



ROTHAMSTED
RESEARCH



ARIES
DOCTORAL TRAINING PARTNERSHIP

UNIVERSITY OF
PLYMOUTH

Expanding Virus-Induced Gene Silencing techniques (VIGS) to *Lolium* spp. using BSMV vectors.

Margaret (Peggy) McGroarty^{1,2}. peggy.mcgroary@rothamsted.ac.uk, ORCID:
<https://orcid.org/0000-0003-0008-1536>. Supervisors: **Dana MacGregor**¹ and
George Littlejohn². 1. Rothamsted Research, Harpenden, United Kingdom AL5
2JQ 2. University of Plymouth, Plymouth, United Kingdom, PL4 8AA.



Main aim:
To determine if
BSMV
constructs
induce VIGS in
Lolium spp.

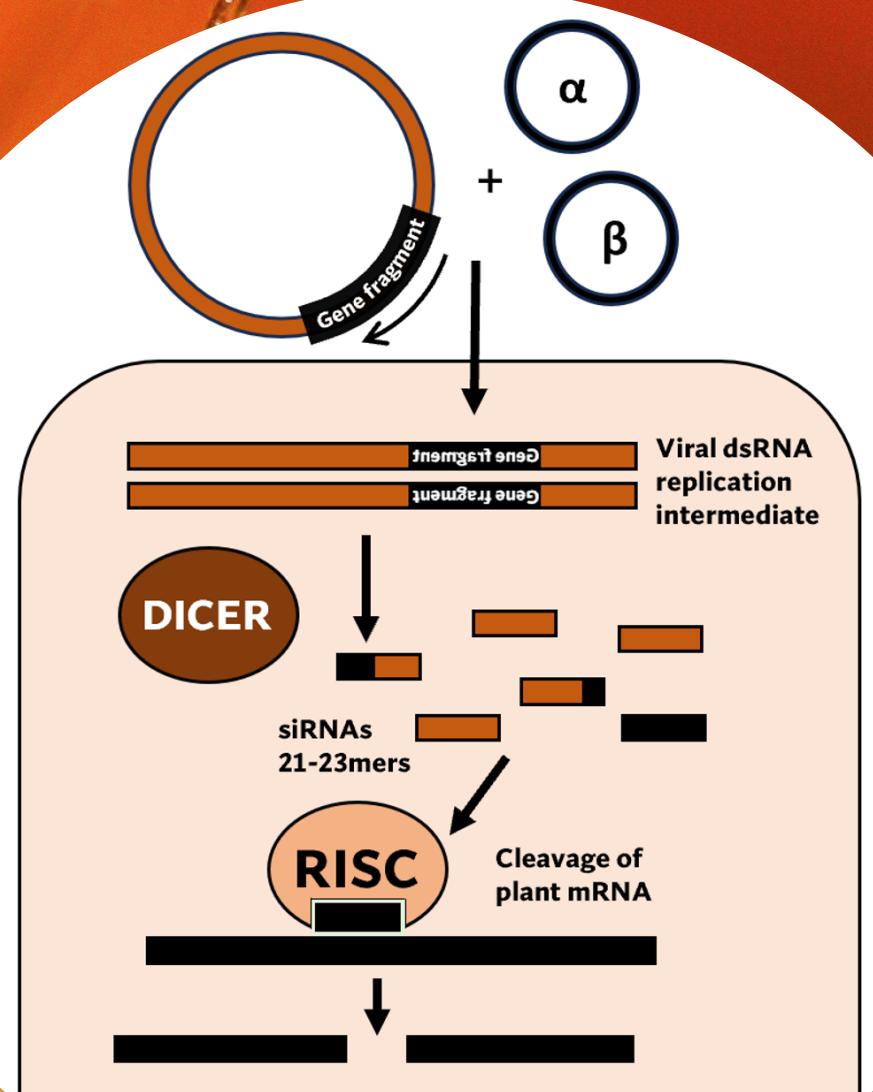


Figure 1:
BSMV and mechanistic
models for BSMV-VIGS.



Expanding Virus-Induced Gene Silencing techniques (VIGS) to *Lolium* spp. using BSMV vectors.

Margaret (Peggy) McGroarty^{1,2}, peggy.mcgroarty@rothamsted.ac.uk, ORCID: <https://orcid.org/0000-0003-0008-1536>. Supervisors: **Dana MacGregor**¹ and **George Littlejohn**². 1. Rothamsted Research, Harpenden, United Kingdom AL5 2JQ 2. University of Plymouth, Plymouth, United Kingdom, PL4 8AA.



Figure 2: Map displaying the current global spread of *Lolium Multiflorum*.



