

Helping Scotland Grow

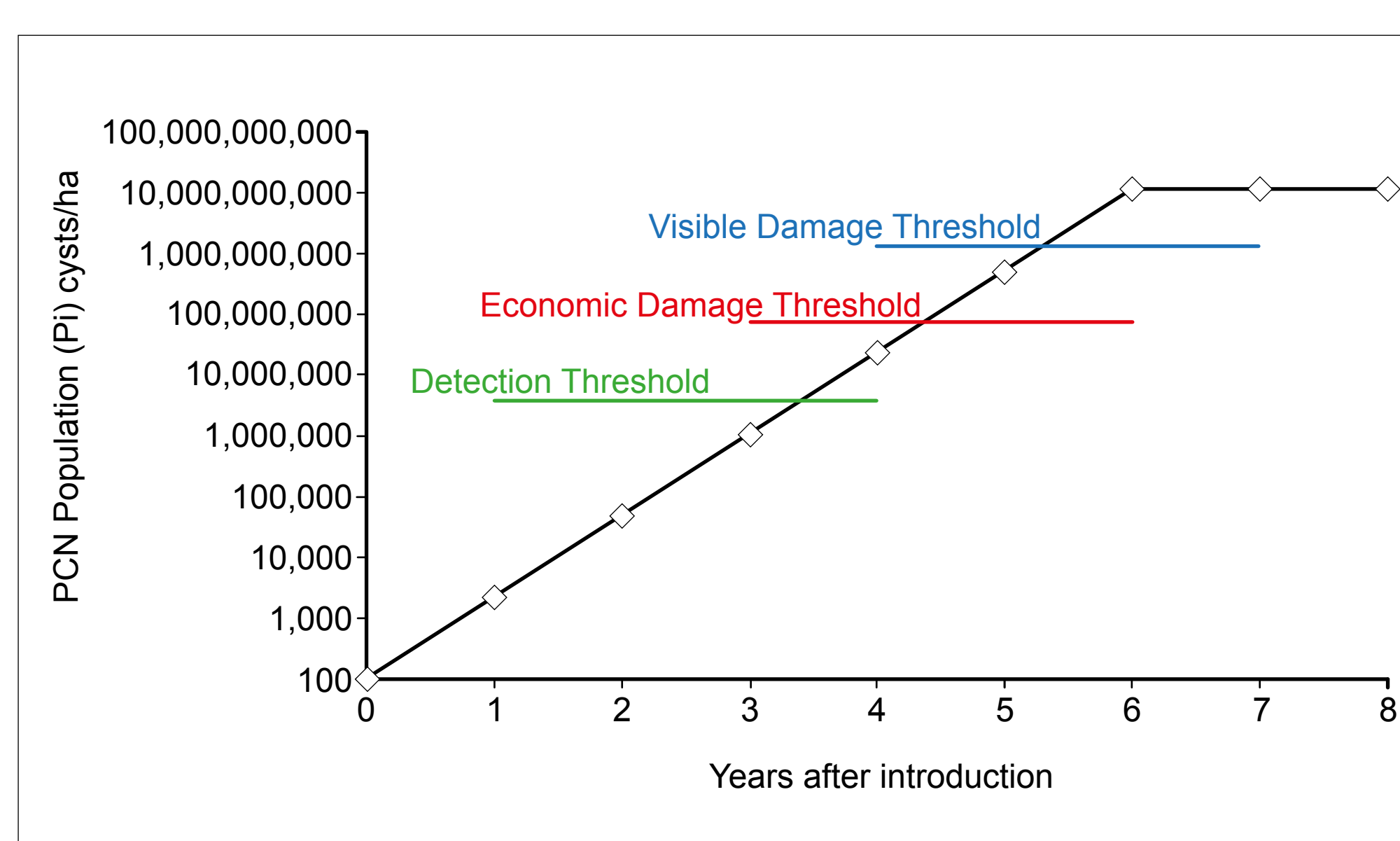
AHDB Project on Optimal Soil Sampling for PCN

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- Early detection helps prevent the spread of potato cyst nematodes (PCN).
- In one hectare of soil the top 20cm contains approx. 2,000,000 litres of soil.
- Each cyst is less than 1mm in diameter therefore detection is very challenging.
- By the time that one cyst is found, PCN populations will be in the millions.
- Each cyst contains about 400 eggs, and will multiply rapidly in the presence of a susceptible host.



Scale of field to sample.



PCN population by year with susceptible host (adapted from Spears, 1968).



PCN *Globodera pallida*.

- PCN detection – to determine whether PCN (cysts) are present or absent.
 - Testing for detection of PCN is an EU requirement for seed land but also useful for ware land if unknown PCN status. The amount of soil tested and the number of cysts in the land determines the likelihood of detection.

