30 June 2015

Annex A

Further information on the case for emergency approval of neonicotinoid-based seed treatments

Executive Summary – a highly targeted approach

To limit the area for which emergency use approval would be available, a single county showing the greatest leaf damage, larvae presence and TuYV presence has been identified. National Farmers Union is therefore applying for an emergency use approval to cover Suffolk only, which represents 5% of the OSR crop area.

The data gathered and presented at 3.2 below estimate that a total of 54% of England's current 634,000 Ha OSR crop is under threat with another 25% at risk.

The future level and location of damaging attacks by CSFB is not predictable. However, the level of impact shown by the Suffolk data gives the opportunity to identify a very limited geographical area but one that would clearly benefit from availability of treated seed for the coming season. **Controlled use of the seed would be further ensured by proposing a maximum total volume of seed that would be treated**, up to 132,648kg, based on the planting rate of 4kg/Ha. Specifying Suffolk only would give the simplest and most controllable form of seed distribution, and would also provide a clear area for comparison with neighbouring untreated areas of very high threat.

It should be remembered that both products (Cruiser OSR and Modesto) were fully approved by the UK regulatory authority and included approval by the ACP as both were containing new active substances for first approval in the UK. Effective stewardship schemes for both products were in place during approval period without any incident.

The application for emergency use of both products has alluded to the extent of the pest problems in winter oil seed rape crops across England and need for effective control of both Cabbage stem flea beetle (CSFB) (*Psylliodes chrysocephala*) and Peach-potato aphid (*Myzus persicae*) which is the vector for turnip yellow virus, TuYV.

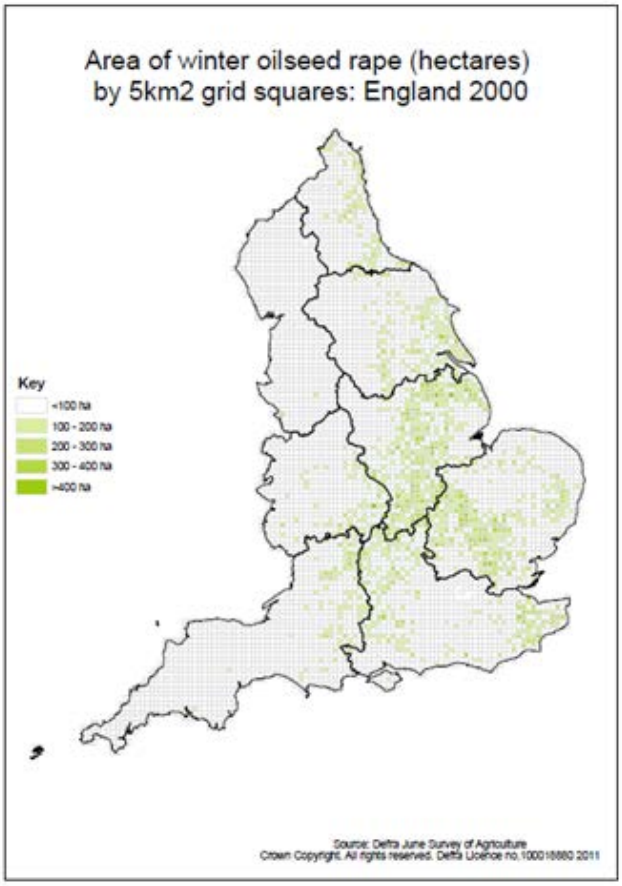
The prevalence of both pests in the major oilseed rape growing areas of England, the lack of effective foliar insecticides for use in the autumn, and an increasing issue of insecticide-resistance underlines the very real need for effective seed-treatment products to be available in areas at risk from either or both pests.

In this application we highlight the damage already caused by CSFB, the risk from CSFB larvae still within the 2014/15 crop, and the critical need for the control of Peach-potato aphid. As a result, the area of the country at risk is considerably wider than that under threat from early season CSFB damage alone.

1. Oil Seed Rape Crop

Oil seed rape is grown throughout the UK and currently accounts for approximately 730,000 Ha of which 650,000 Ha is treated with crop chemistry in order to control insect pests, diseases and weeds.

The drilling date of the crop will fluctuate annually depending on location and climatic conditions of the season; however the period will generally commence with early drilling in the last week of July/first week August. Based on information from ADAS, we estimate 15% of the crop will be drilled in this period and complete drilling finished by mid-September.



In order to establish crops before the onset of difficult winter conditions growers are under pressure to drill OSR crops as early as possible. In order to minimize pest attacks they should be drilling crops later in the season. From the growers perspective it would not be practical to drill crops late, so they are stuck with early drilling in order to maximize establishment and eventual crop yields.

The national location of the UK oil seed rape crop is wide spread throughout England (see figure below)., Note that there is an additional 5,000 Ha of OSR in Wales, 35,000 Ha in Scotland and 1,000 Ha in Northern Ireland.

2. Pest background

2.1 Cabbage stem flea beetle (CSFB) (*Psylliodes chrysocephala*).

The most important flea beetle pest of autumn drilled oilseed rape. Historically this pest was regarded as being most common in the southern part of Britain and even if it is now more widely spread, it remains more common in some areas than others. Data from Crop Monitor shows that in the 2013 / 14 season, the East and North of England had the highest populations, although there is a considerable variation in population from season to season.

It is generally recognized that early sown crops in mild autumns are the ones most vulnerable to damaging attacks by CSFB. The adults move onto emerging OSR crops in late August early

September. Feeding causes shot hole damage on the cotyledons and first true leaves. Where populations are large they can kill plants potentially causing total crop loss.

