

SASA



Potato cyst nematodes in Scotland:

Where are we now and where are we heading?

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The future threat of PCN in Scotland



Plant
Health
Centre

Scotland's Centre of Expertise

Objectives

- Review control options in Scotland and other countries
- Model future risks of both *G. rostochiensis* and *G. pallida*
- Understand grower behaviours and attitudes to interventions
- Economic analysis of likely impact in Scotland based on a range of possible interventions

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PCN testing of seed land

- ❖ 1973: all land intended for seed potato production tested and found free from potato cyst nematodes (PCN) (*Globodera pallida* and *G. rostochiensis*):
 - 600ml soil/4 ha

- ❖ 2010: implementation of 2007 EU PCN Directive:
 - sampling rate (400 or 1500ml/ha)

- ❖ Land in which PCN is found is ‘recorded’ until no PCN are found at a subsequent ‘derecording’ test

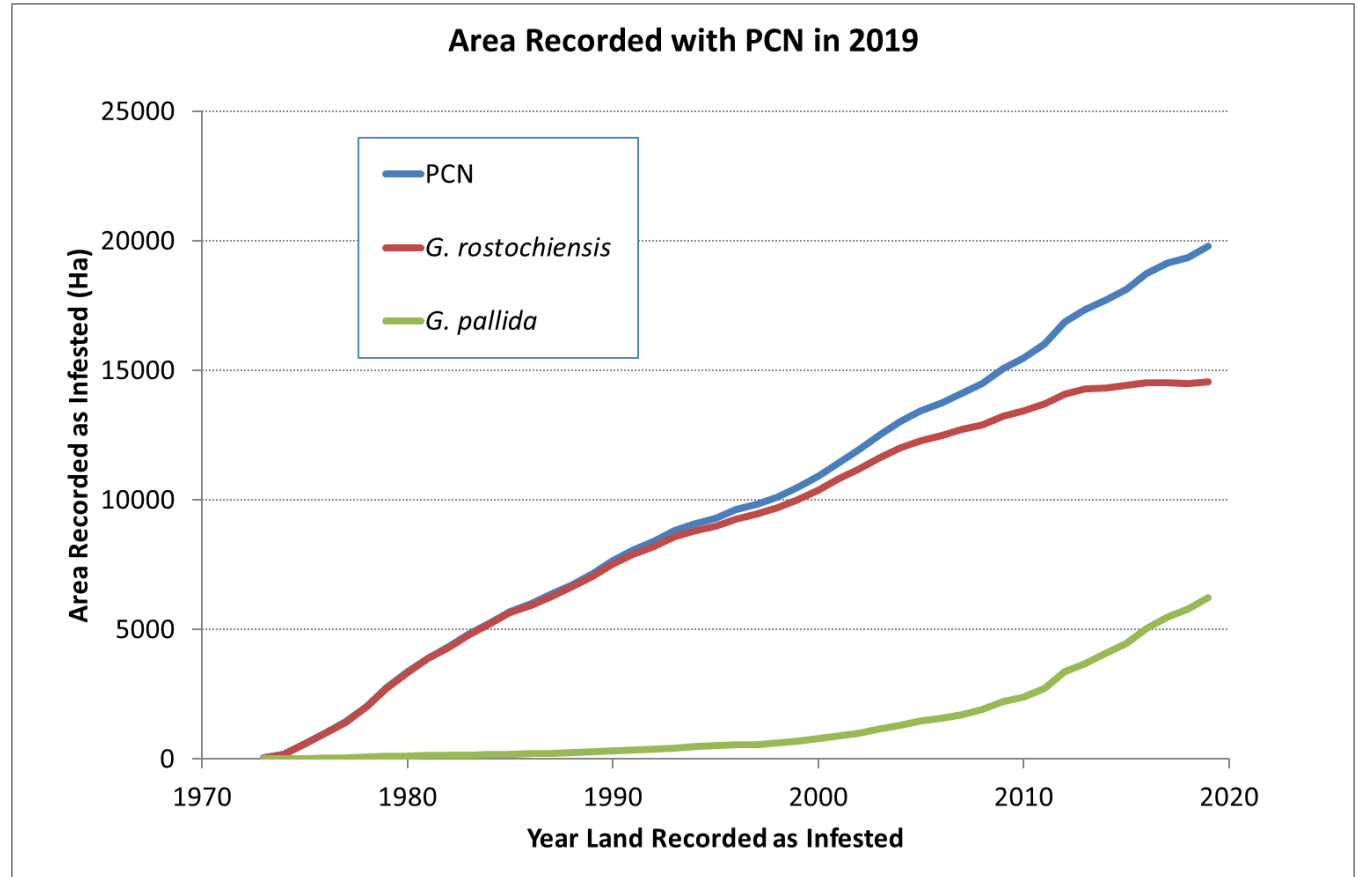


Register of PCN Infested Land by County - 2019

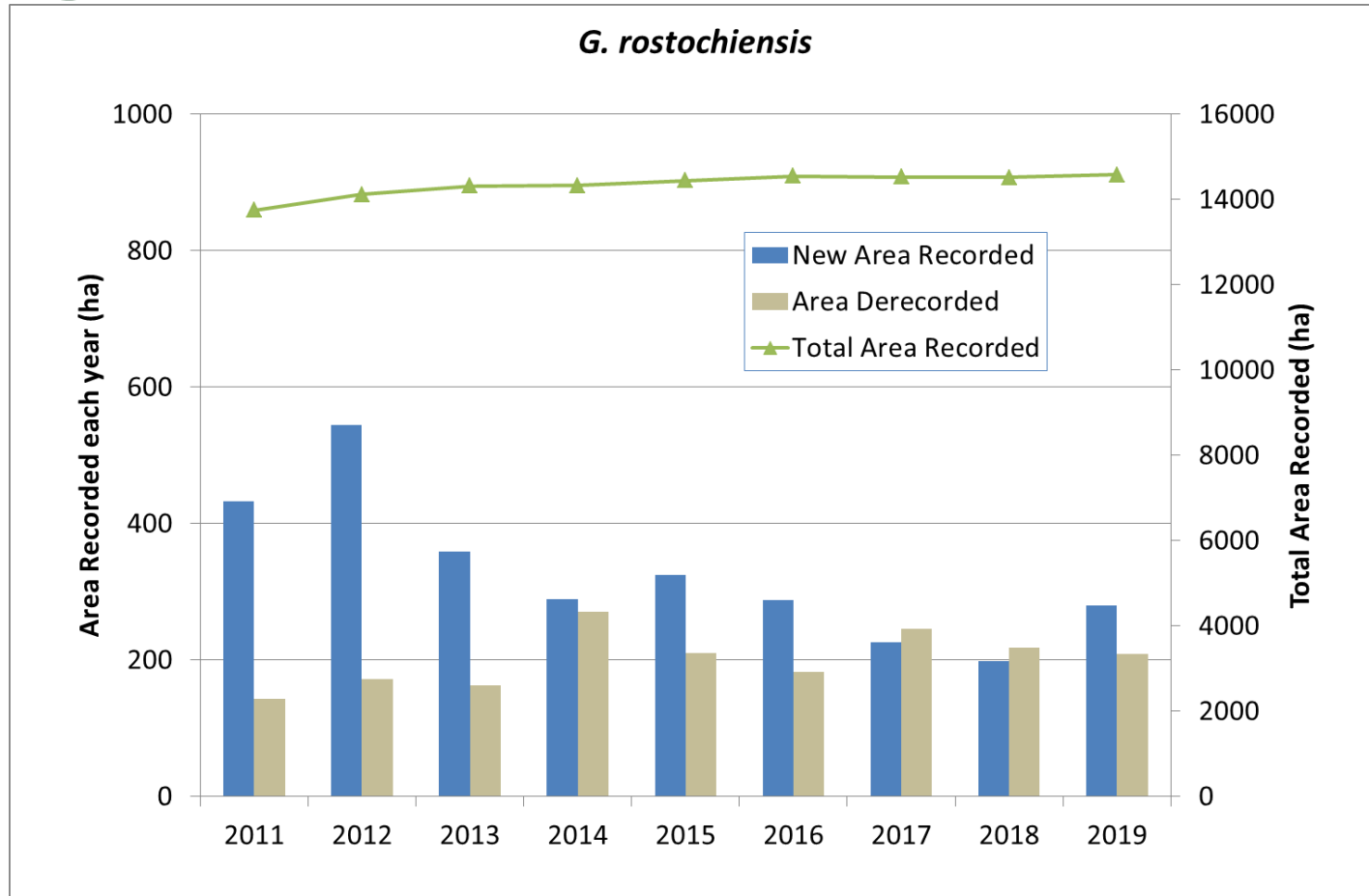
County	Area with PCN (Ha)	Area with <i>G. pallida</i> (Ha)	Area with <i>G. rostoch.</i> (Ha)	Potato Area 2011-16 (Ha)	Estimated Incidence of PCN (%)	Estimated Incidence of <i>G. pallida</i>	Estimated Incidence of <i>G. rostoch.</i>
Angus	8918	4143	5330	49655	18.0%	8.3%	10.7%
Perth	3646	698	3085	23392	15.6%	3.0%	13.2%
Fife	3404	317	3174	13542	25.1%	2.3%	23.4%
Aberdeen	811	250	615	12527	6.5%	2.0%	4.9%
Kincardine	1075	333	805	9487	11.3%	3.5%	8.5%
East Lothian	267	72	197	7665	3.5%	0.9%	2.6%
Berwick	129	31	98	6615	2.0%	0.5%	1.5%
Ross	87	2	85	5706	1.5%	0.0%	1.5%
Moray	397	101	324	4678	8.5%	2.2%	6.9%
Roxburgh	117	56	83	4252	2.8%	1.3%	2.0%
Banff	280	101	193	3777	7.4%	2.7%	5.1%
Others	672	138	566	8281	8.1%	1.7%	6.8%
Scotland	19803	6242	14557	149577	13.2%	4.2%	9.7%

