Recommendations from a new report to map out an integrated pest management route for cabbage stem flea beetle control offers growers clear direction for crop establishment, often with little or no additional costs, according to Syngenta Technical Manager, Dr Max Newbert, co-author of the AHDB research.

The report’s findings, including input from the Syngenta iOSR trials and iOSR growers’ experiences, pinpoint focus on conditions and techniques for rapid crop establishment in the autumn, rather than second guessing the potential timing of CSFB attacks.

“Sowing timing should be dictated by establishment conditions for rapid growth, not around CSFB migration timing due to their variability and persistency,” advised Dr Newbert.
He suggests that OSR establishment is so condition critical, growers should consider that it may need to be prioritised over wheat drilling when the conditions are right, if the two conflict.

Whilst the first and second week of August has become the norm for OSR drilling, huge variation in weather conditions year to year - particularly soil moisture, but also soil temperatures - make it impossible to recommend any specific drilling date. Assessing soil conditions and using weather forecasts can more accurately dictate timely planting. Dr Newbert also pointed out that planting OSR too early, in July, could cause the crop to be at risk from cabbage root fly during establishment.

“The aim is to get all of the crop emerged over a very short window. Crops can get past the critical CSFB damage by sheer mass of emerging plants,” he said.

The report indicates that direct drilling would appear the most reliable technique for establishment. The intention is to plant seed at a consistent two cm depth, into soil moisture.

**Moisture conservation**

Soil type and structure also have a major influence on soil moisture availability for OSR establishment. Research at Nottingham University, for example, has shown a silty loam with 10% clay particles could be dried down to just 5% soil moisture before seeds could no longer extract water. In contrast, seed would be unable to draw moisture in a clay soil, with 50% clay particles that effectively bind onto water molecules, if soil moisture fell below 23%. Studies have shown micro-scale variability in soil structure across the field can be responsible for uneven seedling emergence and growth.
Whilst rolling to conserve moisture is widely practiced, and does aid seed to soil contact important for germination and establishment, research has shown that over consolidation can be extremely detrimental to OSR emergence. The Nottingham work showed seedling emergence to be highly sensitive to compaction, especially on clay soils, where even at a sowing depth of just two cm emergence was significantly compromised at soil bulk density in excess of 1.1 g/cm$^3$.

“Understanding soil structures in individual fields and tailoring OSR establishment timing and techniques accordingly could pay real dividends for consistent emergence and growth,” advised Dr Newbert.
Studies have shown that larger seed is also a significant contributing factor in speed of emergence, with seed greater than two mm identified as beneficial. However, consistent seed size is also deemed important to achieve the even emergence. Previous research has shown the challenge of sowing into unconsolidated seedbeds to avoid placing seed too deep; low levels of emergence had been seen with seed planted deeper than five cm.

One easy fix technique suggested from the report’s studies, which is completely opposite to most growers’ current practice, has been to cut stubble as short as possible in the preceding cereal crop. Hitherto stubble has been left long, to shelter OSR from attack and encourage beneficial predators. However, this new research has shown it actually proves more favourable to CSFB and less conducive to OSR establishment.

The report also highlighted current varieties offer no significant differences for autumn CSFB damage. However, there are clear indications that vigour of some hybrid varieties can create stronger and larger plants more resilient to CSFB damage. Furthermore, studies have shown that high erucic acid HEAR varieties can exhibit 50% fewer larvae in the spring, compared to conventional varieties.

**Rotation extension**

Extending OSR in the rotation to at least one year in four was associated with lower levels of CSFB damage. Furthermore, a reduced area of OSR on the farm could beneficially enable planting new crop away from the previous year’s fields. Studies revealed that a gap of just 50 metres can be significant in limiting migration of CSFB movement, but ideally leaving a whole field distance would be even more effective.
The report suggests that cropping in small fields or blocks of less than five hectares would suffer less damage, or at least trying to keep blocks below 20 hectares.

One of the most significant techniques identified to minimise CSFB damage to newly sown crops is to leave volunteer OSR in the old crop stubble.

“Waiting to remove the volunteers until the new crop is up and established can minimise the risk of CSFB migration,” points out Dr Newbert.

“Beetles that attack the early volunteers appear to lose wing muscle strength to subsequently move on to the new crop. Furthermore, young beetles feed voraciously at first on the volunteers, so any older beetles that do migrate are less likely to feed heavily on the new crop. Any larvae in the volunteers will then be destroyed, halting their lifecycle reducing pressure next season.”

Since most new crop should be established by mid to late August, volunteers can safely be removed in early September without compromising the winter cereal crop, he advocated.

**Companion cropping**

Syngenta iOSR trials’ results in Suffolk, looking at companion cropping, have been validated in the AHDB report - highlighting berseem clover and buckwheat sown alongside OSR as effectively reducing CSFB damage and subsequent larvae populations.

