

# Reproductive fitness, pathogenicity, morphometric and genetic variability among geographical isolates of *Pratylenchus penetrans*

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## Introduction

The root lesion nematode *Pratylenchus penetrans* is known to damage major crops of economic importance (Fig.1). Pure cultures of seven isolates of *P. penetrans* were established from single females recovered from soil samples of different origins in Europe, namely Belgium (BL), Germany (Bonn (BN), Münster (MN), Witzenhausen (WZ)), France (FR), United Kingdom (UK) and The Netherlands (NL) using axenic carrot disc cultures. The diversity among those isolates of *P. penetrans* was characterized based on their level of reproduction and pathogenicity on selected hosts, as well as their morphometric and genetic characteristics.

## Materials and Methods

- The seven *P. penetrans* isolates was tested *in vitro* on carrot discs and *in vivo* on lentil and common vetch.
- Pathogenicity was studied on alfalfa, carrot, fodder radish and French marigold with 3 inoculum levels (0, 5,000 or 10,000 nematodes/plant).
- Females of the seven *P. penetrans* isolates were used for morphometric analysis.
- RAPD-PCR method using the primer SC-1030 was used to characterize genetic variability. Permutation tests for significant differences (d-values) between isolates were performed.

## Results and Discussion

Differences in *in vitro* (Tab.1) and *in vivo* (Fig. 2) reproductive fitness and pathogenicity (Fig. 3) were observed among *P. penetrans* Isolates. In general, reproductive fitness correlated positively with plant damage. Morphometrics of *P. penetrans* isolates were within the range of the original descriptions, but showed differences in some features to populations reported from other countries. RAPD analysis indicated a high level of genetic variability between the seven *P. penetrans* isolates (d = 45) according to their origin (Fig. 4).

## Conclusion

Results of this study suggest that isolates of *P. penetrans* could be distinguished based on reproductive fitness and pathogenicity, as well as morphological and genetic characterization.

Table 1: Reproduction of seven isolates of *Pratylenchus penetrans* after 80 days on carrot disc culture (n = 10).

Isolate	Developmental stages				Total
	Egg	Juvenile	Male	Female	
MN	438 (32) <sup>1</sup>	644 (47)	166 (12)	136 (9)	1384 ab
WZ	3927 (49)	2894 (36)	701 (9)	482 (6)	8004 d
BN	2612 (54)	1488 (31)	292 (6)	443 (9)	4836 cd
BL	25352 (62)	12349 (30)	1238 (3)	2210 (5)	41149 e
UK	387 (38)	457 (45)	115 (11)	61 (6)	1020 a
FR	1236 (51)	777 (32)	156 (6)	270 (11)	2439 b
NL	2083 (50)	1388 (33)	366 (9)	324 (8)	4161 c

