2013 Sugar Beet Crop Emergence

Working closely with the NFU, British Sugar and seed breeders, everyone at Germains takes pride in delivering a high quality sugar beet seed package to UK growers. At our site in King's Lynn, we prime, pellet and coat the sugar beet seed, carefully maintaining the quality and integrity of the seed genetics, provided by the seed breeders, throughout the process.

Following reports from some growers regarding abnormal emergence of the 2013 sugar beet crop, we undertook an extensive investigation, in parallel to that of the British Beet Research Organisation (BBRO), to understand more about the reasons why this unusual emergence occurred. This report details the investigation conducted by Germains and our findings to date.

In 2013, we launched Xbeet® plus, which combines the long established Xbeet® priming, which has been used since 2009 with an enhanced pellet technology.

Xbeet® plus, is an enhanced pellet working in synergy with the industry-leading priming technology, Xbeet®

The launch of the new pellet, Xbeet® plus, for the 2013 sugar beet season coincided with one of the most extreme weather events seen in the UK and across Western Europe. The unusually cold conditions, combined with high winds and following a particularly wet winter harvest, had a significant impact on the sowing season across the region.

How were the assessments conducted?

All the assessments were carried out at our Research and Development Centre based in King's Lynn.

In order to accurately assess the variables involved, we developed an assessment that could mimic, as closely as possible, the unprecedented and prolonged cold temperatures experienced in Spring 2013, to help us understand why emergence had been affected.

It was evidenced that extremely cold, dry and prolonged periods of stress demonstrated similar issues that many growers witnessed in their fields during the Spring of 2013. These highly challenging conditions formed the basis of our laboratory stress test.

Seeds from 2013 commercial production were put through a series of rigorous assessments under laboratory conditions, to try and replicate as closely as possible what had been observed by growers in the field.

Germains set out to answer three questions

Commercial samples were taken from the current season and were used to benchmark the laboratory assessments

| Impact of priming	Impact of the pellet	Impact of climatic conditions
Assessed through field trials, complaints data and laboratory trials	Xbeet® plus and Xbeet® pellets assessed at an R&D level and a large scale production level	All 2012/13 commercial bulks assessed and complaints and weather data evaluated

The impact of priming technology

Figure 1

% Emergence vs Days after planting
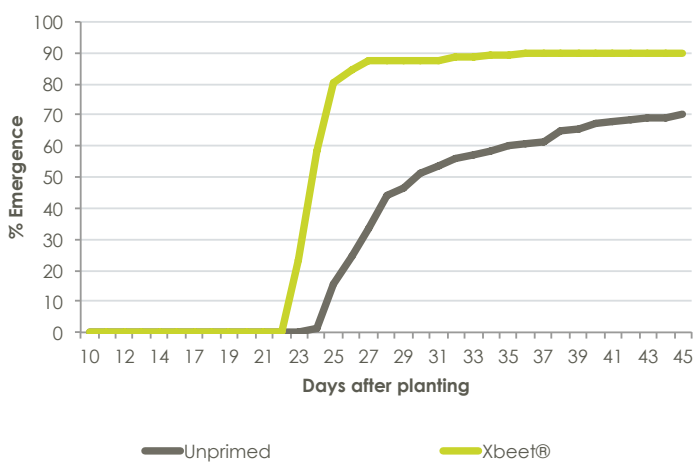
— Unprimed   — Xbeet®

Sugar beet seed in the UK has been primed since 1996 with Advantage®. In 2009 we launched a new priming technology, Xbeet® which growers have used consistently and effectively in the field for the past four years. In 2013, we launched Xbeet® plus, which combines the long established Xbeet® priming technology with an enhanced pellet material.

To understand the impact of priming under extremely stressful growing conditions, Xbeet® primed and unprimed samples were prepared and evaluated. The emergence performance data set was then compared.

In the evaluation, the Xbeet® primed samples emerged faster and had higher final emergence, when compared to the unprimed sample. See Figure 1.

The impact of the 'plus' pellet

This enhanced Xbeet® plus pellet increases the rapid emergence of Xbeet® further and was shown to deliver a potential increased yield benefit of 2.7% in multi-year field trials.

A high level of confidence was demonstrated around the robustness and tolerance of the new pellet in these trials. However, due to the inconsistent germination seen this year, it was clearly necessary to conduct further assessments.