PCN in Scotland: Recorded Infestations to 2019

- 19,803 ha recorded as infested with PCN
- 150,000 ha of land used for potatoes?
- SG: 13.2% of Scottish potato land recorded as infested with PCN

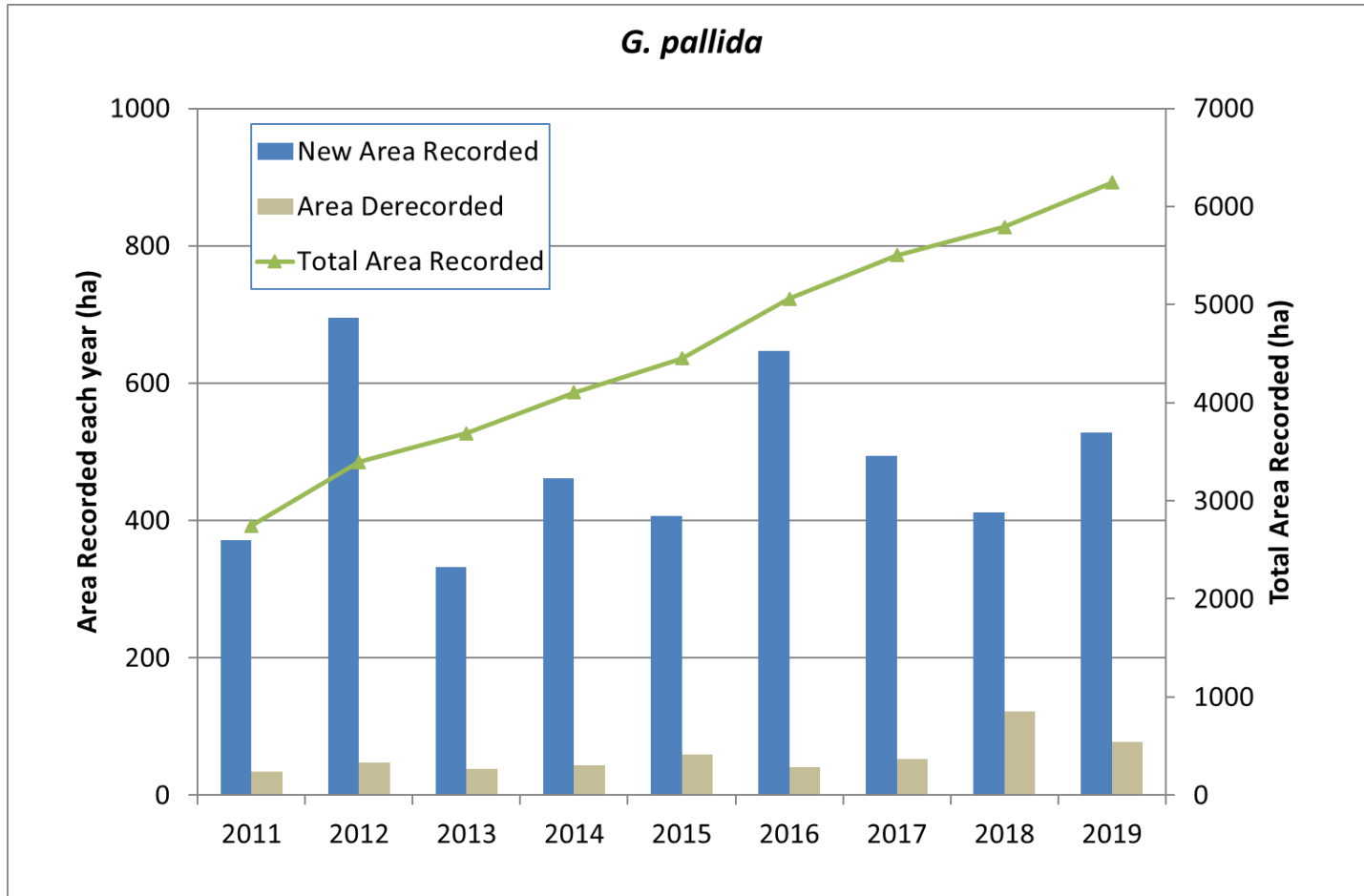


Change in *G. rostochiensis* Infested Land 2011-19



