on fruit quality and the relatively new damage causing organism *Ramularia* were on the programme.

The storage day could be attended both live and online. Laimburg director Michael Oberhuber welcomed about 100 participants, a great number of which came from outside Italy.



the cold store, but it is not known whether the fruits are infested during storage or already before that in the orchard. Therefore, targeted application of fungicides is practically impossible. In the search for a method to control the fungus, as early as 2014, the Laimburg research station investigated the possibilities to immerse the fruits after harvesting in a fungicide solution. For this ten fungicides – some with a systemic effect and some others with a contact effect were used. The apples were immersed for 10 seconds in a fungicide solution and after drying were stored for 341 days under ULO conditions. For the research, apples were taken from an orchard in Vinschgau with a Ramularia history. The result was sobering: The differences between the fungicides were small and not a single fungicide had a sufficient effect. Infestation varied from 22% in the best object to 38% in the untreated control object.

Number of notifications is rising

After the first wave of notifications of infestations in 2014, all was quiet for a few years, until in 2019 the number of cases of *Ramularia* suspected batches of apples increased again. Also during the past season (2021/2022) more notifications and requests for identification were again received by the Laimburg research station. Between March and June 2022 alone, there were about 150 samples. The greater part of the samples (96.8%) was from the Golden Delicious variety. Infestation occurred in all forms of storage, such as CA, ULO, DCA and DCA + 1-MCP.





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First research results into pear scab promising

During the past few years, pear scab (Venturia pyrina) has been cropping up more and more often in Dutch pear orchards, but also in other European orchards. Researcher Marcel Wenneker of Dutch Wageningen University & Research (WUR) started research to make this fungal disease controllable. During an information meeting for fruit growers in the Netherlands he presented the first results and commented on further research(steps).

For a couple of years now, Conference has been classified as susceptible to pear scab. Pear scab also occurs in other pear varieties. Especially organic pear orchards are troubled by this fungal disease. In organic growing, efficacious crop protection products and measures are lacking. Sulphur weakly controls pear scab. In integrated growing, pear scab occurs more in certain spots in the orchards. The ever diminishing chemical crop protection package is a problem there. Possibly, the cultivation method of the past few years also plays a part here. Trees that are being 'boosted' by fertilisation, among other things, produce a lot of young shoots that are especially susceptible to scab.

Info

Epidemiology Because far less is

known of pear scab

(Venturia pyrina) than

of apple scab (V. inae-

qualis), Dutch Wage-

ningen University &

also researching the infestation biology

of pear scab. Spore

released during the

spores are released. The germinative capacity of spores coming from leaves, fruits and branches is also examined separately, to see whether there are differences in germinative capacity.

clear, when spores are

season and how many

traps must make

Research (WUR) is

Development of the disease

Pear scab develops during a couple of years. It is possible, branch infections (branch scab), play an important part in this multiannual development



Scab on young pear fruitlets.

Arjan de Bruine







Conidia from branch lesions can cause infestation. WUR

of the disease level. It is possible that the disease has more and more adapted to the pear variety. The Dutch, but also the Belgian, 'monoculture' of Conference is working to the advantage of pear scab here. The Netherlands do not have their own pear breeding programme to be able to select for pear scab resistance. And another point is, that of new foreign varieties not everything is known under (West) European climate conditions.

Resistance test under development

To be able to control pear scab in future, Wenneker wants to develop a reliable resistance test for pear scab. Meanwhile, he has gathered fifty pear scab isolates for this from, among other varieties, Conference, Beurré Alexandre Lucas, Triomphe de Vienne, Concorde and Verdi (Sweet Blush®). The isolates come from leaves, fruits, and branches to examine whether isolates of these different origins can mutually affect each other. And whether isolates of one variety can

Pear scab versus apple scab

The first pear scab leaf infestations (*Venturia pyrina*) develop during wet weather conditions in the early spring. Just as with apple scab (*V. inae-qualis*), infestations are caused by ascospores from fallen leaves. In addition, early in the season, conidia from branch lesions can be released. These conidia can also cause infestations. From the primary leaf infestations, subsequently, secondary leaf and fruit infestations can develop. These secondary infestations also produce conidia that can again cause more infestations.

Young, still growing shoots are also infested, as a result of which, later in the summer or the next spring, branch scab develops. Especially in the first year, affected branches produce a lot of conidia. Branch scab hardly occurs in apple. In addition, pear scab is mainly visible at the underside of the leaf, whereas apple scab is also visible at the top side of the leaves. infest another variety. Subsequently, the isolates have been tested on various growth media. It appeared, the isolates grew quite well on various media and were even able to sporulate quite well, a thing researchers had not managed up till now. The pear scab isolates can be used to infest pear varieties to test resistance.

First trials

In 2022, WUR succeeded in infesting Conference leaves, fruits and branches by means of inoculations with pear scab in the orchards. Researchers had never succeeded in doing this either. The inoculation spores came from leaves, fruits and branch lesions. Whether these different origins could mutually infest each other is still being worked out. The trial was carried out from June through August. During the winter of 2022/2023 the development of branch scab is also traced. In 2023, these trials will be repeated on Conference, but also on the varieties Cepuna (Migo[®]), Oksana (Xenia®) and some red pear varieties, to determine the susceptibility of leaves, fruits and branches during the growing season. Wenneker also wants to determine the spread of infestation in the orchard.



Information day

Every year the Nederlandse Fruittelers Organisatie (NFO) (Dutch Fruit growers Organisation) and Wageningen University & Research (WUR) organise the Knowledge Day, an information day for fruit growers and other interested persons. In 2022, this day took place on Thursday 24 November in Tiel. About 260 persons present, obtained information on current developments.

Development pear scab

WUR follows the development of pear scab on leaves, fruits and branches. This takes place from March/April through August at the Proeftuin Randwijk trial orchard (the Netherlands). In an organic pear orchard, the varieties are Conference, Cepuna (Migo®), Gräfin Gepa (Early Desire®) and Oksana (Xenia®). The development of pear scab on some red pear varieties is followed in the integrated orchard with new pear varieties.



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Perspectives for apple growing?

Up till now, it has not often been said out loud or written about, but at the moment we are in a serious apple crisis in Europe. How to get on top of this will be a matter of staying power. Where are the possibilities and opportunities?

According to the AMI (*Agrarmarkt Informations-Gesellschaft mbH*) information agency there is a structural overproduction of apples in Europe. According to the AMI, the 12 million tonnes produced in the EU in 2022, is 1.5 to 2 million tonnes above the market potential. During the past 10 years, EU apple production ended up only in one year (2017) below 10 million tonnes. In 3 years, apple production was between 10.5 and 11 million tonnes and in all other years it was considerably higher.

Sharp rise Polish production

In most EU countries, apple production has remained stable or has fallen in the past 10 years. There is only one single exception: Poland. In this country – with EU and Polish government subsidies – growing, cold stores, grading and selling apples has been modernised and at the same time production has been raised by about 1.5 million tonnes in this way.

Obsolete varieties

If we are talking about overproduction of apples, this is mainly about too big a production of a number of varieties. Idared, Jonagold, Boskoop and some other varieties are out of favour with the consumer. Before the invasion of Russia into Ukraine, at least part of these varieties could be exported to Russia, but that is in the past now. Another and perhaps even much bigger problem is the falling consumption of apples. Year on year,



 High energy costs force many consumers to economise.
 Shutterstock

consumers are eating fewer apples. Moreover, the present economic crisis at least forces a part of the population, due to sky-high prices of gas and electricity, to economise on their expenditure. Unfortunately, apples are not part of the 'indispensable' foodstuffs, however, with the result that even less money is spent on apples.

Info

War in Ukraine

The Russian attack on Ukraine is not the cause of the apple crisis but has accelerated a number of developments, which brought the crisis to light earlier and made it deeper.



What are the perspectives for apple growing or what are the alternatives? Shutterstock





The apple growing surface area has to be reduced.

EFM

Rising production costs

Club varieties

In 2020/2021 season, 29% of all trees planted in the North German Niederelbe region consisted of concept varieties and 27% of Fresco/ Wellant[®]. Within the group concept, club or brand varieties GS66/Fräulein® was the most frequently grown variety (224,343 trees), followed by SQ159/ Magic Star[®]/Natyra[®] (64,641 trees) and R201/Kissabel® (64,285 trees). Followed in places 4 and 5 by Milwa/Junami[®] (45,020 trees) and Nicoter/Kanzi® (31,170 trees).

During the past few months, fruit growers have seen a sharp rise in the costs of practically all means of production, including labour and interest. In one single year, production costs, including refrigeration, grading and selling have risen by an estimated 20 to 30 cents per kilo. So, the price for a kilo of apples will have to rise structurally to be able to keep your head above water as a fruit grower in the long run. However, due to developments described above (big supply, falling consumption and falling purchasing power) there is rather a downward pressure on prices than any prospects of higher prices.

Future forum

The situation is dire in many fruit growing regions. The continued existence of numerous farms is in danger. This was reason enough for the AMI and research station the Esteburg in the North German Niederelbe fruit growing region to organise a 'future forum' on the perspectives for the fruit growing sector in the area in Jork at the end of 2022. The meeting was attended by 250 growers and other persons involved in the sector. The number of participants already shows the topical interest of the subject and the size of the emergency. However, the results are not only of use

Fruit growing in the Niederelbe region

During the past 5 years, the number of fruit farms with pip and stone fruit has fallen in the North German Niederelbe region from 565 to 491. This amounts to a decrease of 2.6% per year. The number of farms is expected to have further fallen to 400 in 5 years' time. A remarkable thing is, that the surface area of pip fruit has, on the other hand, increased during the past few years. It is especially apple growing, that has gained ground at the expense of other types of fruit. A larger surface area and fewer farms, means that the surface area per farm is increasing. At the moment, the average Niederelbe fruit farm operates on 21 ha of tree fruit.



