EU BEET SUGAR
SUSTAINABILITY
PARTNERSHIP

GOOD PRACTICES: PLANT PROTECTION

HOW THE EUROPEAN BEET SUGAR SECTOR MAKES OPTIMUM USE OF ALL AVAILABLE CROP PROTECTION TECHNIQUES

2019

ABOUT PLANT PROTECTION

INTRODUCTION

Over the past two decades, European beet growers have reduced inputs while producing more and better, contributing to address environmental (incl. climate change, biodiversity), social (incl. occupational health and safety, human and animal health) and economic issues with the aim to strike a balance between productivity, social and environmental goals. **Plant protection plays a crucial role in beet growing.** This report aims to illustrate both the complexity of crop protection and our sector's continuously ongoing positive developments in terms of sustainable crop protection.

Protecting the sugar beet crop is essential to achieving both optimum quality and yield of the crop to ensure farmers' incomes, secure raw materials for the factories and provide quality products to consumers. In the absence of appropriate crop protection, be it against weeds, pests, diseases or – as is mostly the case – a combination and/or succession of these, there is a great risk of massive losses and even crop failure.

For these reasons, the sugar beet crop is generally protected from external damaging factors by different means. Plant Protection Products (PPPs) are used to prevent or cure crop infection/infestation in situations where no other sustainable solutions are available. All sugar beet growers and workers are mandatorily **trained and certified** on how to handle PPPs (dosage, equipment, timing of application, storage and disposal) in order to minimize risks to humans and the environment.

SUSTAINABLE CERTIFICATION SCHEMES AND MANDATORY CERTIFICATIONS

	DESCRIPTION	EXAMPLES
SUSTAINABLE CERTIFICATION SCHEMES IN BEET GROWING	Plant protection, just as all other aspects of beet growing, is **strictly documented** in **certification schemes** in most EU beet growing countries.	Sustainable Agriculture Initiative (SAI) in many EU countries; Specific national schemes such as: • Standard Vegaplan in Belgium, • QS-Certification in South Germany, • Nyomon-követési rendszer NYKR in Hungary, • Red Tractor Farm Assurance Combinable Crops & Sugar Beet Scheme in the UK, • ÖPUL in Austria, • VVAKkerbouw and Stichting Veldleeuwerik in the Netherlands, • Codes of Good Practice in Poland, • Growers' Guidelines in Denmark, Finland, Lithuania & Sweden.

MANDATORY CERTIFICATIONS FOR USING PPPs	To increase the level of protection of health and the environment, Europe requires **the training and certification** of professional users and distributors of plant protection products (Directive 2009/128 on the use of pesticides compatible with sustainable development). This certificate is issued by all the European Governments to ensure the **correct manipulation** of plant protection products by **professionals** users, distributors or advisors. Certificate holders are kept informed of new developments in pest control with the help of **mandatory continuing trainings**. The aim is to **limit as much as possible the risks** of these products on human, animal health and on the environment.	Belgium's **Phytolicence** is mandatory since 25 November 2015. This certificate for professionals certifies a person's minimum knowledge of products, techniques of use, alternative methods and protection of health and the environment. More information about Phytolicence can be found on: www.fytoweb.be Equivalent systems exist in various EU countries such as: • Patentino per l'acquisto e l'utilizzo di prodotti fitosanitari in agricoltura in Italy, • Pflanzenschutz-Sachkundenachweis in Germany, • Certiphyto in France.

Crop protection is not just about using PPPs, far from it. Other protection techniques are applied and count just as much, if not more, than PPP use. Managing and integrating different crop protection techniques is called "Integrated Pest Management" (IPM). This report on plant protection highlights how these aspects are applied along sugar beet growing and also addresses the sustainable use of PPPs.

