



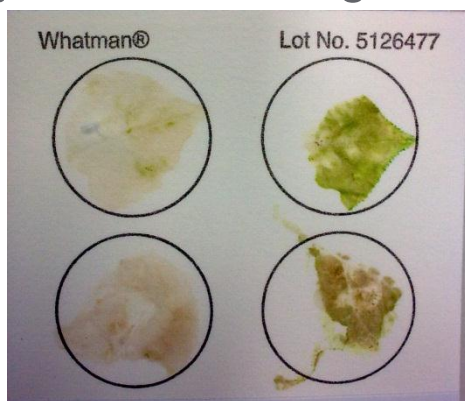
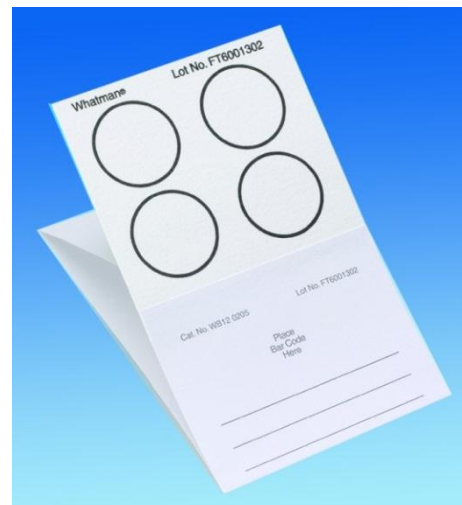
First results of an EU-wide genotype monitoring of *Phytophthora infestans* isolates using FTA cards

F. Meier-Runge, T. van den Bosch, M. Förch,
B. Evenhuis, G. Kessel, D. Cooke

Euroblight conference May 2013,
Limassol

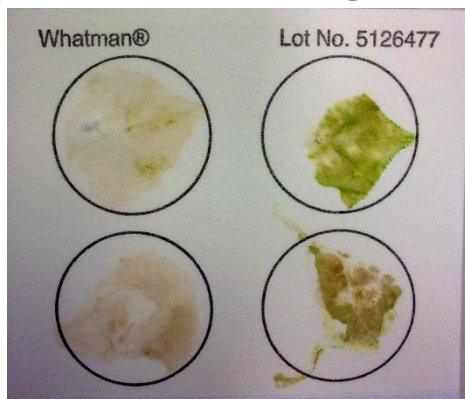
Methodology

- 2 – 4 samples (1 FTA card) per infected field sampled as far apart as possible
- Active, sporulating tissue
- Label card & fill out form
- Differentiate SSR genotypes (multiplex PCR → DNA fingerprinting) between 5 major clonal lineages known



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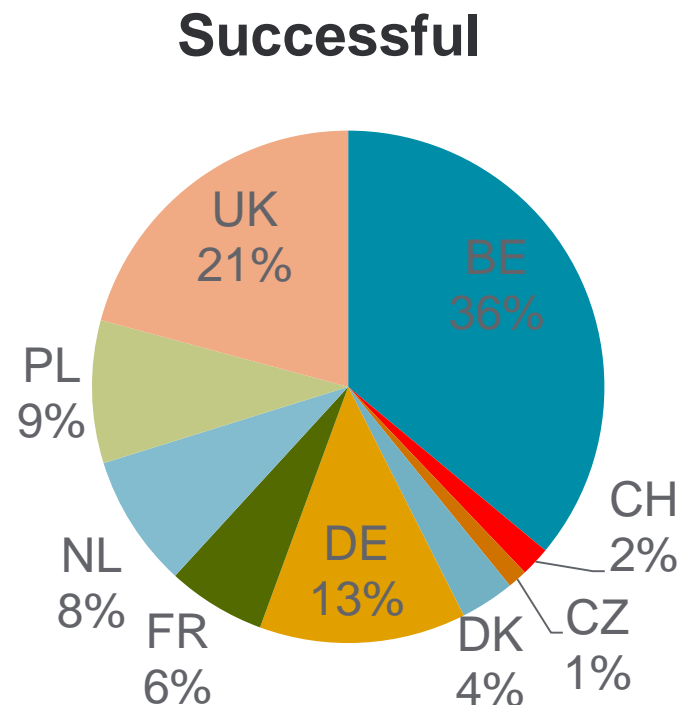


2012 GENOTYPE SAMPLING FORM *Phytophthora infestans*

Country	<input type="text"/>		
Sampler name	<input type="text"/>		
e-mail address	<input type="text"/>		
Date sampled	<input type="text"/>		
Trial number (or Farmer name)	<input type="text"/>		
Protocol number (if trial only)	<input type="text"/>		
Address (City) of Trial /Field	<input type="text"/>		
Postal Code or Region (Important!)	<input type="text"/>		
Variety of Potato	<input type="text"/>		
Disease level at sampling	HIGH / MEDIUM / LOW		
Product performance	GOOD / MODERATE / WEAK		
Applications			
Active ingredient or product name	Date of application	Timing (protective or curative)	Rate (g/ha)