As a freely-to-be planted apple variety, Wellant has established a firm position in the apple assortment in North Germany.

for the growers in the Niederelbe region, but also for apple growers in many other areas in Europe.

Share of apple 91%

With the 491 fruit growers in the Niederelbe that are growing pip and stone fruit, the focus is mainly on apple. Presently, 91% of the 10,400 ha of tree fruit in the area is apple. The most frequently grown varieties are Elstar and Jonagold, including strains such as Jonagored and Red Jonaprince. Both Elstar and Jonagold have a share of 32% of the production, as appears from production figures over 2022.

In contrast to neighbouring countries such as the Netherlands and Belgium, in North Germany, hardly any pears are grown. Only 2.6% of the tree fruit surface area is pear.

Concept varieties

Practically everywhere, club and concept varieties with the accompanying marketing and sales concepts are seen as the solution to the apple crisis. As to new apple varieties, during the past few years, the focus in the Niederelbe region has mainly been on the 'free' Fresco/Wellant® variety. Growing concept varieties, such as Nicoter/ Kanzi® or Milwa/Junami® has never really taken off, however. At the moment, 6.6% of the apple hectarage consists of Wellant, which is popular with consumers. The proportion of Wellant is expected to double to 13%. The present production of 14,000 tonnes in 2022 is expected to increase to about 25,000 tonnes in 2025.

The area has now set its sights on the GS66/ Fräulein[®] concept apple. Meanwhile, as many as 600,000 trees of this variety have been planted. A total of about 13% of the surface area now consists of concept varieties.

Opportunities for pears

During the forum it was stated clearly that the focus in the region is too one-sidedly on apple. About 5% of the surface area is sweet cherry and





Growing pears is a serious alternative for growing apples.

EFM



(Covered) cherry growing is experiencing competition from imported cherries.

only 2.6% is pear. Especially for pears, the experts of the Esteburg and the AMI indicated seeing opportunities. Only 15 to 20% of pears consumed in Germany are also grown in Germany. Annually, Germany imports about 150,000 tonnes of pears. This is mainly Conference from the Netherlands and Belgium. So, there is scope for domestic expansion of the cultivation, but especially for other varieties than Conference. For the fact is, that in the Netherlands and Belgium, production conditions for this variety are much better than in Germany. Therefore, there is mainly interest in Oksana (Xenia[®]).

Cherry no alternative

For years now, sweet cherry has been the most frequently grown tree fruit crop in North Germany. During the past few years there has been a development in the direction of growing under rain protection cover. This offers more certainties of a good crop to growers, but also causes higher production costs. During the past few years, competition of cherries from the south of Europe and Turkey has also increased, however, resulting in a downward pressure on prices. Increased production costs in combination with increasing competition make cherry growing less and less interesting. Therefore, the AMI and the Esteburg advise against further expanding the surface area.

What is the alternative?

Where is the solution to the present crisis to be found? In the first place, the surface area of apple and then especially non-profitable varieties and orchards must be reduced in Europe. This does not only go for Poland, but also for Germany itself. But what is the alternative? The answer will be different for each grower. Continuing to specialise in apple can only be done, if as a fruit grower you can produce a minimum of 50 tonnes per hectare at low costs. During the forum, growing concept varieties or organic apple growing were also mentioned as alternatives. Other possibilities, for instance, are growing various types of fruit, selling fruit under your own management or investing in tourism. In addition, there are possible niches such as pick-your-own, having apple trees adopted by consumers or growing walnuts.

Easily said

Solutions offered are more easily said than realised. Reducing the surface area of apple by grubbing obsolete varieties is advisable, but what are you going to do with the pieces of land that remain empty? Growing concept varieties and other kinds of fruit is certainly a good idea, but takes time and money. Restructuring must take place in as short a time as possible. Many growers will not have the financial means for this, however.

More promotion

An alternative is trying to sell more apples at a higher price. The magic word here is promotion. The participants in the forum in Jork agreed that strong promotional campaigns are needed to bring (preferably regionally grown or at least German grown) apples to the attention of the consumer. Not the price, but regional origin must be to the forefront here. Whether this will succeed remains to be seen. Up till now supermarkets have been shouting at the top of their voices that they prefer regional products, but when it comes to the crunch, they nevertheless often choose the cheapest product.

Conclusion

The forum on the future perspective for fruit growers in North Germany offered no made-to-measure solutions. The surface area of apple and then especially less profitable varieties and orchards must be reduced. It is clear, however, that most alternatives or measures require patience and perseverance and much money.

Berry fruit

For apple growers, growing berry fruit is no alternative either. It is true that the popularity of, for instance, raspberries and blueberries has grown enormously during the past few years, but global production has risen enormously. German blueberries, for instance, have to compete with cheaply offered produce from Poland.

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Opportunities for pears in Germany?

Info

Abate Fetel

Italian pear growers were confronted for 3 years in a row with disappointing productions. Until some years ago, Italian exporters had a firm foothold in Germany. Abate Fetel was sold at prices markedly higher than prices at which Conference was sold in German supermarkets. Because, during the past 3 years, Italian exporters were able to supply much smaller volumes and already early in the season were faced with outof-stock situations, German buyers were forced to switch to Conference (pears) from the Netherlands and Belgium. According to AMI, regaining the lost position will probably be difficult.

In contrast to neighbouring countries the Netherlands and Belgium and to a lesser extent France, pear growing is insignificant in Germany. Consumption is bigger than domestic production, which makes Germany a pearimporting country. At the same time there is a growing demand for locally produced food, at least, that is alleged to be the case.

What also appears from the production figures is, that Germany is an apple country and not a pear country. In 2022, German fruit growers together produced more than 1 million tonnes of apples and only 35,000 tonnes of pears. The most important varieties are Conference, Beurré Alexander Lucas, Williams and Nojabrskaja or Oksana (sold under the brand name Xenia[®]).

Growing popularity of Conference

Especially the Conference variety seems to be a perfect fit with present consumption trends. Through the 2018/2019 season, Abate Fetel was the bestselling pear in Germany, as appears from figures of the German Agrarmarkt Informations-Gesellschaft mbH (AMI). During the past few years, however, Abate Fetel has had to give up this position to Conference. Three bad crops in a row in country of origin Italy, contributed to this. Every year, German growers produce about 10,000 tonnes of Conference. According to AMI, in the 2021/2022 season, Germany imported almost 55,000 tonnes of pears from the Netherlands and 25,000 tonnes from Belgium. The major part is Conference. According to figures of the Belgian promotion agency for agricultural products VLAM, Belgian export of pears to Germany in 2021/2022 was in fact almost 34,000 tonnes.



German consumers are more and more often buying Conference instead of Abate Fetel. Shutterstock

The Conference pears grown in Germany are hitching a ride on the popularity of Conference imported from the Netherlands and Germany. In this way, according to figures of the GfK household panel, purchases of Conference by German households grew from 4,000 tonnes in 2017 to 8,500 tonnes in 2021.

Alternative for apples and pears

AMI sees increasing opportunities for sales of pears grown in Germany. According to AMI, German supermarkets increasingly prefer regionally (domestically) grown pears. For growers, growing pears could be a welcome alternative for apples that due to rising production costs and disappointing prices are becoming ever less interesting, or for cherries, the cultivation of which is becoming more and more difficult due to spotted wing drosophila.





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Is growing fruit with 'green' products possible?

The number of chemical crop protection products available is decreasing every year. Due to increasing demands set for existing and new products, it is very time-consuming for manufacturers or sometimes even unfeasible to complete the necessary dossiers for a new authorisation or extension of an existing one. Both the EU and national governments prefer to see pests and diseases controlled by means of 'green' products instead of chemical ones. How realistic is this?

To answer this question, at the Proeftuin Randwijk trial orchard in the Netherlands, a trial has been set up where crop protection is carried out with the package of products that will be available in 2028, as far as this can be foreseen at the moment. The 'crop protection scheme 2028' for both apple and pear in the trial is compared with a scheme with the products authorised in the Netherlands in 2023. Of various products, it is known even now, that they will no longer be available in 2028. These products have been replaced in the 'scheme 2028' by 'green' alternatives or, if available by often less efficacious chemical products. Examples of products that will be sprayed in the 2023 scheme, but no longer in the 2028 scheme, are: Movento/Batavia (active ingredient (a.i.) spirotetramat), Vertimec (a.i. abamectin), Pirimor (a.i. pirimicarb), captan, Geoxe/Safir (a.i. fludioxonil) and Folicur (a.i. tebuconazole).

Green products as alternatives

As alternatives for chemical products no longer available, 'green' products are deployed. The aim of the research is to test whether alternative, green products or techniques are full alternatives for chemical products. Full here means affordable and without loss of production and quality. If it turns out, however, that there are no good alternatives, the research will also bring this to light. In that case the results can be used in communication with the authorities and policy makers, to extend the availability of existing products and techniques that are efficacious. "This trial will show what happens if we will no longer be able to use a number of products", Fruitconsult advisor Jan Peters told at the end of May during a tour of the trial orchard.

Pear sucker

In the case of pear, the greatest challenge is in the control of the pear bud beetle (*Anthonomus piri*), pear sucker (*Psylla pyri*), black fruit rot (*Stemphylium vesicarium*) and scab (*Venturia pyrina*). The trial orchard is researching whether pear sucker can be controlled without the insecticides Movento and Vertimec, but with Siltac and products on the basis of potassium carbonate. A part of the grass alleys has also been sown with flowers to attract beneficials and earwigs have been deployed.