Picture: Fred Zeller

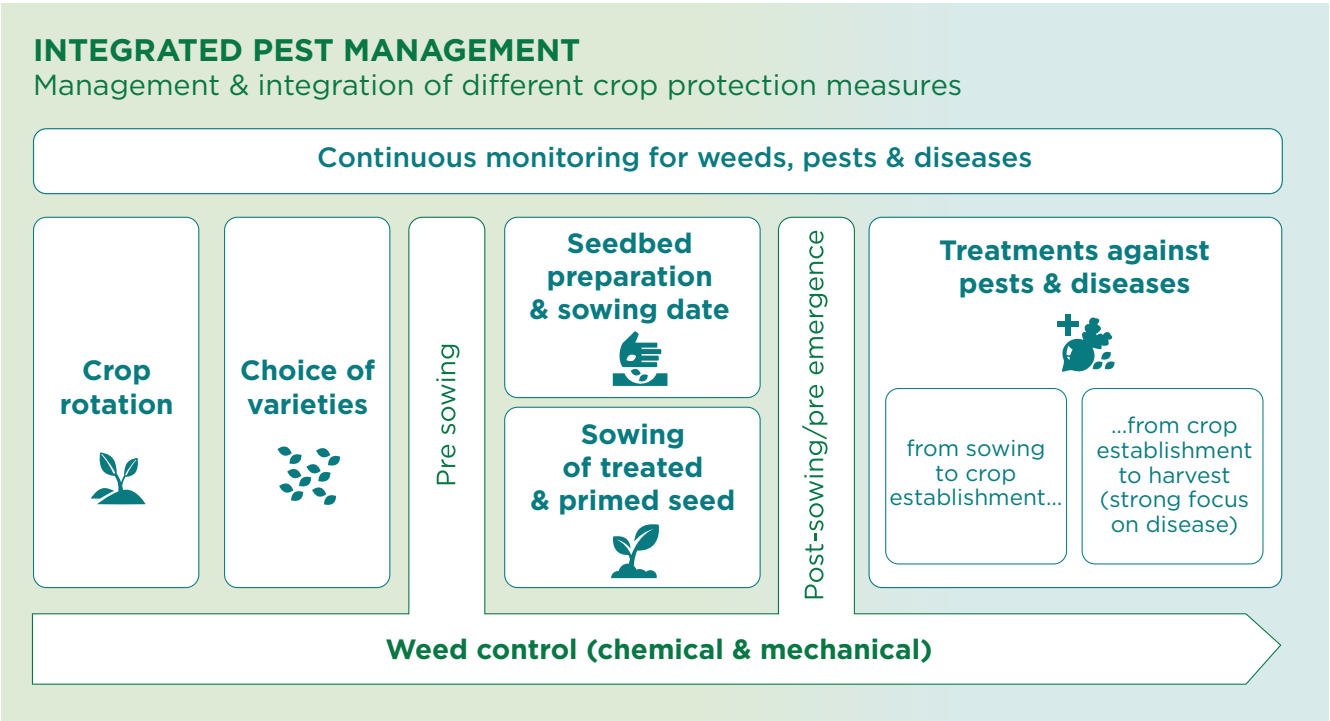
GOOD PRACTICES IN PLANT PROTECTION

1. SUGAR BEET: A KEY ROTATIONAL CROP

Crop rotation is the **first step in integrated pest management**. It is also the first principle of the sugar beet specific guidelines for **integrated production (IP)** (as stipulated by the IOBC - International Organisation for Biological and Integrated Control). Sugar beet is generally grown in the same field only every 1 in 3 to every 1 in 8 years (alternating with other crops, notably cereals). This naturally prevents the build-up of host-specific pests (notably nematodes, pygmy mangold beetles and beet armyworms) and pathogens causing diseases (mainly Rhizoctonia root rot and the leaf diseases Cercospora leaf spot and powdery mildew). In general, **the more years left between two successive beet crops in the same field, the more effective the agronomic measure to reduce populations of crop-specific pests.**

THE FAO DEFINITION: INTEGRATED PEST MANAGEMENT

According to the FAO, "Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment."



2. USING THE APPROPRIATE SUGAR BEET VARIETIES: A CONTINUING SUCCESS STORY

Choice of varieties/cultivars is the second element of both IPM and IP. The general IP principles stipulate that cultivars should be resistant/tolerant to at least one major disease.

VARIETIES	CHOICES PRIOR TO SOWING
RESISTANT/TOLERANT VARIETIES	The IOBC sugar beet specific IP guidelines stipulate that the use of **resistant/tolerant varieties** is obligatory for Rhizomania disease. In the case of both Rhizomania and Rhizoctonia, the choice of resistant or tolerant varieties is the only option allowing economically viable sugar beet cultivation in the presence of these pathogens. Since 2015, the so-called "classic varieties" (i.e. susceptible to Rhizomania infestation) have been fully replaced by Rhizomania tolerant/ resistant and even double resistant/tolerant varieties by all European beet growers.
DOUBLE AND/OR TRIPLE RESISTANT/TOLERANT VARIETIES	An increasing number of **double and/or triple resistant/tolerant sugar beet varieties** are becoming available to growers (combination of Rhizomania tolerance/resistance with resistance to cyst nematodes, Rhizoctonia root rot, Aphanomyces root rot and/or Cercospora leaf spot). Double and/or triple-tolerant varieties have represented 100% of all varieties on offer in Romania and Slovakia since 2011. Currently, these varieties represent between 20 and 75% of all varieties on offer in the other EU countries.