Eggs laid in the autumn hatch and the larvae tunnel into leaf petioles where they feed, and later in spring, they move into the main stem near the growing point. Larval damage however was historically regarded as the most serious threat to crop yields, with 5 larvae per plant equating to a yield loss of 0.34 t / ha. This was based upon using an effective spray programme compared with not using insecticides.

Control of CSFB has traditionally been obtained through the use of neonicotinoid based seed treatments and through the application of pyrethroid based foliar sprays. Spray thresholds are based upon incomplete data and suggest that treatment is required if more than 25% of the leaf area at 1 -2 true leaves has been eaten by adults or more than 50% if the crop is at 3-4 true leaves. Treatment for larvae is based upon finding 2 or more larvae / plant in a random sample collected in late October or where 50% of petioles are damaged.

2.1.1 Insecticide resistance

The first recorded cases of insecticide resistance were reported from Germany and published in Pesticide Biochemistry and Physiology in 2013. Following the publication of this paper Syngenta conducted a limited assessment of cabbage stem flea beetles from three trials sites and this data has been sent to CRD and IRAG. The survey was based on a relatively small sample (circa 10 beetles / site) of beetles taken in the autumn of 2013.

Resistance to Pyrethroids in the UK in cabbage stem flea beetle.

Sampling location	% of ADULT beetles with kdr mutation (homozygous for L1014F)	% of LARVAE beetles with kdr mutation (homozygous for L1014F)
Dullingham, Cambridge	100%	40%
Feltwell, Norfolk	10%	30%
Ousden, Suffolk	50%	-

With the removal of the option of neonicotinoid based seed treatments during season 2013/14, there is increased evidence of insecticide resistance with high levels of crop damage devastation even in crops where multiple foliar insecticide applications have been made. The lack of availability of neonicotinoid based seed treatments with the continued widespread use of pyrethroids over many seasons will only serve to increase the risk of resistance developing in further species. In this respect kdr (knock down resistance) resistance and more recently metabolic resistance has been identified in cabbage stem flea beetle (reference- [redacted] Rothamsted Research, report to IRAG, March 2015)

In the autumn OSR is also attacked by other types of flea beetles. Probably the most important of these is the Wessex flea beetle (*Psylliodes luteola*), but Turnip flea beetles (*Phyllotreta cruciferae* and *P. nigripes*) can also cause problems in autumn drilled crops. There are no known cases of insecticide resistance in the UK in these pests but with the widespread use of pyrethroids over many seasons there is a possible risk of resistance developing in these pests as well.

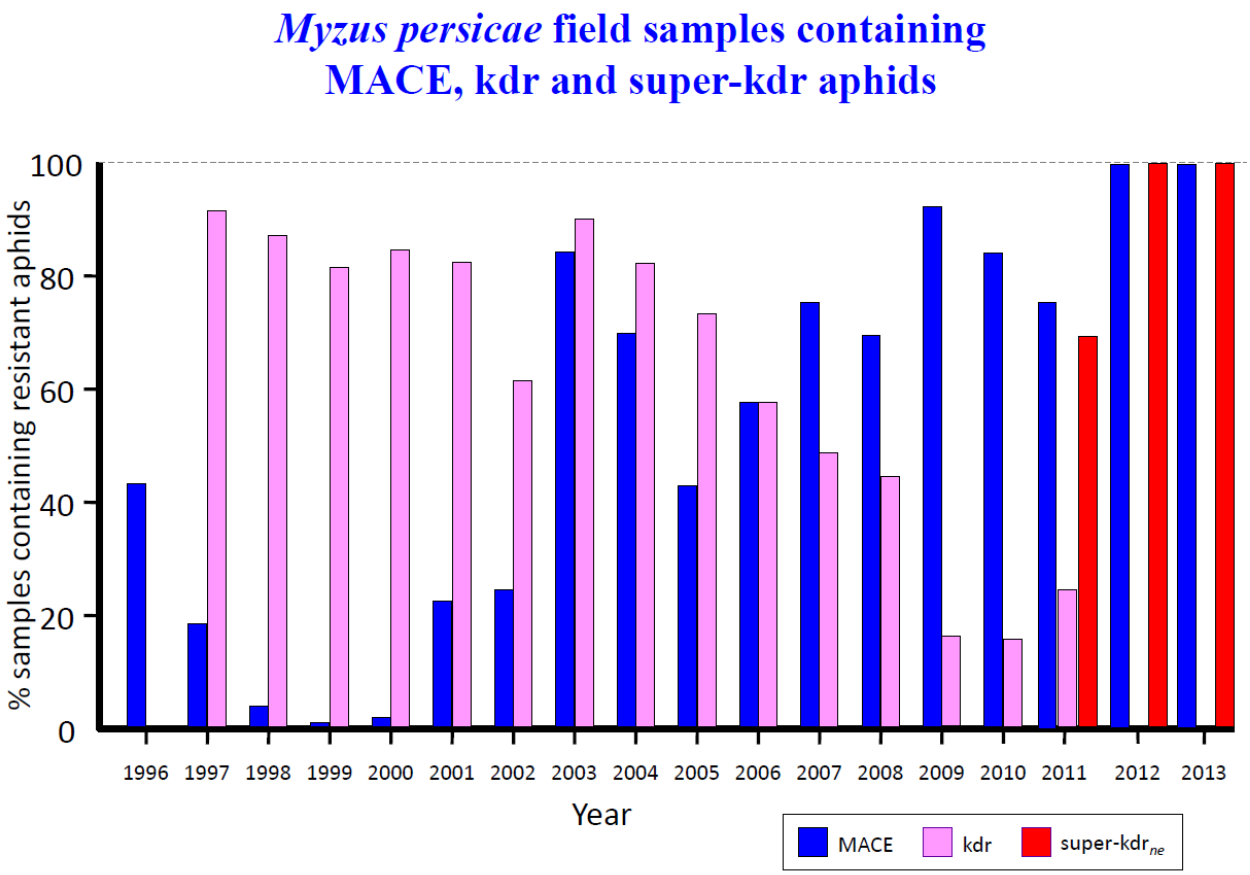
2.2 Peach-potato aphid (Myzus persicae) – the vector for Turnip Yellows Virus (TuYV)