For the control of black fruit rot, chemical products have been replaced by spraying the antagonistic fungus Trichoderma. This fungus, as it were, ousts the black fruit rot fungus and sees to it that the black fruit rot fungus gains no foothold in the orchard. For the control of pear scab, bio stimulants are used in the 'green approach'.

Info

Wurtwinning

The research described in this article is carried out on regular, non-resistant varieties. Parallel to this, Proeftuin Randwijk investigates whether in the case of the Vf resistant Wurtwinning variety, it is possible to reduce the use of chemical products for varieties that are less susceptible to scab.



Will it in the future still be possible to grow fruit with an eversmaller package of products? EFM

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South Tyrol planting new apple varieties on massive scale

Info

Club, concept or brand?

At present, new varieties are in most cases marketed under a brand name and with an often rigorous growing, sales and marketing concept. Such varieties are called club varieties, concept varieties, contract varieties or brand varieties. The terms are interchangeable.

Bio varieties

The Bonita and SQ159/Natyra® varieties have been exclusively planted by organic fruit growers. In the North Italian growing region of South Tyrol, at the moment, an unknown, unequalled and unique innovation in variety assortment is taking place. During the past 3 years (2020, 2021 and 2022), three-quarters of the newlyplanted surface area of apple trees consisted of club or concept varieties. Meanwhile, in the South Tyrolean apple orchards, no fewer than 20 new concept varieties are to be found.

The old and trusted varieties, such as Golden Delicious – three decades ago the most commonly planted variety by far in South Tyrol – but also Red Delicious and even Gala are losing their positions to the newcomers at a rapid pace.

Quarter of surface area for WA38

Made enthusiastic by favourable reports about the flavour and quality of WA38/Cosmic Crisp[®], South Tyrolean fruit growers in 2021 and 2022 opted for this variety on a massive scale. In both years, WA38/Cosmic Crisp was the most commonly planted variety in South Tyrol by far with a share of about one quarter (see table 1). WA38/Cosmic Crisp is one of the three varieties from the latest round of new varieties that have been included in their portfolios by the umbrella organisations of marketing organisations VOG and VI.P. Also of the two other varieties, Ipador/Giga[®] and CIVM49/ Redpop[®], considerable surface areas have been planted during the past two years.

Fourth generation of concept varieties

About 25 years ago, the first concept variety was planted in South Tyrol. This was Cripps Pink/Pink Lady[®]. Pink Lady was followed by apple brands, such as Kanzi[®], Rubens[®], Modi[®], Jazz[®], Envy[™] and Yello[®], and now by Cosmic Crisp, Giga and Red-



In 2021 and 2022, Cosmic Crisp was the most commonly planted variety in South Tyrol. Cosmic Crisp

Pop, but, for instance also SweeTango[®], Crimson Snow[®], Joya[®] and Natyra[®]. During the past 10 years, the surface area of concept varieties has grown from 1,000 ha in 2012 to 4,000 ha now. Not every concept variety turned out to be a success, however. At present, hardly anything or nothing at all is heard about Rubens[®], Modi[®] and Yello[®] and Scifresh/Jazz has no longer been planted during the past few years.

Thirty varieties

At present, the variety assortment in South Tyrol consists of 20 concept varieties and about 10 traditional, free varieties. So, a total of 30 varieties that have to be sold by the cooperatives as well as they can. In the meantime, critics are wondering whether the cooperatives will manage to develop all new club varieties into successful and strong brands with break-even sales prices for the fruit growers.

Wait-and-see

In 2022, fruit growers associated with VOG and Vi.P together planted about 820 ha of apple orchards. This is 100 ha fewer than in 2021 and 200 ha fewer than in 2020, when a record surface area



of 1.048 ha was planted. Fruit growers are obviously marking time and are first waiting for the cultivation and sales results of the new varieties.

Golden Delicious

For years on end, one of two apples grown in South Tyrol was a Golden Delicious. The good prices for Golden Delicious, the high productions and the easy cultivation were the reasons why fruit growers in South Tyrol in the 90s of the previous century planted Golden Delicious on a large scale. In peak years 1993 and 1994, more than 70% of the newly-planted orchards even consisted of this variety. Subsequently, the share of Golden Delicious steadily fell to even below 5% in the years 2017 through 2020. In 2021 and 2022, the share of Golden Delicious in new plantings again showed a slight rise (see table 1).

From 200 to 1,000 m

South Tyrol can be divided into two regions: the region where the VOG marketing organisation is active, and the region where the Vi.P marketing organisation is active. The VOG region covers the low-lying (between 200 and 350 m above sea level) and therefore warmer areas of South Tyrol, plus a number of higher altitude growing areas, such as the surroundings of Meran and the Eisack valley. The Vi.P region includes Vinschgau, an area where apple trees are to be found between 500 and 1,000 m above sea level.

For decades, in the Vi.P area, Golden Delicious and Red Delicious were the main varieties. Heat-loving varieties such as Granny Smith, Fuji and Cripps Pink are mainly to be found in the VOG region.

VOG region

In 2022, in the VOG region, WA38/Cosmic Crisp[®] with a share of 23.9% was the most commonly planted variety, followed by Sekzie/Rosy Glow/Pink Lady[®] with 20.2%. WA38 is planted here in orchards higher than 350 m above sea level. Sekzie/Rosy Glow in lower-lying orchards, on the other hand. At 11.6% Ipador/Giga is in third place.

Vi.P region

Also in the Vi.P growing region, with a share of 35.1%, WA38/Cosmic Crisp is at the top of the list of most commonly planted varieties, followed by Golden Delicious with 14.2% and Scilate/Envy[™] with 12.3%.



In the next few years, the variety assortment in South Tyrol, will change at a rapid pace. Plantpress

Gala in decline

Between 2012 and 2020, Gala was the most commonly planted variety in South Tyrol. During the past 2 years (2021 and 2022), however, Gala has been relegated to fifth, respectively third place of the most commonly planted varieties. For every 10 ha of Gala grubbed during the past 2 years, only 4 ha were newly planted.

Table 1. New plantings in South Tyrol and share per variety in 2021 and 2022

	2021	2022
Total hectarage	921 ha	820 ha
share per variety (in %)		
WA 38/Cosmic Crisp®	22.5	28.4
Sekzie/Rosy Glow/Pink Lady®	8.8	12.8
Gala	7.3	8.2
lpador/Giga®	12.6	7.2
Golden Delicious	6.7	7.0
Nicoter/Kanzi®	4.9	6.0
Scilate/envyTM	7.5	5.0
Fuji	3.4	4.5
CIVM49/Redpop®	6.4	4.2
Granny Smith	6.5	4.2
Bonita	1.3	2.7
SQ 159/Natyra®	0.9	2.5
CR Brisset/Cripps Red/Joya®	5.0	2.0
andere rassen	1.9	1.8
Pinova/RoHo3615/Evelina®	0.6	1.4
Minneiska/SweeTango®		0.9
Тораz	0.4	0.7
Red Delicious	0.8	0.4
MC38/Crimson Snow®	24	03

Source: Obstbau/Weinbau

Drs. Ing. Rob Plaat, Postharvest Consultant info@agracool.eu

Looking for the best ULO-system

Info

Summary

A good ULO-system leads to the highest product quality and lowest electricity costs by:

- A calculated overcapacity from the CO2-scrubber with the correct pipe diameter
- An aeration ventilator on each store
- A measuring tube on each store.

In the past and in less developed storage locations the 'auto-ULO' system has been the most sold ULO system. This system however has one big disadvantage: the high costs for nitrogen needed to decrease the oxygen levels in the coldstores. In this article we explain why and, more important, how this can be avoided.

The auto-ULO system measures the O_2/CO_2 levels of each cold store by blowing the air through the scrubber pipelines. When stores are low in Oxygen fresh air will be put through these pipelines to increase the oxygen in these cold stores. The consequence of this way of operating is that pipelines will sometimes be 'polluted' with a high oxygen level. Stores that still needs to decrease in oxygen levels will suffer from this pollution.

Expensive Nitrogen must be used to decrease the Oxygen levels again in these affected rooms.

Upgraded auto-ULO systems

Most companies in Europe, USA and Canada are not using any longer the 'auto-ULO' system. More and more auto-ULO systems are upgraded/ rebuild into the new systems. Instead of using the scrubber pipelines for measurement and the oxygen injection the new systems have been upgraded with an aeration ventilator and a small 8 mm measuring tube per store. This way no preventable high oxygen levels will be polluting the pipelines. The scrubber can operate more effective while the pipes needed for scrubbing the CO_2 won't be blocked by measuring- and aeration time.



Improved ULO storage ensures better preservation of fruit quality.

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Instead of using the scrubber pipelines for measurement and the oxygen injection the new systems have been upgraded with an aeration ventilator (left) and a small 8 mm measuring tube (rhght) per store. Agracool

The upgrade of the auto ULO system results in better fruit storage quality because stores with different CA-levels will no longer influence each other in a negative way through the pipelines of the CO₂-scrubber.

This leads to the benefit that low oxygen stores stay on the lowest oxygen level without any need of nitrogen because the CA-levels will not be disturbed anymore. This results a reduction of the use of the nitrogen machine and a reduction of cooling energy. The reduced the nitrogen machine operation time will result in less service and depreciation costs.

History

Wim Schmitz founded in 1993 'Schmitz Koeladvies'. In 2016 Schmitz and Rob Plaat joined forces and renamed the company Agracool. Schmitz and Plaat are post-harvest consultants and together they have more than 40 years of experience. With the help of a great network of technicians, researchers, and universities all over the world Agracool brings the latest storage knowledge to their customers. Their core competence is to assist customers building new (ULO-)storage locations. When projects are realised, they educate, train, and assist their customers to deliver the best storage results with their newly acquired storage equipment. The goal is to maintain the best fruit quality with the lowest total cost of ownership.