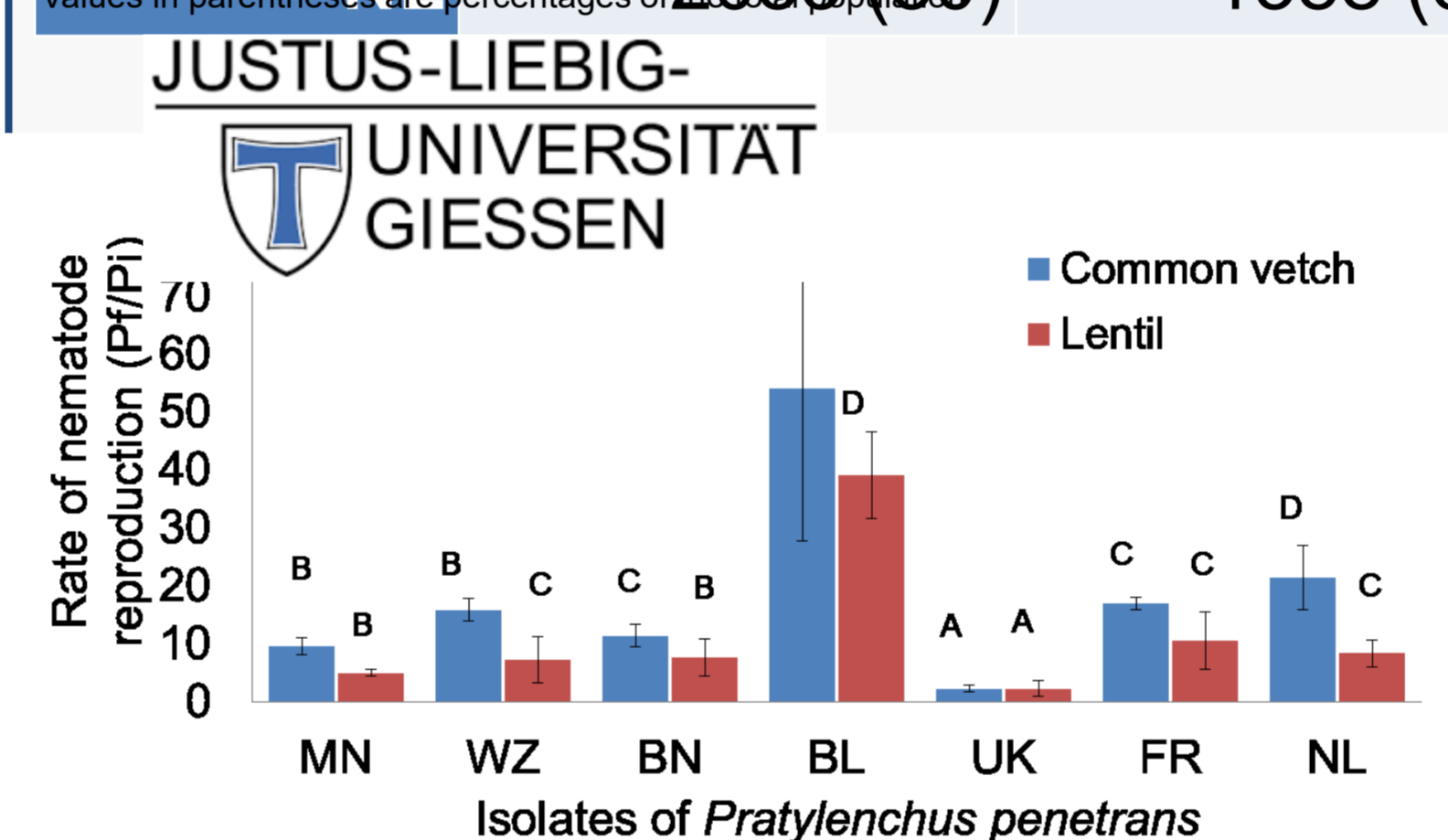


Fig. 2: Reproduction rate (Pf/Pi) of seven *Pratylenchus penetrans* isolates on common vetch and lentil (n = 8).