An unusual feature of this species is that it is able to live on a number of host plants. It is also the vector for a number of important plant viruses including Turnip Yellows Virus (TuYV), which affects oilseed rape. This was previously known as Beet western yellows virus. Peach-potato aphids can occasionally occur in numbers large enough to kill seedling oilseed rape plants but the main problem for growers is usually the fact that Peach-potato aphids are the main vectors for TuYV. There is some dispute about yield losses associated with TuYV infection in the UK; in the literature losses of up to 30% are quoted. The average yield loss according to HGCA is around 15% in an untreated crop.

The level of TuYV infection varies from season to season in part because the percentage of aphids carrying the virus varies as does the number of aphids per season. Work carried out at Brooms Barn for HGCA shows that early infection (September / early October) has the greatest effect on crop yield. Where infection occurs later in the season the effect on crop yield is less. The work conducted by Brooms Barn for HGCA also showed that there were some varietal differences in susceptibility to TuYV but none were immune. Trials work on ten different varieties also showed that with all but one variety the use of a neonicotinoid based seed treatment improved yield compared with an untreated crop.

2.2.1 Insecticide resistance

In the UK Peach-potato aphids are known to carry multiple forms of insecticide resistance. Field samples of aphids assessed by Rothamsted Research in 2013 showed that all of the Peach-potato aphids tested carried MACE resistance and Super kdr (ne) the new form of kdr resistance which has replaced the “old” form of kdr resistance in the Myzus population. The data is presented in the table below produced by [redacted] Rothamsted Research.



Historically populations also carried genes which gave resistance to organophosphate products (esterase resistance), these are now uncommon. This is because this group of products is now little used in the UK and aphids with esterase resistance suffer a significant biological disadvantage in the absence of these products. Resistance to the neonicotinoids is also known but so far only in some parts of Southern Europe.

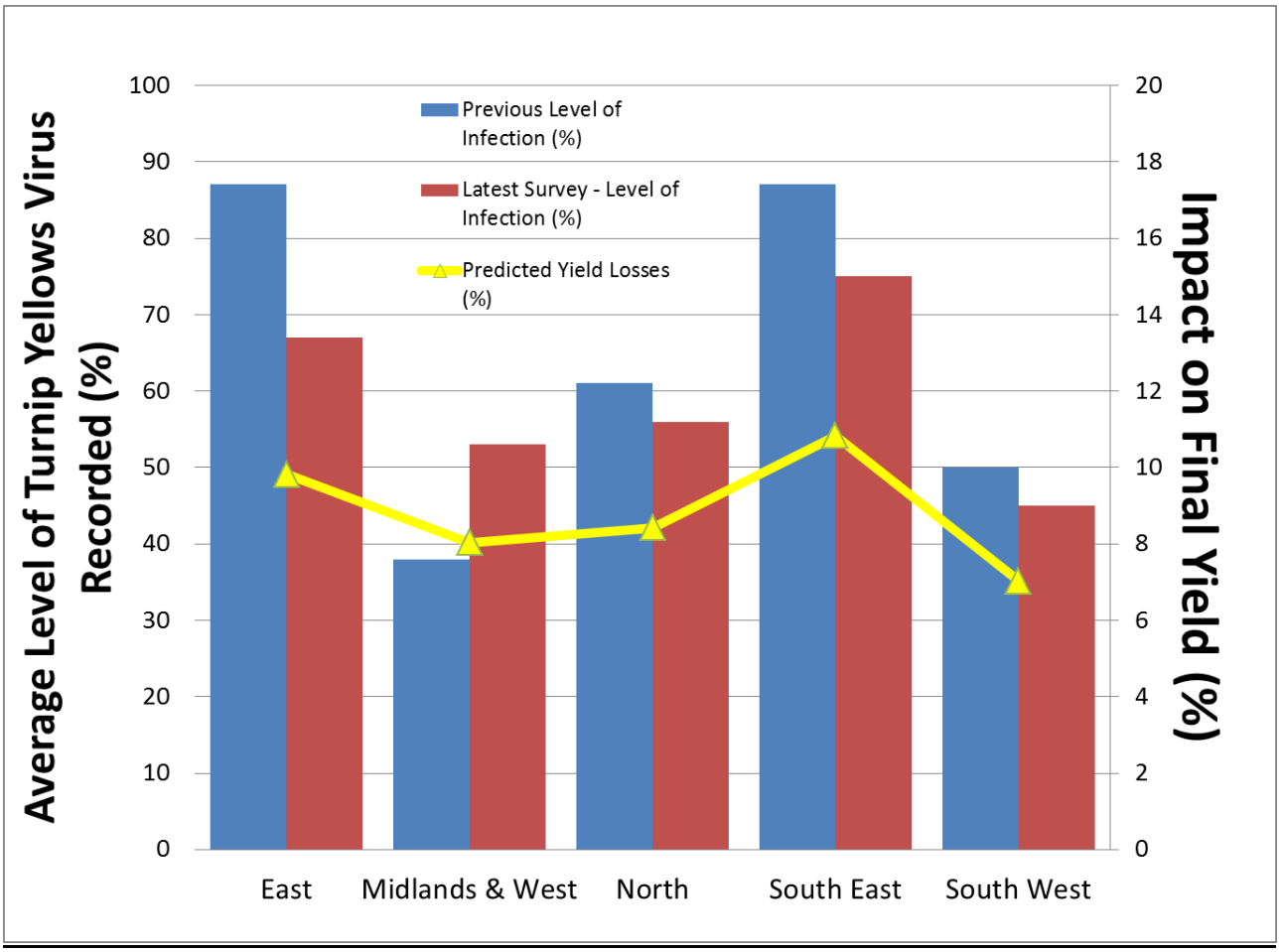
The chemistry available to control Peach-potato aphids in arable crops is now limited (due to kdr, super kdr and MACE resistance) with pymetrozine, flonicamid and thiacloprid probably being the most useful, especially as resistance to these has not been shown in Northern Europe. However, both products have an approval for only one application in the autumn to OSR.

