**Supplementary Table 1. Genomic data used in this study**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species** | **CAZyme Analysis** | **Gene Prediction Database** | **Phylogenomics** | **Reference** |
| *Albugo candida* | X |  |  | (Links et al., 2011) |
| *Albugo laibachii* | X |  |  | (Kemen et al., 2011) |
| *Aphanomyces astaci* | X |  |  | PRJNA264335 |
| *Aphanomyces invadans* | X |  |  | PRJNA188082 |
| *Bremia lactucae* | X | X | X | (Fletcher et al., 2019) |
| *Hyaloperonospora arabidopsidis* | X | X | X | (Baxter et al., 2010) |
| *Peronospora belbahrii* |  |  | X | (Thines et al., 2019) |
| *Peronospora effusa* | X | X | X | (Fletcher et al., 2018) |
| *Phytophthora agathidicida* | X |  | X | (Studholme et al., 2015) |
| *Phytophthora cactorum* | X | X | X | (Armitage et al., 2018) |
| *Phytophthora capsici* | X | X | X | (Lamour et al., 2012) |
| *Phytophthora chlamydospora* | X |  | X | This study |
| *Phytophthora cinnamomi* | X |  | X | (Studholme et al., 2015) |
| *Phytophthora colocasiae* |  |  | X | (Vetukuri et al., 2018a) |
| *Phytophthora cryptogea* | X |  |  | (Feau et al., 2016) |
| *Phytophthora fragariae* | X |  | X | (Adams et al., 2019) |
| *Phytophthora gonapodyides* | X |  | X | This study |
| *Phytophthora infestans* | X | X | X | (Haas et al., 2009) |
| *Phytophthora kernoviae* | X |  | X | (Studholme et al., 2019) |
| *Phytophthora lateralis* |  |  | X | (Feau et al., 2016) |
| *Phytophthora litchii* |  |  | X | (Ye et al., 2016) |
| *Phytophthora megakarya* | X | X | X | (Ali et al., 2017) |
| *Phytophthora multivora* | X |  | X | (Studholme et al., 2015) |
| *Phytophthora nicotianae* | X |  | X | (Liu et al., 2016) |
| *Phytophthora palmivora* | X | X |  | (Ali et al., 2017) |
| *Phytophthora parasitica* | X | X | X | PRJNA259235 |
| *Phytophthora pinifolia* | X |  | X | (Feau et al., 2016) |
| *Phytophthora pisi* | X |  | X | PRJEB6298 |
| *Phytophthora plurivora* | X | X | X | (Vetukuri et al., 2018b) |
| *Phytophthora pluvialis* | X |  | X | (Studholme et al., 2015) |
| *Phytophthora pseudosyringae* | X |  | X | This study |
| *Phytophthora ramorum* | X | X | X | (Tyler et al., 2006) |
| *Phytophthora rubi* | X |  | X | (Tabima et al., 2017) |
| *Phytophthora sojae* | X | X | X | (Tyler et al., 2006) |
| *Phytophthora taxon totara* | X |  | X | (Studholme et al., 2015) |
| *Phytopythium vexans* | X |  |  | (Adhikari et al., 2013) |
| *Pilasporangium apinafurcum* | X |  |  | (Uzuhashi et al., 2017) |
| *Plasmopara halstedii* | X | X | X | (Sharma et al., 2015) |
| *Plasmopara muralis* | X |  | X | (Dussert et al., 2019) |
| *Plasmopara viticola* |  | X | X | (Dussert et al., 2019) |
| *Pseudoperonospora cubensis* |  |  | X | PRJNA80635 |
| *Pythium aphanidermatum* | X |  |  | (Adhikari et al., 2013) |
| *Pythium arrhenomanes* | X |  |  | (Adhikari et al., 2013) |
| *Pythium insidiosum* | X |  |  | (Rujirawat et al., 2015) |
| *Pythium irregulare* | X |  |  | (Adhikari et al., 2013) |
| *Pythium iwayamai* | X |  |  | (Adhikari et al., 2013) |
| *Pythium oligandrum* | X |  |  | (Kushwaha et al., 2017) |
| *Pythium ultimum* | X |  | X | (Lévesque et al., 2010) |
| *Saprolegnia diclina* | X |  |  | PRJNA86859 |
| *Saprolegnia parasitica* | X |  |  | (Jiang et al., 2013) |

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