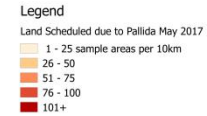
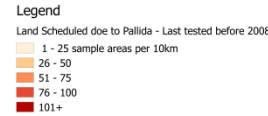
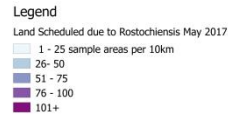
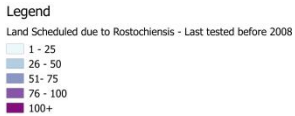
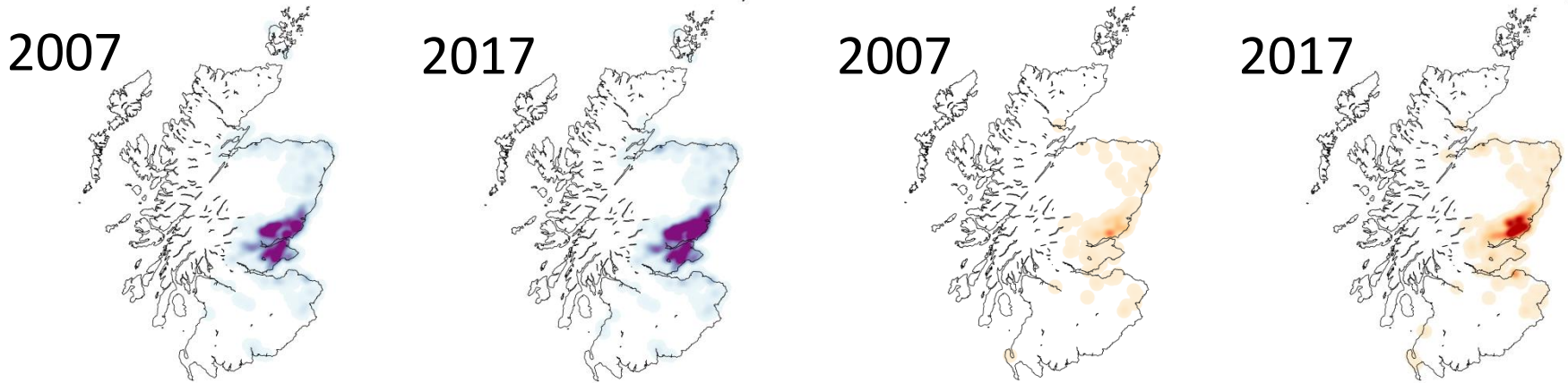
63% of *G. rostochiensis* derecording tests are clear of PCN
 27% contain *G. rostochiensis*; 15% contain *G. pallida*