Breeders' efforts to date have been unable to identify major sources of resistance to virus yellows from global germplasm collections because virus yellows is a complex of three different virus species. But they intensify their R&D. Research work (notably a pre-breeding project exploiting and developing the genetic diversity in beet relatives and identifying candidates showing resistance/tolerance to virus yellows) is ongoing.

The aim is to develop beet varieties with durable and effective resistance to beet virus yellows without yield drag in the absence of the disease, but such varieties are not expected to be available in the short term (i.e. in the next five years).

Other varietal traits of sugar beet (e.g. tolerance to hydric stress) can indirectly impact the disease resistance level of the sugar beet and/or the use of PPPs.

YIELD SECURITY

100%

multiple-resistance traits in varieties of the past 10 years

100%

of sugar beet varieties in the EU:

- have 1-2% more **yield potential**
- are **resistant** to one or more pest and/or diseases
- have improved nutrients and water use **efficiency**

3. THE SOWING OF TREATED BEET **SEED**: A PROGRESS IN TERMS OF SUSTAINABILITY

Young beet is highly susceptible to pest and diseases. An important crop protection technique is the **treatment of the beet seed with very low doses of appropriate fungicide and/or insecticide** during the process of seed pelleting **by seed companies in the controlled environment of beet seed processing plants**.

COMPUTERIZED BEET SEED PROCESSING PLANT

Highly automated procedures dedicated to producing top quality beet seeds

SEED HARVESTING

From mid-July to beginning of August

SEED CLEANING

Pre-cleaning, separation of impurities (straw, leaves), testing for germination capacity/velocity/vigour

SEED PROCESSING

Sieving, polishing, removal of empty/deficient seeds, X-ray analysis, classification of the seeds according to size, germination capacity in vigour.

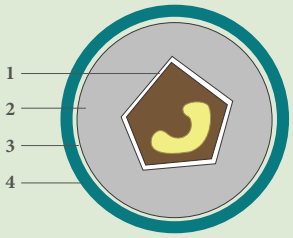
SEED PELLETING

Coat of the irregularly shaped and flat seed with pelleting mass

This technique protects the young beet during the first 80 to 90 days after sowing, when the seedling is highly susceptible to frequent attacks from pathogens and pests.

This single preventive treatment avoids 2 to 3 (sometimes even 4) further fungicide/insecticide applications which would otherwise be necessary to protect the young plants. To illustrate this, The effect of seed treatment generally ends around 90 to 100 days after sowing; after this period of protection from pests in the early growth of sugar beet, it is normal to observe considerable insect life in beet fields, be it crop pests (such as black aphids) or non-target organisms such as ladybirds, hover flies (Syrphidae) and green lacewings (Chrysopidae), whose larvae contribute effectively to the reduction of black aphid colonies.

STRUCTURE OF A PELLETED SUGAR BEET SEED



FIRST LAYER

A thin layer with a fungicide is applied with a film-coating technique. This active substance is a disinfectant, destroying fungal seed-borne pathogens.

SECOND LAYER OR SHAPING (PELLETING) LAYER

This layer gives the seed a spherical shape in a complex pelleting process. Specific pelleting mass ingredients contain several substances which are helpful for germination and emergence. Moreover, this layer of pelleting mass physically separates the seed germ and the plant protection products in the 3rd layer, thus protecting the seed germ against phytotoxic effects.

THIRD LAYER OR PROTECTION LAYER

This layer can contain fungicides and insecticides. It is applied with another film-coating process to help fight seed-borne diseases and some soil and leaf pests.

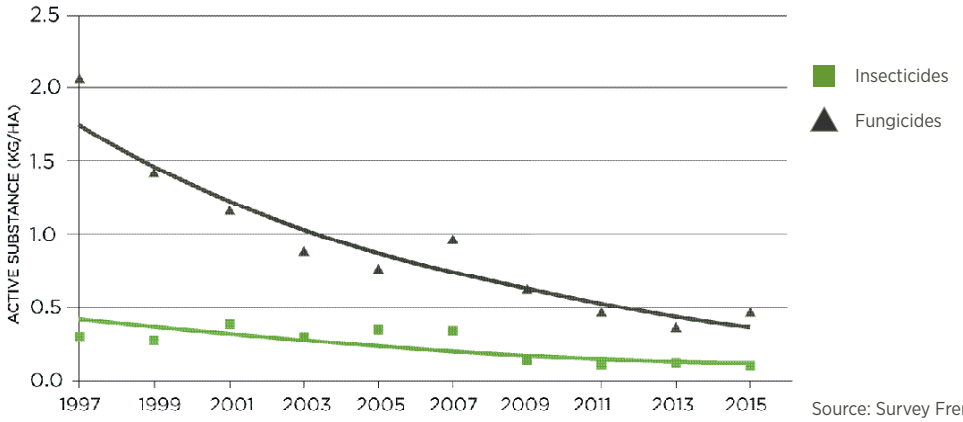
FOURTH LAYER OR PIGMENT LAYER

This layer applied directly after the previous layer, covering the latter and preventing erosion of the pesticides during sowing. This layer helps to avoid the direct contact of the farmer with these active substances.