The integrated approaches suggested by the report have become ever more important with the increasing incidence of pyrethroid resistance identified in CSFB populations. In most recent testing the median level of resistance is 60% of populations, pointed out Dr Newbert.

The resistance mechanism is primarily metabolic, so some fluctuation would be expected year on year for numbers and level of resistance, he claimed. But with migration and movement, the trend is for more widespread issues. All applications will reduce natural predators; as such insecticidal
applications need to be evaluated on your knowledge of previous experiences, he believes.

“The advice, backed by the report, is that if you need to spray, spray once using the best product and application techniques possible. But if the results are not as good as expected, there is little or no point in continuing with the strategy in that season.”

Growers that have continued to achieve good levels of control in the previous seasons should be mindful to follow very best practice to minimise risk of resistance developing,” he advised. That means using Hallmark Zeon as the most effective pyrethroid, at full rate and, for CSFB at 50 ml/ha and 75 ml/ha for flea beetle if thresholds are reached and resistance isn’t expected.

“Trials have also shown that application in the evening onwards into the night, when the beetles are most active foraging in the crop, can achieve higher rates of control in all populations. This is through the better targeting of sprays directly onto the adults increasing the potency of the application,” he added. Leaf damage from night application was reduced by 50%, compared to daylight treatment in Syngenta Application Club split field work.

“The AHDB report is an incredibly detailed look at the science behind practical measures that growers could use,” said Dr Newbert. “Following its guidance to get crops quickly established, and the integrated measures to minimise the impact of CSFB, offers the real chance to revive the crop’s role on UK farms.”

**Report support**

Norfolk iOSR grower, Chris Eglington, strongly agrees with most of the elements of the AHDB report. Having escaped the worst effects of CSFB in early years, more recently populations have built up to damaging numbers - with up to 75% of field areas severely affected this season.

But the crop retains an important role in the rotation - albeit now with longer breaks supported by the
He’s also keen to adopt new techniques that could minimise CSFB impact. The farm’s precision placement drilling at two cm, on a CTF system, using graded seed selected for a TGW of 5.5 g plus, aims to assure consistent establishment.

He strongly agrees that establishment conditions are key for planting timing, and that OSR gets priority for drilling when conditions are right; that takes precedence over CSFB migration timing.

Mr Eglington strongly agrees with the practice of leaving volunteers from the previous year’s crop to hold beetles from migrating onto a new crop. However, from his experience, disagrees with growing in small fields or blocks, as well as strongly disagreeing with the need to plant new fields adjacent to previous year’s crop.

In recent years he has also worked with ADAS and the YEN initiative for oilseed rape trials, including grazing off areas of crop with sheep to reduce larvae loading (above). It’s a technique that has met with some success, although he strongly agrees with the report’s findings and iOSR trials, that it’s a high risk strategy, dependent on spring growing conditions for crop recovery.
Integrated pest management of cabbage stem flea beetle in oilseed rape

Cabbage stem flea beetle (CSFB) is currently the most significant pest of winter oilseed rape (OSR) in England. The loss of neonicotinoid seed treatments, and the perceived resistance to pyrethroid treatments, have meant that chemical control options are very limited. The development of an integrated pest management (IPM) strategy for this pest is urgently required. In particular, the industry needs non-chemical control options to help reduce chemical control and prolong the use of existing chemical options in cases where they are still effective. The aim of this project was therefore to develop an IPM strategy. The specific objectives were:

1. Identify treatment and agronomic factors that affect CSFB adult settling and larval survival.
2. Determine the effect of agricultural practices on CSFB adults, feeding damage, and local population density over the course of the season.
3. Identify temporal thresholds of feeding damage and non-invasive and cost-effective methods to assess these thresholds and put them to use for advice on timing of control measures for CSFB adults and larvae.
4. Assess the value of options for CSFB
5. Develop an IPM strategy for CSFB.
6. Test the feasibility of the new IPM strategy to farmers and agronomists.

Most of the factors that potentially have an impact on CSFB survival are weather-related. This presents potential to predict seasonal risk in advance. The egg larval stages of CSFB migration, survival management, and severe fits all future that growers can start to influence CSFB damage. Performance of CSFB is affected by the same factors as in previous studies, meaning that the current situation is similar to previous years. However, the presence of the pest is also influenced by the use of insecticides to control CSFB adults, which can significantly affect the population dynamics of CSFB adults and larvae. Control options for CSFB include the use of pheromone traps, biological control agents, and insecticides. Other tools to be considered include the use of resistant varieties, crop rotation, and the use of alternative crops. The aim of this project was to develop an IPM strategy for CSFB adults and larvae. The project also aimed to provide guidance on the use of CSFB and the appropriate control measures. The project was funded by the AHDB and was managed by the AHDB. The project was completed in 2020.

Tags:
- iOSR
- Cabbage Stem Flea Beetle
- integrated pest management
- Oilseed rape

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