Valuing variety – understanding and using crop diversity in carrots

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About the UK Vegetable Genebank

A repository for the conservation of global vegetable crop genetic diversity

14,000 seed samples

47 vegetable and herb crops

520 million seeds

Our collections are globally significant

Seed originates from 108 countries

Crops we work with

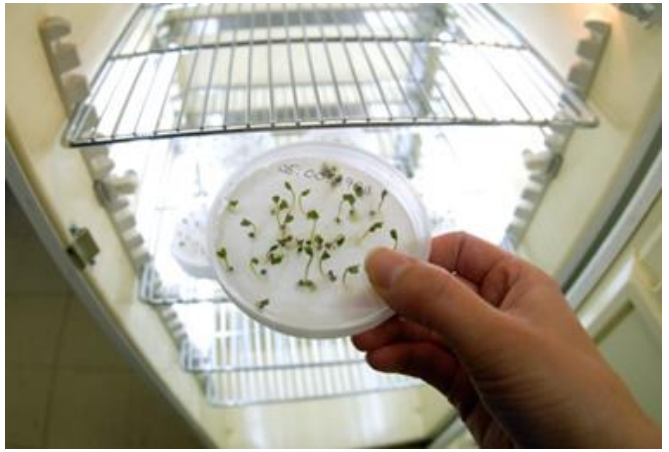



Total number of Accessions	**~14000**
Brassica (cabbage and related crops)	5273
Allium (onions, leeks)	1754
Daucus (carrot)	1481
Lactuca (lettuce)	1483
Raphanus (radish)	803



What we do

- **Conservation activity**
  - Seed storage at -20^{o}C
  - Monitor germination
  - Regeneration of samples
- **Seed distribution**
- **Information management**
- **UK and international collaboration**



THE ORIGIN OF CROP VARIETIES

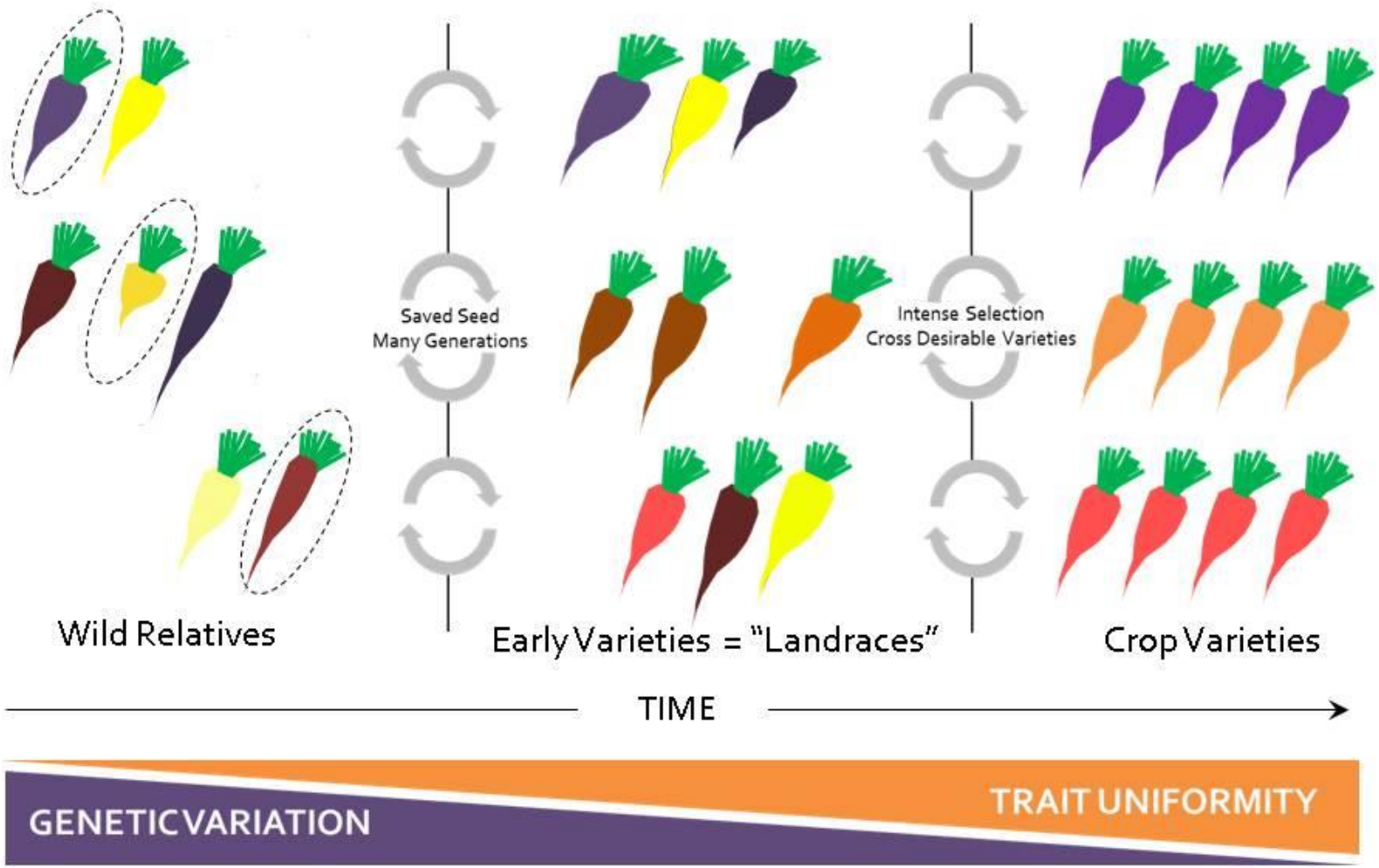
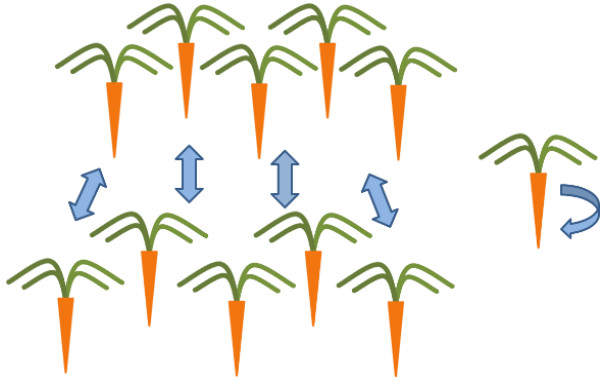