2. Kew Royal Botanic Gardens. *Lolium multiflorum* 2024 [Available from: <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:407486-1>]. Accessed: 5th February 2024.

Why *Lolium multiflorum*?





Expanding Virus-Induced Gene Silencing techniques (VIGS) to *Lolium* spp. using BSMV vectors.

Margaret (Peggy) McGroarty^{1,2}, peggy.mcgroary@rothamsted.ac.uk, ORCID: <https://orcid.org/0000-0003-0008-1536>. Supervisors: **Dana MacGregor**¹ and **George Littlejohn**². 1. Rothamsted Research, Harpenden, United Kingdom AL5 2JQ 2. University of Plymouth, Plymouth, United Kingdom, PL4 8AA.

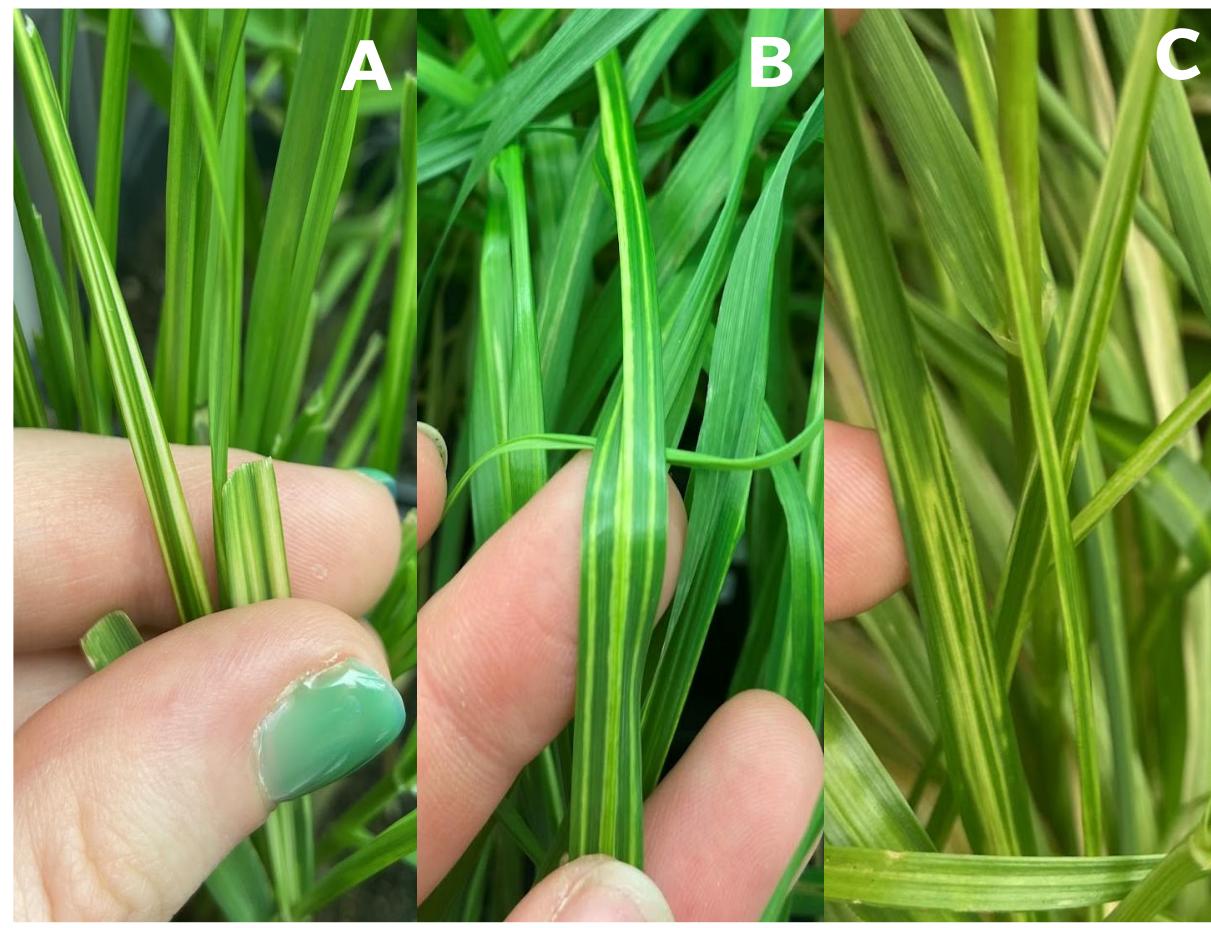


Figure 3: Images of *Lolium multiflorum* successfully expressing photobleaching phenotype from BSMV:asAmPDSV1 over time. A) Day 31 post-inoculation. 10 days after being cut above nodes. On day 50 plants were placed in vernalisation. B) Day 85 post inoculation following removal from vernalisation C) Day 115 post-inoculation.