322 Successful samples of 402 total

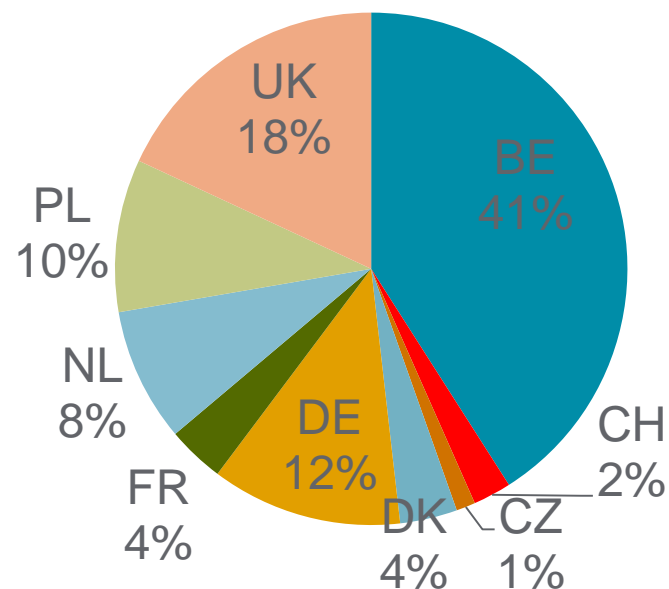
	Success	Failure	% Failure
BE	116	6	5%
CH	6	2	25%
CZ	4	0	0%
DK	11	1	8%
DE	42	22	34%
FR	20	0	0%
NL	27	1	4%
PL	29	43	60%
UK	67	5	7%
Total	322	80	20%
Total ex PL + DE	251	15	5%



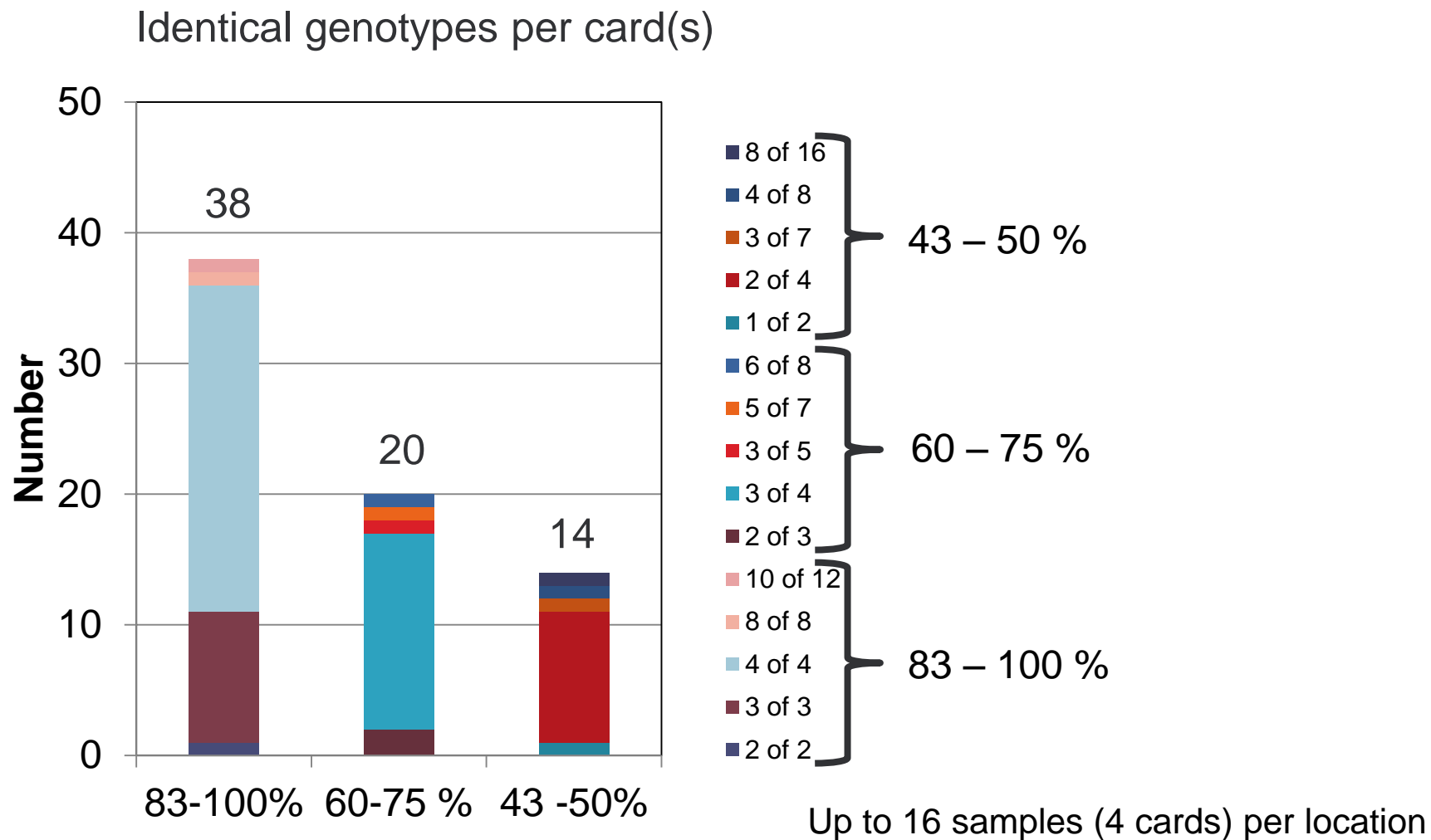
322 Successful samples from 83 locations

