

Control of *Phragmites communis* using Low Rate Glyphosate Applications and TopFilm Adjuvant

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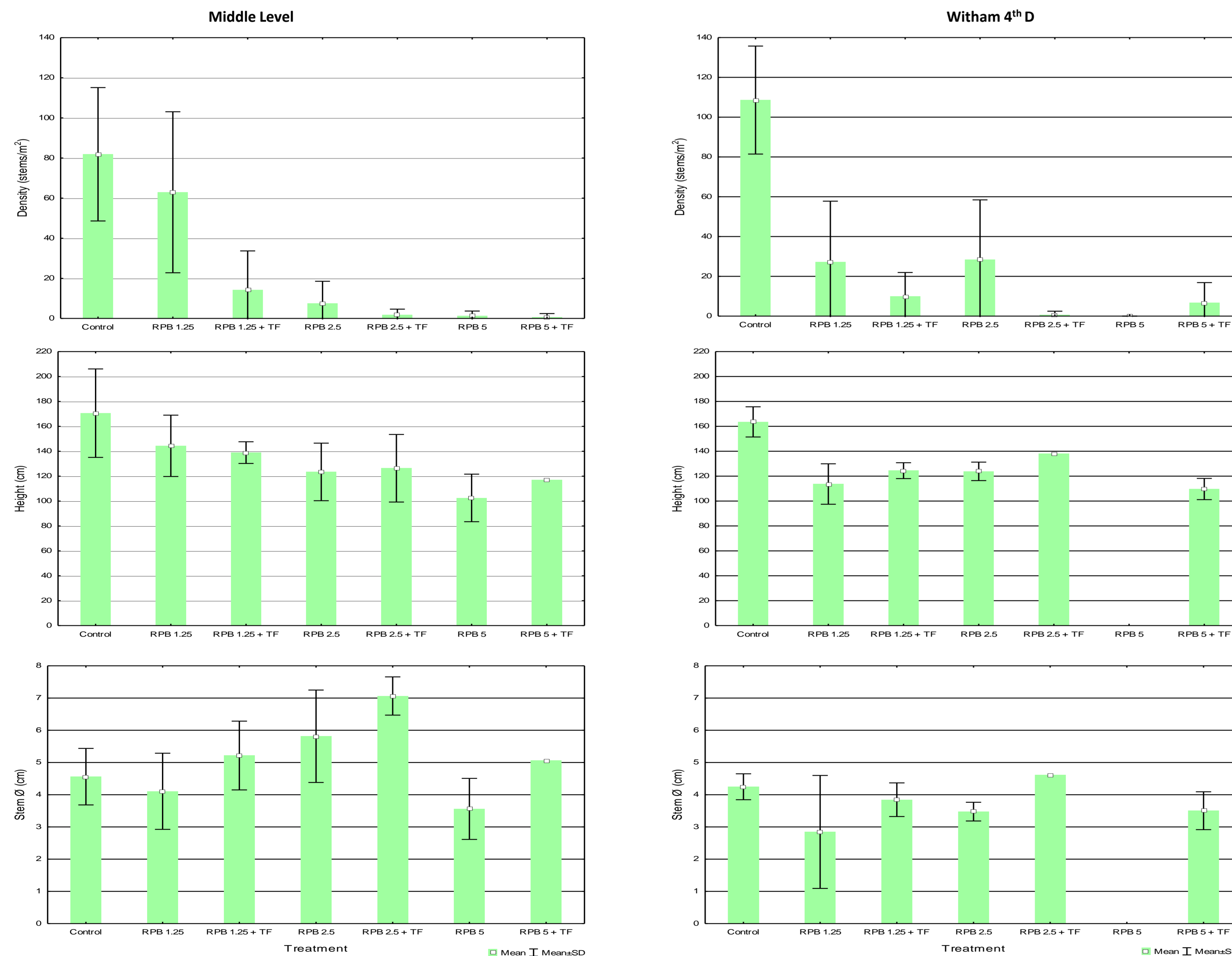
The Policy Requirement...

As part of the implementation of the European Water Framework Directive The UK Government set up a **Theme Advisory Group** (TAG) to assess the use of glyphosate as an amenity herbicide. The TAG classified glyphosate as an environmental pollutant on the basis of potential problems with decomposition products interfering with water treatment processes, and the toxicity to a non-native aquatic macrophyte species in laboratory tests.

As part of this process they set a short term **Environmental Quality Standard** (EQS) of 398 µg/L.

The current maximum application rate of glyphosate formulations is 2.16 kg a.i. Hectare⁻¹ (the water lily rate) If all this went directly into water 30 cm deep (the standard European water depth for assessment of toxicity) then you would end up with a concentration of 648 µg l⁻¹. This means that, without any interception of the herbicide by the leaf. The maximum application rate will be reduced by a factor of 1.62, or about 61% of the maximum recommended rate. We used the normal application rate of 1.8 kg Ha⁻¹ in our experiments, but there might be flexibility to increase the application rate to compensate for the EQS.

The hypothesis behind this experiment is that the addition of TopFilm adjuvant would reduce the effective concentration of glyphosate required to control *Phragmites communis*, the Common Reed, thus enabling compliance with the EQS and maintenance of adequate weed control capacity.



The Weed Control Response...

We used three sites in the east of the UK in Internal Drainage Board Areas (Middle Level, North Level and Witham 4th). We used a split plot three block randomised design at each site to assess 7 treatments: An untreated control, a full rate control (5 litres product per hectare (1.8 kg a.i) , a half rate and a quarter rate; and a full rate a half rate and a quarter rate each with full rate TopFilm (1.2 L Ha⁻¹, or 0.6% of the spray solution).