Original source: "Structure of pelleted KWS Sugar Beet Seed" & "Kockelmann et al, 2010. "Seed production and processing", elaborated by CIBE

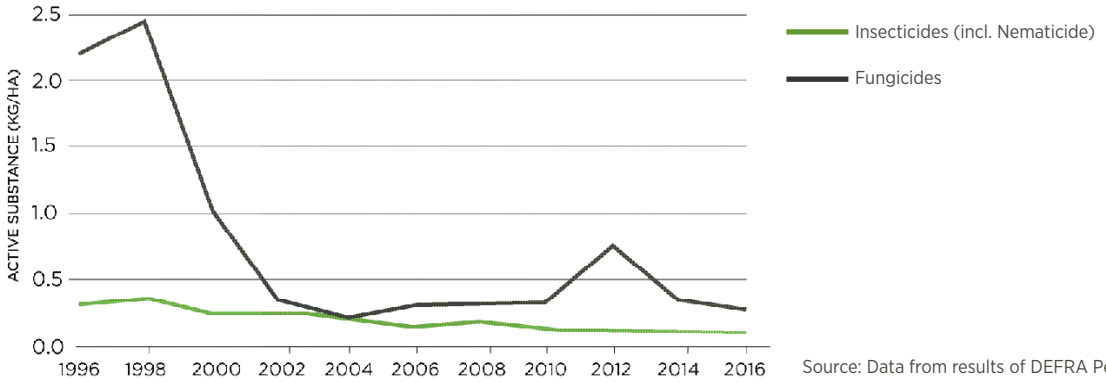
Seed treatments have been used for some 25 years to control numerous pests (up to 15 in the UK and similar or additional pests across north-west Europe) and associated virus diseases (transmitted by aphids). This has led to stabilized insecticide use in sugar beet at very low levels (DIAGRAMS 1, 2 and 3).

DIAGRAM 1: USE OF FUNGICIDES & INSECTICIDES IN SUGAR BEET IN FRANCE, 1997-2015



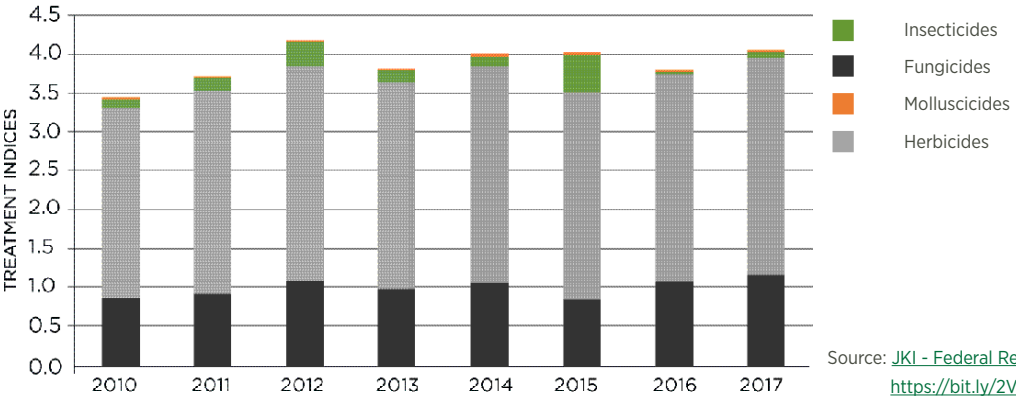
Source: Survey French Technical Institute for Beet ITB - website

DIAGRAM 2: USE OF INSECTICIDE (INCL. NEMATICIDE) & FUNGICIDE ACTIVE SUBSTANCE IN SUGAR BEET IN THE UK, 1996-2016



Source: Data from results of DEFRA Pesticide Use Surveys

DIAGRAM 3: TREATMENT INDICES* IN SUGAR BEET IN GERMANY, 2010 TO 2017



Source: JKI - Federal Research Centre for Cultivated Plants
https://bit.ly/2Vw06VW

*Treatment index=[sum of all pesticide application rates/authorised application rate] * [treated acreage/total acreage of the field].