	Samples	Locations
BE	116	34 (38)
CH	6	2
CZ	4	1
DK	11	3
DE	42	10 (12)
FR	20	3 (5)
NL	27	7
PL	29	8
UK	67	15 (18)
total	322	83 (94)
more than one sample/location		72

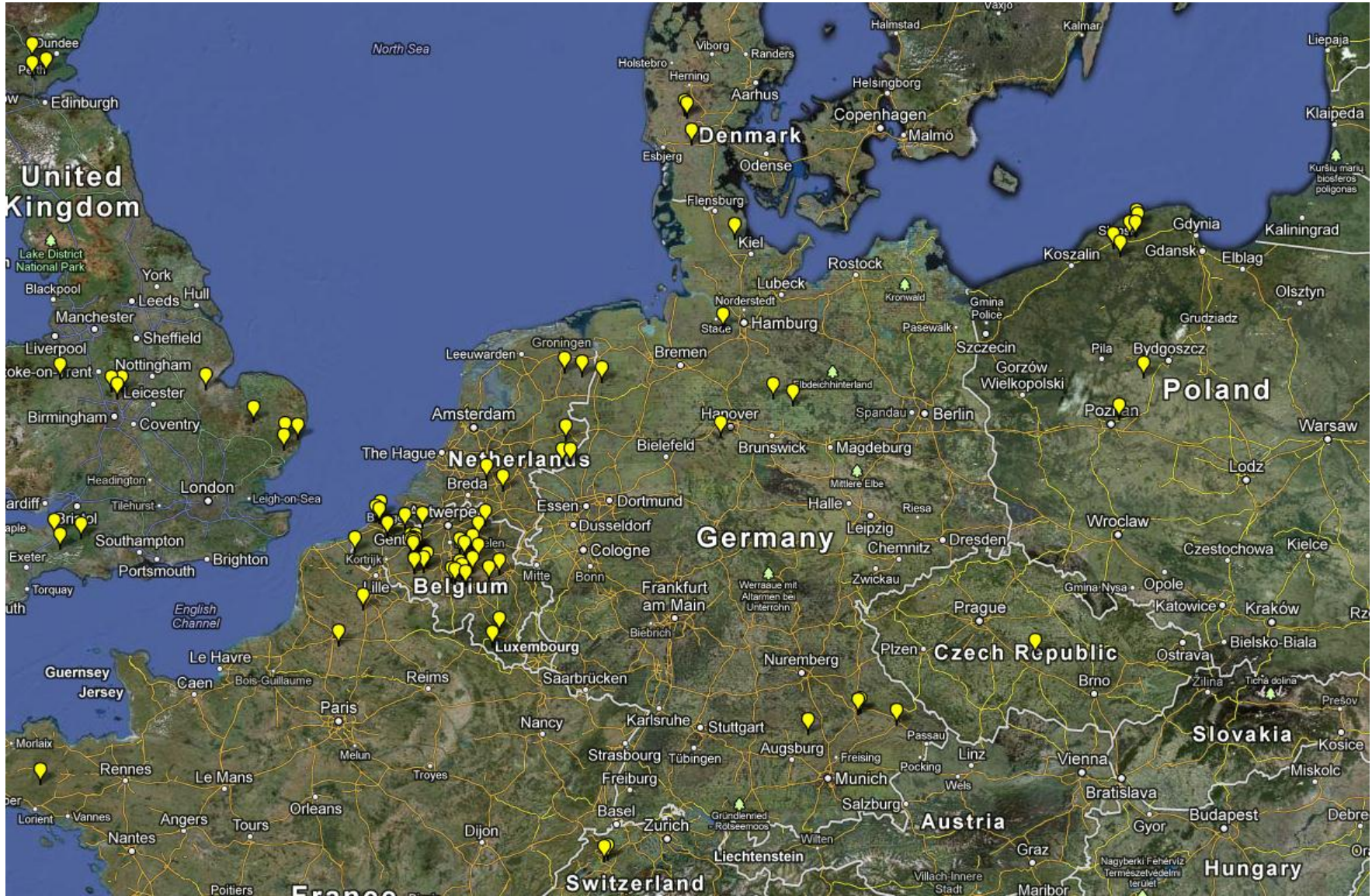
Locations



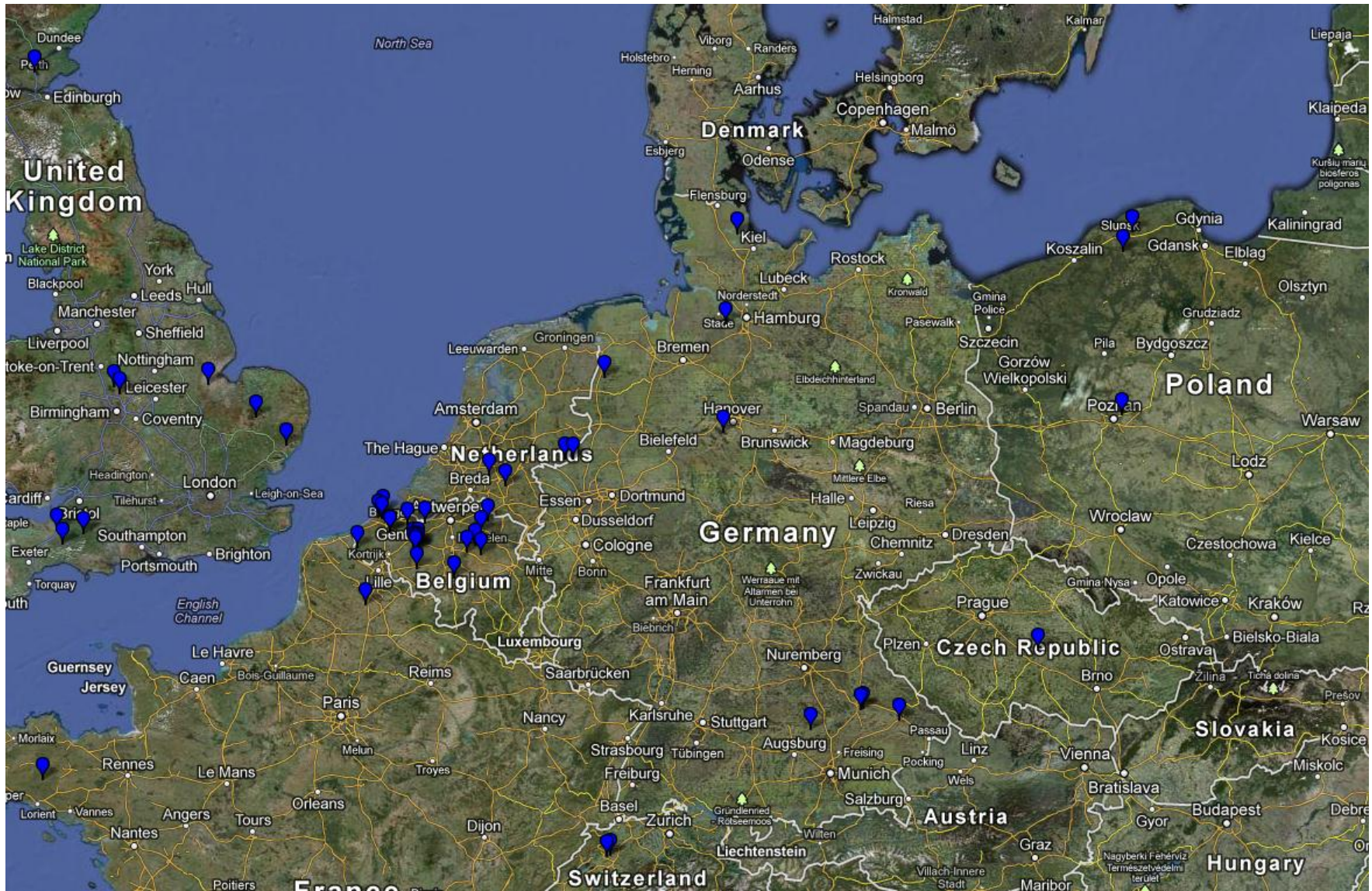
Variability at the 72 multi-sample locations



