Briefing

Farming Sugar Beet without Neonicotinoids

February 2018

Summary

EU wide restrictions are currently in place on the use of three neonicotinoid insecticides on flowering crops due to their risk to bees. The European Commission (EC) is now proposing to extend these restrictions to all outdoor crops due to evidence that neonicotinoids contaminate the environment and so their use on any crop can result in exposure of bees to the chemical. The UK Government has stated that it would now support such an extension to the current restrictions based on the scientific evidence available. Evidence is also growing that neonicotinoids harm other wildlife and natural predators essential for plant protection, and there are some specific concerns about contamination of water arising from use on sugar beet.

In the UK most sugar beet is grown from neonicotinoid treated seeds. The sugar beet sector is predominately situated in the East of England, and the market is highly concentrated with British Sugar buying all UK sugar therefore having considerable influence over how it is grown. There is no organic production in the UK. However in Germany, Denmark and Austria organic production of sugar beet is expanding to meet a growing consumer demand.

In the UK, partly prompted by the possibility of an extended neonicotinoid ban and partly by concerns about target insects developing resistance to neonicotinoids, research is already underway to find alternative ways to protect the sugar beet crop, including varietal choice and better forecasting of any threat to the crop. This response from the sugar beet industry shows how restrictions on pesticides can fuel innovation. The EC proposals would also apply to wheat and research by Friends of the Earth has shown that many wheat farmers are already managing well without neonicotinoids. Building up an ‘army’ of natural predators to control aphids has been shown to be effective for wheat and has potential for sugar beet too. This kind of experience and advice on best practice

needs to be better shared by Government and the National Farmers Union (NFU) to help farmers adjust before, not just when, pesticide products are withdrawn.

Due to growing pest resistance alternative approaches to neonicotinoids in sugar beet need to be made available to British and other EU sugar beet farmers, irrespective of the proposed restrictions, and the Government should work with the industry in its efforts to find innovative solutions. Meanwhile there is no reason to block or delay the extension of the neonicotinoid ban to all crops – a move which is necessary to protect our vital pollinators, other wildlife and soil and water quality. In the short term a mechanism exists within the regulations for emergency use of banned pesticides when a genuine need to use the product can be proven.

Introduction/background

In 2013 EU Member States voted to restrict the use of three neonicotinoid insecticides (imidacloprid, thiamethoxam and clothianidin) on flowering crops attractive to honeybees. This followed a review of evidence[1] by the European Food Safety Authority (EFSA) which found a 'high acute risk' to honey bees when neonicotinoids are used on crops attractive to them. The current restrictions only apply for use on flowering insect pollinated crops, for example oilseed rape (OSR).

The European Commission is now proposing to extend the restrictions to most other crops, including sugar beet and wheat. Due to the way neonicotinoids persist in the soil, travel through soil and water, and are spread by dust at the time of sowing, the chemicals can end up in wildflowers next to treated crops or flowering crops grown next to or subsequent to the treated crop. This means they pose a risk even to pollinators that are not visiting directly treated crops. The UK Government recently showed its support for the proposal to extend restrictions on neonicotinoids, based on the mounting scientific evidence, and the advice of its own Expert Committee on Pesticides (ECP). The ECP's advice states that the evidence of risk to pollinators is greater than in 2013 and also outlines its concerns about the levels of environmental contamination[2] .

Concerns have been raised by the NFU and British Sugar about the restriction of neonicotinoids on sugar beet and the NFU is actively encouraging farmers to lobby against the proposed extended ban[3]. However scientists at the British Beet Research Organisation (BBRO) are taking a positive approach to finding solutions, and have already embarked on research into alternative forms of control[4]. Similar predictions about the impact of the existing restrictions on oilseed rape yield have proved groundless, and 2015 and 2017 saw bumper harvests of oilseed rape in the UK[5].