In Germany, the treatment index is an indicator of pesticide use intensity and summarizes the number and amounts of each pesticide applied per hectare and per crop season in relation to its registered doses.

CONSTANT DEVELOPEMENTS TO IMPROVE SUSTAINABILITY IN PLANT PROTECTION

Seed priming/activation can accelerate the rate of seed emergence by up to 7 days. **Early and uniform seedling establishment reduces the risk of damage to seeds caused by adverse weather and pests.** A good, evenly and quickly established crop allows the sugar beet canopy to contribute significantly to weed suppression, then providing further efficiencies for growers when applying PPPs. There is also potential for research into and development of quick-establishing & ground covering varieties of sugar beet (possibly with the help of new plant breeding technologies).

However, alternative solutions to the rapid end of certain active substances could lead to return to practices that are less sustainable both in terms of environmental, economic and social sustainability.

Therefore, **it is crucial to adopt appropriate timing and support provisions** so that new sustainable techniques or systems be transferred from research and development to the farmers and the fields.

THE FRENCH SOLUTIONS CONTRACT: AN INNOVATIVE CONTRACT BETWEEN FARMERS AND CIVIL SOCIETY

The **Solutions Contract** is a collective commitment from 43 partners from the French agricultural sector to:

- build a trajectory of progress for crop protection of plants based on concrete, effective and sustainable solutions for the protection of all crops on French territory.
- submit proposals to best meet the expectations of citizens and consumers for healthy, safe and sustainable food, by identifying and deploying the virtuous crop protection solutions that guarantee the productivity, competitiveness and sustainability of farms, as well as respect for the environment and health.
- scale up and accelerate the actions carried out for many years by farmers, sectors and actors of research and development which have already contributed to significant improvements in the use of plant protection products
- integrate the combined innovations proposed by research and development, technology, agronomy, industry approaches, advice and training, while continuing to ensure a high level of food safety for all.

Contrat de Solutions
Une trajectoire de progrès pour la protection des plantes

The Solutions Contract covers all the levers that will reduce the use and impact of PPPs, such as agronomic practices, plant improvement, digital agriculture, robotics & agro-equipment, biocontrol, innovative PPPs, sector & territory approaches and advice, training & dissemination. More than 300 sustainable solutions, existing or future, have been identified, as well as the obstacles to be removed and the conditions required to encourage the deployment of these solutions. To learn more: www.contratsolutions.fr

NOTE 8 OF THE FRENCH SOLUTIONS CONTRACT

Increasing the use of sugar beet varieties tolerant to foliar diseases (cercospora/mildew/rust/ramularia) to reduce fungicide treatment.

In France, some **37% of beet area is currently sown with sugar beet varieties** which are tolerant (ranging from slightly tolerant to tolerant) to one or more of the major foliar diseases. While levels of genetic resistance do not allow a total suppression of fungicide applications – the aim of this commitment is to reduce these by **gradually increasing the use of slightly tolerant/tolerant varieties**, to represent 50% of beet area by 2021 and **60% of beet area by 2025**. The **average treatment frequency index** (TFI) for fungicide would thus be **decreased by 20% from the current 1.7 to 1.36 by 2025**.

To learn more: https://bit.ly/2K55Ccu

THE CHALLENGES OF THE END OF NEONICOTINOID SEED TREATMENTS

The ban on all outdoor uses of three neonicotinoid active substances imposed in 2018 leads to challenges:

- The **soil pest complex** (e.g. springtails, symphylids and millipedes) can still **be reasonably controlled** – in low/medium pest pressure situations - by the ongoing use of the active substance tefluthrin as previously used in the late 1980s/early 1990s prior to the introduction of neonicotinoid seed treatments.
- Controlling the **leaf miner fly complex** (e.g. Pegomya hyoscyami and related sub-species) is currently limited to using foliar pyrethroids (e.g. lambda-Cyhalothrin) – which have limited effectiveness against the pests and a negative impact on beneficial insects.
- Controlling the **beet virus yellows complex** by controlling the virus-carrying aphids is particularly challenging, with - at best – one application of flonicamid permitted.

Experience shows that low levels of (or no) insecticide in the seed coating implies more post-emergence whole-area applications in years with high insect pressure than in fields sown with optimised neonicotinoid coated beet seed pellets. Future intensity and scale of post-sowing insecticide applications on sugar beet fields will depend on the possibilities of insecticide seed treatment for sugar beet and/or the development of beet varieties resistant to one or more insect pest complexes. In any case, increased monitoring of pest activity and thresholds throughout the entire crop cycle is an absolute must.