Change in *G. pallida* Infested Land 2011-19



51% of *G. pallida* derecording tests are clear of PCN
 46% contain *G. pallida*; 7% contain *G. rostochiensis*

PCN in Seed Land: 2007 and 2017

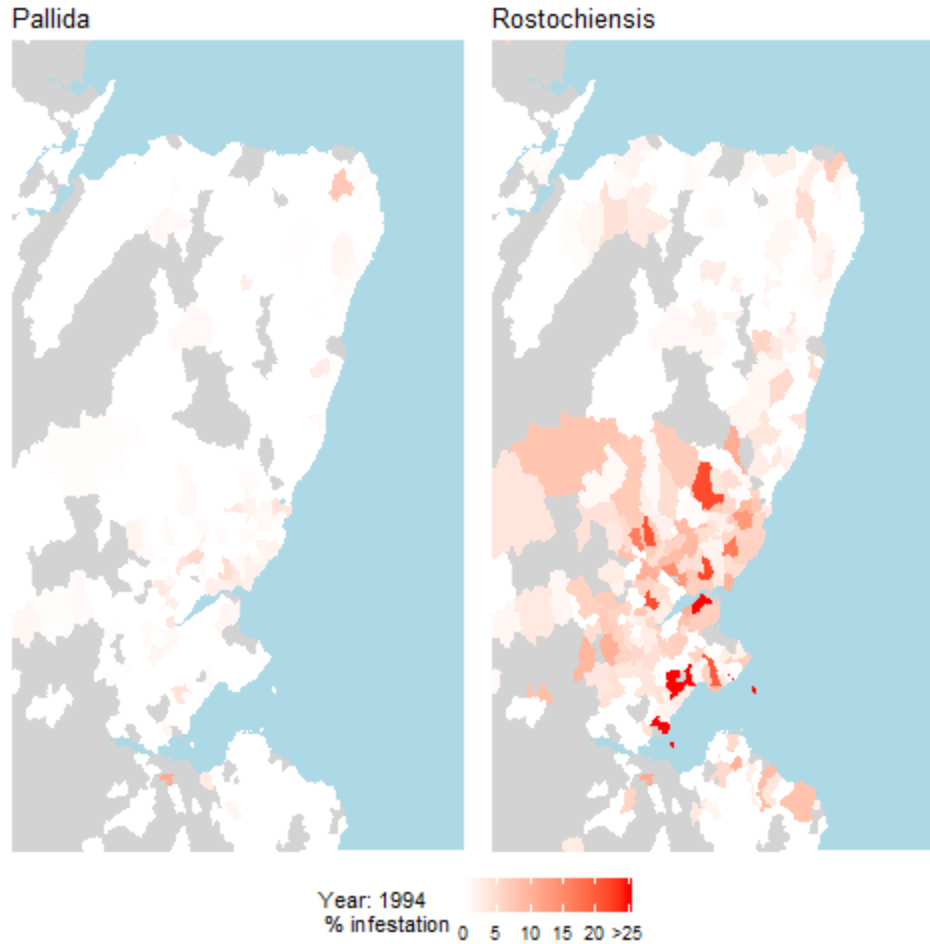


G. rostochiensis