2.2.2 Updated information on TuYV

As indicated in the application data are being gathered on the presence of TuYV in the 2014-15 crop in England. These data have been are summarised in the attached report:

> Title: Report on the sampling of commercial winter oilseed rape fields for the presence of turnip yellows virus (TuYV) in spring 2015
> Authors: [redacted] Bayer CropScience Ltd, Cambridge

A total of 87 different fields across England and 2 in Scotland were sampled in March and April 2015. Overall the results below confirm that there are high infection levels of TuYV across the country including areas where CSFB is less prevalent. The results are presented below as a regional prevalence and an estimate of the potential yield loss due to TuYV is also provided.



2.2.3 Conclusions on TuYV results in 2015

The principal vector of TuYV is the peach potato aphid (*Myzus persicae*) and the number and diversity of insecticides approved to control this pest is now limited.
The available and effective aphicides (principally thiacloprid, flonicamid and pymetrozine) are limited to one application each in the autumn so the timing of the aphicide application is critical. Work conducted in 2007-08 in England ([redacted] 2009) demonstrated that in unprotected OSR crops, a mean of 40% of plant became infected with TuYV by early October within 3 weeks of crop emergence.

[redacted] 2008, reported that in 4 trials where TuYV ranged from 21%-100%, the yield penalty in untreated crops was 12% in comparison to crops treated with Modesto (clothianidin + beta-cyfluthrin). In a wider ranging review of the importance of turnip yellows virus for the HGCA Research Review 69, [redacted] June 2008, commented on the impact the virus on yield and concluded:

The data collected from commercial crops in the spring of 2015 demonstrated that the spread and potential economic importance of TuYV in the national winter oilseed rape crop is far greater and more widespread than that currently being experienced from the infestation and reduced control of cabbage stem flea beetle. The use of an effective neonicotinoid based seed treatment is the most effective way of preventing a reoccurrence of such a widespread infection of the virus across the whole arable areas of the UK and particularly in England. Thus it is concluded that an emergency approval for neonicotinoid based seed treatment should also be based on the need to control aphids and take consideration of the area at risk from this pest given the limited availability of effective foliar aphicides.

3. Justification for the cropping area requiring an emergency approval

3.1 Use of Cruiser OSR and Modesto in 2015 – Emergency Derogation

Should an emergency derogation for the use of Cruiser OSR and Modesto be received for the 2015 autumn season, clear and precise recommendations need to be put in place to ensure the availability and correct use of the product in the most “at risk” locations.

3.1.1 Early Drilling Situations

Information from ADAS, based on Crop Reports indicates that in a “typical season” around 30% of the National OSR crop will be drilled by the end of August and that by the middle of September approximately 80% will be in the ground. Clearly there can be seasonal differences driven by the weather conditions encountered during the late summer and early autumn.

When considering the VERY early drilled crop, approximately 15% of the national crop will be drilled during the last week July and the first week August – 97,500Ha.

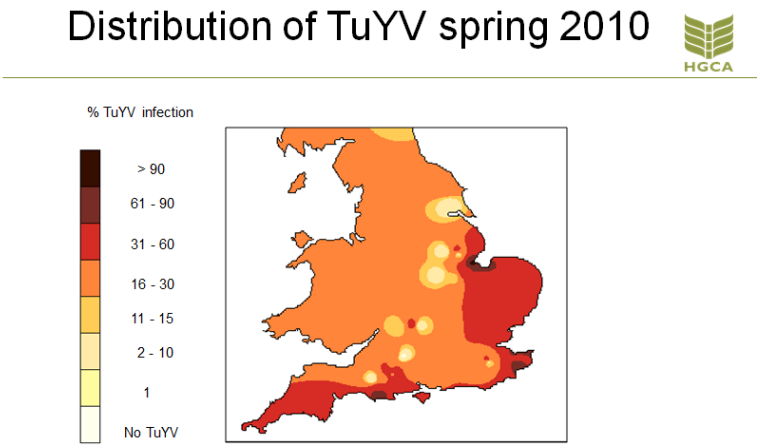
With both CSFB and Peach-potato aphids transmitting TuYV it is clear that early sown crops are at most risk of damage from these pests. The experimental work at Brooms Barn [redacted] for the HGCA (RD-2008-3498) demonstrated that where early infection with TuYV occurred, the greatest adverse effects on yield were observed. The available technical literature supports the idea that early drilled crops in mild autumns are the ones at most risk from CSFB attack.

In order to help growers protect early drilled crops, the ones at most risk from TuYV damage and CSFB attack, the use of Cruiser OSR and Modesto-treated seed must be available for crops in Suffolk that may be drilled from as early as end of July.