NEONICOTINOIDS IN PELLETED SUGAR BEET SEEDS: WHY SUGAR BEET GROWERS CALL FOR A SPECIFIC CONSIDERATION WITH REGARDS TO NEONICOTINOIDS

More information and update about the case for neonicotinoids in pelleted sugar beet seeds available at: www.cibe-europe.eu/PlantProtectionProducts.aspx

However, the enormous challenge posed by the extremely rapid disappearance of key active substances and plant protection products is unprecedented and represents a potential threat for both environmental and economic sustainability on the short and medium terms. **Since 2018, 9 PPP active substances have been banned for beet growing, at least another 5 are likely to disappear from the beet growers toolbox in the short term. Research is necessary to respond to beet growers' needs and provide them with alternatives. The implementation of research results needs to be urgently facilitated. Beet growers are committed to integrated approaches and the development of tools for prevention, monitoring, control and management of pests and diseases along with risk management strategies.**

4. WEED CONTROL: WEED STRESS ON BEET IS PERMANENT FOR THE FIRST PART OF THE CROP SEASON - THE SOONER ADDRESSED, THE BETTER

Sugar beet seedlings are very sensitive to weed competition (for nutrients, light, water and space). Weeds emerging within 8 weeks from crop emergence shade young beets. This can cause large yield losses: yields can be reduced by 11% or more by one tall weed (e.g. volunteer oilseed rape, fat-hen or redshank) per square meter of crop. Severe weed infestations in untreated fields can reduce yields by up to 90%. **It is therefore essential to control weeds before crop establishment, i.e. prior to beet sowing/drilling, before and after emergence of the weed.**

Throughout a major part of the crop cycle – from before sowing to shortly before crop canopy closure – weed control applications (e.g. IRS-LIZ Weed Control) provide targeted weed control advice based on **continuous monitoring** of the growth stage of the beet crop, the most common weeds with respective growth stages, soil and weather conditions before and after spraying.

STAGE	DESCRIPTION OF WEED CONTROL PRACTICES
PRIOR TO SOWING	**Prior to sowing, the stale** (or false) **seedbed method** involves creating a seedbed some weeks before the sugar beet seed is due to be sown. It stimulates weed seeds to germinate, which can then be killed off by mechanical (hoeing) or other means (flame-weeder or chemical treatment). However, this technique can only be used if weather conditions permit it, and care must be taken not to delay sowing the sugar beet later than it needs for a good growing season. **Herbicide application** is warranted for controlling perennial weeds, weeds present prior to seedbed cultivations, volunteer cereals or potatoes and black-grass.
AFTER SOWING	**A pre-emergence herbicide application straight after drilling** may be warranted – when the soil is moist - in fields where large populations of troublesome weed (e.g. black-grass, fool's parsley, mayweed) are expected. Such a treatment will sensitize the weed and give flexibility and support in timing of post-emergence sprays which need to follow.
AFTER CROP EMERGENCE	• **Post-emergence herbicide treatment** can be applied during the early stage of the predominant weeds in the field, when the weeds are more vulnerable and the uptake of active substance is optimal (low quantities of herbicide required). • **Herbicide use can also be reduced by means of mechanical weed control techniques such as inter-row hoeing or harrowing.** However, mechanical weeding between rows of beet does not solve the problem of weeds **within the rows**. • **Mechanical weed control helps reduce chemical herbicide use**, but at the same time may increase the risk of water erosion in hilly landscapes and of wind erosion on sandy soils, depending on site, weather conditions and plant development. Furthermore, hoeing may pose a threat to soil inhabiting arthropods and ground nesting birds. • **Mechanical weed control can only be used effectively following at least two early sprays** to allow the young beet plants to reach the 4 true leaf stage. It could mean saving one to two sprays (25 to 40% reduction of herbicide use). • Techniques of **combined mechanical and chemical weed control** can also be applied (e.g. band-spraying combined with inter-row hoe-steering by camera allow reducing herbicide use by two thirds; mechanical work within the row using rotary hoes or finger wheeled hoes). Nationwide trials conducted in Germany in 2014-16 confirmed that an already existing possibility to save up to 60% of the amount of herbicides used could be the **band application within rows in combination with mechanical weed control between rows.** These trials also showed that the **combination of band spraying and hoeing lowered total costs** (herbicide + hoeing including labour) by 70-100 €/ha. However, **working hours increased** by 1.5-3 h/ha, which **significantly reduced acreage performance**. In practice, some form of machine-driven mechanical weed control is carried out on some 10% of Germany's beet area. • Depending on the crop stage and weather conditions, weed control is carried out by using mechanical techniques, applying herbicides, or combinations of these. These **combined techniques** (in particular **mechanical weed control**) are being **constantly developed and improved**. Research organizations in sugar producing countries organise regularly field events to show the latest technologies. For example, the French sugar beet research Institute has already hosted 5 events known as Desherb' Avenir in 2009, 2011, 2013, 2015 (together with IRBAB in Belgium) and 2017 and will organise a 6th edition in 2019. This field event gathered thousands of participants, mainly farmers, to reflect the new developments in that matter (ex. featuring weeding robots in 2017). Similarly in Germany, the DNZ hosted a demonstration field day on mechanical weed control in 2017. 