Figure source: https://nas-sites.org/ge-crops/2014/11/18/webinar-january-27/


FASCINATING! I'LL TAKE ONE OF EVERYTHING PLEASE!

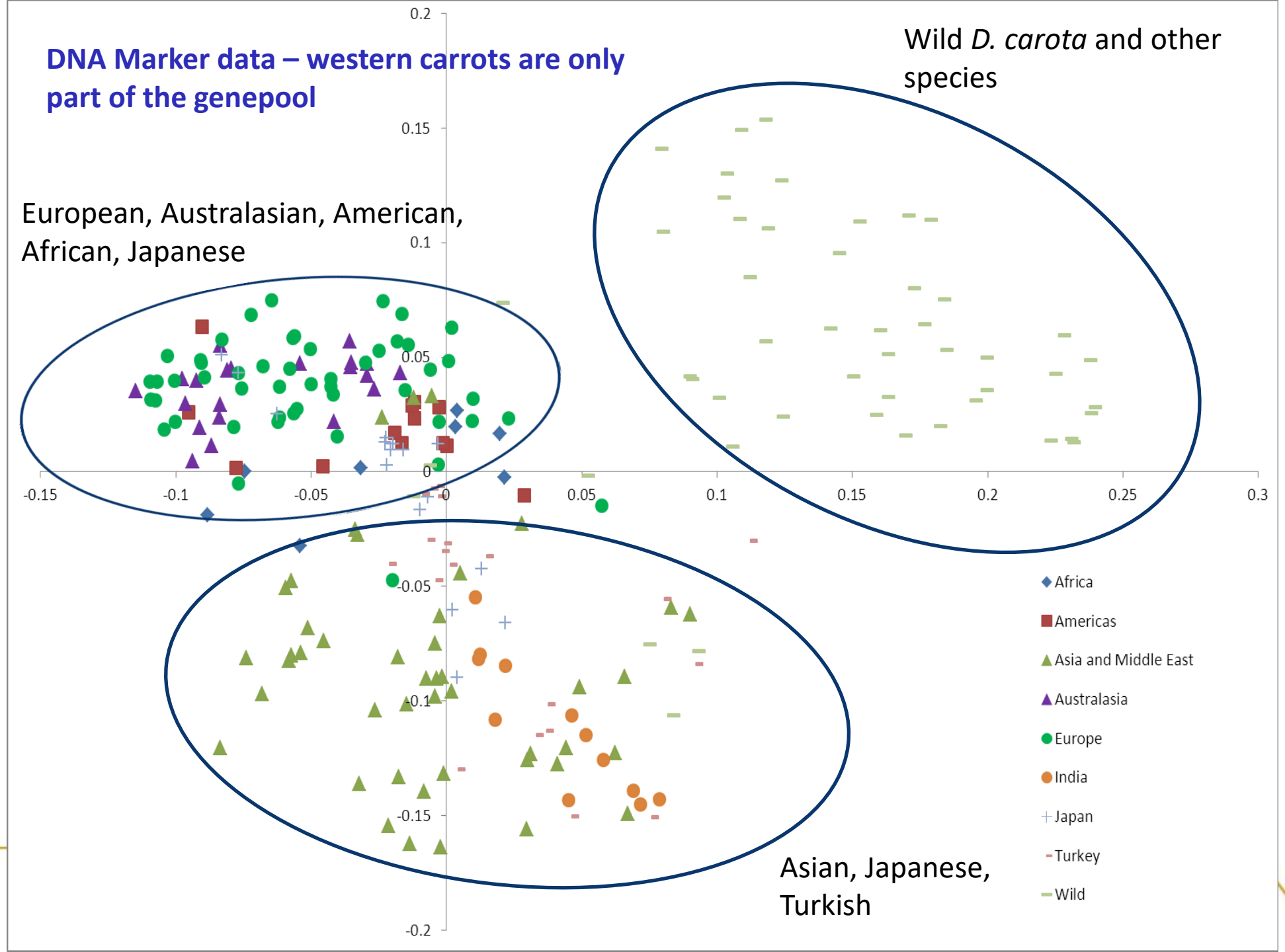
Accessing carrot diversity - The Vegetable Genetic Improvement Network