What you should know about using nitrogen in ULO storage

After the challenging selection of the most suitable cold store equipment, the choice of the proper CA-Technique is crucial to reach top storage results while keeping the totals costs of ownership at a minimum. The easiest way to build CA-Technique is initially also the most cost effective. However, this can lead to increased operational costs and thus to an increased total cost of ownership.

The CO₂-adsorber needs to have a slight overcapacity. A CO₂ scrubber that runs nearly 24 hours a day will bring more and more oxygen into the ULO-store. This will lead to extra operational cost to keep the oxygen low, or it can lead to a reduced quality of the stored fruit. CO₂ adsorption capacity should be calculated, based on the respiration level of the stored fruit varieties.

Reduce expensive nitrogen

Nitrogen use in a cold store should be as effective as possible. The cost price running a nitrogen machine is expensive about 3 Euro an hour / 500 per Euro a week... Inefficient use of the nitrogen machine will have a negative effect on the quality of the stored fruit while storing regimes will probably not be reached. The warm nitrogen will lead to extra cooling time (extra costs) and dehydration of the fruit.

Purity of nitrogen

When the stores will be opened more than once the oxygen level in the cold store must be reduced quickly to preserve the fruit quality. This can be easily done with most nitrogen machines with a purity of about 97% Nitrogen. Partially filled stores on low oxygen levels often need a bit more purified nitrogen (N₂ 99%) on a regular base to keep the oxygen on the preferred ultra-low level. It's important to assess the specifications of nitrogen flow based on two purity conditions. 97%N₂ as well as on 99% N₂.





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Technical innovations at the Dutch Apple Day

Autonomous tractors and spraying technology

On 29 June, Dutch consultancy Delphy organised the biennial apple day at the Trial Orchard in Dutch Randwijk. Participating companies were offered the opportunity to show their innovations during well-organised and conducted demonstrations. As to fruit growing technology, various companies showed, among other things, their innovations or specific adaptations in the field of autonomously driving machines and crop protection. In a following article, the editorial board pays attention to harvesters and mechanical weed control.

Both Dutch company Hol Spraying Systems (H.S.S.) and Polish Dominiak showed their autonomous fruit growing sprayers. Both have a single-row sprayer that drives through the orchard autonomously. Meanwhile, H.S.S. has already sold a couple of machines, one in the Netherlands and some machines in Canada. Dominiak expects to deliver the first spaying robots in fruit growing next year.

Sprayers

Italian manufacturer Mitterer showed a singlerow sprayer with six hydraulically driven fans provided with an Air Adjusting System (AAS). The sprayer has the option, to steplessly regulate the revolutions of the fans. With the right settings and choice of nozzles, the machine provides a 99% reduction in drift.

German manufacturer Wanner was the first to show a three-row sprayer fitted out with six tangential fans. The volume and blowing direction of



The H.S.S. Agbot spraying robot in action

Bert van Sonsbeek





The Wanner three-row sprayerhas six tangentialfans.Bert van Sonsbeek

the air can be steplessly adapted and a remarkable thing was, that the sprayer was very quiet during spraying.

Dutch manufacturer KWH showed a three-row fruit growing sprayer provided with the BBLeap system. The BBLeap system fits on all makes and types of sprayers and the most characteristic thing about the system is that the spray nozzles open and close 100 times per minute. In





KWH three-row sprayer, fitted out with the variable spraying system of BBLeap BBLeap



EM



Tractor fitted out with a GOtrack system for autonomous driving

addition, the opening and closing times can be steplessly varied, which makes a variable spray volume possible. Cameras on the sprayer determine the volume of leaf mass and subsequently the computer determines how much sprav liquid leaves the nozzle. The system can also operate on task charts to adjust the volume of spray liquid place-specifically.

Autonomously driving tractors

Both iQuus and GOtrack demonstrated their systems that make tractors drive autonomously.

IQuus is a system of Dutch company GPX Solutions whereas GOtrack comes from Poland. Both companies operate a mounting system, which in principle is applicable to every modern tractor. GOtrack applies the so-called Teach and Replay system where the tractor drives the route with the driver. The system records all actions concerning the route, control of the throttle, power take-off, lifting system, etc. During the Replay action, the tractor carries out the actions recorded. It is also possible to introduce changes into the actions recorded to be able to prepare the tractor for other operations in that way. In the near future, GOtrack will also be able to work with task charts to variably carry out operations. IQuus works on the basis of digital maps of an orchard, on which the tree rows are also indicated. On the basis of a precise gps device, the tractor follows the routes indicated in the maps and also carries out previously entered operations for the control of the tractor and equipment. Variable operation is also an option with iQuus. Experience has already been gained with this in practice when root cutting and dosing compost. In principle, both GOtrack and iQuus build their systems on to every make of tractor and, of course, a lot of attention has been paid to essential safety systems.



Tractor drives autonomously with iQuus

Bert van Sonsbeek





Well-considered tractor use saves much diesel

More than one-third of the costs of a tractor consists of diesel. However, by well-considered use and maintenance of the tractor considerable savings on fuel can be made.

At present fuel prices, the diesel for a tractor readily turns out to cost some thousands of euros per year. During the online pip fruit seminar in January this year, organised by DLR Rheinpfalz in Germany, Georg Lorenzen of DEULA in Bad Kreuznach, gave various tips on how to save on fuel costs in a simple way. DEULA is the umbrella organisation of twelve regional centres of education for agricultural technology.

Make of tractor

Between the various makes of tractor, diesel consumption per hour differs even up to 10%, Lorenzen showed. In a comparison of agricultural tractors, John Deere scored favourably as to diesel consumption and the makes Fendt, New Holland and Kubota unfavourably on the other hand. The features (nominal capacity, four-wheel drive, transmission, air conditioning and weight) also play a part in fuel consumption.

Maintenance

Good maintenance can save 5% on fuel consumption. Clean cooling elements, air filters and the like are important. "Do not clean filters, but replace them, because filters are damaged while cleaning", Lorenzen advised. Old engine oil increases friction and therefore diesel consumption.

Air conditioning

The more the air conditioning has to cool, the more engine power is needed and the more

diesel is used (3 to 5%). Lorenzen advised only to use the air conditioning when it is really necessary and to set it at a temperature that makes it a maximum of 6°C colder inside than outside.

Tyre pressure

The greatest savings – up to 20% – are possible by the use of the right tyres and tyre pressure. A worn tyre has less traction and therefore leads to a higher fuel consumption. When driving on the road, a higher tyre pressure is necessary than when heavy pulling power is needed on the land. A tyre pressure control system offers a solution here.

Ballast

Carrying ballast on the front of the tractor uses fuel and every kilo of excess ballast raises the fuel consumption. The right amount of ballast – not too much and not too little – is important and can lead up to a 15% saving on fuel.

Driving style

The driving style of the operator also has an effect on fuel consumption. In the case of geared tractors, early shifting up and late shifting down is the motto. Correctly set the engine pressure (limit load control) in the case of continuous variable transmission!

Further tips: keep an eye on the power take-off revolutions and use the eco setting; drive on task charts to determine the most efficient route and prevent overlap; take care of a fluent change at the headland from one row to another. And when driving on the road: drive with foresight and prevent unnecessary braking and accelerating.

Info

A.S.S.

Ploughing When working the

soil fuel use increases with every centimetre of working depth.

Spraying and mowing

A drawn sprayer needs less engine capacity and therefore fuel than a mounted sprayer. Sharp blades reduce fuel consumption when mowing.



By using and maintaining the tractor in a well-considered way, considerable savings on fuel can be made.

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Double table top in cherry:

Not curbing growth but converting it into production

Info

Rootstock

Although Gisela 5, in many growing regions, is the standard rootstock for most cherry varieties, the double table top system is also quite suited to stronger rootstocks, such as Gisela 6 or even Colt. By breaking the branches these can also be made fertile on the Colt rootstock.

Breaking

When 'breaking' or 'cracking' shoots, these are 'broken' in such a way that only at the bottom of the shoot the bark remains whole. Often the shoot in partially sawn into to make it break more easily. The reason to break in August/September is that at that time, there is a smaller risk of Pseudomonas and silver leaf. The branches that have produced are cut away and the space is filled by a new shoot. As is the case in apple and pear, the (slender) spindle is the most frequently chosen tree shape. On a small scale, other training systems are experimented with, such the drapeau, the super slender spindle, the double table top system and the pergola system. In this article more on the double table top system.

In the case of the double table top system, two things are essentially different from growing cherries on a slender spindle. This appears from an explanation by cultivation expert Ronald Vermeulen during the presentation of the MEDA cherry varieties, in early June at the FruitMasters trial orchard in Geldermalsen. In the trial orchard, where the new varieties are, the trees are raised according to the double table top system.

The first fundamental difference is, that in the double table top system growth is not curbed, as is often necessary in a slender spindle, but that growth is converted into flower buds and therefore into production. The second difference is that cherries are only grown on two-year-old branches and at the base of one-year-old shoots. Every cherry grower knows that the best (biggest) cherries grow on well-lighted two-year-old branches and at the base of one-year-old shoots. This means that consistent rejuvenating pruning takes place, so that only one-year-old shoots and two-year-old branches are present in the tree.