Expanding Virus-Induced Gene Silencing techniques (VIGS) to *Lolium* spp. using BSMV vectors.

Margaret (Peggy) McGroary^{1,2}, peggy.mcgroary@rothamsted.ac.uk, ORCID: <https://orcid.org/0000-0003-0008-1536>. Supervisors: **Dana MacGregor**¹ and **George Littlejohn**². 1. Rothamsted Research, Harpenden, United Kingdom AL5 2JQ 2. University of Plymouth, Plymouth, United Kingdom, PL4 8AA.

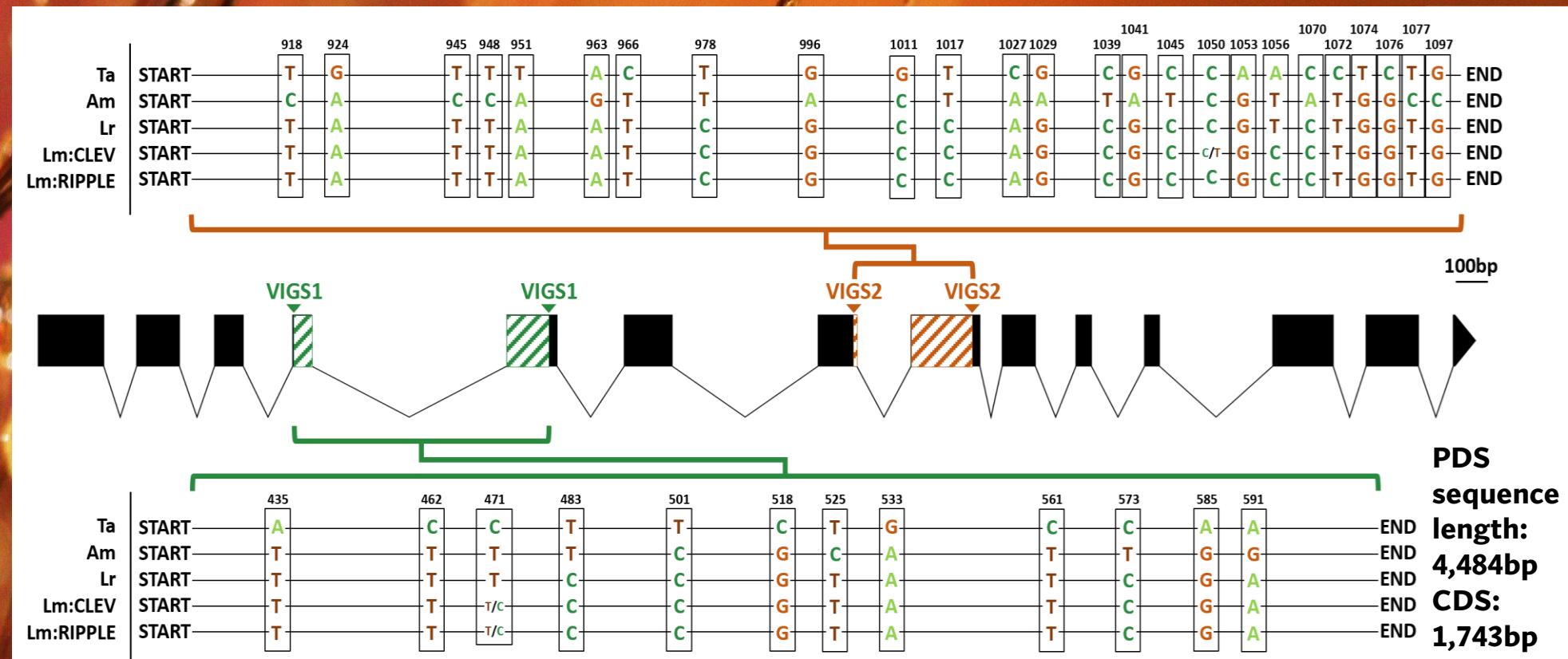


Figure 4: PDS VIGS1 and VIGS2 region alignments for wheat (Ta), Black-grass (Am), *Lolium rigidum* (Lr), *Lolium multiflorum* (Lm:CLEV and RIPPLE) and their location in the *PDS* sequence