Carrot Diversity Set

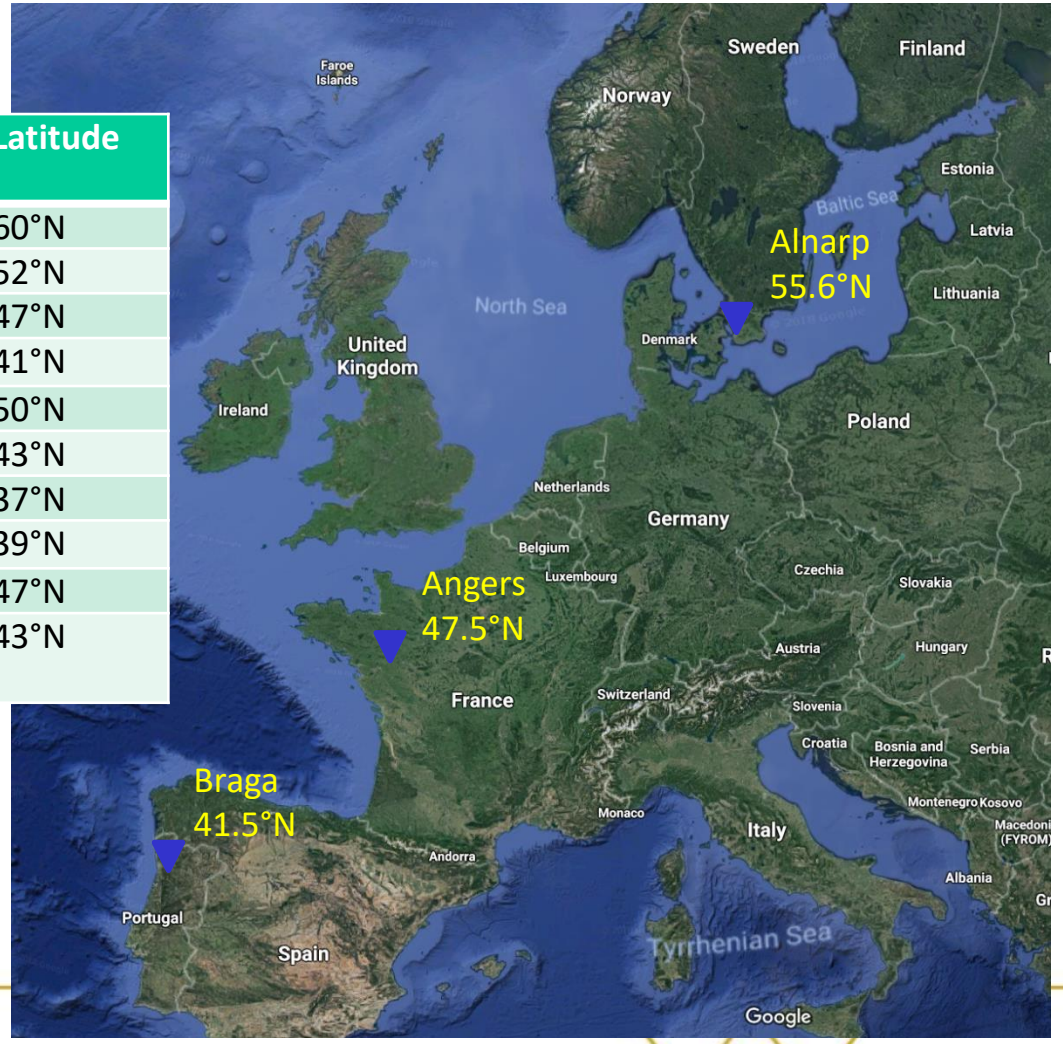
- Material from 35 countries
- 77 samples/accessions from UKVGB
- 10 experimental lines
- Space for 7-9 elite cultivars