Double table top

At the trial orchard of FruitMasters in Geldermalsen, trees are planted on the Gisela 5 rootstock at a distance of 4 by 1 m. The trees are under a rain cover with a ridge height of 4 m. At a height of 100 cm from the ground a yoke (or table) has been constructed, to attach the



Cultivation advisor Ronald Vermeulen offers an explanation on the double table top system.

branches to and at 260 cm there is a second yoke. In this way there is a free space of 120 cm for light interception, ventilation and to be able to pick from a work platform, prune and open and close the cover. In the case of a spindle orchard, the branches present often make it difficult to extend the floor of the work platform far enough to come closely enough to the stem of the tree.

Strong shoot growth required

"Our aim is to raise shoots of a length of about one metre and a diameter of 10 to 12 mm", Ver-





The double table top system in cherry.

EFM

meulen told. "Strong growth is necessary in this system, so no root pruning or other growth curbing measures are taken." Thick, long shoots mean big cherries. The strong growth is converted into flower buds by breaking the shoots in August/September (see text box 'Breaking') and by attaching them to the wires on either side of the tree. The shoots weakened in this way, in the second year, produce plenty of good flower buds, from which cherries grow in the year after. In this system every tree has eight side branches that produce: four lower down in the tree and four higher up. Every year four strong shoots lower down in the tree and four higher up are broken. The branches that have produced are removed and replaced by new shoots. In this way, in winter, every tree has eight new oneyear-old shoots/branches and eight two-yearold branches that start producing.

As to production, in the double table top system, a production of 8 to a maximum of 10 kg per tree is feasible. At a planting distance of 4 by 1 metres (on Gisela 5) this means 20 tonnes per hectare with a good fruit size of 28 mm or more. "More production with more wood in the tree is possible, but certainly not desirable for the sake of fruit size and shoot growth", Vermeulen experienced.

Advantages

Because all branches on which cherries are growing are the same age, according to Vermeulen, fruit quality is more uniform in the double table top system than in spindle cultivation. An additional advantage is that because of the breaking and the horizontal branch position, fruit drop is less. It is also an easy system to explain to nonskilled pruners.

According to Vermeulen, the double table top system is ideal for Kordia and Regina. Due to the consistent renewing of producing branches far less blind wood occurs (Kordia). In the case of self-pollinating varieties, on the other hand, fruit set can be boosted to such an extent, that flower bud thinning is necessary. "Remove flower buds at the transition of branches and at the underside of branches", Vermeulen advised.



Thick, long shoots are converted into fertile branches by breaking them and fixing them on to the yokes.

Ronald Vermeulen Fruit Consultancy (RVFC)

Top growth

By nature, cherry trees have strong top growth. To get a better balance between growth in the top and lower down in the tree, cultivation expert Ronald Vermeulen advised to weaken the growth of the central leader by breaking it or sawing into it.

Growth

In the case of the double table top system, the strongest shoots are not cut away, but they are used to create fertile shoots covered in flower buds. So, converting growth into production.

Production and market developments

HALF OF GRAPE EXPORT CONSIST OF NEW VARIETIES

In 10 years' time, the assortment of table grapes in Chile has been drastically updated. As a result, this season, 50% of the amount of grapes exported consists of new varieties. The new varieties must improve the competitive position of Chilean grapes on the world market.

SHARE CLUB VARIETIES 12% IN LAKE CONSTANCE REGION

This year, 12% of the apple production in the Lake Constance region consists of club varieties. This appears from a survey compiled by market analysis bureau AMI and the cooperatives MaBo and WOG on behalf of Prognosfruit. The estimate worked out at 31,300 tonnes. This is 34% more than the 23,300 tonnes of 2021, but then there was a relatively small crop. Compared with 2020, production of club varieties this year is 3.5% higher. Fruit farms on the German side of Lake Constance picked 258,600 tonnes of apples according to crop estimate figures this year. The 'Jonagold-group' (Jonagold, Jonagored and Red Jonaprince) is, with a total of 81,200 tonnes, or 31% of the total apple production, the most important variety, followed by Elstar with a share of 16%. Gala is in third place with 13%. Production of Golden Delicious, Braeburn, Idared and Fuji is slowly but surely falling. Production of club varieties is rising.

CHINA OPENS THE DOOR TO ITALIAN PEARS

After years of negotiations, Italian pears finally gained access to the Chinese market. The head of the Chinese General Administration of Customs, Yu Jianhua, was on a tour of Europe recently and had already signed an agreement in Poland for the delivery of Polish blueberries to China. In Rome he signed an export agreement for Italian pears. The official negotiations about the access of Italian pears to the Chinese market started in 2017, but had been interrupted during the past couple of years due to the corona epidemic. To get the



This year, 12% of the apple crop at the German side of Lake Constance consists of concept varieties.

most out of the opportunities offered by the newly-signed protocol, the Italian pear industry wants to breathe new life into the production that had been hit during the past few years, among other things, by extreme weather conditions. According to the Italian marketing bureau *Centro Servizi Ortofrutticoli* the export of Italian apples to China is the next point on the agenda. (*Source: fruitnet.com/fruchthandel*)

LIDL INTRODUCES CONSCIENTIOUS HANDLING OF WATER AS A PURCHASE CRITERION

Last year it became clearer than before: in many regions of our earth, water is a scarce resource. At the same time, water is indispensable for food production. Agriculture and horticulture are responsible for 70% of the global use of water. German supermarket chain LIDL is responding to the scarcity of water. At present, responsible handling of water is one of the criteria that are playing a part in the purchase of fresh produce. LIDL's aim: at the latest in February 2026, in countries where the availability of water is in danger, 100% of the fruit and vegetable products has to be certified for responsible use of water. The focus here is on nine water risk countries: Spain, Italy, Greece, Portugal, Egypt, Morocco, Israel, Chile and South Africa. (EFM)

CHILEAN FRUIT EXPORTS DOWN 3% OVER PAST FIVE YEARS

The Chilean fruit export industry experienced a 3% decrease between 2017-18 and 2021-22 as the country is seemingly losing ground to Peru, according to agro exporter company Utilitas and as reported by www.Freshfruitportal. com and Latercera.

In the past five years, clementines have recorded the highest fall, with 34% less



Production and market developments

exports registered. Apples had a drop of 23%, while grapes, one of the most popular Chilean agricultural products, also recorded a 17% drop in exports. Peaches reported a 14% decrease, while pears declined by 10%. Blueberries saw a 3% fall.

However, Chilean cherries continue to excel in the country's portfolio along with mandarins, with a 91% rise in exports each. Fruits that did enjoy growth are oranges (2%), nectarines (26%) and plums (31%).

Utilitas CEO Rodrigo Manasevich said that, without the huge success of the cherry industry, the country's fruit export industry would have fallen by 10%. (Source: FreshFruitPortal.com)



In 2021/2022, Chile exported 3% less fruit than five years earlier.

Pixabay

REPLACING PLASTIC ONLY PARTLY POSSIBLE

A complete replacement of plastics in agriculture is at present neither possible nor desirable. This is the conclusion of recent research by the University of Vienna (Austria).

The researchers point out that synthetic materials are deeply anchored in global food production and play an important part in guaranteeing yield and quality. The extensive use of synthetic materials also goes hand in hand, however, with problems such as the accumulation of plastic particles and poisonous additives in the soil or in food. Therefore, the researchers plead for a rational use of plastics with a minimum ecological impact. They also plead for collection and recycling after use.

"In cases in which plastic remains in the environment, the plastic must be compounded in such a way that it is totally organically decomposed. In addition, it is of crucial importance, that poisonous additives are replaced by safer alternatives", research leader professor Thilo Hofmann says. Moreover, sustainable use of plastic must be further stimulated. Alternatives not based on oil, could also play a part. According to the researchers, however, these cannot be recommended without reservations. The ecological impact of these alternatives is not always better than the classic synthetic materials, for instance, when their life span is insufficiently taken into account. An ill-considered switch from plastics would then even lead to more pressure on ecosystems and the food chain. (*Fruitnet*)



 Plastics seldom totally decompose. After (partial) decomposition, microplastics stay behind in soil or water.
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News of the world

RUSSIA: AFTER APPLES, NOW PEARS PLANTED TOO

Since 2014, Russia has been trying to achieve as high a degree of self-sufficiency as possible in food production. During the past few years, among other things, large surface areas of apple orchards were planted. There was no laying out of pear orchards. Until recently, for in the Dagestan region, this spring, a 55-ha pear orchard was planted, rusexporter.ru reports. And this makes it at once into the largest pear orchard in Russia. The farm intends to plant another 30 ha next winter and wants to extend the hectarage to almost 200 ha.

AUSTRIA: RESIDUE-FREE COMPOSTABLE PLASTIC DEVELOPED

A research consortium led by Fraunhofer Austria, has developed a biobased plastic that can be composted without leaving any residue. The foils that have now been presented by the scientists are biobased, totally degradable and decompose during composting within a few weeks, without leaving any residue. Right from the start, the consortium has seen to it that the foils were fit to be used as shrink film for pallet transport.

Synthetic material on the basis of lactic acid made from polylactide

The consortium managed to develop both a biobased and an organically degradable synthetic material on the basis of lactic acid and consisting of polylactide. On the whole, the biobased synthetic materials were also stronger than polyethylene.

Up till now stretch films were made of synthetic materials based on oil. When these films end up in the environment, it takes 400 years for them to break down. Moreover, microplastics are often produced during the decomposition process.

THE NETHERLANDS: ENDOPHYTES OF FUNGI CAN BE USED AS BIO STIMULANTS

Fungi living in symbiosis with plants may possibly be used as bio stimulants to make plants more resilient. This appears from recent research by a student of Groningen University (the Netherlands).

Fungal endophytes are widespread and various plant symbionts as it were live invisibly in healthy plants. The interaction between endophytes and their host stimulates plant growth and improves the tolerance for bio stress and environment stress.