Hoe & finger weeders


Precision spraying


Reels


Treffler Tine Harrow


Harrow with narrow herbicide band

Pictures: French Technical Institute for Beet ITB, field events during Déherb'Avenir

5. POST-ESTABLISHMENT PEST AND DISEASE CONTROL: MONITORING IS KEY

Major diseases which start hitting the crop later in the growing season include Cercospora leaf spot, Ramularia leaf spot, Uromyces beet rust and downy mildew. They are usually controlled with fungicide applications once damage thresholds identified by **local/regional leaf disease monitoring systems have been reached**. In many countries, beet growers benefits from a leaf-diseases warning service. Weekly controls are carried out on monitoring sites from July to September, and as soon as a level of infestation which warrants treatment is identified (the so-called **control or treatment threshold**), growers in the affected regions receive a control alert telling them that it is time to start inspecting their own fields. If the observed infestation exceeds the control thresholds, immediate treatment to avoid economic damage is required. Through this IPM monitoring, unnecessary preventive spraying is avoided.

SURVEILLANCE - MONITORING - DIGITALISATION

The integrated control of pests and diseases (as well as of development of weeds) tends to be part of a continuous monitoring and updating of the crop and its health status, notably with the communication of treatment/thresholds.

For example:

- In **France**, every week during the growing season (principally from April to September), the ITB (French Beet Research Institute) analyses the health status of the beet fields in the country's seven different beet growing regions based on observations made in the context of the Territorial Biological Surveillance (SBT). This analysis is published in the region-specific Plant Health Bulletin (BSV);

- In the **UK**, the BBRO (British Beet Research Organisation) publishes between 14 and 18 Advisory Bulletins per growing season (usually starting with drilling in March and ending with harvesting in November) with leaf disease alerts usually being concentrated between late June and late October.

- In **Belgium**, the IRBAB/KBIVB (Belgian Beet Research Institute) informs growers regularly (principally between June and September) on the state-of-play of foliar diseases in the beet crop, alerting when for example 90% of the fields observed have reached the treatment threshold.

- In **Denmark** and **Sweden**, NBR (Nordic Beet Research) monitors the beet crop from July to September, alerting growers to monitor their fields to determine whether the control threshold has been reached.

- In **Germany**, the Guidelines for Integrated Plant Protection in Sugar Beet Cultivation aim to contribute to limiting the use of PPPs (including chemical) to the necessary level and identifying options for non-chemical measures. They consist of:
  - **a general guideline** including preventive measures, promotion and use of natural regulatory mechanisms, determination of infestation and use of decision aids, use of non-chemical and chemical plant protection measures, resistance and control and documentation of effect of plant protection measures;
  - **five problem-specific guidelines with detailed instructions** (concerning preventive measures, monitoring methods, thresholds direct control measures, limitation to the necessary level and resistance management strategies) on diseases at emergence, soil-borne diseases, leaf diseases, animal pests (nematodes, insects, mice & slugs) and weeds.

  Consistent with these Guidelines, the advisory services provided by the sugar industry (Nordzucker's Agriportal, Südzucker's BISZ & P&L's LIZ, which can be downloaded as apps) and the nationwide web-based advisory system ISIP offer beet growers innovative programs and different information material to support decision making. They also monitor the development of leaf diseases in the sugar beet crop. A more recent development – in response to the ban on the outdoor use of neonicotinoids - is the **monitoring of insect pests in sugar beet** (using RONDO-Yellowtraps and establishing aphid control thresholds before (10% of plants affected) and after canopy closure (50% of plant affected)).

- In **Poland**, the monitoring of weeds, pests and diseases is carried out by the agricultural services of the sugar companies (in cooperation with the Institute of Plant Protection). These provide (especially via their field inspectors) information and advice via websites, text messages (sms alerts) and intranet (apps).