Sugar Beet is a valuable crop and is highly protected by pesticides with most of the UK crop using neonic treated seeds. The crop is vulnerable to insect

[1] http://www.efsa.europa.eu/en/press/news/130116.htm
[2] https://www.gov.uk/government/groups/expert-committee-on-pesticides#advice-to-ministers
[3] https://www.nfuonline.com/news/latest-news/farmers-urged-to-tell-mps-candidates-and-meps-how-neonicotinoids-ban-would-affect-their-farm/.
[4] http://www.fwi.co.uk/arable/can-sugar-beet-survive-a-future-without-neonicotinoids.htm.

[5] https://www.foe.co.uk/bees/oil-seed-rape-crop-yields-above-average-friends-earth-and-buglife-reaction

damage, viruses carried by insects and weed competition. In the UK the sugar beet industry uses beet from around 3,500 growers[6], it is a highly concentrated industry with one main buyer British Sugar, which controls production.

Risks arising from neonicotinoid use on sugar beet

Sugar beet is harvested before flowering reducing the direct risk to bees as they won't be foraging on the crop. However there is growing evidence of the ubiquitous contamination of the environment from the use of seeds treated with neonicotinoids.

In 2016 EFSA reviewed further data relating to use of the 3 restricted neonicotinoids on non-flowering outdoor crops, such as sugar beet, which are not currently covered by the restrictions. EFSA reviewed data for risks arising from exposure via routes other than directly feeding on a flowering crop. These included the potential for the chemical to be taken up via the soil into succeeding crops in the rotation, adjacent crops and wildflowers, or to be spread by dust drift at the time of sowing[7]. Based on EFSA's review the European Commission concluded that an unacceptable risk to bees and other pollinators cannot be excluded without imposing further restrictions on outdoor crops including sugar beet[8].

The neonicotinoid imidacloprid has been found in soil in a year when no treated seed has been used[9]. Indicating that the chemical can then be taken up by a subsequent flowering crop such as oilseed rape, after use on any other crop, or by wildflowers growing next to the crop.

Indeed, one UK study of OSR and wheat field margins found that 97% of neonicotinoids brought back in pollen to honey bee hives in arable landscapes was from wildflowers, not crops[10]. A recent study in Canada in a landscape without treated flowering crops found that environmental contamination was the main source of neonicotinoid exposure for honey bees. Neonicotinoids were associated with increased worker mortality, declines in social immunity and increased queenlessness. The authors concluded that chronic neonicotinoid exposure from contaminated wildflowers and dust from planting of non-flowering crops reduces the health of honey bee colonies[11].The largest ever field scale trials to investigate the impact of neonicotinoids on bees carried out in the UK,

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[6] https://www.britishsugar.co.uk/

[7] European Food Safety Authority (EFSA) (2016) Technical Report: Outcome of the consultation with Member States, the applicant and EFSA on the pesticide risk assessment for thiamethoxam in light of confirmatory data

[8] https://ec.europa.eu/food/plant/pesticides/approval_active_substances/approval_renewal/neonicotinoids_en

[9] Bonmatin, J.M.,*et al.* (2014), Environmental fate and exposure; neonicotinoids and fipronil. Environmental Science and Pollution Research International. 2015; 22: 35–67. www.ncbi.nlm.nih.gov/pmc/articles/PMC4284396/

[10] http://www.cb.iee.unibe.ch/unibe/portal/fak_naturwis/d_dbio/b_ioekev/abt_cb/content/e58878/e337393/e483898/e483902/Botias_EnvSciTec2015_eng.pdf

[11] https://gylle.dk/wp-content/uploads/2017/07/HoneyBeesNeonicotinoidsScience30June2017.pdf

Germany and Hungary and reported in 2017 found that environmental contamination with imidacloprid – a neonicotinoid that had not been used in the trials but was found in bee nests - increased the exposure and risk to wild bees (Centre for Ecology and Hydrology)[12]