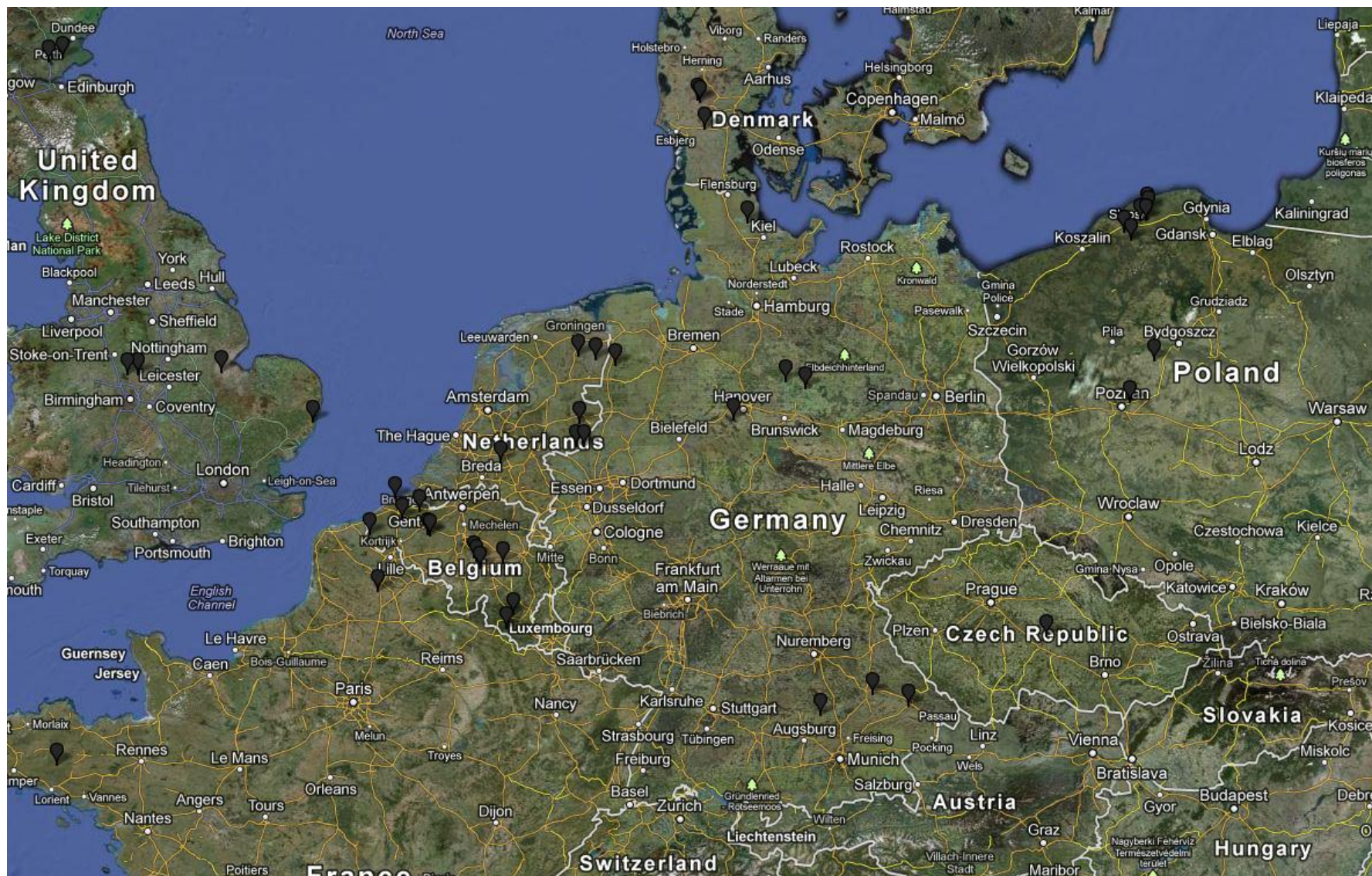
All sites with successful samples