3.1.2 Proximity to Potato Crops

The proximity of the OSR crop to potatoes has significance when considering the green bridge effect for *Myzus persicae* and thus the transmission of TuYV. As the host plants for this aphid species are vast, when the principle hosting potato crop is burnt down at the end of the season, the aphids will move onto another host nearby. So emerging OSR will be at risk where the cropping consists of both a large area of potatoes followed by an early cropping of OSR allowing the *Myzus persicae* population to move from one crop to the next.

Data generated [redacted] for the HGCA (RD-2008-3498) shows that the key infections areas of TuYV (see below). The counties relevant to consider with regards to TuYV green bridge effect are Norfolk and Lincolnshire, both of which have a high proportion of potato hectares grown (13,000ha and 12,000Ha respectively).

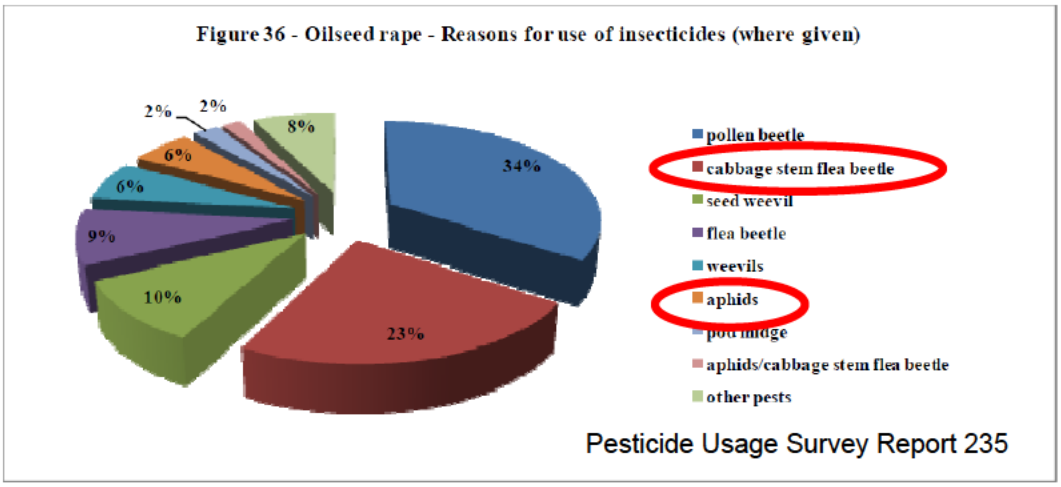


When considering the TuYV above and overlaying with OSR area, the key counties are Norfolk with 35,000ha and Lincolnshire with 75,000ha, a total of 110,000ha cropped OSR (the additional high TuYV areas – Kent and Cornwall are not considered to be large OSR areas and therefore are not at risk).

3.1.3 High Risk Flea Beetle Areas

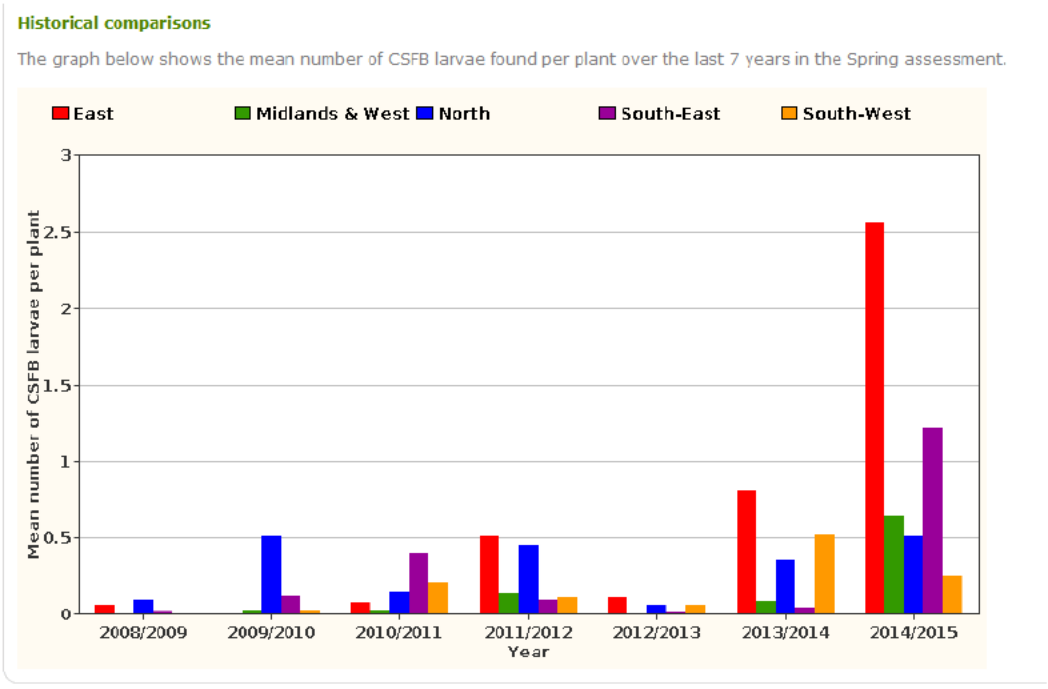
The difficulty in understanding and predicting those areas likely to have high levels of flea beetle has previously been discussed. Had the 2014/15 Emergency Use Approval been given, the problems seen in the east and south east of England would not have been prevented. However, undoubtedly lack of control this season means that the potential pest pressure for the 2015/16 season will only increase. The levels of CSFB larvae in the current crop is testament to this.