It is not just bees that are at risk. The presence of neonicotinoids in water has not been well monitored in the UK, although monitoring started in 2015 due to an EU requirement. Analysis of official data by Buglife[13] shows that 74% of the UK sites monitored were contaminated with neonicotinoids. Chronic neonicotinoid pollution levels were exceeded in East Anglian and Lincolnshire rivers. The levels recorded are likely to have impacted significantly on the insect life of the rivers and so also reduce a key source of food for fish. East Anglia and Lincolnshire are the principal sugar beet growing areas of the UK, and were the only areas where significant amounts of Thiamethoxam were routinely found. The only current large scale UK use of Thiamethoxam is on sugar beet. The River Waveney, on the Norfolk/Suffolk border was most heavily contaminated with Thiamethoxam, the river exceeded recommended acute pollution limits.

In countries with more comprehensive monitoring widespread high levels of contamination have been found. A study in Canada found clothianidin and thiamethoxam in most of the wetlands sampled in the intensively farmed Prairie Pothole Region[14]. Additionally a study of global surface waters found that "strong evidence exists that water-borne neonicotinoid exposures are frequent, long-term and at levels which commonly exceed several existing water quality guidelines[15].

Specific research on leaching from treated sugar beet seeds in 2016 found high concentrations, enough to cause direct mortality to mayflies, of two neonicotinoids, thiamethoxam and imidacloprid in drain water "indicating that leaching from seed dressings contribute to the contamination of surface waters with neonicotinoids"[16]. Further evidence of widespread environmental contamination with neonicotinoids came in 2017 with the publication of a survey of neonicotinoids in honey (ref Mitchell et al) which found that 75% of global honey samples contained residues of these insecticides.

Currently, the growing of sugar beet covers a much lower area of the UK than wheat so is a lesser contributor to the release of neonicotinoids into the environment. However indications are that sugar beet will expand in the UK due

[12] https://www.ceh.ac.uk/news-and-media/news/neonicotinoid-pesticides-harm-honeybees-wild-bees-first-pan-european-field-study

[13] https://www.buglife.org.uk/sites/default/files/QA%20Neonicotinoids%20in%20water%20in%20the%20UK-%20final%20(2)%20+NI.pdf

[14] Maine, A. R., (2014). Widespread Use and Frequent Detection of Neonicotinoid Insecticides in Wetlands of Canada's Prairie Pothole Region. PLoS ONE 9(6): e92821. doi: 10.1371/journal.pone.0092821. http://journals.plos.org/plosone/article/citation?id=10.1371/journal.pone.0092821

[15] Morrissey, C.A., *et al.* (2014). Neonicotinoid contamination of global surface waters and associated risk to aquatic invertebrates: A review. Environmental International Volume 74, Pages 291–303. www.sciencedirect.com/science/article/pii/S0160412014003183

[16] https://www.efsa.europa.eu/sites/default/files/161115-poster-Balmer.pdf

to the end of EU quotas, at least in the short term[17], and so looks set to become a bigger contributor of neonic contamination unless the restrictions are applied to the crop. Longer term prospects for the crop are less certain as farmers become more vulnerable to global price volatility.

Extent of and effectiveness of neonicotinoid use on sugar beet

According to the BBRO UK sugar beet is heavily reliant on neonicotinoids, a reliance which is currently encouraged by the BBRO recommending seeds treated with neonicotinoids to farmers. Official pesticides statistics, based on a sample of farms, suggest that the use of neonicotinoids is not universal[18]. However the report acknowledges that there may be an underestimate in the data for insecticidal seed treatment and that there is an increase in farmers not specifying which seed treatment they are using.

The main purpose of neonicotinoid seed treatments on sugar beet is to control aphids, particularly the peach potato aphid. The aphids themselves are not a significant problem, but they spread viruses including beet yellows virus (BYV), beet chlorosis virus (BChV) and beet mild yellowing virus (BMYV). It is the viruses, and particularly BYV that are of greatest concern in terms of yield loss.

