May 2021

Biostimulant Insight: Stress-free, higher yielding potatoes with Bridgeway

With a dry spring and ideal planting conditions, we are in one of the top 3 seasons for finishing planting. However, the recent cold spell and wet soil conditions have slowed growth and some crops have just sat there under stress. We are now at the cusp of whether crops produce above average tuber numbers. With warmer temperatures now forecast for some areas, there is potential for this which may mean some crops cannot bulk properly.

Heat stress, which slows bulking >20°C and inhibits bulking >26°C, is also a likely threat to crops as we head into the summer. Applying Bridgeway will help crops to recover from abiotic stress now and also protect crops from heat stress, enabling tuber bulking to be maintained and higher yields to be achieved compared to untreated crops.

Recommended timings

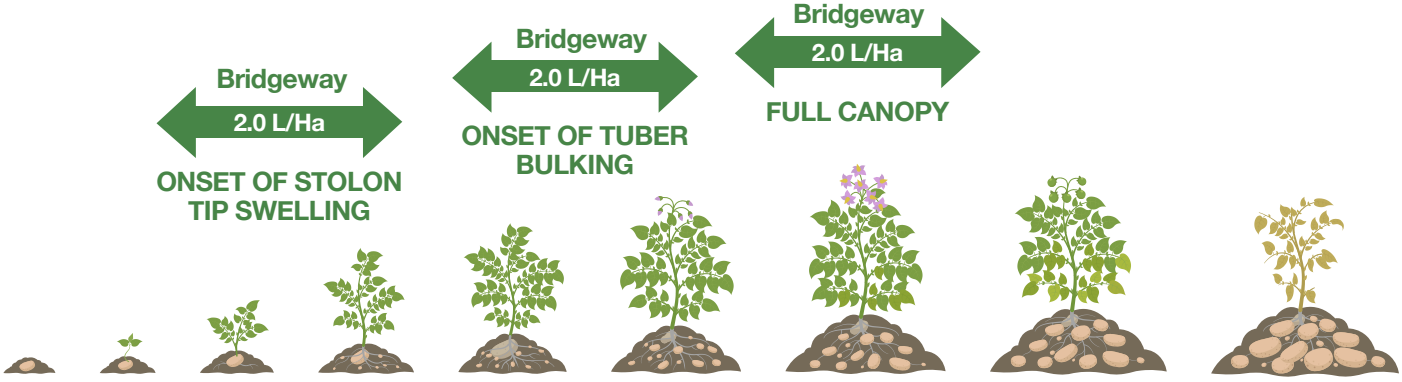
Application	Recommended dose (L/ha / timing)	Recommended no. of applications	Timing of application
Solo	2.0		Any time from emergence, 95% of plants emerged
Programme	2.0	Three per crop	Onset of stolon tip swelling Onset of tuber bulking Full canopy

BRIDGEWAY KEY BENEFITS

- Protects against cold and heat stress
- Recovery from frost & temperature stress
- Maintains tuber bulking in stressful growing conditions
- Speeds up tuber bulking, enhancing the production efficiency of the crop

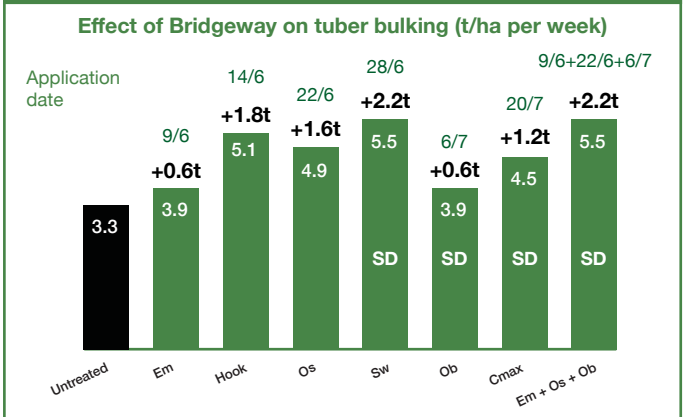
Combat temperature stress and protect yield with Bridgeway

- **Apply 1.0 - 2.0 L/ha at stolon tip swelling and repeat in season** to eliminate abiotic stress, stimulate growth and enhance translocation of assimilates to tubers. **3 applications optimal.**
- **Stimulates root and shoot growth,** increasing nutrient uptake and canopy size
- **Increases chlorophyll concentration,** helping crops to harness more light energy which increases the rate of photosynthesis and starch production