Flea Beetles, with particular reference to the resistance within the CSFB populations are now considered to be of the top insect pest issue for OSR growers in the UK with very few chemical products to control infestation levels.



In the 2014/15 planting season a number of studies have examined the impact of CSFB on the establishment of the OSR crop in the UK. Studies from the HGCA and independent research organizations have demonstrated that CSFB populations impacted crop establishment. Critically and as expected the majority of these areas demonstrated increased plant establishment when the OSR seed has been treated with a neonicotinoid seed treatment.

The prevalence of CSFB in the 2014/15 crop is further demonstrated from Crop Monitor data for larvae - essentially showing an explosion of CSFB in the 2014/15 season compared to historic data (http://www.cropmonitor.co.uk/wosr/surveys/wosrPestAssLab.cfm?year=2014/2015&season=Spring)



3.2 Proposal for The Use of Neonicotinoid seed treatments in OSR 2015

The table below attempts to aggregate much of the data on early season damage by CSFB, the presence of CSFB larvae causing on-going yield losses, and the presence of Turnip Yellows virus in the crop. As can be seen, a total of 54% of England's current 634,000 Ha OSR crop is under threat (in red) with another 25% under risk (in orange). **In order to target the areas under the very highest threat with a very limited provision of treated seed, the NFU seeks emergency use authorisation for Suffolk only, amounting to 5% of the crop area.** From the data it is apparent that Suffolk has active and prolific populations of CSFB that are not adequately controlled by existing management options. As a result, future OSR crops in this county are under significant threat in autumn 2015 unless treated seed are used.

Controlled use of the seed would be further ensured by proposing a maximum total volume of seed that would be treated, up to 132,648kg, based on the planting rate of 4kg/Ha. Specifying Suffolk only would give the simplest and most controllable form of seed distribution. It would also provide a clear area for comparison with neighbouring untreated areas of very high threat. Depending on actual pest pressures, this could generate valuable data to assess the impact of the restrictions.

County	Crop area (1) (ha)	Damage by Flea Beetle (2) (County / trials data) (Avg % leaf area loss at 3-4 leaf stage)	Damage by Flea Beetle (3) (Regional survey data, Area >25% damaged, disaggregated)	Presence of Larvae (4) (CropMonitor, compared to prevous seasons, disaggregated)	Presence of TuYV (5) (% of leaves tested)
Grand total	634,000				
Bedfordshire (E)	5,361		25	Very High	
Berkshire (SW)	9,020		0	High	
Buckinghamshire (SE)	8,253		25	Very High	80
Cambridgeshire (E)	40,997	18	25	Very High	82.6
Cheshire (NW)	2,395		0	Low	87.5
Cornwall (SW)	4,426		0	Low	45
Derbyshire (NW)	1,636		0	Low	
Devon (SW)	3,229		0	Low	
Dorset (SW)	10,165	2	0	Low	
Durham (NE)	8,426		0.5	Low	
East Sussex (SE)	7,427		25	Very High	
Essex (E)	20,560	6	25	Very High	70
Gloucestershire (SW)	4,965		0	High	
Hampshire (SE)	35,705		25	Very High	63
Hereford and Worcester (WM)	11,305		0.5	High	42.5
Hertfordshire (E)	7,169	40	25	Very High	
North Humberside (Y&H)	25,594		3	Low	
South Humberside (Y&H)	9,077		3	Low	
Kent (SE)	15,061	1	25	Very High	72.1
Lancashire (NW)	803		0	Low	75
Leicestershire (EM)	13,972		4	High	
Lincolnshire (E)	77,535	3	25	Very High	73.6
Merseyside (NW)	1,611		0	Low	
Norfolk (E)	39,896	0	25	Very High	37.5
North Yorkshire (Y&H)	33,103	1	3	Low	55
Northamptonshire (EM)	27,276		4	High	37.5
Northumberland (NE)	14,457		0.5	Low	25
Nottinghamshire (EM)	18,377	2	4	High	100
Oxfordshire (SW)	18,908		0	High	36.7
Shropshire (WM)	13,393	1	0.5	High	73.3
Somerset (SW)	5,551		0	Low	
South Yorkshire (Y&H)	7,056	3	3	Low	60
Staffordshire (WM)	6,992		0.5	High	80
Suffolk (E)	33,162	64	25	Very High	70.7
Surrey (SE)	1,479		25	Very High	
Warwickshire (WM)	16,401	1	0.5	High	60
West Midlands (WM)	376		0.5	High	
West Sussex (SE)	1,911	2	25	Very High	
West Yorkshire (Y&H)	7,173		3	Low	85
Wiltshire (SW)	19,178		0	High	32.5
Total under Threat	**343,649**				
Total under Risk	161,560				

(1) GKF Kynetec data – 2015 (2) Country Trials data – Syngenta (3) HGCA Data, split out from regional data (4) Crop Monitor Data, compared to previous years' experience, split out from regional data

3.3 Granting an Emergency Use Approval would not be setting a Precedent

There are already a number of emergency approvals for both clothianidin and thiamethoxam-based seed treatments granted by other member states under Article 53 of Regulation (EC) No 1107/2009.

Estonia	9th of March to 6th of July 2015
Finland	3rd of March to 30th of June 2015
Denmark	1st of May to 31st of August 2015

These are countrywide approvals with restrictions based only on date during which the approval is valid, and that the approvals are for treatment of seed within the country in question.