At the moment the use of neonicotinoid seed treatments appears to be effective on sugar beet, however the universal use of treated seeds is causing concern in the industry about pest resistance to neonicotinoids. Already, resistance is being found in Italy, southern France and northern Spain in peach growing areas where neonicotinoids are also heavily used for aphid control. The peach potato aphid has been found to have “a remarkable ability to evolve mechanisms that avoid or overcome the toxic effect of insecticides”.

Leaf miners can also be a problem for sugar beet farmers. In recent years the industry has been granted emergency authorisation to use additional neonicotinoid sprays (thiacloprid) against leaf miner indicating that the neonicotinoid seed treatments have not kept this insect under control.

Although the NFU and the industry warn of economic impacts of the withdrawal of neonicotinoid seed treatments– especially due to concerns about aphid control - the potential financial losses have not been reliably quantified. There are large variations between studies in the size of the losses attributed to infection in sugar beet. Many factors will influence whether a crop is actually lost due to infection including the crop variety, the strain of the virus, the time of infection, the plant’s nutritional status and environmental conditions. It is also unclear from statements made by the industry whether a threshold for damage from yellow virus has been identified – how much damage can be sustained? Various estimates of yield loss have been made, however yield loss does not equate to final financial impact. This would also depend on other factors including what alternative measures were used and any cost savings on seed treatment..

[17] https://www.britishsugar.co.uk/media/news/2017-10-01-british-beet-sugar-industry-hails-the-upcoming-deregulation-of-the-european-sugar-market-as-great-news-for-britain

[18] Pesticide Usage Statistics, arable crops, https://secure.fera.defra.gov.uk/pusstats/surveys/2016surveys.cfm

Due to concerns about resistance, as well as in response to the possible extension of the neonic restrictions, the sugar beet industry in the UK is already conducting research into alternatives (see below). Use of neonicotinoids on sugar beet is commonplace in other sugar beet producing countries in the EU but there is also an increase in organic production in Austria, Denmark and Germany (see below). The Netherlands has a pest forecasting system that is helping to reduce use of neonicotinoid, and additional restrictions are in place in Slovenia to prevent the use of certain neonicotinoids on sugar beet.

Alternatives to neonicotinoids on sugar beet

For all crops the use of Integrated Pest Management (IPM) should be standard in order to reduce risks to human health and the environment from pesticide use, as well as reducing the risk of pest resistance. This is good practice and in line with the EU's Sustainable Use Directive[19] which aims to reduce the use and impacts of pesticides. IPM should include monitoring and forecasting of threats and the use of damage thresholds to ensure that pesticides are only used when necessary in response to a known threat to the crop. A range of non-chemical approaches should be used including rotations, thresholds, natural predators and the use of resistant varieties.

Currently much of the sugar beet crop in the UK is treated prophylactically rather than in response to a known threat because seeds treated with neonicotinoids is the standard approach and are planted before the level of threat is known. This is incompatible with an IPM approach where chemical treatments should be a last resort.

A major review of neonicotinoid use in sugar beet concluded that better forecasting and monitoring in field, combined with alternative pesticides (tefluthrin was suggested) and breeding of crop varieties are the best approaches in the short term, but noted that virus resistant varieties are not yet available[20].

These approaches should be standard, but a greater sense of urgency to develop and roll them out tends to come from the threat of resistance or the withdrawal of products from the market – showing how regulation can spur innovation. For example the UK sugar beet industry is investigating better forecasting and resistant varieties. This trend has been recently acknowledged by the Defra Chief Scientist Ian Boyd: "The withdrawal of pesticides will incentivize innovations, including changes to the crops grown, cultivation methods, and new types of pesticides"[21]. Although Ian Boyd noted that "abrupt" withdrawal of pesticides can lead to problems this is not the case for neonicotinoids since the sugar beet industry has been aware for several years that the restrictions may be extended.