DNA Marker data – western carrots are only part of the genepool



CarrotDiverse – Collaborative EU project to understand diversity in wild carrots

N°	Taxon	Country of origin	Habitat	Accession ID	Latitude
1	*D. carota* ssp. *carota*	Norway	unknown	NGB21386	60°N
2	*D. carota* ssp. *carota*	UK	continental	HRI8001	52°N
3	*D. carota* ssp. *carota*	France	continental	ACO/IRHS 886	47°N
4	*D. carota* ssp. *carota*	Portugal	continental	BPGV 08159	41°N
5	*D. carota* ssp. *gummifer*	UK	sea coast (Atlantic)	HRI 8716	50°N
6	*D. carota* ssp. *gummifer*	France	sea coast (Atlantic)	ACO/IRHS 710	43°N
7	*D. carota* ssp. *hispidus*	Portugal	sea coast (Atlantic)	BPGV08432	37°N
8	*D. carota* ssp. *maximus*	Portugal	continental	BPGV08391	39°N
9	*D. carota* ssp. *gadecaei*	France	sea coast (Atlantic)	ACO/IRHS 715	47°N
10	*D. carota* ssp. *maritimus*	France	sea coast (Mediterranean)	ACO/IRHS 706	43°N



Experimental Design

- 3 replicate blocks of 20 transplanted plants per site
- Traits assessed on 12 plants per block (following Soldberg and Yndgaard, 2015)

Willow Carrot Aphid

Direct damage of crops

Transmission of viruses such as CYLV, CMD

Hoe to control?

Can breeding offer a solution?

Is there a difference in suitability of different carrot varieties as host plants for the aphid?