4. Stewardship of area to be treated.

The difficulty in understanding and predicting those areas likely to have high levels of flea beetle has previously been discussed. However, acknowledging that article 53 of regulation EC1107/2009 refers to 'limited and controlled use', but for which there is no definition, , an appropriate geographical delimitation to the scope of the approval should be determined. In the case for the total area to be treated it is emphasized that a significantly larger area of the UK crop is at risk when the impacts of the lack of effective control of aphid vectors of TuYV is also considered. Based on the data set out above, we estimate that 79% of the OSR crop in England is either at risk or under threat. **The National Farmers Union is applying for an emergency use approval to cover those areas under the very highest danger i.e. for use on fields in the county of Suffolk only, 5% of the English OSR crop. The maximum amount of seed that will be treated will be 132,648kg, based on the standard planting rate of 4kg/Ha.** This provides a further demonstration of the logistical limitations on the proposed use of treated seed.

4.1 Product stewardship and controlling adherence to the emergency use guidelines

As previously discussed, effective stewardship schemes for both products were in place during the approval period without any incident. On this basis the question has to be asked as to why additional, stewardship should be required over and above an agreement to be reached on the crop area to be treated under the emergency approval. Both companies have control of where the product is supplied to and the conditions by which the seed is treated and sold on but not precisely how and where it is sown by the growers, apart from within the Suffolk county boundaries.

Both companies' seed treatment products are only supplied to a relatively small number of specialist companies who are treating the seed for direct supply to growers, or seed suppliers.

Additional information is available from Bayer (seed treatment engineers) that enables the identification of the specific locations of seed treatment machinery used to treat oil seed rape in England. Additional information is available from Syngenta detailing the limited number of specialist companies that were treating the seed for direct selling to seed suppliers or growers. During seasons in which Cruiser OSR was commercially available Syngenta enforced and monitored a comprehensive product stewardship plan at all commercial locations treating OSR. This will clearly be made very much simpler with the much smaller amount of seed being treated under an emergency use authorisation.

Thus controls over the supply of product into the trade are relatively straight forward and fully traceable. Further evidence of where the treated seed has been grown is obtainable from the sales records of treated seed held by the treater. It is proposed that the conditions of sale of both the Bayer and Syngenta seed treatment products includes a requirement that the details of all customers purchasing neonicotinoid treated OSR are kept by the organisations selling directly to the grower or where appropriate wholeselling to seed retail organisations. All transactional information must be held for a minimum of 12 months and made available upon request.

All rape seed is provided to growers in bags of approximately 8kg. These bags also have a seed tag stitched into the seam which contains the relevant seed treatment product information. To ensure seed is not sown in areas outside of the permitted use it is proposed that both companies would add additional text (exact wording to be agreed with CRD) to this effect.

e.g. Seed treated with [product], in accordance with the approved use of this product seed must only be sown within Suffolk. Any use outside the Suffolk county boundary is not approved and would therefore be considered as being "illegal use".

To ensure that this detail is captured and traceable all retailers of treated OSR seed will be required to record the following parameters:

1. Location of grower and intended planted area
2. Number of units sold (thereby determining the intended planted area)
3. Variety and seed treatment information
4. BASIS qualified agronomist's recommendation for treated seed in each field where the products may be used

Moreover, it is expected that the grower signs a stewardship agreement at point of purchase which will state the exact use restrictions granted for appropriate use of the products as determined by the CRD. This documentation will be kept by the retailers for a period of 12 months and made available on request.

5. Appendix – information provided with the initial application, 14 April 2015

Oil seed rape is grown throughout the UK and currently accounts for approximately 634,000 Ha of which 609,000 Ha is treated with crop protection products in order to help control damaging insect pests, diseases and weeds.

In order to establish crops before the onset of difficult winter conditions growers need to drill OSR crops as early as possible even though this is counter to the agronomic practice of later season drilling which would be best suited to minimize pest attacks. Earlier drilled crops with more developed roots systems are better equipped to survive the severe pigeon damage that occurs in many crops over-winter. The drilling date of the crop will fluctuate annually depending on location and climatic conditions of the season, however the period will generally commence with early drilling in the last week of July and first week of August.

The two key pests which can have a devastating impact on the OSR crop are Cabbage stem flea beetle (CSFB) *(Psylliodes chrysocephala)* and Peach-potato aphid *(Myzus persicae)*.

Cabbage stem flea beetle (CSFB) *(Psylliodes chrysocephala)* is the most important flea beetle pest of autumn drilled oilseed rape and is now widely spread in the UK although still probably more common in some areas than others. HGCA Crop Monitor data shows that in the 2013 / 14 season the East and North of England had the highest populations. Data currently being compiled from the 2014/15 season shows a dramatic increase in CSFB levels across the UK compared to 2013/14, whilst there are still regional differences with the East and South East showing the highest levels. Adult CSFB are present in the soil as the OSR seedlings germinate and can cause damage even before the seedlings emerge resulting in thinner crop stand. Whilst OSR is capable of compensating for missing plants the following spring, thin crops however, are far more attractive to foraging flocks of pigeons in the winter. None of the available foliar insecticide sprays can prevent this pre-emergence damage caused by adult flea beetles.

(http://www.cropmonitor.co.uk/wosr/surveys/wosrPestAssLab.cfm?year=2014/2015&season=Spring)

The results also show considerable variation in population from season to season but it is generally recognized that early sown crops in mild autumns are the ones most vulnerable to damaging attacks by CSFB.

The adult beetles move onto emerging OSR crops in late August or early September and both adults and their larvae are responsible for damage leading to yield reduction or even total crop failure. Larval damage was historically regarded as the most serious threat to crop yields, with 5 larvae per plant equating to a yield loss of 0.34 t / ha. This was based upon using an effective spray program compared with not using insecticides.