EUROPE: EUROPEAN COMMISSION FIGHTS MISLEADING ENVIRONMENTAL CLAIMS

Sustainable consumerism is hip and many companies use environmental claims to recommend their goods and services. However, a study of the European Commission showed that more than half of the claims is vague, misleading or unfounded. Europe is now engaging in the fight against this socalled greenwashing.

"More and more people would like to buy sustainably, but it is extremely difficult for them to distinguish truth from fiction", Euro commissioner for the Environment Virginijus Sinkevičius recently said at a press conference. "T-shirts made from plastic bottles, for instance. That is fine, of course, but we often see that only one percent or less of the material is really made of recycled plastic bottles."

And then you have CO₂ neutral bananas, bee-friendly juices, 100% CO₂ compensating deliveries... The proliferation alone of sustainability labels promotes a broad distrust in the consumer. The European Commission recorded no fewer than 230 of these.

Prove Claims

A 2020 survey of 150 green claims showed that 53.3% was vague, misleading or unfunded. This does not only undermine consumer confidence, it also harms companies that are really working in a sustainable manner, according to the European Commission. That is why the commission worked out a draft guideline with rules that indicate how companies must from now on underpin claims that do not come under existing European regulations, such as the EU ecolabel does, and how to communicate them.

"A company will have to prove claims. It will have to show that the claim is scientifically based and that this is trustworthy", according to Sinkevičius. The European Parliament and the member states still have to approve the regulations. (Source: vilt.be)

ITALY: STINK BUG PEST NUMBER 1

The brown marmorated stink bug (*Ha-lyomorpha halys*) has developed into the most important pest in Italian agriculture and horticulture. The bug does more damage than the feared bacterial disease *Xylella fastidiosa*, which is responsible for many grubbed vineyards and olive orchards.

Especially pear suffers a lot of damage caused by the brown marmorated shield bug. In the most important pear growing regions, such as the Po valley, the insect could hardly be controlled in 2021. There are examples, for instance, where even after 11 insecticide sprayings, 30% of the fruits were still damaged. The research is now reviewing, whether the push & pull strategy can contribute to curbing the infestation. Dispensers are hung in the orchard for



News of the world

this with products that repel the bugs (push) and drive them out of the orchard or prevent them from flying into the orchard. Products tested are eugenol, methylsalicyl acid and methylbenzoate. At the edges of the orchard, traps with pheromones are hung to attract and catch as many bugs as possible (pull). (Source: growers' magazine Fruit)

GERMANY: MORE BEE SPECIES THANKS TO FLOWERS IN AND OUTSIDE THE ORCHARD

Counts in orchards on the German side of Lake Constance offer the proof: sowing flower strips and flower fields in and around the orchard, planting mixed hedgerows with flowering shrubs and trees around the orchard and offering nesting opportunities, promote the number of bee species present in (the neighbourhood of) the orchard. Within the framework of the Pro Planet project, fruit growers on Lake Constance started in 2010 sowing, laying out and building attractive habitats for wild bees. During counts in 2021, in orchards in the region, 112 different species of wild bees were found. 26 of those are in the list of endangered species. Compared with the reference year of 2010, the number of bee species has markedly increased. During the count in that year, 56 species of wild bees were found, half of which were in the orchards and half in vegetation around the orchards. Already during the second count in 2013, the number of wild bees appeared to have increased considerably.

Compared with 2017, in 2021, no greater number of bee species were counted. According to the initiators this was caused by the fact that the spring of 2021 was cold and wet, which has a negative impact on the wild bee population.

Cooperation growers and nature conservation organisations

The Pro Planet project is a good example of how growers and nature organisations can respect each other's interest by means of good cooperation. Nature organisations, for instance, like to sow ecologically valuable plants and plant shrubs, but it is of importance for growers that no host plants for harmful insects are chosen.

The Pro Planet project has been imitated by other fruit growers. Meanwhile, the number of participants has grown from 11 in 2010 to 130 now. Approximately 570 ha were sown with multi-year flower seed mixtures, 14,400 hedgerows, trees and shrubs were planted and 300 nesting sites for insects, birds and bats placed.

The project is an initiative of the German Rewe supermarket chain. This supermarket sells the fruit of the participating growers under the Pro Planet label. The participating growers are financially supported in buying seed, trees and shrubs and nesting boxes. (Source Obstbau magazine)



By sowing and planting flowering plants, shrubs and trees in and around the orchard, the number of bees present could be considerably increased within the Pro Planet project.



'GREEN' PRODUCTS FAIL AGAINST WOOLLY APPLE APHID

In many countries, Movento (active ingredient Spirotetramat) is the basis for the control of the woolly apple aphid (*Eriosoma lanigerum*). The product is expected to disappear from the market within the next few years, however. Are 'green' products an alternative for Movento or can they support the efficacy of Movento against woolly apple aphid? In 2022, the Laimburg research station in North Italian South Tyrol tested a number of green products for their

Tested green products

In the woolly apple aphid trial of the Laimburg research station, the 'green' products mentioned below (in combination with each other or separately) were tested and compared with the insecticides Movento and Pirimor/Aphox.

- Polithiol mix of mineral oil and sulphur
- Oliocin, mineral oil
- Tiovit Jet sulphur
- Naturalis entomopathogenic fungus Beauverio bassiana.
- Ultra Fine Oil (UFO) summer oil
- Flipper potassium salt
- Botanigard OD Beauverio bassiana

efficacy against woolly apple aphid. The conclusion: not a single product could come anywhere near Movento for the rate of efficacy. It was possible, though, by adding oil-containing products to Movento, to extend the effect of this insecticide.

IS PARASITISM OF BROWN MARMORATED STINK BUG BY SAMURAI WASP SUFFICIENT?

Can the feared and in the meantime practically all over Europe occurring marmorated stink bug (*Halyomorpha halys*) be controlled by beneficials? In the North Italian fruit growing region of South Tyrol, in 2020, a start was made with experimentally breeding and introducing the samurai wasp (*Trissolcus japonicus*). In 2021 and 2022, this was repeated and moreover it was investigated whether the samurai wasps that had been introduced in the previous years, had managed to gain a foothold in South Tyrol. In the region of origin of the brown marmorated stink bug in Asia, *T. japonicus* is well-known as the most important parasite of the stink bug.

Observations in South Tyrol have shown that the Samurai wasps introduced have indeed parasitised a part of the eggs of H. *halys*. The parasitic wasp also appeared to survive the South Tyrol winters and to be able to establish itself in



The parasitic wasp *Trisolcus japonicus* parasitises the eggs of the brown marmorated stink bug. The question is, whether this is enough to prevent damage to fruit.

the area permanently. The good news here is, that the parasite prefers more or less the same living conditions as the marmorated stink bug. This means that the beneficial is found in the same places as the bug to be controlled.

Another piece of good news is, that in places where in 2020 *T. japonicus* was introduced, in the course of the years, an ever-higher percentage of the eggs of the parasite is parasitised.

The research also looked at how species-specific T. japonicus is, or whether the parasitic wasp also parasitises other native bug species. This appeared to be the case only to a limited extent. Native bug species are mainly parasitised by other beneficials. Good news here too. The eggs of the, among other places in Central Germany regularly occurring red-legged shield bug (Pentatoma rufipes) that is also harmful to fruit, are also parasitised by the samurai wasp. However, after all these positive elements there is also news that is not so good. Up till now, the parasitism rate of eggs of H. Halys by T. japonicus has moved between 30 and 40%. This is probably sufficient to suppress the population of harmful shield bugs, but too little to prevent damage.





Without the deployment of efficacious products, woolly apple aphid manages to spread quickly in a short time.

In a trial on the woolly apple aphid susceptible variety Fuji, the Laimburg research station compared a number of schemes in 2022, with green products with one time or two times Movento 48 SC and with one time Pirimor followed by Aphox (both with the active ingredient Pirimicarb). In the trial, all products were sprayed with 1,500 litres per hectare (15 hl).

75% efficacy with best green scheme

On 7 July, in the control object left untreated, 91% of shoots and 30% of buds were infested by woolly apple aphid. Two sprayings with 300 ml/hl Movento 48 SC could completely prevent woolly apple aphid infestation (efficacy rate 100%) and two times 50 g/hl Pirimor/ Aphox almost completely. At 4% of buds infested on 23 May, one single time Movento was weaker than two times Movento. The best 'green' scheme managed to achieve a 75% efficacy rate. In this scheme, on 16 March, 5 litres of Poliothol per 100 litres of water were sprayed, followed by five times Naturalis (133 ml/hl) between 28 April and 14 June.

Adding oil

A second trial tested, whether by adding a product to Movento, its efficacy could be improved. In this trial, one single spraying with 300 ml/hl Movento 48SC had an efficacy rate of 67%. By adding 300ml/hl of Ultra Fine Oil or 300ml/hl of the product Prevam (orange oil) the efficacy rate could be boosted to 95%.

(Source: Laimburg research station - Obstbau/Weinbau)

UV LIGHT KILLS EGGS OF SPIDER MITE BUT ALSO OF PREDATORY MITE

Ultraviolet light can kill the eggs of the spider mite (*Tetranychus urticae*). Recent research of Florida University warns of possible side effects, however. Sriyanka Lahiri, an entomologist of the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) was the first to discover that ultraviolet light can help to control spider mite. UV light is combined here with predatory mites. Recently, however, Lahiri and her team found that the same UV doses that kill most of the spider mites also almost kill

most of the spider mites also almost kill 90% of the eggs of the predatory mite. This means that these predatory mites cannot grow into adults as a result of which they cannot eat the spider mites. According to Lahiri, this problem can be sidestepped by first killing the spider mite eggs with UV light and subsequently introducing adult predatory mites. (Source: Freshfruitportal)

ROBOT BRUSHES EGGS OF INSECT PESTS OFF BRANCHES

A team of American students has made a robot that can brush the eggs of insect pests off the branches and stems of trees. In the first instance, the robot was developed to find and remove the eggs of the spotted lanternfly (*Lycorma delicatula*), but it can possibly also be deployed for other pests.