[19] https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides_en
[20] Haur et al (2017) Neonicotinoids in sugar beet cultivation in Central and Northern Europe: Efficacy and environmental impact of neonicotinoid seed treatments and alternative measures. Crop Protection 93 (2017) 132e142 http://www.sciencedirect.com/science/article/pii/S026121941630357X?via%3Dihub
[21] https://www.theguardian.com/environment/2017/sep/21/assumed-safety-of-widespread-pesticide-use-is-false-says-top-government-scientist

Monitoring and use of pest thresholds

IPM strategies for all crops rely on effective field-based crop monitoring to see if pests are present in fields at levels that will cause economic damage[22]. One of the problems for sugar beet farmers is that a virus can be transmitted with low levels of the peach potato aphid so a high level of control of aphids is seen as critical.

However given the concerns about resistance to insecticides it will be essential to cut their use. Pest monitoring systems and models will be vital to allow forecasts of pest populations, especially of Virus Yellows transmitting aphids. Aphid monitoring already happens in the UK but an accurate disease warning system needs to be developed. Such a system works best with insecticide sprays rather than seed treatments which tend to be bought by the farmer before the level of pest or disease threat is known.

For example in the UK this kind of forecasting requires February temperatures as an input, a time when most farmers have already bought the seeds for planting. BBRO are working on projects to improve monitoring of aphid populations and disease threat, and also undertaking research to better understand the mechanisms of insect resistance particularly to pyrethroids and neonicotinoids. A better forecasting system could help farmers to cut the use of insecticide sprays and pyrethroids sprays are available for most sugar beet pests. However there are currently limited foliar sprays available to sugar beet farmers for aphids – something that BBRO is also looking into. There are pesticides approved for other uses (including flonicamid) that could potentially control aphids on sugar beet but it would be important to establish whether these carry a lower risk to bees, other non-target insects as well as the likelihood of resistance developing and the current problems simply being repeated.

In the Netherlands a monitoring system has been developed by the Dutch Institute of Sugar Beet Research. As a result, the use of neonicotinoid treated seeds varies according to the pest threat (e.g. 72% in 2007 and 82% in 2014). However as would be expected it has been more successful at cutting insecticide sprays which are used in addition to seed treatments. This indicates that it is possible to successfully identify areas where the probable need of insecticides is low[23].

Monitoring and forecasting will be an important way to cut insecticide use on sugar beet, but the aim should be to use sprays only as a last resort with non-chemical means of control being tried first.

Resistant crop varieties

[22] http://issuu.com/pan-uk/docs/bee_factsheet6?e=28041656/44513348
[23] M. Hauer et al (2017)

Breeding disease and pest resistance into crop varieties is seen by the industry as another crucial step to tackle resistance, and could be one of the key ways for farmers to protect their crops without neonicotinoids or other potentially harmful insecticides. Parallels can be seen in wheat where research is ongoing into varieties that are more resistant to aphid attack or have greater resistance to barley yellow dwarf virus (BYDV). Varietal choice in wheat has already been successful in managing another pest – Orange wheat blossom midge[24].
There are currently no BYV-resistant varieties of sugar beet available within Europe, the situation is more advanced in the US where sugar beet lines with resistance to key viral diseases have been registered. BBRO sees the development of sugar beet resistant to virus yellows as critical. Resistance to BYV has been identified in closely related wild beet species[25] and BBRO have crossed this trait into sugar beet. In a five year project (started in 2014) BBRO aims to develop this resistance further to cross with modern breeding varieties to combine virus yellows resistance with other desirable traits such as plant vigour and sugar yield.[26] However due to the complexity of the process BBRO does not expect to have new varieties before 2023/24.

Another possible approach has been noted by Rothamsted: “Sugar beet develops mature plant resistance to aphids, producing a sticky fluid that clogs aphids up. A successful new variety could, in theory, be bred to express this throughout its lifespan. That is one mechanism by which aphids could not feed on the plant”[27]. This is an early stage development.

The research into resistant varieties is very promising but will take some time so other means of control also need to be investigated in the short term including boosting natural predators.