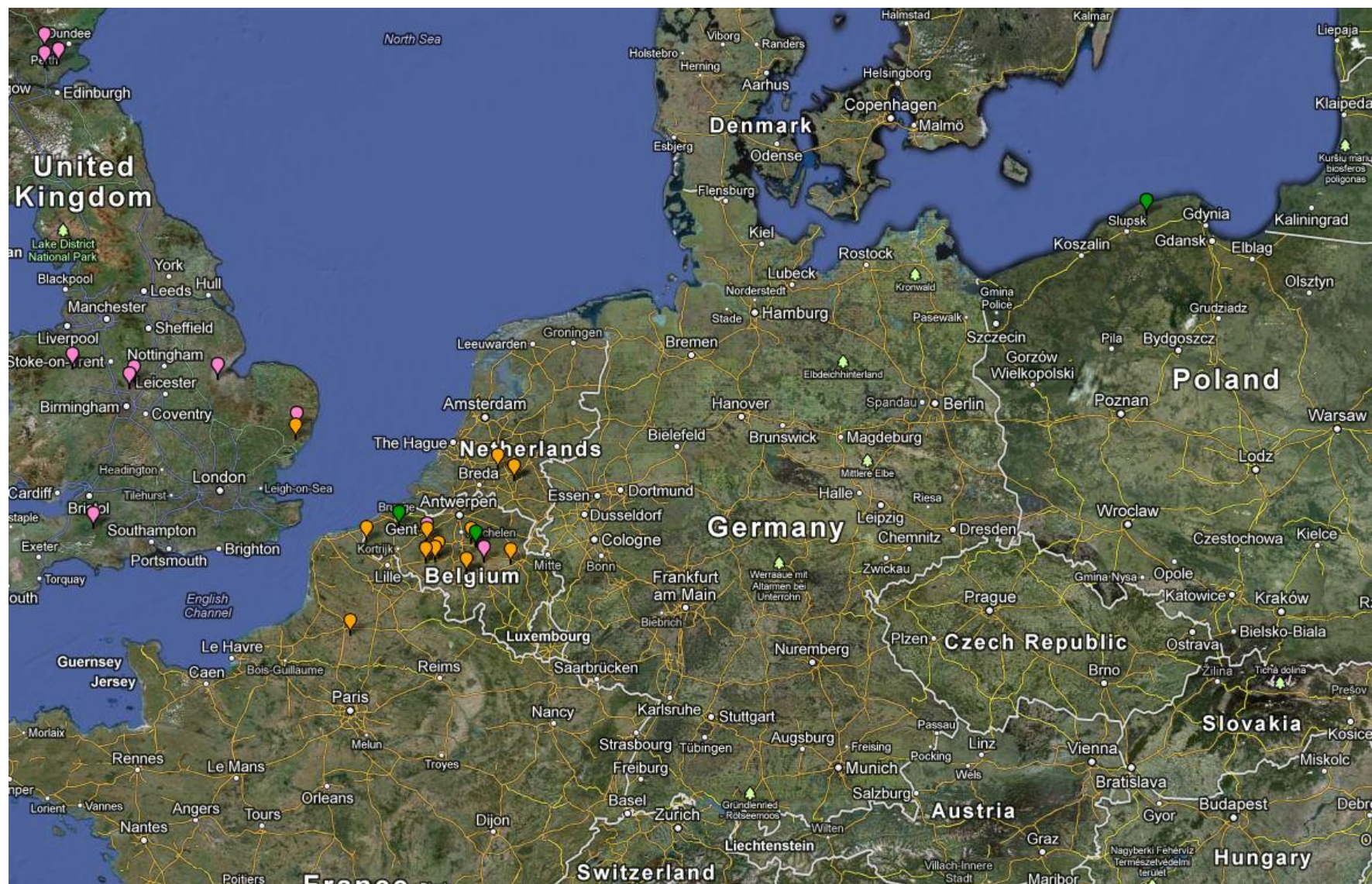
All sites with Blue 13 (13_A2)