In addition to assessing the primed and unprimed seed through the new laboratory stress test, we also compared the Xbeet® plus pellet to the standard pellet with Xbeet® priming.

The results from this assessment suggest that under extremely cold, dry and stressful conditions, the Xbeet® plus pellet performs better than the standard Xbeet® pellet, delivering increased benefits to the grower in the field. See Figure 2.
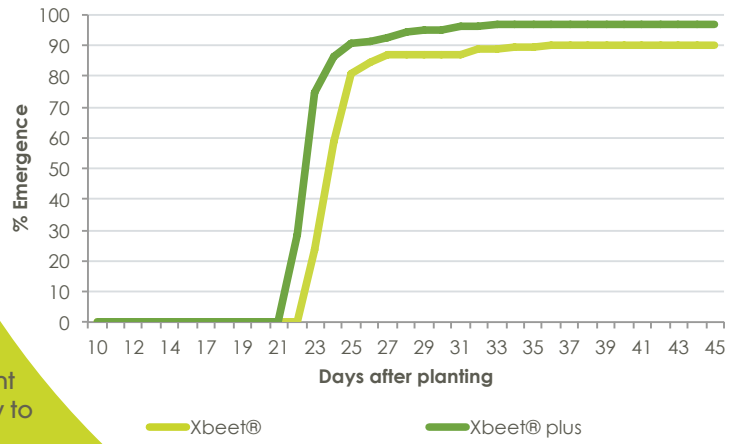
Legend: Xbeet® — Xbeet® plus

Figure 2

The impact of climatic conditions

Reports from Western Europe have also documented unusual emergence patterns across the sugar beet growing regions. In these reports, the unusual climatic conditions of the 2013 sowing season have been highlighted as having a significant impact on sugar beet seed emergence - across Europe including the UK.

Although the 2013 sowing season was exceptional in terms of the temperatures experienced, this does not completely explain the variation in emergence seen between closely located fields and even within some fields. To further understand the role the temperature played in the 2013 sugar beet crop emergence, we conducted a laboratory experiment that used the same low temperature profile to mimic the conditions, but varied the amount of time spent at the cold temperatures between two Xbeet® plus samples. This was aimed at replicating the variability seen between different growing areas in the UK in March and April. The results are shown in Figure 3.

The results from this assessment indicate that when using the same sample, but holding it for an extended period of time at the cold temperature, there was a significant impact on the emergence of the seed. This may explain the variability seen between and within fields. Areas that are more exposed or have subtle differences in soil structure, may have experienced slight variations in temperature, causing the uneven emergence in affected areas. See Figure 4.
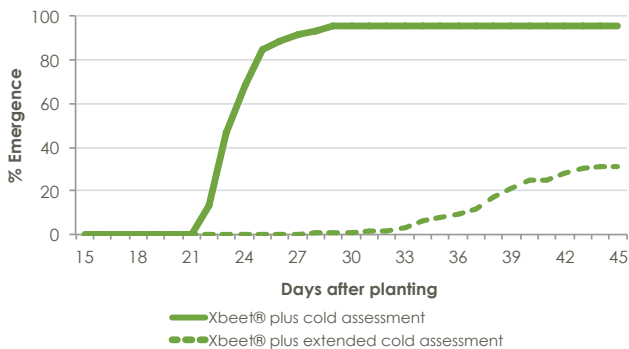
Figure 3