The system makes use of a deep learning algorithm that was trained on 700 photos of the clutches of eggs of the spotted lanternfly. Every single clutch of eggs contains about 30 to 50 eggs which are laid in autumn and hatch the next spring.



Watch the video here.

HAIL NET DOES NOT BOOST EFFICACY OF THINNING AGENTS

Does a hail net boost the efficacy of thinning agents? Many growers and consultants think so, but trials of the research station in Jork (North Germany) have shown that this does not hold good for most thinning agents.

The generally accepted idea is, that, especially under light-poor conditions, such as in Northwest Europe, chemical thinning products are supposed to boost fruit drop under hail nets. Therefore, cultivation consultants advise their clients to show restraint with chemical thinning products under hail nets. To get more insight into the influence of hail nets on the efficacy of thinning agents, the Jork research station carried out research for 5 years. In the period from 2015 through 2019, various thinning agents were tested at various moments and in differing dosages, either jointly or separately. The Pinova-



mutant RoHo3615/Evelina^{*} acted as the trial variety. Half of the trees were under a grey hail net, the other half was not protected by a hail net.

Research showed that in the case of thinning with the products 6-benzyladenine (BA), 1-naphthylactic acid (NAA), ammonium thiosulphate (ATS) or ethephon in all five trial years, there was no difference at all in the thinning effect under the hail net, compared with outside the net. Natural fruit set under the hail net was smaller though, as a result of which there was less need for chemical thinning. This appeared from counts of the number of fruits on the untreated control trees under and outside the hail net. In the case of the photosynthesis inhibitor metamitron (Brevis) the situation was different. Here, the thinning effect in two of the five years was stronger under the net than outside.

According to researcher Michael Clever, the idea that the thinning effect of a thinning agent is stronger under a hail net, is caused by the fact that growers and consultants compare the reaction to thinning agents of trees under a hail with trees outside a hail net. To get an accurate picture of the influence of thinning agents, however, the thinning effect of products must be compared with untreated trees that are also under a hail net. (*EFM/Mitteilungen des OVR*)

MORE FEMALE MASON BEES THROUGH GREATER DIVERSITY OF TREES, SHRUBS AND PLANTS

By adapting the food supply, the fruit grower can 'guide' European orchard bees (Osmia cornuta) to produce more female offspring. Only female mason bees gather pollen and take care of pollination. So, the more female offspring, the better. At the moment the mason bees lay an egg, they can decide whether the offspring will be male or female. Researchers at pcfruit and Ghent University (both from Belgium) found that with an increase in the natural habitat (diversity of shrubs, mixed forests) the proportion of female offspring also increased. More food and a greater diversity of food turns out to be favourable

for propagation. In addition to sweet cherry, apple and pear, especially goat willow (Salix caprea), blackthorn (Prunus spinosa), dandelion (Taraxacum officinale), grape hyacinth (Muscari botryoides), white nettle (Lamium album), sycamore (Acer pseudoplatanus), stinking hellebore (Helleborus foetidus) and white willow (Salix alba) are interesting for mason bees. This appeared from observations of the flower visits of the bees. According to the researchers, grape hyacinth and stinking hellebore are easy to plant and will come back year on year of their own accord. (Source: growers' magazine Fruit)

DIGITALLY (LEARNING TO) PRUNE

Dutch research institute OnePlanet Research Center is developing a 3D computer programme to teach people how to prune fruit trees. With 3D glasses the pruner looks at a digital row of trees that has not yet been pruned. The branches and shoots that have to be removed are shown in red. By virtually 'cutting



The idea that trees under a hail net show a stronger reaction to thinning agents appears not to be correct.



off' the right branches it is possible to practise in a safe 3D environment. It is possible that in future a pruning exam can also be taken in the programme. The pruner is then shown a non-pruned row of trees that he can virtually 'prune'. During the annual Knowledge Day organised by the Nederlandse Fruittelers Organisatie (NFO) (Dutch Fruit Growers Organisation) and Wageningen University & Research (WUR), an information meeting in the Netherlands for fruit growers and other interested persons, visitors could themselves try out a demo version of the 3D pruning programme. The first rows of trees that are used in the programme are of the Guyot planting system at Proeftuin Randwijk trial orchard (the Netherlands). These trees have been mapped out with a laser scanner. Thanks to its 2D shape, this hedge of trees can be scanned quite well and is easily accessible for, for instance, a picking or pruning robot. For that matter, the software also recognises the stakes, wires, drip feeds and the soil.

For the time being, the OnePlanet Research Center will be making scans throughout the year of both a Guyot system and a spindle orchard. The annual scans of before and after pruning show the wood removed. The research institute uses these pruning data plus the knowledge of a pruning expert concerning the reasons for every pruning action, to teach the programme how to prune. In the future the programme will be able to control an autonomous pruning robot. Finally, the programme can be used to develop digital 3D growth forecast models. (*Arjan de Bruine*)



themselves try out a demo version of the 3D pruning programme. Arjan de Bruine

SAVING CROP PROTECTION PRODUCTS THROUGH OPTIMUM PH

The degree of acidity of water affects the number of particles of a crop protection product that is solved in the water. For captan, for instance, the optimum pH is between 8.9 and 9.9. Theoretically, it would be possible to reduce the dosage of a crop protection product if you provide the optimum pH of the spray water.

There are devices that treat the water in order to optimise the spray solution in that way. The device adjusts the water by decalcifying and desalinating the water as is needed and by adjusting conductivity and pH. For this it is necessary to make an analysis of the water used beforehand. Some Belgian fruit growers are operating such a system, and by their own account, are able to reduce the volume of crop protection products by 30%, without loss of efficacy.

Belgian research institute pcfruit investigated on seedlings under laboratory conditions, in how far the efficacy of captan against scab could actually be improved by optimising the pH of the water. The results were marginally positive, but statistically unreliable. Nevertheless, the researchers are convinced that optimising the spray solution is worthwhile and can help to reduce the volume of product and the costs connected with this. (*Source: pcfruit*)



By attuning the pH of the spray solution to the product, the efficacy of the product could be improved.



News from research institutes

NEW ACTIVE INGREDIENT FROM BACTERIA AGAINST BOTRYTIS

Bacteria of the genus *Pseudomonas* produce a strong antimicrobial natural product, as researchers at the Leibniz Institute for Natural Product Research and Infection Biology (Leibniz-HKI) in Germany have discovered. They proved that the substance is effective against both plant fungal diseases and humanpathogenic fungi.



Strawberries are especially susceptible to gray mold rot.

Shutterstock

The newly discovered natural product group of keanumycins in bacteria works effectively against the plant pest Botrytis cinerea, which triggers grey mould rot and causes immense harvest losses every year. But the active ingredient also inhibits fungi that are dangerous to humans, such as Candida albicans. According to previous studies, it is harmless to plant and human cells. Keanumycins could therefore be an environmentally friendly alternative to chemical pesticides, but they could also offer an alternative in the fight against resistant fungi. "We have a crisis in antiinfectives," explains Sebastian Götze, first author of the study and postdoc at Leibniz-HKI. "Many human-pathogenic fungi are now resistant to antimycotics - partly because they are used in large quantities in agricultural fields."

No coincidence

The fact that the researchers have now found a new active ingredient in bac-

teria of the genus Pseudomonas is no coincidence. "We have been working with pseudomonads for some time and know that many of these bacterial species are very toxic to amoebae, which feed on bacteria," says study leader Pierre Stallforth. It appears that several toxins are responsible for the deadly effect of the bacteria, of which only one was known so far. In the genome of the bacteria, the researchers have now found biosynthesis genes for the newly discovered natural products, the keanumycins A, B and C. This group of natural products belongs to the nonribosomal lipopeptides with soap-like properties.

Keanumycin effective against grey mould rot

The researchers suspected that keanumycins could also kill fungi, as these resemble amoebas in certain characteristics. This assumption was confirmed together with the Research

NEWS FROM RESEARCH INSTITUTES

This page consists of a mix of contributions, reports written by employees at one of the European research institutes and reports written or edited by the EFM editorial team about developments within the European research institutes. In the reports written by the researchers, they present 'first-hand' the results of their work or talk about new research projects.

Centre for Horticultural Crops at the University of Applied Sciences Erfurt. There, Keanumycin was shown to be effective against grey mould rot on hydrangea leaves. In this case, culture fluid that no longer contained bacterial cells was sufficient to significantly inhibit the growth of the fungus.

"Theoretically, the keanumycin-containing supernatant from *Pseudomonas* cultures could be used directly for plants," says Götze. Further testing will be carried out together with the colleagues in Erfurt. Keanumycin is biodegradable, so no permanent residues should form in the soil. This means that the natural product has the potential to become an environmentally friendly alternative to chemical pesticides.

Possible applications in humans

Instead of plants, Keanumycin could therefore possibly also be used in humans. According to the tests conducted so far, the natural product is not highly toxic for human cells and is already effective against fungi in very low concentrations. This makes it a good candidate for the pharmaceutical development of new antimycotics. These are also urgently needed, as there are very few drugs against fungal infections on the market. (Source: Leibniz HKI)



News from research institutes

RECOGNISING PHYTOPLASMA INFESTATION WITH A DRONE

With the latest digital technologies, witches' broom disease in apple and pear decline in pear can be recognised at an early stage, even before the symptoms are visible. This can be done with the help of quads or drones fitted out with spectral cameras. The Laimburg research station in North Italian South Tyrol is testing this technology. The aim is to recognise infested trees at an early stage as soon as possible and to grub these or take other measures.