https://www.naturespot.org.uk/species/willow-carrot-aphid
Graham Calow

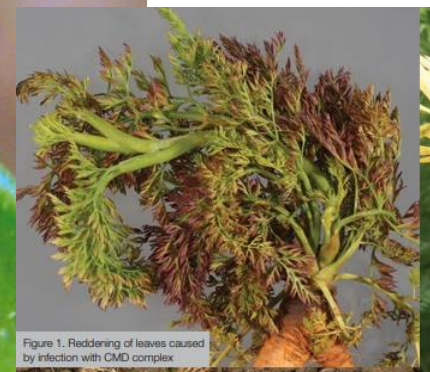


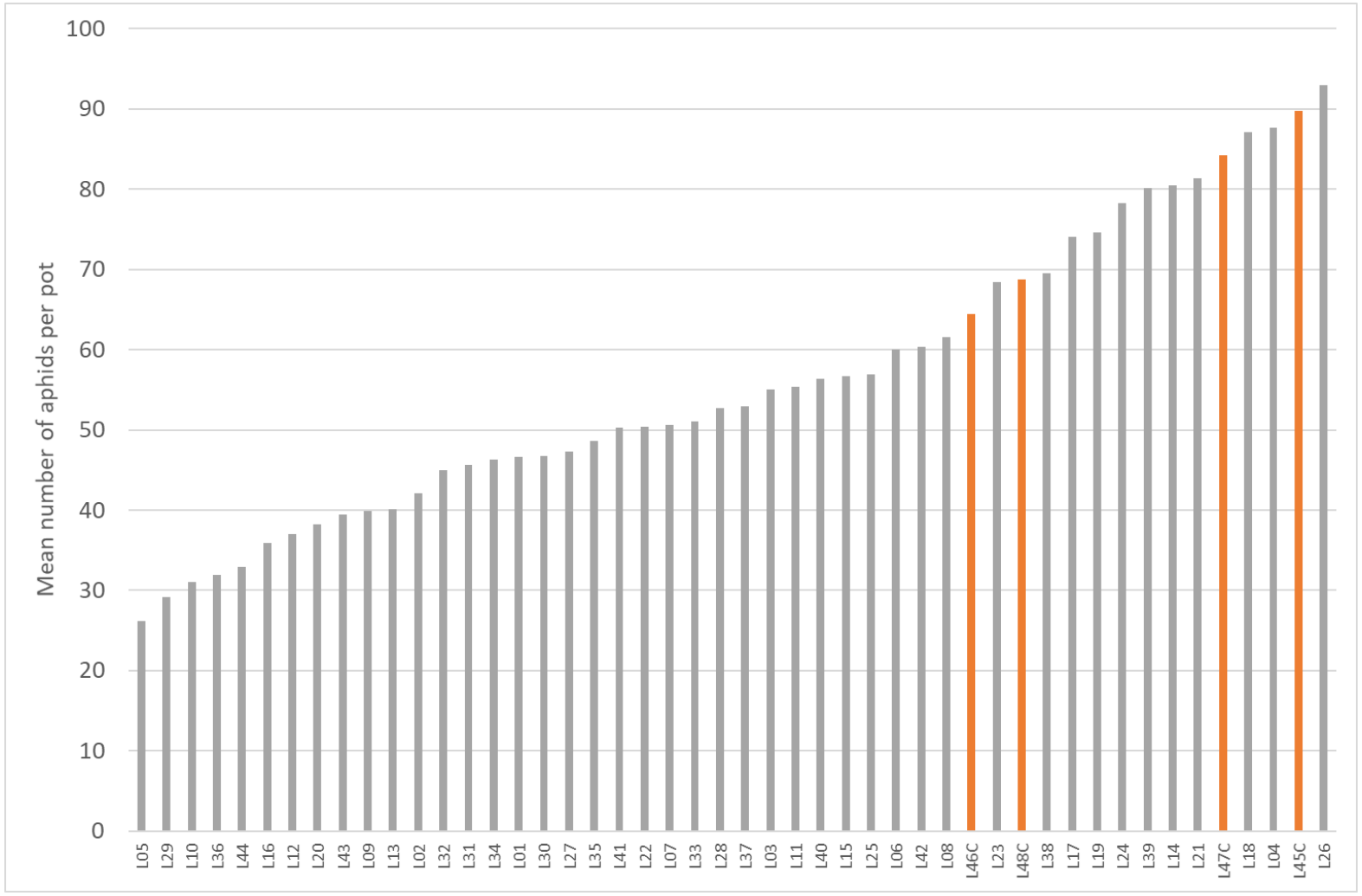
Figure 1. Reddening of leaves caused by infection with CMD complex

Figure 2. Symptoms of viral infection in carrot – Seedling death (necrosis) caused by PYFV

Figure 3. Yellowing of leaves caused by infection with CYLV

AHDB FACTSHEET 07/16

Do some carrot types support more aphids than others?



Data - Lauren McDougall, Rosemary Collier

Thank you for listening

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