Legend:
Xbeet® plus cold assessment
Xbeet® plus extended cold assessment

Figure 4

Legend: Emerged — Germinated but not emerged — Not Germinated

Figure 5

Legend:
- --- Unprimed standard conditions
- --- Xbeet® standard conditions
- --- Xbeet® plus standard conditions
- — Unprimed cold stress conditions
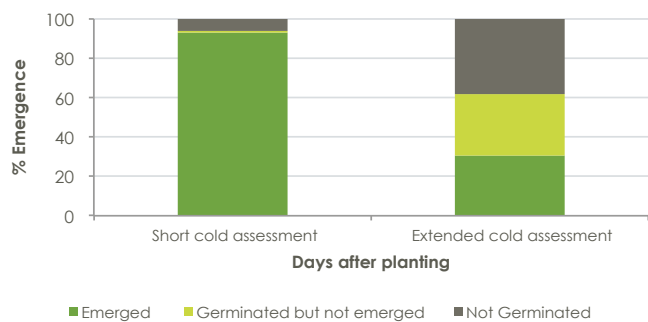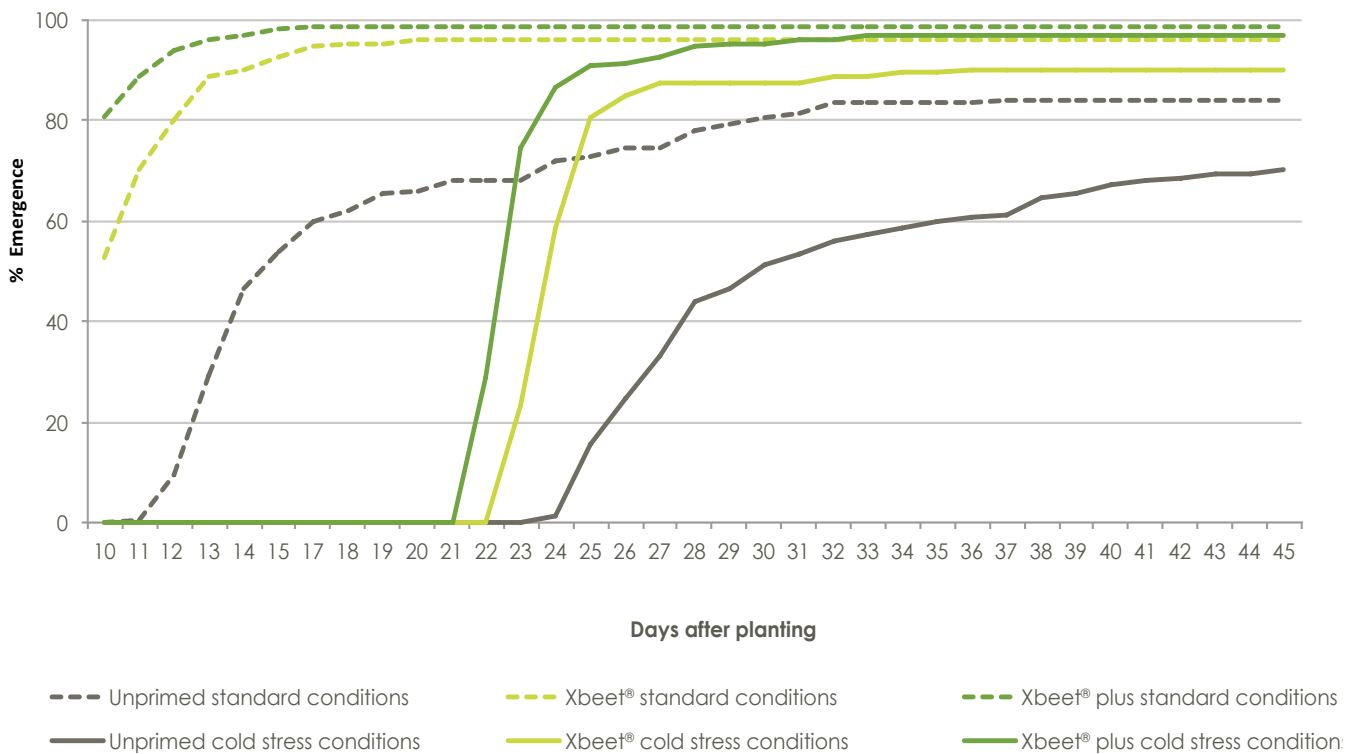- — Xbeet® cold stress conditions
- — Xbeet® plus cold stress conditions

Conclusions

Our investigation has indicated that the combination of the very cold temperatures and the amount of time seed and seedlings were exposed to these low temperatures, had a considerable impact on sugar beet seed emergence. See Figure 5.

The results from this assessmant suggest, that under extremely cold, dry and stressful conditions, primed seed is more beneficial than unprimed seed.

The results also show that Xbeet® plus continues to offer a significant benefit over and above Xbeet®, even under cold, dry and stressful conditions.

Based on these results, it is clear that Xbeet® plus continues to be the product of choice for growers to maximise the performance of their sugar beet crop and secure the additional potential yield benefit this product offers.

We will continue to work closely with the BBRO, NFU and British Sugar to provide enhanced guidelines for drilling the UK sugar beet crop in challenging conditions.

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