Witches' broom disease and pear decline

Witches' broom disease and pear decline are caused by phytoplasmas. These are cellwall-less bacteria. In especially South Tyrol witches' broom disease causes structural problems in apple. This disease is caused by a phytoplasma that is spread by insects, such as the *cacopsylla picta* and the *cacopsylla melanoneura*. Symptoms of the witches' broom disease are, among others, the characteristic bunchy shoot growth, resembling a withes' broom, a premature red colouring of the leaves and small qualitatively inferior apples.

An infested tree is a great infestation risk for other trees. At the moment control measures consist of controlling the insects spreading the disease, in order to limit in that way further spread of the disease and grubbing infested trees.

Spectral analysis technique

At the Laimburg research station the possibility is being investigated at the moment to recognise the disease before symptoms are visible on the tree with the help of the spectral analysis technique. In the case of spectral analysis, the transmitted light, reflected by the leaves is analysed to be able to draw conclusions on the state of health of the trees in that way. This is done with the help of a quad that drives through the orchard or a drone that flies over the trees. The research results are promising and indicate that healthy and infested trees can be distinguished from each other with the help of spectral analysis before symptoms are visible.

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"Our aim is to recognise an infestation with the help of spectral analysis even before recognising the development of symptoms, so that fruit growers can grub infested trees at an early stage to prevent further spread of the disease. The advantage is that the technique offers the opportunity to recognise infested trees in good time, quickly and cheaply", according to Katrin Janik, head of the department for Molecular and microbiology of the Laimburg research station. (*EFM editorial board*)



Remotely recognising trees infested by phytoplasma is within easy reach.

Laimburg Research Centre/Andreas Tauber



News from research institutes

A LONGER LIFE FOR ORGANIC SOLAR CELLS

Photovoltaic cells made of organic materials are light and flexible, which is why they are considered very promising. An international research network led by TU Graz is now aiming to increase the stability of the materials.

Solar cells made of silicon have been around for 70 years. Organic solar cells, on the other hand, are quite new, but open up new possibilities for emissionfree electricity production. These solar cells made of organic compounds achieve efficiencies of up to 19 percent, yet they are extremely thin, light and flexible. Applied to transparent film, they can be used in a wide variety of geometric shapes and colours in areas for which silicon-based solar cells are unsuitable. One problem so far, however, has been their short lifespan: organic solar cells deteriorate quite quickly, which is why they are still of little commercial importance. This is now to change: Under the leadership of Graz University of Technology (TU Graz), the "OPVStability" network brings together international partners from science and industry who will be conducting research over the next four years to increase the durability of organic solar cells. The European Commission is funding the project with around 2.7 million euros.

Ten research institutes across seven countries

"There are thousands of material combinations that can be used to produce organic solar cells," says project director Gregor Trimmel from the Institute for Chemistry and Technology of Materials at TU Graz. "We want to find out which of them are the most suitable: i.e. particularly durable and yet efficient in terms of electricity output." Ten research institutes in seven countries will each create a PhD position in the next few months to drive forward the development work in cooperation with the industry partners InfinityPV, ASCA and Sunnybag. "In principle, organic photo-



Organic solar cells in a so-called glove box in which they are exposed to artificial sunlight. Lunghammer - TU Graz

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voltaic cells have the potential to produce electricity at similarly low costs as silicon-based products," says Trimmel.

Analysis of decomposition

The researchers want to study the decomposition processes of various potentially suitable materials in detail. For this purpose, the organic compounds are exposed to artificial sunlight in the laboratory, but also tested under real weather conditions in Europe as well as the Negev desert. The precise analysis of gradual degradation is a challenge: "Organic solar cells are no more than 200 nanometres thick. To be able to isolate decomposition products in them, very special methods and instruments are needed," Trimmel explains. Furthermore, the researchers are using approaches based on artificial intelligence and machine learning to analyse the large amounts of data that are generated in high-throughput experiments. The results of the investigations will allow detailed deductions of the chemical decomposition processes. In addition to the physical tests, digital simulations of chemical compounds will be run to find the most suitable materials for the next generation of organic photovoltaic cells. (TU Graz)



Company news

ALTERNATIVES TO PLASTIC PACKAGING: HEAVIER AND POORLY RECYCLABLE

A study by the German *Gesellschaft für Verpackungsmarktforschung* (GVM) shows that no other material is as efficient a packaging material as plastic. On average, 24 grams of plastic is enough to safely pack one kilogram of product. Other materials require an average of 116 grams, almost five times as much.

The study, commissioned by the organisation of packaging material manufacturers, compares the material efficiency of all relevant packaging materials such as glass, paper/cardboard, ferrous metals, aluminium and plastic and is representative of the packaging consumption of private households in Germany. Replacing plastic packaging with other materials leads to an increase in the amount of packaging material used. This runs counter to the European Commission's proposal to gradually reduce

per capita packaging consumption by a total of 15 per cent by 2040. Yet a special reduction target for plastic packaging is currently being debated in the EU parliament. GVM experts see a clear conflict here: the EU's packaging reduction targets would not be achievable if a significant amount of lightweight plastic packaging were to be replaced by heavier packaging materials. Even replacing 10% of plastic packaging would lead to a 10-20% increase in household packaging waste.

Composite materials

But that's not all. A special reduction target for plastic would also reinforce the use of composite plastics and laminated paper packaging, to the detriment of the circular economy. "The simplest way to save plastic is to coat paper with plas-



EU packaging reduction targets are not achievable if lightweight plastic packaging is replaced by heavier packaging materials. Shutterstock

COMPANY NEWS

Some of the texts on this page have been provided to the EFM editorial board by companies as press releases, some have been written by the EFM editorial board.

The editorial board decides whether a press release provided is printed completely, partly or not at all. (*EFM*, *Gerard Poldervaart*)

tic," explains Dr Isabell Schmidt, director of circular economy at the IK. "This creates laminates or composites that require less plastic, but usually weigh more and are more difficult to recycle than monomaterials. In particular, the plastic part of the packaging material can then no longer be recycled."

Reducing packaging consumption wisely

It is better to reduce the amount of packaging material in another way, for example by making the packaging smaller and lighter with the same content of product. The plastic packaging industry has put a lot of energy into this in recent decades, Schmidt explains. "Since the early 1990s, plastic packaging has lost an average of a quarter of its weight," Schmidt says.

Reusable packaging

Reusable packaging can also make a meaningful contribution to reducing the amount of packaging material, according to the association, for example in the wholesale and retail trade, in takeaway gastronomy or in the mailorder sector. There, the use of packaging material has increased particularly sharply in recent decades. "But we need to look more closely, because reusable is not always the most ecological choice compared to disposable," Schmidt says. (Source: press release Industrievereinigung Kunststoffverpackungen)



Kalender und Aktivitäten / Agenda en activiteiten / Agenda and activities

Fruit Logistica 2024

Land:	Deutschla
Datum:	7. bis 9. F
Ort:	Messe Be
Programm:	www.frui
Veranstalter:	Messe Be
Info:	www.frui

Deutschland **7. bis 9. Februar 2024** Messe Berlin, Messedamm 22, 14055 Berlin vww.fruitlogistica.com Messe Berlin vww.fruitlogistica.de



Fruit Logistica 2024: 7. bis 9. Februar

Fruit Logistica

BIOFACH 2024

BIOFACH – We	eltleitmesse für Bio-Lebensmittel
Land:	Deutschland
Datum:	13. bis 16. Februar 2024
Ort:	Nürnberg Messe, Nürnberg
Info:	www.biofach.de



Norddeutsche Obstbautage 2024

Fachausstellung von Maschinen und Geräte für den Obstbau,
und Vortragsveranstaltung der Esteburg Obstbauzentrum Jork
Land:DeutschlandDatum:14. und 15. Februar 2024Ort:Altländer Festhalle, Jork
www.norddeutsche-obstbautage.de

Fruchtwelt Bodensee 2024

Internationale Fachmesse für Kernobst, Steinobst, Beeren, Hopfen und Destillation Land: Deutschland **Datum: 23. bis 25. Februar 2024** Ort: Messe Friedrichshafen, Neue Messe 1, 88046 Friedrichshafen

8 Info: w



Fuchtwelt Bodensee von 23. bis 25. Februar 2024 Fruchtwelt Bodensee

Freskon

International trade show for fruit and vegetablesCountry:GreeceLanguage:English, GreekDate:11-13 April 2024Location:Thessaloniki International Exhibition Center,
ThessalonikiInfo:www.freskon.helexpo.gr



FruFreskon: international trade show for fruit and vegetables from 11-13 April 2024 EFM

Macfrut 2024

Trade fair for professional fruit and vegetable growers Country: Italy

Date:	8-10 May 2024
Time:	09:30 - 18:00
Location: Info:	Rimini Expo Centre, Rimini, Italy www.macfrut.com



Kalender und Aktivitäten / Agenda en activiteiten / Agenda and activities

Interpera 2024

International p	pear congress
Country:	Portugal
Language:	English
Date:	26 & 27 June 2024
Location:	Òbidos, Portugal
Info:	www.interpera.com
Organized by:	AREFLH and National Association of Pera Rocha
- ,	Producers



Prognosfruit 2024

Country:HungaryLanguage:EnglishDate:7-9 August 2024Location:Budapest, HungaryInfo:www.prognosfruit.euOrganized by: WAPA



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