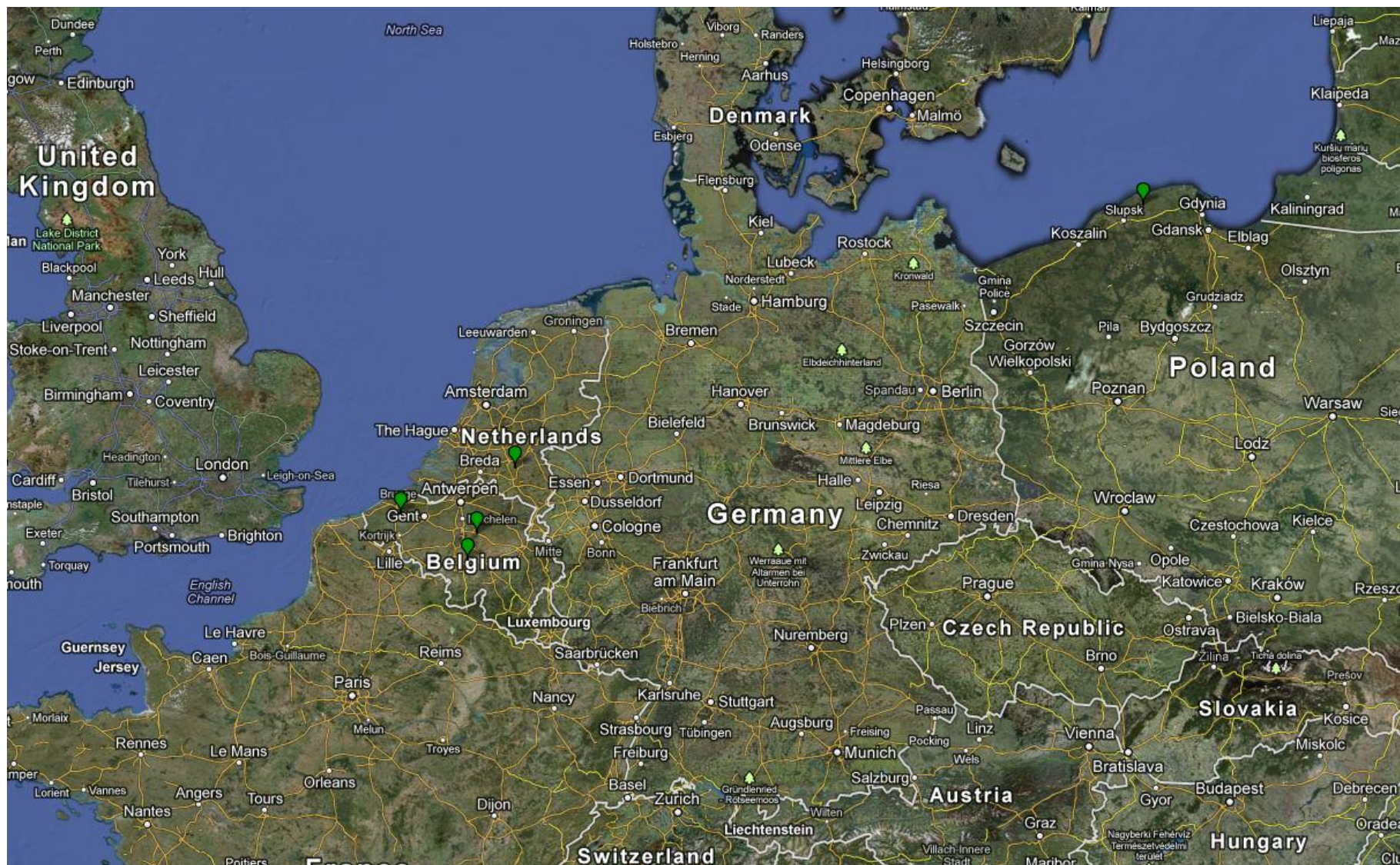
All sites with Others



All sites with Pink 6 (6_A1), GS008 (1_A1), Green 33 (33_A2)



All sites with Green 33



Blue13 and Green33 in the Netherlands



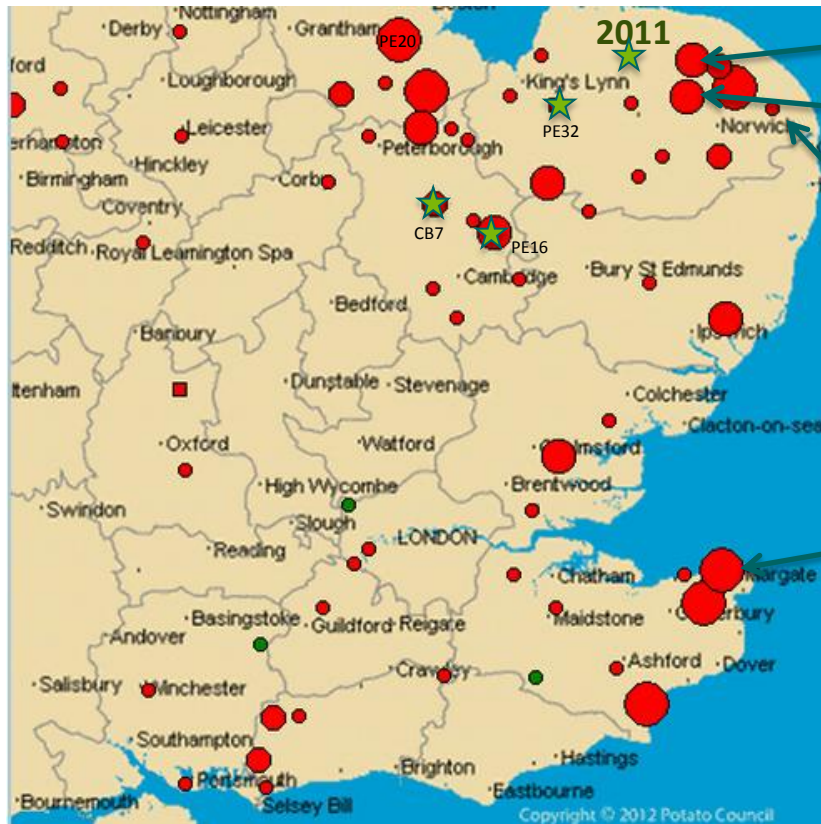


The James Hutton Institute

Green33 status in GB 2012

- green33 absent from early outbreaks. Found on volunteers in July & Aug. Also in tubers at the end of the season.