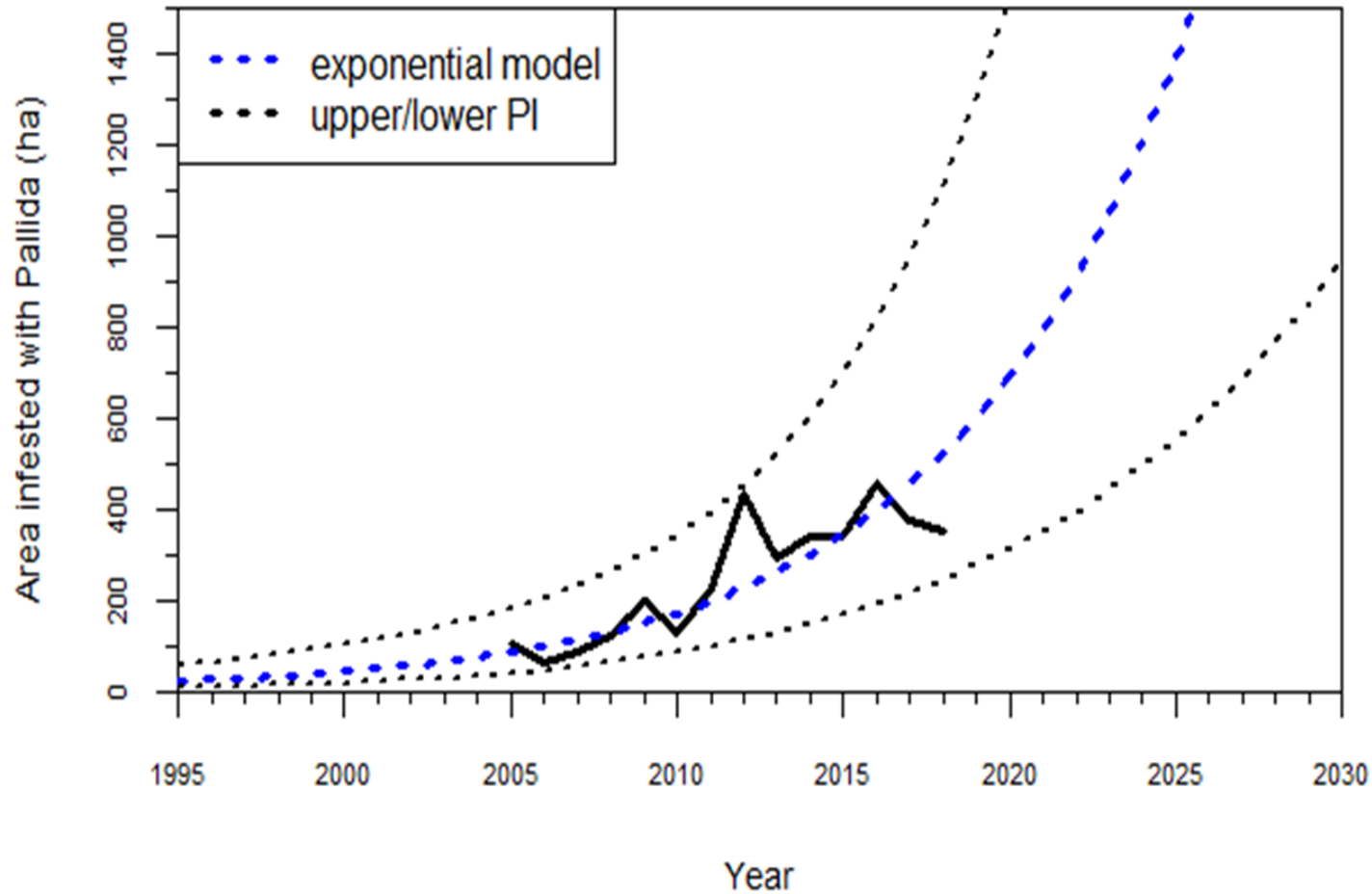
G. pallida

<i>G. rostoch.</i> in 2010 (Ha)	<i>G. rostoch.</i> in 2017 (Ha)	<i>G. rostoch.</i> increase	<i>G. pallida</i> in 2010 (Ha)	<i>G. pallida</i> in 2017 (Ha)	<i>G. pallida</i> increase
13,453	14,217	6%	2,411	5,214	116%