Natural predators and biocontrols

A recent major report on options by Game and Wildlife Conservation Trust (GWCT) set out measures farmers can take to encourage natural predators and so reduce problem insects to below economic thresholds[28]. Although the report did not mention beet specifically it does recommend encouraging hoverflies, lacewings, ladybirds, spiders, carabids, parasitoids wasps and springtails to provide natural control of aphids.

Farmers may be less confident about relying on natural predators to control insects that carry a virus, this is due to the low number of aphids needed for infection to occur. However wheat farmers have successfully used natural predators to replace the use of neonicotinoids to control aphids (which transmit barley yellow dwarf virus to wheat) and cut overall insecticide use[29].

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[24] https://www.foe.co.uk/bees/farming-wheat-without-neonicotinoids
[25] https://link.springer.com/article/10.1007/s10681-005-5231-y?no-access=true
[26] . Innovate BBRO http://www.bbsrc.ac.uk/documents/crop-livestock-disease-challenges-results-pdf/
[27] Analyses of the stomach deposit that develops in M y z u s p e r s i c a e feeding on sugar beet N . B . K I F T,1,2 F. A . M E L L O N ,3 A . M . D E WA R1 and A . F. G . D I X O N2 1IACR-Broom’s Barn, Higham, Bury St. Edmunds, 2School of Biological Sciences, University of East Anglia and 3Institute of Food Research, Norwich, U.K. Physiological Entomology (1998) 23, 347–353
[28] http://www.agricology.co.uk/sites/default/files/files/FPT%20-%20Sustainable%20Agriculture%20-%20Biological%20Control%20FULL%20REPORT.pdf.
[29] https://www.foe.co.uk/bees/farmers-champions-bees

One study described in a major review of sugar beet (Haur et al) demonstrated that in a sugar beet field trial in Germany aphid numbers in an untreated control plot were as low as in the plot using imidacloprid treated seeds and concluded that this was due to the frequent predators in these plots - showing the potential for predators to be an effective means of control.

BBRO also recognises the control provided by natural predators in advisory bulletins and videos[30]. However the use of neonicotinoid seed treatments may mean that the ultimate level of control by natural predators will not be achieved. There is increasing evidence of negative impacts of neonicotinoids on non-target organisms, resulting in less natural predators and lower yields[31] .

Commercial biological control measures (biological controls deliberately released rather than naturally present), including those based on natural predators, are not available yet. Several approaches to the use of beneficial insects against problem insects have been investigated, but they have not made much progress for in-field useField based biological controls have had limited success compared to crops in laboratories or enclosures.

Better farm hygiene and crop rotations

In sugar beet, where the beet itself is the most important reservoir of infection, elimination of overwintering plants is important. This is crucial along with resistant varieties and rotations for Beet cyst nematode control. To reduce infections farmers should ensure the physical separation of root crops and autumn-sown seed crops, rigorous hygiene of root clamps and removal of groundkeepers left after harvesting.

Sugar beet are already usually part of a crop rotation and many agronomic and supply chain factors will be part of the decision-making process. Diversifying and increasing the crop rotation would be a beneficial approach to reduce risk of disease.

Intercropping

Intercropping involves companion planting where crops are under sown in the field with the main crop for a variety of functions including weed suppression, nitrogen fixation or soil condition. Trap cropping involves planting a crop that will divert herbivorous insects away from the main crop.

Intercropping to reduce insect damage has been tested with sugar beet in some regions. An Egyptian study of intercropping of maize, bean, cabbage and toxicants on the population levels of some problem insects and associated

[30] For example: https://twitter.com/BBRO_research/status/923840707118424064
[31] For example see http://dx.doi.org/10.1111/1365-2664.12372 and http://phys.org/news/2016-12-common-insecticides-riskier-thoughtpredatory.html#jCp

predators in sugar beet plantations showed the rate of infestation was higher in the sole sugar beet plants than in those intercropped [32]

Intercropping (companion crops) has proven benefits to soil and seems to have good potential for helping reduce pests. The use of companion cropping and trap cropping is an area which would benefit from more research.