CB7	Cambs. Volunteer	30 July	scattered through field	3 isolates - green33,13_A2, misc
PE16	Cambs. Conventional	30 Oct (tuber blight)	severe	4 isolates - green33
PE32	Norfolk Volunteer	1 Aug	scattered through field	4 isolates - green33, 13_A2, 6_A1



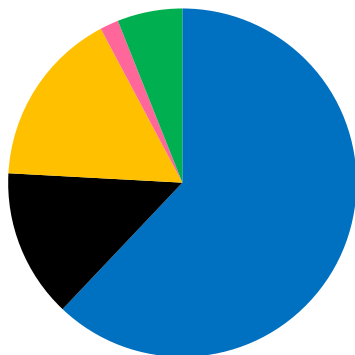
NR11	28 Jun	6_A1
NR10	22 Jun	6_A1
NR10	26 Jun	6_A1 & 13_A2
NR10	4 Jul	6_A1
NR29	2 Jul	13_A2
PE20	26 Jun	6_A1
PE20	3 Jul	6_A1
CT7	13 Jun	13_A2
CT7	14 Jun	13_A2

Overall distribution of genotypes

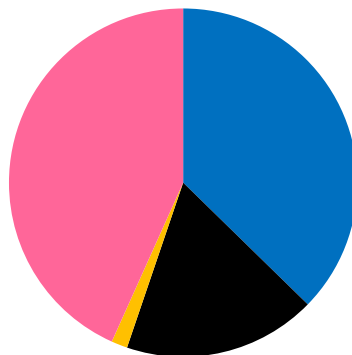
	Blue13	Green33	GS008	Pink6	Other	failure	Total samples
Belgium	72	7	19	2	16	6	122
Czech Republic	1				3		4
Denmark					11	1	12
France	9		8		3		20
Germany	21				21	22	64
Netherlands	8	1	2		16	1	28
Poland	3	1			25	43	72
Switzerland	6					2	8
United Kingdom	25		1	29	12	5	72
Total (#)	145	9	30	31	107	80	402
Relative (%)	45.0	2.8	9.3	9.6	33.2		100.0

Overall distribution of genotypes (> 19 successful samples)

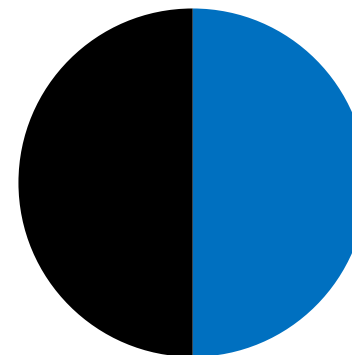
Belgium (116)



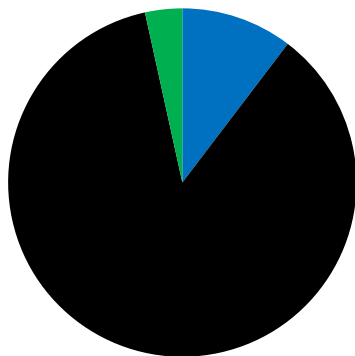
United Kingdom (67)



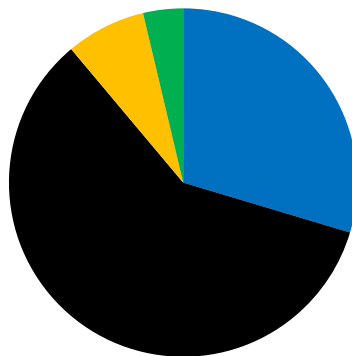
Germany (42)



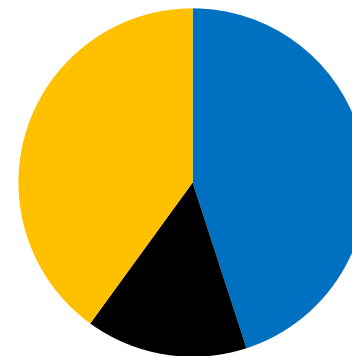
Poland (29)



Netherlands (27)



France (20)



■ Blue13 ■ Other ■ GS008 ■ Pink6 ■ Green33

Summary

- In general good success rate of the methodology (5 % failures)
- Too many sample failures in PL and DE
- About 50 % of multi sample cards with identical genotype, 80 % with a dominant genotype
- Blue 13 and “Others” are major genotypes across all countries
- Pink 6 only dominant in UK, minor in BE
- GS008 important in FR and BE, minor in NL and UK
- Green 33 minor in BE, one occurrence in PL and NL only (but also detected in UK by D. Cooke)
- Some subtypes of Blue13 determined (eg. SSR8, SSR11, D13, G11, Pi4B and combinations)

Reccomendations for 2013

- Ask the samplers to add GPS coordinates in the sampling sheet
- Ask the samplers to sample only clear vital lesions of late blight (sampling in the early morning?)
- Produce a video to show how to put the leaf tissue on the FTA card
- Reduce the number of samples per card to 2 and increase locations
- Avoid taking samples out of efficacy trials, especially when inoculated or from treated plots
- Avoid taking samples for different cards from the same or close locations (even when different varieties or sampling dates)