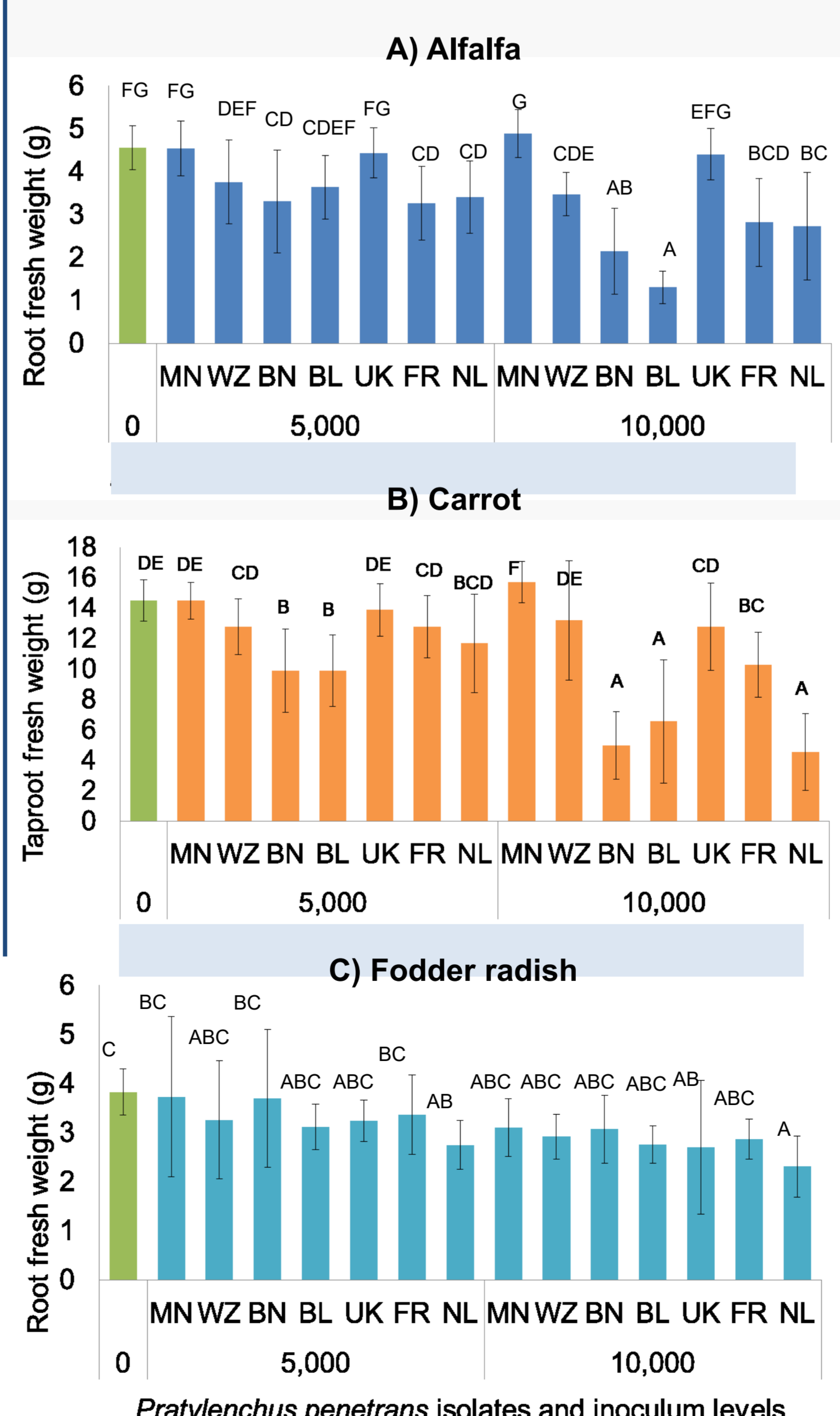


Fig. 3: Effect of inoculum level of seven *Pratylenchus penetrans* isolates on taproot fresh weight of alfalfa (A), carrot (B) and fodder radish (C) (n = 5).



Fig. 1: Damage of *Pratylenchus penetrans* on carrot

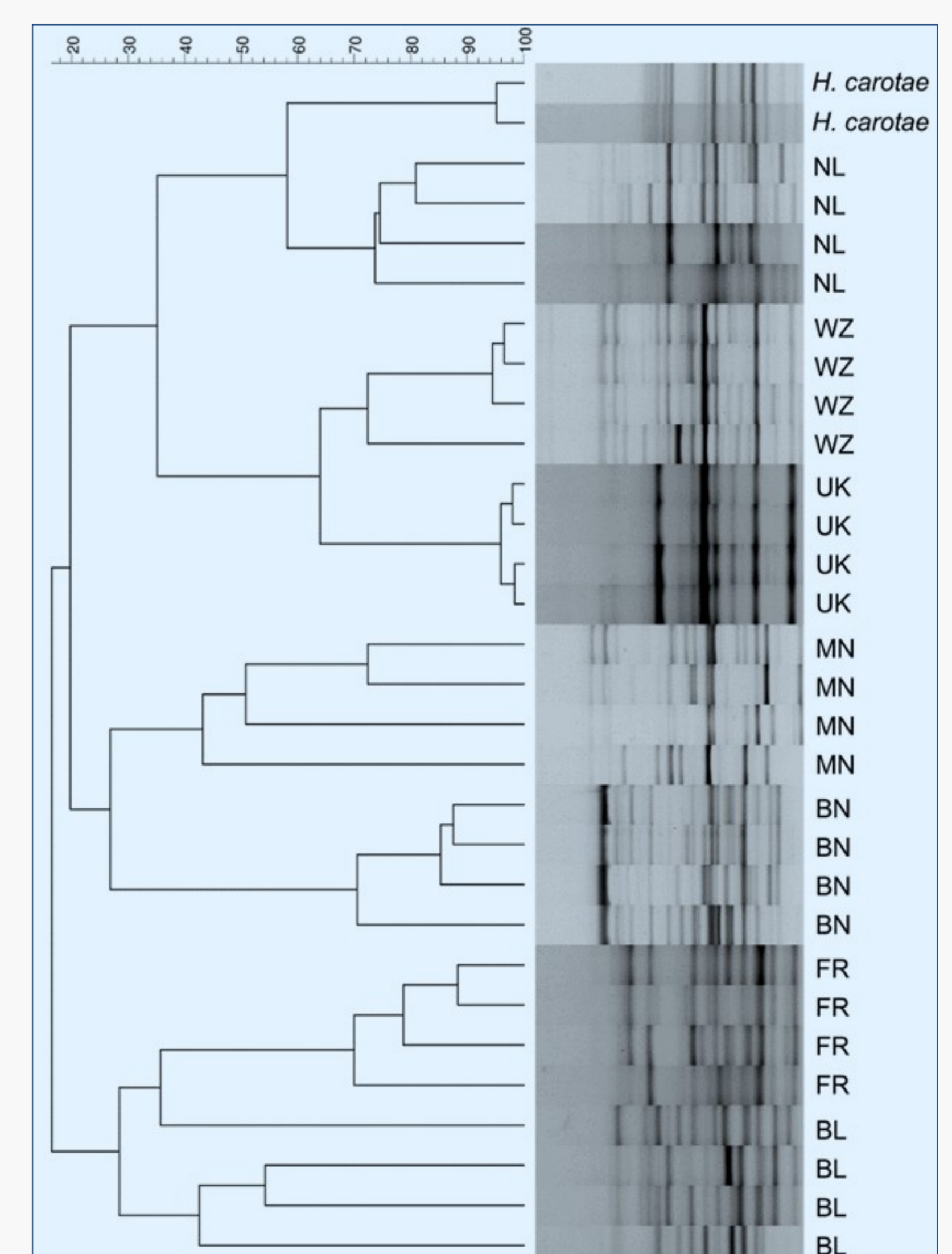


Fig. 4: Dendrogram generated from the UPGMA analysis of RAPD profiles of *Pratylenchus penetrans* isolates using the primer SC-1030

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