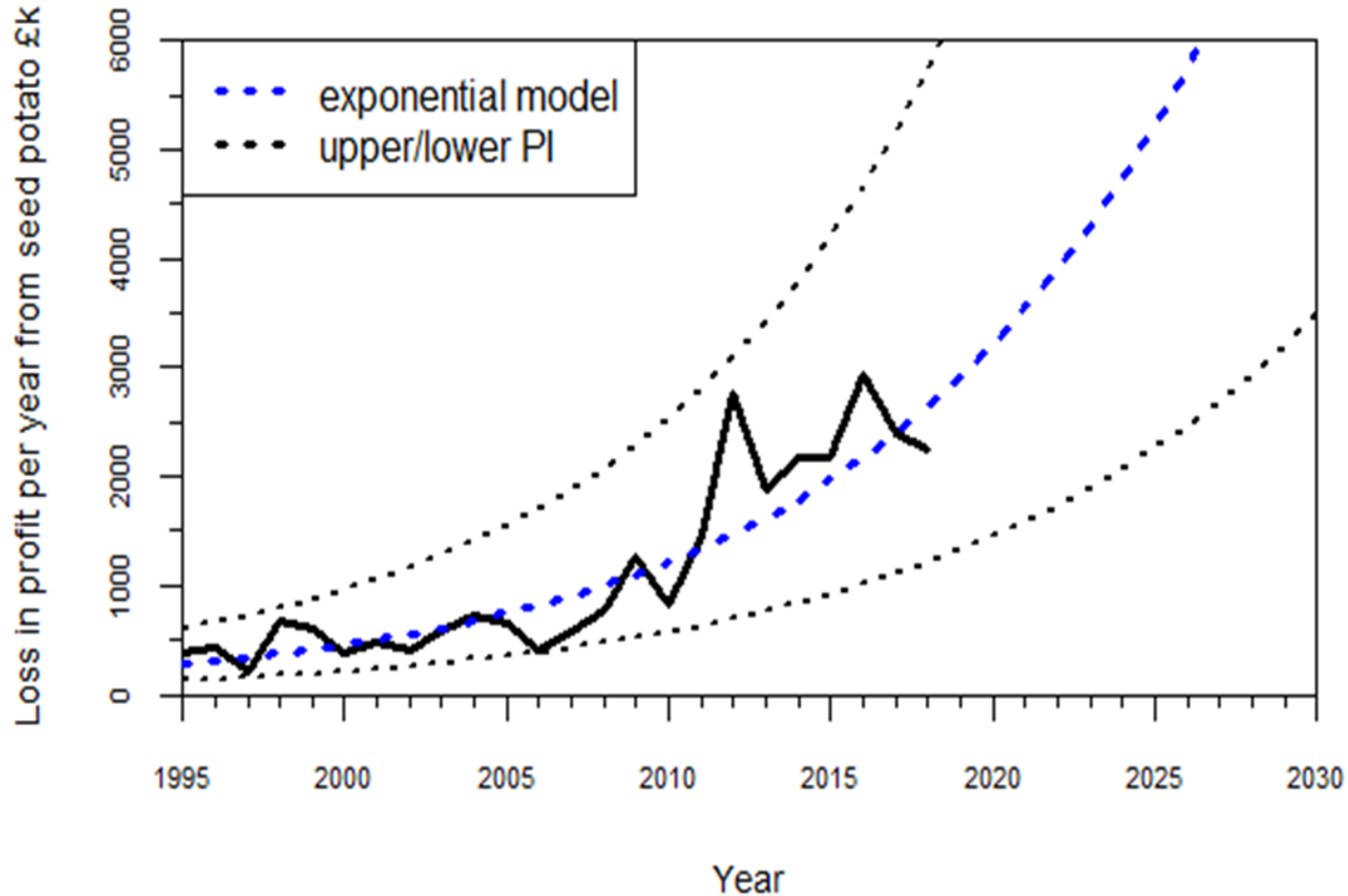
Increase in PCN: 1994-2018



Annual recording of *G. pallida* in Angus

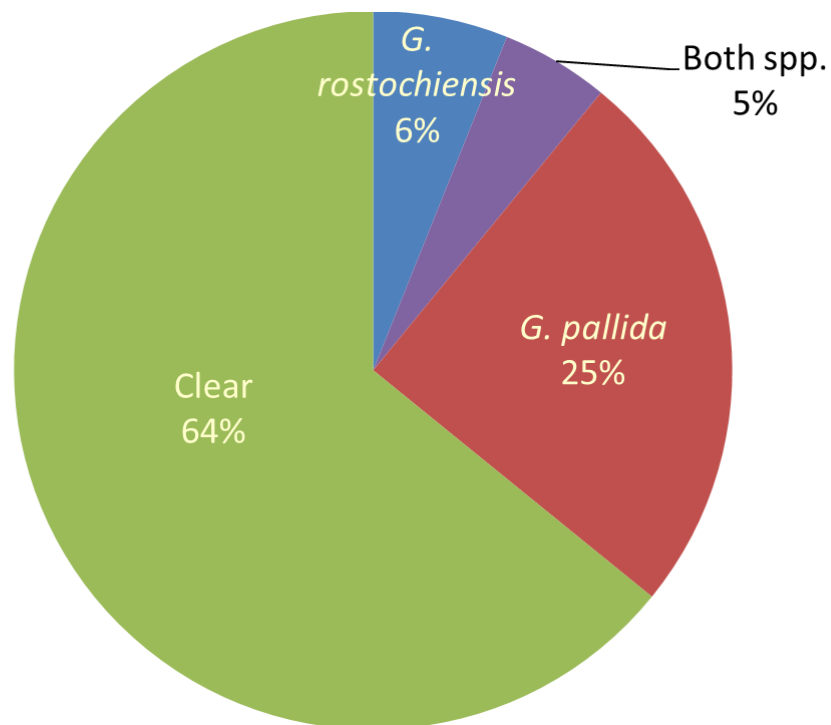


Economic costs of *G. pallida* in Angus



PCN in Ware Land: 2010 - 2018

County	Area tested (Ha)	PCN Incidence in Ware Land	PCN Incidence in Seed Land
Angus	250	46.3%	9.2%
Fife	130	33.7%	5.5%
Perth	95	28.6%	4.8%
East Lothian	52	61.5%	3.2%
Aberdeen	43	28.0%	1.5%
Others	153	21.2%	3.1%
Scotland	723	36.4%	5.5%



2007 EU Directive requirement to survey 0.5% of ware land p.a.

Conclusions

- ❖ Although PCN have been present for over 100 years the health of Scottish soils is rapidly deteriorating with respect to *G. pallida*
- ❖ Incidence of *G. pallida* in Scotland is currently doubling every 6-7 years (6250 ha in 2019)
- ❖ In contrast, *G. rostochiensis* is currently increasing at 1% p.a. (14,500 ha in 2019)
- ❖ 36% of ware land is infested with PCN, 25% with *G. pallida*
- ❖ Inadequate control measures are driving these changes