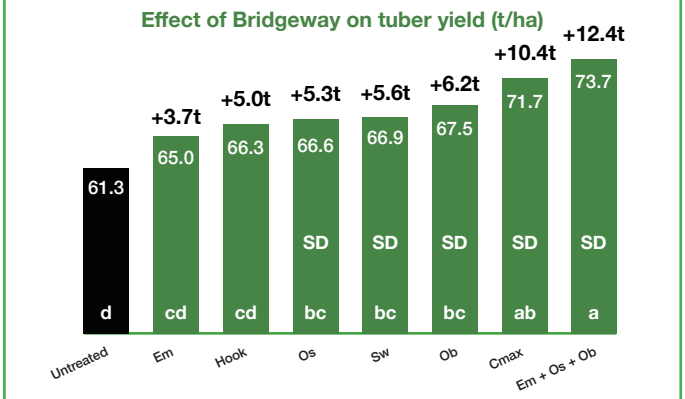


Bridgeway protection against heat stress has been well proven in trials 2017-19

All Bridgeway applications increased tuber bulking



All Bridgeway applications increased tuber yield



2017 cv Desiree. Yield assessment P=0.0007. SD = Significant difference to untreated control. Bridgeway applied at 2.0 L/ha per application

Bridgeway application timings

Appl.	Information
Em	95% emergence < 5cm tall
Hook	Stolons extending, tips hooked
Os	Onset of stolon tip swelling, 1st visible tip swelling
Sw	Mid stolon tip swelling, stolon tips swelling, <10mm
Ob	Onset of tuber bulking, first tubers > 10mm
Cmax	Max. canopy size, mid tuber bulking / onset of senescence

Potato productivity is greatly reduced at temperatures above the optimum of 20°C. The earlier in the season heat stress occurs, the more negative its impact on growth and yield. At 25°C tuberisation can be delayed, at 30 it can stop altogether. Replicated field trials 2017-2019 have shown that Bridgeway helps to minimise the effect of temperature and moisture stress on the crop, and enables photosynthesis and tuberisation to be maintained even under very high temperature duress.

- **All application timings had a positive effect**
- **Highest responses achieved from applications made prior and closest to the stress period**
- **Higher the rate, higher the yield response**
- **Stress events regularly occur through the season making multiple Bridgeway applications optimal**

KEY TAKEAWAYS 2017

- Heat stress periods (>20°C) occurred throughout the growing season which stressed the crop
- Very high temperatures (>26°C) paused tuberisation and the rate of bulking / week
- Bridgeway helped crops maintain photosynthesis during the periods of high temperatures stress and enabled tuber bulking to continue
- With very high temperatures occurring from mid-June onwards, Bridgeway applications which had been applied closest to this time to protect the crop had the biggest benefit and delivered the highest yield responses
- 3 applications that were able to protect the crop just before the onset of the next high temp trigger point, gave the highest yields

CONCLUSIONS

Bridgeway keeps potato crops photosynthesising in stressful conditions and enables tuber bulking to continue, leading to higher yields

Temperature data - Lincolnshire trial area

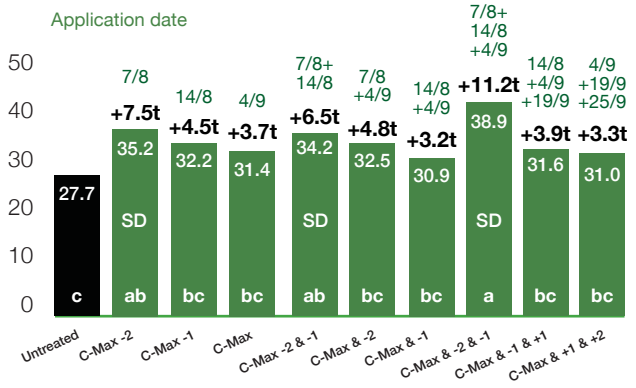
Month	Date >20°C (above optimum, every 5°C above can decrease photosynthesis by 25%)	Date >26°C (delay in photosynthesis, tuberisation inhibited)	No. of stressful days
June	1st, 10th, 13th, 14th, 15th, 16th	17th, 18th, 19th, 21st	10
July	1st-5th, 7th, 8th, 15th-19th, 21st, 22nd, 26th	6th, 9th, 17th	16
August	1st, 3rd, 14th-17th, 22nd, 23rd, 25-27th	28th	15

Bridgeway helped recover and protect yield

2018 trials investigated Bridgeway application timings around CMax – up to 2 weeks before and 2 weeks after

All Bridgeway applications increased yield

Effect of Bridgeway on tuber yield (t/ha)



2019 cv King Edward. Yield assessment P=0.0011. SD = Significant difference to untreated control. Bridgeway applied at 2.0 L/ha per application.