Organic sugar beet production

There are currently no organic sugar beet growers in the UK. However organic beet was grown in the UK in the past and the end of production seems to be based on a decision by British Sugar not to buy organic beet rather than farmers giving up on organic production. Organic Farmers and Growers (a UK certification body) suggested past UK organic producers would have used common organic approaches including crop selection, crop rotation, fertility build, inter-cropping, establishing insect predator habitat[33].

Elsewhere in the EU organic sugar beet production is increasing showing that it is possible to produce sugar beet without neonicotinoids. Nordzucker, a German based sugar company, has made contracts for the first organic sugar beet in 2017, and to market the first volumes of organic beet sugar in 2018. Nordzucker is responding to a steadily rising demand for organic sugar over several years[34]. Nordic Sugar pays almost twice as much for organic beets than it does for non-organic making this a good opportunity for farmers[35] .

Germany and Denmark are considered to have good conditions for organic sugar beet production[36]. Organic sugar from beet has been produced in Austria since 2008 for sugar company AGRANA. During the first growing season around 300 hectares of land was cultivated by around 80 farmers but these more than doubled in a few years37.

Conclusions

The evidence shows that neonicotinoid seed treatments on non-flowing crops present a high risk to bees, there is also evidence that treated sugar beet is a particularly high risk to freshwater life.
The NFU and British Sugar are raising concerns about farmer's ability to grow sugar beet without neonicotinoids. However, predictions of widespread crop

[32] Effect of intercropping of maize, bean, cabbage and toxicants on the population levels of some insect pests and associated predators in sugar beet plantations https://www.researchgate.net/publication/257737043_Effect_of_intercropping_of_maize_bean_cabbage_and_toxicants_on_the_population_levels_of_some_insect_pests_and_associated_predators_in_sugar_beet_plantations
[33] Personal communication between OFG and Vicki Hird conducting research on behalf of Friends of the Earth.
[34] https://www.nordzucker.de/en/company/news-media/view/article/nordzucker-enters-the-organic-segment.html
[35] http://cphpost.dk/news/beet-it-denmark-soon-you-can-have-an-organic-sweet-tooth.html
[36] **https://www.internationalsugarjournal.com/tag/sugar-beet/**
[37] http://www.agrana.com/en/sustainability/planet/production/agranas-organic-products/organic-wiener-zucker/

failure as a result of the existing restrictions on neonicotinoids proved to be unfounded. Good oilseed rape yields have been achieved in the UK since the partial ban, and predictions for economic losses in sugar beet have not been reliably quantified. The prospect of the extension to the ban combined with concerns about aphid resistance to neonicotinoids has already prompted industry led research into alternative ways to protect the sugar beet crop. These are focussed on proving forecasting and monitoring of aphids so farmers can be better informed about the actual threat to the crop, and the development of crop varieties that are resistant to beet yellowing virus. In wheat crops aphids can be controlled by natural predators and this should also be further investigated and encouraged for sugar beet. Although there is currently no organic production of sugar beet in the UK, organic production is expanding in Austria, Germany and Denmark to meet a growing consumer demand showing that sugar beet can be produced without bee harming insecticides.

More solutions should soon be available to British sugar beet farmers, and the Government should support the industry to step up efforts to make this happen. In particular it should finance trials for monitoring and forecasting of actual threats to the crop and ensure tools are made available to farmers. For all crops Defra should ensure that farmers have good advice about maximising non-chemical controls such as natural predators and fund research into innovative approaches such as companion cropping. As solutions for sugar beet farmers are developed there is no reason to block or delay the extension of the neonicotinoid ban to all outdoor crops - a move which is necessary to protect our vital pollinators, aquatic invertebrates, and other wildlife. A mechanism exists within the regulations for emergency use of banned pesticides to be allowed when a genuine need to use the product can be proven.

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