More recently control of CSFB has been obtained through the combined use of neonicotinoid based seed treatments and the application of pyrethroid based foliar sprays. However, with the removal of the option of neonicotinoid based seed treatments during season 2013/14 increased evidence of insecticide resistance has been observed with devastation even in crops where multiple foliar insecticide applications have been made. The lack of availability of neonicotinoid based seed treatments with the continued widespread use of pyrethroids over many seasons will only serve to increase the risk of resistance developing in further species. In this respect kdr resistance and more recently metabolic resistance has been identified in cabbage stem flea beetle (reference- [redacted] Rothamsted Research, report to IRAG, March 2015)

Peach-potato aphids can occasionally occur in numbers large enough to kill seedling oilseed rape plants but the main problem for growers is usually the fact that Peach-potato aphids are the main vectors for Turnip Yellows Virus (TuYV). There is some dispute about yield losses associated with TuYV infection in the UK; in the literature losses of up to 30% are quoted. The average yield loss according to HGCA is around 15% in an untreated crop.

The level of TuYV infection varies from season to season in part because the percentage of aphids carrying the virus varies as does the number of aphids per season. Work carried out at Brooms Barn for HGCA shows that early infection (September / early October) has the greatest effect on crop yield. Where infection occurs later in the season the effect on crop yield is less. The work conducted by Brooms Barn for HGCA also showed that there were some varietal differences in susceptibility to TuYV but no varieties are fully resistant. Trials work on ten different varieties also showed that with all but one variety the use of a neonicotinoid based seed treatment improved yield compared with an untreated crop.

In the UK Peach-potato aphids are known to carry multiple forms of insecticide resistance. Field samples of aphids assessed by Rothamsted Research in 2013 showed that all of the Peach-potato aphids tested carried MACE resistance and Super kdr (ne), the new form of kdr resistance. Historically populations also carried genes which gave resistance to organophosphate products (esterase resistance) although with decreased use of this class of chemicals, these are now uncommon. Resistance to the neonicotinoids is also known but so far only in some parts of Southern Europe.

The chemistry available to control Peach-potato aphids in arable crops is now rather limited (due to Kdr, super Kdr and MACE resistance) with pymetrozine and thiacloprid probably being the most useful. There are no known forms of Peach-potato aphid which are resistant to pymetrozine or thiacloprid in Northern Europe.

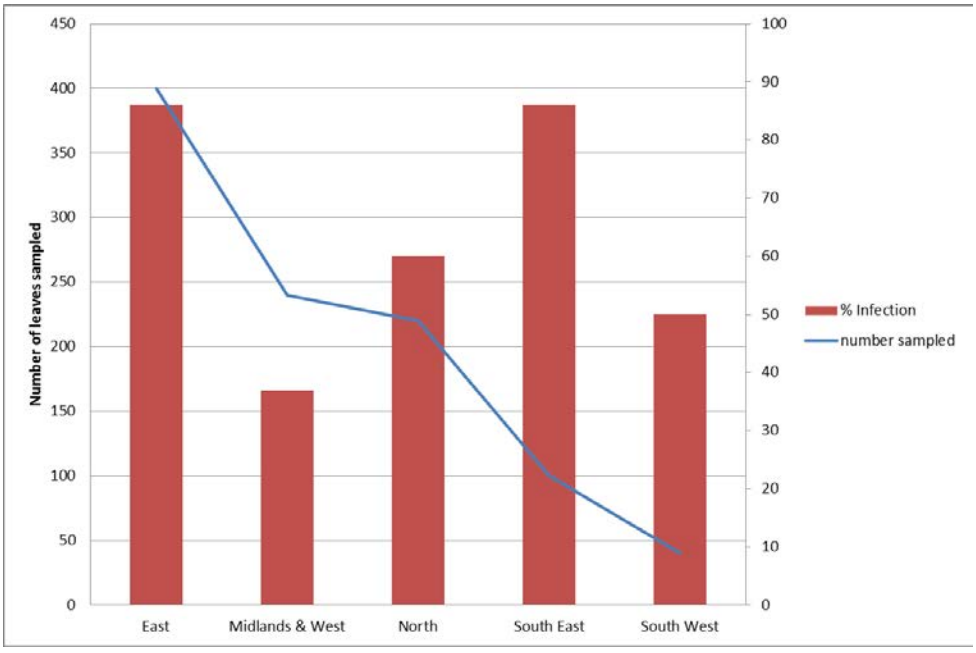
Pymetrozine (Plenum) has an approval for application in the autumn to OSR and only one spray is permitted. Likewise thiacloprid (Biscaya) is limited to only one application in the autumn.

There are a few products still effective for aphid control (*Myzus persicae*) vectors of TuYV, which have a limited number of applications such as thiacloprid, and pymetrozine.

Data are being gathered on the presence of TuYV in the 2014-15 crop in England, with preliminary findings showing a widespread and often significantly high infection levels of TuYV across the country (Fig 1) including areas where CSFB is less prevalent such as the north. This may be indicative of the lack of protection from neonicotinoid seed treatments available coupled with the limited options for effective foliar aphicides for the last growing season.

A summary of the TuYV data available to date is presented below. The results are expressed as % infection from 20 leaves assessed at each site.

Figure 1- preliminary TuYV data



In order to help growers protect crops that are at most risk from TuYV damage and CSFB attack, it is proposed that the use of neonicotinoid based seed treatments be allowed on all crops due to the widespread prevalence of the pests.

Data to back up these statements are available from a number of sources including crop surveys commission by NFU and additional data Syngenta, Bayer Crop Science, IRAG, and the Rothamsted Research led Aphicide Resistance Project which can either be submitted with this application or on request.