

# *Brassica* - virus interactions

John Walsh



# Viruses infecting brassicas

- *Turnip mosaic virus* (TuMV)
- *Cauliflower mosaic virus*  
(CaMV)
- *Beet western yellows virus*  
(BWYV)

All are transmitted by aphids

# Current projects

1. Plant - virus co-evolution in wild brassicas



2. The susceptibility of cabbage to *Turnip mosaic virus* and *Beet western yellows virus*



3. Resistance to TuMV in brassicas



4. Exploiting *eIF4E*-based and associated broad-spectrum recessive resistance to



potyviruses in dicots and monocots

# 1. Plant -virus co-evolution in wild brassicas

With University of  
Birmingham and CEH  
Oxford



# Objectives

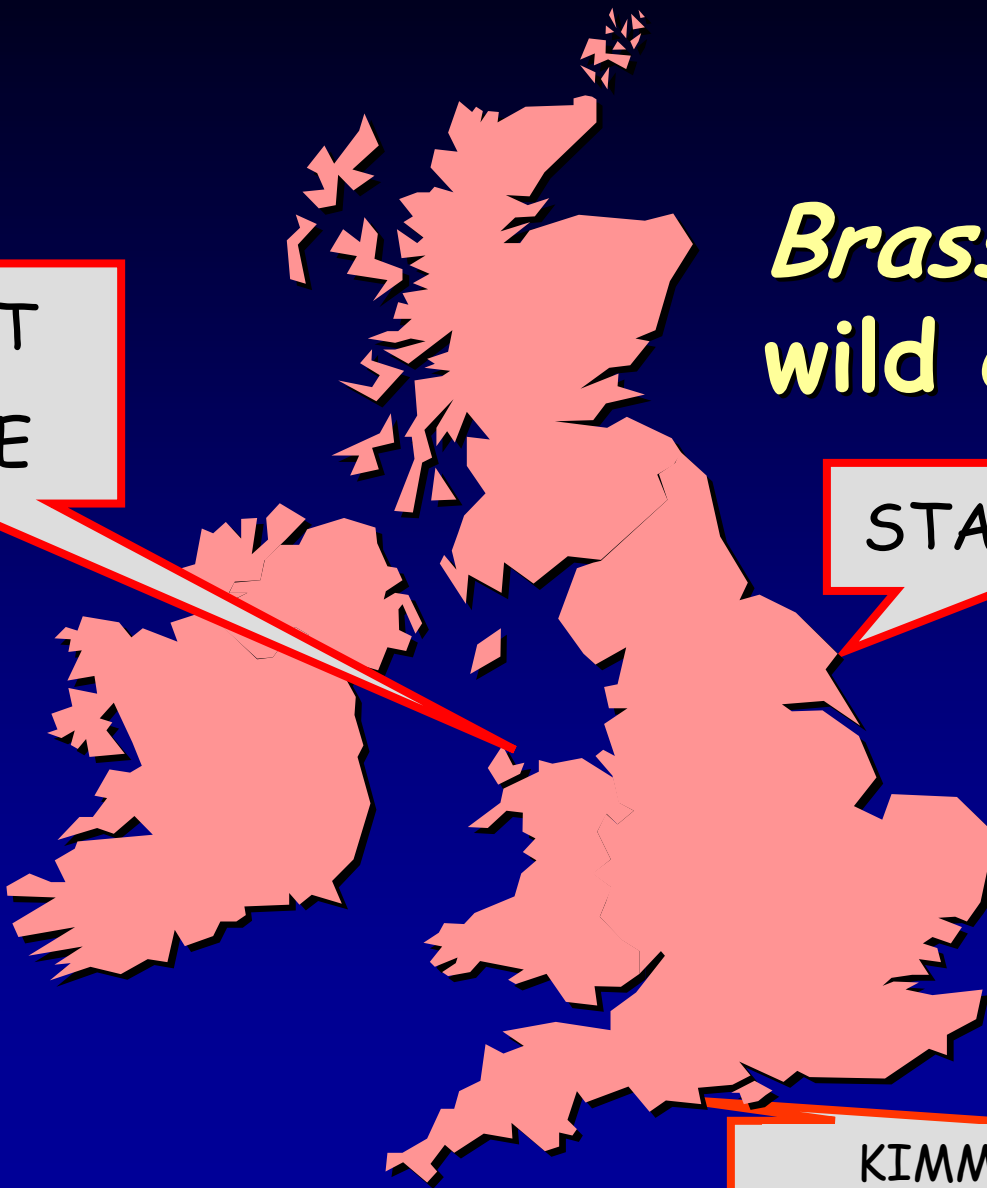
- To study host - virus co-adaptation in wild brassica and TuMV populations
- To elucidate the genomics of host-virus interactions in natural plant populations
- To identify plant genes involved in differential host responses to local and distant virus genotypes

*Brassica oleracea*  
wild cabbage

GREAT  
ORME

STAITHES

KIMMERIDGE  
CHAPMAN'S POOL  
WINSPIT



## 2. The susceptibility of cabbage to *Turnip mosaic virus* and *Beet western yellows virus*

Tina Payne

Josie Brough and

Judith Bambridge





- *Turnip mosaic virus* causes cigar burn of cabbage (internal necrotic spots)
- *Beet western yellows virus* (BWYV) causes tipburn

# 3. Resistance to TuMV in brassicas

Judith Bambridge  
Graham Teakle



# Sources of resistance to TuMV in *Brassica*

Plant line	Virus isolate (pathotype)			
	UK 1 (1)	CZE 1 (3)	CHN 5 (3)	CDN 1 (4)
N-o-1 ( <i>TuRB01</i> )	0	+ <sub>N</sub>	+ <sub>N</sub>	+
No. 2	0	+	+	+
No. 22 ( <i>TuRB03</i> )	+ <sub>N</sub>	+ <sub>N</sub>	+ <sub>N</sub>	0
Ap 1	+	+	R/+	+
Mag 1	0/R	R/+	+	+
Glob 1	0	R/+ <sub>N</sub>	+ <sub>N</sub>	+
165 ( <i>TuRB04 &amp; 5</i> )	0	0	0	+
V 1	0	0/+	0/R	+
'0-2'-5	0	0	R	0/R
No. 1	0	0	R	R
BP-8 ( <i>retr01 + ConTR01</i> )	R	R	R	R
BP-4	R/0	R/0	R	R/0
K185 (dominant)	0	0	N.T.	0

# 4. Exploiting *eIF4E*-based and associated broad-spectrum recessive resistance to potyviruses in dicots and monocots

Guy Barker  
Carol Jenner

with RRes on monocots



# Sources of resistance to TuMV in *Brassica*

Plant line	Virus isolate (pathotype)			
	UK 1 (1)	CZE 1 (3)	CHN 5 (3)	CDN 1 (4)
BP-8	R	R	R	R

*retr01 + ConTR01*

# Objectives

- Study natural allelic variation in *eIF4E* in *Brassica rapa* and possible role of *eIF(iso)4E* in broad-spectrum resistance
- Identify gene which in combination with *eIF4E* provides broad-spectrum resistance to TuMV
- Produce broadly applicable molecular markers for superior *eIF4E* alleles and the additional gene involved in the broad-spectrum resistance in *B. rapa*
- Molecular modelling simulation of *eIF4E* variants