TopFilm was the first adjuvant approved for aquatic use in the UK. It is manufactured by BioSorb Inc and supplied in the UK by Waterland Management Ltd.. Treatments were applied in October 2013. Assessments were made in June 2014. Further assessments will be made one year after treatment to determine longer term control.

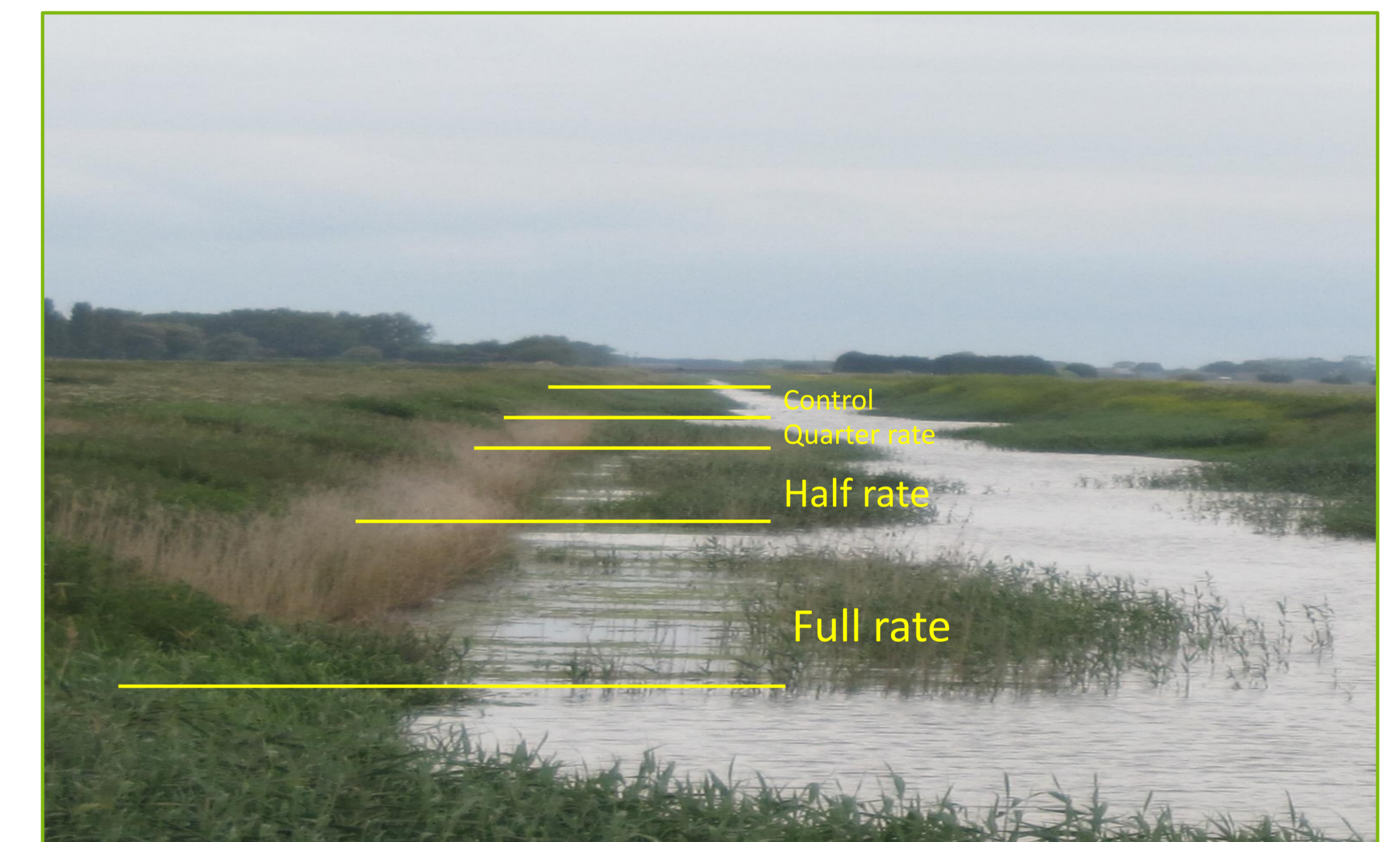
The Conclusions...

The data presented in the graphs to the left were collected using replicated random quadrat data in each plot and show that the addition of TopFilm to both the rates of 2.5 (half) and 1.25 (quarter) decrease the number of stems compared to an untreated control 8 months after treatment. In both the Middle Level and Witham 4th Sites, the addition of TopFilm to the half rate decrease the number of stems to an equivalent level to that achieved in the positive control treatment of full rate application. Data collected in October 2014 (1 YAT) will provide information on any effects of delayed growth caused by applications of glyphosate that may have been observed in these June observations.

Data for maximum stem height and mean stem diameter did not show any differences between treatments, except perhaps for stem height in Middle Level. However, these observations do not reflect weed control objectives of reducing plant numbers and, although data will be collected in future, no further analysis will be performed. It also demonstrates that plants that are not controlled are no different from those in control plots, showing no sub-lethal effects.

These data show that even after the implementation of the EQS in 2018, glyphosate can continue to be used at half rate with TopFilm to achieve the same weed control results on this species.

Tests with other species are planned over the next 4 years to build up a map of susceptibility to low rate applications in order to comply with the proposed EQS.



The picture shows the effect of treatment with glyphosate at various application rates in Autumn 2013 in June 2014.



The picture shows regrowth of *P. communis* treated with glyphosate at quarter rate (1.25 L product per hectare) on the left and at the same rate with TopFilm on the right. The addition of TopFilm results in almost complete control at quarter rate application of glyphosate, while regrowth is unaffected at this rate without TopFilm.