6. THE CHALLENGES OF ORGANIC SUGAR BEET CULTIVATION & PROTECTION

Organic sugar beet growing started in the 2000s in a context of increasing transition in some areas to organic farming and increasing demand for organic sugar beet by-products (pulp) and for organic sugar. Organic beet growing addresses all environmental issues. Organic beet area in Europe is increasing and is estimated in 2018 at around 5 000 to 6 000 ha (acreage in conversion to organic included), compared to some 1.7 million ha of conventional beet.

From a technical/agronomic point of view, organic sugar beet is a highly demanding crop, with considerable challenges for cultivation and with considerable risks of yield variability. Organic sugar beet yield is generally 30% lower than conventional sugar beet yield in normal conditions. The agrotechnical itinerary excludes the use of chemical of plant protection products and only allows the use of non-chemical substances. This itinerary includes:

CHALLENGES	DESCRIPTION OF AGROTECHNICAL ITINERARY OF ORGANIC BEET
VARIETY CHOICE	Mainly Rhizomania/Cercospora tolerant varieties, Rhizomania tolerance being the norm in conventional sugar beet anyway.
CHOICE OF THE FIELD/SOIL	Preferably fields with lower presence of pests.
STRICT CONTROL & MONITORING OF PEST	Pests such as weevils, wireworms, flea beetles, aphids represent very high risks and their control is difficult to impossible, with potentially huge losses after sowing. Of the **1 700 ha organic beet sown in Austria in 2018 less than 600 were harvested**, the major part having been lost due to damage from the beet weevil.
NUTRIENT SUPPLY ISSUE	Including intercrop choice (leguminous).
MECHANICAL/MANUAL WEED CONTROL	It represents around 150 to 300 hours of labour/ha, due to high labour costs it increases production costs/ha to high levels. Therefore, considerable innovation into new technology & automated equipment/robotics for mechanical weed control is necessary, and work is ongoing to develop technical solutions (e.g. a prototype of a between-rows and within-row autonomous weeder is being developed in Denmark). On-farm working conditions are evolving constantly and social conditions in the farming sector deserve special attention.
CLIMATIC CONDITIONS	Year-on-year yield fluctuations can be considerable (e.g. from 49 t/ha to 63 t/ha to 46 t/ha to 57 t/ha to 46 t/ha in Austria in a 5-year period). The extremely very wet conditions in 2017 were quite dramatic for organic sugar beet in Denmark, with **only 30% of organic growers obtaining sugar yields above 4 t/ha (in 2018 this threshold was reached by 90% of organic growers). In Romania some 47% of organic beet area in 2018 were lost because of climatic conditions (compared to 18% lost in 2017).**

AGRICULTURE & PROGRESS PLATFORM

CIBE and CEFS are members of the new platform Agriculture and Progress created in February 2019: www.twitter.com/AgriProgress. It advocates for the development and the application of innovation in the agricultural sector. Agriculture and Progress provides society and decision-makers in a **pedagogic way** with answers and suggestions on the needs and challenges of guaranteeing sustainable agricultural production and the important role of innovation in this context. It **works towards the development of a solid & science-based regulatory framework** that guarantees a balance between health, environmental protection, and qualitative agricultural production whilst guaranteeing the farming community an adequate level of revenue.

GOOD PRACTICES IN PLANT PROTECTION IN A NUTSHELL

IPM methods		Pests, pathogens and weeds				
		Soil-borne fungi	Leaf fungi	Insects	Weeds	Nemathodes
Non-chemical methods	Crop rotation	X	X	X	X	X
	Resistant/tolerant varieties	X	X			X
	Seed activation				X	
	Mechanical techniques				X	
Chemical methods	Seed treatment	X		X		
	PPPs sprayings		X	X	X	

EU BEET SUGAR
SUSTAINABILITY
PARTNERSHIP

OUR CROP, OUR SECTOR, OUR **SUSTAINABILITY**

www.sustainablesugar.eu

CIBE, founded in 1927, represents 300,000 sugar beet growers from 15 EU countries (Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Poland, Romania, Slovakia, Sweden, the United Kingdom) plus Switzerland and Turkey.

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CEFS is an international non-profit organisation and a recognised interlocutor for the EU Institutions since 1953, sharing knowledge and technical expertise on sugar. CEFS' membership is composed of sugar-producing companies in the EU and Switzerland.

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EFFAT results from the merger of two European federations IECF-IUF and EFAI in 2000. It represents 120 national trade unions from 35 countries, defending the interests of more than 2.6 million members in the food, agriculture and tourism sectors.

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