



# Characterization of *Plenodomus lingam* races in Swedish winter oilseed rape



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*Plenodomus lingam*, the causal agent of blackleg disease in *Brassica napus*, exhibits a complex race structure defined by combinations of avirulence (Avr) genes. These races determine the pathogen's ability to infect different plant genotypes with specific resistance (R) genes.

The aim of this study was to identify the race composition of *P. lingam* populations in the main production areas for winter oilseed rape (OSR) in Sweden.

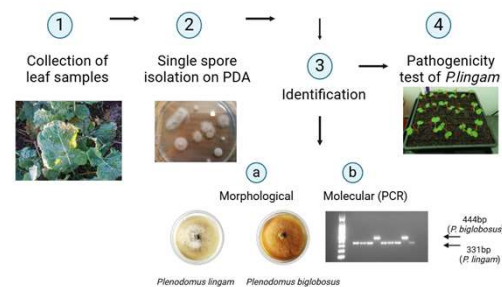


Figure 1. Workflow of isolation and race identification of *Plenodomus lingam* in pathogenicity tests performed at INRAE, France.

## Materials and Methods

- Forty *P. lingam* isolates, obtained by single spore isolation from different winter OSR cultivars were identified by species-specific primers (Liu et al., 2006) (Figure 1).
- Pathogenicity tests were performed at Dr. Lydia Bousset-Vaslin lab, INRAE, Le Rheu, France (Figure 1). The differential set consisted of 4 OSR genotypes with R-genes *Rlm7*, *Rlm3*, *LepR1* and *LepR2*, as well as cv. Westar (with no R-gene) (Figure 2).

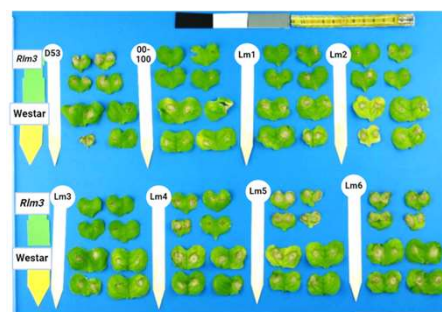


Figure 2. Illustration of the interactions of reference isolates D53 and 00-100 as well as Swedish isolates Lm1-Lm6 on susceptible cv. Westar and the genotype with R-gene *Rlm3*.

## Results

- All forty isolates were virulent on cv. Westar, but not in the genotypes with R-genes *LepR1* and *LepR2* (Figure 3). Compatible interactions were observed for genotypes with *Rlm3* and *Rlm7* in 24 and 27 isolates, respectively. Eleven isolates showed compatible interactions in both *Rlm3* and *Rlm7* (Figure 3).
- Several isolates obtained from cultivars with R-gene *Rlm7*, for example DK Explicit and LG Austin, were virulent in the genotype with *Rlm7* (Table 1).

## Conclusions

- The results indicate that 68% of the tested isolates were virulent in the *Rlm7* genotype.
- In Sweden, several of winter OSR *P. lingam* resistant cultivars carries *Rlm7* gene. There is a need to continue monitoring *P. lingam* populations to avoid putting resistance under pressure.

Table 1. Pathogenicity profiles of 20 *Plenodomus lingam* isolates (Lm21-Lm40) on cv. Westar and four genotypes with R-gene *Rlm7*, *Rlm3*, *LepR1* and *LepR2*.

Isolate	Year of sampling	Winter oilseed rape cultivar	County	cv. Westar	AvrRlm3	AvrRlm7	Avr LepR1	Avr LepR2
Lm21	2023	DK Explicit	Scania	V <sup>2</sup>	A <sup>3</sup>	V	A	A
Lm22	2023	Crocodile	Scania	V	V	V	A	A
Lm23	2023	Akilah	Scania	V	A	V	A	A
Lm24	2023	LG Austin	Scania	V	A	V	A	A
Lm25	2023	DK Expat	Scania	V	V	A	A	A
Lm26	2023	DK Exteel	Scania	V	V	V	A	A
Lm27	2023	-	V. Götaland <sup>1</sup>	V	V	V	A	A
Lm28	2023	DK Expansion	Halland	V	V	A	A	A
Lm29	2023	Cocodile	Scania	V	A	V	A	A
Lm30	2023	Akilah	Scania	V	V	V	A	A
Lm31	2023	LG Austin	Scania	V	V	V	A	A
Lm32	2023	DK Explicit	Östergötland	V	V	V	A	A
Lm33	2023	Holl316	Scania	V	V	V	A	A
Lm34	2024	Crocant	Scania	V	A	V	A	A
Lm35	2024	Create	Scania	V	V	A	A	A
Lm36	2024	Croissant	Scania	V	A	V	A	A
Lm37	2024	Create	Scania	V	A	V	A	A
Lm38	2024	Cromat	Scania	V	V	V	A	A
Lm39	2024	Crotora	Scania	V	V	A	A	A
Lm40	2024	Crossfit	Scania	V	A	V	A	A

<sup>1</sup>Västra Götaland County; <sup>2</sup>(V) indicates compatible interaction; <sup>3</sup>(A) indicates incompatible interaction.

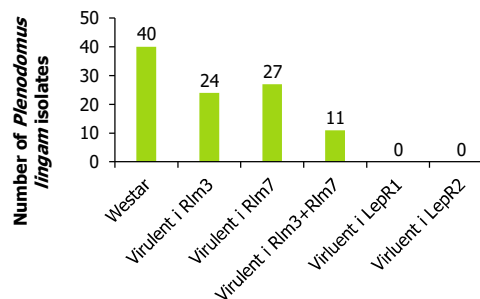


Figure 3. Pathogenicity of forty *Plenodomus lingam* isolates in cv. Westar and four genotypes with R-genes: *Rlm3*, *Rlm7*, *LepR1* and *LepR2*. Eleven of the isolates were virulent in both *Rlm3* and *Rlm7* as in isolate Lm22, Lm26 and Lm27 in table 1.

## Reference:

Liu SY, Liu Z, Fitt BDL et al. , 2006. Resistance to *Leptosphaeria maculans* (phoma stem canker) in *Brassica napus* (oilseed rape) induced by *L. biglobosa* and chemical defence activators in field and controlled environments. Plant Pathology 55, 401–12.



This study was financed by the Foundation for Swedish oil Plant Research.