Bridgeway application timings & dates

Growth Stage	Application Date
2 Weeks before C-Max	7th August
1 Week before C-Max	14th August
C-Max	4th September
1 Week after C-Max	19th September
2 Weeks after C-Max	25th September

Temperature data - Lincolnshire trial area

Month	Date >20°C (above optimum, every 5°C above can decrease photosynthesis by 25%)	Date >26°C (delay in photosynthesis, tuberisation inhibited)	No. of stressful days
June	1st-4th, 9th-13th, 17th, 18th, 21st	5th-8th, 14th-16th, 19th, 20th, 22-27th, 30th	28
July	1st, 4th, 8th, 11th-15th, 18th-22nd	2nd, 3rd, 5th-7th	18
August	1st-3rd, 17th-19th, 26th, 27th		8

KEY TAKEAWAYS 2018

- Crops were under heat stress for the entire month of July and much of August
- Extreme heat stress inhibited tuberisation for long periods in July and at points during the 1st week of August
- By the time Bridgeway was applied, the crop had already experienced considerable stress
- All Bridgeway applications, irrespective of timing, increased tuber bulking and increased yield
- The earliest applications (Cmax-2 and Cmax-1 applied 7th August & 14th August respectively) had the biggest single benefit on rate of bulking and yield because it helped the crop recover from the earlier stresses of July & early August, and prepare for the heat stress of later August
- Conditions remained stressful in September, with a Cmax application on 4th September therefore beneficial
- Highest rate of bulking and yield responses were achieved where Bridgeway was applied in 3 applications to help the crop recover from and protect against stress

CONCLUSIONS

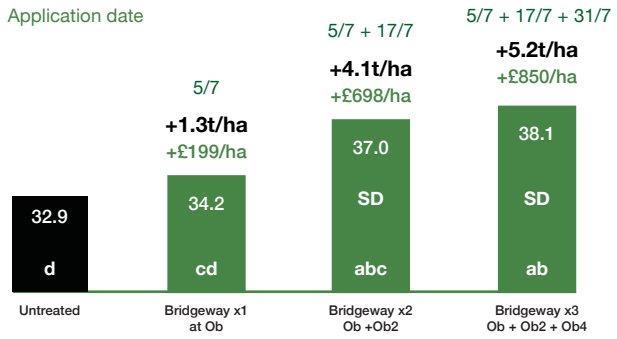
Heat stress can show a considerable impact on bulking and yield. Bridgeway helps speed up the rate of bulking after crops have been under stress and increase yield compared to untreated crops. Multiple applications of Bridgeway provide the best defence to help mitigate the effects of heat stress on yield as the season develops.

Three applications delivered best protection against stress in 2019

2019 trials investigated the impact of application number on yield and margins.

All Bridgeway applications increased yield & margins, 3 optimal

Effect of Bridgeway on tuber yield (t/ha)



2019 cv Sapphire. Yield assessment P=0.002. SD = Significant difference to untreated control. Bridgeway applied at 2.0 L/ha per application. Margin over input cost based on £175/t and Bridgeway £10/L.

Bridgeway application timing:
Ob = Onset of tuber bulking Ob2 = Onset of tuber bulking + 2 weeks Ob4 = Onset of tuber bulking + 4 weeks

KEY TAKEAWAYS 2019

- Temperatures exceeded the optimum of 20ºC throughout July and August.
- A single application of Bridgeway applied on 5th July to the crop already under stress helped.
- With regular heat stress events and periods of excessive heat that inhibited tuber bulking, further top ups of Bridgeway were needed to kick-start photosynthesis and enable bulking to restart and made a significant difference to the overall yield and margin over input cost.
- Three applications delivered the highest benefit to yield.

CONCLUSIONS

During prolonged heat stress periods, repeat applications of Bridgeway every 1-2 weeks will be most beneficial to help the crop maintain photosynthesis and tuber bulking, thereby helping to maximise yield and margins.

Temperature data - Lincolnshire trial area

Month	Date >20ºC (above optimum, every 5ºC above can decrease photosynthesis by 25%)	Date >26ºC (delay in photosynthesis, tuberisation inhibited)	No. of stressful days
July	4th, 5th, 10th-12th, 15th-17th, 20th, 21st, 26th, 29th, 30th	22nd-25th	16
August	1st-11th, 17th, 18th, 21st, 22nd, 28th, 30th, 31st	23rd-27th	23

Bridgeway	Product & Application Information
Classificatio	Foliar biostimulant
Composition	Vegetable derived amino acids and peptides 5% organic nitrogen 17.5% biological organic carbon
Mixing	Shake well before use. Apply in a minimum 100 litres of water per hectare. Add Bridgeway to the spray tank first, before adding crop protection products or fertiliser.
Pack size	10 litres
Latest timing	No restrictions

Technical support

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