Corer diameter (mm)	Depth (cm)	Cores per ha	Volume (ml) of soil collected (per ha)	Approx dry weight soil (g) per ha*	Amount (g) of sample processed	Probability of detection	Comments
13	25	49	1625	2600	2600	67%	
13	25	49	1625	2600	1000	48%	
13	25	49	1625	2600	600	38%	
13	25	49	1625	2600	400	31%	
13	25	49	1625	2600	200	20%	
13	25	100	3319	5310	400	39%	
18	6	100	1500	2400	2400	81%	Standard seed sampling rate
11	4	100	400	640	640	40%	Reduced seed sampling rate

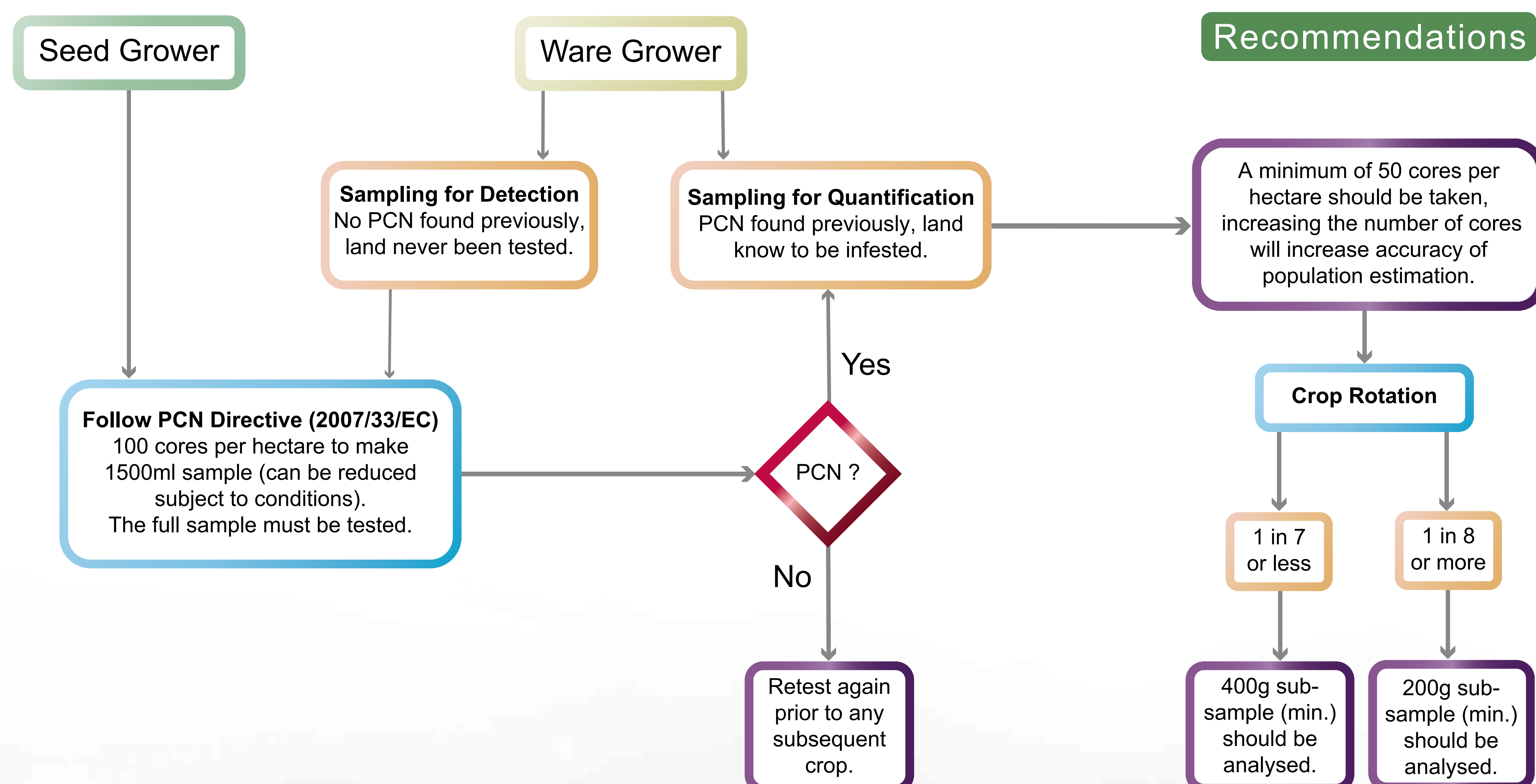
Likelihood of detection when 5m cysts present in 1ha dependent on amount of soil processed *based on a bulk density of 1.6kg/cm³.

- PCN quantification – to estimate the population of PCN (eggs).
 - Useful to underpin management decisions.
 - Helps determine effectiveness of previous control measures.
 - Allows hot spots to be targeted with sterilants.

The size of sub-sample tested and number of cores determines accuracy of estimations.

Subsample	Target Population =10 eggs/g							
	50g		100g		200g		400g	
Eggs per cyst	Lower CL	Upper CL	Lower CL	Upper CL	Lower CL	Upper CL	Lower CL	Upper CL
1	7.1	12.9	7.2	12.8	7.2	12.8	7.3	12.8
10	6.1	13.9	6.7	13.4	6.9	13.1	7.1	12.9
50	3.3	16.8	4.9	15.1	5.9	14.1	6.6	13.5
200	0.0	22.6	0.9	19.1	3.4	16.6	5.0	15.0

Confidence limits for population estimation where actual population is 10 eggs per gram depending on size of sub-sample tested.



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