DIFFERENTIAL SET

Plasmodiophora brassicae (Pb)- **Brassica Oleracea**

Clubroot (*Plasmodiophora brassicae*) is a persistent and devastating soil-borne disease. Resistance genes out of amongst others *Brassica rapa* have been introduced into commercial varieties of *B. oleracea*. A new race designation system for clubroot with four clubroot races and differentials from several *B. oleracea* species was developed in 2012 to enable a relevant and reproducible description of clubroot resistant *B. oleracea* varieties.
ISF EG DRT carried out a project with ring test from 2022 till 2025 to validate this differential set. In this project isolates representing all potential reactions (8 groups) on 4 differentials were tested. These 4 undermentioned differentials from the original set and the 4 type isolates from the originally defined 4 races were validated. It was decided not to denominate any other isolates, because these 4 are sufficient for differentiating the 4 different genotypes for resistance to clubroot in *B. oleracea*. However some of the other isolates, like the isolate breaking all resistance genes (P1) will also be maintained and are available through GEVES isolate collection.

Differentials		**ISF Code and races**	**Pb: 0**	**Pb: 1**	**Pb: 2**	**Pb: 3**
		Gene (s)				
Bartolo[1]	White cabbage		S	S	S	S
051632[1]	White cabbage		HR	S	S	HR
Clapton	Cauliflower		HR	HR	S	HR
Lodero	Red cabbage		HR	HR	HR	S

Explanatory Note:
In evaluating plant varieties for resistance to specific pathogens or pests, the following classifications are used to describe their response:
S = Susceptible; IR = Intermediately Resistant; HR= Highly Resistant

You can find further information on this definitions in the following ISF document https://worldseed.org/document/definitions-of-the-terminology-plants-pests-v-o-seed-industry-2022/

All isolates and differentials are used by the industry

[1] not commercial available (anymore), but through MATREF and Naktuinbouw-Plantum isolate collection

References

W. D. Smilde, E. G. A. Linders & R. M. Veenstra, 2012. Characterization of clubroot resistance in Brassica oleracea. Program and abstract book 10th Conference of the European Foundation of Plant Pathology, 1-5 October 2012, Poster abstract P46 (http://www.efpp.net/ipm2/Program_and_abstract_book/posters.html)

Final report ISF EG DRT clubroot project *Plasmodiophora brassicae* (Pb) in *Brassica oleracea*

Protocol

CPVO. See http://www.cpvo.europa.eu/ for a protocol on disease resistance testing

For more information contact the ISF Secretariat at isf@worldseed.org