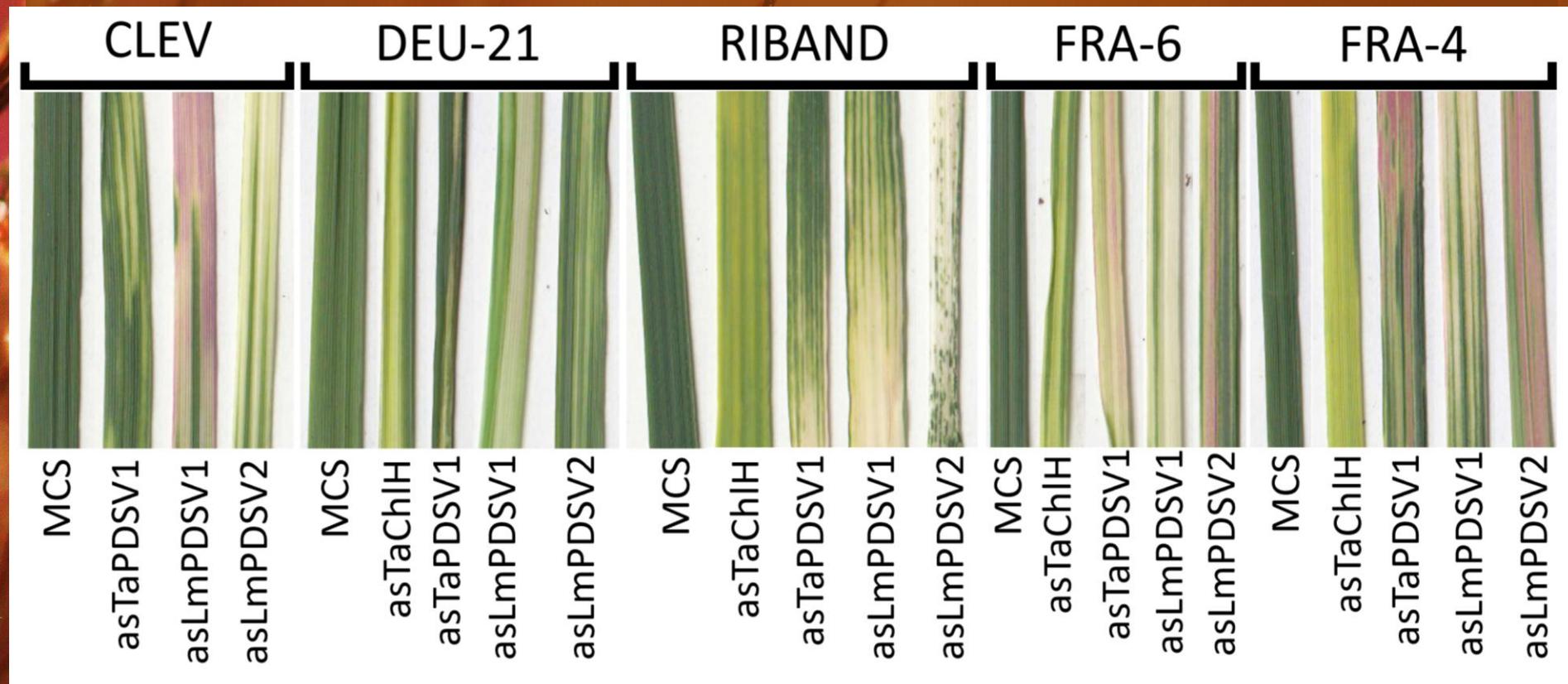


Expanding Virus-Induced Gene Silencing techniques (VIGS) to *Lolium* spp. using BSMV vectors.

Margaret (Peggy) McGroary^{1,2}, peggy.mcgroary@rothamsted.ac.uk, ORCID: <https://orcid.org/0000-0003-0008-1536>. Supervisors: **Dana MacGregor**¹ and **George Littlejohn**². 1. Rothamsted Research, Harpenden, United Kingdom AL5 2JQ 2. University of Plymouth, Plymouth, United Kingdom, PL4 8AA.



Figure 5: Leaf segments displaying positive phenotype expression from multiple constructs in various biotypes. Expression of anthocyanins (pink/red colouring) is a stress response





ROTHAMSTED
RESEARCH



ARIES
DOCTORAL TRAINING PARTNERSHIP

UNIVERSITY OF
PLYMOUTH

Expanding Virus-Induced Gene Silencing techniques (VIGS) to *Lolium* spp. using BSMV vectors.

Margaret (Peggy) McGroarty^{1,2}. peggy.mcgroarty@rothamsted.ac.uk, ORCID:
<https://orcid.org/0000-0003-0008-1536>. Supervisors: **Dana MacGregor**¹ and
George Littlejohn². 1. Rothamsted Research, Harpenden, United Kingdom AL5
2JQ 2. University of Plymouth, Plymouth, United Kingdom, PL4 8AA.

